

**BUILDING CODE**  
**AND**  
**RELATED REGULATIONS**  
**OF THE**  
**PARISH OF JEFFERSON, LOUISIANA**



**OFFICIAL EDITION**

ORDINANCE No. 2225  
ADOPTED: DECEMBER 10, 1952

Revised: June 2, 1977

THIS CODE WAS FORMULATED UNDER THE DIRECTION  
OF THE BUILDING CODE COMMITTEE OF THE  
POLICE JURY OF JEFFERSON PARISH

LE ROY L. HALL – Chairman

John G. Fitzgerald  
Jacob D. Giardina  
George L. Ladnier  
Sidney P. Pertuit  
Robert Otterman

*ASSISTED BY*

Charles H. Hill – Vice-Pres., Keller Construction Corp.  
Wallace J. Moll – Chief Electrical Engineer  
Louisiana Rating & Fire Prevention Bureau  
Alvin E. Hotard – Civil Engineer  
Patrick M. Allison – Architect  
Emmett D. Brown – Pres., Pontchartrain Lumber Co.  
Matt Glynn – Realtor  
John R. Resor – Pres., Resor Plumbing & Heating  
John E. Trygg – Director  
Div. of Public Health Engineers, State Dept. of Health  
Everett G. Roessle – Civil Engineer  
Fred C. Jurgens – Director, Electrical Sec., Delgado Trades School  
Gerald McLendon – Louisiana Power & Light Co.  
E. Hart Gilmore – Electrical Contractor

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*Denis J. DuVun, Sr. - Assistant Director of Inspection & Code Enforcement  
(East Jefferson)*

*Harrison Schouest, Jr. - Assistant Director of Inspection & Code Enforcement  
(West Jefferson)*

## FOREWORD

The phenomenal growth of Jefferson Parish being recognized by its Governing Authority, the Police Jury, at its request, a bill was introduced in the 1952 State Legislature by Representative James E. Beeson, who with the assistance of Senator Alvin T. Stumpf, in the Senate, accomplished its passage. Act No. 520 of the 1952 Legislature authorized the creation of a Building Code by the Governing Authority of the Parish. On August 5, 1952, a committee composed of Le Roy L. Hall, Chairman; John G. Fitzgerald; Jacob D. Giardina; George L. Ladnier; Robert Ottermann and Sidney P. Pertuit, was named to formulate rules, regulations, etc., governing building construction, repairs, etc., in the unincorporated area of Jefferson Parish. A Citizen's Committee, composed of Charles H. Hill, Wallace J. Moll, Alvin E. Hotard, Patrick M. Allison, Emmett D. Brown, Matt Glynn, John R. Resor, John E. Trygg, Everett G. Roessle, Fred C. Jurgens, Gerald McLendon and E. Hart Gilmore, served without compensation in assisting the Policy Jury committee. These gentlemen worked hard and long on the different phases of the Code. Mr. Hill as Chairman, assisted by Messrs. Hotard, Allison, Brown, Glynn and Roessle served as the sub-committee on the Building Code. Mr. Moll was Chairman of the Electrical Code and was assisted by Messrs. Jurgens, McLendon and Gilmore. Mr. Resor was Chairman of the Plumbing and Mechanical Code and was assisted by Mr. Trygg and Mr. Ladnier. After some four months of hard work and research on the part of the Committee, the Code was presented to the Police Jury at its regular meeting on December 10, 1952.

In compiling the Code, the Committee recommended the adoption of the New Orleans Building Code nearly verbatim for two reasons, namely: First, it was considered one of the best Codes available and secondly, the same builders who work in New Orleans, do the majority of the building in Jefferson Parish and every effort in compiling the Code was made to avoid confusion by having conflicting Codes in the two adjoining Parishes.

At the regular meeting of the Police Jury, held on Wednesday, December 10, 1952, Ordinance No. 2225, establishing a Building Code under the direction of the Department of Regulatory Inspections of Jefferson Parish was introduced and unanimously passed. It became effective on January 2, 1953.

Le Roy L. Hall was named as Director, Sidney P. Pertuit, Assistant Director and Chief Building Inspector, George L. Ladnier, Chief Plumbing & Mechanical Inspector and Fred C. Jurgens, Chief Electrical Inspector.

There was also created a Board of Standards and Appeals, consisting of Messrs. Charles H. Hill, Chairman; Wallace J. Moll, Vice-Chairman; William J. Berg, Emmett D. Brown, B. E. Galloway, Alvin E. Hotard and Harry W. Mentrup.

On June 1, 1953, Mr. Wilfred L. Bush was named Chief Building Inspector and on October 31, 1954, resigned from the Department, being replaced by Mr. William J. Berg. Replacing Mr. Berg as Architect on the Board of Standards and Appeals, was Mr. Douglass V. Freret.

Upon the death of Mr. Fred C. Jurgens, ending a long and brilliant career in the electrical industry, his position as Chief Electrical Inspector was filled by Mr. Theodore C. Ainsworth.

The Committee, the Governing Authority of the Parish and the Department of Regulatory Inspections are especially grateful to the following gentlemen of the City of New Orleans for the assistance rendered in forming this Code: Messrs. S. Logan McConnell, Director of Regulatory Inspection; Clarence E. Simmons, Chief Building Inspector and C. L. Hutchinson, Assistant Chief Building Inspector; Herbert C. Sale, Chief Electrical Inspector; James E. Leddy, Chief Mechanical Inspector and Felix G. Fischer, Chief Plumbing Inspector, Sewerage & Water Board. Also, great assistance on the Unfired Vessels Code was rendered by Mr. A. R. Keller, Chief Inspector of the Hartford Steam Boiler Inspection & Insurance Company in New Orleans and to Messrs. H. P. Dixie, Chief Engineer, Louisiana Rating & Fire Prevention Bureau; J. L. Rumold, Philip J. Thompson and Gus Nevle, who were a great help in forming the Air Conditioning Section of this Code.



## **FOREWORD**

In 1958 the Governing Authority of the Unincorporated Areas of the Parish of Jefferson, ever mindful of the continuing rapid growth of the Parish, the many changes taking place in the construction industry and their responsibility for safe-guarding the lives and property of the people of the Parish, have directed the Board of Standards and Appeals to review the Parish Building Code for the purpose of revising and updating the Code, to include such new methods and materials that meet National Standards, also so to include any additional Safety measures deemed necessary.

## **BOARD OF STANDARDS & APPEALS**

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JAMES W. SANDERS

Building Plan Reviewer Supervisor

EMILE TOSSO

Chief Mechanical Inspector

RICHARD MORRIS

Chief Plumbing Inspector

DAVID M. HECKER

Chief Electrical Inspector

**3330 N. CAUSEWAY BLVD.**

**P.O. BOX 855 - METAIRIE, LOUISIANA**

On motion of Mr. Molaison, seconded by Mr. Sciambra, the following Ordinance was offered for adoption:

SUMMARY No. 9302  
ORDINANCE No.12897

An Ordinance to amend and re-enact Ordinance No. 2225, as amended, being

BUILDING CODE AND RELATED REGULATIONS OF THE  
PARISH OF JEFFERSON, LOUISIANA

AN ORDINANCE regulating the erection, construction, enlargement, alteration, repair, moving, removal, conversion, demolition, occupancy, equipment, use, height, area, and maintenance of buildings and/or structures in the Parish of Jefferson, State of Louisiana; providing for a Board of Regulatory Inspections; providing for and creating the Office of Regulatory Inspections; providing for a Director thereof; providing for issuance of permits and collection of fees therefor; providing certain restrictions and penalties for the violation thereof, and repealing all ordinances and/or parts of ordinances in conflict therewith.

The Jefferson Parish Council hereby ordains:

Section 1. Adoption. That Ordinance No. 2225, as amended, be and the same is hereby amended and re-enacted so that the Building Code and Related Regulations of the Parish of Jefferson, Louisiana, shall read as follows, to wit:

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## INTRODUCTION

## CHAPTER 1—ADMINISTRATIVE AND DEFINITIONS

## ARTICLE 101. TITLE AND SCOPE.

(a) **Title.** This Ordinance shall be known as the "Building Code," and may be cited as such, and will be referred to herein as "this Code," and repeals all Ordinances in conflict herewith.

(b) **Purpose.** The purpose of this Code is to provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within the unincorporated areas of the Parish of Jefferson and certain equipment specifically regulated herein.

The provisions of this Code shall supplement any and all laws of the State of Louisiana and Parish of Jefferson relating to buildings and structures.

(c) **Ordinance Remedial.** This Code is hereby declared to be remedial, and shall be construed to secure the beneficial interests and purposes thereof—which are public safety, health, and general welfare—through structural strength, stability, sanitation, adequate light and ventilation, and safety to life and property from fire and other hazards incidental to the construction, alteration, repair, removal, demolition, use and occupancy of buildings, structures, or premises.

In existing subdivisions and/or additions thereto, no home shall be constructed which is not comparable in value to the existing homes in the subdivision; and the value shall be determined by the Planning and Safety Directors of the Parish of Jefferson, in accordance with criteria to be filed and approved by the Jefferson Parish Council. See Ordinance No. 9552, adopted February 26th, 1970.

(d) **Scope.** The provisions of this Code shall apply to the construction, alteration, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures located within the unincorporated areas of the Parish of Jefferson.

No provision of this Code shall be held to deprive any Federal or State agency, or any Municipal authority having jurisdiction, of any power or authority which it had on the effective date of this Code or of any remedy then existing for the enforcement of its orders.

Where in any specific case different sections of this Code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

## ARTICLE 102. ADMINISTRATIVE.

(a) **Director.** The Director shall be the Director of the Department of Safety and Permits, or his duly authorized representative or employee.

(b) **General.** The Director is hereby authorized and directed to enforce all the provisions of this Code. For such purposes he and his designated Deputies shall have the powers of a police officer and be sworn in as such and shall be provided with badges of authority.

The determination of value and valuation under any of the provisions of this Code shall be made by the Director.

The Director is hereby authorized to collect all fees for Certificates and Permits and shall give receipts for same; he shall deposit daily all sums collected with the Parish Treasurer or other official designated by the Governing Authority of the Parish.

The Director shall submit a report to the Governing Authority of the Parish, not less than once a year, covering the work of the Office of Regulatory Inspections during the preceding period. He shall incorporate in said report a summary of his recommendations as to desirable amendments to the laws.

The Director shall keep a permanent, accurate account of all fees and other monies collected and received under this Code, the name of the persons upon whose account the same were paid, the date and amount thereof, together with the location of the building or premises to which they relate.

(c) **Buildings Affected.** The provisions of this Code apply to buildings or structures on land or over water, and to construction, such as vaults, area of street encroachments, however placed, that are appurtenant to such buildings or structures.

1. **Variations.** When there are minor difficulties involved in carrying out the provisions of the Code or of an approved rule, the Chief of the Division of Regulatory Inspections may, with the approval of the Director of the Department of Safety, vary or modify such provisions upon application of the owner or his representative, provided that the spirit and intent of the law shall be observed and public welfare and safety assured.

**2. Modifications.** The application for modifications and the approval of the Director of the Department of Safety shall be in writing and shall be officially recorded with the application for permit in the permanent records of the Division of Regulatory Inspections and a report of the action taken, filed with the Secretary of the Board of Standards and Appeals.

(d) **Employees.** The Director of Safety shall appoint all employees of the Division of Regulatory Inspections subject to the existing Civil Service laws, Parish of Jefferson, State of Louisiana.

The person or persons appointed in the several sections (exclusive of secretarial and clerical personnel) shall be persons fully qualified by technical training and experience, in both theory and practice, in the field in which their services will be utilized.

#### **ARTICLE 103. DEFINITIONS.**

(a) **General.** The following terms when used in this Code shall be construed to have the meaning as herein defined. Words used in the present tense include the future as well as the present; the singular number includes the plural and the plural the singular; the word "person" includes a corporation or co-partnership, as well as an individual. "Writing" includes printing, printed or typewritten matter.

Definitions given herein relate only to this Code.

For definitions of terms not included in this Chapter see the Parts or Chapters to which such terms are related.

Where terms are not defined in this section, they shall have their ordinarily accepted meanings or such as the context may imply.

#### **(b) DEFINITIONS.**

##### **A**

**Accessory Building.** A subordinate building other than a garage on the same premises, the use of which is incidental to that of the main building.

**A.C.I.** American Concrete Institute.

**A.G.A.** American Gas Association.

**Alley.** A way which affords a secondary means of access to abutting property.

**Alteration.** As applied to a building or structure, a change or rearrangement in the structural parts extending on a side or by increasing in height; or the moving from one location or position to another which does not involve a change in grade of Occupancy; the term "alter" in its various moods and tenses and its participial forms, refers to the making of an alteration.

**Alteration, Structural.** See "Structural Alterations."

**Amusement Device.** A mechanically operated device which is used to convey persons in any direction as a form of amusement.

**Apartment.** A space or suite of rooms which is intended for separate and independent living and under the control of the tenant.

**Apartment and Lodging or Rooming House Combined.** A building designed, constructed or altered in such manner that the sum of the number of rooms in the apartment units (excluding bathrooms and kitchens) plus the number of lodging rooms shall not exceed fifteen (15).

**Apartment House or Apartment Hotel.** A building designed, constructed, or altered to provide accommodations for more than four (4) families living independently of each other, each unit of which is designed for cooking upon the premises.

Approved as to materials and types of construction, refers to approval by the Director as the result of investigation and tests conducted by him, or by reason of accepted principles or tests by national authorities, technical or scientific organizations.

**Approved Agency.** An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved by the Director.

**Area.** As applied to the dimensions of a building, means the maximum horizontal projected area of the building at grade.

**Area, Floor.** See "Floor Area."

**A.S.A.** American Standards Association.

**Assembly Building.** A building used, in whole or in part, for the gathering together of persons for such purposes as deliberation, worship, entertainment, amusement, or awaiting transportation.

**A. S. C. E.** American Society of Civil Engineers.

**A. S. R. E.** American Society of Refrigerating Engineers.

**A. S. T. M.** American Society for Testing Materials.

**Attic.** Any space immediately under the roof of a building. Attics of business buildings when used for business or stores shall be counted as a story. Attics of residence buildings shall be counted as a story if their habitable area exceeds fifty percent (50%) of the, habitable area of the floor below. See "Story".

**Automatic.** As applied to a fire door or other opening protective, means normally held in an open position and automatically closed by a releasing device that is actuated by abnormal high temperature or by a predetermined rate of rise in temperature.

## B

**Balcony, Exterior.** See Article 3301 C.

**Balcony, Interior.** That portion of a seating space of an assembly room, the lowest part of which is raised four feet (4') or more above level of the main floor.

**Basement.** That portion of a building which is below the first story but more than fifty per cent (50%) above grade, and is used for storage, garages for use of occupants of building, janitor or watchman quarters, or other utilities (exclusive of rooms of habitation or assembly) common for the rest of the building. A basement used for the above purposes shall not be counted as a story, provided its height in the clear does not exceed seven feet six inches (7', 6"). See "Story".

**Bay Window.** A rectangular, curved or polygonal window, supported on a foundation extending beyond the main wall of the building.

**Beam.** A primary structural member supporting secondary structural members, floor, roof, joist, and the like.

**Boarding House.** A building designed, constructed, or altered to contain not more than fifteen (15) sleeping rooms, where lodging and meals are served for compensation, but not to anyone who may apply.

**Building.** Any structure built for the shelter or enclosure of persons, animals or chattels or any part of such structure when subdivided by division walls or party walls extending to or above the roof and without openings in such separate walls.

The term "building" or "separate building" shall also include those cases where the boundary walls are fire walls with openings, provided both sides of such openings are fitted with approved automatic fire doors and said openings do not exceed one hundred twenty square feet (120 sq. ft.) in area nor twelve feet (12') in either dimension; the total length of the openings not to exceed twenty-five per cent (25%) of the length of the particular fire wall in which they occur. Each portion so separated shall be deemed a separate building notwithstanding uniformity of height, facade or other construction features similar to those adjacent portions of what ordinarily might be considered as the same structure.

The term "building" shall be construed as if followed by the words "or any part thereof."

**Building, Existing.** A building erected prior to the adoption of this Code, or one for which legal building permit has been issued.

**Building, Height Of.** See "Height of Building."

**Building Line.** The line established by law beyond which a building shall not extend, except as specifically provided by law.

**Building Official.** See "Director."

**Building Perimeter.** The real or imaginary line formed on the surface of the ground by the intersection of the outer face of the enclosing walls of a building including porches and galleries whether roofed or not, but excluding stairs, terraces or steps when same are not over five feet (5') high (exclusive of railings and balusters) above established grade."

## C

**Carport:** A canopy or shed, open on two or more sides, for the purpose of providing shelter for one or more vehicles.

**Cellar.** That portion of a building between floor and ceiling which is fifty per cent (50%) or more below grade. See "Story."

**Chief Engineer of the Fire Department.** The head of the Fire Department or his regularly authorized deputy.

**Code.** The terms "Building Code," "this Code," or "Code" shall mean the Building Code of which this definition forms a part.

**Combustible Material.** A flammable material which will ignite at or below a temperature of 1200°F. and continue to burn or glow.

**Corner Lot.** A lot situated at the junction of two or more streets, alleys, or open passageways of not less than fifteen feet (15') in width.

**Court.** An open space other than a yard on the same lot with the building; includes patio.

**Court Yard.** Synonymous with "Court."

**Court, Inner.** A court not extending to a street, alley, open passageway, or yard.

**Court, Outer.** A court extending to a street, alley, open passageway, or yard.

**Court, Vent.** An inner court solely for the lighting and ventilating of water closets, bath rooms, kitchens, public halls, and stair halls.

**Curb Level, Building.** The elevation at that point of the street grade that is opposite the center of the wall nearest to and facing the street line.

**Curb Level, Street Grade.** The elevation of the street grade as fixed by the municipal authorities.

## D

**Day Nursery.** A building or portion thereof appropriated to the care of four or more children, 16 years of age or less, apart from their parents, between the hours of 6 A.M. and 7 P.M.

**Dead Load.** The weight of the walls, permanent partitions, framing, floors, roofs, and all other permanent, stationary construction forming a part of the building.

**Director.** Director of the Department of Safety, or his duly authorized representative or employee.

**Display Sign.** A structure that is arranged, intended, designed or used as an advertisement, announcement or direction; includes signs, screens, billboards, and advertising devices of every kind.

**Dormer.** The enclosure of a usable space project projecting through a sloping roof.

**Dumbwaiter.** See "Article 4701."

**Dwelling.** A building or portion thereof designed, constructed, or altered as a residence for not more than four (4) families living independently of each other, each unit of which is designed for cooking upon the premises.

**Dwelling, One-Family.** A building designed for or occupied by one family only.

**Dwelling, Two-Family.** A building designed for or occupied exclusively by two families.

**Dwelling, Multifamily.** See "Apartment House."

## E

**Elevator.** A device within or in connection with a building used for carrying persons or things upward or downward; includes escalators, moving stairs, and similar devices.

**Elevator, Passenger.** An elevator designed and used for carrying persons.

**Elevator, Freight.** An elevator designed and used for the carrying of freight and such persons only as are necessary for its safe operation or the handling of freight carried by it.

**Escalator.** See "Elevator." Same as "Moving Stair."

**Exit.** A continuous and unobstructed means of egress to a public way, which shall include intervening doorways, corridors, ramps, stairways, smokeproof towers, horizontal exits, and exterior courts.

**Existing Building.** See "Building, Existing."

## F

**Family.** One person living alone or a group of two (2) or more persons living together under one management.

**Fire Door.** A door and its assembly, so constructed and assembled in place as to give the specified protection against the passage of fire.

**Fire Resistive Rating.** The time in hours that the material or construction will withstand the standard fire exposure as determined by a fire test made in conformity with the "Standard Methods of Fire Tests of Building Construction and Materials," (A.S.T.M.E. 119)

**Fire Walls.** See "Walls, Fire."

**Floor Area.** The area included within the outside dimensions of a building, which measurements shall include bays, porches, galleries, and other projections for the floor of which they are a part.

**Footing or Foundation.** The spreading course at the base or bottom of a foundation wall, column or pier.

**Front of Lot.** The front boundary line of a lot bordering on the street; in the case of a corner lot, the shortest front boundary line.

**Freight Elevator.** See "Elevator, Freight."

## G

**Gallery, Interior.** That portion of the seating space of an assembly room having a seating capacity of more than ten (10) located above a balcony.

**Gallery, Exterior.** See "Porch."

**Garage.** A building or portion of a building designed or used for the storage or housing of self-propelled vehicles.

**Garage, Private.** A garage used for storage only, with a capacity for not more than four (4) self-propelled vehicles, trailers, or trucks of one ton or less capacity, and in which



garage space for not more than two (2) vehicles or trailers may be rented to persons not occupants of the premises.

**Garage, Private Storage.** Any premises, except those described as a private or public garage.

**Garage, Public.** A garage, other than a private garage, where self-propelled vehicles are stored, equipped for operation, repaired, or kept for remuneration, hire or sale.

**Gasoline Service Station.** See "Service Station."

**Girder.** The horizontal structural piece or pieces which support the ends of floor beams or joists, or carrying walls over openings, carrying its loads in concentrations.

**Grade.** The elevation of the ground at a building or building site as established by the Department of Roads and Bridges.

**Guest.** Any person hiring or occupying a room for living or sleeping purposes.

## H

**Habitable Room.** Any room occupied in a place of habitation, refuge or detention, as a kitchen, dining room, living room, parlor, bedroom, or library, in distinction from a closet, bathroom, water-closet room, corridor, laundry, furnace or boiler room, storage room or other utility room.

**Half Story.** That part of a story under a gable, hip or gambrel roof, the wall plates of which on at least two (2) opposite exterior walls are not more than two (2) feet above the floor of such story.

**Hall, Public.** A hall, corridor, or passageway, not within an apartment, which may be used by an occupant of such building.

**Hall, Stair.** A hall which includes the stairs, stair landings, and those parts of the public hall through which it is necessary to pass in going from the entrance floor to the upper floors or roof.

**Height, Building.** The perpendicular distance measured in a straight line from top of the highest point of the roof beams in the case of flat roofs, and from the average height of the gable in case of roof having a pitch of more than twenty-five degrees ( $25^{\circ}$ ) with a horizontal plane, downward to the established grade in the center of the front of the building.

Any penthouse or bulkhead covering less than fifteen percent (15%) of the roof area need not be considered in determining the height of the building if used only for the enclosure of a staircase, water tank, elevator machinery, or other mechanical device.

Height of a building in stories does not include basements and cellars, except in school buildings of ordinary, light noncombustible or frame construction; the basement or cellar shall be deemed a story when used for purposes other than storage or heating.

**Height, Court.** The vertical distance from the level of the floor of the lowest story served by that court to the level under consideration.

**Height, Room.** The minimum clear height of a habitable room shall be 6 feet 10 inches, including clear height under beams or other projections from the ceiling.

In rooms with sloping ceilings, the minimum clear height of 6 feet 10 inches shall be required for only 40 per cent of the room area, and where side wall height is less than 3 feet 6 inches, the area beyond that height shall not be made part of a habitable room.

**Height, Story.** The vertical distance from the top of one floor to the top of the next floor or roof beam above.

In case any floor, or the combined area of floors at any one level extends over less than thirty-three and one-third percent ( $33\frac{1}{3}\%$ ) of the horizontal area included within the outside walls at that level, the same shall not be considered as a floor for the purpose of determining story heights.

**Height, Wall.** The height as measured from its base line either at the grade or at the top of a girder to the top of coping or the center of the highest gable. In measuring the height of a wall, the height of the parapet above the top of the roof beams shall not be included.

**Heliport.** A landing field or area designed and adapted for the specific purpose of permitting helicopters to land and take off.

**Home, Child Boarding.** A building or portion thereof appropriated to the care and lodging, apart from their parents, on a 24 hour a day basis of 4 or more children 16 years of age or less.

**Home, Nursing.** Convalescent or old age. A building or buildings used for lodging, boarding or nursing care on a 24 hour a day basis, of 3 or more convalescent or aged persons, not able to care for themselves, but shall not include hospitable and mental or correctional institutions.

**Hotel.** A building occupied as a more or less temporary abiding place of individuals who are lodged with or without meals, and in which there are more than fifteen (15) sleeping rooms, but no provisions for cooking in any individual suite.

**Hotel, Apartment.** See "Apartment Hotel."

**Horsepower.** This term as used in the code shall apply to electric motors and shall be determined by Tables 430-148, 430-150 and 430-151 of the National Electrical Code.

**House.** A building used for sleeping quarters and with usual accessories to the occupants.

**House, Apartment.** See "Apartment House."

**House, Boarding.** See "Boarding House."

**House, Lodging.** See "Rooming House."

**House, Multiple.** See "Apartment House."

**House, Tenement.** See "Apartment House."

I

**Incombustible Construction.** Synonymous with "Non-combustible Construction."

**Incombustible Materials.** Synonymous with "Non-combustible Materials."

**Inner Court.** See "Court, Inner."

**Intake.** A passageway connecting an inner court with a street, alley, open passageway or yard.

J

**No Definitions.**

K

**No Definitions.**

L

**Licensed Gasfitter.** The term "licensed gasfitter" as used in this Code shall mean a man having a license from the Division of Regulatory Inspections to do gasfitting work.

**Lintel.** A beam or girder placed over an opening in a wall, which supports the wall construction above.

**Load, Live.** All imposed, fixed or transient loads other than "Dead Load."

**Load, Dead.** The weight of the walls, permanent partitions, framing, floors, roofs, and all other permanent stationary construction forming a part of the building.

**Lodging House.** See "Rooming House."

**Lot.** Land occupied or which may hereafter be occupied by a building and its accessory buildings, together with such open spaces as are required under this Code, and having its principal frontage upon a street or officially approved place.

**Lot, Corner.** See "Corner Lot."

**Lot, Front.** The front boundary line of a lot bordering on a street; in the case of a corner lot, the shortest front boundary line.

**Lot, Interior.** Land occupied or which may hereafter be occupied by a building and its accessory buildings, together with such open spaces as are required under this Code, and not having its principal frontage upon a street or officially approved place.

**Lot Line.** A line dividing one lot from another, or from a street or other public space.

M

**Machinery.** Stationary steam boilers, stationary engines of every type, both steam and electrical, air compressors; refrigerating (not domestic) ice plants; elevators; air conditioning for cold, warm or hot air, steam and water heating; laundry and cleaning, all processes; sugar syrup refinery distilleries; textile and wood working machines, or any other machines that are co-incidental with and supported by or in the building.

**Mansard Roof.** A mansard roof is one that has a slope of at least 15° and not over 30° from vertical.

**Marquee.** A permanent roofed structure attached to and supported by a building.

**Masonry.** That form of construction, composed of stone, brick, concrete, gypsum, hollow clay tile, concrete block or tile, or other similar building units or materials, or a combination of these materials, laid up unit by unit and set in mortar. For the purpose of this Code plain monolithic concrete shall be considered as Masonry.

**Masonry, Solid.** Masonry built without hollow spaces.

**Mezzanine or Mezzanine Floor.** An intermediate floor placed in any story or room. When the total area of any such "Mezzanine Floor" exceeds thirty-three and one-third percent (33-1/3%) of the total floor area in that room, it shall be considered as constituting an additional "Story." The clear height above or below a "Mezzanine Floor" construction shall be not less than seven feet (7').

**Motel:** A building or group of buildings designed and used to provide guest rooms . . . primarily for automobile transients, each room or unit having a separate entrance opening out-of-doors, or into a foyer, with parking space provided on the lot for use of guests of the court. Operation of such court to be supervised by a person in charge at all hours. Motels include Auto Courts, Motor Courts, Motor Hotels, and Motor Inns.

**Moving Stairs.** See "Elevator."

**Multi-family House, Multiple Family Dwelling** See "Apartment House"

**N.B.F.U.** National Board of Fire Underwriters.  
**National Board,** as referred to in Chapters 48 and 53, shall mean the National Board of Boiler and Pressure Vessel Inspectors.

**Non-Combustible Construction.** Defined in Article 2101.

**Non-Combustible Material.** A non-flammable material which will not ignite at or below a temperature of 1200°F., and will not continue to burn or glow at that temperature.

**Non-Conforming Use.** A building or portion thereof, or land or portion thereof, occupied by a use that does not conform with the regulations of use in district in which is situated.

## O

**Occupancy.** The purpose for which a building is used or intended to be used. Change of occupancy is not intended to include change of tenants or proprietors.

**Oriel Window.** A window which projects from the main line of an enclosing wall of a building and is carried on brackets or corbels.

**Owner.** Any person, firm or corporation owning or controlling property, including a duly authorized agent or attorney. Guardians or trustees shall also be regarded as owners.

## P

**Partition.** Any interior wall in a building.

**Passageway.** An enclosed hallway or corridor connecting a required exit to a street or other open space connecting with a street.

**Passenger Elevator.** See "Elevator, Passenger."

**Patio.** See "Court."

**Penthouse.** An enclosed room or structure other than a "Roof Structure," located on the roof.

**Person.** A natural person, his heirs, executors, administrators, or assigns, also including a firm, partnership or corporation, its or their successors or assigns, or the agent of any of the aforesaid.

**Place.** An open, unoccupied public or private space other than a street or alley, permanently reserved for purposes of joint access to abutting property.

**Place of Assembly.** See "Assembly Building."

**Platform, Enclosed.** A partially enclosed portion of an assembly room the ceiling of which is not more than five feet (5') above the proscenium opening and which is designed or used for the presentation of plays, demonstrations, or other entertainment wherein scenery, props, decorations, or other effects are to be installed or used.

**Porch.** That portion of a building floor not entirely surrounded by the building walls and which is intended to serve as an entrance or exit to, or as a space auxiliary to a building.

**Porte-Cochere.** An awning or shed attached to a building to afford shelter to vehicles at a point of entrance.

**Prefabricated Assembly.** A structural unit, the integral parts of which have been built up or assembled prior to incorporation in the building.

**Public Hall.** See "Hall, Public."

**Public Place.** As used in this code, an unoccupied open space adjoining a building and on the same property, that is permanently maintained accessible to the Fire Department and free of all incumbrances that might interfere with its use by the Fire Department.

## Q

**No Definitions.**

## R

**Rat-Proof.** Impervious to rodent infestation and propagation.

**Regular Hours.** For the purposes of this Code regular hours for inspection purposes of premises are from 7:00 A.M. to 6:00 P.M., Central Standard Time.

**Remodeling.** Any change, addition or modification in construction which involves a change in structure and/or in grade of occupancy.

**Remote.** In reference to two (2) or more exits, removed or distant from one another in such manner that a person in any place served by such exits may choose either of two directions in a path toward an exit and in such manner that a single fire could not, in its early stages, block both paths toward an exit.

**Repairs, Electrical.** Connection or disconnection of wiring, fixtures, lampholders, switches and other devices or equipment which are a part of the fixed or permanent wiring in building.

repairs, structural. repairs to mechanical equipment that fall within the scope of the regulations as set forth in Chapters 47, 48, 51, 52 and 53.

**Repairs, Structural.** The removal of any part of an existing building or structure not in violation of law for the purpose of its maintenance in its present class of construction and grade of occupancy.

**Replacement Value.** See "Value."

**Required.** Required by some provision of this Code.

**Residence.** A detached part or whole of a building occupied exclusively as a family dwelling place and the usual accessory occupancies.

**Roofs.** A flat roof is one that has four inches (4") or less fall per foot; a pitch roof is one that has a rise of more than four inches (4") per foot; a mansard roof is one that has a slope of not over 30° from vertical.

**Roof Structure.** A structure above the roof of any part of a building, enclosing a stairway, tank, elevator machinery, or ventilating apparatus, or such part of a shaft as extends above the roof.

**Room Capacity.** See "Seating Capacity."

**Room, Habitable.** See "Habitable Room."

**Rooming House.** A building designed, constructed, or altered to contain not more than fifteen (15) sleeping rooms, where lodging only is provided for compensation.

## S

**Schools.** A building or group of buildings involving assemblage for instruction, education or recreation; including primary and elementary schools, secondary schools, academies, colleges, universities, trade schools, business schools and colleges, and the like, whether supported by private or public funds or any combination thereof.

**Seating Capacity.** The seating capacity of a theater, auditorium or any room or place of public assemblage in which seats are not fixed, shall be determined on the basis of seven square feet (7 sq. ft.) of floor, balcony and gallery area per person; in the case of fixed seats, such as pews or benches, the seating capacity shall be based on one person to each eighteen inches (18") of pew or bench length.

**Exception 1.** The capacity of dance floors or the playing areas of gymnasiums, when such areas or floors are not to be used for general assembly purposes, shall be determined on the basis of fifteen square feet (15 sq. ft.) of floor area per person.

**Exception 2.** The capacity of school class rooms and individual rooms in public libraries and museums, when two thousand square feet (2,000 sq. ft.) or less in floor area shall be determined on the basis of twenty square feet (20 sq. ft.) of floor area per person.

**Self Closing.** As applied to a fire door or other opening protective, means normally closed and equipped with an approved device which will insure closing after having been opened for use.

**Service Station.** A place or parcel of land, together with its building and accessory buildings, used for the purpose of dispensing lubricating oil, gasoline oil, fuel oil and the like, to motor driven vehicles; also for the cleaning, greasing and emergency repairs of the said motor driven vehicles.

**Shaft.** An enclosed space within a building, whether for air, light, elevator, dumb-waiter or any other purpose, connecting a series of two (2) or more openings in successive floors, and covered either by a skylight or by the roof. A vent shaft shall be used solely to ventilate or light water-closets, compartments or bathrooms.

**Shall,** as used in this Code, is mandatory.

**Shelter.** A sheltering roof supported on columns open on two (2) or more sides.

**Signs.** See "Display Sign."

**Skeleton Construction.** A form of building construction wherein all external and internal loads and stresses are transmitted to the foundations by a rigidly connected framework of metal or reinforced concrete, or of structural timbers. The enclosing walls are supported by girders at each story.

**Sprinklered.** Equipped with an approved automatic sprinkler system properly maintained.

**Stable, Private.** A stable other than a public stable with capacity for not more than two (2) horses or mules; however, on lots having an area of four thousand square feet (4,000 sq. ft.) or more, the capacity of a private stable may be increased, if the premises whereon such stable is located contain not less than two thousand square feet (2,000 sq. ft.) for each horse or mule.

**Stable, Public.** A stable other than a private stable, which is operated for remuneration, hire, sale, or stabling, with a capacity for more than two (2) horses or mules.

**Stage.** A partially enclosed portion of an assembly building which is designed or used for the presentation of plays, demonstrations, or other entertainment wherein scenery, drops,

or other effects may be installed or used, and where the distance between the top of the proscenium opening and the ceiling above the stage is more than five feet (5').

**Stair, Moving.** See "Elevator."

**Stairway.** One or more flights of stairs, together with the necessary landings and platforms connecting them, forming a continuous and uninterrupted passage from one story to another in a building or structure.

**Standard Fire Test.** The fire test formulated under the procedure of the American Standards Association as "American Standard."

**Story.** That portion of a building included between the surface of any floor and the surface of the floor next above it, or if there be no floor above it, then the space between such floor and ceiling next above it. See "Height, Story."

**Story, Half.** See "Half Story."

**Street.** A public thoroughfare which affords principal means of access to abutting property.

**Street Line.** A lot line dividing a lot from a street.

**Structural Alterations.** Any change, except for repair and/or replacement, in the support members of a building such as bearing walls, columns, beams, or girders.

**Structure.** Anything constructed or erected, the use of which requires more or less permanent location on the ground, or attached to something having a permanent location on the ground.

## T

**Tenement.** See "Apartment House."

**Tent.** A temporary shelter made principally of fabric or pliable material.

**Tourist House.** A boarding or rooming house accepting transients.

**Theater.** A building or part thereof which contains an assembly hall, having a stage which may be equipped with curtains and permanent stage scenery or mechanical equipment adaptable to the showing of plays, operas, motion pictures, performances, spectacles and similar forms of entertainment.

**Townhouse:** A family dwelling constructed in a series or group with common wall or walls between contiguous units.

## U

**U. L.** Underwriters' Laboratories, Incorporated; also the abbreviation of Underwriters' Label.

## V

**Value or Valuation** of a building shall be as defined in Article 204.

**Veneer.** A facing of brick, stone, concrete, tile or similar material attached to a wall for the purpose of providing ornamentation, protection or insulation but not counted as adding strength to the wall.

**Vent Shaft.** See "Shaft"; also "Court."

## W

**Wall, Bearing.** A wall which supports any load other than its own weight.

**Wall, Blank.** A wall without openings.

**Wall, Cavity.** A wall built of masonry units or of plain concrete, or a combination of these materials, so arranged as to provide an air space within the wall, and in which the inner and outer parts of the wall are tied together with metal ties.

**Wall, Curtain.** Any exterior non-bearing wall between columns or piers which is not supported by beams or girders at each story.

**Wall, Dead.** Synonymous with "Blank Wall."

**Wall, Division.** Any interior wall in a building.

**Wall, Enclosure.** An exterior, non-bearing wall in skeleton construction, anchored to columns, piers or floors, but not necessarily built between columns or piers.

**Wall, External.** The outer wall or vertical enclosure of a building other than a party wall.

**Wall, Faced.** A wall in which the masonry facing and backing are so bonded as to exert a common action under load.

**Wall, Fire.** A wall of masonry units or monolithic concrete which subdivides a building or separates buildings to restrict the spread of fire, which shall have not less than four-hour fire-resistive rating; and which starts at the foundation and extends continuously through all stories to and above the roof, except where the roof is fire-resistive, and the wall is carried up tightly against the under side of the roof slab. Also see Article 2937.

**Wall, Foundation.** All walls and piers built to serve as supports for walls, piers, columns, girders, parts or beams, etc.

**Wall, Front.** That wall of the building facing a public street, alley, or public approved

place. Where a lot abuts on more than one street, walls facing on any street shall be considered a front wall under the provisions of this Code.

**Wall, Hollow Masonry.** A wall built of masonry units so arranged as to provide an airspace within the wall, and in which the inner and outer parts of the wall are bonded together with masonry units.

**Wall Interior.** A wall entirely surrounded by the exterior walls of the building.

**Wall, Non-Bearing.** One which supports no load other than its own weight.

**Wall, Panel.** Synonymous with "Enclosure Wall."

**Wall, Parapet.** That part of any wall entirely above the roof line.

**Wall, Partition.** Any interior wall in a building.

**Wall, Party.** A wall constructed in the same manner as a "Fire Wall," and used, or built to be used, as a separation of two (2) or more buildings; also, a wall constructed as above and built upon the dividing line between adjoining premises for their common use, extending to and above the roof, except that where the roof is fire-resistive construction and the wall carried tightly against the underside of the roof slab.

**Wall, Retaining.** Any wall built to resist lateral pressure.

**Wall, Veneered.** A wall having a facing which is not attached and bonded to the backing so as to form an integral part of the wall for purposes of load bearing and stability.

**Window, Bay.** See "Bay Window."

**Window, Dormer.** See "Dormer."

**Window, Oriel.** See "Oriel Window."

**Written Notice** shall be considered to have been served if delivered in person to the individual or to the parties intended, or if delivered at or sent by registered mail to the last business address known to the party giving the notice.

## X

### No Definitions.

## Y

**Yard.** An open space, on the same lot with a building, unoccupied and unobstructed from the ground upward except as otherwise provided herein. See "Courts."

**Yard, Front.** A yard extending across the full width of the lot and measured between:

- (a) the street or place line and front line of the building, and
- (b) the street or place line and the nearest line of any projection of the building such as an uncovered porch, terrace, steps, or stairs, etc.

**Yard, Rear.** A yard extending across the full width of the lot and measured between the rear line of the lot and the rear line of the building.

**Yard Side.** A yard extending from the front yard to the rear yard and measured between the side line of the lot and the side line of the building or any projection thereof.

## Z

**Zoning.** The reservation of certain specified areas within the Parish of Jefferson or buildings and structures for certain purposes with other limitations such as height, lot coverage and other stipulated requirements.

**PART III**  
**PRELIMINARY REQUIREMENTS**  
**CHAPTER 2 – PRELIMINARY REQUIREMENTS**

**ARTICLE 201. PERMIT AND PLACARD.**

It shall be unlawful to proceed with the erection, removal, demolition, all alterations, all additions, repairs, installation of machinery, air conditioning, of a building or other structure including the construction of grandstands and tents, a sign, marquee, or awning over the sidewalk, or to perform any excavations below lot grade, or the installation of tank(s) or container(s) above or below lot grade, or the erection of pump(s) and or pump island(s), swimming pools, ponds, wading pools, reflecting pools more than twenty-four inches in depth, above or below lot grade within the unincorporated areas of the Parish of Jefferson, without having previously obtained a permit properly numbered and approved from the Director. Permits will not be required when owner or his roofer is repairing part of the surface or replacing the entire surface of his personal home, provided no structural changes are taking place.

It shall be the duty of the sheriff's department to see that such work requiring a permit is authorized and to report the absence of a permit to the director. All work must comply with this Code and shall be subject to inspection whether a permit is required or not at the discretion of the Director.

If after the issuance of a permit, the operation authorized thereunder be not commenced within six (6) months after date of permit, or if after commencement of operations, the work be discontinued for a period of six (6) months, such permit shall be resubmitted for approval of the Director, for which no additional fee will be charged.

Application for permit shall be made in writing to the Director as a certified statement by the owner or his agent, architect, engineer, or contractor upon a suitable form provided by the Director, which shall show the total floor area of proposed building, estimated cost of work, nature of improvement or repair and use or occupancy of all parts of the building and such other reasonable information as may be required by the Director.

Any permit that has been obtained under a misrepresentation as to cost or approximate floor area, or upon failure to execute said work in accordance with said application, plans and specifications shall constitute a violation of this Code, furthermore, the permit so obtained shall be corrected by the issuance of an additional permit. Any work done contrary to the requirements of this Code shall be stopped. Where the work performed is not in accordance with the application, plans and specifications, it shall be corrected. No permit will be granted except under conditions conforming to the provisions of this Code and other applicable ordinances and laws.

Changes in floor loadings shall comply with Article 2309.

A placard as required by Article 206 shall be kept continuously and conspicuously posted on the project site for duration of the work.

**ARTICLE 202. LOT GRADE**

No superstructure shall be erected until acceptable grade has been established.

No new superstructure shall have fully met the requirements of this code unless the site has been raised to grade with approved sanitary fill. This grade is extended from the established curb grade and shall slope upwards toward the property line, one half (1/2) inch for each foot of width of sidewalk to a maximum of six (6) inches and then beginning at the property line shall slope upwards not less than one inch (1") in twenty feet (20') toward the rear property line or an alternate method approved by the Director. Paved parking areas shall have a minimum gradient of one half percent and a maximum gradient of five percent.

It is recognized that much of the Parish is still in a natural swampy state, and therefore, the Director of Safety may enforce or modify lot grade requirements so as to prevent the breeding of mosquitos or to preserve the ecology.

In case a lot or part of a lot is higher than the adjoining lot, approved arrangements shall be made to prevent water from the higher lot flowing onto the lower adjoining lot. Should the difference in lot elevation be too great for a swale, a retaining wall on the rear and both side-property lines will be required. Such retaining wall shall be constructed of concrete, masonry, or pressure treated lumber with a minimum thickness of two inches and shall be constructed in such a manner as to effectively withstand the soil and water pressures exerted against it. The retaining wall shall extend from the lowest elevation of the lower lot to a minimum of two inches (2") above the higher lot, or where a property owner desires to construct a residence or a building on his lot and the rear of his lot adjoins a lot on which a residence or building is already in existence and which lot drains to the rear, the property owner desiring to construct a residence or building is required to dedicate a drainage servitude and include in his plans drainage facilities to drain the lot on which the residence or building exists when the required lot elevation

on his lot is higher than the existing elevation of the lot on which the residence or building exists and such drainage facility shall be properly installed before the newly constructed residence or building is released for occupancy and the utility companies are notified of its release.

Certificate of use and occupancy and compliance shall not be issued until grade certificate has been secured.

**Slab Foundation.** For residential use the top of the slab shall be not less than 24" above the catch basin less than 18" above the crown of the street. For non-residential use the top of the slab shall be not less than 12" above the catch basin nor less than 6" above the crown of the street.

**Piers or Chain Wall Foundations.** Underside of joists shall not be less than twenty four inches (24") above the finished grade for lot grade at front edge of building. See Article 2527.

#### **ARTICLE 203. DRAWINGS AND SPECIFICATIONS.**

With each application for a building permit or electrical or mechanical permit and when required by the Director of Safety for the enforcement of any provisions of this Code, at least two sets of drawings and specifications shall be submitted:

**EXCEPTION:** One-story buildings of Type V conventional woodstud construction with an area not exceeding 600 square feet.

**Part 1. Building Plan Requirement.** Drawing and specifications for the construction of buildings having walls, floors, and roofs, including all electrical and mechanical work, shall be prepared by or under the direct supervision of a Louisiana Registered Architect or a Louisiana Registered Civil Engineer, and said drawing and specifications shall be imprinted with his seal so designating, and shall contain a statement to the effect that they comply with all Jefferson Parish requirements to the best of his knowledge and belief and that he is supervising (not Supervising) the work.

##### **Exceptions**

##### **Table A**

|                         |                                                                       |
|-------------------------|-----------------------------------------------------------------------|
| Apartments              | Single story less than 1500 square feet                               |
| Assembly, Places of     | Seating under 100 persons,<br>single story less than 1500 square feet |
| Dormitories             | No exceptions                                                         |
| Industrial Buildings    | No exceptions                                                         |
| Institutional Buildings | No exceptions                                                         |
| Hotels                  | No exceptions                                                         |
| Mercantile Buildings    | No exceptions                                                         |
| Offices                 | No exceptions                                                         |
| Old Age Homes           | No exceptions                                                         |
| Penal Institutions      | No exceptions                                                         |
| Residences              | Less than 3000 sq. ft. of gross<br>living area or \$40,000.00         |
| Schools                 | No exceptions                                                         |
| Storage Warehouse       | No exceptions                                                         |

Where there are unusual conditions because of type of occupancy or type of construction, the Director of Inspection and Code Enforcement may depart from the limitations set forth above and required drawings and specifications when ever deemed necessary.

**Part 2. Mechanical and Electrical Plan Requirements.** Drawings and specifications embodying mechanical and electrical installations for buildings shall be prepared by or under the direct supervision of a Louisiana Registered Mechanical or Electrical Engineer, as applicable, and said drawings and specifications shall be imprinted with his seal so designating, and shall contain a statement to the effect that they comply with all Jefferson Parish requirements to the best of his knowledge and belief and that he is supervising (not supervising) the work, said drawings to be submitted at time of application for mechanical and electrical permits.

Except for Group "I" Occupancies

The following limits determine when Mechanical Plans must be designed and stamped by Louisiana Mechanical Engineers:

1. Installation of over 1,000 cubic feet per hour of natural gas service capacity, or
2. Installation of over 10 tons of air-conditioning capacity, or
3. Installation of over 1-1/4" pipe size water service from the meter.

Except for Group "I"

The following limits determine when Electrical Plans must be designed and stamped by Louisiana Registered Electrical Engineer:

1. Installation of over 200 ampere, single phase electrical service, or
2. Installation of over 150 ampere, three phase electrical service, or
3. Installation of any electrical service over 240 volts.



Where there are unusual conditions because of type of occupancy or type of construction, the Director of Inspection and Code Enforcement may depart from limitations set forth above and require drawings and specifications.

Regulations concerning examination of Electrical drawings and specifications are as provided in Article 5031.

Regulations concerning examination of Mechanical drawings and specifications are as provided in Article 4805.

Regulations concerning examination of drawings and field inspections of mechanical and electrical equipment and apparatus are provided in Chapter 46, 48, 50 and 53.

Plans and specifications shall be of sufficient clarity to indicate the nature and character of the work proposed and to show that the requirements of the law will be fulfilled. Computations, strain sheets, stress diagrams and other data necessary to show the correctness of the plans shall accompany the plans and specifications when required by the Director of Inspection and Code Enforcement.

Any specifications in which general expressions are used to the effect that "Work shall be done in accordance with the Building Code" or "to the satisfaction of the Director" shall be deemed imperfect and incomplete and every reference to this Code shall be by Article or Sub-Article applicable to the material to be used or to the method of construction proposed.

The application, drawings and specifications filed by an applicant for a building permit shall be checked by the Director of Inspection and Code Enforcement on receipt of the required permit fee. When such drawings and specifications are found to be in conformity with requirements of this Code and Comprehensive Zoning Ordinance, and all other laws or ordinance applicable thereto, the Director of Inspection and Code Enforcement shall issue a permit for the specified construction and/or installation.

When the Director issues the permit he shall endorse in writing, or stamp, on both sets of plans and specifications "Approved." One set of stamped plans and specifications is required to be kept on the site during the course of construction.

It shall be unlawful to erase, materially alter or modify any lines, figures, letters, words or coloring contained upon any such drawings, specifications or computations filed with or Stamped by the Director of Inspection and Code Enforcement. If during the progress of the execution of such work, it is desired to deviate in any manner affecting the construction of other essentials of the building from the terms of the application, plans, or specifications, or statement of cost of work, notice of such intention to alter or deviate shall be given in writing to the Director, and his written assent shall be obtained before such alterations or deviations may be made. If such change or deviation affects the carrying out of structural parts of such building or structure, or its classification, or group of occupancy, new plans thereof shall be submitted to the Director, and if necessary, an additional permit shall be secured.

#### ARTICLE 204. DETERMINATIONS OF VALUES AND FEES

1. Application for permits for repairs, alterations, additions, removal, building cleaning, painting, re-roofing, demolition, changed floor loadings, machinery installation, air conditioning, and all other construction except new construction shall be accompanied by the contract (if awarded), by a statement of floor area and cost of value certified to by the owners, architect, engineer, or contractor.

2. For new construction and additions the cost or value shall be determined by the Director and in so determining such value he shall be guided by recognized appraisal methods.

3. No fee shall be charged, nor a permit required, when the only work to be done is painting, either interior or exterior, residential or commercial.

For new construction and additions the cost or value shall be determined by using the following valuations:

| Construction                                | Value per Square Foot |
|---------------------------------------------|-----------------------|
| *Type I or II (inside unfinished) . . . . . | \$ 21.00              |
| *Type I or II (inside finished) . . . . .   | 30.00                 |
| Type III (inside unfinished) . . . . .      | 16.00                 |
| Type III (inside finished) . . . . .        | 25.00                 |
| Type IV (inside unfinished) . . . . .       | 11.00                 |
| Type IV (inside finished) . . . . .         | 20.00                 |
| Type V (wood frame) . . . . .               | 14.00                 |
| Type V (brick veneer) . . . . .             | 15.00                 |
| Private Garage (wood frame) . . . . .       | 6.50                  |
| Private Garage (masonry) . . . . .          | 8.50                  |
| Open Carports (private) . . . . .           | 3.50                  |
| Canopies (other than residential) . . . . . | 8.50                  |

\*Add 0.8 percent to the total cost for each story over three.

All plans shall have clearly indicated thereon the floor area of each floor.

Based upon such computations and certified statements, building permits shall be issued by the Director and the fee for same shall be determined as herein set forth.

The Director shall keep a permanent, accurate account of all fees and other monies collected and received under this Code, the names of the persons upon whose account the same were paid, the date and amount thereof, together with the location of the building or premises to which they relate.

Fees for the issuance of permits for new construction shall be determined as follows:

| Total Valuation              | Fee                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| \$1.00 to \$500.00           | \$5.00                                                                                                                            |
| \$501.00 to \$2,000.00       | \$5.00 for the first \$500.00 plus \$1.00 for each additional \$100.00 or fraction thereof, to and including \$2,000.00.          |
| \$2,001.00 to \$25,000.00    | \$20.00 for the first \$2,000.00 plus \$4.00 for each additional \$1,000.00 or fraction thereof, to and including \$25,000.00     |
| \$25,001.00 to \$50,000.00   | \$112.00 for the first \$25,000.00 plus \$3.00 for each additional \$1,000.00 or fraction thereof, to and including \$50,000.00.  |
| \$50,001.00 to \$100,000.00  | \$187.00 for the first \$50,000.00 plus \$2.00 for each additional \$1,000.00 or fraction thereof, to and including \$100,000.00. |
| \$100,001.00 to \$500,000.00 | \$287.00 for the first \$100,000.00 plus \$1.50 for each additional \$1,000.00 or fraction thereof, to and including \$500,000.00 |
| \$500,001.00 and up          | \$887.00 for the first \$500,000.00 plus \$1.00 for each additional \$1,000.00 or fraction thereof.                               |

Fee for a portable (mobile) sign shall be \$15.00 for a ninety (90) day permit.

Where a called for inspection requires a reinspection, a reinspection fee of \$15.00 must be paid before a reinspection can be scheduled.

Where work for which a permit is required by this Code is started or proceeded with, prior to obtaining said permit, the fees above specified shall be increased 100 percent, but the payment of such fee shall not relieve any person from fully complying with the requirements of this Code in the execution of the work, nor from any other penalties prescribed herein.

Where work, for which a permit for removal and demolition is required, is started prior to obtaining said permit, the fees above specified shall be increased 300%, but the payment of such fee shall not relieve any person from fully complying with the requirements of this code in the execution of the work, nor from any other penalties prescribed herein.

#### Sewerage Connection Fee.

A. Single Family Residential. That there is hereby established a sewer availability fee of \$345.00 per dwelling unit for the construction of all single-family residential dwellings.

B. Two-family Residential. That there is hereby established a sewer availability fee of \$244.00 per dwelling unit for the construction of all new two-family residential dwellings.

C. Three and Four-family Residential Units. That there is hereby established a sewer availability fee of \$241.00 per dwelling unit for the construction of new three or four-family residential dwellings.

D. Multiple Family Residential (Five or more units). That there is hereby established a sewer availability fee of \$200.00 per dwelling unit for the construction of all new multi-family residential dwellings.

E. The Mobile Home Parks. That there is hereby established a sewer availability fee of \$200.00 for each rental lot of all new mobile home parks.

F. In addition to the above fees, there shall be a sewer availability fee of twenty cents (20¢) a square foot when any additions to present structures include additional plumbing fixtures or replacement of existing building.

G. In those cases where any existing mobile home lot is converted to a single family residence, the availability charge for the new home will be \$145.00 if any availability charge of \$200.00 has been previously paid by the owner or previous owner of the lot in accordance with Section 1.E. above.

H. When any residential establishment is destroyed by fire, flooding, hurricane or other natural disaster and such establishment is rebuilt on the same site with similar square footage as in the original building and with the same or fewer plumbing fixture units, no availability charge will be assessed.

I. When any building is demolished or removed and replaced with another building, the sewerage availability fee will be 20¢ a square foot applied upon the increase in square footage up to a maximum of \$345.00 per dwelling unit for single family dwellings, \$244.00 per unit maximum for two family residential, \$241.00 per unit for 3 or 4 family and multiply family (5 or more) a maximum of \$200.00 per unit. The applicant must provide a survey of the existing unit or other substantial proof of existing square footage in order to qualify for said consideration.

- 1) Offices, Banks and Professional Buildings. 38¢ per square foot.
- 2) Amusement and Recreational Buildings. 38¢ per square foot.
- 3) Stores and Mercantile Buildings. 20¢ per square foot.
- 4) Churches and Religious Buildings. 38¢ per square foot.
- 5) Hospitals. 38¢ per square foot.
- 6) Industrial. 12¢ per square foot.
- 7) Schools and Educational Buildings. 38¢ per square foot.
- 8) Service Stations. 38¢ per square foot.
- 9) In addition to the above fees, there shall be a sewer availability fee of twenty cents (20¢) per square foot when any additions to present structures are made including additional plumbing fixtures.

#### **ARTICLE 205. RIGHT TO ENTER BUILDINGS**

The Director shall have the right of entry to any building under construction, alteration, repair or removal, and to any building site or premises, or to any new or unoccupied building, or to any building alleged to be unsafe or dangerous, upon the exhibition of proper evidence of authority, and interference with such authorized entry for the purpose mentioned shall be punishable as provided for violation of this Code.

#### **ARTICLE 206. HOUSE NUMBERING**

The Director shall require a dimensioned plot of the lot on which structure is to be erected which shall be furnished by the applicant for building permit. This plot shall show: lot and square number, distance from zero street corner at both corners, width and depth of lot, and names of streets bounding the square on which lot in question is located. In cases of doubt the Director may require the title papers showing location of lot in question to be produced. When issuing building permits, The Director shall designate thereon the street number that the building when completed will bear. Copies of said permit shall be furnished the Sewerage and Water Districts having jurisdiction in the area in which the property is located. At the time of final approval of application the Director shall furnish a placard showing the municipal number and permit number, which placard shall be conspicuously exposed on the building site in front of said building.

Every property owner or agent shall within fifteen (15) days after the completion of any building provide and maintain in a durable and substantial manner on the front of same, in a conspicuous place, the said official number.

#### **ARTICLE 207. INSPECTIONS**

The Director shall inspect or cause to be inspected at various intervals during the erection, construction, enlarging, alteration, repairing, moving, demolition, conversion, occupancy, and underpinning, all buildings or structure referred to in this Code and located in the Parish, and a final inspection shall be made of every building or structure hereafter erected prior to the occupancy or use thereof.

For all new buildings and additions three (3) "stage" inspections will be made.

1st. When the slab is ready to pour with all reinforcing steel and all necessary plumbing and electrical installations in place.

2nd. When the building is ready for closing.

3rd. Final. Building is complete with all grading, driveways, and sidewalks installed.

It is incumbent on the owner and/or contractor to contact the Building Department when a specific stage has been reached. No work beyond a specific stage will be allowed until the owner and/or contractor has received, in writing approval to proceed on to the next stage of the construction.

The Director shall approve or disapprove statements, plans, and specifications, and condemn structures and works upon the conditions and demands of the Building Code.

If the Director finds that the structure or work being erected or done is in violation of this Code, work shall be immediately stopped and a notice of this action shall be posted on the work; and the owner, architect, engineer, agent or contractor, shall be notified in writing that the structure or work is constructed or is being constructed, altered or repaired in violation of the Code.

If said person or persons shall fail or refuse to comply with said orders by making the necessary corrections, then there shall be no more work done on the said building, structure or premises by any person or workman whatsoever, and the permit shall be revoked. Violation of said posted notice shall be a violation of this Code.

A misdemeanor summons shall be issued immediately and all construction, repairs or activities shall cease immediately. The project shall be posted with a placard stating the Ordinance and Article numbers, address of project in violation, misdemeanor summons number, date and signature of inspector or person posting job.

For appeal from the decision of the Director, see Article 402.

#### **ARTICLE 208. ZONING RESTRICTIONS**

The restrictions of any Zoning Ordinance which may be adopted by the Parish shall not be deemed to be modified by any provision of this Code; such restrictions shall be controlled except in so far as this Code imposes greater restrictions by reason of type of construction used, in which case the provisions of this Code shall control.

#### **ARTICLE 209. ALTERNATE MATERIALS AND TYPES OF CONSTRUCTION.**

(a) **General.** The provisions of this Code are not intended to prevent the use of types of construction or materials offered as an alternate for the types of construction or materials required by this Code, but such alternate types of construction or materials shall be offered for approval as specified in this Chapter. Corresponding materials or types of construction referred to in this Code, the use of which is the same as is intended for the new material or construction, and approved, shall be considered as standards of quality and strength if no specification is provided.

Any person desiring to use types of construction or materials not specifically mentioned in this Code shall file with the Director authentic proof in support of claims made regarding their efficiency and request approval and permission for their use.

The Safety Director may approve each alternate type of construction or material and may recommend an amendment to this Code in order to make permissible the use of same. If, in the opinion of the Director of Safety, the evidence and proof are not sufficient to justify approval or recommendation for an amendment, the applicant may refer the entire matter to the Board of Standards and Appeals as specified in Article 401 and 402 of this Code.

(b) **Test of Materials and Systems of Construction.** Where certain systems of construction, qualities of materials or tests are referred to or regulated by this Code, tests may be required by the Director. Such tests shall be made at the expense of the owner or his agent by a testing laboratory or other organization approved for the purpose by the Director. Certified copies of all test reports shall be filed with the Director for his approval before the systems of construction or materials are used. The owner or his agent shall notify the Director of the time and location of all such tests so that he may be present.

(c) **Prefabricated units.** Prefabricated units or structures shall conform to Paragraphs (a) and (b) of this Article.

#### **ARTICLE 210. REQUIREMENTS FOR THE SAFETY OF OCCUPANTS.**

**Any requirements necessary for the strength or stability of any proposed structure for the safety of occupants thereof, not specifically covered by this Code, shall be determined by the Director in writing, subject to appeal.**

#### **ARTICLE 211. EXISTING BUILDINGS.**

Any building or structure which is enlarged, altered, raised, repaired, or built upon to an extent exceeding an expenditure of fifty per cent (50%) of the replacement value after alterations shall be made to comply in its entirety with the requirements for new buildings or structures. See also Articles 502, 2309 and 2945.

#### **ARTICLE 212. FIRE PREVENTION.**

The restrictions of any Fire Prevention Ordinance which may be adopted by the Parish shall not be deemed to be modified by any provision of this Code. Wherever the requirements of this Code are more restrictive, the requirements of this Code shall apply.

#### **ARTICLE 213. APPROVED STANDARDS.**

The intent of this Code is to safeguard the public against dangerous and hazardous, as well as nuisance, conditions arising from the construction, repair, alteration, remodeling, moving, operation, and demolition of buildings and structures, electrical, gas and mechanical installations, including moving stairs, air conditioning, mechanical refrigeration, attic ventilation, boiler, unfired pressure vessels, and smoke abatement, and the operation and maintenance of power equipment and apparatus; and to establish reasonable standards whereby the

foregoing activities may be carried on in a standard and approved manner.

Compliance with nationally recognized standards, as specified hereinafter, shall be prima facie evidence that the work has been done in such standard and approved manner, except as otherwise specifically modified in this Code.

The Director shall maintain a public file of the foregoing standards which shall be deemed as advisory requirements to this Code in so far as they can be applied to each particular situation for which a permit is required. Whenever a new standard is issued the date of which is different from that shown in this Code, it shall be obligatory on the part of the Director to so advise the Board of Building Standards and Appeals in order that an amendment may be made to bring this Code up to current industry standards.

Unless otherwise specifically stated, when there is a conflict between the specific detailed requirements of this Code and the standards listed hereunder, the detailed requirements of this Code shall govern.

#### NATIONAL STANDARD SPECIFICATIONS REFERRED TO IN THIS CODE.

| Author<br>Organization's<br>Designation                                     | Subject                                                                                                                                                                                        |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Aluminum Association</b>                                                 |                                                                                                                                                                                                |
| 1969                                                                        | Aluminum Formed - Sheet Building Sheathing Design Guide                                                                                                                                        |
| 1971                                                                        | Aluminum Sheet Metal Work in Building Construction, Specifications for Section 5                                                                                                               |
| 1976                                                                        | Aluminum Structures, Specifications for, Section 1                                                                                                                                             |
| <b>American Concrete Institute</b>                                          |                                                                                                                                                                                                |
| 301-71                                                                      | Structural Concrete for Buildings, Specifications for                                                                                                                                          |
| 315-74                                                                      | Detailing Reinforced Concrete Structures, Manual of Standard Practice for                                                                                                                      |
| 318-71                                                                      | Building Code Requirements for Reinforced Concrete                                                                                                                                             |
| 506-66                                                                      | Shotcreting, Recommended Practice for                                                                                                                                                          |
| 512-67                                                                      | Reinforced Concrete Floor and Roof Units, Recommended Practice for Manufacture                                                                                                                 |
| 704-44                                                                      | Cast Stone, Specifications for                                                                                                                                                                 |
| <b>American Institute of Steel Construction</b>                             |                                                                                                                                                                                                |
| 1969                                                                        | Design, Fabrication & Erection of Structural Steel for Buildings, Specification for                                                                                                            |
| 1970                                                                        | Supplement No. 1                                                                                                                                                                               |
| 1971                                                                        | Supplement No. 2                                                                                                                                                                               |
| 1974                                                                        | Supplement No. 3                                                                                                                                                                               |
| <b>American Institute of Steel Construction &amp; Steel Joist Institute</b> |                                                                                                                                                                                                |
| 1970                                                                        | Deep Longspan Steel Joists, Standard Specification and Load Tables for; DLJ - Series and DLH - Series                                                                                          |
| 1969                                                                        | Longspan Steel Joists, Standard Specifications and Load Tables for; LJ - Series and LH - Series                                                                                                |
| 1965                                                                        | Open Web steel Joists, Standard Specifications and Load Tables for; J - Series and H - Series                                                                                                  |
| <b>American Institute of Timber Construction</b>                            |                                                                                                                                                                                                |
| AITC 100-76                                                                 | Timber Construction Standards                                                                                                                                                                  |
| AITC 117-76                                                                 | Structural Glued Laminated Timber of Douglas Fir, Western Larch, Southern Pine, and California Redwood, Standard Specifications for                                                            |
| AITC 117-76                                                                 | Supplement No. 2 - Hem-Fir                                                                                                                                                                     |
| AITC 117-76                                                                 | Supplement No. 3 - Western Woods                                                                                                                                                               |
| AITC 117-76                                                                 | Supplement No. 5 - Small Beams                                                                                                                                                                 |
| AITC 119-76                                                                 | Hardwood Glued Laminated Timber, Standard Specification for                                                                                                                                    |
| AITC 120-71 (Amended 1976)                                                  | Structural Glued Laminated Timber Using "E" Rated and visually Graded Lumber of Douglas Fir, Southern Pine, Hem-Fir, and Lodgepole Pine Timber Construction Manual, Standard Specification for |
| AITC 200-73 (Amended 1976)                                                  | Inspection Manual                                                                                                                                                                              |

**American Insurance Association (formerly National Board of Fire Underwriters)**  
1964 Fire Resistive Ratings, Amended to 1972

**American Iron and Steel Institute**

1974 Design of Cold Formed Stainless Steel Structural Members, Specifications for  
1968 Design Cold Formed Steel Structural Members, Specifications for  
1970 Addendum No. 1  
1973 Criteria for Structural Applications of Steel Cables for Building

**American National Standards Institute (Formerly American Standards Association, Inc.)**

A 10.3-1972 Power Actuated Fastening Systems, Safety Requirements for  
A 10.4-1975 Personnel Hoists, Safety Requirements for  
A 10.5-1975 Material Hoists, Safety Requirements for  
A 17.1-1971 Elevators, Dumbwaiters, Escalators and Moving Walks, Safety Code for  
A 17.1a-1972 Supplement to A 17.1-1971  
A 17.1b-1973 Supplement to A 17.1-1971 (Omit Adoption of all Exceptions Included in Article 2 of Rule 211.3a)  
A 17.1c-1974 Supplement to A 17.1-1971, A 17.1a-1972 and A 17.1b-1973  
A 17.1d-1974 Supplement to A 17.1-1971  
A 17.1e-1975 Supplement to A 17.1-1971  
A 17.1f-1975 Supplement A 17.1-1971  
A 17.1g-1976 Supplement to A 17.1-1971  
A 17.2-1973 Elevators, Escalators and Moving Walks, Practice for the Inspection of (Inspector's Manual)  
A 58.1-1972 Minimum Design Loads in Buildings and Other Structures  
A 59.1-1972 (R1972) Reinforced Gypsum Concrete, Specifications for  
A 90.1-1976 Manlifts, Safety Code for  
A 117.1-1961 (R1971) Making Buildings and Facilities Accessible To and Usable by the Physically Handicapped, Specifications for  
A 122.1-1965 Vermiculite Concrete Roofs and Slabs on Grade, Specifications for  
B 9.1-1971 Mechanical Refrigeration (ASHRAE 15-70), Safety Code for  
B 31.1-1973 Power Piping  
B 36.10-1975 Wrought Steel and Wrought Iron Pipe  
O 5.1-1972 Wood Poles, Specifications and Dimensions for

**American Plywood Association**

APA-75 Plywood-Lumber Components (V815), Design Method for  
APA-74 Plywood-Lumber Components (V820), Fabrication of  
APA-74 Plywood Construction Guide for Residential Buildings (V450)  
APA-75 Plywood Construction Systems for Commercial and Industrial Buildings (P310)  
APA-75 Cantilevered In-Line Joist System  
APA-75 Nailed Plywood and Lumber Beams

**American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.**

1972 Handbook of Fundamentals, Chapter 19 only (See Also ANSI B9.1-71)

**American Society of Mechanical Engineers**

1974 Boiler and Pressure Vessel Code:  
Sec. 1 Power Boilers,  
Material Specifications  
II ... Part A - Ferrous  
II ... Part B - Nonferrous  
II ... Part C - Welding Rods, Electrodes, and Filler

|                                                   |                                                                                                    |
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|                                                   | Metals Nuclear Power Plant Components, Division 1                                                  |
| III                                               | ... Subsection NA - General Requirements (Includes All Appendices)                                 |
| III                                               | ... Subsection NB - Class 1 Components                                                             |
| III                                               | ... Subsection NC - Class 2 Components                                                             |
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| IV                                                | Heating Boilers                                                                                    |
| V                                                 | Nondestructive Examination                                                                         |
| VI                                                | Recommended Rules for Care and Operation of Heating Boilers                                        |
| VII                                               | Recommended Rules for Care of Power Boilers Pressure Vessels                                       |
| VIII                                              | ... Division I                                                                                     |
| VIII                                              | ... Division 2 - Alternative Rules                                                                 |
| IX                                                | Welding and Brazing Qualifications                                                                 |
| X                                                 | Fiberglass-Reinforced Plastic Pressure Vessels                                                     |
| XI                                                | Rules for Inservice Inspection of Nuclear Power Plant Components                                   |
| <b>American Society For Testing and Materials</b> |                                                                                                    |
| A 36-75                                           | Structural Steel, Specifications for                                                               |
| A 252-75                                          | Welded and Seamless Steel Pipe Piles, Specifications for                                           |
| A 283-75                                          | Low and Intermediate Tensile Strength Carbon Steel Plates of Structural Quality, Specification for |
| A 366-72                                          | Cold-Rolled Carbon Steel Sheets, Commercial Quality, Specifications for                            |
| A 569-72                                          | Hot-Rolled Carbon Steel Sheets and Strips, Commercial Quality, Specifications for                  |
| A 570-75                                          | Hot-Rolled Carbon Steel Sheets and Strips, Structural Quality, Specifications for                  |
| A 572-75                                          | High-Standard Low-Alloy Columbium-Vanadium Steels of Structural Quality, Specifications for        |
| A 611-72                                          | Steel, Cold-Rolled Sheets, Carbon, Structural Quality, Specifications for                          |
| B 88-76                                           | Seamless Copper Tube, Bright Annealed, Specifications for                                          |
| C 5-59 (1974)                                     | Quicklime for Structural Purposes, Standard Specifications for                                     |
| C 6-49 (1968)                                     | Normal Finishing Hydrated Lime, Standard Specifications for                                        |
| C 10-73a                                          | Natural Cement, Specifications for                                                                 |
| C 22-50 (1974)                                    | Gypsum, Standard Specification for                                                                 |
| C 29-71                                           | Unit Weight of Aggregate, Methods of Test for                                                      |
| C 33-74a                                          | Concrete Aggregates, Standard Specification for                                                    |
| C 34-62 (1975)                                    | Structural Clay Load Bearing Wall tile, Standard Specification for                                 |
| C 35-70 (1975)                                    | Inorganic Aggregates for Use in Interior Plastr, Standard Specification for                        |
| C 37-69                                           | Gypsum Lath, Standard Specification for                                                            |
| C 52-54 (1972)                                    | Gypsum Partition Tile or Block, Standard Specification for                                         |
| C 55-75                                           | Concrete Building Brick, Standard Specification for                                                |
| C 56-71                                           | Structural Clay Non-load bearing Tile, Standard Specification for                                  |
| C 62-75a                                          | Building Brick (Solid Masonry Units Made From Clay or Shale), Specifications for                   |
| C 64-72                                           | Refractories for Incinerators and Boilers, Standard Specifica-                                     |

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|                 | tion for                                                                                                                           |
| C 73-75         | Calcium Silicate Face Brick (Sand-Lime Brick, Standard Specification for                                                           |
| C 90-75         | Hollow Load Bearing Concrete Masonry Units, Standard Specifications for                                                            |
| C 91-75         | Masonry Cement, Specification for                                                                                                  |
| C 94-74         | Ready Mixed Cement, Specification for                                                                                              |
| C 126-71        | Ceramic Glazed Structural Clay Facing Tile, Facing Brick and Solid Masonry Units, Standard Specification for                       |
| C 129-75        | Hollow Non-load Bearing Concrete Masonry Units, Standard Specification for                                                         |
| C 141-67 (1972) | Hydraulic Hydrated Lime for Structural Purposes, Standard Specification for                                                        |
| C 144-76        | Aggregate for Masonry Mortar, Specification for                                                                                    |
| C 145-75        | Solid Load Bearing Concrete Masonry Units, Standard Specifications for                                                             |
| C 150-76        | Portland Cement, Standard Specification for                                                                                        |
| C 331-69 (1976) | Lightweight Aggregate for Concrete Masonry Units, Specification for                                                                |
| C 332-66 (1971) | Lightweight Aggregate for Insulating Concrete, Standard Specifications for                                                         |
| D 25-73         | Round Timber Piles, Standard Specification for                                                                                     |
| D 25-58         |                                                                                                                                    |
| D 93-73         | Flash Point by Pensky-Martens Closed Tester, method of Test for                                                                    |
| D 146-72        | Sampling and Testing Felted and Woven Fabrics Saturated with Bituminous Substances for Use in Waterproofing and Roofing, Method of |
| D 1194-72       | Test for Bearing Capacity of Soil for Static Load on Spread Footings, Standard Method of                                           |
| D 1248-74       | Polyethylene Types II, III; Grade 3, Class C                                                                                       |
| D 1784-75       | Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride)                                                        |
| D 1785-76       | Poly (Vinyl Chloride) (PVC) Plastic Pipe schedules 40, 80, and 120, Specifications for                                             |
| D 2466-76a      | Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40, Specifications for                                     |
| D 2467-76a      | Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, Specifications for                                     |
| D 2513-74a      | Thermoplastic Gas Pressure Pipe, Tubing and Fittings, Specifications for                                                           |
| D 2564-76       | Solvent Cements for Poly (Vinyl Chloride) PVC Plastic Pipe and Fittings, Specifications for                                        |
| D 2899-74       | Establishing Design Stresses for Round Timber Piles, Standard Methods for                                                          |
| E 119-76        | Fire Tests of Building Construction and Materials, Method of                                                                       |

#### **American Welding Society, Inc.**

|           |                                                                |
|-----------|----------------------------------------------------------------|
| B 3.0-41  | Standard Qualification Procedure (Tentative and Abridged 1966) |
| D 1.1-75  | Structural Welding Code with 1976 Revision                     |
| D 12.1-75 | Reinforcing Steel Welding Code                                 |

#### **American Wood Preserves Association**

|        |                                                                                         |
|--------|-----------------------------------------------------------------------------------------|
| C 1-76 | All Timber Products - Preservation Treatment by Pressure Processes                      |
| C 2-76 | Lumber, Timbers, Bridge Ties and Mine Ties-Preservative Treatment by Pressure Processes |



|         |                                                                                                                                                                                                |
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| C 3-76  | Piles-Preservative Treatment by Pressure Processes                                                                                                                                             |
| C 4-75  | Poles-Preservative Treatment by Pressure Processes                                                                                                                                             |
| C 9-76  | Plywood-Preservative Treatment by Pressure Process                                                                                                                                             |
| C 18-75 | Pressure Treated Piles and Timbers In Marine Construction, Standard for                                                                                                                        |
| C 23-76 | Round Poles and Posts Used in Building Construction Preservatives Treatment by Pressure Processes                                                                                              |
| C 28-75 | Preservative Treatment of Structural Glued Laminated Members and Laminations Before Gluing of Southern Pine, Pacific Coast Douglas Fir and Western Hemlock by Pressure Processes, Standard for |
| M 1-76  | The Purchase of Treated Wood Products, Standard for                                                                                                                                            |
| M 2-76  | Inspection of Treated Timber Products, Standard for                                                                                                                                            |
| M 3-70  | Quality Control Procedures for Wood Preserving Plants, Standard for                                                                                                                            |
| M 4-76  | The Care of Preservative-Treated Wood Products, Standard for                                                                                                                                   |
| P 1-65  | Coal Tar Creosote for Land and Fresh Water Use, Standard for                                                                                                                                   |
| P 2-75  | Creosote and Creosote Solutions, Standard for                                                                                                                                                  |
| P 3-67  | Creosote-Petroleum Oil Solution, Standard for                                                                                                                                                  |
| P 4-70  | Petroleum Oil for Blending With Creosote, Standard for                                                                                                                                         |
| P 5-75  | Water-Borne Preservatives, Standard for                                                                                                                                                        |
| P 7-72  | Creosote for Brush or Spray Treatment for Field Cuts, Standard for                                                                                                                             |
| P 8-74  | Oil-Borne Preservatives, Standard for                                                                                                                                                          |
| P 9-75  | Solvents for Organic Preservative Systems, Standard for                                                                                                                                        |
| P 11-70 | Creosote-Pentachlorophenol Wood Preservative Solution, Standard for                                                                                                                            |
| P 12-68 | Creosote-Coal Tar Solution To Be Used In The Treatment of Marine (Coastal Waters) Piles and Timbers, Standard for                                                                              |
| P 13-65 | Coal Tar Creosote To Be Used In The Treatment of Marine (Coastal Waters) Piles and Timbers, Standard for                                                                                       |

#### **American Wood Preserves Bureau**

|          |                                                                                                                                            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------|
| LP-2-75  | Softwood Lumber, Timber and Plywood Pressure Treated With Water-Borne Preservatives for Above Ground Use, Standard For                     |
| LP-22-75 | Softwood Lumber, Timber and Plywood Pressure Treated With Water-Borne Preservatives for Ground Contact use, Standard For                   |
| LP-3-75  | Softwood Lumber, Timber and Plywood Pressure Treated with Light Hydrocarbon Solvent-Penta Solution for Above Ground Use, Standard For      |
| LP-4-75  | Softwood Lumber, Timber and Plywood Pressure Treated With Volatile Hydrocarbon Solvent-Penta Solution for Ground Contact Use, Standard For |
| LP-44-75 | Softwood Lumber, Timber and Plywood Pressure Treated With Volatile Hydrocarbon Solvent-Penta Solution for Ground Contact Use, Standard for |
| LP-33-75 | Softwood Lumber, Tiumber and Plywood Pressure Treated With Light Hydrocarbon Solvent-Penta Solution for Ground Contact Use, Standard For   |

#### **Factory Mutual Engineering Corporation**

1975 Approval Guide

#### **National Fire Protection Association**

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| 13-76 | Installation of Sprinkler Systems              |
| 14-76 | Standpipe and Hose Systems                     |
| 17-75 | Dry Chemical Systems                           |
| 30-73 | Storage, Handling and Use of Flammable Liquids |
| 32-74 | Dry Cleaning Plants                            |

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| 33-73  | Spray Finishing Using Flammable Materials                              |      |
| 40-74  | Cellulose Nitrate Motion Picture Film                                  |      |
| 51-74  | Gas Systems for Welding and Cutting                                    |      |
| 54-74  | National Fuel Gas Code                                                 |      |
| 56-73  | Flammable Anesthetics                                                  |      |
| 61B-73 | Prevention of Dust Explosions in Terminals Grain Elevators             |      |
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| 72A-74 | Local Protected Signaling Systems                                      |      |
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| 80-73  | Fire Doors and Windows                                                 |      |
| 82-72  | Incinerators, Rubbish Handling                                         |      |
| 88A-73 | Parking Structures                                                     |      |
| 88B-73 | Repair Garages                                                         |      |
| 90A-74 | Air-Conditioning and Ventilating Systems                               |      |
| 90B-73 | Warm Air Heating and Air Conditioning                                  |      |
| 91-73  | Blower and Exhaust Systems                                             |      |
| 96-73  | Commercial Cooking Equipment, Vapor Removal                            |      |
| 101-76 | Safety to Life from Fire in Buildings and Structures, Code for         |      |
| 102-72 | Tents, Grandstands and Air-Supported Structures for Places of Assembly | Used |
| 211-72 | Chimneys, Fireplaces and Vents                                         |      |
| 252-72 | Fire Tests, Door Assemblies                                            |      |
| 257-70 | Fire Tests of Window Assemblies                                        |      |

**National Forest Products Association (Formerly National Lumber Manufacturers Association)**

|      |                                                                                              |  |
|------|----------------------------------------------------------------------------------------------|--|
| 1973 | National Design Specifications for Stress-Grade Lumber and Its Fastenings, and Table I, 1974 |  |
| 1974 | Span Tables for Joists and Rafters                                                           |  |
| 1974 | Working Stresses for Joists and Rafters                                                      |  |

**Post-Tensioning Institute**

|      |                                                            |  |
|------|------------------------------------------------------------|--|
| 1975 | Prestressed Slabs-On-Ground, Tentative Recommendations for |  |
|------|------------------------------------------------------------|--|

**Truss Plate Institute, Inc.**

|        |                                                                          |  |
|--------|--------------------------------------------------------------------------|--|
| TPI-74 | Light Metal Plate Connected Wood Roof Trusses, Design Specifications for |  |
| 1972   | Span Tables for Light Metal Plate Connected Wood Trusses                 |  |

**Underwriters Laboratories, Inc.**

|                  |                                                                                 |  |
|------------------|---------------------------------------------------------------------------------|--|
| 10A-74           | Tin-Clad Fire Doors                                                             |  |
| 10B-74           | Fire Tests of Door Assemblies                                                   |  |
| 14B-74           | Sliding Hardware for Standard Horizontally Mounted Tin-Clad Fire Doors          |  |
| 55A-73           | Materials for Built-Up Roof Coverings                                           |  |
| 55B-71 (Rev. 73) | Class "C" Asphalt Organic-Felt Sheet Roofing Shingles                           |  |
| 103-71           | Chimneys, Factory Built, Residential Type and Building Heating Appliances       |  |
| 127-71           | Fireplaces, Factory-Built                                                       |  |
| 167-74           | Smoke Detectors, Combustion Products Type for Fire Protective Signaling Systems |  |
| 168-71           | Photoelectric Type Smoke Detectors for Fire Alarm Service                       |  |
| 181-74           | Air Duct Materials, Factory Made, and Air Duct Connectors                       |  |
| 303-73           | Refrigeration and air Conditioning Condensing and Compressor Units              |  |
| 378-73           | Draft Dampers, Fans, and Regulators                                             |  |
| 441-73           | Gas vents, Safety Standard for                                                  |  |

465-74  
555-73  
959-71

Air Conditioners, Central Cooling  
Dampers, Fire  
Chimneys, Factory-Built, Medium Heat Appliance

**United States Department of Commerce, Bureau of Standards**

|          |                                                          |
|----------|----------------------------------------------------------|
| CS236-66 | Commercial Standard for Mat-Formed Wood Particleboard    |
| PSI-74   | Product Standard for Construction and Industrial Plywood |
| PS20-70  | American Softwood Lumber Standard                        |
| PS51-71  | Hardwood and Decorative Plywood                          |
| PS56-73  | Structural Glued Laminated Timbers                       |
| PS57-73  | Product Standard for Cellulostic Fiber Insulating Board  |
| PS 58-73 | Basic Hardboard                                          |
| PS59-73  | Prefinished Hardboard Siding                             |
| PS60-73  | Hardboard Siding                                         |

**United States General Services Administration:**

|                  |                                                                          |
|------------------|--------------------------------------------------------------------------|
| SS-C-181e-1960   | Federal Specifications for Masonry Cement.                               |
| QQ-A-225/7a 1963 | Aluminum Alloy Bar, Rod, and Wire; Rolled Drawn, or Cold Finished, 5052. |
| QQ-A-250/2b 1963 | Aluminum Alloy 3003, Plate and Sheet.                                    |

**United States Forest Products Research:**

|                        |                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------|
| R1220-1954, Reaf. 1957 | The Designing for Strength of Flat Panels with Stressed Coverings.                                    |
| Pages 275-289          | Handbook No. 72, U.S. Dept. of Agriculture (supercedes R1630) Plywood and other Crossbanded products. |

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**ARTICLE 214. INSPECTION BY LICENSED INSURANCE COMPANIES**

All inspections hereinafter required by Chapters 47, 48 and 53 on insured boilers, unfired pressure vessels, elevators, dumb-waiters, moving stairs, mechanical amusement devices, hot water heaters (5220f), refrigeration and/or air conditioning systems may be conducted by licensed insurance company inspectors, subject, however, to certain conditions hereinafter set forth. The burden of proving that these conditions have been fulfilled is incumbent on the licensed insurance company.

Any insurance company licensed by the State of Louisiana to inspect and insure boilers, unfired pressure vessels, elevators, dumb-waiters, moving stairs, mechanical amusement devices, refrigeration and/or air conditioning systems may make application to the Director to have inspectors employed by them commissioned as Special Inspectors of the Parish of Jefferson. Such inspectors shall receive no salary from, nor shall any of their expenses be paid by the Parish of Jefferson and continuance of said special commission shall be conditioned upon the continuance in the employ of the licensed insurance company who made application for the special commission, and upon their maintenance of the standards of this code.

In order to qualify for a Special Inspector's commission to inspect boilers, unfired pressure vessels, refrigeration and/or air conditioning systems, the person so applying shall hold a commission as a boiler and pressure vessel inspector issued by the National Board of Boiler and Pressure Vessel Inspectors.

In order to qualify for a Special Inspector's commission to inspect elevators, dumb-waiters, mechanical amusement devices and moving stairs, the person so applying shall have at least three years experience as an elevator inspector or shall submit such other evidence of his qualifications as may be required by the Director. Those inspectors who are presently commissioned as elevator inspectors by the Parish of Jefferson and who fulfill the residence requirements of this Article shall be recommissioned as Special Inspectors for elevators, dumb-waiters, mechanical amusement devices and moving stairs.

A Special Inspector shall not be in the employ of more than one licensed insurance company or its affiliate provided, however, inspectors presently commissioned by the Parish and presently making inspections on a fee basis for more than one insurance company may continue to make inspections for such companies on such basis.

Any licensed insurance company which desires to qualify an inspector under the provisions of this Article must maintain a regular inspection service in the State of Louisiana and must have at least one duly authorized Special Inspector in the State of Louisiana at all times.

Such licensed insurance company or Special Inspector must maintain a place of business in the State of Louisiana and provide adequate telephone service therein.

Within thirty (30) days after this Code becomes effective, every licensed insurance company employing inspectors commissioned hereunder shall furnish the Director a list of all objects

insured and to be inspected by them, the location of said insured object, the owner or user of said object and the date the present certificate of inspection on said object expires.

Inspections made by an inspector employed by a licensed insurance company and commissioned by the Director as a Special Inspector will be accepted and exempted from Parish inspections and the payment of Parish inspection fees on all boilers, heating systems, unfired pressure vessels, elevators, dumb-waiters, mechanical amusement devices, moving stairs, air conditioning and/or refrigeration systems when such objects are insured and inspected as required by this Code; provided the inspection of the first installation of the above-named objects shall be made by the Director and Parish inspection fees paid to the Parish by the owner or user as required by Chapters 47, 48, and 53; provided further that inspection of all replacement installation shall also be made by the Director and Parish inspection fees paid by the owner or user to the Parish, as required by Chapters 47, 48 and 53.

When an elevator inspection is requested for the purpose of obtaining an annual elevator operating certificate and the elevator, dumb-waiter, stairs or moving walkways is currently insured and operating under a valid service contract with an elevator service contract company, upon written request, the Director may accept the inspection report from the licensed insurance company who recognizes and accepts a service contract as a favorable inspection report on an insured elevator, dumb-waiter, moving stairway or escalator and shall issue a current annual operating certificate as requested.

The licensed insurance company shall collect for the Parish of Jefferson a Two Dollar (\$2.00) certificate fee annually from the owner or user of each insured boiler, unfired pressure vessel, elevator, dumb-waiter, moving stair, mechanical amusement device, refrigeration and/or air conditioning system. This fee shall be paid to the Director at the time the annual date inspection report is filed with said Director.

On all refrigeration and/or air conditioning systems no exemption from Parish inspections shall be granted or recognized unless the complete and entire system exclusive of the prime mover is insured and inspected.

Special Inspectors shall make all inspections as required by Chapters 47, 48, and 53. A copy of all inspection reports shall be furnished the Director.

Said inspection reports shall be on appropriate A.S.M.E. or National Board of Boiler and Pressure Vessel Inspector's form or form prescribed by the Parish of Jefferson.

If an inspection report indicates that a violation of this Code exists, the licensed insurance company shall cause these violations to be corrected. If said violations are not corrected within a reasonable time, the Director shall cause these violations to be corrected and shall collect from the owner or user the Parish inspection fee as prescribed in Chapters 47, 48 and 53.

If the licensed insurance company fails to inspect and file with the Director, a complete report of inspection of the insured boiler, heating system, unfired pressure vessel, elevator, dumb-waiter, mechanical amusement device, moving stair, air conditioning or refrigeration system within thirty (30) days after the expiration date of the certificate that was last issued on said boiler, heating system, unfired pressure vessel, elevator, dumb-waiter, mechanical amusement device, moving stair, air conditioning or refrigeration system, an inspection of the above-described objects shall be made by Parish inspectors and Parish inspection fees, as prescribed in Chapters 47, 48 and 53, shall be collected from the owner or user.

The licensed insurance company shall notify the Director within twenty-four (24) hours whenever an inspection indicates a dangerous or hazardous condition.

The licensed insurance company shall also notify the Director within thirty (30) days on an appropriate A.S.M.E. or National Board of Boiler and Pressure Vessel Inspector's form or form prescribed by the Parish of Jefferson of all new insurance and discontinuance of insurance on boilers, heating systems, unfired pressure vessels, elevators, dumb-waiters, moving stairs, mechanical amusement devices, refrigeration and/or air conditioning systems.

If said companies or inspectors fail to comply with the above conditions and requirements, the Director is hereby given the authority to suspend or revoke the privilege of the licensed insurance companies of making the inspections on insured objects granted hereunder.

## **ARTICLE 215. OCCUPATIONAL LICENSE REQUIRED.**

"Before a permit to build may be issued to any contractor who owes an occupational tax to Jefferson Parish, or before any final inspection certificate is issued to any sub-contractor who owes an occupational license tax to Jefferson Parish, proof of payment of such occupational license tax to the Parish of Jefferson for the current year must be submitted to the Department of Regulatory Inspections in the manner provided for by Rules and Regulations of the Department of Regulatory Inspections."

**ARTICLE 216. MINIMUM HOUSING RESTRICTIONS.**

The provisions of the minimum Housing Code Ordinance, Ordinance No. 8154 shall not limit, restrict, contravene, or vitiate any of the provisions of the Jefferson Parish Building Code, 2225 as amended.

Whenever there is a conflict between the minimum Housing Ordinance and the Building Code, the more restrictive provisions shall be enforced.

## REQUIREMENTS FOR SAFETY IN CONSTRUCTION

## CHAPTER 3—REQUIREMENTS FOR SAFETY IN CONSTRUCTION

## ARTICLE 301. CONSTRUCTION OR DEMOLISHING PRIVILEGES.

Materials required for use immediately in connection with the construction or demolishing of a building may be placed upon that portion of the street area in front of the building which is not already used for temporary sidewalks or sidewalk shed as provided for in Article 302. The maximum width of such space which will be permitted for materials to be used from day to day in connection with the operations for which the building permit has been issued, shall not exceed one-third ( $1/3$ ) of the width of the roadway, except where the street contains railway tracks, in which case not more than one-half ( $1/2$ ) of the distance between the curb and the nearest rail shall be used. The distance from any such material to the nearest rail shall in no case, however, be less than four feet (4'). This unoccupied space shall be kept free from teams, wagons, vehicles, receptacles, etc., which would in any way obstruct such space. On asphalt streets, all sand, gravel or crushed stone shall be confined in bins to prevent damage to the asphalt street. No materials or tools shall be placed on any street within ten feet (10') of the curb lines of intersecting streets, and not over fifty per cent (50%) of the frontage of adjoining properties but in no case exceeding fifteen feet (15').

If the written consent by the owner of property adjoining the site of the building operations is obtained and is filed with the Director, the street or sidewalk occupancy permit may be extended beyond the limits of such building site upon the same conditions as those herein fixed for the occupation of the street in front of the building site, provided the adjoining owners be not unreasonably deprived of ingress to and egress from their property.

The gutter or waterway shall not at any time be obstructed by any earth, sand, gravel or other building materials, but such gutters or waterways must at all times be kept clear by the builder to allow the free passage of water in and along same, using a substantial bridge over the gutter if necessary.

Any person having the use of any portion of the street or sidewalk shall cause red lights to be placed and maintained in a conspicuous place in front of all obstructions from sunset to sunrise each night, during the time such obstructions remain.

All excavations below lot grade must be adequately protected for the safety of life, limb and property, and where excavations are left uncovered, adequate means must be provided to prevent the accumulation of stagnant water; all back filling must be performed promptly.

Earth taken from excavations and materials or rubbish taken from buildings shall not be stored upon the sidewalks or streets, but shall be removed from day to day as rapidly as accumulated. When such materials are dry, and likely to produce a dust when handled, they shall be kept moist so as to prevent the wind blowing the same about. Materials or rubbish accumulated on upper floors, shall be lowered by elevators in closed receptacles or by closed chutes discharging directly to wagons or trucks.

No material, fence or shed shall be placed in any way that will obstruct free approach to any fire hydrant, fire alarm box, street lighting standard, public utility pole, manhole, catch basin, or U. S. mail box.

Any temporary sheds used by builder shall be removed upon completion of the work. The street and sidewalk shall be cleared of all materials as soon as the use of the street for storage is no longer required.

In consideration of the foregoing permission to use streets and sidewalks for the piling and storing of materials and tools, or the use of equipment, the owner of the building shall be obligated in the event that any of the street or sidewalk pavements or the surface of the paved streets, be damaged by the piling or storing of materials or tools, or the use of equipment, to restore the same within thirty (30) days after completion and acceptance of building, to the original condition in which they were before materials or tools were piled or stored thereon, or before the use of equipment.

In every building of reinforced concrete construction, forms of combustible materials shall be stripped from the concrete and removed from the building as soon as practicable and when approved by Architect or Engineer.

In all buildings over fifty feet (50') in height, in which standpipes are required by Articles 3803 and 3805, such standpipes shall be installed as the construction progresses, in such a manner that they are always ready for Fire Department use to the topmost floor that

has been installed. Such standpipes shall be provided with a Siamese fire department connection on the outside of the building at the street level and with one standard hose outlet at each floor. All outlets, connections and fittings shall be designated to fit fire department equipment.

In every building operation wherever a tool house, storeroom or other shanty is placed, or a room or spare is used for storage, dressing room or workshop, at least one approved hand pump tank or portable chemical extinguisher of non-freezing type or protected against freezing shall be provided and maintained in an accessible location. When a water supply of not less than 100 gallons per minute at 25 pounds nozzle pressure, ready for use at all time, is installed as the building operation progresses, a 1½ inch hose, fifty feet (50') in length, with a half inch nozzle, may be substituted for each such fire extinguisher.

During building construction, free access from the street to fire hydrants and to outside connections for standpipes, sprinklers or other fire extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times. No material or construction equipment shall be placed within ten feet (10') of such hydrant or connection, nor between it and the center line of the street.

#### ARTICLE 302. PROTECTION FOR PEDESTRIANS.

(a) During the progress of any building operations within the Parish of Jefferson, walkway not less than one-half (½) the width of the sidewalk, a minimum width of three feet (3') shall be at all times, kept free and clear and unobstructed for the purpose of passage in front of such lot or lots. If there are excavations, such walkway shall be protected by substantial railings which shall be built and maintained thereon as long as excavations continue to exist. It is not intended to prohibit the use of a driveway for the delivery of material across such walkway from the curb line to the building site.

(b) Temporary walkways elevated above the curb for safety of pedestrians or for delivering materials to buildings being erected, altered or demolished will be permitted. Such temporary walkways shall be built to carry a live load of two hundred (200) pounds per square foot and may be built to a height not greater than four feet (4') above the curb of the street, and shall not be less than five feet (5') wide in the clear, but such width may be increased when, in the opinion of the Director, such increase is necessary. They shall have an even floor of sufficient strength to carry a live load of two hundred (200) pounds per square foot, and shall be provided with a substantial railing on both sides of same not less than thirty-six inches (36") in height, and shall also be provided with substantial steps (if of 3 risers or more), or easy inclines on both ends of the wall and shall at all times be kept free from rubbish or any other obstructions. Such temporary sidewalks shall be provided in any part of the Parish where, in the opinion of the Director, they are required for public safety. When temporary sidewalks are used that extend over or outside the curb line, such sidewalks shall be elevated to a height of the curb level or higher to protect pedestrians from vehicular traffic. Suitable warning devices shall be provided to prevent collisions by vehicles using roadway.

(c) During the erection or the alteration of the front of any building three (3) stories or more in height or any building within five feet (5') of the property line or wherever, in the opinion of the Director, the same is required for safety and not for storage of material, a sidewalk shed shall be provided over the temporary or permanent sidewalk or street. Such sidewalk shed shall ordinarily be provided for use from the time operations commence until the building is enclosed and permanent sidewalks are replaced, except that during the time sheet piles are being driven and foundation piles are being delivered to the site and driven, the requirements for the shed feature may be waived, if in the opinion of the Director, this requirement is impracticable. Openings of approved size and construction will be permitted within the sidewalk shed for vehicles delivering materials, and when necessary, a watchman shall be provided to warn pedestrians when vehicles are about to use the openings.

When the sidewalk shed is used for a building three (3) stories or less in height, the roof shall be constructed of one layer of plank not less than two inches (2") in thickness or approved equivalent, supported by well braced framework and all parts of the structure shall be designed to support a live load of one hundred and twenty-five (125) pounds per square foot. For a building exceeding three (3) stories in height, the shed roof shall be constructed of not less than two (2) layers of plank, each not less than two (2") in thickness or approved equivalent, supported by well braced framework, no piece of which is less than four by four inches (4" x 4") in size and all parts of the structure shall be designed to support a live load of two hundred and fifty (250) pounds per square foot.

Such sidewalk shed shall be so constructed as to give a free and unobstructed passage for pedestrians; such passageway shall be not less than five feet (5') in width, which width shall be increased up to the full sidewalk widths, when, in the opinion of the Director, such increase in width is necessary, and not less than eight feet (8') in height. The height over

openings for handling material may be greater than the remainder of the shed.

Posts under such temporary roof over sidewalk or street shall be plumb and in line with each other and all braces shall be uniform in size. The entire structure shall be near in appearance and no advertising shall be placed thereupon, except for builders and owners of the building. A temporary office for builders' use may be built over the sidewalk shed, provided the height of the same shall not exceed twenty feet (20') above the curb.

The interior side of the sidewalk shed shall be dust-tight and shall be constructed of material of sufficient strength to afford full and complete protection to pedestrians while passing through same. The exterior side of passageway shall be guarded with substantial rails or may be enclosed with sheathing. The covering of such shed shall be watertight and the inside walls, exterior railing, or wall and ceiling thereof shall be painted white or kalsomined throughout the entire length thereof. Such passageway shall be equipped with suitable lights of sufficient number and power to properly illuminate the same. Such passageway shall at all times be maintained in a clean and sanitary condition and kept free from rubbish and litter. Complete detail drawings showing location of temporary raised walkway and of sidewalk shed shall be furnished the Director. No construction or demolishing operations shall be commenced until such drawings are approved.

(d) **Scaffolds.** All scaffolds shall be substantially constructed to insure the safety of persons working on them or passing under or near them. Planks used for platforms shall be of not less than two inch (2") nominal thickness of sound, seasoned lumber, or equivalent. Clear span between scaffolding supports shall not exceed ten feet (10').

Where a large amount of scaffolding is used, the Director may require use of non combustible material or lumber treated to make it fire-resistive. The flame-proofing of tarpaulins may also be required by the Director where, in his opinion, the fire hazard warrants such precaution.

Every scaffold, other than iron workers' scaffolds and carpenters' bracket scaffolds, the platform level of which is more than six feet (6') above the ground or above a permanent or temporary floor, shall be provided with guard rails not less than thirty-six inches (36") high above the platform level, extending its entire length and along ends, except where ramps or runways connect with them, unless otherwise enclosed or guarded.

(e) **Hoists.** Temporary construction hoists shall be substantially constructed and protected to insure safe operation. Floor openings and other spaces through which they operate shall be enclosed on all sides for the full height, except for the necessary doors for loading and unloading, with barriers so constructed to prevent heads, arms or legs from being thrust into the hoistway, or loose material from falling through them.

No hoist shall be used for transportation of persons unless it is equipped for passenger service as required by this Code.

(f) **Protective Shield.** When welding or cutting is done above or within ten feet (10') of combustible material, or above a place where workers are employed or where persons are likely to pass, incombustible shields shall be interposed to protect such materials and persons against sparks, hot metal or oxide, or injurious rays.

(g) **Removal of Paint by Torch.** When flame is used in the removal of paint or rust, the operator of the flame mechanism shall have within easy reach an adequate fire extinguisher at all times during such operations.

(h) **Exterior Operations.** Sand blasting, steam cleaning, spray painting, waterproofing, or other exterior operations shall be performed with sidewalk canopies in such a manner as not to create a nuisance and to adequately protect persons and property.

### **ARTICLE 303. DEMOLITION REQUIREMENT.**

When drawings and detail statements are filed with the Director for the construction of a new building, if any existing building or part of an existing building is to be demolished, such facts shall be stated in the statement so filed.

In demolishing any building, story after story shall be completely removed. No material shall be placed upon the floor of any such building in the course of demolishing, but the brick, timbers and other structural parts of each story shall be lowered to the ground immediately upon displacement. The owner, architect, builder, or contractor for any structure to be demolished, shall give not less than twenty-four (24) hours' notice in writing to the Director, of such intended demolition. The material being removed shall be properly wet down to lay the dust incident to its removal. Immediately following the displacement or demolition of plaster, masonry, concrete, and other dust-raising materials, they shall again be thoroughly hosed down to insure against dust or other objectional features before further removal or disturbance. All remaining exposed walls of adjoining buildings must be left perfectly safe and all proper safeguards for the public shall be taken.

In demolishing buildings, sidewalk sheds in accordance with the requirements of Article 302, may be required when, in the opinion of the Director, such sheds are necessary for



public safety.

#### ARTICLE 304. , REMOVAL OF DEBRIS.

Where any debris remains in any lot, or on the sidewalk contiguous thereto, resulting from a fire, or in the demolition or partial demolition of any building, or upon the completion of any new building on such lot, it is hereby made the duty of the owner of the property or his agent, to remove, or cause to be removed, from sidewalk and street, all such debris within six (6) days after a notice served upon him by the Director and to place such debris in such a manner on his lot as not to be dangerous.

#### ARTICLE 305. UNSAFE BUILDINGS, INSTALLATIONS AND MACHINERY.

Any premises, building or buildings, part or parts of a building, mechanical or electrical installations and equipment, chimneys, staging or other structure that from any cause may now be or shall at any time hereafter become dangerous or unsafe, shall be taken down and removed, or made safe and secure in the following manner:

The Director shall determine as a matter of fact whether or not said premises, building or buildings, part or parts of building, mechanical or electrical installations and equipment, chimneys, staging or other structure are in imminent danger of collapse and constitute a menace to public safety.

If the Director determines that said premises, building, part or parts of building, etc., are in imminent danger of collapse and constitute a menace to public safety, he shall have the authority to cause the demolition of said premises, building, part or parts of building, etc., by any municipal department or private corporation without previous notice to the owner, executor, administrator, agent or lessee, or any person or persons who may have a vested or contingent interest in said premises, building, part or parts of building, etc.

If the Director determines that said premises, building, part or parts of building, etc., are not in imminent danger of collapse but are unsafe and dangerous, the following procedure shall be followed:

1. The location of the building shall be entered immediately on a Docket of Unsafe Buildings to be kept by the Director;
2. The Director shall determine whether the premises, building, part or parts of building, etc., must be removed or repaired.
3. The Director shall serve a written notice containing a description of the premises to be removed or repaired upon the owner or one of the owners, executor, administrator, agent, lessee, or person or persons who may have a vested or contingent interest in the premises, ordering said person or persons to remove or repair the premises whichever is deemed necessary. Said notice shall direct the person or persons served to certify to the Director within twenty-four (24) hours from the time of service of such notice, his or their assent or refusal to secure or remove same.
4. If the person or persons so served assent with the requirements of paragraph 3, above, the work shall be initiated within ten (10) days and performed as speedily as possible and shall be continuously prosecuted until completed to the satisfaction of the Director.
5. The Director shall have authority to discontinue services of the Utility Companies as provided for in Article 209.
6. If the person or persons refuse to comply with the requirements of the first notice, a second notice shall be served on the person or persons heretofore named notifying said person or persons that unless the demolition or repair work is commenced within twenty-four (24) hours, the Director will enter upon the premises, placard same, close up and barricade all entrances, prevent further occupation of any or all parts of the building, and protect the sidewalks with fences or otherwise provide safety for the occupants and the public.
7. He shall also employ such labor, furnish such material and take such steps as, in his judgement, may be necessary to demolish or repair said building. However, the Director shall not enforce the provisions of this paragraph until ordered to do so by the Parish council. The Director shall then proceed to advertise for bids which shall be submitted to the Parish Council for acceptance or rejection and final disposition.

The removal of the placard hereinabove referred to shall be considered a violation of this code.

All expenses incurred by the Parish of Jefferson in the enforcement of this Article shall be borne by the person or persons owning the unsafe premises, building, part or parts of building etc., which sums so expended, together with the Attorney fees and interest at the rate of 6% per annum from date of completion of such work, shall be charged to the owner of the property on the next regular tax bill forwarded to such owner by the Parish, if not paid by such owner prior thereto, which charge shall be due and payable by such owner at the time of payment of such tax bill.

If the full amount due the Parish under this Article is not paid by the owner within 10 days after the work has been done, the Director or his duly authorized representative shall cause to be recorded in the Mortgage Office of the Parish a sworn statement showing the cost and expense incurred for the work and the date, place or property on which such work was done, and the recordation of such sworn statement shall constitute a lien and privilege on the property and shall remain in full force and effect for the amount due in principal and interest, plus costs of court, if any, for collection, until final payment has been made. Such cost and expenses shall be collected in the manner fixed by law for the collection of taxes; and, further, shall be subject to a delinquent penalty of 10% in the event they are not paid in full on or before the date the tax bill upon which the charge appears becomes delinquent. Sworn Statement recorded in accordance with the provisions hereof shall be prima facie evidence that all legal formalities have been complied with and that the work has been properly and satisfactorily done and shall be full notice to every person concerned that the amount of the statement, plus interest, constitute a charge against the property designated or described in the statement and that such charge is due and collectable as provided by law.

The fact that the Parish may cause said premises, building, buildings, or parts thereof, chimneys, staging or other structure to be demolished or repaired at the expense of the person, firm or corporation owning the same, shall not preclude the Director from taking legal action in a court of competent jurisdiction against the person, firm or corporation who shall fail, neglect or refuse to comply with the orders of the Director and the violation or disregard of such orders shall be considered a violation of this Code.

#### **ARTICLE 306. MOVING OF BUILDINGS.**

No building or part of any building shall be moved through or across any sidewalks, street, alley or highway within Parish limits without first obtaining permission from the proper authorities. (See Relocate Ordinance).

#### **ARTICLE 307. STATE LAWS.**

Laws of the State of Louisiana regulating the protection of workmen, and the public, in construction remain in full effect and are in no way altered or reduced by this Code. The Director may delay the issuance of a Building Permit until such time as written approval is received from all State, local and federal agencies having jurisdiction. However the Director does not assume responsibility for enforcing or determining compliance with laws, regulations, or interpretations other than those specified in this Code or as specifically directed by the Jefferson Parish Council.

#### **ARTICLE 308. PENALTIES.**

Any person, firm or corporation who shall be the owner of any such building or buildings, or parts thereof, chimneys, staging, or other structure which has become dangerous or unsafe, and a menace to life and limb, and who shall fail, neglect or refuse to comply with the orders of the Director within the time hereinbefore specified, shall be deemed and held guilty of a violation of the Code. Each day that the said person, firm or corporation shall fail, neglect or refuse to comply with the said orders of the Director, shall constitute a separate violation; and the fact that the Director may cause said building, buildings, or parts thereof, chimneys, staging or other structure to be demolished at the expense of the person, firm or corporation owning the same, shall not preclude the Director from preferring charges against the person, firm or corporation who shall fail, neglect or refuse to comply with the orders of the Director in the premises.

**PART V**  
**BOARD OF STANDARDS AND APPEALS**  
**CHAPTER 4—BOARD OF STANDARDS AND APPEALS**

**ARTICLE 401. BOARD OF STANDARDS AND APPEALS.**

There shall be in the Parish of Jefferson a Board to be called "Board of Standards and Appeals" hereinafter referred to as the "Board" which Board shall consist of seven (7) members to be appointed within thirty (30) days after the Code becomes effective, subject to the approval of the Council, and as follows:

One member of the Board shall be a Louisiana State Registered Architect; one member to be a Louisiana State Registered Civil Engineer; one member to be a Louisiana Registered Electrical Engineer; one member to be Louisiana Registered Mechanical Engineer; one member to be a qualified General Contractor; one member to be nominated by the Property Insurance Association of Louisiana; and one other member to be selected at large from the Parish by the Governing Authority.

The first term of the members of the Board shall be as follows: The Registered Architect for five (5) years; the Registered Civil Engineer and the member of the Property Insurance Association of Louisiana for four (4) years; The Registered Mechanical and Electrical Engineers for three (3) years; the General Contractor for two (2) years; and the member at large for one (1) year.

Thereafter, the term of office shall be five (5) years each, but each member shall serve until his successor is appointed and qualifies. Any member may be removed by the Governing Authority of the Parish for malfeasance, incapacity or neglect of duty. In case any member shall be interested in any way in an appeal, he shall be recused and the Board shall appoint a member of the same calling to serve in his stead for such particular case. Said terms shall terminate on December 31st, of the respective years. All Board Members shall be registered voters of Jefferson Parish and shall be appointed by the Parish Council. Immediately upon convening of the Board, each member shall take an oath of office in a form prescribed by the Parish Attorney, and the Board shall elect one of its members as Chairman, and appoint a secretary, not a member of the Board, and the Board shall meet when called by the Director of Inspection and Code Enforcement or Chairman of the Board to consider appeals which shall be considered a regular meeting; or by the Governing Authority of the Parish for the transaction of such business as they may designate, which shall be considered a special meeting, but regular meetings shall not be held more often than twice in each month of each year. No appeals shall be considered at a meeting of the Board unless the said appeal has been filed by the Director of Inspection and Code Enforcement with the Board not less than five (5) days prior to the meeting. The said Board shall meet when notified by the Director for the purpose of recommending such changes in this Code as may be deemed necessary and then refer the same to the Governing Authority of the Parish for consideration and action. Four (4) members shall constitute a quorum. The Parish Attorney shall be legal advisor to the Board.

Each member of the Board shall be paid by the Parish a compensation of \$50.00 per meeting they serve at any called meeting or regular meeting of the Board. Reasonable expenses for the operation of said Board, including secretary, clerical assistance and stationary, office equipment and supplies, shall be borne by the Parish.

The Director shall have power, and it shall be his duty, subject to the provisions of law and of this Code of the Parish of Jefferson, to pass upon any question relative to the mode, manner of construction or materials to be used in the erection or alteration of any building or other structure erected or to be erected within the Parish of Jefferson which is affected by the provisions of this Code, or of any existing law applicable to the Parish of Jefferson and relating to the design, construction, alteration, maintenance, repair, and removal of buildings or other structures therein, and to require that such design, mode, manner of construction, or materials shall conform to the true intent and meaning of the several provisions of this Code. Whenever the Director, to whom such a question has been submitted, shall reject or refuse to issue a building permit, or to approve the design, mode, manner of construction or materials proposed to be followed or used in the erection or alteration of any such building or structure, or when it is claimed that the rulings of the Director or the provisions of this Code do not apply, or that a more desirable and equally safe form of construction, from the owner's point of view can be employed in any specific case, or whenever the owner of any such building or structure shall object to any decision given by the Director, relative to the extent of damage sustained by any building or structure, by fire or otherwise, or to the extent or value of repairs, alterations or improvements of any existing building or replacement value thereof, the owner of such

building or structure or his duly authorized agent, may appeal from the decision of said Director.

#### **ARTICLE 402. APPEAL FROM DECISION OF THE DIRECTOR .**

Any applicant for a permit from the Director required by this Code, whose application has been refused or revoked, or any person who has received a written violation of any part of this Code, or any person who has been ordered by the Director to incur any expense, or any person who feels that there are practical difficulties or un-necessary hardships involved in the way of carrying out the strict letter of the Code, or where it is alleged there is error in any order, requirement, decision or determination made by the Director, may within fifteen (15) days after being notified of such refusal or order, appeal from the decision of the Director by giving the Director notice in writing that he does so appeal; said notice shall be accompanied by a check in the amount of Fifty Dollars (\$50.00), payable to the Parish of Jefferson, which amount is to be retained by the Parish.

Whenever the owner of an alleged unsafe structure does not agree with the order from the Department of Safety as to the corrections to be made, he shall have the right to appeal to the Board of Standards and Appeals within fifteen (15) days from the date of said order, stating how he proposes to make the structure safe, and, if required by the Board, shall submit detail engineering analysis or recommendations, accompanied by plans and specifications prepared by a Louisiana registered Architect or a Louisiana registered Civil engineer, or other substantiating data concerning the removal or other remedial steps to be taken to render the structure safe. In case of emergency and when the Director considers the structure imminently dangerous of collapse, that portion of Article 305, relative to imminently dangerous structures shall govern, and no appeal to the Board shall be permitted.

When a letter of intent to disconnect all utilities from a building is issued by the Director following a violation notice, the owner or occupant of the building on which the violation has been issued, may appeal the decision of the Director to the Board of Standards and Appeals under the same procedure as outlined above;

It shall be the duty of the Director when an appeal is filed to refer the same to the Board within five (5) working days thereafter.

It shall be the duty of the Board:

1. To hear and decide appeals where it is alleged there is error in any order, requirement, decisions, or determination made by the Director in the enforcement of this Code.

2. To hear and decide all matters referred to it or upon which it is required to pass under this Code.

3. To pass upon appeals where there are practical difficulties or unnecessary hardships in the way of carrying out the strict letter of this Code, to vary or modify the application of any of the regulations or provisions of such articles relating to the construction or alteration of buildings or structures or the use of land so that the spirit of this Code shall be observed, public safety and welfare secured and substantial justice done.

4. To interpret the intent or meaning of this Code for the advice of the Director and to recommend to the Governing Authority of the Parish such amendments or revisions as may be required from time to time to meet changing conditions.

The Board may, in exercising the above-mentioned powers, reverse or affirm wholly or in part, or may modify the order, requirement, decision or determination appeal from and may make such order, requirement, decision or determination as ought to be made, and to that end shall have all the powers of the Director from whom the appeal is taken. The concurring vote of five (5) members of the Board shall be necessary to recall any requirement, decision or determination of the Director, or to decide in favor of the applicant on any matters on which it is required to pass under this Code, or to effect any variation in this Code.

All cases in which appeals have been taken as above provided shall be referred to the Board, and said Board shall, after hearing, inform the Director of its decisions, stating the waivers or denials granted and conditions, if any, as they may require in such action. The decisions shall specify the variations allowed and the reasons therefore, and shall be filed in the office of the Director within ten (10) working days after the hearing. A certified copy shall be sent by registered return receipt mail to the applicant.

If the order or refusal of the Director is affirmed, such order or refusal shall have full force and effect. If the order or refusal is modified or annulled, the Director shall issue a permit in accordance with such decision.

The decision of the Board upon any appeal, shall be rendered without unnecessary delay, and such decision shall be final.

It shall be the duty of the Board to submit to the Governing Authority of the Parish within thirty (30) days of the close of the Parish fiscal year a report giving a summary of all decisions of the Board, together with such recommendations for revision of this Code as may seem to them advisable.

**ARTICLE 403. BOARD NOT LIABLE.**

Neither the Parish nor the Board of Standards and Appeals, nor any individual member thereof, nor any agent or employee thereof shall incur, or be held to assume any liability by reason or in consequence of any decision rendered to issued or given as herein provided, or by any reason of or in consequence of, any things done or acts performed pursuant to any provisions of this Code.

**ARTICLE 404. ZONING AND ITS REGULATIONS.**

In matters concerning an appeal of the Director's ruling in the enforcement of the Zoning Ordinance, the Board of Standards and Appeals shall have no authority. Such appeals shall be made to the Zoning Appeals Board.

## REQUIREMENTS BASED ON OCCUPANCY

CHAPTER 5—CLASSIFICATION OF ALL BUILDINGS BY USE  
OR OCCUPANCY AND GENERAL REQUIREMENTS FOR  
ALL OCCUPANCIES**ARTICLE 501. OCCUPANCY CLASSIFIED.**

Every building whether existing or hereafter erected, shall be classified by the Director according to its use or the character of its occupancy, as a building of Group A, B, C, D, E, F, G, H, I, or J, as defined in Chapters 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15, respectively. (See Tables No. 5-A and 5-B).

When a building is used for more than one occupancy purpose, it shall be classified in the occupancy group representing the greatest occupancy hazard, except that when separate portions form distinct and unmistakable occupancy divisions, and the proper separations are provided as required in this Chapter, each distinct "Occupancy Division" shall be classified in its specific occupancy group and the regulations pertaining to each group applied to the respective portion of the building forming each "Occupancy Division". When portions of a building are separated from the remainder of a building by one or more fire walls extending from the foundation of a building to and through the roof and affording four-hour fire-resistive protection (see Chapter 43), such portions shall be considered as separate buildings.

Any occupancy not mentioned specifically or about which there is any question shall be classified by the Director and included in the Group which its use most nearly resembles based on the existing or proposed life and fire hazard.

No permit for area exceeding the limits of this Code is permissible without being referred to the Board of Standards and Appeals.

**ARTICLE 502. CHANGE IN USE.**

No change shall be made in the character of occupancy or use of any building which would place the building in a different Group of Occupancy, unless such building is made to comply with the requirements of this Code for that Group, as certified in writing by the Director.

Exception: The character of the occupancy of existing buildings may be changed subject to the approval of the Director, and the building may be occupied for purposes in other Groups without conforming to all the requirements of this Code for those Groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use. Nothing herein shall be construed as preventing the Director from requiring the installation of additional exits, or the removal of other definite hazards to life in existing buildings.

No change in the character of occupancy of a building shall be made without a Certificate of Occupancy, as required by the Fire Prevention Ordinance.

Buildings in existence at the time of the passage of this Code, may have their existing use or occupancy continued, if such use or occupancy was legal at the time of the passage of this Code, provided such continued use is not dangerous to life.

**ARTICLE 503. MIXED OCCUPANCY.**

(a) **General.** When a building is used for more than one occupancy purpose, each part of the building comprising a distinct "Occupancy Division" as described in Chapters 5 to 15, inclusive, shall be separated from any other occupancy division as specified in Tables No. 5-A and 5-B.

(b) **Forms of Occupancy Separations.** Occupancy separations shall be vertical or horizontal or both or, when necessary, of such other form as may be required to afford a complete separation between the various occupancy divisions in the building.

(c) **Types of Occupancy Separation.** Occupancy separations shall be classed as "Absolute", "Special" and "Ordinary".

1. An "Absolute Occupancy Separation" shall be a fire wall of not less than four-hour fire-resistive construction as specified in Chapters 42 and 43, unpierced or with openings as required in Article 501, definition of "Building" under Article 103, and requirements for party and fire walls under Article 2937.

2. A "Special Occupancy Separation" shall be of not less than three-hour fire-resistive construction as specified in Chapters 42 and 43. All openings in walls forming such separation shall be protected on each side thereof by self-closing one-hour fire-resistive doors

as specified in Article 4306 (a) and such doors shall be kept normally closed. The total width of all openings in any "Special Occupancy Separation" wall in any one story shall not exceed twenty-five percent (25%) of the length of the wall in that story and no single opening shall have an area greater than one hundred and twenty square feet (120 sq. ft.)

All openings in floors forming a "Special Occupancy Separation" shall be protected by vertical enclosures, extending above and below such openings. The walls of such vertical enclosures shall be of not less than two-hour fire-resistive construction as specified in self-closing one-hour fire-resistive doors as specified in Article 4306 (a), and such doors shall be kept normally closed.

3. An "Ordinary Occupancy Separation" shall be of not less than one-hour fire-resistive construction as specified in Chapters 42 and 43. All openings in such separations shall be protected with self-closing metal-clad doors, as specified in Article 4306 (a), and such doors shall be kept normally closed.

(d) **Fire Ratings For Occupancy Separations.** Occupancy separations shall be provided between the various groups and divisions of occupancies as specified in Tables No. 5-A and 5-B, except that in no case need the separation be more fire-resistive than the exterior walls of the building in which the separation occurs, unless such walls are of less than one-hour fire-resistive construction. Where any occupancy separation is required the minimum shall be an "Ordinary Occupancy Separation".

(e) Local Special Hazards such as gasoline, oil and paint storage, dry cleaning equipment, spray painting, and film storage, when safeguarded in accordance with recognized good practice, shall not determine the basic occupancy classification of a building. Compliance with the requirements of the National Board of Fire Underwriters (see Article 215) shall be accepted as recognized good practice.

#### **ARTICLE 504. LOCATION ON PROPERTY.**

The location of all buildings and the protection of certain openings shall conform to the requirements of the occupancy group in which such building is classified in this Code according to the use or character of the occupancy; provided, that exterior walls which form an angle of seventy-five (75) degrees or more with the adjacent property line may have openings therein which are protected by not less than one-hour fire-resistive construction as specified in Article 4306 (a).

The specific requirements given in Articles 603, 703, 803, 903, 1003, 1103, 1203, 1303, 1403, and 1503, regulating the construction of exterior walls and the protection of openings therein with respect to adjacent property lines, shall apply to buildings erected on the same property, but with reference to an imaginary property line located between such buildings and parallel to the face of either building; provided that in the case of Group J-1 Occupancies which are accessory to Group I Occupancies on the same property, the requirements for Occupancy Separations between such occupancies as set forth in Article 503 may be substituted in lieu thereof.

Walls at a distance from adjacent property lines in which no openings are allowed (Group J Occupancies excepted) may have openings therein with the following provisions:

1. Special consideration shall be given each case by the Board of Standards and Appeals.

2. The owner of the structure must file in the Conveyance Office of Jefferson Parish a declaration by notarial act agreeing to close at his expense all openings in party walls or walls in common blanketed by any future adjoining building and to further agree to convert to one-hour fire-resistive construction (Article 4306) all openings within 30 feet of openings in any future building or existing buildings with masonry walls, or within 30 feet of any future building or existing building with walls of Type IV or V construction; or within 30 feet from or over any part of a roof of any future building or existing building where such roof is of other than Type I or II construction.

3. In walls where a fire-resistive rating is required, openings allowed shall have assemblies of incombustible construction (See Article 3401) windows bearing Underwriter's Laboratories label of approval for the intended location are acceptable as conforming to this section and in compliance with standards of good practice. No opening shall exceed 120 square feet in area, with no dimension greater than 12 feet and the aggregate width of all openings at any level shall not exceed 25% of the length of the wall.

4. There shall be no parallel wall within 6 feet of wall in which openings are provided. The intervening space shall be unobstructed from ground to sky, or from roof of an adjacent building to the sky.

5. Openings shall comply with the laws of servitude of the state of Louisiana.

6. In the case of party walls or walls in common, should the neighboring owner at any time in the future erect an adjoining building, said owner shall have the right to close said windows without compensation for the cost of installing said windows and using the party wall or wall in common as originally intended. Such wall shall also be made to conform with Article 2937.

For existing walls see Article 2945.

7. Walls and roofs of all structures located within 8 feet of the nearest point of oil filled transformers installed outdoors (not in a transformer vault) shall be of noncombustible one-hour fire rated construction.

8. Every yard, or court, shall not be less than three feet in width.

#### **ARTICLE 505. RAT-PROOFING.**

The specific requirements of Chapter XVIII of the Sanitary Code of the Louisiana State Board of Health governing the rat-proofing of all buildings shall apply to all groups of occupancy as defined herein, the nature of which occupancy falls within the meaning of said rat-proofing laws.

#### **ARTICLE 506. SANITARY REQUIREMENTS.**

The specific requirements of the Sanitary Code of the Louisiana State Board of Health governing the sanitary requirements of buildings shall apply to all groups of occupancy as defined herein, the nature of which occupancy falls within the meaning of said Sanitary Code. For occupancy available to the general public, the provisions of Article 1105 shall apply to arrangement of toilet rooms with respect to food preparation centers.

#### **ARTICLE 507. GRANDSTANDS, TENTS AND OTHER PLACES OF OUTDOOR ASSEMBLY.**

(a) **Scope.** This article covers the design, construction, location, maintenance, and, use of grandstands, tents and other structures and premises used as places of outdoor assembly.

(b) **Detailed Requirements.** Structures and items within the scope of this Article shall meet the requirements of the "Specifications for Places of Outdoor Assembly" (A.S.A.Z20.3) as adopted by the National Fire Protection Association, and such other applicable standards as are therein referred to.

No permit shall be issued for a tent (as defined in Article 103) for a period of more than forty-five (45) calendar days.

(c) **Exception.** Wherever specific requirements of this Code are in conflict with the requirements of said A.S.A. pamphlets, the requirements of this Code shall take precedence over and supersede the requirements of said A.S.A. pamphlets.

#### **ARTICLE 508. PLUMBING AND WATER SUPPLY REQUIREMENTS.**

The specific requirements of the "Rules" of the Sewerage and Water Board of Jefferson Parish Governing Use of Sewerage, Water and Drainage Systems and Plumbing, governing the sanitary requirements of buildings, shall apply to all groups of occupancy as defined herein, the nature of which occupancy falls within the meaning of said "Rules".

#### **ARTICLE 509. AREA RESTRICTIONS.**

(a) When the entire building is protected by an automatic sprinkler system as provided in Chapter 38 and sprinklers are not otherwise required by this Code, the permissible areas may be increased by one hundred per cent (100%).

(b) When a hazardous condition is not created thereby, the area of a public building, a business building, or a storage building, not over two stories high, may be increased in excess of the area fixed by this Article, in the discretion of the Board of Standards and Appeals; provided that a building of combustible occupancy, or involving considerable combustible material in its structural parts, shall be sprinkled, and also curtain boards or draft stops shall be installed as required by the Director.

#### **ARTICLE 510. SPECIAL FLOOR AREA RESTRICTIONS - NEW BUILDINGS**

(a) The floor area enclosed by exterior walls or by exterior walls and fire walls in any story of a building shall not exceed the limits of Articles 5 through 15, for those respective buildings.

(b) For the purpose of this Article loading platforms, sheds and similar structures open on the long side and attached to buildings located outside of the congested commercial areas shall not be deemed parts of the buildings if the aggregate area of such loading platforms, sheds and similar structures does not exceed the area limits for buildings of the same type construction.

(c) The aggregate area of buildings or portions of buildings not of fire-resistive construction attached to buildings of fire-resistive construction shall not exceed the allowable area for any of the buildings or portions of buildings not of fire-resistive construction.

(d) Where 2 or more buildings not of fire-resistive construction are connected by enclosed bridges, corridors, tunnels or other similar connections (not including covered malls) and the aggregate area of the buildings so connected exceeds the allowable area of any of the buildings, the openings onto such interconnections between the buildings shall be restricted to doorways, or other openings protected by approved self-closing fire doors. The



construction of the bridges, corridors, tunnels or other similar connections between the buildings shall be of noncombustible construction or equivalent to the type of construction of the building having the highest allowable area.

(e) Where 2 or more buildings are connected by an enclosed mall the construction of the mall shall be of noncombustible construction or equivalent to the type of construction of the building having the highest allowable area and shall be protected by a standard automatic sprinkler system.

Enclosed mall's shall also meet the following requirements:

1. Standard draft curtains of non-combustible construction shall be installed and so arranged that the number of sprinkler heads in one heat banking area shall not exceed one hundred.

2. Exits shall conform to the requirements of this Code and of the N.F.P.A. Building Exit Code for type of building and occupancy involved.

3. When the exit doorways are not visible from all locations, directional signs as required by the Director, shall be placed on walls or otherwise displayed in conspicuous locations to direct occupants to exit doorways.

4. All exit doors shall conform to the requirements of Chapter 6 of this Code and Section 32 of N.F.P.A. Building Exit Code.

5. Air conditioning system or systems installed in the mall and buildings connected thereto shall conform to the requirements of Chapter 48 of this Code and Section 47 of N.F.P.A. Building Exit Code.

NOTE: All other requirements applicable to this type of building, structure or occupancy as contained in other sections of this Code shall be met.

#### **ARTICLE 511. AIDS TO PHYSICALLY HANDICAPPED PERSONS.**

The provisions of American Standard Specifications for Making Buildings and Facilities Accessible to, and usable by, the Physically Handicapped (ASAA117.1) are acceptable under this Code, provided no recommendations therein shall be approved which will reduce the fire safety requirements of this Code.

TABLE No. 5-A — OCCUPANCY CLASSIFICATIONS

| Chapter Reference | Group | OCCUPANCY*                                                                                                                                                                                                                                                                                                                                                                                          | Perma-<br>nent<br>Stage | Seating<br>Capacity in<br>Any One Room |
|-------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------|
|                   |       | DIVISION                                                                                                                                                                                                                                                                                                                                                                                            |                         |                                        |
| 6                 | A     | 1—All theatres, etc. ....                                                                                                                                                                                                                                                                                                                                                                           | Yes                     | 1000 or more                           |
|                   |       | 2—Assembly halls. ....                                                                                                                                                                                                                                                                                                                                                                              | No                      | 3500 or more                           |
| 7                 | B     | 1—Same as Group "A", Division 1. ....                                                                                                                                                                                                                                                                                                                                                               | Yes                     | 300-1000                               |
|                   |       | 2—Same as Group "A", Division 2. ....                                                                                                                                                                                                                                                                                                                                                               | No                      | 750-3500                               |
| 8                 | C     | 1—Same as Group "A", Division 1. ....                                                                                                                                                                                                                                                                                                                                                               | Yes                     | Less than 300                          |
|                   |       | 2—Same as Group "A", Division 2. ....                                                                                                                                                                                                                                                                                                                                                               | No                      | 50-750                                 |
|                   |       | 3—Same as Group "A", Division 2. ....                                                                                                                                                                                                                                                                                                                                                               | No                      | Less than 50                           |
|                   |       | 4—Stadiums, reviewing stands, amusement<br>park structures not included in the above                                                                                                                                                                                                                                                                                                                |                         |                                        |
| 9                 | D     | 1—Jails, prisons, reformatories, asy-<br>lums, similar buildings.                                                                                                                                                                                                                                                                                                                                   |                         |                                        |
|                   |       | 2—Hospitals, sanitariums.                                                                                                                                                                                                                                                                                                                                                                           |                         |                                        |
|                   |       | 3—Nursing, convalescent and old age<br>homes accommodating more than<br>2 persons.                                                                                                                                                                                                                                                                                                                  |                         |                                        |
|                   |       | 4—Child boarding homes and day<br>nurseries accommodating more<br>than 3 children.                                                                                                                                                                                                                                                                                                                  |                         |                                        |
| 10                | E     | 1—Public garages, (not private storage<br>garages), paint or petroleum storage,<br>dry cleaning plants, paint shops,<br>spray painting rooms and shops, and<br>film exchanges.                                                                                                                                                                                                                      |                         |                                        |
|                   |       | 2—Planing mills, box factories, woodwork-<br>ing and mattress factories                                                                                                                                                                                                                                                                                                                             |                         |                                        |
|                   |       | 3—Storage of highly flammable or ex-<br>plosive materials and liquids, air-<br>craft repair hangers.                                                                                                                                                                                                                                                                                                |                         |                                        |
| 11                | F     | 1—Wholesale and retail stores, office<br>buildings, restaurants, undertaking<br>parlors, printing plants, municipal<br>police and fire stations, clinics with-<br>out beds, parking lots, night clubs,<br>and cocktail lounges                                                                                                                                                                      |                         |                                        |
|                   |       | 2—Bakeries, factories and workshops<br>using materials not highly flammable<br>or combustible, gasoline filling and<br>service stations, storage garages (pri-<br>vate), stables (public), cold storage<br>(furs), and aircraft hangars where no<br>repair work is done except exchange<br>of parts and maintenance requiring<br>no open flame, welding, or the use<br>of highly flammable liquids. |                         |                                        |
| 12                | G     | 1—Ice plants, power plants, pumping<br>plants, cold storage, creameries, dial<br>telephone exchanges, boiler buildings<br>or rooms                                                                                                                                                                                                                                                                  |                         |                                        |
|                   |       | 2—Factories and workshops using incomb-<br>ustible or non-explosive materials,<br>machine shops.                                                                                                                                                                                                                                                                                                    |                         |                                        |
|                   |       | 3—Storage and sales rooms of incomb-<br>ustible or non-explosive goods,<br>dry cleaning plants using non-<br>flammable liquid, service shops,<br>small schools.                                                                                                                                                                                                                                     |                         |                                        |
|                   |       | 4—Small shops, small stores.                                                                                                                                                                                                                                                                                                                                                                        |                         |                                        |
| 13                | H     | 1—Hotels, motels, apartment houses, dormitories<br>lunch counters and hamburger stands.                                                                                                                                                                                                                                                                                                             |                         |                                        |
|                   |       | 2—Convents, monasteries (when ac-<br>commodating 15 or more persons).                                                                                                                                                                                                                                                                                                                               |                         |                                        |
| 14                | I     | 1—Dwellings (no more than 4 apart-<br>ments), lodging or rooming houses<br>boarding houses, rectories, manse,<br>parsonages & townhouses.                                                                                                                                                                                                                                                           |                         |                                        |
|                   |       | 2—Fences, tanks and towers                                                                                                                                                                                                                                                                                                                                                                          |                         |                                        |
| 15                | J     | 1—Private garages, car ports, porte-<br>cocheres, private stables, sheds and<br>minor buildings used as accessories<br>only when not over one thousand<br>(1,000) square feet in area                                                                                                                                                                                                               |                         |                                        |
|                   |       | 2—Fences, tanks and towers                                                                                                                                                                                                                                                                                                                                                                          |                         |                                        |

\*Refer to Chapters 6 to 15, inclusive, for more complete listing of occupancies and definitions.

TABLE No. 5-B — GROUPS AND DIVISIONS OF OCCUPANCY

| Legend: A—Absolute separations = 4 hr. O—Ordinary separation = 1 hr.<br>S—Special separations = 3 hr. N—No separation required. |          |    |    |      |      |      |    |      |     |    |    |
|---------------------------------------------------------------------------------------------------------------------------------|----------|----|----|------|------|------|----|------|-----|----|----|
| GROUP                                                                                                                           |          | A  | B  | C    | D    | E    | F  | G    | H   | I  | J  |
|                                                                                                                                 | Division | 12 | 12 | 1234 | 1234 | 123  | 12 | 1234 | 12  | 1  | 12 |
| A                                                                                                                               | 1        | NN | NN | NNNN | SSSS | AAA  | SA | ASOO | SS  | O  | AN |
|                                                                                                                                 | 2        | N  | NN | NNNN | SSSS | AAA  | SA | ASOO | OO  | O  | AN |
| B                                                                                                                               | 1        |    | NN | NNNN | SSSS | AAA  | SA | ASOO | SS  | O  | AN |
|                                                                                                                                 | 2        |    | N  | NNNN | SSSS | AAA  | SA | ASOO | NN  | O  | AN |
| C                                                                                                                               | 1        |    |    | NNNN | OOOO | ASA  | OO | OONN | NN  | N  | AN |
|                                                                                                                                 | 2        |    |    | NNN  | OOOO | ASA  | OO | OONN | NN  | N  | AN |
|                                                                                                                                 | 3        |    |    | NN   | OOOO | ASA  | OO | OONN | NN  | N  | AN |
|                                                                                                                                 | 4        |    |    | N    | NNNN | SSS  | OO | ONNN | OO  | O  | ON |
| D                                                                                                                               | 1        |    |    |      | NOOO | ASA  | SO | AOOO | OO  | O  | SN |
|                                                                                                                                 | 2        |    |    |      | NNN  | ASA  | OS | AOOO | OO  | O  | SN |
|                                                                                                                                 | 3        |    |    |      | NN   | ASA  | OS | AOOO | OO  | O  | SN |
|                                                                                                                                 | 4        |    |    |      | N    | ASA  | OS | AOOO | OO  | O  | SN |
| E                                                                                                                               | 1        |    |    |      |      | N+SA | SS | SSOO | SS  | S* | OO |
|                                                                                                                                 | 2        |    |    |      |      | NO   | SN | SNNN | AA  | O  | ON |
|                                                                                                                                 | 3        |    |    |      |      | N    | SS | SSOO | AA  | S  | SS |
| F                                                                                                                               | 1        |    |    |      |      |      | NN | ONNN | O*O | N  | ON |
|                                                                                                                                 | 2        |    |    |      |      |      | N  | ONNN | OO  | O  | ON |
| G                                                                                                                               | 1        |    |    |      |      |      |    | NNOO | SS  | O  | NN |
|                                                                                                                                 | 2        |    |    |      |      |      |    | NNN  | OO  | N  | NN |
|                                                                                                                                 | 3        |    |    |      |      |      |    | NN   | OO  | N  | NN |
|                                                                                                                                 | 4        |    |    |      |      |      |    | N    | OO  | N  | NN |
| H                                                                                                                               | 1        |    |    |      |      |      |    |      | NN  | N  | ON |
|                                                                                                                                 | 2        |    |    |      |      |      |    |      | N   | N  | ON |
| I                                                                                                                               | 1        |    |    |      |      |      |    |      |     | N  | NN |
| J                                                                                                                               | **1      |    |    |      |      |      |    |      |     |    | NN |
|                                                                                                                                 | 2        |    |    |      |      |      |    |      |     |    | N  |

NOTE: † Provided that local special hazards, such as gasoline, oil, and paint storage, dry cleaning equipment spray painting and films, are safeguarded as required in Article 503 (e).

\* Provided that an "Ordinary Separation" shall be permitted between public garages and dwellings, and between dwellings and dry cleaning establishments using low hazard solvents or liquids.

\* Provided that in Type I buildings, no separation shall be required.

• Private garages not exceeding 1,000 sq. ft. in area may have separations as outlined in Article 1509.

\*\* See Article 1401 exception for townhouse carports.

In cases of local hazards only, a separation of one hour plus sprinkler system will be accepted in place of a Special Separation.

## CHAPTER 6 – REQUIREMENTS FOR GROUP A OCCUPANCIES

### ARTICLE 601. GROUP A OCCUPANCIES DEFINED.

Group A Occupancies shall be:

Division 1: Theatres, motion picture theatres, auditoriums, schools, churches, lodges, clubs, museums, dance halls, armories, libraries, gymnasiums, passenger stations, administration buildings and similar buildings having a permanent stage and seating capacity of one thousand (1000) or more in any one room.

Division 2. The same as Division 1 except, not having a permanent stage and having a seating capacity of thirty-five hundred (3500) or more in any one room.

See Tables Nos. 5-A and 5-B, and Article 503 for all occupancy classifications and separations.

### ARTICLE 602. CONSTRUCTION, HEIGHT and AREA ALLOWABLE.

(a) **General.** Buildings or parts of buildings classed in Group A because of the use or character of the occupancy shall be of Type I Construction and shall not be limited as to location, seating capacity, height or floor area.

Platforms which are used in lieu of stages shall be included in the floor area of the assembly room, when determining the seating capacity as defined herein.

(b) **Special Construction.** Stages as defined herein shall be of Type I Construction, except as specified in Article 3905.

The slope of the main floor of the auditorium shall not exceed one in five. Ramps steeper than one in eight shall have non-slip floor surfaces.

Bleachers over usable spaces in a gymnasium shall be protected on the under side with one-hour fire-resistive ceiling, or equivalent.

(c) **Grandstands, Tents and Other Places of Outdoor Assembly.** See Article 507.

### ARTICLE 603. LOCATION ON PROPERTY.

All buildings housing Group A Occupancies shall front directly upon at least one public street not less than twenty feet (20') in width in which front shall be located the main entrance and exit of such buildings. The main floor of every Group A Occupancy shall be located at or near the adjacent ground level.

All exterior walls or parts of walls, except on street fronts, of Group A Occupancies which are less than five feet (5') from adjacent property lines shall have no openings therein. All openings in exterior walls, except on street fronts, which are less than ten feet (10') from adjacent property lines shall be protected by doors or windows of one-hour fire-resistive protection as set forth in Article 4306. See Article 504 for regulating adjacent buildings on the same property.

For openings in party walls and walls on or within five feet (5') of the property line, the special requirements of Article 504, third paragraph, shall apply.

Exceptions: Protection of exterior openings is not required for churches.

### ARTICLE 604. EXIT FACILITIES.

Exception: Protection of exterior openings is not required for churches.

The requirements of the Building Exits Code (see Article 215) will be accepted as complying with the requirements of this Code.

(a) **Main Entrance and Exits.** In every Group A Occupancy there will be not less than one exit on each of the three sides of the auditorium. Each of these exits shall be not less than 5 feet in width and shall open directly upon a street or into an open exit court which shall be directly connected to a street as specified in Sub-Article (b) of this Article.

One such exit on a street front which shall serve as the main entrance, shall be proportioned on the basis of 2 feet of width for each 100 persons or major fraction thereof to and including 1000 persons, with an additional one foot per 100 persons for each additional 100 persons or major fraction thereof and including 2000 persons and an additional 6 inches for each additional 100 persons or major fraction thereof, all based upon the total seating capacity of the building served by such entrance and exit.

At the main entrance of each Group A Occupancy there shall be a foyer having an area of one square foot to each seat in such building having access to such foyer. The required width of the foyer at any point shall be the combined width of the aisles, passageways and stairways tributary thereto at that point but need not exceed the required width of the entrance. The foyer shall be at the same level as the back of the auditorium and all changes in elevation between the foyer and the public street adjacent thereto shall be by ramps with a slope of not more than one in ten.

The foyer, if not abutting directly upon a public street, shall communicate therewith by a straight and unobstructed corridor or passageway equal in width to that required for the

main entrance which shall be used only as an exit or entrance; provided, however, that not to exceed ten per cent (10%) of such required width may be used for the placing of a ticket booth.

(b) **Exit Courts.** Along each side of, and long enough to accommodate all side exits of the auditorium not fronting directly upon a street, (not including that side bounded by the stage) shall be an open court, or a passageway of Type I Construction, not less than five feet (5') in width when the total seating capacity is 1000 or less, and such width shall be increased by one foot (1') for each additional 500 persons or major fraction thereof. These are required widths and shall not be reduced in any manner.

The courts shall extend full width to a street or shall be connected to the street by a passageway of the same required width, with a height of not less than seven feet (7') and such passageway shall not exceed a length of fifty feet (50'). The court or passageway shall meet the street level and all changes in elevation shall be by ramps with a slope of not more than one in eight.

All doors opening into such open courts or passageways of Type I Construction shall be arranged so as not to decrease the clear width of the court when open.

(c) **Main Floor Auditorium Exits.** There shall be provided at the rear of the auditorium leading into the foyer, exits which shall be not less in width than the full width of the aisle or aisles leading thereto. Additional exits located on each side of and not less than one-half (1/2) the length of the auditorium from the foyer, shall be provided on the main floor of each Group A Occupancy. These exits shall be proportioned on the basis of not less than twenty-two (22') of combined width to each 150 seats or major fraction thereof on the main floor of the auditorium, and this exit width shall be equally divided to each side of the auditorium. All such exits shall open directly upon a street or upon an exit court or upon corridors connected to an exit court. Each such corridor shall have a clear width of not less than the required width of the largest door opening into the corridor, plus one-half (1/2) the sum of the widths of all other doors opening into the corridor. There shall be no openings in such corridors other than the exit openings, and the exit doors shall be hung so as not to decrease the required width. Egress from the main floor of the auditorium to the street shall be by means of ramps having a slope of not more than one in eight, except as required in Sub-Article (a) of this Article.

Where fixed seats are not provided the exits shall be proportioned on the seating capacity as defined herein, and shall be evenly distributed and so arranged that the distance between adjacent exits shall not exceed one hundred feet (100') measured along the wall.

(d) **Balcony and Gallery Exits.** For balconies or galleries having a seating capacity of over fifty (50), exits shall be provided from each side of each balcony or gallery, leading directly to a street or exit court. These exits shall have a combined width of not less than twenty-two inches (22") for every one hundred fifty (150) seats or major fraction thereof in such balcony or gallery and such exits shall be equally divided on each side. No exit shall be less than three feet six inches (3'6") in width. All exits shall be served by stairs or ramps, completely enclosed and constructed as specified in Chapter 33. Balconies or galleries having a seating capacity of thirty (30) to fifty (50) shall be provided with not less than two (2) means of egress at least one (1) of which shall lead directly to a street or court. These exits shall be not less than three feet six inches (3'6") in width. All such exits shall be located as far apart as is practicable and all combined exits shall continue the full combined width to the street. No stair exit shall be continued to or communicate with a basement.

Exits leading to the foyer shall have a combined width of not less than twenty-two inches (22") for each seventy-five (75) seats or major fraction thereof in such gallery or balcony. No such exit shall be less than three feet six inches (3'6") in width.

Where fixed seats are not provided the exits shall be proportioned on the seating capacity as defined herein.

Hand rails shall be provided for stairs, as specified in Article 3305.

Stairs emptying into exit courts shall meet the court floor at not less than the stair width from the near side of any main floor exit opening into such exit court.

A stairway or ramp serving as an exit only from the first or lowest balcony above the main floor need not be enclosed and the path therefrom may join a path of exit from the main floor. When the said balcony has a seating capacity of thirty (30) or less, only one (1) such exit will be required and same shall not be less than three feet (3') in width.

(e) **Stage Exits.** For size and location of stage exits see Article 3907.

(f) **Aisles.** Aisles on the main floor shall be located so that there are not more than six (6) seats between any seat and an aisle. The width of an aisle running at right angles to the seat rows, in places of assembly in which seating is provided shall be not less than thirty-six inches (36") plus one-quarter inch (1/4") for every foot of length of such aisle, from its beginning to an exit door or to a cross aisle, or between cross aisles. Cross aisles

shall be not less in width than the widest aisle with which they connect. There shall be no steps or obstructions of any kind in any aisles, and aisles may have a slope of not more than one in five. Ramps steeper than one in eight shall have non-slip floor surfaces.

Aisles in balconies or galleries shall be located so that there are not more than six (6) seats between any seat and an aisle.

Aisles in balconies and galleries shall have the same minimum width as for aisles on the first floor and shall have the same ratio of increase in width with the exception that the increase shall be in the direction of exit travel. There shall be provided in all balconies or galleries having more than twenty (20) rows of seats across aisle not less than four feet (4') wide from the back of one chair to the edge of the seat, when down in the next row. Such cross aisle shall lead directly to an entrance or to an emergency exit.

Risers shall be not more than seven and one-half inches (7½") and shall be the full width of the aisle and no tread shall be less than ten inches (10"). When the slope of the aisle is not more than one in five it shall be ramped. All aisles shall lead directly to exits.

The floor between rows of seats shall be on the same level as the aisles where they intersect.

(g) **Seats.** Seats shall be spaced not less than thirty inches (30") back to back.

All seats in occupancies of Division 1 of Group A on the main floor and in balconies and galleries shall be fastened securely to the floor, and shall be not less than eighteen inches (18") in minimum width.

Where seats are of the bench type without backs, they may be spaced a minimum of twenty-six inches (26"), center to center, and, if not marked off, a distance of eighteen inches (18") along such bench shall constitute one (1) seat in computing the required aisles, stairs, and exits.

(h) **Boxes.** Boxes may be served by stairs not less than three feet (3') in width with a rise and tread as required for main stair exits. Boxes accommodating more than twenty-five (25) persons shall be considered as balconies. Seats in boxes need not be fastened to the floor.

(i) **Doors and Gates.** All exit and entrance doors or gates shall swing in the direction of exit travel and if provided with latches such latches shall be of self-releasing type, such as panic bolts or similar devices, which will permit the door to open when pressed against. All doors shall be installed so as not to decrease the required width of any opening, passageway or corridor in any manner whatsoever. No single door shall be more than three feet six inches (3'6") in width and every exit door on the exterior of such building shall be not less than one-hour fire-resistive construction, as specified in Article 4306, except at the main entrance and exit. Doors opening from within the building into a stair or ramp enclosure may be metal-clad doors as specified in Article 4306.

(j) **Exit Lights.** All exits shall be marked with illuminated signs bearing the word "Exit" in letters, at least five inches (5") high. Internally illuminated signs and their circuit arrangement shall be as specified under Chapter 50. All exit and directional signs shall be illuminated all during the time the conditions of occupancy require that the exitways be open or available.

(k) **Smokeproof Tower.** Where there is more than one balcony or gallery, all balconies or galleries above the first shall be served by not less than one (1) smokeproof tower located on each side of such balcony or gallery and constructed as specified in Chapter 33.

1. **General.** No obstructions shall be placed in any aisle, exist, foyer, passageway, or corridor.

Exit doors, including those from individual rooms (other than private offices) shall not be fastened against exit by any device except self-releasing latches, panic bolts or similar devices which can be opened readily from the inside at all times without the use of keys or any special knowledge or effort.

No bars shall be placed upon any window or any other opening in any Group A Occupancy except on the windows of a private office.

All doors shall have a clear height of not less than six feet eight inches (6'8").

#### ARTICLE 605. LIGHT AND VENTILATION.

All portions of Group A Occupancies customarily used by human beings and all dressing rooms shall be provided with light and ventilation by means of windows and skylights with an area not less than one-eighth (1/8) of the total floor area, or shall be provided with artificial light and a mechanically operated ventilating system. The mechanically operated ventilating system shall supply at least thirty (30) cubic feet of pure air per minute per seat in all portions of the building and such system shall be kept continuously in operation during such time as the building is occupied. If the velocity of the air at the register exceeds ten feet (10') per second the register shall be placed more than eight feet (8') above the floor directly beneath.

Lights in all parts of the building customarily used by human beings and in all dressing rooms shall be on a separate circuit from that of the stage and shall be controlled from the box office. All lights in corridors, exit courts, aisles, stair enclosures, exit passageways and

exit and directional lighting shall conform with the provisions of Article 5035 of this Code and shall be protected by wire cages, or equivalent, where subject to mechanical injury.

All registers or vents supplying air backstage shall be equipped with approved automatic closing devices which shall be located where the vents or ducts pass through the proscenium wall and shall be operated by smoke detectors, fusible links, or other approved devices located on both sides of the proscenium wall and both inside of and outside of the vent or duct.

#### **ARTICLE 606. ENCLOSURE OF VERTICAL OPENINGS.**

Main stair ramp exits from the first or lower balcony or gallery need not be enclosed but all other stair exits shall be enclosed as specified in Chapter 30 and Article 3308. There shall be no openings into stair or ramp enclosures other than necessary entrance and exit doors, except for doors opening into lavatories exclusively occupied as such and having no combustible storage. All emergency stair or ramp enclosures shall lead directly to a public street or alley or exit court..

All elevator shafts, vent shafts and other vertical openings shall be enclosed as specified in Chapter 30.

#### **ARTICLE 607. FIRE EXTINGUISHING APPARATUS.**

Group A Occupancies shall be equipped with automatic sprinklers as required in Chapter 38.

Wet and dry standpipes shall be provided as required in Chapter 38.

Stages shall be equipped with automatic ventilators as required in Article 3901.

#### **ARTICLE 608. SPECIAL HAZARDS.**

Chimneys, heating apparatus and gas fired furnaces shall conform to the requirements of Chapters 37, 52 and 53.

Motion picture machine booths shall conform to the requirements of Chapter 40.

No flammable liquids shall be placed or stored in a Group A Occupancy.

Every gas service to the stage portion of the building shall be separated from any other service to the building and each gas service shall be provided with an approved shut-off valve at a convenient and conspicuous place outside the building and adequately marked.

Exterior openings in a boiler room or room containing central heating equipment, if located below openings in another story or if less than ten feet (10') from other doors or windows of the same building, shall be provided with one-hour fire-resistive protection as set forth in Article 4306.

Every boiler room or room containing a heating plant which burns gas, liquid or solid fuel shall be separated from the rest of the building with a "Special Occupancy Separation" as defined in Article 503.

Every boiler room or room containing a heating plant which burns gas as fuel shall be separated from the rest of the building with not less than a "Special Occupancy Separation" as defined in Article 503.

The use of combustible materials for decorative purposes, including among others, flammable curtains, cloth, paper, streamers, draperies, vines, leaves, trees, moss or other interior decorations, shall be prohibited.

The use of imitation leather or other material consisting of, or coated with, a pyroxylin or similarly hazardous base, shall be prohibited.

For regulations governing ceiling, partition, and wall materials, the provisions of Articles 1816, 3004, and 3317 shall apply.

#### **ARTICLE 609. EXCEPTIONS AND DEVIATIONS.**

Gymnasiums and similar occupancies may have running tracks constructed of wood or unprotected steel or iron.

In gymnasiums, tight wood wall covering may be used on the gymnasium walls, when applied over a noncombustible base, as provided in Article 1816. Wood flooring may be used when applied as specified in Article 1810; however, said restrictions shall not apply to running tracks.

#### **ARTICLE 610. MIXED OCCUPANCIES.**

Separation of Group A Occupancies from all other occupancies shall be provided as specified in Article 503.

**THE SEPARATION REQUIREMENTS OF GARAGES WILL BE REQUIRED BETWEEN GARAGES AND GROUP A OCCUPANCIES.**

**FOR REQUIREMENTS FOR OPEN AIR AND ENCLOSED PUBLIC PARKING GARAGES, SEE ARTICLE 1011.**

# CHAPTER 7—REQUIREMENTS FOR GROUP B OCCUPANCIES

## ARTICLE 701. GROUP B OCCUPANCIES DEFINED.

Group B Occupancies shall be:

Division 1: Theatres, motion picture theatres, auditoriums, schools, churches, lodges, clubs, museums, dance halls, armories, libraries, gymnasiums, passenger stations, administration buildings and similar buildings having a permanent stage and a seating capacity of 300 or more, but less than 1000 in any one room.

Division 2: The same as Division 1, except not having a permanent stage and having a seating capacity of 750 or more, but less than 3500 in any one room.

See Tables Nos. 5-A and 5-B, and Article 503, for all occupancy classifications and separations.

## ARTICLE 702. CONSTRUCTION, HEIGHT AND AREA ALLOWABLE.

(a) **General.** Buildings classed in Group B, because of the use or character of the occupancy shall be of Type I, II or III Construction only and shall not exceed the maximum limits set forth in Table No. 7-A.

Platforms which are used in lieu of stages shall be included in the floor area of the assembly room when determining the seating capacity as defined herein.

(b) **Special Provisions.** Stages and platforms shall be constructed as specified in Chapter 39.

Divisions 1 and 2 occupancies when Type III construction over one story are required to have one-hour protection throughout.

Bleachers over usable spaces in a gymnasium shall be protected on the under side with one-hour fire-resistive ceiling, or equivalent.

For attic space partitions and draft stops see Article 3205.

(c) **Grandstands, Tents and Other Places of Outdoor Assembly.** See Article 507.

TABLE No. 7-A—TYPES OF CONSTRUCTION, SEATING CAPACITIES AND  
MAXIMUM AGGREGATE FLOOR AREAS PERMITTED  
FOR GROUP B OCCUPANCIES.

| Types of<br>Construction<br>Permissible | No. of<br>Stories | Maximum<br>Total Seating<br>Capacity in<br>Any one Room | Maximum Aggregate<br>Floor Area<br>Permissible<br>(Sq. Ft.) |
|-----------------------------------------|-------------------|---------------------------------------------------------|-------------------------------------------------------------|
| Type I                                  | Unlimited         | 3500                                                    | No Limit                                                    |
| Type II                                 | 4                 | 1000*                                                   | 15,000                                                      |
| Type III                                | 2                 | 750*                                                    | 12,000                                                      |

\* Seating capacity may be increased, except for Division 1 Group B Occupancies, not to exceed fifty percent (50%) when no balconies or galleries are constructed as a part of such building and when the auditorium floor is located at or near ground floor level, in which case all exits shall be at street level or shall meet street level by means of ramps.

## ARTICLE 703. LOCATION ON PROPERTY.

All buildings housing Group B Occupancies shall front directly upon at least one public street not less than twenty feet (20') in width, in which front shall be located the main entrance and exit of such building, or such building may be connected to the street by an entrance passageway as specified in Article 604 (a). The main floor of each Group B Occupancy shall be located at or near the adjacent ground level; occupancies in Division 2 of Group B having a total seating capacity of not more than 1500, may be located above the ground floor or in the first basement, and stairs may be used as a means of ingress and egress.

All exterior walls or parts of walls, except on street fronts, of Group B Occupancies which are less than five feet (5') from adjacent property lines shall have no openings therein, shall be of not less than four-hour fire-resistive construction as specified in Chapter 43 and shall be constructed as specified in Chapters 17 thru 41 of this Code. Walls five feet (5') or more, but less than ten feet (10') from adjacent property lines, except on street fronts shall be of not less than two-hour fire-resistive construction as specified in Chapter 43. All openings in exterior walls, except on street fronts, which are less than ten feet (10') from



adjacent property lines shall be protected by doors or windows of one-hour fire-resistive construction as specified in Article 4306. See Article 504 for regulating adjacent buildings on the same property.

For openings in party walls and walls on or within five feet (5') of the property line, the special requirements of Article 504, third paragraph, shall apply.

Exception: Protection of exterior openings is not required for churches.

#### **ARTICLE 704. EXIT FACILITIES.**

Exit requirements shall be the same as specified in Article 604 with the following exceptions:

1. A foyer shall not be required.

2. No balcony or gallery shall be allowed except in buildings of Type I Construction.

Exception: This shall not apply to a school gymnasium in which there is no stage, and where there are not more than 2 balconies and the seating capacity of each balcony does not exceed 300 persons.

3. Exit doors, including those from individual rooms (other than private offices), shall not be fastened against exit by any device except self-releasing latches, panic bolts or similar devices which can be opened readily from the inside at all times without the use of keys or any special knowledge or effort.

4. No bars shall be placed upon any window or any other opening, except on the windows of a private office.

#### **ARTICLE 705. LIGHT, AND VENTILATION.**

All portions of Group B Occupancies customarily used by human beings and all dressing rooms shall be provided with light and ventilation, either natural or artificial, as specified in Article 605.

For sanitary requirements see Articles 506 and 508.

#### **ARTICLE 706. ENCLOSURE OF VERTICAL OPENINGS.**

All vertical openings, such as elevator shafts, stairs, ramps and vent shafts, which permit the passage of fire or smoke in buildings over one story, shall be enclosed as specified in Chapter 30. There shall be no openings into stair or ramp enclosures other than necessary entrance and exit doors, except for doors opening into lavatories exclusively occupied as such and having no combustible storage.

#### **ARTICLE 707. FIRE EXTINGUISHING APPARATUS.**

Automatic sprinklers, standpipes and basement pipe inlets shall be installed as and when required in Chapter 38.

#### **ARTICLE 708. SPECIAL HAZARDS.**

Chimneys, heating apparatus and gas fired furnaces shall conform to the requirements of Chapters 37, 52, and 53. Motion picture machine booths shall conform to the requirements of Chapter 40.

No flammable liquids shall be placed or stored in a Group B Occupancy.

Every gas service to a Group B Occupancy shall be provided with an approved outside shut-off valve conspicuously marked.

Exterior openings in a boiler room or room containing central heating equipment, if located below openings in another story if less than ten feet (10') from other doors or windows of the same building, shall be provided with one-hour fire-resistive protection as specified in Article 4306.

Every boiler room or room containing a heating plant which burns gas, liquid or solid fuel shall be separated from the rest of the building with a "Special Occupancy Separation" as defined in Article 503.

The use of combustible materials for decorative purposes, including among others, flammable curtains, cloth, paper, streamers, draperies, vines, leaves, trees, moss or other interior decorations, shall be prohibited.

The use of imitation leather or other material consisting of, or coated with, a pyroxylin or similarly hazardous base, shall be prohibited.

For regulations governing ceiling, partition, and wall materials the provisions of Articles 1816, 1916, 3004, and 3317, shall apply in conjunction with the construction-type employed.

#### **ARTICLE 709. EXCEPTIONS AND DEVIATIONS.**

Gymnasiums and similar occupancies may have running tracks constructed of wood or unprotected steel or iron.

In gymnasiums, tight wood wall covering may be used on the walls in lieu of fire-resistive plaster.

Roof trusses, roof girders and beams twenty-five (25') or more above the nearest floor or balcony need not be fire-protected.

In school buildings, rooms having a seating capacity of more than three hundred (300) shall not be located above the first story above grade except in buildings of Type I Construction.

In other than school buildings, rooms having a seating capacity of more than three hundred (300) shall not be located above the second story above grade except in buildings of Type I Construction.

No school classroom used for a kindergarten, first or second grade pupils shall be located above the first story above grade, except in buildings of Type I construction.

An arcade connecting buildings, when used exclusively as a passageway, need not be considered as an adjacent building for the provisions of this Chapter, provided the walls of the building adjoining the arcade are finished with the same construction as required for the exterior walls of the building, with no communicating openings between the arcade and the building except a door, and provided, further, that the arcade is of not less than one-hour fire-resistive construction, or entirely of incombustible materials, or of heavy timber construction with two-inch (2") nominal sheathing.

#### **ARTICLE 710. MIXED OCCUPANCIES**

Separation of Group B Occupancies from any other occupancies shall be provided as specified in Article 503.

For Requirements for Open Air and Enclosed Public Parking Garages, See Article 1011.

# CHAPTER 8—REQUIREMENTS FOR GROUP C OCCUPANCIES

## ARTICLE 801. GROUP C OCCUPANCIES DEFINED.

Group C Occupancies shall be:

Division 1: Theatres, motion picture theatres, auditoriums, schools more than one story in height, churches, lodges, clubs, museums, dance halls, armories, libraries, gymnasiums, passenger stations, administration buildings and similar buildings having a permanent stage and having a seating capacity of less than 300, and one-story schools having a seating capacity of not more than 500 in any one room.

Division 2: The same as Division 1, except, not having a permanent stage, but having a seating capacity of 50 or more but less than 750.

Division 3: The same as Division 1, except, not having a permanent stage but having a seating capacity of less than 50.

Division 4: Stadiums, reviewing stands and amusement park structures not included within Groups A and B, and Divisions 1, 2 and 3 of Group C. See Article 507.

See Tables Nos. 5-A and 5-B and Article 503, for all occupancy classifications and separations.

## ARTICLE 802. CONSTRUCTION, HEIGHT AND AREA ALLOWABLE.

(a) **General.** Buildings classed in Group C, because of the use or character of the occupancy, shall be one of the "Types of Construction", and shall not exceed the maximum limits set forth in Table No. 8-A.

TABLE No. 8-A—TYPES OF CONSTRUCTION, NUMBER OF STORIES AND FLOOR AREAS PER FLOOR PERMITTED FOR GROUP C OCCUPANCIES

| Types of Construction | Number of Stories | Maximum Floor Areas (Sq. Ft.) Per Floor When Building Fronts on |           |                   |
|-----------------------|-------------------|-----------------------------------------------------------------|-----------|-------------------|
|                       |                   | 1 street                                                        | 2 streets | 3 or more streets |
| Type I                |                   | NO RESTRICTIONS                                                 |           |                   |
| Type II               | 6 or 7 stories    | 12,000                                                          | 15,000    | 18,000            |
|                       | 2 to 5 stories    | 15,000                                                          | 18,000    | 20,000            |
|                       | 1 story           | 20,000                                                          | 25,000    | 30,000            |
| Type III              | 2 to 5 stories    | 12,000                                                          | 15,000    | 18,000            |
|                       | 1 story           | 18,000                                                          | 22,000    | 26,000            |
| Type IV*              | 2 stories         | 10,000                                                          | 12,500    | 15,000            |
|                       | 1 story†          | 10,000                                                          | 12,500    | 15,000            |
| Type V                | 2 stories‡        | 6,000†                                                          | 7,000†    | 8,000†            |
|                       | 1 story           | 8,500                                                           | 9,500     | 10,500            |

\* See Article 802, Sub-Article (c).

† See Article 802, Sub-Article (d).

‡ Areas may be increased fifty percent (50%) when exterior walls and bearing partitions are of one-hour fire-resistive construction and floor construction over usable space is protected with a ceiling of one-hour fire-resistance.

Division 1 and 2 Occupancies may be located above the first story when protected throughout with not less than one-hour fire-resistive construction, except that non-bearing partitions, other than stair enclosures, may be of incombustible construction in lieu of one-hour protected combustible material. Educational occupancies not more than 2 stories in height and having not over 100 occupants are not required to have this one-hour protection except for stair enclosures.

Stairs and corridors in Group C Occupancies shall be of not less than one-hour fire-resistive construction.

A side or rear yard which is thirty feet (30') or more in width to the adjacent property line or to another building, and which affords unobstructed access to a street, may

be considered a street for the purpose of determining the allowable area of a school building.

Platforms which are used in lieu of stages shall be included in the floor area of the assembly room when determining the seating capacity as defined herein.

(b) **Special Provisions.** All public and private school buildings more than two (2) stories in height shall be of Type I Construction, provided that when the ceiling of the uppermost story is of Type I Construction and the attic area immediately above same is not used for human habitation, or Group C Occupancy, the attic and roof construction may be of Type II, III or IV Construction provided further that said attic area is fire-stopped and draft-stopped.

Bleachers over usable spaces in a gymnasium shall be protected with one-hour fire-resistive ceiling.

Stages as defined herein and platforms shall be constructed as provided in Chapter 39.

For attic space partitions and draft stops, see Article 3205.

(c) **Special Type IV Construction—Increase in Area Allowed.** The allowable floor area for one or two-story Type IV buildings may be increased fifty per cent (50%) provided that exterior and court walls are of not less than two-hour fire-resistive construction and the structural frame is protected by not less than one-hour fire-resistive construction and that all ducts, pipe sleeves and vents shall be fire-protected between ceiling and floor or roof where they cut through the ceiling space.

(d) **Special Type V Construction—Increase in Area Allowed.** The allowable floor area for one-story Type V buildings may be increased fifty per cent (50%) provided one-hour fire-resistive construction is used throughout. The allowable floor area for two-story Type V buildings may be increased fifty per cent (50%) provided the construction up to and including the first floor is of Type I construction and the rest of the building of one-hour fire-resistive construction throughout.

(e) **Division 4 Construction.** Erection and structural maintenance of structures housing Group C Division 4 Occupancies shall conform to the requirements of this Code and where there are not such specific requirements, shall provide adequate safety for the loads to which they may be subjected.

Structures housing Group C Division 4 Occupancies, other than those of open frame construction, when more than one story in height or two hundred square feet (200 sq. ft.) in area, shall have exterior walls, bearing partitions and floors of not less than one-hour fire-resistive construction as set forth in Chapter 43.

When the space under a Division 4 Occupancy is used for any purpose, it shall be separated from all parts of such Division 4 Occupancy including exits, by walls, floors and ceilings of not less than one-hour fire-resistive construction as set forth in Chapter 43.

(f) **Grandstands, Tents and Other Places of Outdoor Assembly.** See Article 507.

The Director may cause all Division 4 structures to be reinspected at least once every six (6) months.

Exceptions: 1. When the entire building is protected by an automatic sprinkler system, as provided in Chapter 38, the permissible areas shown may be increased 100% where sprinklers are not already required.

2. When a building of Type IV or V Construction is provided with certain fire-resistive protection, as specified in Sub-Articles (c) and (d) of this Article, the permissible floor areas shown in the table may be increased as indicated.

3. Division 4 structures of open skeleton frame type shall not be limited in height or area.

4. In a two-story building of Type III, IV or V, when the first story above grade and including the second floor is of Type I or II Construction and floor of second story is unpierced for human access, one-hour protection is not required on second story.

5. Two stories of Type III or Type IV construction are allowed above Types I and II construction when one-hour fire-protection is provided throughout, and the second story is unpierced for human access, or, if the slab of the second floor is pierced, then enclosures are protected with 4-hour fire-resistive walls and class B doors opening to the outside.

#### **ARTICLE 803. LOCATION ON PROPERTY.**

All Group C Occupancies shall front directly upon at least one public street not less than twenty feet (20') in width, in which front shall be located the main entrance and exit of such building, or such building may be connected to such street by an entrance passageway as specified in Article 604 (a).

All exterior walls or parts of walls except on street fronts of Divisions 1, 2, and 3 of Group C Occupancies which are less than three feet (3') from adjacent property lines shall have no openings therein, shall be of not less than four-hour fire-resistive construction, as specified in Chapter 43, and shall be constructed as set forth in Chapters 17 through 41 of this Code. Walls which are three feet (3') or more but less than ten feet (10') from adjacent

property lines except street fronts, shall be of not less than two-hour fire-resistive construction as specified in Chapter 43. All openings in exterior walls except on street fronts which are less than ten feet (10') from adjacent property lines, shall be provided with doors and windows of one-hour fire-resistive construction as specified in Article 4306.

When any portion of a Division 4 Occupancy is less than ten feet (10') from adjacent property lines, such portion shall have exterior walls, including openings of not less than one-hour fire-resistive construction as set forth in Chapter 43. See Article 504 for regulating adjacent buildings on the same property.

For openings in party walls and walls on or within three feet (3') of the property line, the special requirements of Article 504, third paragraph, shall apply.

In educational occupancies not more than 2 stories in height and small churches not more than one story, and having not over 100 occupants, the walls and openings not less than 3 feet from the property line are not required to be protected, provided building on adjoining property is not within 6 feet of this wall.

Exception: Protection of exterior openings is not required for churches.

#### **ARTICLE 804. EXIT FACILITIES.**

Requirements in this Article for Group C Occupancies shall be the same as for Group A Occupancies, as specified in Article 604, with the following exceptions:

1. A foyer shall not be required.
2. Seats shall not be required to be fixed.
3. Divisions 2 and 3 when located above the first floor may be served by stairs in place of ramps.
4. Balconies and bleachers and all exits therefrom over usable space and all janitor closets shall be protected with materials approved for one-hour fire-resistive construction.
5. In Division 3 all required exits may be located on one side of the room provided that in no case shall any part of a room be more than 35 feet from an exit.
6. Except as required in Article 803, the provisions requiring fire-protected doors specified in Article 604 (i) shall not apply.
7. For classroom portions of school buildings and similar small assembly rooms, the aggregate width of exit stairs in any story shall be on the basis of whole units of 22 inches each. The required number of units shall be determined by dividing the greatest number of people on any one floor above the stairs in question by 100 and no stairs shall be decreased in width toward the building exit. Each floor shall have not less than 2 exit stairs. Each classroom, the floor of which is more than 4 feet above the finished grade, shall have an exit door not more than 100 feet (measured along the line of travel) from the nearest building exit or exit stairway. For other requirements, see Chapter 33.

The clear width of hallways in school buildings shall be measured in whole 22 inch units and shall have a width of one more than the number of units obtained by dividing the total number of people in all rooms opening into such hallway by 100, provided that such hallway shall have a minimum clear width of 4 feet 6 inches and the required clear width shall not be diminished by any furniture, fixtures or locker or room doors when such doors are fully open. There shall be no dead end in exit hallways more than 10 feet beyond the stairway or exit. Where an auditorium exits into a hallway that serves as an egress from other rooms of a school, the hallway between the auditorium and the exit to the exterior need only provide for the occupants of either the auditorium or the classrooms, whichever requires the greater width. The minimum width of exit doors at either end of a hallway to a yard or passage shall be 18 inches less than the required width of the hallway.

Single classrooms and other similar small assembly rooms accommodating 40 or more pupils or persons shall have not less than 2 exit doors each 3 feet wide and there shall be not less than 2 means of exit available from each door.

8. Any room in a school basement used by students shall have at least one exit leading directly to the outside of the building and this exit shall be not less in width than one-half of the total required width of all room exits for that room.

9. Exit lights need not be installed over classroom exits and over exits in churches used exclusively for religious purposes. (See Article 5027).

10. All stairs and ramps serving as entrances or exits for any Group C Occupancy shall be not less in width than the width required for the doors serving such stairs and shall be designed and constructed as specified in Chapter 33. When the Group C Occupancy is located on the second floor of a two-story building, stairs or ramps leading to and serving such occupancy only need not be enclosed when leading directly to the outer air or when connected thereto by direct passages with unpierced walls and ceilings.

All emergency stairs and ramps shall lead directly to a public street or alley or to a court or space not less than 5 feet in clear width connected directly to a street or alley.

11. Stairs, exits, aisles, and seating for permanent stadiums and permanent reviewing

stands shall be as follows; however, for temporary or portable seating, the provisions of Article 507 shall apply:

a. **Stairs.** All stairs shall have a rise of not more than 7½ inches and a tread of not less than 10 inches, not including the nosing.

b. **Exits.** There shall be provided one exit not less than 7 feet wide for each 2000 persons or major fraction thereof which the stadium or reviewing stand is designed to seat. Such exits shall be spaced not more than 75 feet apart. Passageways serving such exits shall be not less than 7 feet in clear height nor less than 7 feet in clear width.

c. **Aisles.** Aisles not less than 3 feet 6 inches in width shall be provided so that there are not more than 20 seats between any seat and an aisle.

d. **Seats.** Where seats in a stadium or reviewing stand are not spaced or marked off, a distance of 18 inches along any bench or platform shall constitute one seat in computing the required aisles, stairs and exits. Seats shall be spaced not less than 26 inches back to back, except that where backs are provided, they shall be spaced not less than 30 inches apart.

12. Stairs and exits for Division 4 amusement structures shall be provided according to the principles used in Chapter 33, subject to the approval of the Director. Exit lights and markers clearly indicating direction to and means of exit, shall be installed in accordance with requirements of Article 3312.

13. Exit doors, including those from individual rooms (other than private offices), shall not be fastened against exit by any device except self-releasing latches, panic bolts or similar devices which can be opened readily from the inside at all times without the use of keys or any special knowledge or effort.

14. No bars shall be placed upon any window or any other opening, except on the windows of a private office.

#### **ARTICLE 805. LIGHT AND VENTILATION.**

All portions of Group C Occupancies customarily used by human beings shall be provided with light and ventilation, either natural or artificial, as specified in Article 605.

For sanitary requirements see Articles 506 and 508.

#### **ARTICLE 806. ENCLOSURE OF VERTICAL OPENINGS.**

All vertical openings, such as elevator shafts, stairs, ramps and vent shafts which permit the passage of fire or smoke in buildings over one story, shall be enclosed as specified in Chapter 30. There shall be no openings into stair or ramp enclosures other than necessary entrance and exit doors, except for doors opening into lavatories exclusively occupied as such and having no combustible storage.

#### **ARTICLE 807. FIRE EXTINGUISHING APPARATUS.**

Automatic sprinklers, standpipes and basement pipe inlets shall be installed as and when required in Chapter 38.

#### **ARTICLE 808. SPECIAL HAZARDS.**

Chimneys, heating apparatus and gas fired furnances shall conform to the requirements of Chapters 37, 52, and 53.

Motion picture machine booths shall conform to the requirements of Chapter 40.

Where the basement and first floor of a Type V building is required to be of Type I Construction, the first floor shall be unpierced for human access. No usable underfloor space or basement shall be allowed in a two-story Type V building unless such space or basement is surrounded by four-hour fire-resistive construction.

Exterior openings in a boiler room or room containing central heating equipment, if located below openings in another story or if less than ten feet (10') from other doors or windows of the same building, shall be provided with one-hour fire-resistive protection as specified in Article 4306.

Every boiler room or room containing a heating plant which burns liquid or solid fuel shall be separated from the rest of the building with not less than an "Ordinary Occupancy Separation" as defined in Article 503.

No flammable liquids shall be placed, used or stored in any Group C Occupancy except in small quantities as necessary in laboratories, and such liquids shall be kept in tight or sealed containers when not in actual use.

Any gas service to a Group C Occupancy shall be provided with an approved outside shut-off valve conspicuously marked.

The use of combustible materials for decorative purposes, including among others, flammable curtains, cloth, paper, streamers, draperies, vines, leaves, trees, moss or other interior decorations, shall be prohibited.

The use of imitation leather or other material consisting of, or coated with, a pyroxylin

or similarly hazardous base, shall be prohibited.

For regulations governing ceiling, partition, and wall materials the provisions of Articles 1816, 1916, 3004, and 3317 shall apply in conjunction with the construction-type employed.

#### **ARTICLE 809. EXCEPTIONS AND DEVIATIONS.**

Gymnasiums and similar buildings may have running tracks constructed of wood or unprotected steel or iron.

In gymnasiums, tight wood wall covering may be used on the walls in lieu of fire-resistive plaster.

All walls, partitions and floors of Group C Occupancies (except as noted in Article 802 (a),) when more than one story in height and all walls, bearing partitions and floors below a Group C Occupancy when such occupancy is placed or is to be placed above the first floor of a building or structure shall be of not less than one-hour fire-resistive construction as specified in Chapter 43, unless as otherwise provided in Article 802, Exception 4.

Roof trusses, roof girders and beams 25 feet or more above the nearest floor or balcony need not be fire-protected.

In school buildings, rooms having a seating capacity of more than 300 shall not be located above the first story above grade except in buildings of Type I Construction, unless as otherwise provided in Article 802, Exception 4.

In other than school buildings, rooms having a seating capacity of more than 300 shall not be located above the second story above grade except in buildings of Type I Construction, unless as otherwise provided in Article 802, Exception 4.

No school classroom used for kindergarten, first or second grade pupils (other than Sunday schools not over two stories) shall be located above the first story above grade except in buildings of Type I Construction, unless otherwise provided in Article 802, Exception 4.

An arcade connecting buildings and used exclusively as a passageway, need not be considered as an adjacent building for the provisions of this Chapter, provided the walls of the building adjoining the arcade are finished with the same construction as required for the exterior walls of the building and with no communicating openings between the arcade and the building, except a door, and provided the arcade is of not less than one-hour fire-resistive construction or entirely of incombustible materials, or of heavy timber construction with two-inch (2") nominal sheathing.

#### **ARTICLE 810. MIXED OCCUPANCIES.**

Separation of Group C occupancies from any other occupancies shall be provided as specified in Article 503.

The separation requirements of the National Building Code Section 316, entitled "Garages," will be required between garages and Group C occupancies.

For requirements for Open Air and Enclosed Public Parking Garages - See Article 1011.

# CHAPTER 9—REQUIREMENTS FOR GROUP D OCCUPANCIES

## ARTICLE 901. GROUP D OCCUPANCIES DEFINED.

Division 1: Jails, prisons, reformatories, houses of correction, asylums for the insane or feeble-minded, and similar buildings where personal liberties of inmates are restrained.

Division 2: Hospitals, sanitariums

Division 3: Nursing, convalescent and old age homes accommodating more than two (2) persons.

Division 4: Child boarding homes and day nurseries accommodating more than three (3) children.

See Tables Nos. 5-A and 5-B, and Article 503, for all occupancy classifications and separations.

## ARTICLE 902. CONSTRUCTION. HEIGHT AND AREA ALLOWABLE.

(a) **General.** Buildings classed in Group D because of the use or character of the occupancies shall be one of the Types of Construction, and shall not exceed the maximum limits set forth in Table No. 9-A.

Exceptions: When the entire building is protected by an automatic sprinkler system as set forth in Chapter 38, the permissible areas shown may be increased one hundred per cent (100%), where sprinklers are not already required.

(b) **Special Provisions.** All Division 1 Occupancies of Group D shall be Type I Construction throughout. All Division 2 Occupancies shall be of not less than one-hour fire-resistive construction or Type II; not less than Type II or III for two (2) stories; and not less than Type I for three (3) stories or more. If sprinklered, new Types IV and V buildings may be two (2) stories for Division 2 Occupancies.

Exceptions: 1. Existing Type III, IV and V buildings may be used for Division 3 Occupancies (caring for more than (2) patients) and not more than eight (8); when patients are housed above the ground floor, shall be protected throughout by an approved automatic sprinkler system; when housing nine (9) or more inmates (whether one (1) or two (2) stories) shall be protected by an approved automatic sprinkler system. Nursing convalescent and old age homes of fire-resistive Type I construction not over one story in height need not be sprinklered.

2. Existing Type III, IV, and V buildings may be used for Division 4 Occupancies (caring for four (4) or more children); when children are housed above first story, the building is required to be protected throughout by an approved automatic sprinkler system.

For attic space partitions and draft stops, see Article 3205.

## ARTICLE 903. LOCATION ON PROPERTY.

All exterior walls or parts of walls, except on street fronts, of Group D Occupancies which are less than five feet (5') from adjacent property lines shall have no openings therein, shall be of not less than four-hour fire-resistive construction, as specified in Chapter 43, and shall be constructed as set forth in Chapters 17 through 41 of this Code. Walls five feet (5') or more, but less than ten feet (10') from adjacent property lines, except on street fronts, shall be of not less than two-hour fire-resistive construction as specified in Chapter 43. All openings in exterior walls except on street fronts, which are less than ten feet (10') from adjacent property lines, shall be provided with doors or windows of one-hour fire-resistive construction as specified in Article 4306. See Article 504 for regulating adjacent buildings on the same property.

TABLE No. 9-A—TYPES OF CONSTRUCTION, NUMBER OF STORIES AND FLOOR AREAS PER FLOOR PERMITTED FOR GROUP D OCCUPANCIES.

| Types of Construction | Number of Stories | Maximum Floor Areas (Sq. Ft.) Per Floor When Building Fronts on |           |                   |
|-----------------------|-------------------|-----------------------------------------------------------------|-----------|-------------------|
|                       |                   | 1 street                                                        | 2 streets | 3 or more streets |
| Type I                |                   | NO RESTRICTIONS                                                 |           |                   |
| Type II               | 2 stories         | 15,000                                                          | 18,000    | 20,000            |
|                       | 1 story           | 20,000                                                          | 25,000    | 30,000            |
| Type III              | 2 stories         | 10,000                                                          | 12,500    | 15,000            |
|                       | 1 story           | 15,000                                                          | 20,000    | 25,000            |
| Type IV               | 1 story           | 8,000                                                           | 10,000    | 12,000            |
| Type V                | 1 story           | 5,000                                                           | 6,000     | 7,000             |



#### **ARTICLE 904. EXIT FACILITIES.**

Not less than two (2) exits shall be provided from each floor in every Group D Occupancy regardless of the height or area of the building, and additional exits shall be provided as required in Chapter 33.

In hospitals or sanitariums of Types III, IV and V Construction, ramps with a slope of not more than one in eight, or horizontal exits, shall be installed instead of stairways or in addition thereto to serve all portions of the building where bedridden patients are or may be placed. All ramps shall land at the first or ground floor level at points giving the most direct access practicable to the outer air, preferably not on inner courts. The width of all ramps and corridors shall be not less than five feet (5') clear of all obstructions except hand rails.

Except in places of detention, exit doors, including those from individual rooms (other than private offices), shall not be fastened against exit by any device except self-releasing latches, panic bolts or similar devices which can be opened readily from the inside at all times without the use of keys or any special knowledge or effort.

Except in places of detention, no bars shall be placed upon any window or any other opening, except on windows of a private office.

Smokeproof towers shall be provided as and when required in Chapter 33.

#### **ARTICLE 905. LIGHT, VENTILATION, AND SANITATION.**

All portions of Group D Occupancies customarily used by human beings shall be provided with light and ventilation by means of windows or skylights with an area equal to one-eighth (1/8) of the total floor area, or shall be provided with artificial light and a mechanically operated ventilating system. The mechanically driven ventilating system shall supply at least thirty cubic feet (30 cu. ft.) of pure air per minute for each occupant thereof in all portions of the building and such system shall be kept continuously in operation while the building is occupied.

For sanitary requirements see Article 506 and 508.

#### **ARTICLE 906. ENCLOSURE OF VERTICAL OPENINGS.**

All vertical openings, such as elevator shafts, stairs, ramps and vent shafts which permit the passage of fire or smoke in buildings over one story, shall be enclosed as specified in Chapter 30. There shall be no openings into stair or ramp, enclosures other than necessary entrance and exit doors, except for doors opening into lavatories exclusively occupied as such and having no combustible storage.

#### **ARTICLE 907. FIRE EXTINGUISHING APPARATUS.**

Automatic sprinklers, standpipes and basement pipe inlets shall be installed as and when required in Chapter 38.

#### **ARTICLE 908. SPECIAL HAZARDS.**

Chimneys, heating apparatus and gas fired furnaces shall conform to the requirements of Chapters 37, 52, and 53.

Motion picture machine booths shall conform to the requirements of Chapter 40.

Any gas service to a Group D Occupancy shall be provided with an approved outside shut-off valve conspicuously marked.

Every boiler room or room containing a heating plant which burns liquid or solid fuel shall be separated from the rest of the building with a "Special Occupancy Separation" as defined in Article 503. Every boiler room or room containing a heating plant which burns gas as fuel shall be separated from the rest of the building by not less than an "Ordinary Occupancy Separation" as defined in Article 503.

In lobbies, waiting rooms, and in areas used for assembly purposes in Group D Occupancies, the use of combustible materials for decorative purposes, including among others, flammable curtains, cloth, paper streamers, draperies, vines, leaves, trees, moss or other interior decorations, shall be prohibited.

#### **ARTICLE 909. EXCEPTIONS AND DEVIATIONS.**

No requirements of this Chapter shall be so construed as to prohibit the construction of cell blocks in jails or prevent the use of any locks or safety devices in buildings where it is necessary to forcibly restrain the inmates.

#### **ARTICLE 910. MIXED OCCUPANCIES.**

Separation of Group D Occupancies from any other occupancies shall be provided as specified in Article 503. The separation requirements of the National Building Code, Section 316, entitled "Garages," will be required between garages and Group D Occupancies.

**ARTICLE 911. INGRESS SIGNS.**

At all normal points of ingress to each floor of all Group D-2 and D-3 occupancies there shall be placed directional signs indicating the correct location of, or direction to, each living area such as apartment or room. Similar directional signs shall be located at corridor turns or branches.

**ARTICLE 912. FIRE ALARM AND DETECTION SYSTEMS.**

An approved Fire Alarm System shall be provided for all Group "D" Occupancies. Audible Alarm Devices shall be used in all non-patient occupied areas. In addition, an approved automatic "Early Warning Ionization Detection System" (or any type triggered by latent fire stages, not smoke, heat rise, etc.), shall be installed in all lines of egress of Division 2 & 3. Note: Smoke or heat rise detectors are not considered "Early Warning Fire Detectors." Such systems shall be installed in accordance with applicable standards, but in no case shall detectors be spaced further apart than 30 feet on centers or more than 15 feet from any wall. All automatic detection systems required by this section shall be electrically inter-connected to the fire alarm system.

Exception: Where each patient sleeping room is protected by such an approved detection system and a local detector is provided at any smoke partition, such corridor systems will not be required on the patient sleeping room floors.

# CHAPTER 10—REQUIREMENTS FOR GROUP E OCCUPANCIES

## ARTICLE 1001. GROUP E OCCUPANCIES DEFINED.

Group E Occupancies shall be:

Division 1: Public garages,(not private storage garages), paint or petroleum storage,dry cleaning plants, paint shops, spray painting rooms and shops, and film exchanges.

Division 2: Planing mills, box factories, woodworking and mattress factories.

Division 3: Storage of hazardous and highly flammable or explosive materials and liquids, and aircraft repair hangars.

See Tables Nos. 5-A and 5-B, and Article 503, for all occupancy classifications and separations.

The following materials and processes, among others, shall be classified as of special fire hazard, constituting highly combustible, flammable, or explosive products or materials:

|                                                  |                                          |
|--------------------------------------------------|------------------------------------------|
| Acetylene Gas                                    | Grain Elevators                          |
| Acids: Sulphuric, Nitric or Hydrofluoric         | Hair                                     |
| Artificial Flowers                               | Hemp                                     |
| Artificial Leather                               | Japanning or Enameling                   |
| Asphaltum                                        | Jute                                     |
| Bags: Second-hand, Burlap, Cotton, Paper, Jute   | Kapok                                    |
| Barrels: Second-hand                             | Lacquers                                 |
| Boxes and Containers: Paper, Pasteboard and Wood | Matches                                  |
| Brooms and Broom Corn                            | Mattresses                               |
| Calcium Carbide                                  | Munitions                                |
| Carpet Linings                                   | Naval Stores                             |
| Celuloid                                         | Nitrate of Soda                          |
| Chemicals: Irritating, Poisonous                 | Oakum                                    |
| Combustible, Explosive                           | Paints: Manufacture and Mixing           |
| Cotton: Bales, Bolts, Wadding and Waste          | Paper: Baled Waste                       |
| Cereal Mills                                     | Petroleum Products                       |
| Cork                                             | Plant Fibers, loose                      |
| Drugs                                            | Pyroxylin and Pyroxylin Plastic Products |
| Excelsior                                        | Rags                                     |
| Explosives                                       | Salvaged and Second-hand Merchandise     |
| Feather Renovating                               | Shoddy Mills                             |
| Fertilizer                                       | Spices and Vegetable Stocks              |
| Films, Combustible                               | Spray Painting Shops                     |
| Fireworks                                        | Starch Mills                             |
| Flour and Feed                                   | Straw                                    |
| Fuel Gas and Oil                                 | Textiles                                 |
| Gas: Poisonous, Irritating and Flammable         | Tow                                      |
|                                                  | Varnish, Turpentine                      |
|                                                  | Waste Paper                              |
|                                                  | Wood and Wood Working.                   |

Low hazard liquid—a flammable liquid having a flash point of 100°F. or higher.

High hazard liquid—a flammable liquid with a flash point below 100°F.

Non-flammable liquid—a liquid whose flash point is greater than 190°F. as determined by closed cup tester.

## ARTICLE 1002. CONSTRUCTION, HEIGHT AND AREA ALLOWABLE.

Buildings classed in Group E because of the use or character of the occupancy shall be one of the Types of Construction and shall not exceed the maximum limits set forth in Table No. 10-A.

Exception: When the entire building is protected by an automatic sprinkler system, as set forth in Chapter 38, the permissible areas shown may be increased one hundred per cent (100%), where sprinklers are not already required.

For attic space partitions and draft stops, see Article 3205.

## ARTICLE 1003. LOCATION ON PROPERTY.

All exterior walls or parts of walls, except on street fronts, of Group E Occupancies which are less than five feet (5') from adjacent property lines, shall have no openings therein, and shall be of not less than four-hour fire-resistive construction; such walls five feet (5') or more, but less than ten feet (10') from adjacent property lines, except on street

fronts, shall be not less than two-hour fire-resistive construction as specified in Chapter 43, and shall be constructed as set forth in Chapters 17 thru 41 of this Code. All openings in exterior walls, except on street fronts, which are less than ten feet (10') from adjacent property lines, shall be provided with doors or windows of one-hour fire-resistive construction as specified in Article 4306.

See Article 504 for regulating adjacent buildings on the same property.

For openings in party walls and walls on or within five feet (5') of the property line, the special requirements of Article 504, third paragraph, shall apply.

**TABLE No. 10-A—TYPES OF CONSTRUCTION, NUMBER OF STORIES AND FLOOR AREAS PER FLOOR PERMITTED FOR GROUP E OCCUPANCIES.**

| Types of Construction | Number of Stories | ‡Maximum Floor Areas (Sq. Ft.) Per Floor When Building Fronts on |           |                   |
|-----------------------|-------------------|------------------------------------------------------------------|-----------|-------------------|
|                       |                   | 1 street                                                         | 2 streets | 3 or more streets |
| Type I                |                   | NO RESTRICTIONS                                                  |           |                   |
| Type II               | 6 or 7 stories    | 8,000                                                            | 10,000    | 12,000            |
|                       | 2 to 5 stories    | 10,000                                                           | 12,000    | 15,000            |
|                       | 1 story           | 18,000                                                           | 22,000    | 26,000            |
| Type III              | 2 to 5 stories    | 8,000                                                            | 10,000    | 12,000            |
|                       | 1 story           | 12,000                                                           | 15,000    | 18,000            |
| Type IV               | 1 story*          | 8,000                                                            | 10,000    | 12,000            |
| Type V                | 1 story           | 8,000                                                            | 9,000     | 10,000            |

‡Areas may be increased in accordance with Article 509.

\*Areas may be increased fifty per cent (50%) when exterior walls and bearing partitions are of one-hour fire-resistive construction and floor construction over usable space is protected with a ceiling of one-hour fire-resistive construction.

#### **ARTICLE 1004. EXIT FACILITIES.**

All Group E Occupancies shall have not less than two (2) means of egress from each story, including basements or cellars. If such basements or cellars are used solely for heating apparatus, only one exit shall be required.

Stairs and exits shall be provided as and when required in Chapter 33.

Smokeproof towers shall be provided as and when required in Chapter 33.

Where ramps are used for the transfer of automobiles from one floor to another, such ramps shall meet the ground floor level at a point not less than twenty feet (20') from the exit from such building.

#### **ARTICLE 1005. LIGHT, VENTILATION AND SANITATION.**

All portions of Group E Occupancies customarily used by human beings shall be provided with light and ventilation by means of windows or skylights with an area equal to one-eighth (1/8) of the total floor area or shall be provided with artificial light and a mechanically operated ventilating system. The mechanically driven ventilating system shall supply at least thirty cubic feet (30 cu. ft.) of pure air per minute for each occupant thereof in all portions of the building and such systems shall be kept continuously in operation while the building is occupied.

In all buildings used for the storing or handling of automobiles operated under their own power and in all buildings where flammable liquids are used, exhaust ventilation shall be provided sufficient to produce one complete change of air every fifteen (15) minutes. Such exhaust ventilation shall be taken from a point at or near the floor level.

For sanitary requirements see Article 506 and 508.

#### **ARTICLE 1006. ENCLOSURE OF VERTICAL OPENINGS.**

All vertical openings such as elevator shafts, stairs, ramps, and vent shafts which permit the passage of fire or smoke through more than one floor shall be enclosed as specified in Chapter 30. There shall be no openings into stair or ramp enclosures other than necessary entrance and exit doors, except for doors opening into lavatories exclusively occupied as such and having no combustible storage.

Doors which are part of an automobile ramp enclosure may be kept normally open, but shall be equipped with fusible links and so arranged as to be self-closing when released.

Exception: Enclosures are not required in open air parking garages.

## ARTICLE 1007. FIRE EXTINGUISHING APPARATUS.

Automatic sprinklers, standpipes and basement pipe inlets shall be installed as and when required in Chapter 38.

## ARTICLE 1008. SPECIAL HAZARDS.

(a) **General.** Chimneys and heating apparatus shall conform to the requirements of Chapters 37, 48 and 52. In any room in which volatile flammable liquids are used or stored, no device generating a glow or flame capable of igniting gasoline vapor shall be installed or used within twenty-four inches (24") of the floor.

The use, handling, storage and sale of gasoline, fuel oil and other flammable liquids shall comply with the National Board of Fire Underwriters.

(b) **Dry Cleaning Plants.** Dry cleaning plants in which high hazard volatile combustible solvents are used or stored shall be of Type I Construction, and shall not exceed one (1) story in height or ten thousand square feet (10,000 sq. ft.) in area, and shall be without attics, concealed roof spaces, basements or pits. Floors shall not be below grade. All partitions shall be of two-hour fire-resistive construction, except for the necessary openings for the vent ducts, piping and shafting. All openings in exterior walls, except wall vents, shall be protected with one-hour fire-resistive doors or windows. Wall vents having a net area of not less than sixteen square inches (16 sq. in.) each, shall be placed in the exterior walls near the floor line, not more than six feet (6') apart horizontally. Each building shall be provided with a power-driven fan exhaust system of ventilation which shall be arranged and operated so as to produce a complete change of air in each room every three (3) minutes.

Roof shall be flat. If, due to local conditions, the Director deems it desirable to vent possible explosions upward, the roof may be of light construction.

Drying rooms under the same roof as the dry cleaning and dry dyeing rooms, shall be separated from such rooms by walls having a fire resistance of not less than two hours. The entrance to such drying rooms shall be provided with self-closing fire doors. If automatic sprinkler protection is provided, separation may be omitted if no added hazard is thereby created.

Exterior walls except those in street fronts, which are located less than ten feet (10') from adjacent property lines shall have no openings therein, and shall be of solid masonry at least twelve inches (12") thick or the equivalent, but in no case shall more than two sides of the building have blank walls.

Skylights shall be provided. They shall be constructed with metal frame and sash with plain thin glass, and with wire screen provided above the skylight as prescribed in Article 3402, or with wire glass arranged to swing outward readily in case of an explosion.

Equipment, protection and operation of all plants, whether using high-hazard, low-hazard or non-flammable cleaning fluids, shall comply with the National Board of Fire Underwriters requirements.

The above special requirements for high hazard dry cleaning plants shall not specifically apply to dry cleaning plants using low hazard combustible solvents; however all low hazard dry cleaning plants shall comply with the basic requirements for Group E Occupancy and shall not be of Type V construction.

(c) **Grain Elevators.** Grain elevators, or structures used to store grain, shall be constructed of steel, concrete, or other non-combustible material. Lumber exterior and interior framing, including planks and laminated walls, may be used when sizes of members conform to the requirements for Type II heavy timber construction, and meet the requirements of this Code and the approval of the Director. All such structures, buildings and equipment shall be erected, altered, or installed in accordance with the provisions of National Board of Fire Underwriters pamphlets No. 61B and 61C, "Prevention of Dust Explosions in Terminal Grain Elevators, Flour and Feed Mills."

(d) **Nitro-Cellulose Film.** Film exchanges and any room where nitro-cellulose film is handled or stored (not including projection booths) must be equipped with an approved system of automatic sprinklers. Storage under one thousand pounds (1,000 lbs.) may be in approved cabinets. Storage of one thousand pounds (1,000 lbs.) and over must be in specially designed vaults, which must be vented, provided with explosion relief, and protected with fire control equipment and conforming to recognized rules of safety and good practice.

Conformity with the "Regulations of the National Board of Fire Underwriters pamphlet No. 40 "Cellulose Motion Picture Film" will be considered as conforming with the above-mentioned rules of good practice.

(e) **State Laws.** Laws of the State of Louisiana regulating the construction and maintenance of dry cleaning plants, grain elevators or other buildings containing any occupancy or special hazard covered by this Chapter, shall be deemed to be a part of this

Code and such buildings shall conform to the provisions of such State laws.

#### **ARTICLE 1009. EXCEPTIONS AND DEVIATIONS.**

Public garages shall not be of Type V Construction and shall not be of Type III Construction when more than two (2) stories in height.

All public garage floors shall be of incombustible materials and if not placed directly on the ground shall conform to the requirements for floors of Type I Construction, or the floors may be of Type II Construction properly protected with incombustible materials against saturation by oil and grease.

Division 3 Occupancies of Group E more than five (5) stories in height shall have all floors of not less than three-hour fire-resistive construction as specified in Article 4303.

The requirements of the National Building Code of the National Board of Fire Underwriters, Section 316, entitled "Garages," will be accepted as the equivalent of the requirements set forth and referred to in this Chapter. See Article 215.

Parapet walls of roof parking decks, dwarf guard walls of open parking deck structures, perimeter walls enclosing above grade garages, and walls protecting all floor, deck or roof openings, or guard railings in lieu thereof, shall be designed to resist a minimum linear load of one hundred fifty pounds (150 lbs.) per foot applied twenty-one inches (21") above the roof or deck. Parapet or dwarf guard walls which are less than forty-two inches (42") high shall be surmounted by a railing to a minimum height of forty-two inches (42") above the roof or deck, and such railings shall not have openings which exceed six inches (6") in width and forty-eight inches (48") in length. A bumper block at least eight inches (8") high shall be fastened to the roof, deck or floor, four feet (4') or more from the wall, and shall be designed to resist a minimum linear load of three hundred pounds (300 lbs.) per foot.

The requirements of N.B.F.U. Pamphlet No. 33, "Spray Finishing Using Flammable Materials," will be accepted as the equivalent of the requirements set forth and referred to in this Chapter.

#### **ARTICLE 1010. MIXED OCCUPANCIES.**

Separation of Group E Occupancies from all other Occupancies shall be provided as specified in Article 503.

#### **ARTICLE 1011. OPEN AIR PARKING GARAGES.**

(a) Open air parking garages shall be of fire-resistive construction of protected noncombustible construction or of unprotected noncombustible construction.

(b) Open air parking garages which exceed 2,500 square feet in area shall not have open sides along and within 15 feet of any lot line along which buildings are or may be built, nor within 15 feet of another building of wood frame construction or unprotected noncombustible construction on the same lot, nor within 15 feet of any openings in another building on the same lot.

(c) Open air parking garages shall not exceed 75 feet in height nor 30,000 square feet in area when of protected noncombustible construction and shall not exceed 50 feet in height nor 20,000 square feet in area when of unprotected noncombustible construction.

(d) Open air parking garages shall not be located within or attached to a building used for any other occupancy unless separated from the other occupancies as required in Sections 316.3 and 316.4 of the National Building Code for enclosed parking garages.

(e) Lifts to transport only employees may be installed in open air parking garages. Such lifts need not be enclosed but shall be protected from floor to ceiling in each story with wire mesh or other approved material. Approved devices shall be installed to prevent use of the lifts by persons other than employees.

(f) Ramps connecting floors of garages, which are not considered as required exit ways under Sections 602 and 603 National Building Code need not be enclosed.

(g) Where enclosure walls are omitted, no glass, tarpaulins or other enclosing material shall be permitted.

(h) Adequate curbs and guardrails approved by the building official shall be provided at openings in exterior walls in open air parking garages other than those in which cars are mechanically parked. For open and enclosed parking garages 50% of two sides shall be open to the air at each story.

#### **ENCLOSED PARKING GARAGES NOT EXCEEDING 750 SQUARE FEET IN AREA.**

(a) An enclosed parking garage not exceeding 750 square feet in area shall not be located within or attached to a building used for any other occupancy, except industrial occupancy, unless separated from the other occupancies by walls, partitions, floors and ceilings of materials to restrict the passage of gases, smoke and odor from the garage to the other occupancies. The garage need not be so separated from industrial occupancies.

(b) There shall be no opening from the garage into rooms used for sleeping purposes. For open and enclosed parking garage 50% of two sides shall be open to the air at each story.

#### **ENCLOSED PARKING GARAGES BETWEEN 750 AND 3,000 SQUARE FEET IN AREA.**

(a) An enclosed parking garage between 750 and 3,000 square feet in area shall not be located within or attached to a building used for any other occupancy unless separated from the other occupancies by walls, partitions and floor and ceiling assemblies having a fire-resistance rating of not less than one hour. Openings from the garage into spaces used for other occupancies shall be provided with approved self-closing fire doors. There shall be no opening from the garage into rooms used for sleeping purposes.

(b) Floor surfaces shall be of noncombustible material and shall be without pits or depressions.

(c) Garages located in basements shall be ventilated by a mechanical ventilating system with positive means for both the inlet and exhaust of at least one cubic foot of air per minute per square foot of floor area. Control of the exhaust and inlet fans shall be close to the entrance door. The ventilating equipment may be combined with the heating system.

(d) Ramps connecting floors of garages, which are not considered a required exit ways under Section 602 and 603 National Building Code need not be enclosed in garages of fire-resistive construction or noncombustible construction nor in sprinklered garages. For open and enclosed parking garage 50% of two sides shall be open to the air at each story.

#### **ENCLOSED PARKING GARAGES EXCEEDING 3,000 SQUARE FEET IN AREA.**

(a) An enclosed parking garage exceeding 3,000 square feet in area shall not be located within or attached to a building used for any other occupancy unless separated from the other occupancies by walls, partitions and floor and ceiling assemblies of noncombustible material having a fire-resistance rating of not less than 2 hours. Where a salesroom, showroom or office not exceeding 1,500 square feet in area is operated in connection with such garage the walls, partitions and floor and ceiling assemblies separating the garage from such salesroom, showroom or office are not required to have a fire resistance rating but shall be of materials to restrict the passage of gases, smoke and odor from the garage to the salesroom, showroom or office.

(b) Openings from the garage into spaces used for other occupancies shall be provided with approved self-closing fire doors, except in openings from the garage into a salesroom, showroom or office not exceeding 1,500 square feet in area and operated in connection with the garage.

(c) Floor surfaces shall be of noncombustible material and shall be without pits or depressions.

(d) Garages located in basements shall be ventilated by a mechanical ventilating system with positive means for both the inlet and exhaust of at least one cubic foot of air per minute per square foot of floor area. Control of the exhaust and inlet fan shall be close to the entrance door. The ventilating equipment may be combined with the heating system.

(e) Ramps connecting floors of garages, which are not considered as required exit ways under Sections 602 and 603 of National Building Code, need not be enclosed in garages or fire-resistive construction or noncombustible construction nor in sprinklered garages. For open and enclosed parking garage 50% of two sides shall be open to the air at each story.

#### **REPAIR GARAGES.**

(a) Repair garages shall not be located within or attached to a building used for any other occupancy unless separated from the other occupancies by walls, partitions and floor and ceiling assemblies of noncombustible material having a fire-resistive rating of not less than 2 hours. Where a salesroom, showroom or office not exceeding 1,500 square feet in area is operated in connection with such garages the walls, partitions and floor and ceiling assemblies separating the repair garage from such salesroom, showrooms or offices are not required to have a fire-resistance rating but shall be of materials to restrict the passage of gases, smoke and odor from the repair garage to the salesroom, showroom or office. Repair garages shall not be located in any basement.

(b) Walls, partitions and floor and ceiling assemblies separating the garage from other occupancies shall be without openings except that door openings equipped with approved self-closing fire doors leading to salesrooms or offices that are operated in connection with such garages shall not be prohibited. Entrance from the garage to rooms or spaces used for other occupancies shall be by vestibules or balconies constructed and arranged as required by Section 605.4 National Building Code for horizontal exits.

(c) Floors shall be of noncombustible material that may be readily cleaned and shall be without pits or depressions except for repair pits.

# CHAPTER 11—REQUIREMENTS FOR GROUP F OCCUPANCIES

## ARTICLE 1101. GROUP F OCCUPANCIES DEFINED.

Group F. Occupancies shall be:

Division 1: Wholesale and retail stores, office buildings with partial mercantile occupancy, restaurants, undertaking parlors, printing plants, municipal police and fire stations, clinics without beds, parking lots, night clubs, and cocktail lounges.

Division 2: Bakeries, factories and workshops using materials not highly flammable or combustible, gasoline filling and service stations, or the installation of tank(s) or container(s) above or below lot grade, or the erection of pump(s) and/or pump island(s) storage garages (private), stables (public), cold storage (furs), and aircraft hangars where no repair work is done except exchange of parts and maintenance requiring no open flame, welding, or the use of highly flammable liquids, and dry cleaning plants using a low hazard liquid having a flash point of 100°F. or higher.

See Tables Nos. 5-A and 5-B, and Article 503 for all occupancy classifications and separations.

## ARTICLE 1102. CONSTRUCTION, HEIGHT AND AREA ALLOWABLE.

Buildings classed in Group F because of the use or character of the occupancy shall be one of the Types of Construction, and shall not exceed the maximum limits set forth in Table No. 11-A.

Exceptions: 1. When the entire building is protected by an automatic sprinkler system as set forth in Chapter 38, the permissible areas shown may be increased one hundred per cent (100%), where sprinklers are not already required.

2. The area of a Group F Occupancy of Types II and III Construction may exceed that set forth in Table No. 11-A, provided that such a building is divided into areas by "Special Occupancy Separations," no division of which shall exceed the area set forth in Table No. 11-A.

3. The area of a Group F Occupancy of Types IV and V Construction may exceed that which is set forth in Table No. 11-A of this Chapter, if the building is divided into areas by two-hour fire separations with all openings therein provided with one-hour fire-resistive protection, no division of which shall exceed the area set forth in said table.

For attic space partitions and draft stops, see Article 3205.

TABLE No. 11-A—TYPES OF CONSTRUCTION, NUMBER OF STORIES AND FLOOR AREAS PER FLOOR PERMITTED FOR GROUP F OCCUPANCIES.

| Types of Construction | Number of Stories | ‡Maximum Floor Areas (Sq. Ft.) Per Floor When Building Fronts on |           |                    |
|-----------------------|-------------------|------------------------------------------------------------------|-----------|--------------------|
|                       |                   | 1 street                                                         | 2 streets | 3 or more streets† |
| Type I                |                   | NO RESTRICTIONS                                                  |           |                    |
| Type II               | 6 or 7 stories    | 12,000                                                           | 15,000    | 18,000             |
|                       | 2 to 5 stories    | 15,000                                                           | 18,000    | 20,000             |
|                       | 1 story           | 20,000                                                           | 25,000    | 30,000             |
| Type III              | 2 to 5 stories    | 12,000                                                           | 15,000    | 18,000             |
|                       | 1 story           | 18,000                                                           | 22,500    | 27,000             |
| Type IV               | 2 or 3 stories    | 10,000                                                           | 12,500    | 15,000             |
|                       | 1 story*          | 15,000                                                           | 20,000    | 25,000             |
| Type V                | 2 to 3 stories    | 5,000                                                            | 6,000     | 7,000              |
|                       | 1 story           | 10,000                                                           | 12,000    | 14,000             |

†Areas may be increased in accordance with Article 509.

\*Areas may be increased fifty per cent (50%) when exterior walls, bearing partitions and all ceilings are provided with one-hour fire-resistive construction and floor construction over usable space is protected with a ceiling of one-hour resistive protection.

‡The area of any one- or two-story building of Group F Occupancy shall not be limited, if the building is provided with automatic sprinklers throughout, as specified in Chapter 38, and entirely surrounded by public space, streets, or yards not less than thirty feet (30') in width.

Note: The area of one-story shelter sheds of Group F Occupancy and Type IV construction or better, open on at least two (2) sides, and not used for permanent storage, shall not be limited if separated from other buildings by public space, streets, or yards not less than thirty feet (30') in width, or wall of not less than four-hour fire-resistance. Such structures need not be sprinklered.



#### **ARTICLE 1103. LOCATION ON PROPERTY.**

All exterior walls or parts of walls, except on street fronts, of Group F Occupancies which are less than four feet (4') from adjacent property lines shall have no opening therein, shall be of not less than four-hour fire-resistive construction; such walls four feet (4') or more, but less than eight feet (8') from adjacent property lines, except on street fronts, shall be not less than two-hour fire-resistive construction, as specified in Chapter 43, and shall be constructed as set forth in Chapters 17 through 41 of this code. All openings in exterior walls, except on street fronts, which are less than eight feet (8') from adjacent property lines, shall be provided with doors and windows of one-hour fire-resistive construction as specified in Article 4306. See Article 504 for regulating adjacent buildings on the same property, and Article 1108 for location of service stations.

For openings in party walls and walls on or within four feet (4') of the property line, the special requirements of Article 504, third paragraph, shall apply.

#### **ARTICLE 1104. EXIT FACILITIES.**

Stairs and exits shall be provided as and when required in Chapter 33.

Smokeproof towers shall be provided as and when required in Chapter 33.

#### **ARTICLE 1105. LIGHT, VENTILATION AND SANITATION.**

All portions of Group F Occupancies customarily used by human beings shall be provided with light and ventilation by means of windows or skylights with an area not less than one-eighth (1/8) of the total floor area or shall be provided with artificial light and a mechanically operated ventilating system. In no case shall less than four (4) changes of air per hour be provided.

Every building or portion thereof where more than four (4) persons are employed shall be provided with at least one (1) toilet. Every building and each subdivision thereof where both sexes are employed shall be provided with access to at least two (2) toilets located either in such building or conveniently in a building adjacent thereto.

Toilet rooms in connection with food establishments where food is prepared, stored or served, shall have a non-absorbent interior finish on floors, walls and ceilings; shall be separated from such food establishments with close-fitting, tight doors with a vestibule between, and shall be provided with an exterior window at least three square feet (3 sq. ft.) in area, fully openable, or a vertical duct not less than forty-eight square inches (48 sq. in.) in area, leading to the exterior, or an acceptable method of forced air ventilation.

#### **ARTICLE 1106. ENCLOSURE OF VERTICAL OPENINGS.**

All vertical openings such as elevator shafts, stairs, ramps, and vent shafts which permit the passage of fire or smoke through more than one floor shall be enclosed as specified in Chapter 30. There shall be no openings into stair or ramp enclosures other than necessary entrance and exit doors, except for doors opening into lavatories exclusively occupied as such and having no combustible storage.

#### **ARTICLE 1107. FIRE EXTINGUISHING APPARATUS.**

Automatic sprinklers, standpipes and basement pipe inlets shall be installed as and when required in Chapter 38.

#### **ARTICLE 1108. SPECIAL HAZARDS.**

(a) **General.** Chimneys, heating apparatus and gas fired furnaces shall conform to the requirements of Chapters 37, 52 and 53. No storage of volatile flammable liquids shall be allowed in Group F Occupancies and the handling and use of gasoline, fuel oil and other flammable liquids shall not be permitted in any Group F Occupancies unless such use and handling comply with the requirements of this Code.

In any room in which volatile flammable liquids are used or stored, no device generating a glow or flame capable of igniting gasoline vapor shall be installed or used within twenty-four inches (24") of the floor.

No permit shall be issued for a service station that does not conform to the requirements of this Code as is described on Drawings A, B, C, D, E, and F, which are on file in the Director's Office and form part of this Code.

**Drawing A.** When located so as to abut on two public streets forming an angle of ninety (90) degrees, having ingress and egress from both streets, such part of land shall measure not less than fifty feet (50') front on one of said streets and not less than forty-five feet (45') front on the other street.

**Drawing B.** When located so as to abut on two public streets forming an angle greater than ninety (90) degrees, having ingress and egress from both streets, such part of land shall measure fifty feet (50') front on each of the said streets and the nearest distance, measured

from the apex of the angle formed by the intersecting street property lines to a diagonal line drawn from the two points fifty feet (50') from such apex, shall measure at least twenty feet (20').

**Drawing C.** When located so as to abut on two public streets forming an angle less than ninety (90) degrees, and which shall have ingress and egress from each of the two streets, such part of land shall measure at least fifty feet (50') front on each of the said streets or highways, and the distance measured along the diagonal line drawn from the two points fifty feet (50') from the intersection of the two street property lines shall measure not less than twenty-five feet (25').

**Drawing D.** When located on parts of land forming a corner on two public streets only one of which shall afford ingress and egress, or when located on parts of land not on a corner, said parts of land shall measure not less than fifty feet (50') front on the street affording ingress and egress by a minimum depth of twenty feet (20').

**Drawing E.** When located so as to abut on three streets with ingress or egress from each of the above three streets, such parts of land shall measure at least fifty feet (50') front on at least two (2) opposite streets and at least twenty-five feet (25') front on the remaining streets.

**Drawing F.** When located so as to abut on four or more streets with ingress or egress from all of the abutting streets, such parts of land shall measure at least fifty feet (50') front on at least two (two) opposite streets and at least twenty-five feet (25') front on the remaining streets.

**Restrictions common to all of the above drawings:**

So as to afford a clear point of vision, no obstructions of any kind (excepting canopy-columns and pumps) shall be permitted within the hatched portion of the drawing; no fences will be permitted on those sides of the land affording ingress and egress to the station. Further, ingress and egress shall be from independent driveways measuring not over twenty-five feet (25') in width at the property line and when two or more driveways are constructed on any one street, they shall be separated by safety islands measuring at least five feet (5') by width of the sidewalk.

If any side or sides of the land abut on streets which do not afford ingress or egress, then that side or sides of the land shall have a physical barrier in the form of a continuous substantial masonry or concrete curb at least eight inches (8") thick, two feet (2') in the ground, and twelve inches (12") above the paved grade.

Pumps shall be located no less than ten feet (10') back from property line and no vehicle shall be parked or encroach upon any part of the sidewalk.

Permit for a service station shall not include flood-lights, signs or curb cuts. Permits for same must be taken out separately.

All service stations must be provided with sanitary comfort stations, including toilets for both male and female.

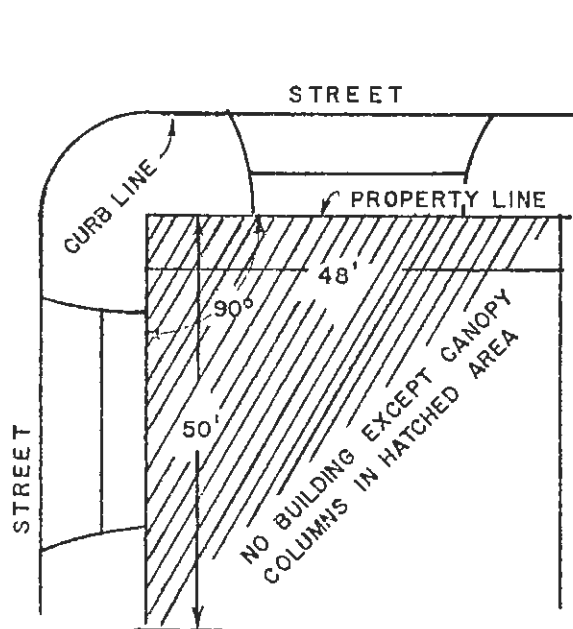
A complete set of plans and specifications, showing the lot and buildings, must be submitted and approved by the Director before a permit is issued.

Any service station existing prior to the passage of this Code, that does not conform with any or all of the requirements of this Code, shall be known as a non-conforming service station and should same be closed or discontinued for a continuous period of six (6) months, it shall not be permitted to reopen.

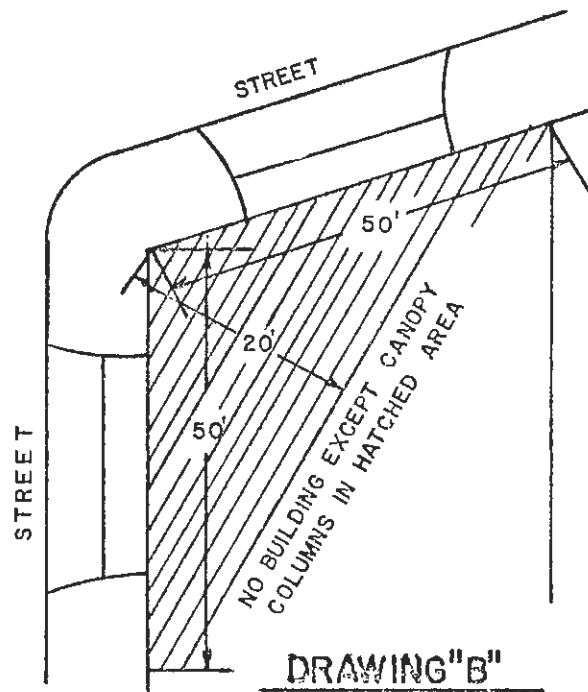
For curb cuts see Article 4401 M.

# SERVICE STATION SETBACKS DRAWINGS TO ACCOMPANY ARTICLE 1108 (B)

NOTE: ALL LOT AND SETBACK MEASUREMENTS SHOWN ARE MINIMUM ONES



DRAWING "A"

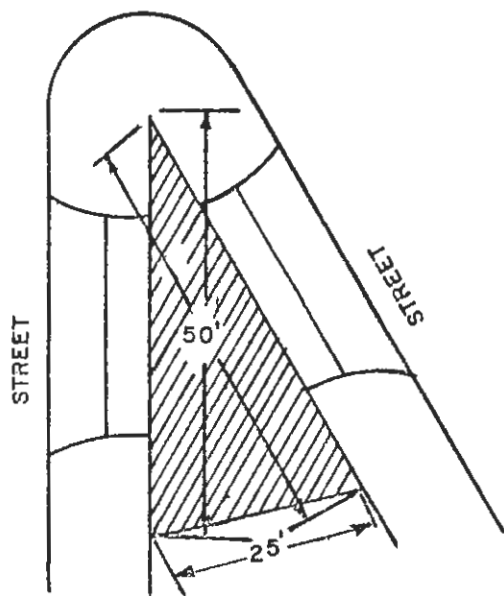


DRAWING "B"

# SERVICE STATION SETBACKS

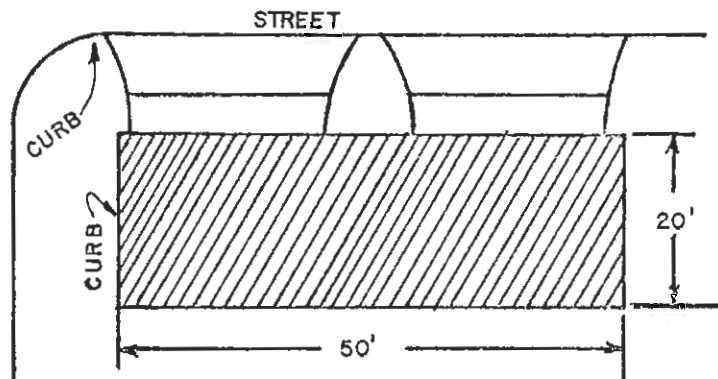
## DRAWINGS TO ACCOMPANY ARTICLE 1108 (B)

NOTE: ALL LOT AND SETBACK MEASUREMENTS SHOWN ARE MINIMUM ONES



NO BUILDINGS EXCEPT CANOPY  
COLUMNS IN HATCHED AREA

**DRAWING "C"**



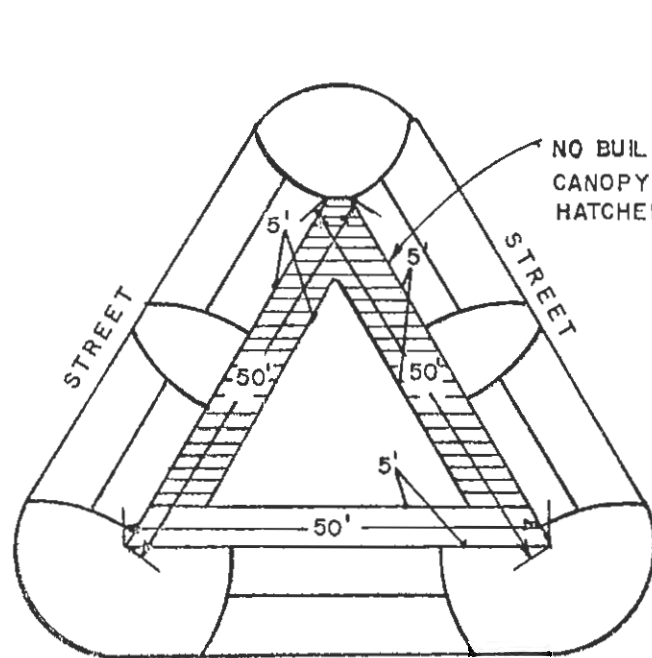
NO BUILDINGS IN HATCHED AREA  
EXCEPT CANOPY COLUMNS

**DRAWING "D"**

# SERVICE STATION SETBACKS

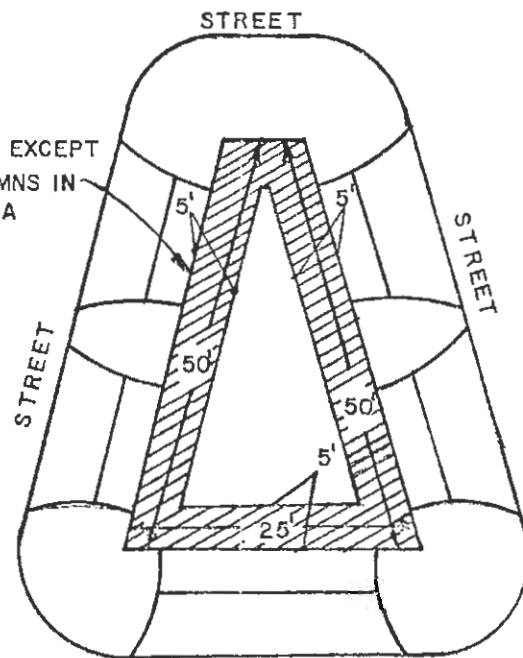
## DRAWINGS TO ACCOMPANY ARTICLE 1108 (B)

NOTE: ALL LOT AND SETBACK MEASUREMENTS SHOWN ARE MINIMUM ONES



STREET  
DRAWING "E"

NO BUILDINGS EXCEPT  
CANOPY COLUMNS IN  
HATCHED AREA



STREET  
DRAWING "F"

#### **ARTICLE 1109. EXCEPTIONS AND DEVIATIONS.**

Service stations of Type V Construction shall have incombustible exterior wall covering. Canopies, including supports thereof, over pumps shall be of incombustible materials or one-hour fire-resistive construction.

Private storage garages shall not be of Type V Construction and shall not be of Type III or IV Construction when more than two (2) stories in height.

The requirements of the National Building Code, Section 316, entitled "Garages," will be accepted as the equivalent of the requirements set forth and referred to in this Chapter.

A one-hour separation is required between a cleaning establishment and all other occupancies, and boiler room for such cleaning establishment is to be a detached building of at least two-hour partitions.

#### **ARTICLE 1110. MIXED OCCUPANCIES.**

Separation of Group F Occupancies from all other Occupancies shall be provided as specified in Article 503.

The separation requirements of the National Building Code, Section 316, entitled "Garages" will be required between garages and Group "F" Occupancy.

# CHAPTER 12 – REQUIREMENTS FOR GROUP G OCCUPANCIES

## ARTICLE 1201. GROUP “G” OCCUPANCIES DEFINED.

Group G Occupancies shall be:

Division 1: Ice plants, power plants, pumping plants, cold storage (except furs), creameries, dial telephone exchanges, boiler building or room.

Division 2: Factories and workshops using incombustible and nonexplosive materials, machine shops.

Division 3: Storage and salesrooms of incombustible and non explosive materials, dry cleaning plants using a non-flammable liquid having a flash point of 190 deg. F. as determined by closed cup test, service shops – beauty parlors, barber shops and small schools – private, dancing, music or other.

Division 4: Small shops – plumbing, electrical, radio, sheet metal, shoe repair. Small stores – notions, grocery, food, liquor, “rabais shops.”

See Tables Nos. 5-A and 5-B and Article 503 for all occupancy classifications and separations.

## ARTICLE 1202. CONSTRUCTION, HEIGHT AND AREA ALLOWABLE.

Buildings classed in Group G because of the use or character of the occupancy shall be one of the Types of Construction, and shall not exceed the maximum limits set forth in Table No. 12-A.

Exceptions: 1. When the entire building is protected by an automatic sprinkler system as provided in Chapter 38, the permissible areas may be increased one hundred per cent (100%), where sprinklers are not already required.

2. The area of a Group G Occupancy of Types II and III Construction may exceed that which is set forth in Table No. 12-A, provided that such building is divided into areas by a “Special Occupancy Separation,” no division of which shall exceed the area set forth in Table No. 12-A.

3. The area of a Group G Occupancy of Types IV and V Construction may exceed that which is set forth in Table No. 12-A, provided that such building is divided into areas by two-hour fire-separations with all openings therein protected with one-hour fire-resistive protection, no division of which shall exceed the area set forth in Table No. 12-A.

4. Division 4 occupancies shall not exceed 1000 square feet.

For attic space partitions and draft stops, see Article 3205.

**TABLE No. 12-A—TYPES OF CONSTRUCTION, NUMBER OF STORIES AND FLOOR AREAS PER FLOOR PERMITTED FOR GROUP G OCCUPANCIES.**

| Types of Construction | Number of Stories | Maximum Floor Areas (Sq. Ft.) Per Floor When Building Fronts on |           |                    |
|-----------------------|-------------------|-----------------------------------------------------------------|-----------|--------------------|
|                       |                   | 1 street                                                        | 2 streets | 3 or more streets† |
| Type I                |                   | NO RESTRICTIONS                                                 |           |                    |
| Type II               | 6 or 7 stories    | 15,000                                                          | 18,000    | 20,000             |
|                       | 2 to 5 stories    | 20,000                                                          | 25,000    | 30,000             |
|                       | 1 story           | NO RESTRICTIONS                                                 |           |                    |
| Type III              | 2 to 5 stories    | 15,000                                                          | 18,000    | 21,000             |
|                       | 1 story           | 25,000                                                          | 30,000    | 35,000             |
| Type IV               | 2 or 3 stories    | 12,000                                                          | 15,000    | 18,000             |
|                       | 1 story*          | 20,000                                                          | 25,000    | 30,000             |
| Type V                | 2 or 3 stories    | 10,000                                                          | 12,500    | 15,000             |
|                       | 1 story           | 12,000                                                          | 15,000    | 18,000             |

†Areas may be increased in accordance with Article 509.

\*Areas may be increased fifty per cent (50%) when exterior walls and bearing partitions are of one-hour fire-resistive construction and floor construction over usable space is protected with a ceiling of one-hour fire-resistive construction.

†The area of any one or two-story building of Group G Occupancy shall not be limited, if the building is provided with automatic sprinklers throughout, as specified in Chapter 38, and entirely surrounded by public space, streets, or yards not less than thirty feet (30') in width.

Note: The area of one-story shelter sheds of Group G Occupancy and Type IV construction or better, open on at least two (2) sides, and not used for permanent storage, shall not be limited if separated from other buildings by public space, streets, or yards not less than thirty feet (30') in width, or wall of not less than four-hour fire-resistance. Such structures need not be sprinklered.

#### **ARTICLE 1203. LOCATION ON PROPERTY.**

All exterior walls or parts of walls, except on street fronts of Group G Occupancies which are less than three feet (3') from adjacent property lines, shall have no openings therein, shall be of not less than one-hour fire-resistive construction as specified in Chapter 43, and shall be constructed as specified in Chapters 17 through 41 of this Code. See Article 504 for regulating adjacent buildings on the same property.

For openings in party walls and walls on or within three feet (3') of the property line, the special requirements of Article 504, third paragraph shall apply.

#### **ARTICLE 1204. EXIT FACILITIES.**

Stairs and exits shall be provided as and when required in Chapter 33.

Smokeproof towers shall be provided as and when required in Chapter 33.

#### **ARTICLE 1205. LIGHT, VENTILATION AND SANITATION.**

All portions of Group G Occupancies customarily used by human beings shall be provided with light and ventilation.

Every building or portion thereof where more than four (4) persons are employed shall be provided with at least one (1) toilet. Every building and each subdivision thereof where both sexes are employed shall be provided with access to at least two (2) toilets located either in such building or conveniently in a building adjacent thereto.

#### **ARTICLE 1206. ENCLOSURE OF VERTICAL OPENINGS.**

All vertical openings, such as elevator shafts, stairs, ramps, and vent shafts, which permit the passage of fire or smoke through more than one floor shall be enclosed as specified in Chapter 30. There shall be no openings into stair or ramp enclosures other than necessary entrance and exit doors, except for doors opening into lavatories exclusively occupied as such and having no combustible storage.

Exception: For Division 1 only, vertical openings need not be enclosed except for buildings three (3) stories in height and over.

#### **ARTICLE 1207. FIRE EXTINGUISHING APPARATUS.**

Automatic sprinklers, standpipes and basement pipe inlets shall be installed as and when required in Chapter 38.

#### **ARTICLE 1208. SPECIAL HAZARDS.**

Chimneys, heating apparatus and gas fired equipment shall conform to the requirements of Chapters 37, 52 and 53. In any room in which volatile flammable liquids are used or stored, no device generating a glow or flame capable of igniting gasoline vapor shall be installed or used within twenty-four inches (24") of the floor.

The storage, use and handling of gasoline, fuel oil and other flammable liquids shall not be permitted in any Group G Occupancy unless such storage and handling comply with the requirements of this Code.

#### **ARTICLE 1209. EXCEPTIONS AND DEVIATIONS.**

Fire protection of the underside of all roof framing of Divisions 1 and 2 of Group G Occupancies may be omitted in all Types of Construction.

#### **ARTICLE 1210. MIXED OCCUPANCIES.**

Separation of Group G Occupancies from all other occupancies shall be provided as specified in Article 503.

For requirements for Open Air and Enclosed Public Parking Garages, See Article 1011.



# CHAPTER 13 -- REQUIREMENTS FOR GROUP H OCCUPANCIES

## ARTICLE 1301. GROUP H OCCUPANCIES DEFINED.

Group H Occupancies shall be:

Division 1: Hotels; motels; apartment houses; dormitories; lunch counters and hamburger stands (limit floor space to 800 sq. ft.)

Division 2: Convents and monasteries having more than 15 sleeping rooms.

See Tables Nos. 5-A and 5-B and Article 503, for all occupancy classifications and separations.

## ARTICLE 1302. CONSTRUCTION, HEIGHT AND AREA ALLOWABLE.

Buildings classed in Group H because of the use of character of the occupancy shall be one of the "Types of Construction," and shall not exceed the maximum limits set forth in Table No. 13-A.

Exception: When the entire building is protected by an automatic sprinkler system as provided in Chapter 38, the permissible areas shown may be increased one hundred per cent (100%), where sprinklers are not already required.

For attic space partitions and draft stops, see Article 3205.

## ARTICLE 1303. LOCATION ON PROPERTY.

All exterior walls or parts of walls, except on street fronts of Group H Occupancies which are less than three feet (3') from adjacent property lines, shall have no openings therein, shall be of not less than two-hour fire-resistive construction; such walls three feet (3') or more, but less than five feet (5') from adjacent property lines, except on street fronts, shall be not less than one-hour fire-resistive construction, as specified in Chapter 43, and shall be constructed as set forth in Chapters 17 through 41 of this Code. All openings in exterior walls, except on street fronts which are less than five feet (5') from adjacent property lines, shall be provided with doors or windows of one-hour fire-resistive construction as specified in Article 4306. See Article 504 for regulating adjacent buildings on the same property.

Location of Group H Occupancies on the property shall meet the requirements of any State laws which are intended to regulate such location.

For openings in party walls and walls on or within three feet (3') of the property line, the special requirements of Article 504, third paragraph, shall apply.

TABLE No. 13-A—TYPES OF CONSTRUCTION, NUMBER OF STORIES AND FLOOR AREAS PER FLOOR PERMITTED FOR GROUP H OCCUPANCIES.

| Types of Construction | Number of Stories | Maximum Floor Areas (Sq. Ft.) Per Floor When Building Fronts on |           |                   |
|-----------------------|-------------------|-----------------------------------------------------------------|-----------|-------------------|
|                       |                   | 1 street                                                        | 2 streets | 3 or more streets |
| Type I                |                   | NO RESTRICTIONS                                                 |           |                   |
| Type II               | 6 or 7 stories    | 12,000                                                          | 15,000    | 18,000            |
|                       | 2 to 5 stories    | 15,000                                                          | 18,000    | 20,000            |
|                       | 1 story           | 20,000                                                          | 25,000    | 30,000            |
| Type III              | 2 to 5 stories    | 12,000                                                          | 15,000    | 18,000            |
|                       | 1 story           | 18,000                                                          | 20,000    | 22,500            |
| Type IV               | 2 or 3 stories    | 9,000                                                           | 10,000    | 12,000            |
|                       | 1 story*          | 9,000                                                           | 10,000    | 12,000            |
| Type V                | 2 or 3 stories    | 6,000                                                           | 7,000     | 8,000             |
|                       | 1 story           | 8,000                                                           | 9,000     | 10,000            |

\*Areas may be increased fifty per cent (50%) when exterior walls and bearing partitions are of one-hour fire-resistive construction and floor construction over usable space is protected with a ceiling of one-hour fire-resistive construction.

#### **ARTICLE 1304. EXIT FACILITIES.**

Stairs and exits shall be provided as and when required in Chapter 33.

Smokeproof towers shall be provided as and when required in Chapter 33.

All stairs and exits in Group H Occupancies shall open directly upon a street, alley, or a yard or court not less than four feet (4') in width directly connected to a street or alley by means of a passageway not less in width than the stairway opening into such passageway and not less than seven feet (7') in height.

#### **ARTICLE 1305. LIGHT, VENTILATION AND SANITATION.**

All rooms of Group H Occupancies used for eating, living or sleeping purposes shall be provided with light ventilation by means of windows with an area not less than one-eighth (1/8) of the total floor area of such room or rooms.

Every building shall be provided with at least one toilet. Every building and each subdivision thereof where both sexes are accommodated shall be provided with at least two toilets located in such building and one such toilet shall be conspicuously marked "For Women" and the other conspicuously marked "For Men." Not less than one toilet shall be provided for each fifteen (15) persons or major fraction thereof that such building is designed to accommodate.

Light, ventilation and sanitation shall be provided as required by any State laws intended to regulate such light, ventilation and sanitation.

There shall be no openings from a room in which a water closet is placed into a room in which food is prepared, except that the provisions of Article 1105 shall apply to occupancies available to the general public.

#### **ARTICLE 1306. ENCLOSURE OF VERTICAL OPENINGS.**

All vertical openings, such as elevator shafts, stairs, ramps and vent shafts, which permit the passage of fire or smoke in buildings over one story shall be enclosed as specified in Chapter 30. There shall be no openings into stair or ramp enclosures other than necessary entrance and exit doors, except for doors opening into lavatories exclusively occupied as such and having no combustible storage.

Exception: 1. Interior stairs serving one apartment only, need not be required to be enclosed, provided a one hour separation is provided between all apartments, and that there are no lockers under the stairs, and further that firestats are provided in the return air to the heating and/or cooling units.

#### **ARTICLE 1307. FIRE EXTINGUISHING APPARATUS.**

Automatic sprinklers, standpipes and basement pipe inlets shall be installed as and when required in Chapter 38.

Smoke Detectors shall be required in buildings four (4) stories or more in height regardless of type of construction.

#### **ARTICLE 1308. SPECIAL HAZARDS.**

Chimneys, heating apparatus and gas fired equipment shall conform to the requirements of Chapter 37, 52 and 53.

Every boiler room or room containing a central heating plant using solid or liquid fuel shall be separated from the rest of the building by a "Special Occupancy Separation" as defined in Article 503; in buildings of Type IV and V Construction an "Ordinary Occupancy Separation" may be used.

The storage and handling of gasoline, fuel oil and other flammable liquids shall not be permitted in any Group H Occupancy unless such storage and handling comply with the requirements of this Code.

#### **ARTICLE 1310. MIXED OCCUPANCIES.**

Separations between Group H Occupancies and all other occupancies shall be provided as specified in Article 503.

The separation requirements of the National Building Code, Section 316, entitled "Garages," will be required between garages and Group H Occupancies.

For Requirements For Open Air and Enclosed Public Parking Garages, See Article 1011.

#### **ARTICLE 1311. INGRESS SIGNS.**

At all normal points of ingress to each floor of all Group H Occupancies there shall be placed directional signs indicating the correct location of, or direction to, each living area such as apartment or room. Similar directional signs shall be located at corridor turns or branches.

# **CHAPTER 14 — REQUIREMENTS FOR GROUP I OCCUPANCIES**

## **ARTICLE 1401. GROUP I OCCUPANCIES DEFINED.**

Group I occupancy shall be dwelling (note more than 4 apartments) lodging or rooming houses, boarding houses, rectories, manses, parsonages, townhouses and other residential occupancies not transit.

Exception 1. Walls separating single family units contiguous to a common lot line (Townhouses) may be constructed meeting recognized ratings of not less than two-hour, fire resistive, combustible construction. Their structural support shall be on each side of said lot line. There shall be no vent, waste, drain, electrical service, gas or other building components in this wall other than the necessary electrical convenience outlets in steel outlet boxes. Where the number of contiguous units exceed four, then there shall be an absolute separation provided between each group of such units; when said separation is provided between each group of such units, the individual units may be classified as Group I Occupancies. Detached carports serving the above need not be separated by a two-hour separation provided the structures are of incombustible material and do not exceed 600 square feet per dwelling unit, and that where the number of contiguous carports exceed four there shall be absolute separation. See Article 2937 and Article 504.

See Tables Nos. 5-A and 5-B, and Article 503, for all occupancy classifications and separations.

## **ARTICLE 1402. CONSTRUCTION AND AREA ALLOWABLE.**

Buildings or parts of buildings classed in Group I because of use or the character of the occupancy shall be one of the Types of Construction. The floor area of Types I and II buildings shall be unlimited; the floor area of Type III buildings shall be limited to ten thousand square feet (10,000 sq. ft.) and the floor area of Types IV and V buildings shall be limited to seven thousand five hundred square feet (7,500 sq. ft.).

## **ARTICLE 1403. LOCATION ON PROPERTY.**

All exterior walls or parts of walls, except on street fronts, of Group I Occupancies which are less than 3 feet from adjacent property lines shall have no openings therein, shall be of not less than one-hour fire-resistive construction as set forth in Chapter 43, and shall be constructed as set forth in Chapters 17 through 41 of this Code. See Article 504 for regulating adjacent buildings on the same property.

For openings in party walls and walls on or within 3 feet of the property line, the special requirements of Article 504, third paragraph, shall apply.

Roofs or parts of roofs shall project not more than one foot (1') nearer any property line than the minimum for the wall.

Nothing in this Article shall be deemed to authorize the violation of any title restrictions, zoning ordinance, or precedent in which greater restrictions are established.

## **ARTICLE 1404. EXIT FACILITIES.**

Stairs and exits shall be provided as and when required in Chapter 33.

## **ARTICLE 1405. LIGHT, VENTILATION AND SANITATION.**

All rooms of Group I Occupancies used for eating, living or sleeping purposes shall be provided with light and ventilation by means of windows with an area not less than one-eighth (1/8) of the total floor area of such room or rooms.

Light, ventilation and sanitation shall be provided as required by any State laws which are intended to regulate such light, ventilation and sanitation.

There shall be no openings from a room in which a water closet is placed into a room in which food is prepared.

## **ARTICLE 1406. ENCLOSURE OF VERTICAL OPENINGS.**

Stairs in Group I Occupancies need not be enclosed, Dumbwaiter shafts, clothes chutes and other similar vertical openings shall be protected as specified in Chapter 30.

## **ARTICLE 1407. FIRE EXTINGUISHING APPARATUS.**

Fire extinguishing apparatus when installed shall conform to the requirements of Chapter 38.

## **ARTICLE 1408. SPECIAL HAZARDS.**

Chimneys, heating apparatus and gas fired equipment shall conform to the requirements of Chapters 37, 52 and 53.

Flammable liquids shall not be stored or used in Group I Occupancies in quantities in excess of one gallon and all such flammable liquids shall be kept in tight or sealed containers when not in actual use.

**ARTICLE 1409. EXCEPTIONS AND DEVIATIONS.**

Group I Occupancies constructed on the roof of multiple storied buildings shall be considered as an additional story insofar as the construction, location, exposure, stairs, exits and fire extinguishing apparatus are concerned.

Furnaces may be used without an "Occupancy Separation" in buildings not more than two (2) stories in height.

**ARTICLE 1410. MIXED OCCUPANCIES.**

Separation of Group I Occupancies from all other Occupancies shall be provided as specified in Article 503.

**ARTICLE 1411. PREFABRICATED UNIT CONSTRUCTION.**

For use of prefabricated unit construction See Article 209.

For requirements For Open Air and Enclosed Public Parking Garages, See Article 1011.

# CHAPTER 15 – REQUIREMENTS FOR GROUP J OCCUPANCIES

## ARTICLE 1501. GROUP J OCCUPANCIES DEFINED.

Group J Occupancies shall be:

Division 1: Private garages, car ports, portes-cocheres, open shelters, open and enclosed sheds, bomb and fallout shelters, private stables, sheds, and minor buildings used as accessories only when not over one thousand square feet (1000 sq. ft.) in area.

Division 2: Fences, tanks and towers.

See Tables Nos. 5-A and 5-B and Article 503, for all occupancy classifications and separations.

## ARTICLE 1502. CONSTRUCTION, HEIGHT AND AREA ALLOWABLE.

Buildings or parts of buildings classed in Group J because of the use or character of the occupancy shall be one of the Types of Construction. The Floor area shall not exceed one thousand square feet (1000 sq. ft.). The height shall not exceed one (1) story.

When any building exceeds the limit set forth in this Chapter, it shall be classed in the occupancy group other than Group J that it most nearly resembles.

For party fences the provisions of Chapter 45 shall apply.

Exception: Division No. 2 Tank Towers and Antennas are unlimited.

## ARTICLE 1503. LOCATION ON PROPERTY.

All exterior walls or parts of walls, except on street fronts of Group J Occupancies which are less than three feet (3') from adjacent property lines, shall have no opening therein, and be of one-hour fire resistive construction, unless specific approval is obtained from the Director.

Carports used with townhouses, See Article 1401

No part of a building shall extend over the property line and no water from roof shall fall or drain over the property line.

Nothing in this Article shall be deemed to authorize the violation of any title restrictions, zoning ordinance or precedent in which greater restrictions are established.

## ARTICLE 1504. EXIT FACILITIES.

Stairs and exits shall be provided as and when required in Chapter 33.

## ARTICLE 1505. LIGHT AND VENTILATION.

All portions of Group J Occupancies customarily used by human beings shall be provided with proper light and ventilation. For ventilation of private garages see Article 1509.

## ARTICLE 1506. ENCLOSURE OF VERTICAL OPENINGS.

Enclosure of vertical openings shall not be required.

## ARTICLE 1507. FIRE EXTINGUISHING APPARATUS.

Fire extinguishing apparatus shall be installed as and when required in Chapter 38.

## ARTICLE 1508. SPECIAL HAZARDS.

Chimneys, heating apparatus and gas fired equipment shall conform to the requirements of Chapters 37, 52 and 53.

Flammable liquids shall not be stored, handled or used in Group J Occupancies unless such storage or handling shall comply with the requirements of this Code.

If bomb shelters and fallout shelters are constructed, they shall be in accordance with the requirements or recommendations of the Office of Civil Defense having jurisdiction.

## ARTICLE 1509. EXCEPTIONS AND DEVIATIONS.

Attached garages shall be constructed as follows:

A garage not exceeding 1,000 square feet in area and used for the storage of passenger automobiles or trucks of one ton or less capacity, may be attached to or form a part of a residence building or a business building if separated from other occupancies by walls, partitions and ceilings of materials to restrict the passage of gases, smoke and odor from the garage to other parts of the building.

There shall be no openings from the garage into rooms used for sleeping purposes. The separation shall be an ordinary separation.

When doorway connects directly with any room in which there is any direct-fired heating device or gas fixture, it shall have a sill raised at least 8 inches above the garage floor level; or the doorway shall lead into a vestibule from which a second door connects with such room.

Garage floor shall be of concrete or equally fire-resistive and impervious material, and

shall have a slope sufficient to permit natural drainage of gases, oil and water to the outside. There shall be no pit in the garage floor; nor shall there be any artificial light other than incandescent electric lights.

Carports, portes-cocheres and similar structures having at least 2 sides open are classified as shelter sheds and shall be treated as canopies or awnings. They must have approved roof covering, must be adequately wind braced and anchored, and must not constitute a hazard to surrounding property. They shall not shed water on adjacent property.

Storage space termed in this Code "private garage" when more than 1,000 square feet in floor area shall be separated from other portions of the building as required for public garages.

#### **ARTICLE 1510. MIXED OCCUPANCIES.**

Separation of Group J Occupancies from any other Occupancies shall be provided as specified in Article 503 and Article 1509.

#### **ARTICLE 1511. PREFABRICATED UNIT CONSTRUCTION.**

For use of prefabricated unit construction, See Article 211.

**ARTICLE 1601. PERMIT REQUIRED.**

A Permit shall be obtained from the Safety Department before erecting or installing any swimming pool . . . public or private, ponds, wading pools or reflecting pools . . . more than twenty-four inches in depth, above or below Grade.

**ARTICLE 1602. FENCE REQUIREMENTS.**

All swimming pools shall be enclosed by a fence 6 feet (6') in height (not an integral part of the pool structure) and shall be provided with a self-closing gate with locking device at each opening. Fence shall be of masonry, solid board construction or of chain link wire in compliance with Ordinance No. 9426.

**ARTICLE 1603. ELECTRICAL EQUIPMENT.**

All Electrical equipment shall conform to the requirements of the National Electric Code and Chapter 50 of the Parish Building Code.

**ARTICLE 1604. PLUMBING AND DRAINAGE INSTALLATIONS.**

All plumbing and drainage installations shall conform to the requirements of Chapter 51 of the Parish Building Code.

**ARTICLE 1605. HEATING INSTALLATION.**

All heating installations shall conform to the requirements of Chapter 52 and 53 of the Parish Building Code.

**ARTICLE 1606. FILTERING AND CHLORINATING - PROCESS.**

Filtering and chlorinating process shall be in accordance with recognized standards.

**ARTICLE 1607. UNSAFE SWIMMING POOLS, ETC.**

Swimming pools or other dangerous excavations if not protected or supervised as for example, when a family moves, leaving the property abandoned, or a corporation or firm becomes inoperative and abandons the property, then the Parish Department of Safety and/or the Sheriff's Department, shall take steps to make the property safe.

**ARTICLE 1608. DISCLAIMER OF LIABILITY.**

This shall not make the Parish or Sheriff's Department responsible in any way for action in execution of the above.

**ARTICLE 1609. RECOVERY OF COST.**

Any cost incurred by the Parish or Sheriff's Department may be recovered by Civil Suit.

**ARTICLE 1610. LIABILITY OF CORPORATIONS FOR VIOLATION OF CHAPTER PROVISIONS.**

If any corporation, whether operated for profit or otherwise violates the provisions of this chapter, the criminal penalty and civil remedy hereinafter provided for shall be applicable to any officer, director or stockholder of such corporation.

**ARTICLE 1611. PENALTY FOR VIOLATION OF PROVISIONS OF THIS CHAPTER.**

Any person, firm or corporation (including any Officer, Director or Stockholder of a Corporation) found guilty of a violation of the Provisions of this Chapter shall be punished by a fine not to exceed \$100.00 or by imprisonment in the Parish Jail for not in excess of thirty (30) days, or both, in the discretion of The Court.

Exceptions: 1. Where swimming pools are located within a totally enclosed building or buildings, the installation of a fence shall not be required.

2. Swimming pools, wading pools, ponds and reflecting pools not more than twenty-four inches in depth, shall not be included in the provisions of this Chapter.

## **PART VIII**

### **REQUIREMENTS BASED ON TYPES OF CONSTRUCTION**

#### **CHAPTER 17—CLASSIFICATIONS OF ALL BUILDINGS BY TYPES OF CONSTRUCTION**

##### **ARTICLE 1701. GENERAL.**

The requirements of Chapter 17 through 22 are the minimum requirements for the various Types of Construction. In order that a building may be classed in any specific Type of Construction, it shall comply with all of the requirements of that Type of Construction as set forth in this Code.

No building or portion thereof shall be required to conform to the details of a Type of Construction higher than that Type which meets the minimum requirements based on Occupancy (Part VI) even though certain features of such building actually conform to a higher Type of Construction.

The various Types of Construction herein defined represent varying degrees of public safety and resistance to fire. Where specific materials, types of construction or fire-resistive protection are required, such requirements shall be the minimum requirements and any materials, types of construction or fire-resistive protection which will afford equal or greater public safety or resistance to fire, as specified in this Code, may be used.

Prefabricated units or structures will be allowed, but they must conform to above minimum requirements for strength, fire-resistance and other specified qualities. See Article 211.

Any system or method of construction to be used shall admit of a rational analysis in accordance with well established principles of mechanics.

The requirements of the Sanitary Code of the Louisiana Board of Health and the requirements of the Rules of the Sewerage and Water Board of Jefferson Parish shall govern all types of construction.

##### **ARTICLE 1702. CLASSIFICATION BY TYPES OF CONSTRUCTION.**

All buildings shall be divided into the following Types of Construction based upon their resistance to fire, and Type I shall be deemed to be the most fire-resistive and Type V the least fire-resistive Type of Construction.

Type I—Fire-Resistive Construction.

Type II—Heavy Timber or Equivalent Construction.

Type III—Ordinary Masonry Construction.

Type IV—Light Incombustible Construction.

Type V—Wood Frame Construction.

When two or more types of construction occur in the same building and are not separated by an unpierced wall of four-hour fire-resistive construction, the entire building shall be classed in the least fire-resistive type of construction and such buildings shall be subject to the restrictions of that type. Any building erected prior to the passage of this Code which by its construction can not be classified definitely as Type I, II, III, IV or V as defined herein, shall for the purpose of this Code be deemed to belong to the least fire-resistive class of the two types to which it most nearly conforms. Any building which cannot be classed as Type I, II, III or IV Construction shall be considered to be of Type V Construction.

##### **ARTICLE 1703. PARTY WALLS.**

For party wall requirements, the provisions of Article 2937 shall apply.

##### **ARTICLE 1704. PARAPET WALLS.**

For parapet wall requirements, the provisions of Article 2938 shall apply.

##### **ARTICLE 1705. OPENINGS IN WALLS.**

When allowed in exterior wall other than on street fronts, public ways, or parks, the aggregate area of such openings at any one level shall not exceed 25% of the wall computed as per Article 504. When walls face on streets, public ways, or parks 30 feet or more in width, openings cannot exceed 75% of the gross area of the wall at any one level.

In bearing walls, a panel or spandrel of the same fire-resistive construction as required for the wall must be provided at least 3 feet between any opening and the bottom of the opening above.



In non-bearing walls, a 3-foot panel or spandrel of the same fire-resistive construction as required for the building must be provided; however, on street fronts, public ways, or parks, this 3-foot panel can be of 2-hour fire-resistive construction.

Exceptions: on street fronts, public ways, or parks, a panel or spandrel is not required when:

1. Building is not over 3 stories in height.
2. The height of any 2 successive exterior openings under consideration if set back from the lower exterior opening a horizontal distance of not less than 3 feet.
3. The exterior openings are separated by an incombustible assembly of the same fire-resistance as the otherwise required spandrel, same to extend from the building wall a horizontal distance of not less than 3 feet.

**ARTICLE 1801. DEFINITION.**

In Type I buildings, the structural frame shall be of fire-protected structural steel or iron or of reinforced concrete. The exterior walls, inner court walls, and walls enclosing vertical openings shall be of fire-resistive construction. The roof construction and floors shall be of fire-resistive materials. Exterior doors and windows shall be of fire-resistive construction only when specified in Article 1813.

Note: Fire-resistive materials and fire-resistive construction have a specific meaning in this Code, as specified in Chapters 42 and 43.

**ARTICLE 1802. HEIGHT ALLOWABLE.**

The height of Type I buildings shall not be limited.

**ARTICLE 1803. AREA ALLOWABLE.**

The floor area of Type I buildings shall not be limited.

**ARTICLE 1804. FOUNDATIONS.**

Footings shall be of solid masonry or of reinforced concrete, as specified in Chapters 24 and 26, respectively, and shall be designed as specified in Article 2311 and Chapter 28. Foundation walls shall be of masonry or reinforced concrete as specified in Chapter 29.

**ARTICLE 1805. EXTERIOR AND INNER COURT WALLS.**

Exterior wall shall be of masonry or reinforced concrete as set forth in Chapter 29, and shall be of not less than four-hour fire-resistive construction as set forth in Article 4302, except walls fronting on streets having a width of at least 30 feet may be of incombustible construction with all structural members fire-protected as required in Article 1809.

Inner court walls shall be of masonry or reinforced concrete of not less than three-hour fire-resistive construction as specified in Article 4302.

Opening limitation in exterior walls shall be as set forth in Article 1705.

See Article 2937 and 2938 for requirements for party walls, fire walls, and parapets.

**ARTICLE 1806. PARTITIONS.**

Only noncombustible materials shall be used in the construction of corridor partitions. This shall not prohibit the use of wooden doors, door casings, frames, jambs and bucks, window and transom frames and casings in these partitions, unless required to have a two-hour fire-resistive rating.

Nothing in this article shall prevent the erection of temporary non-fire-resistive partitions within spaces of not more than 5000 sq. ft. (occupied by a single tenancy) provided such room or space is enclosed within partitions of not less than one-hour rated non-combustible partitions, with one-hour fire-resistive openings.

**ARTICLE 1807. ENCLOSURE OF VERTICAL OPENINGS.**

Enclosures for elevator shafts, vent shafts, stair wells, and other vertical openings, when required because of Occupancy, shall be of two-hour fire-resistive construction, and all openings therein shall be protected by fire-resistive doors or windows as specified in Chapters 30 and 43.

A parapet wall or hand rail at least thirty inches (30") in height above the roof shall be provided around all open shaft enclosures extending through the roof.

**ARTICLE 1808. STRUCTURAL FRAMEWORK.**

Structural framework shall be of structural steel or iron, as specified in Chapter 27, or shall be of reinforced concrete as specified in Chapter 26.

The structural frame shall be considered as the columns, and all girders, beams, trusses or spandrels having rigid connections to the columns and all other members essential to the stability thereof. The members of floors or roof panels which have no connection to the columns shall be considered secondary members. The structural frame and secondary members shall be designed and constructed to carry all dead, live and other loads to which they may be subjected both during erection and after completion of the structure. Unless otherwise provided for in the structural frame, the floor and roof panel construction shall be designed and constructed to carry the horizontal forces to such parts of the structural frame as are designed to carry the horizontal forces to the foundations.

The entire structural frame and each member which is a part of such frame shall be so designed and constructed that the stresses may be satisfactorily determined by a rational analysis in accordance with well established principles of mechanics and sound engineering practice.

(a) **Structural Steel or Iron Members.** All structural steel or iron members, not including frames or structural members for elevators and elevator enclosures, shall be thoroughly fire-protected with not less than four-hour fire-resistive protection for columns, beams, and girders and three-hour fire-resistive protection for floors, for all buildings more than eight (8) stories or eighty-five feet (85') in height; and with three-hour fire-resistive protection for columns, beams and girders and two-hour fire-resistive protection for floors, for all buildings which are eight (8) stories or eighty-five feet (85') or less in height. All such fire-resistive protection shall be as specified in Chapter 43.

Exceptions: 1. The thickness of the fire-protection on the outer edge of lugs or brackets on columns may be reduced to not less than one inch (1").

2. The masonry over window openings may be supported by a steel plate, angle or similar member which is not fire-protected on the under side, provided the member is supported at proper intervals from a structural beam or girder which is fire-protected on all sides. For openings in masonry bearing walls not exceeding four feet (4') in width, an angle or similar member supported by masonry and not fire-protected on the under side may be used.

3. Where every part of the structural steel framework of the roof of a Group A, B, or C Occupancy is not less than twenty-five feet (25') above any floor, balcony or gallery, fire-protection of all members of the roof construction may be omitted.

4. Where every part of the structural steel framework of the roof of a Group A, B, or C Occupancy is more than eighteen feet (18') and less than twenty-five feet (25') above any floor, balcony or gallery, the roof construction shall be protected by a ceiling of not less than one-hour fire-resistive construction as specified in Chapter 43.

5. A. Steel trusses, beams and girders which support columns, masonry, concrete walls, and/or walls required to be of 2-hours fire-protection, shall be individually fire-protected. Truss members may be individually fire-protected, or the truss as a whole may be individually enclosed in fire-protective materials.

B. Beams, girders and trusses supporting accumulated floor loads and/or loads of more than one floor shall be individually fire protected, also all beams, girders and trusses connected to columns shall be individually protected.

C. Columns shall be individually fire-protected for their entire lengths including all connections and knee bracing thereto. Where the fire protection of columns is subject to impact damage, such fire-protection shall be suitably protected against injury.

D. Except for individual protection specified in sub-paragraph A, B and C, group protection may be employed, subject to the following conditions:

1. The floor or ceiling system shall conform to a fire-resistive system rated and listed by a competent and recognized testing laboratory which issues regularly published list of tested building materials. Where a part of the floor slab is occupied by outlet boxes or raceways, the equivalent mass of such outlet boxes or raceways shall be restored by an increase in the thickness of the slab.
2. The space between the floor and ceiling shall be divided into areas not exceeding 1500 square feet by tight, closely fitted and substantially constructed noncombustible fire-and draft-stops, the integrity of which must be maintained at all times. This space shall contain no exposed combustible material. Solid webs of rolled sections may be utilized as fire-stops provided noncombustible material is adequately applied between the bottom flanges of such sections and the approved ceiling itself. Sheet metal or iron or steel not less than 24 gauge may be used as fire-stopping.

E. Trusses carrying roof loads only may be group protected, provided there is no habitable space between the topmost ceiling and the roof.

6. In one-story assembly buildings of Group A, B or C Occupancy, required to be of Type 1 Construction, no protection shall be required for the members of roof trusses, purlins or roof beams when the clear height to the lowest chord is 20 feet from the main floor.

(b) **Reinforced Concrete Members.** All reinforced concrete columns, beams and girders shall be thoroughly fire-protected with four-hour fire-resistive protection, and all floors, joists and slabs shall be thoroughly fire-protected with not less than three-hour fire-resistive protection, for all buildings more than eight (8) stories or eighty-five feet (85') in height. All reinforced concrete columns, beams and girders shall be thoroughly fire-protected with not less than three-hour fire-resistive protection and all floors, joists and slabs shall be thoroughly fire-protected with not less than two-hour fire-resistive protection, for all buildings which are eight (8) stories or eighty-five feet (85') or less in height. All such fire-resistive protection shall be as specified in Chapter 43.

Exceptions: Required protection (in hours) for reinforced concrete construction shall

#### **ARTICLE 1810. FLOOR CONSTRUCTION.**

Floors shall be constructed of reinforced concrete, brick or hollow tile arches, reinforced gypsum or composite floors of those materials in combination with structural steel or iron or reinforced concrete; floor panel construction shall consist of any floor system providing not less than two-hour fire-resistive construction for buildings which are eight (8) stories or eighty-five feet (85') or less in height, and providing not less than three-hour fire-resistive construction for all buildings more than eight (8) stories or eighty-five feet (85') in height, all as specified in Article 4303.

The type of floor construction used shall provide means to keep the beams and girders from spreading, by either ties or bridging, and no laterally unsupported length of joists shall exceed eight feet (8'), except as otherwise provided in Articles 3102 and 3103. The floor and roof panel construction shall be so designed and constructed as to transfer horizontal forces to such parts of the structural frame as are designed to carry the horizontal forces to the foundations, unless such forces are provided for otherwise.

Where wood sleepers are used for laying wood floors, the space between the floor slab and the underside of the wood flooring shall be filled with incombustible material in such a manner that there will be no open spaces under the flooring which will exceed one hundred square feet (100 sq. ft.) in area and such space shall be filled solidly under all partitions so that there is no communication under the flooring between adjoining rooms. Flooring of wood, linoleum, rubber, tile, cork, or magnesite may be secured to a sub-floor of wood.

#### **ARTICLE 1811. ROOF CONSTRUCTION.**

Roofs shall be constructed of any materials or combination of materials as allowed for floors in Article 1810, except that where structural steel roof members are not required to be fire-proofed, as provided in Article 1809, approved unprotected incombustible material having a flame spread rating of 25 or less and installed in such a manner as to prevent roofing compound from seeping through the joints may be used for the construction.

Roof covering shall be a "Fire Retardant" roofing as specified in Article 4305.

Any drainage fill placed on a roof deck of any building shall be of incombustible material, and such fill shall be considered as a part of the dead load in designing the roof framing.

#### **ARTICLE 1812. STAIR CONSTRUCTION.**

Stairs and stair platforms shall be constructed of reinforced concrete, iron or steel with treads and risers of concrete, iron or steel. Brick, marble, tile or other hard incombustible materials may be used for the finish of such treads and risers.

All stairs shall be designed and constructed as specified in Chapter 33 and as required under Occupancy Chapters 5 through 15.

#### **ARTICLE 1813. DOORS AND WINDOWS.**

Doors, windows and other openings in the exterior walls shall be protected by one-hour fire-resistive construction as specified in Article 4306.

Exceptions: 1. The provisions of this article shall not apply to doors, windows and other openings which face directly upon, and are not within thirty feet (30') of the opposite side of a public street or other public place, this distance to be measured from and at right angles to the plane of the wall in which such openings occur; or not within thirty feet (30') of opening in another building with masonry walls, or not within thirty feet (30') from and over any part of a roof of another building where this roof is of other than Type I or II construction - measurements between openings are to be taken along the shortest line and from the intersection of such line with the inner surface of masonry wall.

2. The provisions of the first paragraph of this article shall not apply to openings in an open or outer court, except those less than twenty feet (20') from openings in an occupancy from which separation is required; measurements to be taken along the shortest line and from the intersection of such line with the inner surface of the wall.

In buildings four (4) stories or more in height, enclosed courts, such as light and ventilation shafts, which are under twenty feet (20') in least dimension, or less than four hundred square feet (400 sq. ft.), must have openings protected with one-hour windows. In larger courts, protection of openings is not required except where occupancy separations are required.

For open deck parking garages, the provisions of Chapter 10 shall apply.

#### **ARTICLE 1814. PROJECTIONS FROM THE BUILDINGS.**

Bays, oriels and similar projections shall be constructed of incombustible materials with walls, floors and roofs as specified in this Chapter and as specified in Chapter 35.

Porches and exterior balconies shall be constructed of incombustible materials but

structural steel or iron members need not be fire-protected, wood flooring may be used on porches and exterior balconies up to and including the third floor. Loading platforms for warehouses, freight depots and similar buildings may be of heavy timber construction with wood floors not less than one and five-eighths inches (1 5/8") thick. Such wood construction shall not be carried through the exterior walls of any Type I building.

Cornices, marquees and similar appendages which are a part of a Type I building shall be constructed of substantial incombustible materials, and as required in Chapter 44.

#### **ARTICLE 1815. PENTHOUSES AND SKYLIGHTS.**

Penthouses and other roof structures shall be constructed with floors and roof complying with the requirements of Articles 1810 and 1811, respectively; enclosure walls shall be of masonry, reinforced concrete or other incombustible materials. Complying with Articles 1805 and 3601.

See Chapter 48, Part XV, for requirements of roof structures connected with air conditioning, mechanical refrigeration and attic ventilation.

Skylights shall be constructed of one-hour fire-resistive materials as specified in Article 3403 and in Chapter 43, and shall be of metal or other non-combustible construction.

When sprinklered, roof structures built entirely of noncombustible materials will be acceptable when complying with the provisions of Chapter 36.

#### **ARTICLE 1816. COMBUSTIBLE MATERIALS REGULATED.**

Wood or unprotected steel or iron shall be permitted in the following places:

1. Mezzanine floors may be of wood or unprotected steel provided that there shall be not more than two (2) such mezzanines in any room of any building, and provided, further, that no such mezzanine floor or floors shall cover more than thirty-three and one-third per cent (33 1/3%) of the area in the room where located. Such mezzanine floors constructed in dense commercial sections shall be of heavy timber construction as required for floor construction in Type II buildings.

2. Show window frames and aprons, also show cases and other appurtenances on the first floors of stores or other similar buildings may be of wood with or without unprotected steel or iron.

3. Trim, picture molds, chair rails, wainscoting, baseboards, hand rails, show window backing, temporary partitions, floors and sleepers may be of wood. Wooden trim used for door or window casings, chair rails, picture mouldings and baseboards, etc., shall be backed solidly with noncombustible materials. Wood floor sleeper installation shall conform with Article 1810. Wood doors may be used except in stair, elevator or other shaft enclosures or where not specifically prohibited under Occupancy.

4. Roofs may be sheathed by wood planks of two and one-half inch (2 1/2") nominal thickness when such sheathing is more than thirty feet (30') distant from any floor, balcony or gallery and when such plank sheathing is protected on the underside by a ceiling of not less than one-hour fire-resistive construction as specified in Article 4301. For alternate types of materials or construction, the provisions of Article 211 shall apply.

5. Combustible material used as wall or ceiling finish shall not exceed one and one-half inches (1 1/2") in thickness except for projecting decorative mouldings, and the total area of such material in any one room or space shall not exceed five thousand square feet (5,000 sq. ft.) unless the material so used is an approved material of low fire hazard. Any combustible material which has been so treated as to make it of low fire hazard (flame spread rating of 75 or less) may be submitted to the Director and given special approval for use without area limitations.

6. Supporting members for wall, partition or ceiling finish shall be noncombustible, except for furring strips not over one and five-eighths inches (1 5/8") in thickness applied directly against a noncombustible surface, in which case the space between the furring strips must be draft-stopped in such manner that there shall be no open spaces behind the partition, wall or ceiling finish which shall exceed sixteen square feet (16 sq. ft.) in area.

7. The use of a surface finish of paper or of material of no greater fire hazard than paper shall not be prohibited provided such finish does not exceed three one-hundredths of an inch (0.03") in thickness and is applied directly and solidly to a noncombustible base.

8. The construction of contact, furred, or suspended ceiling (prior to the application of the ceiling finish as set forth in paragraph 5 above) shall be of noncombustible material in its entirety, adequately and properly fire-stopped and draft-stopped with noncombustible materials, so that no area shall exceed 1,500 square feet. If protected by an approved system of sprinklers, this area may be doubled.

9. For surface finish of vertical openings, stairway enclosures, etc., the requirements of Articles 3004 and 3317 shall apply.

For special interior finish and decoration limitations, see "Requirements Based on Types of Construction," Part VIII of this Code.

# CHAPTER 19—TYPE II BUILDINGS (HEAVY TIMBER OR EQUIVALENT CONSTRUCTION)

## ARTICLE 1901. DEFINITION.

In Type II buildings the structural frame shall be of fire-protected structural steel or iron, reinforced concrete, masonry or heavy timbers. Exterior walls shall be of fire-resistive construction. Inner court walls shall be of incombustible materials or protected solid wood. Roof construction, floors and non-bearing partitions shall be of wood or incombustible materials.

## ARTICLE 1902. HEIGHT ALLOWABLE.

Type II buildings shall not exceed a height of seventy-five feet (75') in which height there shall be not more than seven (7) stories. The height of a building erected on sloping ground may be not to exceed seventy-five feet (75') plus a vertical distance equal to the vertical change in slope along the length of any side of such building, but in no case shall such height exceed eighty-five feet (85') above the adjacent finished ground level. No one-story building shall exceed a height of sixty-five feet (65').

Towers, spires and steeples erected as a part of the building and not used for habitation or storage may extend not to exceed twenty feet (20') above such height limit.

## ARTICLE 1903. AREA ALLOWABLE.

The floor area of Type II buildings shall be limited according to occupancy as required in Chapters 5 through 15.

## ARTICLE 1904. FOUNDATIONS.

Footings shall be of solid masonry or reinforced concrete as set forth in Chapters 26, and shall be designed as set forth in Article 2311 and Chapter 28. Foundation walls shall be of masonry or reinforced concrete as set forth in Chapter 29.

## ARTICLE 1905. EXTERIOR AND INNER COURT WALLS.

Exterior wall shall be of masonry or reinforced concrete as set forth in Chapter 29, and shall be of not less than four-hour fire-resistive construction as set forth in Article 4302, except that walls fronting on streets having a width of at least 30 feet may be of incombustible construction, with columns having not less than three-hour fire-resistive protection and beams and girders not less than two-hour fire-resistive protection as set forth in Chapter 43.

See Articles 2937 and 2938 for requirements for party walls, fire walls and parapets.

All walls within five feet (5') of adjacent property lines (excepting property lines abutting a street or an alley) and all walls within ten feet (10') of other buildings on the same property, shall be provided with a parapet wall at least thirty inches (30") high above the roof at all points provided that parapet walls need not be constructed on buildings twenty feet (20') or less in height or where the roof slopes more than twenty degrees (20°) from the horizontal back from the exterior wall of such building.

Inner court walls shall be constructed the same as exterior walls or shall be of not less than four-inch solid wood laminated construction protected on the weather side thereof by incombustible fire-resistive materials as provided in Article 4202.

Opening limitation in exterior walls shall be as set forth in Article 1705.

## ARTICLE 1906. PARTITIONS.

Interior partitions shall be of one-hour fire-resistive construction as specified in Article 4302 or may be of solid wood construction formed of two layers of one-inch (1") nominal matched boards or of two-inch (2") nominal tongued and grooved wood planking or of solid wood laminated construction not less than three and five-eighths inches (3-5/8") thick.

Where wood partitions abut or adjoin masonry walls, they shall be tied as required in Article 2518.

Temporary partitions as specified in Article 1806 may be used.

## ARTICLE 1907. ENCLOSURE OF VERTICAL OPENINGS.

Enclosures for elevator shafts, vent shafts, stair wells and other vertical openings shall be of two-hour fire-resistive construction as specified in Chapters 30 and 43; provided, that in buildings not more than three (3) stories in height which are completely sprinklered as specified in Chapter 38, such enclosure walls may be of any construction permitted for interior partitions.

A parapet wall or hand rail at least thirty inches (30") in height above the roof shall be provided around all open shaft enclosures extending through the roof.

## ARTICLE 1908. STRUCTURAL FRAMEWORK.

Structural framework shall be of masonry as specified in Chapter 24, of wood as specified in Chapter 25, of concrete as specified in Chapter 26, or of structural steel as specified in Chapter 27.

All wood columns in such structural frame shall be directly superimposed, one above the other (no girders or bolsters between columns), and shall be provided with reinforced concrete, steel or cast iron caps, pintles or base plates, or be connected by timber splice blocks fastened to columns by connectors housed within the contact faces or by bolts. No wood column shall be less than eight inches (8") nominal in its least dimension; no beam, girder or joist shall be less than six inches (6") nominal in its least dimension, nor less than forty-eight square inches (48 sq. in.) nominal in cross-sectional area; and no wood roof truss or arch framing member shall be less than four inches (4") nominal in least dimension; however, top and bottom chords of truss may be built up of two (2) or more elements of not less than three inches (3") nominal thickness when the space between such elements is either solidly filled or is tightly closed for the full length on the under-side thereof with a wood cover plate of two-inch (2") nominal thickness.

Where adjoining ends of girders and beams meet at columns they shall be closely fitted and cross-tied by approved reinforced concrete, steel or iron post caps or metal straps, or shall be intertied with columns by through bolted wood corbel and splice blocks or side bolsters with load transferred by connectors housed within the contacting faces or by bolts. Approved wall plates, boxes or hangars shall be provided where wood beams, girders or trusses rest on masonry or concrete walls.

## ARTICLE 1909. FIRE PROTECTION OF STRUCTURAL MEMBERS.

(a) **Structural Steel or Iron Members.** All structural steel or iron members (not including frames and structural members for elevators and elevator enclosures) shall be thoroughly fire-protected. Such fire protection shall be of three-hour fire-resistive protection for columns, and two-hour fire-resistive protection for beams, girders and floor systems, and all fire protection shall be determined as specified in Chapter 43; such fire-protection may be reduced to not less than one hour when the building does not exceed a height of one story.

Exceptions: 1. The thickness of the fire-protection on the outer edge of lugs or brackets on columns may be reduced to not less than one inch (1").

2. The masonry over window openings may be supported by a steel plate, angle or similar member which is not fire-protected on the under side, provided the member is supported at proper intervals from a structural beam or girder which is fire-protected on all sides. For openings in masonry bearing walls not exceeding four feet (4') in width, an angle or similar member supported by masonry and not fire-protected on the under side may be used.

3. Where the structural steel framework of the roof of a Group A, B or C Occupancy is not less than twenty-five feet (25') above any floor, balcony or gallery, fire-protection of all members of the roof construction may be omitted.

4. Where the structural steel framework of the roof of a Group A, B or C Occupancy is more than eighteen feet (18') and less than twenty-five feet (25') above any floor, balcony or gallery, the roof construction shall be protected by a ceiling of not less than two-hour fire-resistive construction as specified in Chapter 43.

5. Group protection may be employed as defined and specified in Article 1809, Exception 5.

(b) **Wood Structural Members.** Wood structural members shall not be required to be fire-protected.

(c) **Reinforced Concrete Members.** All reinforced concrete columns shall be thoroughly fire-protected with not less than three-hour fire-resistive protection and all joists, beams, girders and slabs shall be thoroughly fire-protected with not less than two-hour fire-resistive protection outside of all steel reinforcing as specified in Article 4301.

Exception: Required protection (in hours) for reinforced concrete construction shall be as required for steel roof construction.

## ARTICLE 1910. FLOOR CONSTRUCTION.

Floor construction shall be as required for Type I buildings or shall be one of the types noted below:

1. Floor construction shall be of tongued and grooved or splined lumber not less than three inches (3") nominal thickness with a top layer of flooring of one inch (1") nominal thickness laid thereon.

2. Construction of solid lumber placed on edge and securely spiked together to make a floor not less than four inches (4") nominal thickness.

If such floor is six inches (6") nominal or more in thickness, the lumber shall be air seasoned or kiln dried.

A space of one-half inch (1/2") shall be required between all floor construction and the wall which it adjoins, to allow for swelling in case the floor becomes wet. This space shall be properly covered by a molding so arranged that it will not interfere with the swelling and shrinking movements of the flooring.

Wood joists, beams and girders supported by masonry walls shall be anchored thereto as required in Chapter 25. Ventilation shall be provided between the ground and a wood floor as required in Article 2527.

The timbers and planking shall be self-releasing at end support on walls and no planking or timber shall extend through or across any party or occupancy separation walls.

#### **ARTICLE 1911. ROOF CONSTRUCTION.**

Roof deck construction shall be as required for floor construction in Article 1910 except that the minimum allowable thickness of roof sheathing shall be 2 inches nominal. Other forms of roof decks may be used in accord with requirements of Article 211.

Attic or roof spaces shall be divided into areas not exceeding twenty-five hundred square feet (2500 sq. ft.) as specified in Article 3205.

Roof covering shall be a "Fire-Retardant" roofing as specified in Article 4305 and shall be required over all combustible roof construction.

When roof has a slope of less than 15° from the vertical, construction must have a fire rating as required for outside walls.

#### **ARTICLE 1912. STAIR CONSTRUCTION.**

Stair construction may be of wood in buildings not exceeding three (3) stories in height.

In buildings four (4) or more stories in height, all stairs and stair construction shall be as required for Type I buildings.

All stairs and exits shall be designed and constructed as specified in Chapter 33 and required under Occupancy in Chapters 5 through 15.

#### **ARTICLE 1913. DOORS AND WINDOWS.**

Doors, windows and other openings in the exterior walls shall be protected by one-hour fire-resistive construction as specified in Article 4306.

Exceptions: 1. The provisions of this article shall not apply to doors windows and other openings which face directly upon, and are not within thirty feet (30') of the opposite side of a public street or other public place, this distance to be measured from and at right angles to the plane of the wall in which such openings occur; or not within thirty feet (30') of openings in another building with masonry walls, or not within thirty feet (30') of a wall of Type IV or V construction; or not within thirty feet (30') from and over any part of a roof of another building where this roof is of other than Type I or II construction. Measurements between openings are to be taken along the shortest line and from the intersection of such line with the inner surface of masonry wall.

2. The provisions of the first paragraph of this article shall not apply to openings in an open or outer court, except those less than twenty feet (20') from openings in an occupancy from which separation is required; measurements to be taken along the shortest line and from the intersection of such line with the inner surface of the wall.

In buildings four (4) stories or more in height, enclosed courts, such as light and ventilation shafts, which are under twenty feet (20') in least dimension, or less than four hundred square feet (400 sq. ft.), must have openings protected with one-hour windows. In larger courts, protection of openings is not required except where occupancy separations are required.

For open deck parking garages, the provisions of Chapter 10 shall apply.

#### **ARTICLE 1914. PROJECTIONS FROM THE BUILDING.**

Bays, oriels and similar projections shall be constructed of incombustible materials with walls, floors and roofs as specified in this Chapter and in Chapter 35.

Porches and exterior balconies shall be constructed of incombustible materials but structural steel or iron members need not be fire-protected. Wood flooring may be used on porches and exterior balconies up to and including the third floor.

Loading platforms for warehouses, freight depots and other similar buildings may be of heavy timber construction with wood floors not less than one and five-eighths inches (1-5/8") thick. Such wood construction shall not be carried through the exterior walls of any Type II building.

Cornices, marquees and similar appendages which are a part of a Type II building shall be constructed of substantial incombustible materials and as specified in Chapter 44.



#### **ARTICLE 1915. PENTHOUSES AND SKYLIGHTS.**

Penthouses shall be as required for Type I construction and as required in Chapter 36. Skylights shall be of one-hour fire-resistive construction as specified in Chapters 34 and 43.

See Chapter 48, Part XV, for requirements of roof structures connected with air conditioning, mechanical refrigeration and attic ventilation.

When sprinklered, roof structures built entirely of noncombustible materials will be acceptable when complying with the provisions of Chapter 36.

#### **ARTICLE 1916. COMBUSTIBLE MATERIALS REGULATED.**

No wood lath or wood furring shall be allowed in any buildings of Type II construction, but unprotected steel or iron or weed will be allowed in the following places:

1. Mezzanine floors may be of weed or unprotected steel, provided that there shall be not more than two (2) such mezzanines in any room of any building, and provided, further, that no such mezzanine floor or floors shall cover more than thirty-three and one-third per cent (33-1/3%) of the area in the room where located.

2. Show window frames and aprons, also show cases and other appurtenances on the first floors of stores and other similar buildings may be of wood, with or without unprotected steel or iron.

3. Trim, hand rails, show window backing and temporary partitions as specified in Article 1906, picture molds, chair rails and wainscoting or baseboards may be of wood. Wooden trim used for door or window casings, chair rails, picture moldings, baseboards, etc., shall be backed solidly so as to minimize concealed air spaces. Wood doors may be used, except in stair, elevator and other shaft enclosures, or where not specifically prohibited under Occupancy.

4. Combustible materials for ceiling and for interior finish of side walls and partitions shall be of a type which will not have a rate of flame spread in excess of that of wood painted with ordinary varnish and will not develop gases more toxic or noxious than wood when exposed to heat or flame. Such materials, when applied, shall be backed solidly so as to minimize concealed air spaces. When furring strips are used, the space between the furring strips must be draft-stopped in such a manner that there shall be no open spaces behind the wall or partition or ceiling finish which will exceed sixteen square feet (16 sq. ft.) in area.

5. The use of a surface finish of paper or of material of no greater fire hazard than paper shall not be prohibited provided such finish does not exceed three one-hundredths of an inch. (0.03") in thickness, and is applied directly and solidly to the surface.

6. For surface finish of vertical openings, stairway enclosures, etc., the requirements of Articles 3004 and 3317 shall apply.

7. The construction of contact, furred, or suspended ceiling (prior to the application of the ceiling finish as set forth in paragraph 4 above) shall be of noncombustible material in its entirety, adequately and properly fire-stopped and draft-stopped with noncombustible materials, so that no area shall exceed 1500 square feet. If protected by an approved system of sprinklers, this area may be doubled.

For special interior finish and decoration limitations, see "Requirements Based on Types of Construction," Part VIII of this Code.

## **CHAPTER 20 – TYPE III BUILDINGS ( ORDINARY MASONRY).**

### **ARTICLE 2001. DEFINITION.**

In Type III buildings, the interior load bearing construction may be masonry or reinforced concrete walls, a structural frame of steel reinforced concrete, or wood. Exterior walls shall be of fire-resistive materials. Partitions, floors and roof framing may be of wood.

### **ARTICLE 2002. HEIGHT ALLOWABLE.**

Type III buildings shall not exceed a height of fifty-five feet (55') in which height there shall be not more than five (5) stories; however, the height of a building erected on sloping ground may be fifty-five feet (55') plus a vertical distance equal to the vertical change in slope along and in the length of any side of such building, but in no case shall such height exceed sixty-five feet (65') above the adjacent finished ground level. Towers, spires and steeples erected as a part of such building and not used for habitation or storage may extend not to exceed fifteen feet (15') above such height limit.

### **ARTICLE 2003. AREA ALLOWABLE.**

The floor area of Type III buildings shall be limited according to occupancy as required in Chapters 5 through 15.

### **ARTICLE 2004. FOUNDATIONS.**

Footings shall be of solid masonry or of reinforced concrete as set forth in Chapters 24 and 26, respectively, and shall be designed as set forth in Article 2311 and Chapter 28. Foundation walls shall be of masonry or reinforced concrete as set forth in Chapter 29.

### **ARTICLE 2005. EXTERIOR WALLS AND INNER COURT WALLS.**

Exterior walls shall be of masonry or reinforced concrete as specified in Chapter 29, and shall be not less than four-hour fire resistive construction as specified in Article 4302. However, walls fronting on streets having a width of at least 30 feet may be of incombustible construction with all structural members having not less than one-hour fire-resistive protection, as specified in Chapter 43, except that one-story buildings would not require this one-hour fire-resistive protection (this being limited to not more than 2 street sides.)

See Articles 2937 and 2938 for requirements for party walls, fire walls and parapets.

The enclosing walls and openings of inner courts and shafts extending through less than 4 stories of a building shall have a fire-resistive rating of not less than one hour. The enclosing walls of inner courts and shafts extending through 4 stories or more of a building shall be of approved noncombustible material having a fire-resistive rating of not less than 2 hours, with 1-hour openings.

If all structural members including walls, floors, roofs and their supports are of steel, iron, concrete, or other non-combustible materials, the exterior enclosure walls may be of masonry, concrete, other fire-resistive material, or assemblies of materials which have not less than two-hour fire-resistive ratings, except that walls fronting on streets may conform to the first paragraph of this Article.

Opening limitation in exterior walls shall be as set forth in Article 1705.

### **ARTICLE 2006. PARTITIONS.**

Partitions of wood shall be constructed as required in Chapter 25. In buildings of four (4) stories or more in height, all partitions shall be of one-hour fire-resistive construction as specified in Article 4302. Bearing partitions, when constructed of wood, shall not support more than two (2) stories and a roof.

Temporary partitions as set forth in Article 1806 may be used.

### **ARTICLE 2007. ENCLOSURE OF VERTICAL OPENINGS.**

Enclosures for elevator shafts, vent shafts, stair wells and other vertical openings when required because of occupancy in Part VI shall be of one-hour fire-resistive construction as specified in Chapters 30 and 43.

A parapet wall or hand rail at least thirty inches (30") in height above the roof shall be provided around all open shaft enclosures extending through the roof.

### **ARTICLE 2008. STRUCTURAL FRAMEWORK.**

Structural framework shall be of steel, iron, reinforced concrete, masonry or wood and shall be designed and erected as specified in Chapter 26 for reinforced concrete, Chapter 27 for steel and iron, Chapters 22 and 25 for wood and Chapters 24 and 29 for masonry.

## **ARTICLE 2009. FIRE PROTECTION OF STRUCTURAL MEMBERS.**

Fire protection of steel, iron or wood structural members may be omitted in buildings under four (4) stories, unless otherwise required because of Location as in Part VII or Occupancy as in Part VI, or as required in this Chapter.

All members carrying masonry in buildings over one (1) story in height shall be provided with not less than one-hour fire-protection. Bottom flanges of exterior lintels need not be fire-protected.

Group protection may be employed as defined and specified in Article 1809, Exception 5.

## **ARTICLE 2010. FLOOR CONSTRUCTION.**

Floors may be constructed as specified in Chapter 26 for reinforced concrete, Chapter 24 for masonry, Chapter 25 for wood, and Chapter 27 for steel or iron.

In buildings of four (4) stories or more in height, the lower side of all metal or wood floor or roof construction shall be entirely protected by a ceiling of one-hour fire-resistive construction as required in Chapter 43.

In all buildings having a usable space under the first floor, except Groups I and J Occupancies, the underside of such floor construction when of metal or wood, shall be protected by a ceiling of one-hour fire-resistive construction as set forth in Chapter 43.

Wood joists, beams and girders supported by masonry walls shall be anchored thereto as required in Article 2518. Ventilation shall be provided between the ground and a wood floor as required in Article 2527.

In areas of fifteen hundred square feet (1500 sq. ft.) or less, beams and girders may be protected by a suspended ceiling without being individually fire-protected, provided that such members around the perimeter of the area have solid webs and that any space between the bottom of these members and the ceiling is draft-stopped with incombustible material, as per Article 3205 (c).

## **ARTICLE 2011. ROOF CONSTRUCTION.**

Roof construction shall be of any Type of Construction permitted for floors except in buildings four (4) stories or more in height as specified in Article 2010 and except where otherwise required in Chapters 5 through 15 because of occupancy.

Wood rafters, joists, purlins, beams and girders supported by masonry walls shall be anchored thereto as required in Chapter 25.

Attic or roof spaces shall be divided into areas not exceeding twenty-five hundred square feet (2500 sq. ft.) as required in Article 3205.

Roof covering shall be a "Fire Retardant" roofing as specified in Article 4305.

When roof has a slope of less than 15° from the vertical, construction must have a fire rating as required for outside walls.

## **ARTICLE 2012. STAIR CONSTRUCTION.**

Stairs may be of steel, iron, reinforced concrete, masonry or wood, and shall be designed and constructed as specified in Chapter 33, and as required under Occupancy in Part VI.

## **ARTICLE 2013. DOORS AND WINDOWS.**

Doors, windows and other openings in exterior walls may be of wood or of plain glass and wood sash unless otherwise required under Occupancy in Part VI or Location in Part VII.

## **ARTICLE 2014. PROJECTIONS FROM THE BUILDING.**

Bays, oriels and similar projections shall be constructed of incombustible materials with walls, floors and roof as required in this Chapter and in Chapter 35.

Primary structural supports of exterior balconies or porches attached to or supported by walls required to be of masonry shall be of incombustible material, and these incombustible members are not required to be fire-protected. Loading platforms for warehouses, freight depots and similar buildings may be of heavy timber construction with wood floors not less than 1-5/8 inches thick. Such wood construction shall not be carried through the exterior walls of any TYPE III building.

Cornices, narquees and similar appendages which are a part of a Type III building, shall be constructed of substantial incombustible materials and as required in Chapter 44.

## **ARTICLE 2015. PENTHOUSES AND SKYLIGHTS.**

Penthouses and other roof structures shall be of not less than one-hour fire-resistive construction as specified in Chapters 36 and 43.

Skylights shall be of not less than one-hour fire-resistive construction as specified in Chapters 34 and 43.

See Chapter 48, Part XV, for requirements of roof structures connected with air conditioning, mechanical refrigeration and attic ventilation.

When sprinklered, roof structures built entirely of noncombustible materials will be acceptable when complying with the provisions of Chapter 36.

#### **ARTICLE 2016. COMBUSTIBLE MATERIALS REGULATED.**

Wood shall be permitted in a building of Type III Construction except where specifically prohibited under Occupancy in Part VI or Location in Part VII.

No enclosed air space in any vertical wood framing shall have any dimension greater than seven feet (7').

Combustible insulation materials may be placed in the partition, floor or roof framing but shall in no way interfere with the fire blocking or fire separations required by this Code.

In buildings required to have one hour protection throughout, low fire hazard material (flame spread rating of 75 or less) may be applied directly to the one-hour protected ceiling.

## **CHAPTER 21—TYPE IV BUILDINGS (LIGHT INCOMBUSTIBLE)**

### **ARTICLE 2101. DEFINITION.**

In Type IV buildings the structural framework shall be of steel, iron, masonry, or reinforced concrete and exterior walls shall be of incombustible materials. Partitions, floors and roof construction shall be of incombustible materials except as set forth in this Chapter. Foundations shall be of masonry or reinforced concrete.

### **ARTICLE 2102. HEIGHT ALLOWABLE.**

Type IV buildings shall not exceed a height of forty-five feet (45') in which height there shall not be more than three (3) stories; provided that the height of such building erected on sloping ground may be forty-five feet (45') plus a vertical distance equal to the vertical change in slope along and in the length of any side of such building but in no case shall such height exceed fifty-five feet (55') above the adjacent finished ground level; and provided further that if occupancy is confined to that described as Group G Occupancy, there shall be no limitation in height. Towers, spires and steeples erected as a part of such building and not used for habitation or storage may extend not to exceed ten feet (10') above such height limit except that the height of such towers of Group G Occupancies shall not be limited.

### **ARTICLE 2103. AREA ALLOWABLE.**

The floor area of a Type IV building shall be limited as set forth under Occupancy in Part VI and Location in Part VII.

### **ARTICLE 2104. FOUNDATIONS.**

Footings shall be of solid masonry or reinforced concrete as set forth in Chapters 24 and 26, and shall be designed as set forth in Article 2311 and Chapter 28. Foundation walls shall be of masonry or reinforced concrete as specified in Chapter 29.

### **ARTICLE 2105. EXTERIOR WALLS.**

Exterior wall covering shall provide suitable protection from the elements and shall be of incombustible materials of such thickness and strength and so anchored to the wall frame as to resist effectively wind and other forces that may be applied to it. Wall coverings may be considered a structural part of the structural frame if designed and constructed to act integrally therewith.

Studs or other similar vertical supports shall in no case be spaced more than four feet (4') on centers. All openings wider than the regular stud spacing in the wall shall be trussed or provided with lintels with proper end support, provided that where no studs are used the structural frame shall be designed in accordance with Chapters 24, 26 or 27. All walls shall be thoroughly and effectively braced; and effectively fire-stopped at all floor and ceiling levels with incombustible materials. All steel studs shall be designed in accordance with Chapter 27.

All roof and floor loads shall be transmitted to the steel studs or other supporting members, either directly or by means of a load distributing member. Maximum wall height between horizontal supports perpendicular to bearing walls shall not exceed forty-five (45) times the structural thickness of the wall.

Exterior wall construction in Type IV Buildings more than 2 stories in height, except for Group I Occupancy, shall be of not less than one-hour fire-resistive construction.

Portland cement plaster not less than one and one-half inch (1-1/2") in thickness reinforced in two directions with not less than three-tenths per cent (0.3%) of steel may be considered to act with the studs to resist bending and shear under horizontal forces when said reinforcement is anchored to the stud in such a manner as to resist effectively the stresses developed. The unit stresses for such reinforced plaster shall not be more than fifty per cent (50%) of those allowed for concrete beams in Table No. 26B based on a compressive strength of such plaster of fifteen hundred pounds (1500 lbs.) per square inch.

### **ARTICLE 2106. PARTITIONS.**

Bearing partitions shall be constructed as required for exterior walls. Interior non-bearing partitions may be of combustible construction when building is not over 2 stories.

### **ARTICLE 2107. ENCLOSURE OF VERTICAL OPENINGS.**

Enclosures for elevator shafts, stair wells and other vertical openings when required because of Occupancy in Part VI, shall be of incombustible one-hour fire-resistive construction as specified in Chapters 30 and 43.

A parapet wall or hand rail at least thirty inches (30") in height above a flat roof shall be provided around all open shaft enclosures extending through the roof.

#### **ARTICLE 2108. STRUCTURAL FRAMEWORK.**

The structural framework shall be as specified in Chapter 27 for iron and steel, Chapters 24 and 29 for masonry, and Chapter 26 for reinforced concrete.

#### **ARTICLE 2109. FIRE PROTECTION OF STRUCTURAL MEMBERS.**

All structural steel or iron members in buildings more than 2 stories in height shall be thoroughly fire-protected with not less than one-hour fire-resistive protection except as follows:

Exceptions: 1. Bottom flanges of exterior lintels carrying masonry need not be fire-protected.

2. Steel studs, steel joists, cellular members and other steel members in walls, floors, ceilings and roofs need not be individually fire-protected.

3. Frames and members for elevator and elevator equipment need not be fire-protected.

4. Group protection may be employed as defined and specified in Article 1809, Exception 5.

For fire-protection of walls, partitions, floors and ceilings, see Articles 2105, 2106, 2110, and 2111, respectively.

#### **ARTICLE 2110. FLOOR CONSTRUCTION.**

Floor construction shall be of incombustible material; however, wood flooring may be used.

In all buildings having a usable space under the first floor, except Groups I and J Occupancies, the underside of such floor construction when of metal or wood shall be protected by a ceiling of one-hour fire-resistive construction as set forth in Chapter 43.

#### **ARTICLE 2111. ROOF CONSTRUCTION.**

Roof framing, decking, and sheathing shall be of incombustible material. Roof covering shall be a "fire retardant" roofing as specified in Chapter 43, with proper provision to prevent the hazard of propagation of fire on the underside of the metal roof deck.

#### **ARTICLE 2112. STAIR CONSTRUCTION.**

Stairs may be of steel, iron, reinforced concrete, masonry or wood, and shall be designed and constructed as specified in Chapter 33, and as required under Occupancy in Chapters 5 through 15.

#### **ARTICLE 2113. DOORS AND WINDOWS.**

Doors, windows and other openings in exterior walls may be of any type permitted by this Code, unless otherwise required under Occupancy in Chapters 5 through 15.

#### **ARTICLE 2114. PROJECTIONS FROM THE BUILDING.**

Porches, cornices, marquees, canopies, and all other similar projections from the building shall be of incombustible materials; however, a loading platform not including the roof or roof structure thereof, may be constructed of wood as specified in Article 1914. For projections over Public Property, the provisions of Chapter 44 shall govern.

#### **ARTICLE 2115. PENTHOUSES AND SKYLIGHTS.**

Penthouses and other roof structures shall be constructed as required for any story above the first floor. Skylights shall be constructed as required in Chapter 34.

See Chapter 48 for requirements of roof structures connected with air conditioning, mechanical refrigeration and attic ventilation.

## CHAPTER 22—TYPE V BUILDINGS (WOOD FRAME)

### ARTICLE 2201. DEFINITION.

In Type V Buildings, enclosing walls, interior walls, partitions, floors and roofs shall be of wood as specified in Chapter 25 or of wood in combination with other materials except where prohibited as specified under Occupancy in Chapters 5 through 15. Any building which can not be classed as Type I, II, III or IV Construction, shall be considered to be of Type V.

### ARTICLE 2202. HEIGHT ALLOWABLE.

Type V building shall not exceed the height of thirty-eight feet (38'), in which height there shall be not more than three (3) stories; however, a composite constructed building of Type I on the ground floor and 3 Type V stories above shall be permitted to contain 4 stories if all stair wells and elevators are enclosed in 4-hour walls, with class B doors on the stairwells and label doors on the elevators, and further, that a 3-foot spandrel of at least 2-hour fire-resistive construction is provided above the ceiling slab of the first floor.

A building erected on sloping ground may be thirty-eight feet (38') plus a vertical distance equal to the vertical change in slope along and in the length of any side of such building, but in no case shall such height exceed forty-five feet (45') above the adjacent finished ground level.

Spires, towers or steeples erected as a part of such building and not used for habitation or storage may extend not to exceed ten feet (10') above such height limit.

### ARTICLE 2203. AREA ALLOWABLE.

The maximum floor area allowable for a Type V building shall in no case exceed that specified under Occupancy in Part VI.

### ARTICLE 2204. FOUNDATIONS.

All exterior walls and interior bearing walls of Type V buildings shall be supported on masonry or reinforced concrete footings which shall be of sufficient size to support safely the loads imposed as determined from the character of the soil. Masonry foundation walls or piers shall extend at least twelve inches (12") above the finished grade adjacent to the wall at all points. Except for Groups H and I Occupancies, sills shall be bolted to the foundation or foundation wall with not less than one-half inch (1/2") bolts, embedded at least seven inches (7") into the masonry and spaced not more than six feet (6') apart.

All mudsills shall be eighty-five per cent (85%) heart, long leaf southern pine, all heart cedar, all heart cypress or foundation grade redwood, or any species of wood if treated under pressure with an approved preservative.

Foundations for all buildings where the surface of the ground slopes more than one foot (1') in ten feet (10') shall be level or shall be stepped so that both top and bottom of such foundation are level.

Foundation walls and all other walls used as retaining walls in connection with Type V buildings shall be not less than eight inches (8") in thickness. All such walls shall be designed for the loads specified in Article 2310; except that for Group I and J Occupancies, foundation walls of concrete may be six inches (6") thick.

Foundations of Type V building may be of piles, constructed as provided in Chapter 28.

Exceptions: 1. Interior bearing walls in one-story buildings may be supported on piers.

2. For Type V buildings (except Groups H and I Occupancies) isolated piers of solid masonry or reinforced concrete may be used for post and girder construction.

3. A one-story building (except a Group I Occupancy) which does not exceed four hundred square feet (400 sq. ft.) in area, including additions, may be constructed without a masonry or reinforced concrete foundation if the walls are supported on a wood mudsill.

4. Type V buildings for Group I Occupancy may be supported on isolated pier foundations.

### ARTICLE 2205. EXTERIOR WALLS AND WALL COVERINGS.

Exterior walls of Type V buildings having a floor area of four hundred square feet (400 sq. ft.) or more, including additions, shall be constructed with studding not less than two inches by three inches (2" x 3"), spaced not more than twenty-four inches (24") on centers for a one-story building, and not less than two inches by four inches (2" x 4"), spaced not more than sixteen inches (16") on centers for the first floor of one and one-half, two, or two and one-half story buildings; or such walls may be constructed of not less than four inch by four inch (4" x 4") posts spaced not more than five feet (5') on centers, or of larger members designed as required in Chapter 25, or may be of post and beam framing with

plank sheathing not less than one and one-half inches (1-1/2") thick, or may be of laminated construction, with the structural assembly properly designed to support all loads, as required in Chapter 25.

Buildings three stories in height shall have the first story studs not less than two inches by six inches (2" x 6") spaced not more than sixteen inches (16") on centers. Nonload-bearing walls shall be permitted of two inch by four inch (2" x 4") studs spaced not more than sixteen inches (16") on centers.

Underpinning shall be not less in size than the studding of the story above; provided, that all underpinning exceeding four feet (4') in height shall be not less in size than the studding required for an additional story. All such underpinning shall be effectively braced.

Where studs continue through more than one story, joists shall be nailed securely to the studs and shall be supported upon a one inch by four inch (1" x 4") ribbon notched into the studs and securely nailed thereto, or by other means affording equivalent strength and rigidity. Where stories are framed separately, each tier of studding shall have top and bottom plates and the top plates shall be doubled and lapped at all corners and intersections. Laps in separate pieces of the top plate shall be staggered not less than four feet (4').

All exterior walls and partitions shall be thoroughly and effectively braced.

Maximum allowable height of two inch by three inch (2" x 3") stud framing shall be eleven feet (11'), of two inch by four inch (2" x 4"), fourteen feet (14') and of two inch by six inch (2" x 6") stud framing shall be twenty feet (20') unless the wall is supported laterally by adequate framing in a horizontal direction, perpendicular to the direction of the stud wall.

All walls shall be fire-stopped effectively as required in Article 2526.

All openings four feet (4') wide or less shall be provided with double headers not less than two inches (2") thick placed on edge, and such headers shall have two inch (2") solid bearing to the floor or bottom plate. All openings more than four feet (4') wide shall be trussed or provided with lintels which shall have not less than two inch (2") solid bearing to the floor or bottom plate.

Ventilating openings under first floor joists shall be provided as required in Article 2527.

A wood sill not less than two inches (2") thick and not less in width than the wall framing supported thereon, shall be placed under all wood frame walls or partitions directly supported by masonry or reinforced concrete foundations.

Sheathing where required for exterior walls shall be applied solidly over the wall surface and shall be one or more of the following materials:

Wood not less than five-eighths inch (5/8") thick.

Approved fiber board not less than seven-sixteenths inch (7/16") thick.

Approved gypsum sheathing not less than one-half inch (1/2") thick.

Approved plywood not less than five-sixteenths inch (5/16") thick.

All Type V buildings three stories in height shall have the exterior walls covered with a solid sheathing as set forth in this Article.

All exterior walls shall be covered on the outside with weatherboarding, shingles, stucco, masonry veneer or galvanized metal as specified in this Article or by other similar approved materials, however, one-story buildings having a total floor area of not more than four hundred square feet (400 sq. ft.) may have exterior walls of vertical one inch (1") boards and battens without studs.

The Minimum requirements for all coverings for Type V buildings are as specified in Sub-Articles (a), (b), (c), (d), and (e) of this Article.

(a) **Wood Weatherboarding.** Studs shall be covered on the outside face with one layer of approved water-proof paper applied and tacked shingle fashion with joints horizontal except where water-repellent gypsum sheathing or other approved water-repellent sheathing is used. Horizontal joints of the paper shall be lapped at least two inches (2") and perpendicular joints at least six inches (6"). Weatherboarding, when in place, shall have an average thickness of not less than five-eighths inch (5/8") and a minimum thickness of not less than three-eighths inch (3/8"). Such weatherboarding shall be placed over the paper and shall be securely nailed to the studding with not less than two nails to each stud in each piece of such weatherboarding. Weatherboarding shall be laid shingle fashion and lapped not less than one-half inch (1/2"). Building paper may be omitted where the interior face of the studs is not covered or where there is no human occupancy. Siding patterns known as rustic, drop siding or shiplap shall have an average thickness in place of not less than nineteen thirty-seconds inch (19/32") and a minimum thickness of not less than three-eighths inch (3/8"). Bevel siding shall have a minimum thickness measured at the butt section of not less than twenty-one thirty-seconds inch (21/32") and a tip thickness of not less than one-quarter inch (1/4"). Siding of lesser dimensions may be used, provided the outside face of the studs is first covered with sheathing as provided in this Article.



(b) **Shingles or Shakes.** Shingles or shakes may be used for the exterior wallcovering when applied as follows: The outside face of the studs shall be first sheathed with boards of uniform thickness not less than twenty-five thirty-seconds inch (25/32") thick and such sheathing shall be securely nailed to the studding with not less than two eight-penny common nails to each stud in each piece of sheathing eight inches (8") or less in width and not less than three such nails when such sheathing boards exceed eight inches (8") in width or with water-repellent gypsum sheathing not less than one-half inch (1/2") thick and securely nailed to the studding with not less than No. 11 gauge galvanized nails spaced not more than four inches (4") on centers. In all cases, except where the building is not intended for human occupancy, where the interior face of the studs is not covered, or where water-repellent gypsum sheathing or other approved sheathing is not used, an approved water-proof building paper shall be applied directly over the outer face of the sheathing in the same manner as specified in Sub-Article (a) of this Article. Shingles or shakes shall be nailed securely to the wall sheathing with at least two nails in each piece except that when gypsum sheathing is used the shingles or shakes shall be nailed securely to wood furring strips not less than one inch by two inches (1" x 2") or fastened securely to the sheathing with approved metal fasteners.

(c) **Stucco.** Stucco may be applied with or without sheathing or similar backing.

In all cases except in back-plastered construction, an approved water-proof paper or asphalt saturated felt weighing not less than fourteen pounds per one hundred square feet (100 sq. ft.) or any substantial water-proof paper which successfully passes a 60-pound Mullen test shall be applied weatherboard fashion directly over the studs or sheathing. Horizontal joints shall be lapped not less than two inches (2") and vertical joints not less than six inches (6"). Where sheathing or similar backing is not used, an 18 W. & M. gauge wire stretched taut horizontally across the stud frame at not more than six inch (6") centers shall be securely fastened in place before the paper or felt is applied; provided, that where such paper or felt is fastened to the metal reinforcing in such a manner as not to affect the waterproof qualities of such paper or felt, the wire need not be installed. Skeleton sheathing shall be of boards not less than four inches (4") wide, spaced not to exceed four inches (4") apart.

In all cases a metal reinforcement of either expanded metal or wire fabric shall be used as follows:

1. Expanded metal cut from sheets not less than 20 U. S. gauge in thickness with mesh not less than three-quarters inch (3/4") in least dimension, nor more than four inches (4") in greatest dimension and not exceeding six square inches (6 sq. in.) in area; the fabric shall weigh not less than one and eight-tenths (1.8) pounds per square yard.

2. Wire fabric composed of wires with no openings or mesh therein less than three-fourth inch (3/4") nor greater than two inches (2"). The minimum allowable gauge of the wire for the various meshes shall be as follows:

For openings not exceeding 1 inch—18 W. & M. gauge.

For openings not exceeding 2 inches—16 W. & M. gauge.

3. Expanded metal lath weighing not less than three pounds per square yard.

4. Electrically welded wire of 16 W. & M. gauge with openings not exceeding two inches (2") in greatest dimension and not exceeding four square inches (4 sq. in.) in area.

Metal reinforcing shall be securely fixed in place using a furring device that will positively fur the metal reinforcing at least one-fourth inch (1/4") from the studs, sheathing or other backing. No form of strips or metal rods shall be used for furring which will serve to weaken the stucco. Metal reinforcing shall be secured with not less than four penny nails driven to at least three-fourth inch (3/4") penetration in the studs or sheathing. Nails and furring devices shall be not more than six inches (6") apart vertically. Horizontal and vertical joints of the metal reinforcing shall be lapped at least one full mesh. All horizontal joints between studding shall have not less than one tie with number 18 annealed tie wire, except when building is sheathed, and all vertical joints shall be made at the studs when attached directly thereto.

Stucco shall consist of three coats: (1) First or scratch coat, (2) second or brown coat, (3) finish coat. The total thickness of the three coats shall be not less than seven-eighths inch (7/8") at every point. No one coat of stucco shall be less than one-fourth inch (1/4") thick, except the finish coat, which shall be not less than one-eighth inch (1/8") in thickness at any point.

The stucco shall be of portland cement and sand as specified in Chapter 26 and shall consist of one (1) part by volume of portland cement to not more than three (3) parts of sand by volume, with an addition of not more than ten per cent (10%) of hydrated lime or similar material based on volume of cement in either the scratch coat or brown coat and with not more than thirty-three and one-third per cent (33-1/3%) of hydrated lime or similar material based on volume of cement in the finish coat.

The first or scratch coat of stucco shall be shovelled thoroughly through the metal reinforcing until all space between the metal and the backing is filled solidly and such coat shall be kept thoroughly moist during the first twenty-four (24) hours after being applied. The brown coat shall be kept thoroughly moist during the first twenty-four (24) hours after being applied and at least seven (7) days shall elapse between the application of the scratch coat and the brown coat, except when an approved high-early-strength cement is used, when at least forty-eight (48) hours shall elapse between the application of the scratch coat and brown coat.

The above requirements shall not apply to stucco placed on masonry backing. Before applying stucco on masonry backing, such backing shall be thoroughly washed and cleaned.

Gunite, as defined in Chapter 26, shall be applied in not less than two coats, and shall be reinforced as specified for stucco in this Article. Gunite shall be not less than three-fourths inch (3/4") in thickness on one or two-story buildings and not less than one inch (1") in thickness on three-story buildings.

(d) **Masonry Veneer.** Masonry veneer on wood frame constructions shall not be less than two inches (2") thick for one-story only, and not less than three and three-fourths inches (3-3/4") thick for more than one story. The masonry shall be bonded to the studs by means of approved corrosion-resistant metal clips or 30 penny large head corrosion-resistant nails driven to a two-inch (2") penetration not more than twelve inches (12") on center vertically, nor more than twenty-four inches (24") on center horizontally. Other forms of ties are prohibited unless approved by the Director. The veneer shall be supported directly on the foundation, or lintels. See Article 2924 for height limitations.

In all cases before applying masonry veneer, an approved waterproof paper or asphalt-saturated felt weighing not less than fourteen pounds (14 lbs.) per one hundred square feet (100 sq. ft.) shall be applied weatherboard fashion directly over the studs, sheathing or backing as specified for stucco under Sub-Article (c) of this Article, except that no wire need be stretched back of such paper.

(e) **Siding.** Galvanized iron not less than 28 gauge, aluminum of not less than 26 gauge, or cement asbestos siding of not less than one-eighth inch (1/8") thickness, may be used on stud walls without sheathing. Walls shall be effectively braced and nailing strips shall be placed in such manner as to permit the siding to be securely nailed.

(f) **Plywood.** Where plywood is used for covering the exterior of outside walls it shall be of the exterior type not less than three-eighths inch (3/8") thick. If three-ply is used without sheathing, it shall be placed so that the grain of the outside plies runs perpendicular to the supporting members. Joints shall be backed solid with nailing pieces not less than two inches (2") wide.

#### **ARTICLE 2206. INTERIOR PARTITIONS.**

Interior partitions may be of any material permitted for exterior walls in this Code. If of wood, interior partitions shall be constructed, framed and fire-stopped as required for exterior walls as specified in Chapter 25, except that interior non-bearing partitions may have a single top plate.

#### **ARTICLE 2207. ENCLOSURE OF VERTICAL OPENINGS.**

Except for Group I and J Occupancies and structures two and one-half (2-1/2) stories in height and less, enclosure walls for elevator shafts, vent shafts, stair wells and similar vertical openings through a building shall be of not less than one-hour fire-resistive construction as specified in Chapters 30 and 43 and where required under occupancy in Chapters 5 through 15. Chutes and dumbwaiter shafts with a cross sectional area of not more than nine square feet (9 sq. ft.) may be lined with approved incombustible materials covered with not less than 26 U. S. gauge sheet metal with all joints in such sheet metal lock-lapped. All openings into any such vertical enclosures shall be protected by metal, metal-clad or solid slab wood doors of not less than one and three-eighths inches (1 3/8") in thickness.

#### **ARTICLE 2208. STRUCTURAL FRAMEWORK.**

Structural framework may be of any type of construction permitted in this Code.

#### **ARTICLE 2209. FIRE-PROTECTION OF STRUCTURAL MEMBERS.**

Fire-protection of structural framework shall not be required except as provided under occupancy in Chapters 5 through 15.

#### **ARTICLE 2210. FLOOR CONSTRUCTION.**

Floors may be of any type of construction permitted in this Code.

#### **ARTICLE 2211. ROOF AND CEILING CONSTRUCTION.**

Roof construction may be of any type of construction permitted in this Code. When roof construction is of wood, it shall conform to the requirements of Chapter 25.

Attic or roof spaces shall be divided into areas not exceeding twenty-five hundred square feet (2500 sq. ft.) as required in Article 3205.

Roof covering shall be a "Fire Retardant" roofing, except that for Groups H, I and J Occupancies, an ordinary roofing may be used as specified in Article 4305. Wherever a composition roofing is used, the roof construction shall be solidly sheathed with wood, sheathing to be not less than twenty-five thirty-seconds inch (25/32") thick.

#### **ARTICLE 2212. STAIR CONSTRUCTION.**

Stair construction may be of any type permitted in this Code and shall conform to the requirements of Chapter 33.

#### **ARTICLE 2213. DOORS AND WINDOWS.**

Doors and windows may be of any type permitted in this Code.

#### **ARTICLE 2214. PROJECTIONS FROM BUILDING.**

Any projections from the building shall conform to the requirements for exterior walls, as required in Chapter 44.

#### **ARTICLE 2215. PENTHOUSES AND SKYLIGHTS.**

Penthouses and skylights may be of any material permitted in Chapters 34 and 36 of this Code.

See Chapter 46, Part XV, for requirements of roof structures connected with air conditioning, mechanical refrigeration and attic ventilation.

#### **ARTICLE 2216. COMBUSTIBLE MATERIALS REGULATED.**

Combustible insulating materials may be used in any part of the building, but shall not be installed in such a manner as to interfere with the fire-stopping elsewhere herein required.

# ENGINEERING REGULATIONS, QUALITY AND DESIGN OF THE MATERIALS OF CONSTRUCTION

## CHAPTER 23 — LIVE AND DEAD LOADS

### ARTICLE 2301. DEFINITIONS.

**Dead Load.** The dead load of a building shall include the weight of the walls, permanent partitions, framing, floors, roofs and all other permanent stationary construction entering into and becoming a part of the building.

**Live Load.** The live load includes all loads except dead and lateral loads.

### ARTICLE 2302. LOADS.

(a) **General.** Buildings and all parts thereof shall be of sufficient strength to support the estimated or actual imposed dead and live loads in addition to their own proper dead load, without exceeding the stresses noted elsewhere in this Code, provided that no building or part thereof shall be designed for live loads less than those specified in the following Articles. Impact shall be considered in the design of any structure where impact loads occur.

(b) **Special.** Provisions shall be made in designing office floors for a load of 2000 pounds placed upon any space two and one-half feet (2-1/2') square wherever this load upon an otherwise unloaded floor would produce stresses greater than those caused by a uniformly distributed load of fifty pounds (50 lbs.) per square foot.

In designing floors to be used for industrial or commercial purposes, the actual live load caused by the use to which the building or part of the building is to be put, shall be used in the design of such building or part thereof, and special provision shall be made for machine or apparatus loads when such machine or apparatus would cause a greater load than specified for such use in Article 2304.

Floors in office buildings and in other buildings, where partition locations are subject to change, shall be designed to support in addition to all other loads, a uniformly distributed load equal in pounds per square foot to one-twelfth (1/12) of the weight of one linear foot of the partition.

Public garages and commercial or industrial buildings in which loaded trucks are placed, used or stored shall have the floor systems designed to support a concentrated rear wheel load of a loaded truck placed in any possible position.

Provision shall be made in designing garages, ramps and open parking structures, used exclusively for passenger automobiles and with a maximum height at the entrance thereto of 7 feet, for a load of 2,000 pounds upon a space 2 feet square where this load upon an otherwise unloaded floor would produce stresses greater than those caused by a uniformly distributed live load of 50 pounds per square foot.

### ARTICLE 2303. METHOD OF DESIGN.

Any system or method of construction to be used shall admit of a rational analysis in accordance with well established principles of mechanics.

### ARTICLE 2304. UNIT LIVE LOADS.

The following unit loads shall be taken as the minimum live loads in pounds per square foot to be used in the design of buildings for the occupancies listed, and loads at least equal shall be assumed for uses not listed this Article but which create or accommodate similar loads.

|                                           |     |
|-------------------------------------------|-----|
| Apartments .....                          | 40  |
| Armories .....                            | 150 |
| Auditoriums—Fixed Seats .....             | 50  |
| Movable Seats .....                       | 100 |
| Balconies and Galleries—Fixed Seats ..... | 50  |
| Movable Seats .....                       | 100 |
| Dance Halls .....                         | 100 |
| Drill Rooms .....                         | 100 |
| Dwellings .....                           | 40  |
| Dwelling Attics (Accessible) .....        | 20  |
| Exterior Balconies .....                  | 100 |
| Fire Escapes .....                        | 100 |
| Garages .....                             | 100 |

|                                                                                  |                    |
|----------------------------------------------------------------------------------|--------------------|
| Garages, Ramps and Open Parking Structures                                       | 50                 |
| For Passenger Automobiles Exclusively                                            | 100                |
| Gymnasiums                                                                       | 40                 |
| Hospitals—Wards and Rooms                                                        | 100                |
| Corridors and Public Rooms                                                       | 40                 |
| Hotels—Guest Rooms and Private Corridors                                         | 100                |
| Public Rooms                                                                     | 100                |
| Corridors (Public)                                                               | 60                 |
| Libraries—Reading Rooms                                                          | 100                |
| Corridors                                                                        | 125                |
| Stack Rooms                                                                      | 100                |
| Loft Building                                                                    | 75                 |
| Manufacturing—Light                                                              | 125                |
| Heavy                                                                            | 60                 |
| Marquees                                                                         | 50                 |
| Offices                                                                          | 150                |
| Printing Plants—Press Rooms                                                      | 100                |
| Composing and Linotype Rooms                                                     | 100                |
| Public Rooms                                                                     | 50                 |
| Rest Rooms                                                                       | 100                |
| Reviewing Stands and Bleachers                                                   | (See Article 2305) |
| Roof Loads                                                                       | 40                 |
| Schools—Class Rooms                                                              | 100                |
| Corridors                                                                        | 250                |
| Sidewalks                                                                        | 100                |
| Skating Rinks                                                                    | 100                |
| Stairways                                                                        | 125                |
| Storage—Light                                                                    | 250                |
| Heavy (Load to be determined from proposed use of occupancy but never less than) | 75                 |
| Stores—Retail (Light Merchandise)                                                | 100                |
| Wholesale (Light Merchandise)                                                    |                    |

All ceiling joists shall be designed for not less than ten (10) pounds per square foot total load.

Railings. All balcony railings shall be designed to withstand a horizontal force of twenty (20) pounds per lineal foot, applied at the top of the railing.

#### ARTICLE 2305. ROOF LOADS.

Roofs shall be designed for a vertical live load of twenty (20) pounds per square foot of horizontal projection applied to any and all slopes, except as hereinafter provided.

Where the rise exceeds twelve inches (12") per foot, no vertical live loads need be assumed, but the roof shall be designed for the dead load and for a wind load as required by Table 23A applied to the vertical projection.

When roofs are used for ponds for water cooling, for air conditioning or insulation, the roof structure shall be designed for the imposed load and the roofing and flashing shall be in conformity with the use; and ample drainage outlets shall be provided for the discharge of the water.

When a roof, in addition to serving a closure of a building or structure, is to be used as a floor, it shall be designed to carry safely the live load to be imposed but not less than the minimum live load prescribed in this Article for floors.

All roofs shall be adequately drained in accordance with provisions of Article 3206.

#### ARTICLE 2306. REDUCTION OF LIVE LOADS.

The following reductions in assumed live loads shall be permitted in designing of columns, piers, walls, foundations, trusses, (exclusive of roof trusses), and girders.

1. No reduction shall be applied to any roof live load.
2. No reduction of the assumed live load shall be allowed in the design of any slabs, lintels, joists, or beams.
3. A reduction of the total live load used in the design of girders based on a certain tributary floor area shall be permitted as noted in the following schedule. This reduction shall not be carried into the columns nor shall such reduction be used in design of buildings to be used or occupied as warehouses or for storage purposes.

##### Reduction Allowed

##### Tributary Floor Area

5% . . . . . 100 sq. ft.

|          |                     |
|----------|---------------------|
| 10%..... | 200 sq. ft.         |
| 15%..... | 300 sq. ft. or more |

4. For determining the total live loads carried by columns the following reductions shall be permitted, the reductions being based on the assumed live loads applied to the entire tributary floor area:

#### **Allowable Reductions for Warehouses and Storage Buildings**

|                                          |             |
|------------------------------------------|-------------|
| Carrying the roof .....                  | 0 per cent  |
| Carrying 1 floor and roof .....          | 0 per cent  |
| Carrying 2 floors and roof .....         | 5 per cent  |
| Carrying 3 floors and roof .....         | 10 per cent |
| Carrying 4 floors and roof .....         | 15 per cent |
| Carrying 5 or more floors and roof ..... | 20 per cent |

#### **Live Load Reductions for Manufacturing Buildings, Stores and Garages**

|                                          |             |
|------------------------------------------|-------------|
| Carrying the roof .....                  | 0 per cent  |
| Carrying 1 floor and roof .....          | 0 per cent  |
| Carrying 2 floors and roof .....         | 10 per cent |
| Carrying 3 floors and roof .....         | 20 per cent |
| Carrying 4 or more floors and roof ..... | 30 per cent |

#### **Allowable Live Load Reductions for All Other Buildings**

|                                          |             |
|------------------------------------------|-------------|
| Carrying the roof .....                  | 0 per cent  |
| Carrying 1 floor and roof .....          | 0 per cent  |
| Carrying 2 floors and roof .....         | 10 per cent |
| Carrying 3 floors and roof .....         | 20 per cent |
| Carrying 4 floors and roof .....         | 30 per cent |
| Carrying 5 floors and roof .....         | 40 per cent |
| Carrying 6 floors and roof .....         | 45 per cent |
| Carrying 7 or more floors and roof ..... | 50 per cent |

### **ARTICLE 2307. WIND PRESSURE AND COMBINED STRESSES.**

For purpose of design, buildings or other structures shall be designed and constructed to withstand the applicable horizontal pressure shown in Table 23A, allowing for wind from any direction.

The overturning moment calculated from the wind pressure shall in no case exceed 66-2/3 per cent of the dead load resisting moment, unless the building or structure is anchored so as to resist the excess overturning moment without exceeding the allowable stresses for materials used. The axis of rotation for computing the overturning moment and the moment of stability shall be taken as the intersection of the outside wall line on the leeward side and the plane representing the average elevation of the bottom of the footings. The weight of earth superimposed over the footing may be used in computing the moment of stability due to dead load.

For combined stresses, due to wind and other loads, the allowable unit stresses (including the assumed soil bearing value) may be increased in accordance with Chapters 24, 25, 26, 27 and 28. In no case shall the section be less than required if the wind stress is neglected.

### **ARTICLE 2308. LIVE LOADS AND SEATING CAPACITY POSTED.**

The live loads for which each floor or part thereof of a commercial or industrial building is or has been designed, shall have such designed live loads conspicuously posed by the owner in that part of each story in which they apply, using durable signs, and it shall be unlawful to remove or deface such notices. The occupant of the building shall be responsible for keeping the actual load below the allowable limit.

The maximum seating capacity shall be conspicuously posted by the owner of the building by means of durable signs placed in each assembly room, auditorium or room, used for a similar purpose where fixed seats are not installed, and it shall be unlawful to remove or deface such notice or to permit more than this legal number of persons within such space.

### **ARTICLE 2309. CHANGED FLOOR LOADING.**

Plans for other than residential buildings filed with the Director with applications for permits shall show on each drawing the live loads per square foot of area covered, for which the building is designed, and buildings hereafter erected shall not be occupied until the floor load signs required by Article 2308, have been installed. No changes in the occupancy of a building now existing or hereafter erected shall be made until a building permit has been issued by the Director certifying that the floors are suitable for the loads characteristic of

the proposed occupancy.

#### ARTICLE 2310. RETAINING WALLS AND BASEMENT FLOORS.

When earth or water, or earth and water, cause or may cause a pressure on any building or structure, such total pressure created shall be calculated in accordance with the best accepted engineering practice, and such calculations and design shall take into account any possible surcharge due to moving or fixed loads.

#### ARTICLE 2311. FOOTING DESIGN.

The base area of the footings, of all buildings shall be designed in the following manner: The area of the footing which has the largest percentage of live load to total load shall be determined by dividing the total load by the allowable soil load. From the area thus obtained, the dead load soil pressure of such footings is determined and the areas of all other footings of the building shall be determined on the basis of their respective dead loads only and such dead load soil pressure. In no case shall the load per square foot under any portion of any footing, due to the combined dead, live, wind and/or any other loads, exceed the safe sustaining power of the soil upon which the footing rests. The total reduced live load occurring in the column immediately above the footing shall be the live load used in the above computation.

Actual heavy storage loading remaining constant and continuous over a period of time exceeding three (3) months, shall be considered as dead load, and the reduction allowed under Article 2306, sub-paragraph 2, shall not apply to such footings.

For additional mandatory requirements see Article 2802.

TABLE 23 A – WIND LOADS

| Height Above<br>Ground (Ft.) | Building and<br>Closed<br>Structures | Sprinkler Tanks<br>Chimneys, Solid<br>Towers (3) (4) | Signs & Billboards<br>Solid Open<br>(2) Signs |
|------------------------------|--------------------------------------|------------------------------------------------------|-----------------------------------------------|
| 30 and less                  | 20                                   | 30                                                   | 30                                            |
| 31 – 49                      | 35                                   | 45                                                   | 42                                            |
| 50 – 99                      | 55                                   | 55                                                   | 61                                            |
| 100 – 499                    | 70                                   | 70                                                   | 77                                            |
| 500 – 1199                   | 80                                   | 80                                                   | (1)                                           |

- (1) Signs located more than 500' above ground should be determined by special analysis of conditions.
- (2) Signs in which the projected area exposed area to wind consist of 70% or more of the gross area as determined by over-all dimensions shall be classified as solid signs.
- (3) See ASAA 58.1-1955 for shape factor multiplier for open and trussed towers.
- (4) Circular chimneys, tanks and solid towers may be designed for pressures 6/10 of those indicated.

# CHAPTER 24 — MASONRY (QUALITY AND DESIGN)

## ARTICLE 2401. GENERAL.

(a) **Quality and Design.** The quality and design of masonry construction and materials shall conform to the minimum standards specified in this Chapter. Masonry units may be re-used when clean, sound and conforming to the requirements of this Chapter.

(b) **Combination of Units.** Where units of different type or strength are used in combination, the lowest allowable stresses shall be used.

(c) **Freezing.** All masonry shall be protected against freezing for at least forty-eight (48) hours after being laid. No masonry shall be built upon frozen material.

(d) **Dimensions.** Dimensions given are nominal; actual dimensions of unit masonry may not be decreased by more than one-half inch (1/2").

(e) **Definitions.**

1. **Masonry.** The following materials, when laid up in mortar, shall be classed as masonry, and when used in any building, shall conform to the minimum requirement of this Chapter:

- |                            |                            |
|----------------------------|----------------------------|
| a. Brick                   | f. Concrete—Plain          |
| b. Concrete Block and Tile | g. Gypsum—Plain, poured*   |
| c. Gypsum Block and Tile   | h. Structural Glass Blocks |
| d. Hollow Clay Tile        | i. Glazed Building Units   |
| e. Stone                   |                            |

2. **Brick Masonry.** The term "Brick Masonry" as used in this Code, shall be defined to mean masonry of burned clay or shale brick, sand-lime brick or concrete brick as specified in Articles 2402, 2403, and 2404, respectively.

3. **Brick.** The term "Brick" as used in this Code shall be defined to mean a structural unit of burned shale or clay sand-lime or concrete, usually solid and about eight inches by three and three-quarters inches by two and one-half inches (8" x 3-3/4" x 2-1/2") in size.

4. **Masonry of Hollow Units.** The term "Masonry of Hollow Units" as used in this Code shall be defined to mean masonry of hollow tile, concrete tile or blocks or gypsum tile or blocks as specified in Articles 2405, 2406 and 2409, respectively.

5. **Glass Masonry.** The term "Glass Masonry" as used in this Code shall be defined to mean masonry of hollow glass blocks as specified in Article 2412.

6. **Glazed Building Units.** Glazed building units shall conform to requirements of A.S.T.M. "Tentative Specifications for Glazed Masonry Units", except that the requirements for finish shall not apply to salt-glazed building units.

7. **Tests.** Tests of materials shall be made in accordance with the standard specifications of the American Society for Testing Materials as such Standard Specifications are noted in this Chapter.

## ARTICLE 2402. BURNED CLAY OR SHALE BRICK.

Brick of burned clay or shale, except for thickness, shall meet the requirements for Grade "B" brick given in the "Tentative Specifications for Building Brick." When in contact with the ground, the brick shall be of at least Grade MW.

## ARTICLE 2403. SAND-LIME BRICK.

Sand-lime brick shall meet the requirements for Grade "B" brick given in the A.S.T.M. "Standard Specifications for Sand-Lime Building Brick". Sand-lime brick shall not be used in contact with the ground, but may be used immediately above an approved damp course.

## ARTICLE 2404. CONCRETE BRICK.

Concrete brick shall meet the requirements for Grade "B" brick, given in the A.S.T.M. "Standard Specification for Concrete Building Brick". When in contact with the ground, the brick shall be of at least Grade A.

## ARTICLE 2405. HOLLOW CLAY TILE.

Hollow clay tile used for exterior walls and bearing walls shall meet the requirements for the "5-15" clay tile given in the A.S.T.M. "Standard Specifications and Tests for Structural Clay Load Bearing Wall Tile". The exterior shell of such tile shall be not less than three-fourths of an inch (3/4") thick, except that a tolerance of one-sixteenth of an inch (1/16") will be permitted in such shell thickness.

\*NOTE: This applies only to gypsum used in roof construction, non-bearing walls or partitions, fire-protection or similar uses where not exposed to the weather.



Hollow clay tile used in non-bearing partitions, fire protection and furring, shall meet the requirements of A.S.T.M. "Standard Specifications for Structural Clay Non-Load-Bearing Tile".

Hollow Clay Tile used for floor construction shall meet with the requirements of the "Standard Specifications for Structural Clay Floor Tile," (A.S.T.M.).

#### **ARTICLE 2406. CONCRETE BLOCK OR TILE.**

Concrete masonry units shall be of a quality at least equal to that required by Group "A" of A.S.T.M. "Standard Specifications for Hollow Load-Bearing Concrete Masonry Units," or Group "B" of A.S.T.M. "Standard Specifications for Solid Load-Bearing Concrete Masonry Units," when used for bearing walls or piers, or when in contact with ground or exposed to the weather; or equal to A.S.T.M. "Standard Specifications for Hollow Non-Load-Bearing Concrete Masonry Units," when used for non-bearing purposes and not exposed to the weather.

All masonry units included in this Article shall be branded with a permanent identification mark of the manufacturer, which shall be registered with the Director.

#### **ARTICLE 2407. PLAIN CONCRETE.**

Monolithic concrete construction containing less than one-fourth of one per cent (1/4%) of reinforcement shall be classified as plain concrete. Plain concrete shall have a strength of not less than 2000 pounds per square inch and shall conform to the requirements in Chapter 26.

Cement, fine aggregate and coarse aggregate shall conform to the requirements in Chapter 26.

#### **ARTICLE 2408. CAST STONE.**

Cast stone shall be of a quality at least equal to that required by A.C.I. Specifications for Cast Stone".

All cast stone shall be branded with a permanent identification mark of the manufacturer which shall be registered with the Director.

#### **ARTICLE 2409. GYPSUM.**

(a) **Gypsum Units.** Gypsum partition tile or block shall be of a quality at least equal to that required by A.S.T.M. "Standard Specifications for Gypsum Partition Tile or Block".

(b) **Gypsum and Calcined Gypsum.** All Gypsum and calcined gypsum shall be of a quality at least equal to that specified in the "Standard Specifications for Gypsum and Calcined Gypsum," (A.S.T.M.).

#### **ARTICLE 2410. MORTAR AND GROUT.**

(a) **Cementitious Materials.** Cementitious materials used in mortars shall be of a quality at least equal to the quality of materials required by the following applicable specifications: A.S.T.M. "Standard Specifications for Quicklime for Structural Purposes," A.S.T.M. "Standard Specifications for Normal Finishing Hydrated Lime," and before slaking shall contain at least eighty-five per cent (85%), by weight, of calcium oxide; A.S.T.M. "Standard Specifications for Hydraulic Hydrated Lime for Structural Purposes," A.S.T.M. "Standard Specifications for Natural Cement," "Federal Specifications for Masonry Cement," A.S.T.M. "Standard Specifications for Portland Cement," A.S.T.M. "Standard Specifications for Gypsum."

(b) **Aggregate.** Aggregate for mortar shall be of a quality at least equal to that required by A.S.T.M. "Standard Specifications for Aggregate for Masonry Mortar".

(c) **Water.** Water used in mixing mortar shall be clean, and free from deleterious amounts of acids, alkalies, or organic materials.

(d) **Mortar.** Mortar other than gypsum mortar used in masonry construction shall be classified as set forth in Table No. 24-A.

Mortar when applied shall have a flow after suction for one minute of not less than seventy per cent (70%) of that immediately before suction when determined by the method of the water retention test of the "Federal Specifications for Masonry Cement."

Tests made to classify mortar by compressive strength shall be made as described in the "Federal Specifications for Masonry Cement," using the proportions and materials proposed for use.

(e) **Strength.** Unless the strength classification of the mortar has been established by tests in accordance with this Article, mortars using the cementitious materials set forth in Table No. 24-B shall be assumed to meet the strength classification shown when mixed with aggregate in the proportions required by this Article.

The volume of aggregate in mortar shall be at least two times but not more than three times the sum of the volumes of cementitious materials or the amounts set forth in Table No. 24-B.

(f) **Gypsum Mortar.** Gypsum mortar shall be composed by weight of one part of gypsum and not more than three parts of mortar aggregate.

(g) **Grout.** Grout shall be Type A mortar to which is added water to produce consistency for pouring without segregation of constituents of the mortar.

(h) **Footings and Foundations.** Masonry units used in foundation walls and footings shall be laid up in Type A or B mortar.

#### **ARTICLE 2411. GENERAL REQUIREMENTS FOR MASONRY CONSTRUCTION.**

(a) **Plain Solid Brick Masonry.** Plain solid brick masonry is that form of construction made with brick as defined in Sub-Article (e) 1 of Article 2401, and without metal reinforcement. See Chapter 29 for construction requirements.

(b) **Grouted Brick Masonry.**

1. **General.** Grouted brick masonry is that form of construction made with brick in which interior joints of the masonry are filled by pouring grout therein as the work progresses. See Chapter 29 for construction requirements.

(c) **Reinforced Brick Masonry.**

1. **Allowable Stress and Tests.** The compressive strength of masonry ( $f'_m$ ) shall be determined by tests on masonry prisms or may be assumed to be sixty per cent (60%) of the compressive strength of the brick used with grout and Type "A" mortar, or forty-five per cent (45%) of the compressive strength of the brick used with grout and Type "B" mortar, but such assumed compressive strength shall not exceed a value of two thousand (2,000) pounds per square inch, or fifteen hundred (1,500) pounds per square inch, respectively.

Tests made to determine the strength ( $f'_m$ ) shall be made on not less than five prisms built of the material called for by design, cured in moist atmosphere for fifteen (15) days and then allowed to dry for at least thirty (30) days before testing. Tests shall be made in accordance with the procedure required for testing concrete cylinders. The prisms for beams and slabs shall be approximately eight by eight by twenty-five inches (8" x 8" x 25"), built in a horizontal position with unselected brick laid as stretchers in running bond, two bricks wide and three courses high, with one-half inch (1/2") joints. Prisms representing walls shall be approximately eight by sixteen inches (8" x 16") in plan and sixteen inches (16") high. Those representing columns and pedestals shall be approximately eight by eight inches (8" x 8") in plan and sixteen inches (16") high. The bonding arrangement of the brick shall be similar to that in the structures represented. The compressive ( $f'_m$ ) value shall be the average value of all prisms tested.

2. **Reinforcement.** Reinforcement shall conform to the requirements of Article 2604.

3. **Design.** The design of reinforced brick masonry shall be based on the assumptions, limitations, and methods of stress determination specified for reinforced concrete in Chapter 26, and shall conform to the additional requirements of this Chapter.

In reinforced masonry walls, the minimum area of reinforcement shall be not less than 0.002 times the cross sectional area of the wall, not more than two-thirds (2/3) of which may be used in either direction. A lesser amount of reinforcement may be used to resist tensile stresses if the masonry is designed under limitations and stresses specified for unreinforced masonry. No required vertical reinforcement shall be less than three-eighths inch (3/8") in diameter.

See Chapter 29 for construction requirements.

(d) **Concrete-Plain.** The maximum allowable working stresses in masonry of plain concrete shall be the following percentages of the ultimate strength of the concrete in compression as determined by the requirements of Chapter 26.

Compression .....  $0.20f'_c$

Shear or diagonal tension .....  $0.02f'_c$

where ( $f'_c$ ) represents the ultimate compression strength.

(e) **Masonry of Hollow Units.**

1. **General.** Hollow unit masonry is that type of construction made with structural clay tile or hollow concrete masonry units in which the units are all laid and set in mortar. Types A, B, or C mortar shall be used in such construction except that interior non-bearing masonry of hollow units may be laid up on gypsum mortar.

2. **Reinforced Filled Cell Construction.** In walls of hollow unit masonry, structural members may be built by filling continuous cores or spaces with concrete or grout in which reinforcement is embedded. Such members may be designed as specified for reinforced brick masonry in Article 2411 (c). The area of such core walls in contact with the fill, and of the face shells of units containing such cores not exceeding the length of one unit, may be included in the computation of the effective areas of the section. In such walls the required horizontal steel may be concentrated in bond beams and at the tops and bottoms of walls

and openings. The minimum steel required shall be calculated on the gross area of the wall. The value of ( $f_m$ ) may be assumed as provided in Article 2411 (c), applying the designated percentages to the net comprehensive strength of the units. The value of ( $f_m$ ) may be determined by tests as provided in Article 2411 (c) based on specimens of the dimensions specified for beams and slabs, which may be built of units in the form of hollow squares laid with the mortar and filled with the concrete or grout on which the design is based. See Chapter 29 for other construction requirements.

**(f) Cavity Wall Masonry.**

1. **General.** Cavity wall masonry is that type of construction made with brick, structural clay tile or hollow concrete masonry units or any combination of such units in which facing and backing are completely separated except for the metal ties which serve as bonding. Type A, B, or C mortar shall be used in cavity walls having a nominal thickness of ten inches (10"). Cavity wall ties shall be spaced not more than twenty four inches (24") apart horizontally and not more than sixteen inches (16") apart vertically.

Cavity walls ten inches (10") in thickness shall not exceed twenty-five feet (25') in height, and in no case shall any cavity wall exceed thirty-five feet (35') in height. See Chapter 29 for Construction requirements.

**(g) Gypsum Masonry.**

1. **General.** Gypsum masonry is that form of construction made with gypsum blocks or tile in which the units are laid and set in gypsum mortar. No gypsum masonry shall be used in any bearing wall or in any location where the gypsum will be directly exposed to weather or where subject to frequent or continuous wetting.

2. **Construction.** All units in gypsum masonry shall be placed in side construction with cells horizontal and the bonding of units in such masonry shall comply with the requirements for bonding of hollow unit masonry as specified in Article 2411 (e). The entire bearing surface of every unit shall be covered with mortar spread in an even layer, and all joints shall be filled with mortar.

(A) Ties. Horizontal mortar joints shall be reinforced with ties which shall run continuously from end to end of mortar joint, but must not "bridge" expansion joints. Where splices occur the individual lengths shall be lapped not less than six inches (6").

Ties shall be formed of two parallel steel wires No. 16 gauge or larger, spaced two inches (2") apart by steel cross wires No. 16 gauge, or larger, welded thereto at intervals not exceeding eight inches (8"), and galvanized after forming, or equivalent reinforcement. They shall be located in horizontal joints as follows:

Blocks 6 inches high in wall every fourth course.

Blocks 8 inches high in wall every third course.

Blocks 12 inches high in wall every course. Veneered walls - see Article 2924.

**(h) Reinforced Gypsum.**

1. **General.** Reinforced gypsum shall consist of a mixture of gypsum with or without wood chips, shavings or fiber or other approved aggregates, premixed at the mill, with only water added at the job. Reinforced gypsum shall not be used in any bearing wall or in any location where the gypsum is directly exposed to weather or subject to frequent or continuous wetting.

Precast reinforced gypsum shall contain not more than three per cent (3%), and cast-in-place reinforced gypsum not more than twelve and one-half per cent (12-1/2%) of wood chips, shavings, or fiber measured as a percentage by weight of the dry mix.

Reinforced gypsum shall develop the minimum ultimate compressive strength in pounds per square inch set forth in Table No. 24-F when dried to constant weight, with tests made on cylinders six inches (6") in diameter and twelve inches (12") long.

Tests, when required, shall follow the procedure specified in Section 2-2 of A-S-A "Building Requirements for Reinforced Gypsum Concrete."

2. **Design.** Except as hereinafter provided, methods of design admitting of rational analysis according to established principles of mechanics shall be used. The general assumptions and principles established for reinforced concrete shall also apply to reinforced gypsum insofar as they are pertinent.

For precast floor and roof slabs which cannot be analyzed in accordance with established principles of mechanics, and safe load, uniformly distributed, shall be taken as one-fifth (1/5th) of the total load causing failure in a full-size test panel with the load applied along two lines each distant one-fourth (1/4th) of the clear span from the support.

The minimum thickness of reinforced gypsum in floors and roofs shall be two inches (2") except in the suspension system, which shall be not less than three inches (3"). Hollow precast reinforced gypsum units for roof construction shall be not less than three inches (3") thick, and the shell not less than one-half inch (1/2") thick.

Precast gypsum units for floor and roof construction shall be reinforced and, unless the

shape or marking of the unit is such as to insure its being placed right side up, the reinforcement shall be placed symmetrically so that the unit can support its load either side up.

In floor or roof slabs of the suspension type, the reinforcement shall consist of wires with continuity through multiple spans and anchored at the ends. The wires shall be supported in the top of the slab by the roof or floor beams and shall be tightly drawn down as near to the bottom of the slab at mid-span as fire protection requirements will allow, but not closer than one-half inch (1/2"). Provisions shall be made in the framing of the end bays of this system for resisting the forces due to end anchorage of the wires. The wires shall be designed for a tension in pounds per foot width of slab equal to:

$$\frac{wL^2}{8d}$$

WHERE

w = the total load in pounds per square foot.

L = the clear span in feet.

d = the sag of the wires in feet.

(i) **Stone Masonry.**

1. **General.** Stone masonry is that form of construction made with natural or cast stone in which the units are laid and set in mortar, with all joints thoroughly filled.

Walls of rubble stone masonry shall be at least four inches (4") greater in thickness than specified for ashlar stone masonry.

2. **Construction.** All ashlar stone masonry shall be so laid that there is at least one bond stone extending through the wall for every five stretchers. Such bond stone shall be uniformly distributed throughout the wall. See Chapter 29 for additional construction requirements.

3. **Stresses.** The maximum allowable compressive stresses in rubble stonework, due to combined live and dead loads, shall not exceed one hundred and forty (140) pounds per square inch when laid in Type A mortar, nor one hundred (100) pounds per square inch when laid in Type C mortar.

**ARTICLE 2412. GLASS MASONRY.**

(a) **Use.** Glass blocks may be used in exterior or interior walls in openings which might otherwise be filled with windows, either isolated or in continuous bands, provided the glass block panels have a minimum overall thickness at the mortar joint of at least three and one-half inches (3-1/2"), and provided further that all mortar surfaces shall have satisfactory treatment for mortar bonding properties. Glass blocks shall not be used in any fire or party wall, or enclosure wall for any stairway, elevator shaft or other vertical opening.

(b) **Horizontal Forces.** The blocks shall be restrained laterally by an approved mechanical device capable of resisting the horizontal forces to which the affected area may be subjected.

(c) **Areas and Dimensions.** Glass block panels, vertical or horizontal, for exterior walls shall not exceed in area one hundred and forty-four square feet (144 sq. ft.) of unsupported wall surface nor shall they exceed twenty-five feet (25') in one direction between supports. Continuous panels may be used, but the above panel size shall not be exceeded between vertical or horizontal supports. There shall be a spandrel wall or beam not less than two feet (2') high above the finished floor line at all adjoining floors.

For interior walls no single panel nor portion of a continuous series of panels of glass block construction in partitions, shall exceed two hundred and fifty square feet (250 sq. ft.) of unsupported area, nor shall exceed twenty-five feet (25') in either horizontal or vertical dimension between structural supports.

(d) **Access Panels.** Each story, above the first story or ground floor, shall have readily identified access panels for Fire Department use in every frontage and spaced as required in Article 2939. Each panel shall consist of a glazed metal sash at least thirty-two inches (32") wide and forty-eight inches (48") high, fixed or openable, except as permitted in Article 2939.

(e) **Mortar.** Glass blocks shall be laid up in Type C mortar. All mortar joints shall be completely filled and pointed after the mortar has passed its initial set, and shall have a thickness of at least one-fourth inch (1/4") not more than three-eighths inch (3/8").

(f) **Ties.** Horizontal mortar joints shall be reinforced with ties which shall run continuously from end to end of mortar joint, but must not "bridge" expansion joints. Where splices occur the individual lengths shall be lapped not less than six inches (6").

Ties shall be formed of two parallel steel wires No. 16 gauge or larger, spaced two inches (2") apart by steel cross wires No. 16 gauge, or larger, welded thereto at intervals not exceeding eight inches (8"), and galvanized after forming, or equivalent reinforcement. They shall be located in horizontal joints as follows:

Blocks 5-3/4 inches high in wall every fourth course.

Blocks 7-3/4 inches high in wall every third course.

Blocks 11-3/4 inches high in wall every course.

(g) **Supports.** Glass block panels must be adequately supported to resist wind pressure and protected from forces caused by expansion or contraction by properly designed expansion joints which shall be entirely free of mortar. The back of all chases shall be filled with an approved resilient material, the side of each joint lined with tightly packed oakum or other similar material and pointed with non-hardening caulking material at least one-half inch (1/2") deep. The sill shall be coated with an approved asphalt emulsion previous to laying the first course of mortar.

(h) **Glass Block Panels.** Where glass blocks are to be used as a veneer in masonry construction, the glass block panels shall be self supporting, with suitable ties into the masonry wall, and shall be clear from and not adhering to the masonry. See Chapter 29 for construction requirements.

#### ARTICLE 2413. ALLOWABLE WORKING STRESSES.

(a) **General.** The maximum allowable working stresses for masonry described in this Chapter shall not exceed the values shown in Tables Nos. 24-B, 24-D, 24-E, and 24-G, for the respective types of masonry construction, except as otherwise provided in this Chapter.

(b) **Eccentric and Lateral Forces.** The effects of eccentric and lateral forces shall be fully analyzed and allowances made for them in the design. Concentrated loads shall be distributed so as not to exceed the allowable working stresses as specified in Article 2411 by more than twenty-five per cent (25%).

(c) **Wind Load Stresses.** For combined stresses due to wind and other loads, the allowable unit stresses may be increased thirty-three and one-third per cent (33-1/3%) in excess of the values specified in this Article. In no case shall the section be less than required if the wind stresses be neglected.

#### ARTICLE 2414. BOLTS.

Bolts which are embedded in masonry shall be grouted in place and the connection shall be designed so that the shear on every bolt is not more than the values set forth in Table No. 24-C.

TABLE No. 24-A—TYPES OF MORTAR

| Type | Minimum Compressive Strength of 2-In. Cubes at 28 Days,<br>Lb. Per Sq. In. |
|------|----------------------------------------------------------------------------|
| A    | 2,500                                                                      |
| B    | 1,800                                                                      |
| C    | 600                                                                        |

TABLE No. 24-B—MORTAR PROPORTIONS OF CEMENTITIOUS MATERIALS  
(by volume)

| Type   | Minimum<br>Portland<br>Cement | Maximum<br>Hydrated Lime<br>or Lime Putty | Masonry Cement<br>Type II | Maximum<br>Dry Loose<br>Aggregate |
|--------|-------------------------------|-------------------------------------------|---------------------------|-----------------------------------|
| Type A | 1 part                        | 1/5 part                                  | .....                     | 3 parts                           |
| Type B | 1 part                        | 1/2 part                                  | .....                     | 4 1/2 pts.                        |
| Type C | 1 part                        | 1 part                                    | .....                     | 6 parts                           |
| Type C | .....                         | .....                                     | 1 part                    | 3 parts                           |

TABLE No. 24-D—WORKING STRESSES IN UNREINFORCED MASONRY

| MATERIAL<br>Grade of Unit | WORKING STRESS LB. PER SQUARE INCH GROSS AREA |                          |       |                  |                          |       |                  |                          |       |
|---------------------------|-----------------------------------------------|--------------------------|-------|------------------|--------------------------|-------|------------------|--------------------------|-------|
|                           | TYPE A MORTAR                                 |                          |       | TYPE B MORTAR    |                          |       | TYPE C MORTAR    |                          |       |
|                           | Com-<br>pressure                              | Tension<br>in<br>Flexure | Shear | Com-<br>pressure | Tension<br>in<br>Flexure | Shear | Com-<br>pressure | Tension<br>in<br>Flexure | Shear |
| Plain Solid Brick Masonry |                                               |                          |       |                  |                          |       |                  |                          |       |
| 4500 lb. p.s.i.....       | 250                                           | 20                       | 20    | 225              | 15                       | 15    | 200              | 15                       | 15    |
| 2500 lb. p.s.i.....       | 175                                           | 20                       | 20    | 160              | 15                       | 15    | 140              | 15                       | 15    |
| 1500 lb. p.s.i.....       | 125                                           | 20                       | 20    | 115              | 15                       | 15    | 100              | 15                       | 15    |
| Grouted Brick Masonry     |                                               |                          |       |                  |                          |       |                  |                          |       |
| 4500 lb. p.s.i.....       | 350                                           | 25                       | 25    | 275              | 20                       | 20    | ....             | ....                     | ....  |
| 2500 lb. p.s.i.....       | 275                                           | 25                       | 25    | 215              | 20                       | 20    | ....             | ....                     | ....  |
| 1500 lb. p.s.i.....       | 225                                           | 25                       | 25    | 175              | 20                       | 20    | ....             | ....                     | ....  |
| Concrete Units—Solid      |                                               |                          |       |                  |                          |       |                  |                          |       |
| Type A.....               | 175                                           | 12                       | 12    | 150              | 12                       | 12    | 125              | 12                       | 12    |
| Type B.....               | 125                                           | 12                       | 12    | 115              | 12                       | 12    | 100              | 12                       | 12    |
| Hollow Unit Masonry.....  | 85                                            | 12*                      | 12*   | 75               | 10*                      | 10*   | 70               | 10*                      | 10*   |
| Cavity Wall Masonry       |                                               |                          |       |                  |                          |       |                  |                          |       |
| Solid Units.....          | 125*                                          | 12*                      | 12*   | 115*             | 10*                      | 10*   | 100*             | 10*                      | 10*   |
| Hollow Units.....         | 60*                                           | 12*                      | 12*   | 55*              | 10*                      | 10*   | 50*              | 10*                      | 10*   |
| Stone Masonry.....        |                                               |                          |       |                  |                          |       |                  |                          |       |
| Cast Stone.....           | 400                                           | 12                       | 12    | 350              | 12                       | 12    | 320              | 12                       | 12    |
| Natural Stone.....        | 125                                           | 8                        | 8     | 125              | 8                        | 8     | 125              | 8                        | 8     |
| Gypsum Masonry.....       | 20                                            | ....                     | ....  | 20               | ....                     | ....  | 20               | ....                     | ....  |

\*Net Area.

TABLE No. 24-C—ALLOWABLE SHEAR ON BOLTS

| Diameter of<br>Bolt (Inches) | Plain, Grouted, and Hollow<br>Unit Masonry |                   |
|------------------------------|--------------------------------------------|-------------------|
|                              | Embedment<br>(Inches)                      | Shear<br>(Pounds) |
| 1/2                          | 4                                          | 350               |
| 5/8                          | 4                                          | 500               |
| 3/4                          | 5                                          | 750               |
| 7/8                          | 6                                          | 1000              |
| 1                            | 7                                          | 1250              |
| 1 1/8                        | 8                                          | 1500              |

**TABLE No. 24-E—WORKING STRESS IN REINFORCED BRICK MASONRY**

| TYPE OF STRESS                                                                                          | FOR ANY STRENGTH OF<br>BRICK MASONRY f' <sub>m</sub><br>(Pounds per Square Inch)<br>(SEE Article 2411 (a)) |                 |
|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------|
|                                                                                                         |                                                                                                            |                 |
| Compression—Axial .....                                                                                 | 0.18                                                                                                       | f' <sub>m</sub> |
| Compression—Flexural .....                                                                              | 0.33                                                                                                       | f' <sub>m</sub> |
| Shear—No Web Reinforcement.....                                                                         | 0.015                                                                                                      | f' <sub>m</sub> |
| Shear—Web Reinforcement, taking $\frac{2}{3}$ of vertical and<br>$\frac{1}{3}$ of horizontal shear..... | 0.033                                                                                                      | f' <sub>m</sub> |
| Bearing .....                                                                                           | 0.25                                                                                                       | f' <sub>m</sub> |
| Modulus of Elasticity .....                                                                             | 1000                                                                                                       | f' <sub>m</sub> |
| Modulus of Rigidity .....                                                                               | 400                                                                                                        | f' <sub>m</sub> |
| Bond Type A Grout .....                                                                                 |                                                                                                            |                 |
| Plain Bars .....                                                                                        | 80                                                                                                         |                 |
| Deformed Bars .....                                                                                     | 100                                                                                                        |                 |

**TABLE No. 24-F—MINIMUM ULTIMATE COMPRESSIVE STRENGTH  
Reinforced Gypsum**

| CLASS | MIXTURE                                                                             | COMPRESSIVE STRENGTH<br>(Pounds per Sq. In.) |
|-------|-------------------------------------------------------------------------------------|----------------------------------------------|
| 1     | Neat (gypsum and water only).....                                                   | 1800                                         |
| 2     | Not more than 3 per cent by<br>weight of wood chips,<br>shavings or fiber.....      | 1000                                         |
| 3     | Not more than 12 1/2 per cent by<br>weight of wood chips,<br>shavings or fiber..... | 500                                          |

**TABLE No. 24-G—WORKING STRESSES  
Reinforced Gypsum**

| TYPE OF STRESS               | WORKING STRESS<br>(Pounds Per Sq. In.) |         |         |
|------------------------------|----------------------------------------|---------|---------|
|                              | Class 1                                | Class 2 | Class 3 |
| Compression—flexural.....    | 350                                    | 220     | 125     |
| Compression—bearing.....     | 200                                    | 165     | 100     |
| Bond (Reinf. Anchored).....  | 36                                     | 20      | 10      |
| Shear (Reinf. Anchored)..... | 36                                     | 20      | 10      |
| Modulus of Elasticity.....   | 1,000,000                              | 600,000 | 200,000 |

**TABLE No. 24-H—MINIMUM THICKNESS OF MASONRY WALLS**

| Type of Masonry          | Maximum Ratio<br>Unsupported<br>Height or Length<br>to Thickness | Nominal<br>Minimum<br>Thickness<br>(Inches) |
|--------------------------|------------------------------------------------------------------|---------------------------------------------|
| Plain Solid Masonry      | 20                                                               | 8                                           |
| Grouted Brick Masonry    | 22                                                               | 7                                           |
| Reinforced Brick Masonry | 25                                                               | 7                                           |
| Hollow Unit Masonry      | 18                                                               | 8                                           |
| Cavity Wall Masonry      | 12                                                               | 10                                          |
| Stone Masonry (Ashlar)   | 14                                                               | 12                                          |
| Interior Non-Bearing     | 48                                                               | 2                                           |

### ARTICLE 2501. QUALITY AND DESIGN.

(a) **General.** The quality and design of all wood members used for load-supporting purposes in buildings or other structures shall conform to the standards specified in this Chapter.

(b) **Workmanship.** All members shall be so framed, anchored, tied, and braced together as to develop the strength and rigidity necessary for the purposes for which they are used.

(c) **Fabrication.** Preparation, fabrication, and installation of wood members, and glues and mechanical devices for the fastening thereof, shall conform throughout to good engineering practices.

(d) **Grade and Species.** The species and grade of all wood used for load-bearing purposes shall be shown on the plans filed with the Director.

(e) **Design.** Except as otherwise provided in this Code, the "National Design Specification for Stress-Grade Lumber and Its Fastenings, National Lumber Manufacturers Association," shall be deemed to be good engineering practice in design with and use of stress-grade lumber and its joints and fastenings.

(f) **Concrete and Masonry.** In no case shall reinforced concrete or masonry, other than tile or concrete floor finishes not more than three inches (3") in thickness, be supported on wood construction, except wood piling as specified in Article 2803.

### ARTICLE 2502. DETERMINATION OF REQUIRED SIZE.

(a) All wood structural members shall be of sufficient size and strength to carry their imposed loads safely and without exceeding the allowable working stresses as specified in Article 2503.

In determining the safe load which a member will sustain or in determining the required size of a member, the following provisions shall govern:

(b) **Rough Lumber.** Where rough lumber is designated on the plans and in the specifications, the full nominal size of the member may be used for determining cross sectional area.

(c) **Surfaced Lumber.** Where surfaced lumber is designated on the plans or in the specifications, the minimum surfaced dressed sizes corresponding to nominal dimensions as indicated in regional lumber manufacturers' association grading rules as listed in Table No. 25-A, shall govern unless actual dressed sizes are specified on plans.

(d) **Unspecified Lumber.** Where nominal dimensions of lumber are indicated on plans and specifications, without reference to surfacing, the minimum surfaced sizes corresponding to such nominal dimensions shall be used for determining the cross sectional area.

### ARTICLE 2503. ALLOWABLE UNIT STRESSES.

(a) **Working Stresses, General.** Except as hereinafter modified, stresses in pounds per square inch induced by permanently applied loads shall not exceed the allowable unit stresses for the respective species and grade stated in Table 25-A; provided, however, other stress grades may be approved and stresses for species and grades not given in the following tables may be established by the Director in accordance with the principles set forth in the "National Design Specification for Stress Grade Lumber and Its Fastenings"

Stresses that exceed those given in Table 25-A for the lowest stress-grade of a species shall be used only when the lumber is identified to be of a higher grade of that species. Such identification shall be by the grade mark of, or certificate of inspection issued by, a lumber grading or inspection bureau or agency recognized as being competent.

(b) **Stress Modification for Duration of Load.** For the case of members designed for a live load that will be intermittent, or of infrequent occurrence and duration of less than twenty-four (24) hours insofar as maximum conditions are concerned, unit stresses may be increased twenty-five per cent (25%). Such increase shall be applicable to roof rafters, roof joists and roof trusses. Such increase shall not be applicable where the dead load is greater than the live load, nor to the minimum required live loads on floors, nor shall it be applicable to columns.

For other loading not exceeding a duration of five (5) minutes, the allowable stresses may be increased by fifty per cent (50%). For wind in combination with permanent loading, the allowable unit stresses in Table 25-A may be increased



by fifty per cent (50%), provided that the resulting structural members are not smaller than those required for permanent loading alone. The provisions of this paragraph do not apply to the modulus of elasticity. Those increases apply to mechanical fastenings except as otherwise noted.

Allowable unit stresses given in Table No. 25-A for permanent loading may be used without regard to impact if the stress induced by impact does not exceed the allowable unit stress for permanent loading; but the sum of stresses induced by any combination of loading, e.g., impact with dead, longtime live, and/or short-time live loading, shall not exceed twice the allowable unit stress for permanent loading. The provisions of this paragraph do not apply to modulus of elasticity.

(c) **Conditions of Exposure.** The allowable stresses in Table No. 25-A and the modifications thereof apply to lumber used under conditions continuously dry. They apply also to lumber impregnated by an approved process and preservatives and to the heartwood of a durable species under dry or other conditions of use.

Where the conditions of the above paragraph are not met or other adequate protective measures are not taken, in permanent construction appropriate modifications of the stresses in Table 25-A shall be made by the Director.

(d) **Joist Details.** For joists spiked to studding and supported on a ribbon board gained into the studding, the allowable unit stress in compression perpendicular to the grain may be increased fifty per cent (50%) above that specified elsewhere in this Article, provided that the vertical load shall be considered to be transferred directly to the ribbon. For other conditions of bearing, such unit stresses may be increased in accordance with the following factors for bearings less than six inches (6") in length and located three inches (3") or more from the end of the timber.

| Length of bearing<br>(inches) | ½    | 1    | 1½   | 2    | 3    | 4    | 6 or more |
|-------------------------------|------|------|------|------|------|------|-----------|
| Factor                        | 1.75 | 1.38 | 1.25 | 1.19 | 1.13 | 1.10 | 1.00      |

For stress under a washer or small plate, the factor of increase may be taken as for a bearing, the length of which equals the diameter of the washer.

In designing joint details, the maximum allowable unit horizontal shear stress values specified in Table No. 25-A of this Article may be increased not to exceed fifty per cent (50%).

(e) **Plywood Stresses.** Working stresses of plywood shall not exceed the values set forth in the bulletin, "Methods of Calculating the Strength of Plywood," issued by the Forest Products Laboratory, or as shown in Table No. 25-H.

Plywood of Douglas Fir shall conform to U. S. Commercial Standard. Plywood of other species, when used structurally, shall be identified as to veneer grade and glue type by an approved agency and shall meet the performance standards in U. S. Commercial Standard for its type.

(f) **Green Lumber.** Where green lumber is used provisions for deflection shall be in accordance with "National Design Specification for Stress-Grade Lumber and its Fastenings."

#### ARTICLE 2504. HORIZONTAL SHEAR.

The maximum allowable unit stress in horizontal shear in beams and other members in flexure shall be computed by use of the following formula:

$$H = \frac{3 R}{2 b h}$$

WHERE:

H = maximum unit horizontal shear, pounds per square inch.

b = breadth of beam, inches.

h = height of beam, inches.

R = Reaction, pounds, under the following conditions:

- (1) Distribution of load to adjacent beams through flooring or other members shall be considered.
- (2) All loads uniform or concentrated, within a distance of the height of the beam from the nearest support, shall be neglected.

The maximum allowable intensity of horizontal shear due to beam action in any structural member may be increased to two and one-half (2½) times the value specified in Table No. 25-A, provided that increased unit stress does not occur over a length greater than one and one-half (1½) times the depth of the member.

Horizontal shear for notched members shall be computed in accordance with stress values given in Article 2521.

## ARTICLE 2505. COLUMNS.

Columns, including struts and other members in compression parallel to grain, shall be designed structurally as follows:

(a) **Short Columns.** The safe load, in pounds per square inch of net cross sectional area, for columns and other members, stressed in compression parallel to the grain, with a ratio of unsupported length to least dimension  $l/d$  not exceeding 11 (short columns), shall not exceed the allowable unit compression stress parallel to grain for short columns, as shown in Table No. 25-A, i.e.,

$$\frac{P}{A} = c$$

(b) **Intermediate Columns.** For columns with a ratio of unsupported length to least dimension greater than 11 (intermediate columns), the following formula shall be used until the reduction in allowable stress equals one-third (⅓) the stress permitted for short columns:

$$\frac{P}{A} = c \left[ 1 - \frac{1}{3} \left( \frac{l}{Kd} \right)^4 \right]$$

(c) **Long Columns.** For columns with a ratio of unsupported length to least dimension greater than  $K$ , (long columns), the safe unit load shall be determined by the following formula:

$$\frac{P}{A} = \frac{0.329 E}{\left( \frac{l}{d} \right)^2}$$

### WHERE:

$P$  = total load in pounds

$A$  = area in square inches of net cross-section

$P$

— = working stress or maximum load per square inch

$A$

$c$  = allowable unit stress in compression parallel to grain for short columns (Table No. 25-A)

$l$  = unsupported length of column in inches

$d$  = least dimension of column in inches

$E$  = modulus of elasticity

$K$  = the  $\frac{l}{d}$  at the point of tangency of the parabolic and Euler curves, at which point

$$\frac{P}{A} = \frac{2c}{3} \quad K = \frac{\pi}{2} \sqrt{\frac{E}{5c}} = .702 \sqrt{\frac{E}{c}}$$

Columns shall be limited in maximum length between points of lateral support to  $l = 50 d$ , except as provided in Article 2516.

(d) **Round Columns.** The safe load on a column of round cross-section shall not exceed that permitted for a square column of the same cross-sectional area.

**ARTICLE 2506. COMBINED STRESSES.**

Members subject to both axial and bending stresses shall be proportioned in accordance with the following formula:

$$\frac{P/A}{c_1} + \frac{M/S}{f_1} \text{ equals, or is less than } 1.$$

WHERE:

- P = total axial load (in pounds).  
 A = area (in square inches) of net cross section.  
 c<sub>1</sub> = allowable unit axial stress permitted for members acting solely as a column (see Table No. 25-A and Article 2505.)  
 M = total bending moment in inch pounds resulting from load causing flexure.  
 S = section modulus (in inches cubed) for net cross section.  
 f<sub>1</sub> = allowable unit fiber stress in bending permitted for member (see Table no. 25-A)

**ARTICLE 2507. COMPRESSION ON INCLINED SURFACES.**

The unit stress normal to a plane inclined to the fiber of a wood member shall not exceed that determined from the formula:

$$n = \frac{p \ q}{p \sin^2 \theta + q \cos^2 \theta}$$

WHERE:

- n = allowable unit stress on inclined surface, pounds per square inch.  
 p = allowable compressive unit stress parallel to grain (Table No. 25-A.)  
 q = allowable compressive unit stress perpendicular to grain (Table No. 25-A.)  
 θ = angle between the direction of the load and the direction of the grain, in degrees.

**ARTICLE 2508. BOLTED JOINTS.**

(a) **Design of Bolted Joints.** Bolted joints wherein bolts are used to resist stresses in wood structures shall be designed in accordance with the principles set forth in the "National Design Specification for Stress Grade Lumber and Its Fastenings, National Lumber Manufacturers Association."

(b) **Safe Loads, Double Shear.** Safe loads, in pounds on bolts in seasoned lumber of the following species: Cedar, eastern red; cypress, southern; Douglas fir (coast region); larch, western; pine, southern yellow; redwood and tamarack, in joints consisting of three members in which the side members are one-half the thickness of the main member, shall not exceed values stated in Tables 25-B and 25-C.

(c) **Loads at Angle to Grain.** When a force is applied by means of a bolt at an angle with the fiber of a wood member, the safe load shall be determined in accordance with the formula:

$$n = \frac{p \ q}{p \sin^2 \theta + q \cos^2 \theta}$$

WHERE:

- n = safe load in pounds on bolt.  
 p = safe load on bolt parallel to grain as determined from Table No. 25-B.  
 q = safe load on bolt perpendicular to grain from Table No. 25-C.  
 θ = angle between direction of load and direction of member, in degrees.

(d) **Bolts in Other Species of Wood.** For species of wood other than those set forth in Tables Nos. 25-B and 25-C, bolt values shall be derived in accordance with the principles stated in "National Design Specification for Stress-Grade Lumber and Its Fastenings."

(e) **Joints Other Than Double Shear.** When a joint consists of two members (single shear) of equal thickness, one-half the tabulated load for a piece twice the thickness of one of the members shall be used. When members of a two-member joint are of unequal thickness, one-half the tabulated load for a piece twice the thickness of the thinner member shall be used.

For multiple-member joints other than two or three members, the load for each shear plane shall be computed in the same manner as for a two-member joint.

(f) **Metal Side Plates.** When metal plates are used each side of a wood member, tabulated bolt values may be increased one-quarter for values parallel to the grain.

(g) **Joints in Wet Locations.** When the joint is to be used in a location "occasionally wet but quickly dried", tabulated bolt values shall be reduced one-quarter.

In locations "usually wet", tabulated bolt values shall be reduced one-third.

(h) **Definition of Seasoned Lumber.** "Seasoned Lumber" for the purpose of this Article, is defined as lumber which has been air-dried for at least sixty (60) days, or which has at the time of installation in the structure reached a moisture content approximately equal to that which it will eventually contain in service. Where green or recently cut lumber is used, tabulated bolt values shall be reduced one-third.

(i) **Bolt Holes.** Bolt holes in wood members shall be made the same diameter as the bolt, unless otherwise specified on plans. Bolt holes may be specified to be not more than one-sixteenth of an inch ( $\frac{1}{16}$ " ) larger than the bolt, in which case allowable loads shall be reduced ten per cent (10%).

(j) **Bolt Hole Spacing.** "Row of Bolts" is defined as a number of bolts placed in a line parallel to the direction of load.

Minimum center-to-center spacing of bolts in any one row for full design loads shall be four times the bolt diameter. In no case shall the bolt bearing capacity of any member be exceeded.

Spacing center-to-center between rows of bolts for loads perpendicular to grain shall be not less than two and one-half times the bolt diameter for an  $l/d$  ratio of two, and not less than five times the bolt diameter for  $l/d$  ratios of six or more. Intermediate values shall be directly interpolated.

Spacing center-to-center between rows of bolts for loads parallel to grain shall be such that the net tension area remaining at a critical section shall be not less than eighty per cent (80%) for softwoods, and one hundred per cent (100%) for hardwoods, of the total area in bearing under all bolts in the particular timber.

End margin is defined as the distance from the end of a bolted member to the center of the bolt hole nearest the end. This distance, for a member in tension, shall be not less than seven times the bolt diameter for softwoods and five times for hardwoods. End margin, for members in compression, shall be not less than four times the bolt diameter.

Edge margin is defined as the distance from the edge of the timber to the center of the nearest bolt hole. For members loaded perpendicular to grain, edge margin nearest the edge toward which the load is acting shall be at least four times the bolt diameter. For members loaded parallel to grain, edge margin shall be at least one and one-half times the bolt diameter.

#### **ARTICLE 2509. TIMBER CONNECTORS.**

Joints wherein timber connectors are used with bolts to transmit stresses between structural or load-bearing members shall be designed in accordance with the principles and recommended safe loads set forth in "National Design Specifications for Stress-Grade Lumber and Its Fastenings."

Safe loads and design practice for types of connectors not mentioned or fully covered by the above publication may be determined from other published recommendations, provided such recommendations are first approved by the Director. Allowable load values for timber connectors shall be based on empirical test data. Connector safe load values shall be determined from the combined resistance of the connectors and its bolt.

#### **ARTICLE 2510. CYLINDRICAL PINS.**

In connections involving the use of tightly fitting cylindrical pins of iron, steel, heavy steel pipe or hardwood, the allowable load on a pin shall be determined in the same manner as for bolts as set forth in the "National Design Specifications for Stress-Grade Lumber and Its Fastenings."

#### **ARTICLE 2511. LAG SCREWS.**

Connections involving the use of lag screws shall be designed in accordance with the provisions of the "National Design Specification for Stress-Grade Lumber and Its Fastenings."

#### **ARTICLE 2512. WOOD SCREWS.**

(a) **General.** Stressed connections involving the use of wood screws shall be designed in accordance with the provisions of "National Design Specification for Stress-Grade Lumber and Its Fastenings."

(b) **Shear Connections.** A wood screw used to fasten a metal plate to a wooden member or a wooden member to a wooden member, shall not be subjected to a greater load causing shear and bending than the safe lateral strength of the wood screw as determined from Table No. 25-D. Screws shall have an embedment into the farther member of at least six-tenths (6/10) of the length of the screw. The length of the screw shall be not less than seven (7) times the diameter of the screw.

(c) **Tension Connections.** A wood screw inserted perpendicular to the grain of the wood shall not be subjected to a greater load tending to cause withdrawal than the safe resistance of the screw to withdrawal as determined from Table No. 25-E.

A wood screw inserted parallel to the grain of the wood shall not be allowed for resisting computed tensile stresses.

#### **ARTICLE 2513. NAILS.**

(a) **General.** Stressed connections involving the use of nails shall be designed in accordance with the provisions of "National Design Specification for Stress-Grade Lumber and Its Fastenings."

(b) **Safe Lateral Strength.** A wire nail inserted perpendicular to the grain of the wood when used to fasten wooden members together, shall not be subjected to a greater load causing shear and bending than the safe lateral strength of the wire nail or spike as determined from Table No. 25-F.

A wire nail inserted parallel to the grain of the wood shall not be subjected to more than three-fourths (¾) of the lateral load allowable when inserted perpendicular to the grain.

(c) **Safe Resistance to Withdrawal.** A wire nail inserted perpendicular to the grain of the wood shall not be subjected to a greater load, tending to cause withdrawal, than the safe resistance of the nail to withdrawal, as determined from Table No. 25-G.

Nails inserted parallel to the grain of the wood shall not be allowed for resisting computed tensile stresses.

(d) **Spacing and Penetration.** Nails shall not be driven closer together than one-half (1/2) their length unless driven in bored holes nor closer to the edge of the timber than one-quarter (1/4) their length. Holes for nails when necessary to prevent splitting, shall be bored of diameter smaller than that of the nails. Nails shall be of such length that, when joining one timber to another, the penetration of the nail into the second or farther timber shall be not less than one-half (1/2) the length of the nail.

#### **ARTICLE 2514. WASHERS**

All bolts in direct tension shall be provided with steel plate washers under heads and nuts. The area of these washers must be such that the unit bearing stress on the wood shall not exceed the allowable unit stress. The washer shall be not less in thickness than one-tenth (1/10) the diameter or the length of the longer side of the washer.

Bolts taking shear only shall have Standard O. G. malleable iron washers, or equivalent, under head and nuts.

#### **ARTICLE 2515. COLUMNS OR POSTS.**

For allowable unit stresses, see Articles 2503, 2504 and 2505.

All wood columns and posts shall be framed to true end bearings; shall extend down to supports of such design as to hold securely the column or post in position and to protect its base from deterioration; shall be supported in basements by footings projecting at least two inches (2") above the finished floor and separated therefrom by a metal plate of not less than one-quarter inch (1/4") thickness; shall not rest directly or indirectly on floor beams except in cases where there is no column below.

Preservatives shall be applied to column ends where necessary to protect against dampness.

Untreated wood columns in basements, when built into masonry partitions or walls, shall be exposed on at least two (2) sides.

Wood posts, where used as foundations below ground and as piles (except for minor structures), shall be pressure-treated with an approved preservative.

#### **ARTICLE 2516. BUILT-UP COLUMNS OR COMPRESSION MEMBERS.**

The compressive strength of built-up columns or compression members, when composed of two (2) or more members spiked or bolted together, either with or without spacing blocks between members, shall be taken as the combined compressive strength of the individual pieces, each considered as an independent column; provided, however, that compression members which are fastened together by bolts and timber connectors, or otherwise used in such a manner as to approach fixed-end conditions, or which are laterally braced parallel to the least dimension of the individual members, may be calculated as having eighty per cent (80%) of the compressive strength of long columns having a slenderness ratio/d based on the least over-all dimension of the composite member.

Spaced columns or compression members shall be based upon design principles acceptable to the Director, or the design principles set forth for spaced columns in "National Design Specification for Stress-Grade Lumber and Its Fastenings."

#### ARTICLE 2517. HORIZONTAL MEMBERS.

Where joists enter stud walls, either exterior or interior, in which the studs are not cut off and capped underneath, the joists thus giving bearing support thereto, such joists shall be connected to the studs in an approved manner or may be supported on a wooden ribbon not less than one inch by four inches (1" x 4"), set snugly into the studs. In the latter case, design shall be in accordance with Article 2503 (d).

Joists under bearing partitions and running parallel thereto, shall be doubled and well spiked or separated by solid bridging not more than sixteen inches (16") on centers to permit the passage of pipes.

The bearing surfaces of masonry on which wooden structural members are to rest shall be finished to give true and even support. When less than three feet (3') from the ground, the bearing surfaces of wooden joists, beams, girders, built-up girders, or rafters over six inches (6") in width of bearing, which would otherwise rest directly upon masonry or concrete shall be protected in an approved manner against damage by moisture or other injurious conditions.

Every wooden joist, rafter, beam or girder entering any masonry or reinforced concrete wall shall be separated from any wood members entering the opposite side of said wall by at least four inches (4") of solid masonry.

Ends of wood members entering masonry or concrete walls shall be treated with approved preservative or shall be provided with metal wall boxes affording one-half inch ( $\frac{1}{2}$ ") air space on each side or shall be provided with at least one inch (1") of air space at top and sides.

Header beams shall be placed not closer than twenty inches (20") from the face of a chimney. All spaces between chimneys and wood joists or beams shall be filled with loose incombustible materials placed in an incombustible support, or a metal collar connected to the chimney and fastened to the joists, beams or flooring to form an effective fire stop.

All joists shall have a minimum bearing of two inches (2") except when supported on a ribbon board and nailed securely to the adjoining stud.

Cutting of wood girders, beams or joists shall be limited to that permitted in Article 2521.

#### ARTICLE 2518. WALL ANCHORS AND TIES.

When timber construction is used in connection with masonry or reinforced concrete walls, the walls shall be tied to the interior timber construction at each floor and roof at horizontal intervals as required by design loads and stresses.

Where the joists, rafters or beams are supported by wooden girders, such girders shall be anchored to the walls so as to furnish resistance as required by the design loads and stresses.

#### ARTICLE 2519. HEADER AND TAIL JOISTS.

Header joists over six feet (6') long and tail joists over twelve feet (12') long shall be hung in joist or beam hangers, or secured by other devices affording equivalent support.

Trimmers and header joists more than four feet (4') long shall be doubled.

#### ARTICLE 2520. FLOOR JOIST BRIDGING.

Solid wood blocking of two inch (2") nominal thickness, wood cross bridging of not less than one inch by three inches (1" x 3"), or metal cross bridging of equal strength, shall be placed between joists where the joist span exceeds eight feet (8'). The distance between lines of bridging or between bridging and bearing shall not exceed eight feet (8'). Solid blocking shall be placed between joists at all points of support and at all points where flooring is not continuous, except that bridging may be omitted when the joists are nailed to studs. The lower ends of the cross bridging shall be driven up and nailed after the floor or subfloor has been nailed.

#### ARTICLE 2521. CUTTING AND NOTCHING.

Girders, beams or joists, may be notched or bored in any part of the section within three (3) times the beam depth from either support. Such notches or holes shall not exceed one-fifth ( $\frac{1}{5}$ ) of the depth of beam except at point of support and as hereinafter provided. Where girders, beams or joists are notched at points of support, they shall meet design requirements for net section in bending, and also for shear. The unit shearing stress at such point shall be calculated by the following formula and shall not exceed values given in Table No. 25-A.

$$H = \frac{3 V}{2 b d} \times \frac{h}{d}$$

WHERE:

- V = vertical shear at section under consideration.  
 b = width of beam.  
 d = actual depth of beam at the notch.  
 h = total depth of beam.  
 H = allowable unit horizontal shear stress.

Where notches or holes are made in other portions of the beam, the net remaining depth of beam shall be used in determining the bending strength.

#### ARTICLE 2522. DEFLECTION.

Joists supporting plastered ceilings shall be so proportioned that their deflection under full live load and dead load exclusive of weight of plaster, shall not exceed one three-hundred-and-sixtieth (1/360) of the span length. (Also see Article 2503 (f) ).

#### ARTICLE 2523. LAMINATED FLOORS.

Every member of a solid or laminated floor, consisting of members set closely together on edge, shall be firmly nailed with two nails at each end and at intervals along its length not greater than eighteen inches (18"). The nails used shall be of a length equal to two and one-half times the thickness of a single lamination. Devices of equivalent strength may be used in lieu of nails.

In the case of laminated floors in structures of more than one span, at least two-thirds (2/3) of the members shall pass over the supports. In any three consecutive members, no two splices shall be nearer to each other than one-quarter (1/4) of a span length. No member shall be spliced more than once in a distance equal to a span length.

In all single span laminated floors, the members forming the floor shall be full length and free from joints.

When laminated floors bear on a masonry wall, suitable anchorage shall be provided capable of resisting the design forces. (See also Article 3104).

#### ARTICLE 2524. STUD WALLS AND PARTITIONS.

(a) **Placing.** Studs in walls and partitions may be placed with the longest dimension parallel with the wall or partition, provided the studs are considered as columns and comply with the column formulas. Such walls shall have top and bottom plates except when framed as provided in Article 2517, first paragraph; except that non-bearing partitions may be framed in the above manner without further limitations.

(b) **Plates.** In bearing partitions, the top plate shall be doubled (2 inches nominal thickness minimum each) and lapped at each intersection with walls or partitions. Joints in the upper and lower members of the top plate shall be staggered not less than four (4) feet.

(c) **Bridging.** All stud partitions or walls over ten feet (10') in height shall have solid bridging, not less than two inches (2") in thickness and of the same width as the stud, fitted snugly and spiked into the studs at mid-height of stud, or other means for giving equal lateral support to the studs. Solid bridging may serve as fire-stopping as required in Article 2526.

(d) **Size and Height.** Exterior stud walls and bearing partitions shall be constructed with studding not less than two inches by three inches (2" x 3"), spaced not more than twenty-four inches (24") on centers for a one-story building, and not less than two inches by four inches (2" x 4"), spaced not more than sixteen inches (16") on centers for the first story of one and one-half, two, or two and one-half story buildings. For buildings of three stories, the studding shall be not less than three inches by four inches (3" x 4") or two inches by six inches (2" x 6") to the bottom of the second floor joists and two inches by four inches (2" x 4") for the two upper stories.

Maximum allowable height of two inches by three inches (2" x 3") shall be eleven feet (11'); for two inches by four inches (2" x 4") and three inches by four inches (3" x 4") shall be fourteen feet (14'); and two inches by six inches (2" x 6") stud framing shall be twenty feet (20') unless the wall is supported laterally by adequate framing.

No studding shall be spaced more than specified above in the Sub-Article except that in lieu of this requirement the studs and plates may be designed as a system of columns and beams, provided structural grade material is used, or such walls may be constructed of not less than four inches by four inches (4" x 4") posts spaced not more than five feet (5') on centers or of larger members designed as required in this Chapter, or may be of post and beam framing with plank sheathing not less than one and one-half inches (1½") thick or may be of laminated construction not less than four inches (4") nominal in

thickness with the structural assembly properly designed to support all loads. One-story buildings having a total floor area of not more than four hundred square feet (400 sq. ft.) may have exterior walls of vertical one-inch (1") boards and battens without studs.

(e) **Base Plates.** Stud walls resting on masonry shall have base plates or sills of foundation grade redwood, Southern Pine, 85% heart, cedar, cypress or wood treated with approved preservative. Such sills shall be bolted to the masonry at corners and between corners with bolts not less than one-half inch ( $\frac{1}{2}$ ") in diameter, embedded not less than seven inches (7") into the masonry and spaced not more than six feet (6') apart, center to center. These sills shall be not less than the width of the studs nor less than two inches (2") thick.

(f) **Corners and Bracing.** Angles at corners where stud walls or partitions meet shall be framed solid so that no lath can extend from one room to another. All exterior and main cross stud partitions shall be effectively and thoroughly braced.

(g) **Pipes in Walls.** Stud partitions containing plumbing, heating or other pipes shall be so framed and the joists underneath so spaced as to give proper clearance for the piping. Where a partition containing such piping runs parallel to the floor joists, the joists underneath such partitions shall be doubled and spaced to permit the passage of such pipes and shall be bridged with solid bridging. Where plumbing, heating or other pipes are placed in or partly in a partition, necessitating the cutting of the soles or plates, a metal tie not less than one-eighth inch ( $\frac{1}{8}$ ") thick and one and one-half inches ( $1\frac{1}{2}$ ") wide shall be fastened to the plate across and to each side of the opening with not less than four (4) 16d nails.

(h) **Chimney Space.** Wood lath, furring or framing shall be placed not less than two inches (2") from any chimney and not less than four inches (4") from the outside of masonry at the back of any fireplace.

(i) **Underpinning.** The underpinning of bearing stud walls shall be so constructed as to resist the design forces.

(j) **Headers.** All wall openings four feet (4') wide or less shall be provided with double headers not less than two inches (2") thick, placed on edge, securely fastened together, and such headers shall have two-inch (2") solid bearing to the floor or bottom plate. All openings more than four feet (4') wide shall be trussed or provided with lintels which shall have not less than two inch (2") solid bearing at each end to the floor or bottom plate.

## ARTICLE 2525. NAILING AND FASTENING.

The wooden framework of all buildings shall be connected together in a secure manner, and the connections between the various parts shall be such that all forces will be adequately resisted. The sheathing and the sub-flooring shall be fastened to the studs, rafters or joists with nails which shall be in length at least two and one-half ( $2\frac{1}{2}$ ) times the nominal thickness of the sheathing or sub-flooring. The nailing shall have an average spacing not more than four inches (4") along each stud, rafter or joist.

Exception: For plywood sheathing or sub-flooring nails shall not be less than six penny and shall be spaced not more than six inches (6") along the edges of panels and twelve inches (12") along intermediate supports and shall be at least three-eighths inch ( $\frac{3}{8}$ ") from the edge of panel.

## ARTICLE 2526. FIRE STOPS.

Fire-stopping shall be provided to cut off all concealed draft openings (both vertical and horizontal), and form an effective fire barrier between stories and between a top story and the roof space. It shall be used in specific locations, as follows:

1. In exterior or interior stud walls, at ceilings and floor levels.
2. In all stud walls and partitions, including furred spaces, so placed that the maximum dimension of any concealed space is not over ten feet (10').
3. In furred masonry walls.
4. Between stair stringers at least once in the middle portion of each run, at top and bottom, and between studs, along and in line with run of stair adjoining such partition.
5. Around top, bottom, sides and ends of sliding door pockets.
6. Spaces between chimneys and wood framing shall be solidly filled with mortar, loose cinders or other incombustible material placed in incombustible supports.
7. Any other locations not specifically mentioned above, such as holes for pipes, shafting etc., which could afford a passage for flames.



Fire stops shall be of two inch (2") nominal material. If width of opening is such that more than one piece of lumber is necessary, there shall be two thicknesses of one inch (1") material with joints broken.

#### **ARTICLE 2527. FOUNDATION VENTILATION.**

The space between bottom of floor joists and the ground of any building (except such space as is occupied by a basement or cellar) shall be provided with a sufficient number of ventilating openings through foundation walls or exterior walls to insure ample ventilation, and such openings shall be covered with a corrosion-resistant wire mesh with openings in such mesh not greater than one-half inch (1/2") in any dimension. The minimum total area of ventilating openings shall be proportioned on the basis of two square feet (2 sq. ft.) for each twenty-five linear feet (25 lin. ft.) or major fraction thereof of exterior wall. Such openings need not be placed in the front of the building.

Minimum clearance between bottom of floor joists and the ground beneath shall be twenty-four inches (24"). See Article 202.

#### **ARTICLE 2528. GLUED LAMINATED CONSTRUCTION.**

Where glued laminated construction is used involving stresses in structural members, the design, fabrication and erection shall be in accordance with the "National Design Specifications for Stress-Grade Lumber and Its Fastenings." For prefabricated construction see Articles 211 and 1701.

#### **ARTICLE 2529. STRESSED SKIN PANELS.**

Stressed skin panels shall be designed in accordance with the publication, "The Designing for Strength of Flat Panels with Stressed Coverings," issued by the Forest Products Laboratory. For prefabricated construction see Articles 211 and 1701.

**TABLE No. 25-A—ALLOWABLE UNIT STRESSES—STRESS-GRADE LUMBER**  
Continuously Dry Location—Long-Time Loading

|                                     | Allowable Unit Stresses in Pounds per Square Inch |                                                                                |                            |                                                  |                                 |                                                                                                                        |           |           |           |           |           |           |           |           |           |
|-------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------|----------------------------|--------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1                                   | 2                                                 | 3                                                                              | 4                          | 5(i)                                             | 6                               | 7                                                                                                                      |           |           |           |           |           |           |           |           |           |
| Species and commercial<br>Grade (1) | Rules<br>under<br>which<br>graded                 | Extreme fiber<br>in bending "f"<br>and tension<br>parallel to<br>grain (2) "f" | Horizontal<br>shear<br>"H" | Compression<br>perpendicular<br>to<br>grain "c⊥" | Modulus of<br>elasticity<br>"E" | Compression parallel to grain (for solid<br>columns and solid struts) for ratios of<br>length-to-least-dimension (l/d) |           |           |           |           |           |           |           |           |           |
|                                     |                                                   |                                                                                |                            |                                                  |                                 | 1/d 11<br>or<br>less<br>"C" (2)                                                                                        | 1/d<br>14 | 1/d<br>17 | 1/d<br>20 | 1/d<br>23 | 1/d<br>26 | 1/d<br>30 | 1/d<br>35 | 1/d<br>40 | 1/d<br>50 |
| CYPRESS, SOUTHERN:                  |                                                   |                                                                                |                            |                                                  |                                 |                                                                                                                        |           |           |           |           |           |           |           |           |           |
| 1700 f Grade.....J&P-B&S            | Natl.                                             | 1700                                                                           | 145                        | 360                                              | 1,200,000                       | 1425                                                                                                                   | 1320      | 1196      | 986       | 746       | 583       | 438       | 322       | 247       | 158       |
| 1300 f Grade.....J&P-B&S            | Hardw.                                            | 1300                                                                           | 120                        |                                                  |                                 | 1125                                                                                                                   | 1072      | 1011      | 907       |           |           |           |           |           |           |
| 1450 c Grade.....P&T                | Lumber                                            | ----                                                                           | ---                        |                                                  |                                 | 1450                                                                                                                   | 1338      | 1208      | 986       |           |           |           |           |           |           |
| 1200 c Grade.....P&T                | Assn.                                             | ----                                                                           | ---                        |                                                  |                                 | 1200                                                                                                                   | 1136      | 1062      | 936       |           |           |           |           |           |           |
| CYPRESS, TIDEWATER RED:             |                                                   |                                                                                |                            |                                                  |                                 |                                                                                                                        |           |           |           |           |           |           |           |           |           |
| 1700 f Grade.....J&P-B&S            | Sou.                                              | 1700                                                                           | 145                        | 360                                              | 1,200,000                       | 1425                                                                                                                   | 1320      | 1196      | 986       | 746       | 583       | 438       | 322       | 247       | 158       |
| 1300 f Grade.....J&P-B&S            | Cypr.                                             | 1300                                                                           | 120                        |                                                  |                                 | 1125                                                                                                                   | 1072      | 1011      | 907       |           |           |           |           |           |           |
| 1450 c Grade.....P&T                | Mfrs.                                             | ----                                                                           | ---                        |                                                  |                                 | 1450                                                                                                                   | 1338      | 1208      | 986       |           |           |           |           |           |           |
| 1200 c Grade.....P&T                | Assn.                                             | ----                                                                           | ---                        |                                                  |                                 | 1200                                                                                                                   | 1136      | 1062      | 936       |           |           |           |           |           |           |
| DOUGLAS FIR, COAST<br>REGION:       |                                                   |                                                                                |                            |                                                  |                                 |                                                                                                                        |           |           |           |           |           |           |           |           |           |
| Dense Sel. Struc. (5).....J&P-B&S   | West<br>Coast<br>Lumber<br>& Insp.                | 2150                                                                           | 145                        | 455                                              | 1,600,000                       | 1550                                                                                                                   | 1474      | 1384      | 1234      | 995       | 779       | 584       | 430       | 329       | 210       |
| Select Struc. ....J&P-B&S           |                                                   | 1900                                                                           | 120                        | 415                                              |                                 | 1450                                                                                                                   | 1388      | 1314      | 1188      | 992       | 779       |           |           |           |           |
| 1700 f Dense No. 1 (5).....J&P-B&S  |                                                   | 1700                                                                           | 145                        | 455                                              |                                 | 1325                                                                                                                   | 1277      | 1222      | 1126      | 977       | 779       |           |           |           |           |
| 1450 f No. 1.....J&P-B&S            |                                                   | 1450                                                                           | 120                        | 390                                              |                                 | 1200                                                                                                                   | 1165      | 1123      | 1054      | 943       | 779       |           |           |           |           |
| 1100 f No. 2.....J&P                |                                                   | 1100                                                                           | 110                        | 390                                              |                                 | 1075                                                                                                                   | 1049      | 1019      | 969       | 889       | 772       |           |           |           |           |
| Dense Sel. Struc. (5).....P&T       |                                                   | ----                                                                           | ---                        | 455                                              |                                 | 1550                                                                                                                   | 1474      | 1384      | 1234      | 995       | 779       |           |           |           |           |
| Select Struc. ....P&T               |                                                   | ----                                                                           | ---                        | 415                                              |                                 | 1450                                                                                                                   | 1388      | 1314      | 1188      | 992       | 779       |           |           |           |           |
| Dense No. 1 (5).....P&T             |                                                   | ----                                                                           | ---                        | 455                                              |                                 | 1400                                                                                                                   | 1344      | 1278      | 1165      | 990       | 779       |           |           |           |           |
| No. 1.....P&T                       | ----                                              | ---                                                                            | 390                        | 1200                                             | 1165                            | 1123                                                                                                                   | 1054      | 943       | 779       |           |           |           |           |           |           |
| DOUGLAS FIR, INLAND<br>REGION:      |                                                   |                                                                                |                            |                                                  |                                 |                                                                                                                        |           |           |           |           |           |           |           |           |           |
| Select Struc. (5).....J&P-B&S       | Western<br>Pine<br>Assn.                          | 2150                                                                           | 145                        | 455                                              | 1,600,000                       | 1750                                                                                                                   | 1640      | 1509      | 1288      | 995       | 779       | 584       | 430       | 329       | 210       |
| Structural.....J&P-B&S              |                                                   | 1900                                                                           | 100                        | 400                                              | 1,500,000                       | 1400                                                                                                                   | 1336      | 1260      | 1133      | 934       | 730       | 548       | 403       | 308       | 197       |
| Common Struc. ....J&P-B&S           |                                                   | 1450                                                                           | 95                         | 380                                              | 1,500,000                       | 1250                                                                                                                   | 1204      | 1150      | 1059      | 915       |           |           |           |           |           |
| Sel. Struc. (5).....P&T             |                                                   | ----                                                                           | ---                        | 455                                              | 1,600,000                       | 1750                                                                                                                   | 1640      | 1509      | 1288      | 995       | 779       | 584       | 430       | 329       | 210       |
| Structural.....P&T                  |                                                   | ----                                                                           | ---                        | 400                                              | 1,500,000                       | 1400                                                                                                                   | 1336      | 1260      | 1133      | 934       | 730       | 548       | 403       | 308       | 197       |
| Common Struc. ....P&T               |                                                   | ----                                                                           | ---                        | 380                                              | 1,500,000                       | 1250                                                                                                                   | 1204      | 1150      | 1059      | 915       |           |           |           |           |           |

|                                |         |         |      |        |     |      |      |      |      |     |     |
|--------------------------------|---------|---------|------|--------|-----|------|------|------|------|-----|-----|
| LARCH:                         |         |         |      |        |     |      |      |      |      |     |     |
| Select Struc. (5).....         | J&P-B&S | Western | 2150 | 145    | 455 | 1750 | 1582 | 1384 | 1069 |     |     |
| Structural.....                | J&P-B&S | Pine    | 1900 | 120    | 415 | 1450 | 1354 | 1243 | 1063 |     |     |
| Common Struc.....              | J&P-B&S | Assn.   | 1450 | 120    | 390 | 1325 | 1252 | 1187 | 1023 |     |     |
| Select Struc. (5).....         | P&T     |         |      |        | 455 | 1750 | 1582 | 1384 | 1069 |     |     |
| Structural.....                | P&T     |         |      |        | 415 | 1450 | 1354 | 1243 | 1063 |     |     |
| Common Struc.....              | P&T     |         |      |        | 390 | 1325 | 1252 | 1167 | 1023 | 808 | 632 |
|                                |         |         |      |        |     |      |      |      |      | 475 | 349 |
|                                |         |         |      |        |     |      |      |      |      |     | 268 |
|                                |         |         |      |        |     |      |      |      |      |     | 170 |
| OAK, RED AND WHITE:            |         |         |      |        |     |      |      |      |      |     |     |
| 2150 f Grade.....              | J&P     | Natl.   | 2150 | 145    |     | 1550 | 1463 | 1362 | 1190 | 932 | 730 |
| 1900 f Grade.....              | J&P-B&S | Hardw.  | 1900 | 145    |     | 1375 | 1315 | 1243 | 1122 | 932 | 730 |
| 1700 f Grade.....              | J&P-B&S | Lumber  | 1700 | 145    | 600 | 1200 | 1159 | 1111 | 1031 | 904 | 730 |
| 1450 f Grade.....              | J&P-B&S | Assn.   | 1450 | 120    |     | 1050 | 1023 | 991  | 939  | 855 | 731 |
| 1300 f Grade.....              | B&S     |         | 1300 | 120    |     | 950  | 930  | 906  | 866  | 804 | 712 |
| 1325 c Grade.....              | P&T     |         |      |        |     | 1325 | 1271 | 1206 | 1097 | 926 | 730 |
| 1200 c Grade.....              | P&T     |         |      |        |     | 1200 | 1159 | 1111 | 1031 | 904 | 730 |
| 1075 c Grade.....              | P&T     |         |      |        |     | 1075 | 1048 | 1012 | 954  | 862 | 728 |
| PINE, SOUTHERN: (4)            |         |         |      |        |     |      |      |      |      |     |     |
| Dense Sel. Struc. (5).....     | J&P-B&S |         | 2400 | 120(7) | 455 | 1750 | 1640 | 1509 | 1288 | 995 | 779 |
| Dense Structural (5).....      | J&P-B&S |         | 2000 | 120(7) | 455 | 1400 | 1344 | 1278 | 1165 | 990 | 779 |
| Dense Struc. SE&S (5).....     | J&P-B&S |         | 1800 | 120(7) | 455 | 1300 | 1255 | 1202 | 1112 | 971 | 779 |
| Dense No. 1 Struc. (5).....    | J&P-B&S |         | 1600 | 120(7) | 455 | 1150 | 1119 | 1082 | 1020 | 922 | 779 |
| No. 1 Dense (5).....           | J&P(8)  |         | 1700 | 150    | 455 | 1400 | 1344 | 1278 | 1165 | 990 | 779 |
| No. 1 Pine.....                | J&P(8)  | Sou.    | 1450 | 125    | 390 | 1200 | 1165 | 1123 | 1054 | 943 | 779 |
| No. 2 Dense (5).....           | J&P(8)  | Inspe.  | 1250 | 100    | 455 | 1025 | 1003 | 977  | 934  | 865 | 764 |
| No. 2 Pine.....                | J&P(8)  | Bureau  | 1100 | 85     | 390 | 875  | 861  | 845  | 817  | 774 | 711 |
| Dense Sel. Struc. (5).....     | P&T     |         |      |        | 455 | 1750 | 1640 | 1509 | 1288 | 995 | 779 |
| Dense Structural (5).....      | P&T     |         |      |        | 455 | 1400 | 1344 | 1278 | 1165 | 990 | 779 |
| Dense Struc. SE&S (5).....     | P&T     |         |      |        | 455 | 1300 | 1255 | 1202 | 1112 | 971 | 779 |
| Dense No. 1 Struc. (5).....    | P&T     |         |      |        | 455 | 1150 | 1119 | 1082 | 1020 | 922 | 779 |
| PINE, SOUTHERN LONGLEAF (4)    |         |         |      |        |     |      |      |      |      |     |     |
| Sel. Struc. L. L. (5-6).....   | J&P-B&S |         | 2400 | 120(7) |     | 1750 | 1640 | 1509 | 1288 | 995 | 779 |
| Prime Struc. L. L. (5-6).....  | J&P-B&S |         | 2000 | 120(7) |     | 1400 | 1344 | 1278 | 1165 | 990 | 779 |
| Merch. Struc. L. L. (5-6)..... | J&P-B&S |         | 1800 | 120(7) |     | 1300 | 1255 | 1202 | 1112 | 971 | 779 |
| Struc. SE&S L. L. (5).....     | J&P-B&S |         | 1800 | 120(7) |     | 1300 | 1255 | 1202 | 1112 | 971 | 779 |
| No. 1 Struc. L. L. (5).....    | J&P-B&S |         | 1600 | 120(7) | 455 | 1150 | 1119 | 1082 | 1020 | 922 | 779 |
| No. 1 Longleaf (5).....        | J&P(8)  |         | 1700 | 150    |     | 1400 | 1344 | 1278 | 1165 | 990 | 779 |
| No. 2 Longleaf (5).....        | J&P(8)  |         | 1250 | 100    |     | 1025 | 1003 | 977  | 934  | 865 | 764 |
| Sel. Struc. L. L. (5-6).....   | P&T     |         |      |        |     | 1750 | 1640 | 1509 | 1288 | 995 | 779 |
| Prime Struc. L. L. (5-6).....  | P&T     |         |      |        |     | 1400 | 1344 | 1278 | 1165 | 990 | 779 |
| Merch. Struc. L. L. (5-6)..... | P&T     |         |      |        |     | 1300 | 1255 | 1202 | 1112 | 971 | 779 |
| Struc. SE&S L. L. (5).....     | P&T     |         |      |        |     | 1300 | 1255 | 1202 | 1112 | 971 | 779 |
| No. 1 Struc. L. L. (5).....    | P&T     |         |      |        |     | 1150 | 1119 | 1082 | 1020 | 922 | 779 |

**TABLE No. 25-A—ALLOWABLE UNIT STRESSES—STRESS-GRADE LUMBER—Continued**  
Continuously Dry Location—Long-Time Loading

| Allowable Unit Stresses in Pounds per Square Inch |                          |                                                                    |                      |                                                      |                           |                                                                                                                  |        |        |        |        |        |        |        |        |        |
|---------------------------------------------------|--------------------------|--------------------------------------------------------------------|----------------------|------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1                                                 | 2                        | 3                                                                  | 4                    | 5(i)                                                 | 6                         | 7                                                                                                                |        |        |        |        |        |        |        |        |        |
| Species and commercial Grade (1)                  | Rules under which graded | Extreme fiber in bending "f" and tension parallel to grain (2) "f" | Horizontal shear "H" | Compression perpendicular to grain "c <sub>⊥</sub> " | Modulus of elasticity "E" | Compression parallel to grain (for solid columns and solid struts) for ratios of length-to-least-dimension (1/d) |        |        |        |        |        |        |        |        |        |
|                                                   |                          |                                                                    |                      |                                                      |                           | 1/d 11 or less "C" (2)                                                                                           | 1/d 14 | 1/d 17 | 1/d 20 | 1/d 23 | 1/d 26 | 1/d 30 | 1/d 35 | 1/d 40 | 1/d 50 |
| REDWOOD:                                          |                          |                                                                    |                      |                                                      |                           |                                                                                                                  |        |        |        |        |        |        |        |        |        |
| Dense Structural(5) --- J&P-B&S                   | Calif.                   | 1700                                                               | 110                  |                                                      |                           | 1450                                                                                                             | 1338   | 1208   | 986    |        |        |        |        |        |        |
| Heart Structural(5) --- J&P-B&S                   | Redwood                  | 1300                                                               | 95                   | 320                                                  | 1,200,000                 | 1100                                                                                                             | 1051   | 994    | 897    |        |        |        |        |        |        |
| Dense Structural(5) --- P&T                       | Assn.                    | ---                                                                | ---                  |                                                      |                           | 1450                                                                                                             | 1338   | 1208   | 986    | 746    | 583    | 438    | 322    | 247    |        |
| Heart Structural(5) --- P&T                       |                          | ---                                                                | ---                  |                                                      |                           | 1100                                                                                                             | 1051   | 994    | 897    |        |        |        |        | 158    |        |

- (1) ABBREVIATIONS: J&P, Joists & Planks; B&S, Beams & Stringers; P&T, Posts and Timbers; SE&S, Square Edge & Sound.  
 (2) When graded in accordance with par. 310 of Misc. Pub. 185 U. S. Dept. of Agr.  
 (3) When graded according to par. 310 of Misc. Pub. 185, U. S. Dept. of Agriculture and when the 1/d ratio is 11 or less.  
 (4) According to 1948 Standard Grading Rules.  
 (5) These grades meet requirements for density.  
 (6) These grades are based on requirements for heartwood.  
 (7) The grading rules provide a basis for obtaining higher shearing stresses of 140, 160 and 180 lbs. per sq. in. when specified.  
 (8) These grades are applicable to 2 inch thickness only.

**TABLE No. 25-B—HOLDING POWER OF BOLTS**  
Loads Parallel to Grain (P)

| Length of Bolt in Main Members in Inches* | DIAMETER OF BOLT IN INCHES |      |      |      |      |      |      |
|-------------------------------------------|----------------------------|------|------|------|------|------|------|
|                                           | ½                          | ⅝    | ¾    | ⅞    | 1    | 1⅝   | 1¾   |
| 1⅝                                        | 1000                       | 1260 | 1520 | 1780 | 2030 |      |      |
| 2⅝                                        | 1250                       | 1850 | 2380 | 2830 | 3260 |      |      |
| 3⅝                                        | 1260                       | 1970 | 2810 | 3520 | 4340 |      |      |
| 4½                                        | 1260                       | 1970 | 2830 | 3850 | 4870 | 5840 |      |
| 5½                                        |                            | 1970 | 2830 | 3850 | 5020 | 6290 |      |
| 6½                                        |                            | 1970 | 2830 | 3850 | 5030 | 6400 |      |
| 7½                                        |                            | 1970 | 2830 | 3850 | 5030 | 6400 |      |
| 9½                                        |                            |      | 2830 | 3850 | 5030 | 6400 | 7860 |
| 11½                                       |                            |      |      |      | 5030 | 6400 | 7860 |

\*This assumes American Lumber Standard dressed sizes.  
Safe loads on full sizes may be obtained by interpolation.

**TABLE No. 25-C—HOLDING POWER OF BOLTS**  
Loads Perpendicular to Grain (Q)

| Length of Bolt in Main Members in Inches* | DIAMETER OF BOLT IN INCHES |      |      |      |      |      |      |
|-------------------------------------------|----------------------------|------|------|------|------|------|------|
|                                           | ½                          | ⅝    | ¾    | ⅞    | 1    | 1⅝   | 1¾   |
| 1⅝                                        | 460                        | 500  | 560  | 620  | 680  |      |      |
| 2⅝                                        | 720                        | 830  | 910  | 1010 | 1100 |      |      |
| 3⅝                                        | 960                        | 1140 | 1260 | 1390 | 1520 |      |      |
| 4½                                        | 960                        | 1360 | 1570 | 1730 | 1880 | 2050 |      |
| 5½                                        |                            | 1360 | 1810 | 2110 | 2300 | 2510 |      |
| 6½                                        |                            | 1300 | 1820 | 2360 | 2700 | 2960 |      |
| 7½                                        |                            | 1220 | 1760 | 2340 | 2920 | 3400 |      |
| 9½                                        |                            |      | 1570 | 2200 | 2860 | 3640 | 4310 |
| 11½                                       |                            |      |      |      | 2690 | 3460 | 4220 |

\*This assumes American Lumber Standard dressed sizes.  
Safe loads on full sizes may be obtained by interpolation.

**TABLE No. 25-D—SAFE LATERAL RESISTANCE OF WOOD SCREWS**  
In Pounds Per Screw

| KIND OF WOOD                          | GAUGE OF SCREW |     |                           |     |     |     |     |
|---------------------------------------|----------------|-----|---------------------------|-----|-----|-----|-----|
|                                       | 12             | 14  | 16                        | 18  | 20  | 22  | 24  |
| Southern Pine and Douglas Fir (Coast) | 185            | 232 | 284                       | 342 | 406 | 473 | 546 |
| Other Species                         |                |     | As determined by Director |     |     |     |     |

**TABLE No. 25-E—SAFE RESISTANCE OF WOOD SCREWS TO WITHDRAWAL**  
When Inserted Perpendicular to Grain of Wood, in Pounds per  
Linear Inch of Screw

| KIND OF WOOD  | GAUGE OF SCREW             |     |     |     |     |
|---------------|----------------------------|-----|-----|-----|-----|
|               | 12                         | 16  | 20  | 22  | 28  |
| Southern Pine | 148                        | 184 | 220 | 238 | 292 |
| Douglas Fir   | 115                        | 142 | 170 | 184 | 226 |
| Other Species | As determined by Director. |     |     |     |     |

**TABLE No. 25-F—SAFE LATERAL STRENGTH OF COMMON WIRE NAILS**  
Inserted Perpendicular to the Grain of Wood in Pounds per Nail

| KIND OF WOOD                                             | SIZE OF NAIL               |     |     |     |     |     |     |     |     |     |
|----------------------------------------------------------|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                                                          | 6d                         | 8d  | 10d | 12d | 16d | 20d | 30d | 40d | 50d | 60d |
| Length of Nail                                           | 2"                         | 2½" | 3"  | 3¼" | 3½" | 4"  | 4½" | 5"  | 5½" | 6"  |
| Southern Pine<br>Pine or<br>Douglas Fir<br>Other Species | 63                         | 78  | 94  | 94  | 108 | 139 | 156 | 176 | 200 | 222 |
|                                                          | As determined by Director. |     |     |     |     |     |     |     |     |     |

**TABLE No. 25-G—SAFE RESISTANCE TO WITHDRAWAL OF COMMON WIRE NAILS**

Inserted Perpendicular to the Grain of the Wood, in Pounds per Linear  
Inch of Penetration into the Main Member

| KIND OF WOOD  | SIZE OF NAIL               |    |     |     |     |     |     |     |     |     |
|---------------|----------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
|               | 6d                         | 8d | 10d | 12d | 16d | 20d | 30d | 40d | 50d | 60d |
| So. Pine      | 41                         | 47 | 54  | 54  | 56  | 60  | 66  | 71  | 77  | 83  |
| Longleaf      |                            |    |     |     |     |     |     |     |     |     |
| So. Pine      |                            |    |     |     |     |     |     |     |     |     |
| Shortleaf     | 34                         | 38 | 43  | 43  | 46  | 49  | 53  | 58  | 62  | 68  |
| Douglas       | 29                         | 34 | 38  | 38  | 42  | 49  | 53  | 58  | 62  | 67  |
| Fir (Coast    |                            |    |     |     |     |     |     |     |     |     |
| Region)       |                            |    |     |     |     |     |     |     |     |     |
| Other Species | As determined by Director. |    |     |     |     |     |     |     |     |     |

**TABLE No. 25-H—WORKING STRESSES FOR PLYWOOD (DOUGLAS FIR)**  
 In bending, tension, and compression (except bearing and 45-degree stresses) consider only those plies with their grain direction parallel to the principal stress

| DRY LOCATION                                                                                                                   |           |            |                    |                 |           |
|--------------------------------------------------------------------------------------------------------------------------------|-----------|------------|--------------------|-----------------|-----------|
| Type of Stress                                                                                                                 | G2S       | G1S Marine | So2S Concrete Form | So1S Wall-board | Sheathing |
| Extreme fiber in bending (face plies parallel to span)<br>Tension (three-ply)* (parallel to grain of face plies)               | 2500      | 2375       | 2188               | 2000            | 1875      |
| Extreme fiber in bending (face plies perpendicular to span)<br>Tension (all thicknesses, perpendicular to grain of face plies) | 1875      | 1875       | 1875               | 1875            | 1875      |
| Compression, parallel to grain (three-ply only)*                                                                               | 1830      | 1735       | 1605               | 1460            | 1375      |
| Compression, perpendicular to grain                                                                                            | 1375      | 1375       | 1375               | 1375            | 1375      |
| Bearing or crushing (on face)                                                                                                  | 405       | 405        | 405                | 405             | 405       |
| Shear, rolling (in plane of plies)                                                                                             | 60        | 57         | 52½                | 48              | 45        |
| Shear (in plane perpendicular to panel and parallel or perpendicular to face grain)                                            | 240       | 228        | 210                | 192             | 180       |
| Shear (in plane perpendicular to panel and at 45-degrees to face grain)                                                        | 480       | 456        | 420                | 384             | 360       |
| Tension (45-deg. to grain)                                                                                                     | 470       | 470        | 470                | 470             | 470       |
| Compression (45-deg. to grain)                                                                                                 | 460       | 460        | 460                | 460             | 460       |
| Modulus of elasticity in bending                                                                                               | 1,600,000 | 1,600,000  | 1,600,000          | 1,600,000       | 1,600,000 |
| *For tension or compression, parallel to grain, in five-ply or thicker, use values for three-ply, but in next lower grade.     |           |            |                    |                 |           |

**\*DAMP OR WET LOCATION:**

Where moisture content will exceed sixteen percent, (16%) decrease by twenty per cent (20%) values shown for Dry Location for following properties:

Extreme Fiber in Bending, Tension and Compression both parallel and perpendicular to grain and at 45-degrees, and Bearing. (No change in values for shear or modulus of elasticity.)

Only exterior type plywood should be used where moisture content will exceed eighteen percent (18%).

## CHAPTER 26—REINFORCED CONCRETE (QUALITY AND DESIGN)

### ARTICLE 2601. QUALITY.

The quality of the materials used in concrete and the quality of concrete shall conform to the physical and chemical properties as specified in Articles 2604, 2605, and 2606.

### ARTICLE 2602. DESIGN.

The design of reinforced concrete shall conform to the rules and principles specified in this Chapter, except that designs conforming to "Building Code Requirements for Reinforced Concrete" (ACI 318), where not in conflict with the specific requirements of this Chapter, shall be deemed good engineering practice and complying with the requirements of this Code.

### ARTICLE 2603. DEFINITIONS.

The following definitions give the meaning of certain terms as used in this Chapter:

**Aggregate.** Inert material which is mixed with Portland cement and water to produce concrete.

**Column.** An upright compression member, the length of which exceeds three times its least lateral dimension.

**Column Capital.** An enlargement of the upper end of a reinforced concrete column designed and built to act as a unit with the column and flat slab.

**Column Strip.** A portion of a flat slab panel one-half panel in width occupying the two quarter-panel areas outside of the middle strip, and extending through the panel in the direction in which bending moments are being considered.

**Combination Column.** A column in which a structural steel section designed to carry the principal part of the load, is wrapped with wire and encased in concrete of such quality that some additional load may be allowed.

**Composite Column.** A column in which a steel or cast-iron section is completely encased in concrete containing reinforcement of spiral reinforcement and longitudinal bars.

**Concrete.** A mixture of Portland cement, fine aggregate, coarse aggregate and water.

**Deformed Bar.** Reinforcing bars with closely spaced shoulders, lugs or projections formed integrally with the bar during rolling so as to firmly engage the surrounding concrete. Wire mesh with welded intersections not farther apart than twelve inches (12") in the direction of the principal reinforcement, and with cross wires not smaller than No. 10 W. & M Gauge may be rated as a deformed bar.

**Diagonal Band.** A group of bars covering a width approximately 0.4 the average span, symmetrical with respect to the diagonal running from corner to corner of the panel of a flat slab.

**Direct Band.** A group of bars, covering a width approximately 0.4, symmetrical with respect to the center lines of the supporting columns of a flat slab.

**Dropped Panel.** The structural portion of a flat slab which is thickened throughout an area surrounding the column capital.

**Effective Area of Concrete.** The area of a section which lies between the centroid of the tensile reinforcement and the compression face of a slab or beam.

**Effective Area of Reinforcement.** The area obtained by multiplying the right cross sectional area of the metal reinforcement by the cosine of the angle between its direction and that for which the effectiveness of the reinforcement is to be determined.

**Flat Slab.** A concrete slab reinforced in two or more directions, generally without beams or girders to transfer the loads to supporting columns.

**Guniting.** Same as Pneumatically Placed Concrete, which see.

**Laitance.** Extremely fine material of little or no hardness which may collect on the surface of freshly deposited concrete or mortar, resulting from the use of excess mixing water and usually recognized by its relatively light color.

**Middle Strip.** A portion of a flat slab panel, one-half panel in width, symmetrical with respect to the panel center line and extending through the panel in the direction in which bending moments are being considered.



**Mortar.** A mixture of Portland cement, fine aggregate and water.

**Negative Reinforcement.** Reinforcement so placed as to take tensile stress due to negative bending moment.

**Paneled Ceiling.** The ceiling of a flat slab in which approximately the portion of the area enclosed within the intersection of the two middle strips is reduced in thickness.

**Panel Length.** The distance along a panel side from center of columns to a flat slab.

**Pedestal.** An upright compression member whose height does not exceed three times its least lateral dimension.

**Plain Concrete.** Concrete without metal reinforcement, or reinforced only for shrinkage or temperature changes.

**Pneumatically Placed Concrete.** A mixture of Portland cement and fine aggregate, mixed dry, passed through a cement gun, or other similar device hydrated at the nozzle and deposited under pressure in its place of final repose. It shall be considered as concrete for particulars of design as specified in this Chapter.

**Portland Cement.** The product obtained by finely pulverizing clinker produced by calcining to incipient fusion an intimate and properly proportioned mixture of argillaceous and calcareous materials, with no additions subsequent to calcination excepting water and calcined or uncalcined gypsum.

**Positive Reinforcement.** Reinforcement so placed as to take tensile stress due to positive bending moment.

**Ratio of Reinforcement.** The ratio of the effective area of the reinforcement cut by a section of a beam or slab to the effective area of the concrete at that section.

**Reinforced Concrete.** Concrete in which metal other than that provided for shrinkage or temperature changes is embedded in such a manner that the two materials act together in resisting forces.

**Surface Water.** The water carried by the aggregate except that held by absorption within the aggregate particles themselves.

**Two-Way Slab.** A concrete slab reinforced in two directions and supported on four sides.

#### ARTICLE 2604. MATERIALS.

(a) **Portland Cement.** Portland cement shall conform to the "Standard Specifications for Portland Cement" (A. S. T. M.)

(b) **Concrete Aggregate.** Concrete aggregates, except lightweight aggregates, shall conform to the "Standard Specifications for Concrete Aggregates" (A. S. T. M.), including the methods of sampling and testing.

Lightweight aggregates for concrete shall conform to the "Standard Specifications for Lightweight Aggregates for Concrete" (A. S. T. M.), including the methods of sampling and testing.

Aggregates that do not meet the above specifications and that have been shown by test or actual service to produce concrete of the required strength, durability, water-tightness and wearing qualities, may be used under the provisions of Article 2606, Method 2, where authorized by the Director.

The maximum size of the aggregate shall be not larger than one-fifth ( $\frac{1}{5}$ ) of the narrowest dimension between the forms of the member for which the concrete is to be used, nor larger than three-fourths ( $\frac{3}{4}$ ) of the minimum clear spacing for reinforcing bars.

(c) **Water.** Water used in mixing concrete shall be clean and free from injurious amounts of oil, acid, alkali, organic matter or other harmful substances.

(d) **Metal Reinforcement.** Metal reinforcement shall conform to the requirements of "Standard Specifications for Billet-Steel Bars for Concrete Reinforcement" (A. S. T. M.), or "Standard Specifications for Rail Steel Bars for Concrete Reinforcements" (A. S. T. M.), or "Standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement" (A. S. T. M.), or "Standard Specifications for Axle Steel Bars for Concrete Reinforcement" (A. S. T. M.)

All reinforcement bars lacking grade identification marks shall on delivery

be accompanied by a manufacturer's guarantee of grade which will identify variations.

Deformed bars, to receive that rating which permits the use of bond stresses higher than those allowed for plain bars, shall show a bend strength of twenty-five per cent (25%) greater than shown by plain bars of equivalent cross-sectional area.

(e) **Storage.** Storage of cement and aggregates shall be in a manner to prevent deterioration or the intrusion of foreign matter. Any material which has been damaged shall be immediately and completely removed from the work.

#### ARTICLE 2605. TESTS.

(a) **General.** On concrete or reinforced concrete work, the Director shall have the right to require the owner or his agent to make tests of the concrete and other materials from time to time to determine whether the materials and methods in use are such as to produce concrete or reinforced concrete of the quality specified and used in the design of the building or structure. The tests shall be made, when ordered by the Director, by the owner or his authorized representative, and no responsibility for the expense of these tests shall attach to the Parish of Jefferson, La. All such tests shall be made by an approved agency, and copies of the results shall be kept on file in the office of the Director for a period of not less than two (2) years after the acceptance of the structure. Specimens for concrete cylinder tests shall be taken at the place where the concrete is being deposited and shall be taken, cured and tested in accordance with the "Standard Method of Making and Storing Specimens of Concrete in the Field", A. S. T. M.

(b) **Load Tests.** The Director shall have the right to order the test under load of any portion of a completed structure, when the conditions have been such as to leave reasonable doubt as to the adequacy of the structure to serve the purpose for which it is intended.

When a load test is required, the member or portion of the structure under consideration shall be subject to a superimposed load equal to one and one-half times the live load plus one-half of the dead load. This load shall be left in position for a period of twenty-four (24) hours before removal. If, during the test, or upon removal of the load, the member or portion of the structure shows evident failure, such changes or modifications as are necessary to make the structure adequate for the rated capacity shall be made; or where lawful, a lower rating shall be established. The structure shall be considered to have passed the test if the maximum deflection at the end of the twenty-four (24) hour period does not exceed the value of  $D$  as given by the following:

$$D = \frac{.001 L^2}{12t} \dots\dots\dots (1)$$

#### WHERE:

$L$  is the span,  $t$  is the total depth of the slab or beam and  $D$  is the maximum deflection—all expressed in the same units.

If the deflection exceeds the value of  $D$  as given in Formula (1), the construction shall be considered to have passed the test if within twenty-four (24) hours after the removal of the load, the slabs or beams show a recovery of at least seventy-five per cent (75%) of the observed deflection.

#### ARTICLE 2606. QUALITY OF CONCRETE.

(a) **General.** For the design of concrete structures, the value of  $f'$ , used for determining the working stresses as stipulated in Article 2613 shall be based on the specified minimum ultimate 28-day compressive strength of the concrete, or on the specified minimum ultimate compressive strength at the earlier age at which the concrete may be expected to receive its full load. All plans, submitted for approval or used on the job shall clearly show the assumed strength of concrete at a specified age for which all parts of the structure were designed.

All concrete exposed to freezing and thawing weather shall have a minimum ultimate 28-day compressive strength of not less than 3000 pounds per square inch. All other concrete shall have a minimum compressive strength of 2000 pounds per square inch.

The determination of the proportions of cement, aggregate and water to attain the required strengths shall be made by one of the following methods:

##### (b) **Strength-Quality of Materials.**

1. **Concrete Made from Average Materials.** When no preliminary tests of the materials to be used are made, the water-content per sack of cement shall not exceed the values in Table No. 26-A. Method 2. shall be employed when artificial aggregates or admixtures are used.

Method 2. Controlled Concrete. Proportions of the materials and water content, other than those shown in Table No. 26-A may be used provided the strength-quality of the materials proposed for use in the structure shall be established by tests which shall be made in advance of the beginning of operations, using the consistencies suitable for the work and in accordance with the "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders", (A. S. T. M.).

A curve representing the relation between the water-content and the average 28-day compressive strength or earlier strength at which the concrete is to receive its full working load, shall be established for a range of values including all the compressive strengths called for on the plans. The curve shall be established by at least three points, each point representing average values from at least four test specimens. The water-content used in the concrete for the structure as determined from the curve, shall correspond to a strength which is fifteen per cent (15%) greater than that called for on the plans. No substitutions shall be made in the materials used on the work without additional tests in accordance herewith to show that the quality of the concrete is satisfactory.

#### ARTICLE 2607. PROPORTIONS AND CONSISTENCY.

The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing employed on the work, but without permitting the materials to segregate or excess free water to collect on the surface. The combined aggregates shall be of such composition of sizes that when separated on the No. 4 standard sieve, the weight passing the sieve (fine aggregate) shall be not less than thirty per cent (30%), nor greater than fifty per cent (50%) of the total, unless otherwise required by the Director, except that the proportions do not necessarily apply to lightweight aggregates.

Measurement of materials for ready mixed concrete shall conform to the "Standard Specifications for Ready Mixed Concrete." (A. S. T. M.).

Admixtures of lime or finely pulverized inert materials may be added but not in excess of six per cent (6%) by volume of the cement used.

#### ARTICLE 2608. CONTROL OF PROPORTIONS.

The methods of measuring concrete materials shall be such that the proportions of all materials can be accurately controlled during the progress of the work and easily checked at any time by the Director, or his authorized representative. A tolerance of one fourth gallon of water per sack of cement in any batch of concrete will be allowed, provided that the average of any 10 consecutive batches does not show a water-content greater than that shown in Table No. 26-A, and on plans as specified in Article 2606.

The method of delivering the aggregates to the work and of storing and handling shall be such that the moisture content of the aggregates as they come to the mixer shall not be subject to frequent or unnecessary changes.

#### ARTICLE 2609. MIXING AND PLACING CONCRETE.

(a) **Mixing.** The concrete shall be mixed until there is a uniform distribution of the materials and the mass is uniform in color and homogeneous. In the machine mixing, only batch mixers shall be used. Each batch shall be mixed not less than one minute after all the materials are in the mixer and must be discharged completely before the mixer is recharged. Machine mixers shall have a peripheral speed of approximately two hundred feet (200') per minute.

Ready mixed concrete shall be mixed and delivered in accordance with the requirements set forth in the "Standard Specifications for Ready Mixed Concrete." (A. S. T. M.).

(b) **Cleaning Forms and Equipment.** Before concrete is placed all equipment for mixing and transporting the concrete shall be cleaned, all debris shall be removed from the spaces to be occupied by the concrete, forms shall be thoroughly wetted (except in freezing weather) or oiled and masonry that will be in contact with concrete shall be well drenched (except in freezing weather). Reinforcement shall be thoroughly cleaned and secured in position. Concrete shall not be placed until the forms and reinforcement have been inspected and approved by the Director.

(c) **Removal of Water from Evacuations.** Water shall be removed from excavations before concrete is deposited, unless otherwise directed by the Director. Any flow of water into an excavation shall be diverted through proper side drains to a sump, or be removed by other approved methods which will avoid washing

the freshly deposited concrete. Watervent pipes and drains shall be filled by grouting or otherwise, after the concrete has hardened thoroughly.

(d) **Transporting Concrete.** Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which shall prevent the separation or loss of the ingredients. It shall be deposited as nearly as practicable in its final position to avoid rehandling or flowing. Under no circumstances shall concrete that has attained its initial set be used.

Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery and without separation of the materials.

(e) **Placing.** Concrete shall be thoroughly compacted with suitable tools. When necessary, openings shall be provided in the forms to permit the placing of concrete in such a manner as to avoid accumulations of hardened concrete on the forms or reinforcing bars. The concrete shall be thoroughly worked around the reinforcement.

(f) **Curing.** Exposed surfaces of concrete shall be kept moist for a period of at least seven (7) days after being deposited for ordinary cement, and three (3) days for high early-strength cement.

(g) **Depositing in Cold Weather.** Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during freezing or near-freezing weather. No frozen materials, or materials containing ice, shall be used.

All concrete materials and all reinforcement, forms, fillers, and ground with which the concrete is to come in contact, shall be free from frost. Wherever the temperature of the surrounding air is below 40-degrees Fahrenheit, all concrete when placed in the forms shall have a temperature of between 60 and 90 degrees Fahrenheit, and shall be maintained at a temperature of not less than 50-degrees Fahrenheit for at least seventy-two (72) hours for normal concrete, or twenty-four (24) hours for high early-strength of curing of the concrete. The housing, covering or other protection used in connection with curing shall remain in place and intact for at least twenty-four (24) hours after the artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for the prevention of freezing. Manure, when used for protection, shall not be applied directly to concrete.

(h) **Bonding Fresh and Hardened Concrete.** Before new concrete is deposited on or against concrete which has set, the forms shall be retightened, the surface of the set concrete shall be roughened, cleaned of foreign matter and laitance, and thoroughly wetted but not saturated. The clean and wetted surfaces of the hardened concrete, including vertical and inclined surfaces, shall be slushed with a coating of neat grout against which the new concrete shall be placed before the grout has attained its set. For walls and columns the grout may be omitted on the horizontal surfaces, but a layer of mortar having the composition of the mortar in the concrete shall be placed before resuming concreting.

#### **ARTICLE 2610. FORMS AND DETAILS OF CONSTRUCTION.**

(a) **Design of Forms.** Forms shall conform to the shape, lines and dimensions of the member as called for on the plans and shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape. If adequate foundation for shores cannot be secured, trussed supports shall be provided.

Temporary openings shall be provided at the base of column and wall forms, and at other points where necessary, to facilitate cleaning and inspection.

(b) **Removal of Forms.** Forms shall not be disturbed until the concrete has hardened sufficiently to permit their removal with safety. Shoring shall not be removed until the member has acquired sufficient strength to support safely its own weight and the load upon it. Members subject to additional loads during construction shall be adequately shored to support both the member and construction loads in a manner that will protect the member from damage.

The Director may require forms to remain in place for a specified time.

(c) **Cleaning and Bending Reinforcement.** Metal reinforcement at the time concrete is placed, shall be free from rust scale or other coatings that will destroy or reduce the bond. Bends for stirrups and ties shall be made around a pin having a diameter not less than two (2) times the minimum thickness of the bar. Bends for other bars, except hooks, shall be made around a pin having a diameter not less than six (6) times the minimum thickness of the bar, except that for bars larger than one inch (1") the pin shall be not less than eight (8) times the minimum thickness of the bar. All bars shall be bent cold.

(d) **Placing Reinforcement.** Metal reinforcement shall be accurately placed and secured and shall be supported by chairs, spacers or hangers. The minimum clear distance between parallel bars shall be one and one-half ( $1\frac{1}{2}$ ) times the diameter for round bars, or two (2) times the side dimension for square bars. The minimum clear distance between bars and forms shall be the diameter of round bars and one and one-half ( $1\frac{1}{2}$ ) times the dimension of square bars. If the ends of bars are anchored as specified in Article 2618 (c), the clear spacing may be made equal to the diameter of round bars, or to one and one-half ( $1\frac{1}{2}$ ) times the dimension of square bars, but in no case shall the spacing between bars be less than one inch (1"), nor less than one and one-third ( $1\frac{1}{3}$ ) times the maximum size of the coarse aggregate. Bars shall be imbedded a distance from any face of any member not less than the minimum distance as specified in Article 4301.

When wire or other reinforcement, not exceeding one-fourth inch ( $\frac{1}{4}$ ") in diameter is used as reinforcement for slabs not exceeding ten feet (10') in span, the reinforcement may be curved from a point near the top of the slab over the support to a point near the bottom of the slab at mid-span; provided such reinforcement is either continuous over, or securely anchored to the support.

(e) **Splices and Offsets in Reinforcement.** In slabs, beams and girders, splices of reinforcement shall not be made at points of maximum stress without the approval of the Director. Splices, where permitted, shall provide sufficient lap to transfer the stress between bars by bond and shear. In such splices the bars shall be spaced at the minimum distance specified in paragraph (d) of this Article.

Where changes in the cross section of a column occur, the longitudinal bars shall be offset in a region where lateral support is afforded. Where offset, the slope of the inclined portion shall not be more than one in six, and in the case of tied columns, the ties shall be spaced not over three inches (3") on centers for a distance of one foot (1') below the actual point of offset.

(f) **Protective Covering of Concrete.** At the under side of footings metal reinforcement shall have a minimum covering of three inches (3") of concrete.

If fire-resistive construction, metal reinforcement shall be protected as specified in Article 4301.

Exposed reinforcement bars intended for bonding with future extensions shall be protected from corrosion.

(g) **Construction Joints.** Joints not indicated on the plans shall be so made and located as to least impair the strength of the completed structure. Where a joint is to be made, any excess water and laitance shall be removed from the surface after concrete is deposited. Before depositing of concrete is resumed the hardened surface shall be treated as specified in paragraph (h) of Article 2609.

At least two (2) hours must elapse after concrete is deposited in the columns or walls before depositing in beams, girders, or slabs supported thereon. Haunches and column capitals shall be considered as part of, and to act continuous with, the floor.

Construction joints in floors shall be located near the middle spans of slabs, beams or girders, unless a beam intersects a girder at this point, in which case the joints in the girders shall be offset a distance equal to twice the width of the beam. Provision shall be made for shear by use of reinforcement, inclined in both directions across the joint.

Pipes which will contain liquid, gas or vapor at other than room temperature shall not be embedded in concrete necessary for structural stability or fire protection. Drain pipes and pipes whose contents will be under pressure greater than atmospheric pressure by more than one pound (1 lb.) per square inch shall not be embedded in structural concrete except in passing through from one side to the other of a floor, wall or beam. Electric conduits and other pipes whose embedment is allowed shall not, with their fittings, displace that concrete of a column on which stress is calculated or which is required for fire protection, to greater extent than four per cent (4%) of the area of the cross section. Sleeves or other pipes passing through floors, walls or beams shall not be of such size or in such location as to unduly impair the strength of the construction; such sleeves or pipes may be considered as replacing structurally the displaced concrete, provided they are not exposed to rusting or other deterioration, are of uncoated iron or steel not thinner than standard wrought-iron pipe, have a nominal inside diameter not over two inches (2") and are spaced not less than three (3) diameters on centers. Embedded pipes, or conduits, other than those merely passing through, shall not be larger in outside diameter than one-third ( $\frac{1}{3}$ ) the thickness of the slab, wall or beam in which they are embedded; shall not be spaced closer than three (3) diameters on centers, nor so located as to unduly impair the strength of the construction. Circular uncoated or galvanized

electric conduit of iron or steel may be considered as replacing the displaced concrete.

#### ARTICLE 2611. ASSUMPTION FOR DESIGN.

The design of reinforced concrete members, shall be made with reference to working stresses and safe loads. The accepted theory of flexure as applied to reinforced concrete shall be applied to all members resisting bending. The following assumptions shall be made:

1. The steel takes all the tensile stress.
2. In determining the ratio ( $n$ ) for design purposes the modulus of elasticity for the concrete shall be taken as  $1000f'_c$ , and that for steel at 30,000,000 pounds per square inch.

#### ARTICLE 2612. SYMBOLS AND NOTATIONS.

The symbols and notations used in these regulations are defined as follows:

- $a$  = Width of face of column or pedestal
- $\alpha$  = Angle between inclined web bars and axis of beam.
- $A$  = Total area of top of pedestal, pier or footing at the column base; the span length between opposite supports in one direction (floors and supports on four sides).
- $A'$  = Loaded area of pedestal, pier, or footing at the column base.
- $A_s$  = Area of core of a spirally-reinforced column measured to the outside of the spiral; net area of concrete section of a composite column.
- $A_g$  = The overall or gross area of spirally-reinforced or tied columns; the total area of the concrete encasement of combination columns.
- $A_r$  = Area of the steel or cast iron core of a composite column; the area of the steel core in a combination column.
- $A_e$  = Effective cross-sectional area of reinforcement in tension in beams or in compression in columns; the effective cross-sectional area of reinforcement which crosses any of the principal design sections of a flat slab.
- $A_w$  = Total area of web reinforcement in tension within a distance of  $s$ , or the total area of all bars bent up in any one plane.
- $b$  = Width of rectangular beam or width of flange of T-beam.
- $b'$  = Thickness of web in beams or I or T sections.
- $b_1$  = Dimension of the dropped panel of a flat slab in the direction parallel to  $l_1$ .
- $C$  = Moment co-efficient for two-way slabs as set forth in Table No. 26-C.
- $c$  = Diameter, in fact, of column capital of a flat slab at the underside of the slab, or dropped panel. No portion of the column capital shall be considered for structural purposes which lies outside of the largest 90° cone that can be included within the outlines of the column capital; distance from gravity axis to extreme fiber in compression (in a column).
- $d$  = Depth from compression face of beam or slab to center of longitudinal tensile reinforcement; the least lateral dimension of a concrete column; the diameter of round bar or side of a square bar.
- $D$  = Deflection of a floor member under test load.
- $e$  = Eccentricity of the resultant load on a column, measured from the gravity axis.
- $E_c$  = Modulus of elasticity of concrete in compression.
- $E_s$  = Modulus of elasticity of steel in tension or compression (30,000,000 lbs. per sq. in.).
- $f_c$  = Compressive unit stress in extreme fiber of concrete in flexure or axial compression in concrete columns.
- $f'_c$  = Ultimate compressive strength of concrete usually at age of 28 days. (See Article 2606).
- $f_r$  = Permissible unit stress in the metal core of a complete column.
- $f'_r$  = Permissible unit stress on unencased steel columns and pipe columns.
- $f_s$  = Tensile unit stress in longitudinal reinforcement; nominal working stress in vertical column reinforcement.

- $f'_s$  = Useful limit stress of spiral reinforcement.  
 $f_s$  = Tensile unit stress in web reinforcement.  
 $h$  = Unsupported length of column.  
 $I$  = Moment of inertia of a section about the neutral axis for bending.  
 $j$  = Ratio of distance between centroid of compression and centroid of tension to the depth ( $d$ ).  
 $K$  = Least radius of gyration of a metal pipe section (in pipe columns); the stiffness factor, that is, the moment of inertia divided by the span (floors with supports on four sides).  
 $l$  = Span length of beam or slab; span length of flat slab (usually expressed in feet) center to center of columns in the direction in which moments are considered (See Article 2619).  
 $l_1$  = Span length of flat slab panel center to center of column perpendicular to the rectangular direction in which moments are considered.  
 $l'$  = Clear span for positive moment and the average of the two adjacent clear spans for negative moment (See Article 2614 (a)).  
 $L$  = Span of member under load test (See Article 2605).  
 $M$  = Bending moment or moment of resistance in general.  
 $M_f$  = Bending moment in foot-pounds per foot of width for two-way slabs.  
 $M_o$  = Sum of positive and negative bending moments at the principal design sections of a panel of a flat slab.  
 $m$  = Ratio of short span to long span for two-way slabs.  
 $n$  = Ratio of modulus of elasticity of steel to that of concrete =  $\frac{E_s}{E_c}$   
 $N$  = The sum of the lengths of those edges of panel AB supporting continuous adjacent spans (floors with supports on four sides).  
 $\Sigma_o$  = Sum of perimeters of bars in one set.  
 $p$  = Ratio of effective area of tensile reinforcement to effective area of concrete in beams.  
 $p_o$  = Ratio of effective cross-sectional area of vertical reinforcement to the gross area  $A_g$  (See Article 2620).  
 $p'$  = Ratio of volume of spiral reinforcements to the volume of the concrete core (out to out of spirals) of a spirally reinforced concrete column.  
 $P$  = Total allowable axial load on a column whose length does not exceed 10 times its least cross-sectional dimension.  
 $P'$  = Total allowable axial load on a long column.  
 $r_s$  = Permissible unit working stress in concrete over the loaded area of a pedestal, pier or footing.  
 $R$  = Least radius of gyration of a section; ratio of gross area to core area of a spirally-reinforced concrete column,  $\frac{A_g}{A_c}$   
 $s$  = Spacing of stirrups or of bent bars in a direction parallel to that of the main reinforcement.  
 $t$  = Thickness of the flange of T-beams; the total thickness or depth of a member under load test.  
 $t_1$  = Thickness of flat slab without dropped panels; or the thickness of flat slabs, including dropped panels where such are used.  
 $t_2$  = Thickness of flat slabs with dropped panels at points outside the dropped panel.  
 $t_3$  = Total thickness of slab (floors supported on four sides).  
 $u$  = Bond stress per unit of surface area of bar.  
 $v$  = Shearing unit stress.  
 $v_o$  = Unit shearing stress permitted on the concrete of the web.  
 $V$  = Total shear.  
 $V'$  = Excess of the total shear over that permitted on the concrete.  
 $w$  = Uniformly distributed load per unit of length of beam or slab.

$w'$  = Uniformly distributed dead and live load per unit of area of a floor or roof.

$W$  = Total dead and live load uniformly distributed over a single panel area.

## ARTICLE 2613. WORKING STRESSES.

(a) **Allowable Unit Stresses in Concrete.** As specified in Article 2606, the structural drawings and plans shall show the ultimate strength of concrete for which the several parts of the structures were designed. The working stresses for the design of buildings or structures shall be based on the ultimate strength indicated on the drawings as specified in Article 2606 and shall be in the ratios specified in this Chapter. The ultimate strength ( $f'_c$ ) shall be the average strength attained at twenty-eight (28) days, based on six inch by twelve inch (6" x 12") or eight inch by sixteen inch (8" x 16") cylinders made, cured and tested in accordance with the "Standard Methods of Making and Curing Concrete Compression and Flexure Test Specimens in the Field." (A. S. T. M.), and "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders" (A. S. T. M.).

Test cylinders of pneumatically placed concrete shall be made in a manner that will permit the blast of air to compact firmly the materials and provide proper escapement of the air to eliminate possible back pressure, and such cylinders shall be cured and tested as specified above.

The unit stresses in pounds per square inch on concrete to be used in the design shall not exceed the values shown in Table No. 26-B where  $f'_c$  equals the minimum ultimate compressive strength at 28 days.

(b) **Allowable Unit Stresses in Reinforcement.** The following unit stresses in reinforcing steel shall not be exceeded:

### TENSION:

|                                                                                                                                                                                                                                                                                         |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Intermediate grade billet steel.....                                                                                                                                                                                                                                                    | ( $f_s$ ) = 20,000 p. s. i. |
| Rail steel bars.....                                                                                                                                                                                                                                                                    | ( $f_s$ ) = 20,000 p. s. i. |
| Web reinforcement.....                                                                                                                                                                                                                                                                  | ( $f_s$ ) = 20,000 p. s. i. |
| Structural steel shape.....                                                                                                                                                                                                                                                             | ( $f_s$ ) = 18,000 p. s. i. |
| Wire mesh or other steel reinforcement not exceeding one-fourth inch ( $\frac{1}{4}$ ") in diameter (used in one-way slabs), fifty per cent (50%) of the minimum yield point is established by the A. S. T. M. Standards for the particular grade of steel used; but not to exceed..... | ( $f_s$ ) = 30,000 p. s. i. |

### COMPRESSION:

|                                                    |                 |
|----------------------------------------------------|-----------------|
| Structural steel section in composite columns..... | 16,000 p. s. i. |
| Cast-iron section in composite columns.....        | 10,000 p. s. i. |

**Note:** If special conditions require the use of billet-steel concrete reinforcement bars of structural or hard grades, the allowable unit stress shall not exceed 18,000 p. s. i. for structural grade nor 20,000 p. s. i. for hard grade bars.

(c) **Wind Load Stresses.** For combined stresses due to wind and other loads, the allowable unit stresses may be increased thirty-three and one-third per cent ( $33\frac{1}{3}\%$ ) in excess of the values specified in this Article. In no case shall the section be less than required if the wind stresses be neglected.

## ARTICLE 2614. FLEXURAL COMPUTATIONS.

All members shall be designed to resist at all sections the maximum bending moments and shears produced by dead load, live load and other loads, as determined by the principle of continuity. In the case of approximately equal spans with loads uniformly distributed, where the intensity of live load does not exceed three times the intensity of dead load, this is satisfied essentially by the following values:

Negative moment at face of first interior support;

For beams and girders and for slabs exceeding ten feet (10'):

|                     |                |         |
|---------------------|----------------|---------|
| Two spans           | $\frac{1}{8}$  | $wl'^2$ |
|                     | 8              |         |
| More than two spans | $\frac{1}{10}$ | $wl'^2$ |
|                     | 10             |         |



For slabs not exceeding ten feet (10') in span:

|                                                     |                       |
|-----------------------------------------------------|-----------------------|
|                                                     | 1                     |
| Two spans                                           | $\frac{1}{10} w l'^2$ |
|                                                     | 1                     |
| More than two spans                                 | $\frac{1}{12} w l'^2$ |
| Negative moment at face of other interior supports: | $\frac{1}{12} w l'^2$ |
|                                                     | 1                     |
| Positive moment at center of span:                  | $\frac{1}{10} w l'^2$ |
| End spans                                           | $\frac{1}{12} w l'^2$ |
| Interior spans                                      | $\frac{1}{12} w l'^2$ |
| Shear in end members at first interior support      | $1.20 \frac{w l'}{2}$ |
| Shear at other supports                             | $\frac{w l'}{2}$      |

For the purpose of applying this method "approximately" shall be construed to mean that the longer of two adjacent spans shall not exceed the shorter by more than twenty per cent (20%). In these expressions  $l'$ —the clear span for positive moments and the average of the two adjacent clear spans for negative moment.

(a) **Permissible Assumptions.** The span length of freely supported beams and slabs shall be the clear span plus the depth of beam or slab, but shall not exceed the distance between centers of the supports.

In the application of the principle of continuity, the following assumptions should be permissible:

1. Consideration may be limited to combinations of dead load on all spans with full live load on two adjacent spans and with full live load on alternate spans.

2. Any reasonable and consistent assumption may be made as to the relative stiffness of the floor construction and columns. In computing the relative stiffness of floors to columns, the value ( $I$ ) of the floor members may be based on the entire concrete section neglecting the reinforcement, and that of columns on the entire concrete section plus the transformed steel section. The moment of inertia assumed for the columns in computing bonding moments must also be used in computing stresses.

3. The far ends of columns above and below the floor under consideration may be considered fixed.

4. When members are deepened near their ends by haunches they may be analyzed as members of constant section provided the minimum depth is used throughout in computing stresses due to bonding; otherwise, a complete analysis is required. Where members are widened near their supports the additional width may be neglected in computing moments but may be used in computing stresses.

Additional section at the end may in any case be utilized in resisting shear if properly reinforced.

5. Where slabs of uniform thickness are built integrally with their supports, the span length may be taken equal to the clear span between faces of supports and the width of support otherwise neglected.

6. In the application of the principle of continuity, center to center distances may be used in the moment determination of all members.

Moments prevailing at the faces of support may be used to proportion the members at those sections.

7. In slabs other than ribbed floor construction or flat slabs, the principal reinforcement shall not be spaced farther apart than three times the slab thickness.

8. All beams except cantilevers shall have positive reinforcement of not less than .005  $b'd$ .

9. Not less than .005  $b'd$  of negative reinforcement shall be provided at the outer end of members built integrally with their supports.

10. Where analysis indicates negative reinforcement along the full length of

a span, the reinforcement need not be extended beyond the point where the required amount is .0025 b'd or less.

11. In slabs of uniform thickness the minimum amount of reinforcement in the direction of principal stress shall be:

For structural, intermediate and hard grades and rail steel.....0025 bd

For steel having a minimum yield point of 56,000 lb. per sq. in..... .002 bd

(b) Distance Between Lateral Supports. The clear distance between lateral supports of a beam shall not exceed 32 times the least width of compression flange.

(c) Depth of Beam or Slab. The depth of the beam or slab shall be taken as the distance from the centroid of the tensile reinforcement to the compression face of the structural members. Any floor finish not placed monolithically with the floor slab shall not be included as a part of the structural member. When the finish is placed monolithically with the structural slab in buildings of the warehouse or industrial class, the over-all depth shall be at least one-half inch ( $\frac{1}{2}$ " ) over that required by the design of the member.

(d) Requirements for T-Beams. 1. In T-beam construction the slab and beam shall be built integrally or otherwise effectively bonded together. The effective flange width to be used in the design of symmetrical T-beams shall not exceed one-fourth of the span length of the beam, and its overhanging width on either side of the web shall not exceed eight times the thickness of the slab nor one-half the clear distance to the next beam.

2. For beams having a flange on one side only, the effective overhanging flange width shall not exceed one-twelfth of the span length of the beam, nor six times the thickness of the slab, nor one-half the clear distance to the nearest beam.

3. Where the principal reinforcements in a slab which is considered as the flange of a T-beam (not a rib in ribbed floors) is parallel to the beam, transverse reinforcement shall be provided in the top of the slab. This reinforcement shall be designed to carry the load on the portion of the slab assumed as the flange of the T-beam. The spacing of the bars shall not exceed five times the thickness of the flange, nor in any case eighteen inches (18").

4. Provisions shall be made for the compressive stress at the support in continuous T-beam construction, care being taken that the provisions of Article 2610 relative to the spacing of bars, and Article 2609 (e), relating to the placing of concrete shall be fully met.

5. The overhanging portion of the flange of the beam shall not be considered as effective in computing the shear and diagonal tension resistance of T-beams.

6. Isolated beams in which the T-form is used only for the purpose of providing additional compression area, shall have a flange thickness not less than one-half the width of the web and a total flange width not more than four times the web thickness.

(e) One-Way Ribbed Floor Construction. 1. Ribbed floor construction consists of concrete ribs and slabs placed monolithically with or without burned clay or concrete tile fillers. The ribs shall not be farther apart than thirty inches (30") face to face. The ribs shall be straight, not less than four inches (4") wide, nor of a depth more than three times the width.

2. When burned clay or concrete tile fillers, of material having a unit compressive strength at least equal to that of the designed strength of the concrete in the ribs, are used, and the fillers are so placed that the joints in alternate rows are staggered, the shells of the fillers in contact with the ribs may be included in the calculations involving shear or negative bending moment. No other portion of the fillers may be included in the design calculations.

3. The concrete slab over the fillers shall be not less than one and one-half inches ( $1\frac{1}{2}$ " ) in thickness, nor less in thickness than one-twelfth of the clear distance between ribs. Shrinkage reinforcement in the slab shall be provided as required in Article 2615.

4. Where removable forms or fillers not complying with (2) are used, the thickness of the concrete slab shall not be less than one-twelfth ( $1/12$ ) of the clear distance between ribs and in no case less than two inches (2"). Such slab shall be reinforced at right angles to the ribs with a minimum of .049 square inches of reinforcing steel per foot of width, and in slabs on which the prescribed live load does not exceed 50 pounds per square foot no additional reinforcement will be required.

5. When the finish used as a wearing surface is placed monolithically with the structural slab in buildings of the warehouse or industrial class, the thick-

ness of the concrete over the fillers shall be one-half inch ( $\frac{1}{2}$ " ) greater than the thickness used for design purposes.

6. Where the slab contains conduits or pipes, the thickness shall be not less than one inch (1") plus the total over-all depth of such conduits or pipes at any point. Such conduits or pipes shall be so located as not to impair the strength of construction.

(f) **Compression Steel in Flexural Members.** Compression steel in beams, girders, or slabs shall be anchored by ties or stirrups not less than one-fourth inch ( $\frac{1}{4}$ " ) in diameter, spaced no farther apart than 16 bar diameters or 48 tie diameters. Such ties or stirrups shall be used throughout the distance where compression steel is required.

The effectiveness of compression reinforcement in resisting bending may be taken at twice the value indicated from calculations assuming a straight line relation between stress and strain and the modular ratio given in Article 2611, but not of greater value than the allowable stress in tension.

#### ARTICLE 2615. SHRINKAGE AND TEMPERATURE REINFORCEMENT.

Reinforcement for shrinkage and temperature stresses normal to the principal reinforcement shall be provided in floor and roof slabs where the principal reinforcement extends in one direction only. Such reinforcement shall provide for the following minimum ratios of reinforcement area to concrete area ( $bd$ ), but in no case shall such reinforcing bars be placed farther apart than five times the slab thickness nor more than eighteen inches (18").

|                                                                                                                                     |        |
|-------------------------------------------------------------------------------------------------------------------------------------|--------|
| Floor slabs where plain bars are used.....                                                                                          | 0.0025 |
| Floor slabs where deformed bars are used.....                                                                                       | 0.002  |
| Floor slabs where wire fabric is used, having welded intersections not farther apart in the direction of stress than 12 inches..... | 0.0018 |
| Roof slabs where plain bars are used.....                                                                                           | 0.003  |
| Roof slabs where deformed bars are used.....                                                                                        | 0.0025 |
| Roof slabs where wire fabric is used, having welded intersections not farther apart in the direction of stress than 12 inches.....  | 0.0022 |

#### ARTICLE 2616. TWO-WAY SLABS.

(a) **General Provisions.** This construction, consisting of floors reinforced in two directions and supported on four sides, includes solid reinforced concrete slabs; concrete ribs with burned clay or concrete tile fillers, with or without concrete top slabs; and concrete ribs with top slabs placed monolithically with the ribs. The supports for the floor slabs may be walls, reinforced concrete beams, or steel beams fully encased in concrete.

When burned clay or concrete tile fillers, of material having a unit compressive strength at least equal to that of the designed strength of the concrete in the ribs, are used, the shells in contact with the concrete ribs may be included in calculations involving resistance to shear and bending moment, and the top and bottom shells may be included in calculations involving resistance to bending moment.

When a concrete top slab, placed monolithically with the ribs is used, it shall be not less in thickness than one and one-half inches ( $1\frac{1}{2}$ " ) nor less than one-twelfth ( $1/12$ ) of the clear distance between ribs. It shall be reinforced for shrinkage as required in Article 2615.

Where removable forms or fillers not complying with this Sub-Article are used, the thickness of the concrete slab shall be not less than one-twelfth ( $1/12$ ) of the clear distance between ribs and in no case less than two inches (2"). Such slab shall be reinforced to provide sufficient strength to carry the imposed loads.

(b) **Limitations.** A two-way slab shall be considered as consisting of strips in each direction as follows:

A middle strip one-half panel in width, symmetrical about panel center line and extending through the panel in the direction in which moments are considered.

A column strip one-half panel in width, occupying the two quarter-panel areas outside the middle strip.

Where the ratio of short to long span is less than 0.5 the middle strip, in the short direction shall be considered as having a width equal to the difference between the long and short span, the remaining area representing the two-column strips.

The critical sections for moment calculations are referred to as principal design sections and are located as follows:

For negative moment, along the edges of the panel at the face of the support ing beams.

For positive moment, along the center lines of the panels.

(c) **Bending Moments.** The bending moments for the middle strips shall be computed from the formula

$$M_f = Cw'S^2 \quad (2)$$

in which  $M_f$  is bending moment in foot-pounds per foot of width;  $C$  is a coefficient as given in Table No. 26-C;  $w'$  is total load per square foot; and  $S$  is short span in feet. The span shall be considered as the center-to-center distance between supports or the clear span plus twice the thickness of slab, whichever value is the smaller.

The average moments per foot of width in the column strip shall be two-thirds of the corresponding moments in the middle strip. In determining the spacing of the reinforcement in the column strip, the moment may be assumed to vary from a maximum at the edge of the middle strip to a minimum at the edge of the panel.

Where the negative moment on one side of a support is less than eighty per cent (80%) of that on the other side, two-thirds ( $\frac{2}{3}$ ) of the difference shall be distributed in proportion to the relative stiffness of the slabs.

(d) **Shear.** The shearing stresses in the slab may be computed on the assumption that the load is distributed to the supports in accordance with Article 2616 (f).

(e) **Minimum Slab Thickness.** The slab thickness shall be not less than four inches (4"), nor less than the value computed by the formula

$$t_3 = \left[ S + \frac{S}{m} - \frac{N}{10} \right] \frac{1}{72} \sqrt{\frac{2500}{f'_c}} \quad (3)$$

in which  $t_3$ ,  $S$  and  $N$  are in inches.

(f) **Supporting Beams.** The loads on the supporting beams for a two-way rectangular panel may be assumed as the load within the tributary areas of the panel bounded by the intersection of 45° lines from the corners with the median line of the panel parallel to the long side.

The bending moments may be determined approximately by using an equivalent uniform load per lineal foot of beam for each panel supported as follows:

$$\text{For the short span, } \frac{wS}{3}$$

$$\text{For the long span, } \frac{wS}{3} \left( \frac{3-m^2}{2} \right) \quad (4)$$

(g) **Arrangement of Reinforcement.**

1. In any panel the reinforcement per unit width in the long direction shall be at least one-third ( $\frac{1}{3}$ ) of that provided in the short direction.

2. The positive moment reinforcement adjacent to a continuous edge only and for a width not exceeding one-fourth ( $\frac{1}{4}$ ) of the shorter dimension of the panel may be reduced twenty-five per cent (25%).

3. At a non-continuous edge negative moment reinforcement per unit width in amount at least as great as one-half ( $\frac{1}{2}$ ) that required for maximum positive moment for the center half of the panel shall be provided across the entire width of the exterior support.

4. The spacing of the reinforcement shall be not more than three (3) times the slab thickness and the ratio of reinforcement shall be at least 0.0025.

5. The amount of reinforcement in any one foot-wide strip shall be at least 0.003 times the product of the width of strip by the effective depth.

## ARTICLE 2617. SHEAR AND DIAGONAL TENSION.

(a) **Shearing Unit Stress.** The shearing unit stress ( $v$ ) in reinforced concrete beams shall be computed by formula (14):

$$v = \frac{V}{bjd} \quad (14)$$

For beams of  $I$  or  $T$  section ( $b'$ ) shall be substituted for ( $b$ ) in formula (14).

In ribbed construction, where burned clay or concrete tile are used,  $b'$  may be taken as a width equal to the thickness of the concrete web plus the thickness of the vertical shells of the concrete or burned clay tile in contact with the joist as specified in Articles 2614 and 2616.

Where the value of the shearing unit stress computed by formula (14) exceeds

the shearing unit stress ( $v$ ) permitted on the concrete of an unreinforced web (See Article 2613), web reinforcement shall be provided to carry the excess.

(b) **Types of Web Reinforcement.** Web reinforcement may consist of:

1. Stirrups or web reinforcement bars perpendicular to the longitudinal steel.
2. Stirrups or web reinforcement bars welded or otherwise rigidly attached to the longitudinal steel and making an angle of  $30^\circ$  or more thereto.
3. Longitudinal bars bent so that the axis of the incline portion of the bar makes an angle of  $15^\circ$  or more with the axis of the longitudinal portion of the bar.
4. Special arrangements of bars with adequate provisions to prevent slip of bars or splitting of the concrete by the reinforcement (See Sub-Article (d) last paragraph).

Stirrups or other bars to be considered effective as web reinforcement shall be anchored at both ends, according to the provisions of Article 2618.

(c) **Stirrups.** The area of steel required in stirrups placed perpendicular to the longitudinal reinforcement shall be computed by formula (15).

$$A_s = \frac{V'}{f_s j d} \quad (15)$$

Inclined stirrups shall be proportioned by formula (17).

Stirrups placed perpendicular to the longitudinal reinforcement shall not be used alone as web reinforcement when the shearing unit stress ( $v$ ) exceeds  $0.08f'_c$ .

(d) **Bent Bars.** When the web reinforcement consists of a single bent bar or of a single group of bent bars the required area of such bars shall be computed by formula (16).

$$A_s = \frac{V'}{f_s \sin \alpha} \quad (16)$$

In formula (16)  $V'$  shall not exceed  $0.040f'_c bjd$ .

Only the center three-fourths ( $\frac{3}{4}$ ) of the inclined portion of such bar, or group of bars, shall be considered effective as web reinforcement.

Where there is a series of parallel bent bars, the required area shall be determined by formula (17).

$$A_s = \frac{V'}{f_s j d (\sin \alpha + \cos \alpha)} \quad (17)$$

When bent bars having a radius of bend of not more than two (2) times the diameter of the bar are used alone as web reinforcement, the allowable shearing unit stress shall not exceed  $0.060f'_c$ . This shearing unit stress may be increased at the rate of  $0.01f'_c$  for each increase of four (4) bar diameters in the radius of bend until the maximum allowable shearing unit stress is reached. (See Article 2613).

The shearing unit stress permitted when special arrangements of bars are employed shall be that determined by making comparative tests, to destruction, of specimens of the proposed system and of similar specimens reinforced in conformity with the provisions of this Code, the same factor of safety being applied in both cases.

(e) **Combined Web Reinforcement.** Where more than one type of reinforcement is used to reinforce the same portion of the web, the total shearing resistance of this portion of the web shall be assumed as the sum of the shearing resistances computed for the various types separately. In such computations the shearing resistance of the concrete shall be included only once, and no one type

of reinforcement shall be assumed to resist more than  $\frac{2V'}{3}$ .

(f) **Spacing of Web Reinforcement.** Where web reinforcement is required, it shall be so spaced that every  $45^\circ$  line (representing a potential crack) extending from the mid-depth of the beam to the longitudinal tension bars shall be crossed by at least one line of web reinforcement. If a unit shearing stress in excess of  $0.06f'_c$  is used, every such line shall be crossed by at least two such lines of web reinforcement.

(g) **Shearing Stress in Flat Slabs.** In flat slabs, the shearing unit stress on a vertical section which lies at a distance  $t_1 - 1\frac{1}{2}$  inches beyond the edge of the column capital and parallel with it, shall not exceed the following values when computed by formula (14) (in which  $d$  shall be taken as  $t_1 - 1\frac{1}{2}$  inches):

1.  $0.03 f'_c$ , when at least fifty per cent (50%) of the total negative reinforcement in the column strip passes directly over the column capital.

2.  $0.025 f'_c$ , when twenty-five per cent (25%) of the total negative reinforcement in the column strip passes directly over the column capital.

3. For intermediate percentages, intermediate values of the shearing unit stress shall be used.

In flat slabs, the shearing unit stress on a vertical section which lies at a distance of  $t_c - 1\frac{1}{2}$  inches beyond the edge of the dropped panel and parallel with it, shall not exceed  $0.03 f'_c$  when computed by formula (14) in which  $d$  shall be taken as  $t_c - 1\frac{1}{2}$  inches. At least fifty per cent (50%) of the cross-sectional area of the negative reinforcement in the column strip must be within the width of strip directly above the dropped panel.

(h) **Shear and Diagonal Tension in Footings.** The shearing unit stress computed by formula (14) on the critical section (See Article 2621 (d)), shall not exceed  $0.02 f'_c$  for footings with straight bars, nor  $0.03 f'_c$  for footings in which the bars are anchored at both ends by adequate hooks or as otherwise specified in Article 2618.

## ARTICLE 2618. BOND AND ANCHORAGE.

(a) **Computation of Bond Stress in Beams.** In flexural members in which the tensile reinforcement is parallel to the compression face, the bond stress at any cross-section shall be computed by formula (18).

$$u = \frac{V}{\sum o j d} \quad (18)$$

in which  $V$  is the shear at that section.

Adequate end anchorage shall be provided for the tensile reinforcement in all flexural members in which formula (18) does not apply, such as footings, brackets and other tapered or stepped beams in which the tensile reinforcement is not parallel to the compression face.

(b) **Ordinary Anchorage Requirements.** Tensile negative reinforcement in any span of a continuous, restrained, or cantilever beam, or in any member of a rigid frame shall be adequately anchored by bond, hooks or mechanical anchors in or through the supporting member. Within any such span every reinforcing bar shall be extended at least 12 diameters beyond the point at which it is no longer needed to resist stress. In cases where the length from the point of maximum tensile stress in the bar to the end of the bar is not sufficient to develop this maximum stress by bond, the bar shall extend into a region of compression and be anchored by means of a standard hook or it shall be bent across the web at an angle of not less than  $16^\circ$  with the longitudinal portion of the bar and either made continuous with the positive reinforcement or anchored in a region of compression.

Of the positive reinforcement in continuous beams not less than one-fourth the area shall extend along the same face of the beam into the support a distance of ten (10) or more bar diameters, or shall be extended as far as possible into the support and terminated in standard hooks.

In simple beams, or at the outer ends of freely supported end spans of continuous beams, at least one-half ( $\frac{1}{2}$ ) the positive reinforcement shall extend along the same face of the beam into the support a distance of ten (10) or more bar diameters, or shall be extended as far as possible into the support and terminated in standard hooks.

(c) **Special Anchorage Requirements.** Where increased shearing or bond stresses are permitted because of the use of special anchorage (See Article 2613), every bar shall be terminated in a standard hook in a region of compression, or it shall be bent across the web at an angle of not less than  $15^\circ$  with the longitudinal portion of the bar and made continuous with the negative or positive reinforcement.

(d) **Anchorage of Web Reinforcement.** Single separate bars used as web reinforcement shall be anchored at each end by one of the following methods:

1. Welding to longitudinal reinforcement.

2. Hooking tightly around the longitudinal reinforcement through  $180^\circ$ .

3. Embedment in the compression area of the beam a distance sufficient to develop the allowable tensile stress specified in Article 2613 at a bond stress not exceeding  $0.04 f'_c$  on plain bars nor  $0.05 f'_c$  on deformed bars.

4. Standard hook plus embedment in the compression area of the beam, which embedment exclusive of the hook shall be sufficient to develop by bond a stress



of not less than 10,000 pounds per square inch at a bond stress of not more than  $0.04f'$ , on plain bars nor  $0.05f'$ , on deformed bars.

The extreme ends of bars forming simple *U* or multiple stirrups shall be anchored by one of the methods of Sub-Article (d) or shall be bent through an angle of at least  $90^\circ$  tightly around a longitudinal reinforcing bar not less in diameter than the stirrup bar, and shall project beyond the bend at least twelve (12) diameters of the stirrup bar.

The loops or closed ends of such stirrups shall be anchored by bending around the longitudinal reinforcement through an angle of at least  $90^\circ$ , or by being welded or otherwise rigidly attached thereto.

Hooking or bending stirrups or separate web reinforcement bars around the longitudinal reinforcement shall be considered effective only when those bars are perpendicular to the longitudinal reinforcement.

Longitudinal bars bent to act as web reinforcement shall, in a region of tension, be continuous with the longitudinal reinforcement. The tensile stress in each bar shall be fully developed in both the upper and the lower half of the beam by one of the following methods:

I. As specified in Sub-Article (d-3).

II. As specified in Sub-Article (d-4).

III. By bond, at unit bond stress not exceeding  $0.04f'$ , on plain bars nor  $0.05f'$ , on deformed bars, plus a bend of radius not less than two (2) times the diameter of the bar, parallel to the upper or lower surface of the beam, plus an extension of the bar of not less than twelve (12) diameters of the bar terminating in a standard hook. This short radius bond extension and hook shall together not be counted upon to develop a tensile unit stress in the bar of more than 10,000 pounds per square inch.

IV. By bond, at a unit bond stress not exceeding  $0.04f'$ , on plain bars nor  $0.05f'$ , on deformed bars, plus a bend of radius not less than two times the diameter of the bar, parallel to the upper or lower surface of the beam and continuous with the longitudinal reinforcement. The short radius bend and continuity shall together not be counted upon to develop a tensile unit stress in the bar of more than 10,000 pounds per square inch.

V. The tensile unit stress at the beginning of a bend may be increased from 10,000 pounds per square inch when the radius of bend is two (2) bar diameters, at the rate of 1,000 pounds per square inch tension for each increase of one and one-half ( $1\frac{1}{2}$ ) bar diameters in the radius of bend, provided that the length of the bar in the bond and extension is sufficient to develop this increased tensile stress by bond at the unit stresses given in Sub-Article (d)-III.

In all cases web reinforcement shall be carried as close to the compression surface of the beam as fireproof regulations and the proximity of other steel will permit.

(e) Anchorage of Bars in Footing Slabs. All bars in footing slabs, except the longitudinal reinforcement between loads in continuous slab footings, shall be anchored by means of standard hooks. The outer faces of these hooks shall be not less than three inches (3") nor more than six inches (6") from the face of the footing.

(f) Hooks. The terms "hook" or "standard hook" as used herein shall mean a complete semicircular turn with a radius of bend on the axis of the bar of not less than three (3) and not more than six (6) bar diameters, plus an extension of at least four (4) bar diameters at the free end of the bar. Hooks having a radius of bend of more than six (6) bar diameters shall be considered merely as extensions to the bars, and shall be treated as in Sub-Article (d)-V.

In general, hooks shall not be permitted in the tension portion of any beam except at the ends of simple or cantilever beams or at the freely supported ends of continuous or restrained beams.

No hook shall be assumed to carry a load which would produce a tensile stress in the bar greater than 10,000 pounds per square inch.

Any mechanical device capable of developing the strength of the bar without damage to the concrete may be used in lieu of a hook. Tests must be presented to show the adequacy of such devices.

#### ARTICLE 2619. FLAT SLABS.

(a) Limitations. The term flat slabs as used in these regulations refer to concrete slabs, without beams or girders to carry the load to supporting members, reinforced with bars extending in two or four directions. Slabs with dropped panels or paneled ceilings shall be considered as flat slabs provided that they meet the requirements herein given for such construction.

The moment coefficient, moment distribution, and slab thicknesses specified herein are for a series of rectangular slabs of approximately uniform size arranged in three or more rows of panels in each direction, and in which the ratio of length to width panel does not exceed 1.33.

For structures having a width of less than three (3) rows of panels, or in which irregular panels are used, an analysis shall be made of the moments developed in both slabs and columns.\* When so required, computations shall be submitted to the Director.

(b) **Panel Strips and Principal Design Sections.** A flat slab panel shall be considered as consisting of strips in each direction as follows:

A middle strip one-half panel in width, symmetrical about panel center line and extending through the panel in the direction in which moments are considered.

A column strip one-half panel in width occupying the two quarter-panel areas outside of the middle strip.

The critical sections for moment calculations are referred to as principal design sections and are located as follows:

1. **Sections for Negative Moment.** These shall be taken along the edges of the panel, on lines joining the column centers, except that they follow the perimeter of the column capital instead of passing through it.

2. **Sections for Positive Moment.** These shall be taken on the center lines of the panel.

In the two-way system, it shall be assumed that the various moments in the strips are resisted by the bands located within the strips, each band being  $.5l_1$  in width.

In the four-way system, it shall be assumed that the column-strip positive moment is resisted by the direct band; that the column strip negative moment is resisted by the direct band plus the two diagonal bands multiplied by the cosine of the angle between the direct band and the diagonal bands; that the middle strip positive moment is resisted by the two diagonal bands multiplied by the cosine of the angle between the axis of the middle strip and the diagonal bands; and that the middle strip negative moment is resisted by an independent top band across the middle of the direct band. The width of direct and middle strip negative bands shall be approximately  $.4l_1$ , the width of the diagonal bands shall be approximately  $.4$  of the average span length or

$$\frac{(l + l_1)}{5}$$

The width of the column head section for compression shall be taken as the width of the dropped panel ( $b_1$ ) or half the width of the panel ( $.5l_1$ ) where no dropped panel is used.

(c) **Slab Thickness and Dropped Panel Sizes.** In Table No. 26-D are given the thicknesses, dimensions and moments governing flat slab design when  $f'_c$  equals 2000 pounds per square inch. The general formulas are given under the heading "General Case"; the formulas for the case where the diameter of the column capital ( $c$ ) = 0.225 $l$  are given under the heading "Special Case" for ( $c$ ) = 0.225 $l$ .

Where  $f'_c$  is greater than 2000 pounds per square inch, the required and minimum slab thicknesses given in Table No. 26-D may be reduced by multiplying by the factor

$$\sqrt{\frac{2000}{f'_c}}$$

in which  $f'_c$  is the ultimate 28-day compressive strength of the concrete to be used.

(d) **Column Capital Sizes.** The average ( $c$ ) for the columns at the four corners of a panel shall be used in obtaining the slab thickness, the numerical sum of the total positive and negative moments ( $M_e$ ) in either direction and the middle strip positive and negative moments in either direction.

The average ( $c$ ) for two adjacent columns shall be used in obtaining the positive and negative moments in the column strip between these adjacent columns.

(e) **Panels With Marginal Beams or Reinforced Bearing Walls.** Moments to be used in the design of panels with marginal beams or reinforced concrete bearing walls shall be as given in Table No. 26-G.

\* It is not the intention to prohibit flat slab construction for panels longer than 1.33 times the width, or for buildings less than three bays wide, provided the moment factors are properly adjusted.



(f) Limitations (Applicable to Tables Nos. 26-E, 26-F and 26-G.) Any of the above moments may be varied by not more than six per cent (6%) provided that the total numerical sum of the positive and negative moments on the principal design sections is not reduced.

The ratio of reinforcement considered in any strip shall not exceed the value of ( $p$ ) calculated for balanced reinforcement by Article 2613. The ratio of reinforcement in any strip shall be not less than .0025. Bars shall not be spaced farther apart than one and one-half ( $1\frac{1}{2}$ ) times the slab thickness for the full width of the bands.

Moments for the four-way system are shown in Table No. 26-F by strips, and for convenience, also by bands.

Slabs supported by marginal beams on opposite edges shall be designed as solid one or two-way slabs to carry the entire panel load.

(g) Length of Bars and Points of Bend. The positive moment reinforcement perpendicular to the discontinuous edge shall extend to this edge and have an embedment of at least six inches (6") in spandrel beams or columns. All negative moment reinforcement shall be bent or hooked at spandrel beams or columns to provide adequate bond resistance. Length of bars and points of bend shall be as given in Table No. 26-H.

(h) Arrangement of Reinforcement. The slab reinforcement shall be accurately placed so as to resist not only the moments at the critical sections, but also the moments at intermediate sections, and shall be secured and supported by concrete or metal chairs and spacers.

(i) Brackets. Brackets extending the full width of the column may be substituted for column capitals at exterior columns, provided the sloping face of the bracket makes an angle not more than forty-five degrees with the face of the column, projected upward.

The value of ( $c$ ) where brackets are used is twice the distance from the center of the column to a point where the bracket is one and one-half inches ( $1\frac{1}{2}$ ") thick.

(j) Columns Without Capitals or Brackets. Brackets and column capitals may be omitted altogether, provided the slab thickness is sufficient to resist fully the moments and shears at the column head section.

The value of ( $c$ ) where brackets and column capitals are omitted is the width of the column in the direction in which moments are considered, except that, when a beam of greater depth than the thickness of the slab or dropped panel extends into the column in the direction in which moments are considered, the value of ( $c$ ) may be taken as the width of the column plus twice the projection of the beam below the slab or dropped panel.

(k) Openings in Flat Slabs. Openings of any size may be cut through the floor in the area common to two intersecting middle strips, provided the total positive and negative resisting moments be maintained as required in Sub-Article (d) and that these total positive and total negative moments be redistributed between the remaining principal design sections to meet the new conditions.

In any area common to two column strips, not more than one opening shall be allowed and the greatest dimension of such an opening, shall not exceed .05L.

In any area common to one column strip and one middle strip, openings shall not interrupt more than one-quarter of the bars in either strip and the equivalent of the bars so interrupted shall be provided by extra steel on both sides of the opening.

Any opening larger than described above shall be completely framed on all sides with beams to carry the loads to the columns.

(l) Shearing Stresses in Flat Slabs. (See Article 2617).

## ARTICLE 2620. REINFORCED CONCRETE COLUMNS.

(a) Limiting Dimensions. The following Articles on reinforced concrete and composite columns except Sub-Article (g) apply to a short column, for which the unsupported length is not greater than 10 times the least lateral dimension. When the unsupported length exceeds this value, the design shall be modified as shown in Sub-Article (g). Principal columns in buildings shall have a minimum diameter or thickness of ten inches (10") and a minimum gross area of one hundred and twenty square inches (120 sq. in.). Posts that are not continuous from story to story shall have a minimum diameter or thickness of six inches (6").

(b) Unsupported Length of Columns. For purpose of determining the limiting dimensions of columns, the unsupported length of reinforced concrete columns shall be taken as the clear distance between floor slabs.

Exceptions: 1. In flat slab construction, it shall be the clear distance between the floor and the lower extremity of the capital.

2. In beam and slab construction, it shall be the clear distance between the floor and the under side of the deeper beam framing into the column in each direction at the next higher floor level.

3. In columns restrained laterally by struts, it shall be the clear distance between consecutive struts in each vertical plane; provided that to be an adequate support, two such struts shall meet the column at approximately the same level, and the angle between vertical planes through the struts shall not vary more than 15 degrees from a right angle. Such struts shall be of adequate dimensions and anchorage to restrain the column against lateral deflection.

4. In columns restrained laterally by struts or beams, with brackets used at the junction, it shall be the clear distance between the floor and the lower edge of the bracket, provided that the bracket width equals that of the beam or strut and is at least half that of the column.

For rectangular columns, that length shall be considered which produces the greatest ratio of length to depth of this section.

#### (c) Spirally Reinforced Columns.

1. **Permissible Load.** The maximum permissible axial load,  $P$ , on columns with closely spaced spirals enclosing a circular concrete core reinforced with longitudinal bars shall be that given by Formula (22)

$$P = A_g (0.225f'_c + f_p p_s) \dots \dots \dots (22)$$

#### WHERE

$A_g$  = the gross area of the column

$f'_c$  = compressive strength of the concrete

$f_p$  = nominal working stress in vertical column reinforcement, to be taken at 40 per cent of the minimum specification value of the yield point, viz., 16,000 pounds per square inch for intermediate grade steel, and 20,000 pounds per square inch for rail or hard grade steel.\*

$p_s$  = ratio of the effective cross-sectional area of vertical reinforcement to the gross area, ( $A_g$ ).

2. **Vertical Reinforcement.** The ratio ( $p_s$ ) shall not be less than 0.01 nor more than 0.08. The minimum number of bars shall be six (6), and minimum diameter shall be five-eighths inch ( $\frac{5}{8}$ "). The center to center spacing of bars within the periphery of the column core shall not be less than two and one half ( $2\frac{1}{2}$ ) times the diameter for round bars or three (3) times the side dimension for square bars. The clear spacing between bars shall be not less than one and one-half inches ( $1\frac{1}{2}$ "), or one and one-half ( $1\frac{1}{2}$ ) times the maximum size of the coarse aggregate used. The spacing rules apply to adjacent pairs of bars at a lapped splice.

3. **Splices in Vertical Reinforcement.** Where lapped splices in the column verticals are used, the minimum amount of lap shall be as follows:

I. For deformed bars with concrete having a strength of 3000 pounds per square inch or above, 24 diameters of bar of intermediate grade steel and 30 diameters of bar of rail or hard grade steel. For bars of higher yield point, the amount of lap shall be increased in proportion to the nominal working stress. When the concrete strengths are less than 3000 pounds per square inch, the amount of lap shall be one-third greater than the values given above.

II. For plain bars the minimum amount of lap shall be twenty-five per cent (25%) greater than that specified for deformed bars.

III. Welded splices or other positive connections may be used instead of lapped splices. Welded splices shall preferably be used in cases where the bar diameter exceeds one and one-fourth inch ( $1\frac{1}{4}$ "). An approved welded splice shall be defined as one in which the bars are butted and welded and that will develop in tension at least the yield point stress of the reinforcing steel used.

IV. Where changes in the cross section of a column occur, the longitudinal bars shall be offset in a region where lateral support is afforded by a concrete capital, floor slab or by metal ties or reinforcing spirals. Where bars are offset, the slope of the inclined portion from the axis of the column shall not exceed one in six, and the bars above and below the offset shall be parallel to the axis of the column.

\* Nominal working stresses for reinforcement of higher yield point may be established at forty per cent (40%) of the yield point stress, but not more than 30,000 pounds per square inch, when the properties of such reinforcing steels have been definitely specified by standards of A.S.T.M. designation. If this is done, the lengths of splice required by Article 2620, Sub-Article (c), paragraph (3), shall be increased accordingly.

4. **Spiral Reinforcement.** The ratio of spiral reinforcement ( $p'$ ) shall not be less than the value given by Formula (23), nor shall it be less in any case than 0.0112 for hot rolled spirals of intermediate grade or 0.0075 for cold drawn wire spirals.

$$p' = 0.45 (R - 1) \frac{f'_c}{f'_s} \dots \dots \dots (23)$$

WHERE

$p'$  = ratio of volume of spiral reinforcement to the volume of the concrete core (out to out of spirals).

$R$  = ratio of gross area to core area of column  $A_g/A_c$ .

$f'_s$  = useful limit stress of spiral reinforcement, to be taken as 40,000 pounds per square inch for hot rolled rods of intermediate grade (A. S. T. M.), and 60,000 pounds per square inch for cold drawn wire (A. S. T. M.)

The spiral reinforcement shall consist of evenly spaced continuous spirals held firmly in place and true to line by at least three vertical spacer bars. Anchorage of spiral reinforcement shall be provided by one and one-half extra turns of spiral rod or wire at each end of the spiral unit. Splices, when necessary, shall be made in spiral rod or wire by welding or by a lap of one and one-half turns. The center to center spacing of spirals shall not exceed one-sixth of the core diameter. The clear spacing between spirals shall not exceed three inches (3") nor be less than one and three-eighths inches (1 $\frac{3}{8}$ ") or one and one-half times the maximum size of coarse aggregate used. The reinforcing spiral shall extend from the floor level in any story, or from the top of the footing in the basement, to the level of the lowest horizontal reinforcement in the slab, dropped panel or beam above. In a column with a capital, it shall extend to the plane at which the diameter or width of the capital is twice that of the columns.

5. **Protection of Reinforcement.** The column reinforcement shall be protected everywhere by a covering of concrete cast monolithically with the core, for which the thickness shall not be less than one and one-half inches (1 $\frac{1}{2}$ "), nor less than one and one-half times the maximum size of the coarse aggregate, nor shall it be less than required by the fire protection and weathering provisions of Article 2610 (f).

6. **Limits of Column Section.** For columns built monolithically with concrete walls or piers the outer boundary of the column section shall be taken either as a circle one and one-half inches (1 $\frac{1}{2}$ ") outside the column spiral or as a square or rectangle of which the sides are one and one-half inches (1 $\frac{1}{2}$ ") outside the spiral. The value of ( $A_g$ ) thus defined shall be used in both Formulas (22) and (23). In any case it shall be permissible to design a circular column and to build it as a square column of the same least lateral dimension. In such case the permissible load, the gross area considered, and the required percentage of reinforcement must be taken of those as the circular column.

#### (d) Tied Columns.

1. **Permissible Load.** The maximum permissible axial load on columns reinforced with longitudinal bars and separate lateral ties shall be eighty per cent (80%) of that given by Formula (22). That ratio, ( $p_r$ ), to be considered in tied columns shall be not less than 0.01, nor more than 0.04. The longitudinal reinforcement shall consist of at least four bars of minimum diameter of five-eighths of an inch ( $\frac{5}{8}$ "). Splices in reinforcing bars shall be made as described in Sub-Article (c), paragraph (3).

2. **Lateral Ties.** Lateral ties shall be at least one-fourth inch ( $\frac{1}{4}$ ") in diameter and shall be spaced apart not over 16 bar diameters, 48 tie diameters or the least dimension of the column. When there are more than four (4) vertical bars, additional ties shall be provided so that every longitudinal bar is held firmly in its designed position and has lateral support equivalent to that provided by a 90-degree corner of a tie.

3. **Limits of Column Section.** In a tied column which for architectural reasons has a larger cross section than required by consideration of loading, a reduced defective area ( $A_d$ ) not less than one-half ( $\frac{1}{2}$ ) the total area may be used in applying the provisions of Sub-Article (d), paragraph (1).

#### (e) Composite Columns.

1. **Permissible Load.** The permissible load on a composite column consisting of a structural steel or cast iron column thoroughly encased in concrete rela-

forced with both longitudinal and spiral reinforcement, shall not exceed that given by Formula (24).

$$P = 0.225A_c f'_c + f_r A_r + f_r A_r \dots\dots\dots (24)$$

WHERE

- $A_c$  = net area of concrete =  $A_g - A_r - A_r$ .  
 $A_r$  = cross sectional area of longitudinal bar reinforcement.  
 $A_r$  = cross sectional area of the steel or cast iron core.  
 $f_r$  = permissible unit stress in metal core, not to exceed 16,000 pounds per square inch for a steel core; or 10,000 pounds per square inch for a cast iron core.

The remaining notation is that of Sub-Article (c).

2. **Details of Metal Core and Reinforcement.** The cross-sectional area of the metal core shall not exceed twenty per cent (20%) of the gross area of the column. If a hollow metal core is used, it shall be filled with concrete. The amounts of longitudinal and spiral reinforcement and the requirements as to spacing of bars, details of splices and thickness of protective shell outside the spiral shall conform to the limiting values specified in Sub-Article (c), paragraphs (2), (3) and (4). A clearance of at least three inches (3") shall be maintained between the spiral and the metal core at all points except that when the core consists of a structural steel H-column, the minimum clearance may be reduced to two inches (2").

3. **Splices and Connections of Metal Cores.** Metal cores in composite columns shall be accurately milled at splices and positive provision shall be made for alignment of one core above another. At the column base, provision shall be made to transfer the load to the footing at safe unit stresses in accordance with Article 2613 and Table No. 26-B. The base of the metal section shall be designed to transfer the load from the entire composite column to the footing, or it may be designed to transfer the load from the metal section only, provided it is so placed in the pier or pedestal as to leave ample section of concrete above the base for the transfer of load from reinforced concrete section of the column by means of bond on the vertical reinforcement and by direct compression on the concrete. Transfer of loads to the metal core shall be provided for by the use of bearing members such as billets, brackets or other positive connections; these shall be provided at the top of the metal core and at intermediate floor levels where required. The column as a whole shall satisfy the requirements of Formula (24) at any point; in addition to this, the reinforced concrete portion shall be designed to carry in accordance with Formula (22), all floor loads brought onto the columns at levels between the metal brackets or connections. In applying Formula (22), the value of ( $A_g$ ) shall be interpreted as the area of the concrete section outside the metal core, and the permissible load on the reinforced concrete section shall be further limited to  $0.35 f'_c A_g$ . Ample section of concrete and continuity of reinforcement shall be provided at the junction with beams or girders.

4. **Permissible Load of Metal Core Only.** The metal cores of composite columns shall be designed to carry safely any construction or other loads to be placed upon them prior to their encasement in concrete.

(f) **Combination Columns.**

1. **Steel Columns Encased in Concrete.** The permissible load on a structural column which is encased in concrete at least two and one-half inches (2½") thick over all metal (except rivet heads) reinforced as hereinafter specified, shall be computed by Formula (25).

$$P = A_r f'_r \left( 1 + \frac{A_r}{100 A_c} \right) \dots\dots\dots (25)$$

WHERE

- $A_r$  = cross sectional area of steel column.  
 $f'_r$  = permissible stress of unencased steel column.  
 $A_c$  = total area of concrete section.

The concrete used shall develop a compressive strength ( $f'_c$ ) of at least 2000 pounds per square inch at 28 days. The concrete shall be reinforced by (the equivalent of) welded wire mesh having wires of No. 10 W. & M. Gauge, the wires encircling the column being spaced not more than four inches (4") apart, and those parallel to the column axis not more than eight inches (8") apart. This mesh shall extend entirely around the column at a distance of one inch (1") inside the outer concrete surface and shall be lap-spliced at least 40-wire diameters and wired at the splice. Special brackets shall be used to receive the entire floor load

at each floor level. The steel column shall be designed to carry safely any construction or other loads to be placed upon it prior to its encasement in concrete.

2. **Pipe Columns.** The permissible load on columns consisting of steel pipe filled with concrete shall be determined by Formula (26).

$$P = 0.225f'_c A_c + f'_r A_r \dots\dots\dots (26)$$

The value of  $f'_r$  shall be that given by Formula (27).

$$f'_r = \left( 18,000 - 70 \frac{h}{K} \right) F \dots\dots\dots (27)$$

WHERE

$f'_r$  = average unit stress in metal core.

$h$  = unsupported length of column.

$K$  = least radius of gyration of metal core section.

$F$  = (yield point of pipe)

45,000

If the yield point of the pipe is not known, the factor shall be taken as 0.5.

(g) **Long Columns.** The maximum permissible load on axially loaded reinforced concrete or composite columns having a length ( $h$ ) greater than ten (10) times the least lateral dimension ( $d$ ), shall be given by Formula (28).

$$P' = P \left( 1.3 - .03 \frac{h}{d} \right) \dots\dots\dots$$

where ( $P$ ) is the permissible axial load on a short column as given by Formulas (22) and (24).

The maximum permissible load ( $P'$ ) on eccentrically loaded columns in which  $\frac{h}{d}$  exceeds ten (10) shall also be given by Formula (28), in which ( $P$ ) is

the permissible eccentrically applied load on a short column as determined by the provisions of Sub-Articles (i) and (j). In long columns subjected to definite bending stresses, as determined by Sub-Article (h), the ratio ( $h/d$ ) shall not exceed 20.

(h) **Bending Moments in Columns.** The bending moments in the columns of all reinforced concrete structures shall be determined on the basis of loading conditions and restraint and shall be provided for in the design. When the stiffness and strength of the columns are utilized to reduce moments in beams, girders, or slabs, as in the case of rigid frames, or in other forms of continuous construction where in column moments are unavoidable, they shall be provided for in the design. In building frames, particular attention shall be given to cases of unbalanced floor loads on both exterior and interior columns and of eccentric loading due to other causes. Wall columns shall be designed to resist moments produced by:

1. Loads on all floors of the building.
2. Loads on a single exterior bay at two adjacent floor levels, or
3. Loads on a single exterior bay at one floor level. Resistance to bending moments at any floor level shall be provided by distributing the moments between the columns immediately above and below the given floor in proportion to their relative stiffness and conditions of restraint.

(i) **Combined Axial and Bending Stress.** In reinforced concrete column subjected to bending moments, the recognized methods of analysis shall be followed in calculating the stresses due to combined axial load and bending. The maximum fiber stress in compression and (in case of large eccentricities of loading) the tensile stress in the vertical bars will govern the design. The gross area of both spiral and tied columns shall be used in the computations.

**Note:** For preliminary designs it will usually give satisfactory results to compute the combined fiber stress in compression on the basis of an uncracked section of column, using Formula (29).

$$f_c = \frac{P \left( 1 + \frac{ec}{R^2} \right)}{A_g \left( 1 + (n-1) p_g \right)} \dots\dots\dots (29)$$



# WHERE

- $e$  = eccentricity of resultant load, measured from the gravity axis.  
 $c$  = distance from gravity axis to extreme fiber in compression.  
 $R$  = radius of gyration of equivalent concrete section.  
 $n = 30,000$

$$f'_c$$

This will result in a fairly accurate design if the eccentricity is less than one-half ( $\frac{1}{2}$ ) the over-all column depth and the value of  $(p, n)$  is 0.3 or more.

The term  $\frac{ec}{R^2}$  may be replaced by the value  $\frac{6e}{t}$  for rectangular columns, and  $\frac{8e}{t}$

for round columns without appreciable error, ( $t$  = over-all depth of section). This design shall then be analyzed by more accurate methods to insure that permissible stresses are not exceeded.

(j) **Permissible Combined Compressive and Tensile Stress.** For spiral and tied columns eccentrically loaded or otherwise subjected to combined axial compression and flexural stress, the maximum permissible compressive fiber stress, ( $f_c$ ) is given by Formula (30).

$$f_c = f_a \frac{1 + \frac{ec}{R^2}}{1 + C \frac{ec}{R^2}} \dots \dots \dots (30)$$

wherein  $f_a$  is the average permissible stress on an equivalent axially loaded concrete column, and  $C$  is the ratio of  $f_a$  to the permissible fiber stress for members in flexure. Thus

$$f_a = \frac{0.225f'_c + f_s p_s}{1 + (n-1) p_s} \dots \dots \dots (31)$$

for spiral columns, and 0.8 of this value for tied columns. In general  $C = f_a / 0.4f'_c$ .

The permissible tensile stress in the longitudinal reinforcement may equal that specified for flexural members, provided, however, that splices in the tensile steel at or near the section of maximum column moment are capable of developing fully the yield point strength of the reinforcement.

## (k) Walls.

1. **Lateral and Eccentric Loads.** Walls shall be designed for any lateral or other loads to which they are subjected. Proper provision shall be made for eccentric loads.

2. **Height and Thickness.** The thickness of reinforced concrete walls shall be not less, and the maximum height, number of stories, and distance between supports shall be not more, than shown in Table No. 26-1.

**Exception:** The provisions of this paragraph may be waived when written evidence is submitted by a qualified person showing that the walls meet all the other requirements of this Code.

3. **Design.** The maximum allowable compressive stress in reinforced concrete bearing walls with minimum reinforcement as required by this Sub-Article shall not exceed:

$$\left[ 1 - \left( \frac{h}{30d} \right)^3 \right] 0.2f'_c \dots \dots \dots (32)$$

When the reinforcement in bearing walls is designed, placed, and anchored in position as for columns, the working stresses shall be on the basis of formulas for columns. For calculating wall stresses, concentrated loads, may be assumed to be distributed over a maximum length of wall not exceeding the center to center distance between loads nor five (5) times the width of the bearing.

Reinforced concrete walls shall be reinforced with an area of steel in each direction, both vertical and horizontal, at least equal to 0.0025 times the cross-sectional area of the walls. Walls more than ten inches (10") in thickness shall have the reinforcement for each direction placed in two (2) layers parallel with their faces of the wall. One layer consisting of not less than one-half ( $\frac{1}{2}$ ) and not more than two-thirds ( $\frac{2}{3}$ ) the total required reinforcement shall be placed

not less than one and one-half inches ( $1\frac{1}{2}$ "), nor more than one-third ( $\frac{1}{3}$ ) the thickness of the wall from the exterior surface. The other layer, comprising the balance of the required reinforcement, shall be placed not less than three-fourths inch ( $\frac{3}{4}$ "), and not more than one-third ( $\frac{1}{3}$ ) the thickness of the wall from the interior surface. Bars shall be not less than three-eighths inch ( $\frac{3}{8}$ ") round, nor shall they be spaced more than eighteen inches (18") on centers.

Reinforced concrete walls shall be anchored at all points of lateral support. Such anchorage shall be capable of resisting the horizontal forces with a minimum of two-hundred (200) pounds per lineal foot.

4. **Non-Bearing Partitions.** Non-bearing partitions of reinforced concrete shall have a thickness of not less than one-forty-eighth ( $1/48$ ) of the distance between their supports nor less than three inches (3").

#### ARTICLE 2621. FOOTINGS.

(a) **Loads.** Footing resting directly on soil or on piles shall be proportioned as to soil bearing area or number of piles on the basis of the total column load plus the weight of the footing itself. For computations of moments and shears, an upward reaction per unit area or per pile shall be based on the total column load (not including the weight of the footing itself) divided by the area or by the number of piles.

(b) **Sloped or Stepped Footings.** Footings in which the thickness has been determined by the requirements for shear as specified in Article 2617, Sub-Article (h), may be sloped or stepped, provided that the shear on section outside the critical section exceeds the value specified, and provided, further, that the thickness of the footing above the reinforcement at the edge shall not be less than six inches (6") for footings on soil, nor less than twelve inches (12") for footings on piles. Sloped or stepped footings shall be cast as a unit.

(c) **Bending Moment in Footings.** The critical section for bending moment in a concrete footing which supports a concrete column, pedestal or wall, shall be considered to be at the face of the column, pedestal or wall. For footings under masonry walls, the critical section shall be assumed as halfway between the middle and the edge of the wall. For footings under metallic bases, the critical section shall be assumed as halfway between the face of the column, or pedestal, and the edge of the metallic base.

The bending moment at the critical section in a square footing, or in a rectangular footing having its side not greater than one and one-half times its width, shall be computed from the load on trapezoids bounded by the line of the critical section for moment, the corresponding outside edge of the footing, and the portions of the two diagonals. The load on the two corner triangles of the trapezoid shall be considered as applied at a distance equal to six-tenths ( $\frac{6}{10}$ ) of the projection of the footing from the line of critical section for moment. The load on the rectangular portion of the trapezoid shall be considered as applied at its center of gravity.

For a round or octagonal concrete column or pedestal, the face of the column shall be taken as the side of a square of an area equal to the area enclosed within the perimeter of the column or pedestal.

(d) **Shearing and Bond Stresses.** The critical section for diagonal tension in footings on soil shall be assumed as a vertical section at a distance ( $d$ ) from the face of the column or pedestal supported by the footings.

In footings on piles the critical section shall be assumed at a distance  $\left(\frac{d}{2}\right)$

from the face of the column or pedestal, and any piles whose centers are at or within the section shall be excluded in computing shear.

For shearing stresses, see Article 2617, Sub-Article (h).

The critical sections for bond shall be assumed at the face of the column, or pedestal; at vertical planes where changes occur, and near the end of the bending moment reinforcement.

For bond stresses see Article 2618, Sub-Articles (a) to (e), inclusive.

(e) **Transfer of Stress at Base of Column.** The compressive stress in longitudinal reinforcement at the base of a column shall be transferred to the pedestal or footing by dowels. There shall be at least one (1) dowel for each column bar, and the total section area of the dowels shall not be less than the sectional area of the longitudinal reinforcement in the columns. The dowels shall extend up into the column and down into the pedestal or footing the distance required for lap of longitudinal column bars (see Article 2620, Sub-Article (c)).

The permissible compressive unit stress on top of the pedestal or footing directly under the column shall not be greater than that determined by Formula (33).

$$r_a = 0.25f'_c \sqrt[3]{\frac{A}{A_1}} \dots\dots\dots (33)$$

In sloped or stepped footings, (A) may be taken as the area of the top horizontal surface of the footing, or as the area of the lower base of the largest frustum of a pyramid or cone contained wholly within the footing and having for its upper base the loaded area (A'), and having side slopes of one (1) vertical to two (2) horizontal.

(f) Pedestals and Footings (Plain Concrete). (See Article 2624 (c).

#### ARTICLE 2622. PRECAST CONCRETE JOISTS.

The depth of precast concrete joists shall be not more than four (4) times the width of the top or bottom flanges nor less than one twenty-fourth (1/24) of the span length.

The thickness of the top slab shall not be less than one-twelfth (1/12) of the clear span between joists nor less than two inches (2") for roofs and floors, and not less than one and one-half inches (1½") over the joists. The slab shall have not less than 0.2 per cent reinforcement at right angles to the span of joists. The reinforcement shall be spaced not farther apart than five times the slab thickness.

When the top slab is adequately reinforced and bonded to the joist, the construction may be considered as a T-beam.

Precast joists shall be bridged as provided in Article 3102.

#### ARTICLE 2623. COMPOSITE BEAMS.

The term "Composite Beam" shall apply to any rolled or fabricated steel floor beam entirely encased in poured concrete at least four inches (4") wider, at its narrowest point, than the flange of the beam, supporting a concrete slab on each side without openings adjacent to the beam; provided that the top of the beam is at least one and one-half inches (1½") below the top of the slab, and at least two inches (2") above the bottom of the slab; provided that a good grade of stone or gravel concrete with Portland cement is used; and provided that the concrete has adequate mesh, or other reinforcing steel, throughout its whole depth and across the soffit.

Composite beams may be figured on the assumption that:

1. The steel beam carries unassisted all dead loads prior to the hardening of the concrete, with due regard for any temporary support provided.

2. The steel and concrete carry by joint action all loads, dead and live, applied after the hardening of the concrete.

The total tensile unit stress in the extreme fiber of the steel beams thus computed shall not exceed 20,000 pounds per square inch (see Article 2702).

The maximum stresses in concrete and the ratio of Young's moduli for steel and concrete, shall be as prescribed by the specifications governing the design of reinforced concrete for the structure.

The web and end connections of the steel beam shall be adequate to carry the total dead and live load without exceeding the unit stresses prescribed in this Code, except as this may be reduced by the provision for other proper support.

#### ARTICLE 2624. PLAIN CONCRETE.

(a) General. Plain concrete, other than fill, shall have a minimum ultimate compressive strength at 28 days of 2,000 pounds per square inch, and material, proportioning, and placing shall conform to the requirements of this Chapter.

Provisions shall be made to care for temperature and shrinkage stresses either by use of reinforcement or by means of joints.

Plain concrete construction shall conform to the detailed minimum requirements specified in this Chapter.

(b) Wall Thickness. The thickness of plain concrete walls may be two inches (2") less than required by Article 2404 for plain masonry walls, but in no case less than seven inches (7"), and the ratio of unsupported height or length (whichever is the lesser) to thickness, shall not be greater than 22.

(c) Design. Plain concrete walls shall be designed to withstand all vertical and horizontal loads as specified in Chapter 23.



(d) **Stresses.** The allowable working stresses in plain concrete walls shall not exceed the following percentages of ultimate strength:

|                   |            |
|-------------------|------------|
| Compression ..... | .25 $f'_c$ |
| Tension .....     | .01 $f'_c$ |
| Shear .....       | .02 $f'_c$ |

(e) **Pedestals and Footings (Plain Concrete).** The allowable compressive unit stress on the gross area of a concentrically loaded pedestal shall not exceed  $0.25 f'_c$ . Where this stress is exceeded, reinforcement shall be provided and the member designed as a reinforced concrete column.

The depth and width of a pedestal or footing of plain concrete shall be such that the tension in the concrete shall not exceed  $0.03 f'_c$ , and the average shearing stress shall not exceed  $0.02 f'_c$  taken on critical sections as determined for reinforced concrete footings.

#### **ARTICLE 2625. BOLTS.**

Bolts shall be solidly embedded in plain or reinforced concrete, and the connection shall be designed so that the shear on every bolt is not more than the values set forth in Table No. 26-J.

#### **ARTICLE 2626. PRESTRESSED CONCRETE.**

Prestressed Concrete designed in accordance with the Report of ACI-ASCE Joint Committee 323 intitled "Tenative Recommendations for Prestressed Concrete," issued by the American Concrete Institute, shall be deemed good Engineering practice and in compliance with the requirements of this Code.

Copies of complete detail drawings and design computations shall be submitted for approval.

The manufacturing, transportation, assembling and jointing of all structure elements shall be under the direct supervision of a registered architect or civil engineer as defined in Article 203.

#### **ARTICLE 2627. PILE/BEAM SUPPORTED RESIDENTIAL FLOOR SLABS CONSTRUCTION**

Design of structural slabs shall be in accordance with "Building Code Requirements for Reinforced Concrete" of the American Concrete Institute, ACI 318-63. Where the design of the slab has not been determined by a structural analysis, the following, based upon unusual residential first floor loads, and with average soil conditions for spans not to exceed 12', shall have a minimum acceptable reinforcement for spans indicated. See Table 26-K.

EXCEPTION: Above article does not apply to soil supported slabs.

TABLE NO. 26-A—ASSUMED STRENGTH OF CONCRETE MIXTURES

| Water-Content U. S. Gallons<br>Per 94-lb. Sack of Cement |         | Assumed Compressive Strength<br>at 28 days |
|----------------------------------------------------------|---------|--------------------------------------------|
| U. S. Gallons                                            | Cu. Ft. | p. s. i.                                   |
| 7½                                                       | 1.00    | 2000                                       |
| 6¾                                                       | .90     | 2500                                       |
| 6                                                        | .80     | 3000                                       |
| 5                                                        | .67     | 3750                                       |

NOTE: In interpreting this table, surface water contained in the aggregate must be included as part of the mixing water in computing the water-content.

TABLE NO. 26-B—ALLOWABLE UNIT STRESSES IN CONCRETE

| Description                                                                                                     |       | Allowable Unit Stresses                                                                                       |                                                                                      |                                       |                                       |                                      |
|-----------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|
|                                                                                                                 |       | For Any Strength of Concrete as Fixed by Test in Accordance with Sec. 2606<br>$n = 30000$<br>$\frac{f'_c}{n}$ | When Strength of Concrete is Fixed by the Water-Content in Accordance with Sec. 2606 |                                       |                                       |                                      |
|                                                                                                                 |       |                                                                                                               | $f'_c = 2000$<br>p. s. i.<br>$n = 15$                                                | $f'_c = 2500$<br>p. s. i.<br>$n = 12$ | $f'_c = 3000$<br>p. s. i.<br>$n = 10$ | $f'_c = 3750$<br>p. s. i.<br>$n = 8$ |
| Flexure: $f_c$                                                                                                  | $f_c$ | $0.45f'_c$                                                                                                    | 900                                                                                  | 1125                                  | 1350                                  | 1688                                 |
| Extreme fiber stress in compression                                                                             |       |                                                                                                               |                                                                                      |                                       |                                       |                                      |
| Shear: $v$                                                                                                      |       |                                                                                                               |                                                                                      |                                       |                                       |                                      |
| Beams with no web reinforcement and without special anchorage of longitudinal steel                             | $v_r$ | $0.02f'_c$                                                                                                    | 40                                                                                   | 50                                    | 60                                    | 75                                   |
| Beams with no web reinforcement, but with special anchorage of longitudinal steel                               | $v_r$ | $0.03f'_c$                                                                                                    | 60                                                                                   | 75                                    | 90                                    | 113                                  |
| Beams with properly designed web reinforcement but without special anchorage of longitudinal steel              | $v$   | $0.06f'_c$                                                                                                    | 120                                                                                  | 150                                   | 180                                   | 225                                  |
| Beams with properly designed web reinforcement and with special anchorage of longitudinal steel                 | $v$   | $0.12f'_c$                                                                                                    | 240                                                                                  | 300                                   | 360                                   | 450                                  |
| Flat slabs at distance $d$ from edge of column capital or dropped panel                                         | $v_r$ | $0.03f'_c$                                                                                                    | 60                                                                                   | 75                                    | 90                                    | 113                                  |
| Footings where longitudinal bars have no special anchorage                                                      | $v_r$ | $0.02f'_c$                                                                                                    | 40                                                                                   | 50                                    | 60                                    | 75                                   |
| Footings where longitudinal bars have special anchorage                                                         | $v_r$ | $0.03f'_c$                                                                                                    | 60                                                                                   | 75                                    | 90                                    | 113                                  |
| Bond: $u$                                                                                                       |       |                                                                                                               |                                                                                      |                                       |                                       |                                      |
| In beams and slabs and one-way footings:                                                                        |       |                                                                                                               |                                                                                      |                                       |                                       |                                      |
| Plain bars or structural shapes                                                                                 | $u$   | $0.04f'_c$                                                                                                    | 80                                                                                   | 100                                   | 120                                   | 150                                  |
| Deformed bars                                                                                                   | $u$   | $0.05f'_c$                                                                                                    | 100                                                                                  | 125                                   | 150                                   | 188                                  |
| In two-way footings:                                                                                            |       |                                                                                                               |                                                                                      |                                       |                                       |                                      |
| Plain bars or structural shapes                                                                                 | $u$   | $0.03f'_c$                                                                                                    | 60                                                                                   | 75                                    | 90                                    | 113                                  |
| Deformed bars                                                                                                   | $u$   | $0.0375f'_c$                                                                                                  | 75                                                                                   | 94                                    | 112                                   | 141                                  |
| (Where special anchorage is provided (see Art. 2618c), one and one-half times these values in bond may be used) |       |                                                                                                               |                                                                                      |                                       |                                       |                                      |
| Bearing: $f_c$                                                                                                  |       |                                                                                                               |                                                                                      |                                       |                                       |                                      |
| On full area                                                                                                    | $f_c$ | $0.25f'_c$                                                                                                    | 500                                                                                  | 625                                   | 750                                   | 938                                  |
| On one-third area*                                                                                              | $f_c$ | $0.375f'_c$                                                                                                   | 750                                                                                  | 938                                   | 1125                                  | 1405                                 |
| Pedestals (see Art. 2621e)                                                                                      | $r_a$ |                                                                                                               |                                                                                      |                                       |                                       |                                      |

\*The allowable bearing stress on an area greater than one-third but less than the full area shall be interpolated between the values given.

**TABLE No. 26-C—BENDING MOMENT COEFFICIENTS FOR RECTANGULAR PANELS SUPPORTED ON FOUR SIDES AND BUILT MONOLITHICALLY WITH SUPPORTS**

Coefficients are for moments in middle strips

| Moments                            | Short Span  |      |      |      |      |                 | Long Span<br>All<br>Values<br>of m |
|------------------------------------|-------------|------|------|------|------|-----------------|------------------------------------|
|                                    | Values of m |      |      |      |      |                 |                                    |
|                                    | 1.0         | 0.9  | 0.8  | 0.7  | 0.6  | 0.5<br>and less |                                    |
| Case 1—Interior Panels             |             |      |      |      |      |                 |                                    |
| Negative Moment at Continuous edge | .033        | .040 | .048 | .055 | .063 | .083            | .033                               |
| Discontinuous edge                 | .025        | .030 | .036 | .041 | .047 | .062            | .025                               |
| Positive Moment at Midspan         |             |      |      |      |      |                 |                                    |
| Case 2—One Edge Discontinuous      |             |      |      |      |      |                 |                                    |
| Negative Moment at Continuous edge | .041        | .048 | .055 | .062 | .069 | .085            | .041                               |
| Discontinuous edge                 | .021        | .024 | .027 | .031 | .035 | .042            | .021                               |
| Positive Moment at Midspan         | .031        | .036 | .041 | .047 | .052 | .064            | .031                               |
| Case 3—Two Edges Discontinuous     |             |      |      |      |      |                 |                                    |
| Negative Moment at Continuous edge | .049        | .057 | .064 | .071 | .078 | .090            | .049                               |
| Discontinuous edge                 | .025        | .028 | .032 | .036 | .039 | .045            | .025                               |
| Positive Moment at Midspan         | .037        | .043 | .048 | .054 | .059 | .068            | .037                               |
| Case 4—Three Edges Discontinuous   |             |      |      |      |      |                 |                                    |
| Negative Moment at Continuous edge | .058        | .066 | .074 | .082 | .090 | .098            | .058                               |
| Discontinuous edge                 | .029        | .033 | .037 | .041 | .045 | .049            | .029                               |
| Positive Moment at Midspan         | .044        | .050 | .056 | .062 | .068 | .074            | .044                               |
| Case 5—Four Edges Discontinuous    |             |      |      |      |      |                 |                                    |
| Negative Moment at Continuous edge | .033        | .038 | .043 | .047 | .053 | .055            | .033                               |
| Discontinuous edge                 | .050        | .057 | .064 | .072 | .080 | .083            | .050                               |
| Positive Moment at Midspan         |             |      |      |      |      |                 |                                    |

**TABLE No. 26-D—LIMITATIONS FOR SLAB THICKNESSES—DROPPED PANELS AND MOMENTS**

|                                                                                                          | Symbol         | Unit    | General Case                                                                                                         | Special Case For $c = .225l$                       |
|----------------------------------------------------------------------------------------------------------|----------------|---------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Minimum Floor Slab Thickness                                                                             | $t_1$ or $t_2$ | Inches  | .375 (long $l$ )                                                                                                     | 0.375 (long $l$ )                                  |
| Minimum Roof Slab Thickness                                                                              | $t_1$ or $t_2$ | Inches  | 0.300 (long $l$ )                                                                                                    | 0.300 (long $l$ )                                  |
| Slab Thickness without Dropped Panel                                                                     | $t_1$          | Inches  | $0.038 \left(1 - 1.44 \frac{c}{l}\right) l \sqrt{w'} + 1\frac{1}{2}$ (19)<br>$0.025l \sqrt{w'} + 1\frac{1}{2}$ (19a) |                                                    |
| Slab Thickness beyond Dropped Panel                                                                      | $t_2$          | Inches  | $0.02l \sqrt{w'} + 1$ (20)                                                                                           | $0.02l \sqrt{w'} + 1$ (20a)                        |
| Slab Thickness through Dropped Panel                                                                     | $t_1$          | Inches  | (Minimum = $1.25 t_2$ )<br>(Maximum = $1.50 t_2$ )                                                                   | (Minimum = $1.25 t_2$ )<br>(Maximum = $1.50 t_2$ ) |
| Minimum side or diameter of Dropped Panel                                                                | $b_1$          | Feet    | $0.35t_1$                                                                                                            | $0.35t_1$                                          |
| Numerical sum of positive and negative moments in direction of either side of interior rectangular panel | $M_o$          | ft. lb. | $0.09Wl \left(1 - \frac{2c}{3l}\right)^2$ (21)                                                                       | $0.065Wl$ (21a)                                    |

Maximum  $l$  shall be used in thickness formulas.

In these tables ( $l$ ), ( $t_1$ ), ( $b_1$ ) and ( $c$ ) are always expressed in feet while the units to which the formulas develop are shown in the column headed "units."

TABLE No. 26-E—MOMENTS TO BE USED IN DESIGN OF AN INTERIOR PANEL OR FLAT SLAB

|                                                                   | Symbol | Units   | General Case | Special Case<br>$c = \sqrt{.225}$ |
|-------------------------------------------------------------------|--------|---------|--------------|-----------------------------------|
| <b>TWO-WAY SYSTEM WITH DROPPED PANEL</b>                          |        |         |              |                                   |
| Column Strip, Negative Moment                                     | $-M_o$ | ft. lb. | $0.50M_o$    | $0.0325Wl$                        |
| Column Strip, Positive Moment                                     | $+M_o$ | ft. lb. | $0.20M_o$    | $0.0130Wl$                        |
| Middle Strip, Negative Moment                                     | $-M_m$ | ft. lb. | $0.15M_o$    | $0.00975Wl$                       |
| Middle Strip, Positive Moment                                     | $+M_m$ | ft. lb. | $0.15M_o$    | $0.00975Wl$                       |
| <b>TWO-WAY SYSTEM WITHOUT DROPPED PANEL</b>                       |        |         |              |                                   |
| Column Strip, Negative Moment                                     | $-M_c$ | ft. lb. | $0.46M_o$    | $0.030Wl$                         |
| Column Strip, Positive Moment                                     | $+M_c$ | ft. lb. | $0.22M_o$    | $0.0142Wl$                        |
| Middle Strip, Negative Moment                                     | $-M_m$ | ft. lb. | $0.16M_o$    | $0.0104Wl$                        |
| Middle Strip, Positive Moment                                     | $+M_m$ | ft. lb. | $0.16M_o$    | $0.0104Wl$                        |
| <b>FOUR-WAY SYSTEM WITH DROPPED PANELS (MOMENTS BY STRIPS)</b>    |        |         |              |                                   |
| Column Strip, Negative Moment                                     | $-M_o$ | ft. lb. | $0.54M_o$    | $0.0351Wl$                        |
| Column Strip, Positive Moment                                     | $+M_o$ | ft. lb. | $0.19M_o$    | $0.0124Wl$                        |
| Middle Strip, Negative Moment                                     | $-M_m$ | ft. lb. | $0.06M_o$    | $0.0052Wl$                        |
| Middle Strip, Positive Moment                                     | $+M_m$ | ft. lb. | $0.19M_o$    | $0.0124Wl$                        |
| <b>(MOMENTS BY BANDS)</b>                                         |        |         |              |                                   |
| Direct Band, Negative Moment                                      | $-M$   | ft. lb. | $0.307M_o$   | $0.0200Wl$                        |
| Direct Band, Positive Moment                                      | $+M$   | ft. lb. | $0.19M_o$    | $0.0124Wl$                        |
| Diagonal Band, Negative Moment                                    | $-M$   | ft. lb. | $0.168M_o$   | $0.0109Wl$                        |
| Diagonal Band, Positive Moment                                    | $+M$   | ft. lb. | $0.134M_o$   | $0.0087Wl$                        |
| Cross Band, Negative Moment                                       | $-M$   | ft. lb. | $0.08M_o$    | $0.0052Wl$                        |
| <b>FOUR-WAY SYSTEM WITHOUT DROPPED PANELS (MOMENTS BY STRIPS)</b> |        |         |              |                                   |
| Column Strip, Negative Moment                                     | $-M$   | ft. lb. | $0.50M_o$    | $0.0325Wl$                        |
| Column Strip, Positive Moment                                     | $+M$   | ft. lb. | $0.20M_o$    | $0.0130Wl$                        |
| Middle Strip, Negative Moment                                     | $-M$   | ft. lb. | $0.10M_o$    | $0.0065Wl$                        |
| Middle Strip, Positive Moment                                     | $+M$   | ft. lb. | $0.20M_o$    | $0.0130Wl$                        |
| <b>(MOMENTS BY BANDS)</b>                                         |        |         |              |                                   |
| Direct Band, Negative Moment                                      | $-M$   | ft. lb. | $0.30M_o$    | $0.0195Wl$                        |
| Direct Band, Positive Moment                                      | $+M$   | ft. lb. | $0.20M_o$    | $0.0130Wl$                        |
| Diagonal Band, Negative Moment                                    | $-M$   | ft. lb. | $0.141M_o$   | $0.0092Wl$                        |
| Diagonal Band, Positive Moment                                    | $+M$   | ft. lb. | $0.141M_o$   | $0.0092Wl$                        |
| Cross Band, Negative Moment                                       | $-M$   | ft. lb. | $0.10M_o$    | $0.0065Wl$                        |

**TABLE No. 26-F—MOMENTS TO BE USED IN DESIGN OF AN EXTERIOR  
PANEL OR FLAT SLAB**

Moments in the strips perpendicular to the discontinuous edge where they differ from an interior panel, are given in the following table. Negative moments in the column strip and middle strip on the line of the first interior columns are the same as for an interior panel.

Moments in the strips parallel to the discontinuous edge are the same as for an interior panel.

|                                                                   | Symbol | Units   | General Case | Special Case<br>$c = .225l$ |
|-------------------------------------------------------------------|--------|---------|--------------|-----------------------------|
| <b>TWO-WAY SYSTEM WITH DROPPED PANEL.</b>                         |        |         |              |                             |
| Column Strip Negative Moment at discontinuous edge                | $-M_c$ | ft. lb. | $0.45M_u$    | $0.029Wl$                   |
| Column Strip Positive Moment                                      | $+M_c$ | ft. lb. | $0.25M_u$    | $0.016Wl$                   |
| Middle Strip Negative Moment at discontinuous edge                | $-M_m$ | ft. lb. | $0.10M_u$    | $0.0065Wl$                  |
| Middle Strip Positive Moment                                      | $+M_m$ | ft. lb. | $0.19M_u$    | $0.012Wl$                   |
| <b>TWO-WAY SYSTEM WITHOUT DROPPED PANEL</b>                       |        |         |              |                             |
| Column Strip Negative Moment at discontinuous edge                | $-M_c$ | ft. lb. | $0.41M_u$    | $0.027Wl$                   |
| Column Strip Positive Moment                                      | $+M_c$ | ft. lb. | $0.28M_u$    | $0.018Wl$                   |
| Middle Strip Negative Moment at discontinuous edge                | $-M_m$ | ft. lb. | $0.10M_u$    | $0.007Wl$                   |
| Middle Strip Positive Moment                                      | $+M_m$ | ft. lb. | $0.20M_u$    | $0.013Wl$                   |
| <b>FOUR-WAY SYSTEM WITH DROPPED PANELS (MOMENTS BY STRIPS)</b>    |        |         |              |                             |
| Column Strip Negative Moment at discontinuous edge                | $-M$   | ft. lb. | $0.485M_u$   | $0.0315Wl$                  |
| Column Strip Positive Moment                                      | $+M$   | ft. lb. | $0.24M_u$    | $0.0156Wl$                  |
| Middle Strip Negative Moment at discontinuous edge                | $-M$   | ft. lb. | $0.05M_u$    | $0.0032Wl$                  |
| Middle Strip Positive Moment                                      | $+M$   | ft. lb. | $0.24M_u$    | $0.0156Wl$                  |
| <b>(MOMENTS BY BANDS) (FOR SQUARE PANEL)</b>                      |        |         |              |                             |
| Direct Band at Column Head at discontinuous edge                  | $-M$   | ft. lb. | $0.28M_u$    | $0.018Wl$                   |
| Direct Band at Center                                             | $+M$   | ft. lb. | $0.24M_u$    | $0.0156Wl$                  |
| Diagonal Bands at Column Head at discontinuous edge               | $-M$   | ft. lb. | $0.15M_u$    | $0.010Wl$                   |
| Diagonal Bands at Center                                          | $+M$   | ft. lb. | $0.17M_u$    | $0.011Wl$                   |
| Top Band (across Middle of Direct) at discontinuous edge          | $-M$   | ft. lb. | $0.05M_u$    | $0.003Wl$                   |
| <b>FOUR-WAY SYSTEM WITHOUT DROPPED PANELS (MOMENTS BY STRIPS)</b> |        |         |              |                             |
| Column Strip Negative Moment at discontinuous edge                | $-M$   | ft. lb. | $0.45M_u$    | $0.029Wl$                   |
| Column Strip Positive Moment                                      | $+M$   | ft. lb. | $0.25M_u$    | $0.0163Wl$                  |
| Middle Strip Negative Moment at discontinuous edge                | $-M$   | ft. lb. | $0.062M_u$   | $0.004Wl$                   |
| Middle Strip Positive Moment                                      | $+M$   | ft. lb. | $0.25M_u$    | $0.016Wl$                   |
| <b>(MOMENTS BY BANDS) (FOR SQUARE PANEL)</b>                      |        |         |              |                             |
| Direct Band at Column Head at discontinuous edge                  | $-M$   | ft. lb. | $0.27M_u$    | $0.017Wl$                   |
| Direct Band at Center                                             | $+M$   | ft. lb. | $0.25M_u$    | $0.016Wl$                   |
| Diagonal Bands at Column Head at discontinuous edge               | $-M$   | ft. lb. | $0.13M_u$    | $0.0084Wl$                  |
| Diagonal Bands at Center                                          | $+M$   | ft. lb. | $0.18M_u$    | $0.0117Wl$                  |
| Top Band (across Middle of Direct) at discontinuous edge          | $-M$   | ft. lb. | $0.06M_u$    | $0.004Wl$                   |

TABLE No. 26-G—MOMENTS TO BE USED IN DESIGN OF PANELS WITH MARGINAL BEAMS OR REINFORCED BEARING WALLS

|                                                                                                          |                                                                                                                     |                    |                    |                     |                    |                                                                           |                   |                   |                    |                   |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|---------------------|--------------------|---------------------------------------------------------------------------|-------------------|-------------------|--------------------|-------------------|
|                                                                                                          | Marginal Beams with Depth greater than $1\frac{1}{2}$ times the Slab Thickness; or reinforced Bearing Wall.         |                    |                    |                     |                    | Marginal Beam with depth $1\frac{1}{2}$ times the Slab Thickness or less. |                   |                   |                    |                   |
| (a) Load to be carried by Marginal Beam or Wall.                                                         | Loads directly superimposed upon it plus a uniform load equal to one-quarter of the total live and dead panel load. |                    |                    |                     |                    | Loads directly superimposed upon it exclusive of any panel load.          |                   |                   |                    |                   |
|                                                                                                          | Two-Way System                                                                                                      |                    |                    | Four-Way System     |                    | Two-Way System                                                            |                   |                   | Four-Way System    |                   |
|                                                                                                          |                                                                                                                     | With Drop          | Without Drop       | With Drop           | Without Drop       |                                                                           | With Drop         | Without Drop      | With Drop          | Without Drop      |
| (b) Moment to be used in the design of Half Column Strip adjacent and parallel to Marginal Beam or Wall. | Neg.                                                                                                                | .125M <sub>o</sub> | .115M <sub>o</sub> | .135M <sub>o</sub>  | .125M <sub>o</sub> | Neg.                                                                      | .25M <sub>o</sub> | .23M <sub>o</sub> | .27M <sub>o</sub>  | .25M <sub>o</sub> |
|                                                                                                          | Pos.                                                                                                                | .05 M <sub>o</sub> | .055M <sub>o</sub> | .0475M <sub>o</sub> | .05M <sub>o</sub>  | Pos.                                                                      | .10M <sub>o</sub> | .11M <sub>o</sub> | .095M <sub>o</sub> | .10M <sub>o</sub> |
| (c) Negative Moment to be used in Design of Middle Strip continuous over Beam or Wall.                   | Neg.                                                                                                                | .195M <sub>o</sub> | .208M <sub>o</sub> | .104M <sub>o</sub>  | .13M <sub>o</sub>  | Neg.                                                                      | .15M <sub>o</sub> | .16M <sub>o</sub> | .08M <sub>o</sub>  | .10M <sub>o</sub> |

TABLE No. 26-H—LENGTH OF BARS AND POINTS OF BEND

|                                                                   | With Drop                        |                               | Without Drop            |                  |
|-------------------------------------------------------------------|----------------------------------|-------------------------------|-------------------------|------------------|
|                                                                   | General Case                     | $c = .225l$                   | General Case            | $c = .225l$      |
| <b>TWO-WAY FLAT SLAB</b><br>(COLUMN STRIP)                        |                                  |                               |                         |                  |
| Length of straight bars (not less than .4 of total band steel)    | $l - b_1 + (2' \text{ or } 40d)$ | $.65l + (2' \text{ or } 40d)$ | .75l                    | .75l             |
| Length of bent bars (not less than .4 total band steel)           | $1.5l + .6c \uparrow$            | 1.635l $\uparrow$             | 1.44l + .66c $\uparrow$ | 1.59l $\uparrow$ |
| Length of additional straight bars over column head (if required) | .5l + .6c                        | .635l                         | .44l + .66c             | .59l             |
| Point of top bend in bent bars (from column center)               | .25l                             | .25l                          | .25l                    | .25l             |
| <b>MIDDLE STRIP</b>                                               |                                  |                               |                         |                  |
| Length of straight bars (not more than .5 total band steel)       | .65l                             | .65l                          | .7l                     | .7l              |
| Length of bent bars (not less than .5 total band steel)           | 1.5l $\uparrow$                  | 1.5l $\uparrow$               | 1.5l $\uparrow$         | 1.5l $\uparrow$  |
| Point of top bend in bent bars (from column centers)              | .175l                            | .175l                         | .15l                    | .15l             |
| <b>FOUR-WAY FLAT SLAB</b><br>(COLUMN STRIP)                       |                                  |                               |                         |                  |
| Length of straight bars (not less than .4 total band steel)       | $l - b_1 + (2' \text{ or } 40d)$ | $.65l + (2' \text{ or } 40d)$ | .75l                    | .75l             |
| Length of bent bars (not less than .4 total band steel)           | $1.5l + .6c \uparrow$            | 1.635l $\uparrow$             | 1.44l + .66c $\uparrow$ | 1.59l $\uparrow$ |
| Length of additional straight bars over column head (if required) | .5l + .6c                        | .635l                         | .44l + .66c             | .59l             |
| Point of bend for bent bars (from column centers)                 | .2l                              | .2l                           | .2l                     | .2l              |
| <b>DIAGONAL BAND</b>                                              |                                  |                               |                         |                  |
| Length of straight bars (not more than .6 total band steel area)  | $l - b_1 + (2' \text{ or } 40d)$ | $.65l + (2' \text{ or } 40d)$ | .75l                    | .75l             |
| Length of bent bars (not less than .4 total band steel area)      | 2.21l $\uparrow$                 | 2.21l $\uparrow$              | 2.21l $\uparrow$        | 2.21l $\uparrow$ |
| Point of bend for bent bars (from column centers)                 | .33l                             | .33l                          | .33l                    | .33l             |
| Length of additional straight bars over column head (if required) | .8l                              | .8l                           | .8l                     | .8l              |
| Top band across middle of direct band (length of straight bars)   | .5l                              | .5l                           | .5l                     | .5l              |

Note: To these lengths proper allowance to be added for bends.

TABLE No. 26-I—REQUIREMENTS FOR REINFORCED CONCRETE WALLS

| Maximum Height In Feet | Story    | Limiting Ratio—Distance Between Supports to Wall Thickness | Minimum Thickness In Inches |   |   |
|------------------------|----------|------------------------------------------------------------|-----------------------------|---|---|
| 38                     | 3        | 25                                                         | 6                           |   |   |
|                        | 2        |                                                            | 7                           | 6 |   |
|                        | 1        |                                                            | 7                           | 7 | 6 |
|                        | Basement |                                                            | 8                           | 8 | 8 |

TABLE No. 26-J—ALLOWABLE SHEAR ON BOLTS

| Diameter (in inches) | Embedment (in inches) | Shear (in pounds) |
|----------------------|-----------------------|-------------------|
| $\frac{1}{2}$        | $1\frac{1}{2}$        | 520               |
| $\frac{3}{8}$        | $1\frac{3}{4}$        | 820               |
| $\frac{3}{4}$        | 2                     | 1180              |
| $\frac{7}{8}$        | $2\frac{1}{4}$        | 1600              |
| 1                    | $2\frac{1}{2}$        | 2100              |
| $1\frac{1}{8}$       | 3                     | 2660              |
| $1\frac{1}{4}$       | 4                     | 3280              |

|                              | SIMPLE SPAN* | CONTINUOUS SPAN |
|------------------------------|--------------|-----------------|
| 6 x 6 6/6 Mesh               | 5'-6"        | 7'-0"           |
| 6 x 6 6/6 Mesh w/#3 18" o.c. | 8'-0"        | 10'-0"          |
| 6 x 6 Mesh w/#3 12" o.c.     | 9'-6"        | 12'-0"          |
| 6 x 6/6 Mesh w/#3 6" o.c.    | 12'-0"       | -               |
| 6 x 12 o/1                   | 9'-6"        | 12'-0"          |
| 6 x 12 0/1 w/#3 18" o.c.     | 12'-0"       |                 |

4" slab 2500 P.S.I. Concrete Center to Center Grade Beam or Support.

NOTE: Place bars in direction of span. Place fabric with narrow mesh in direction of span.

\*A simple span rests upon a support at each end.

\*\*A continuous span is supported on more than two supports. Continuous spans are commonly used in reinforced concrete construction.



## ARTICLE 2701. DESIGN.

The design of all structural steel and iron used in buildings or structures shall conform to the requirements specified in this Chapter, except that designs conforming to the "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", of the American Institute of Steel Construction, where not in conflict with specific requirements of this Code, shall be deemed good engineering practice and complying with the requirements of this Code.

These requirements are intended to govern the design, fabrication, and erection of structural steel for buildings and other structures covered by building code requirements. The requirements do not apply to steel joists, members formed of flat-rolled sheet, or strip steel, light-gauge steel construction, skylights, marques (except structural frame), fire escapes, or other miscellaneous light steel constructions, which are provided for elsewhere in this Chapter.

The computation and design shall be properly made so that the unit working stresses specified in this Chapter are not exceeded. The structure and its details shall possess the requisite strength and rigidity for proper stability and the design of structural members shall be such as to admit of a rational analysis according to well established principles of mechanics and sound engineering practice.

## ARTICLE 2702. MATERIALS.

(a) **Structural Steel.** Structural steel shall conform to the "Standard Specifications for Structural Steel for Bridges and Buildings" (A.S.T.M.).

(b) **Rivet Steel.** Rivet steel shall conform to the "Standard Specifications for Structural Rivet Steel" (A. S. T. M.).

(c) **Pipe.** Steel pipe for steel pipe columns shall be of such quality as to conform to "Standard Specifications for Welded and Seamless Steel Pipe", (A. S. T. M.), and shall be a medium carbon steel manufactured by the open hearth or electric furnace process.

(d) **Cast Steel.** Cast steel used in buildings or structures shall be of such quality as to conform to the "Standard Specifications for Carbon Steel Castings" (A. S. T. M.).

(e) **Cast Iron.** Cast iron used in buildings or structures shall be of such quality as to conform to the "Standard Specifications for Gray Iron Castings" (A. S. T. M.).

(f) **Stock Material.** Stock material shall be of a quality equal to that called for by Sub-Article (a). Mill test reports shall constitute sufficient record as to the material taken from stock.

Unidentified stock material if free from surface imperfections, may be used for short sections of minor importance, or for small unimportant details, where the precise physical properties of the material would not affect the strength of the structure.

(g) **Filler Metal.** Arc-Welding electrodes shall conform to the requirements of the "Specifications for (Mild) Steel Arc-Welding Electrodes" of the American Welding Society. Electrodes shall be of Classification Numbers E6010, E6011, E6012, E6013, E6020 or E6030 and shall be suitable for the positions and other conditions of intended use.

With each container of electrodes the manufacturer shall furnish instructions giving recommended voltage and amperage (and polarity if direct current) for all uses and welding positions for which the electrode is suitable.

(h) **Tests.** All structural steel, cast steel and cast iron shall be tested in accordance with the above specifications when deemed necessary by the Director, and copies of such tests shall be filed in the office of the Director. No structural steel, cast steel and cast iron shall be used in any building or structure which does not comply with the above requirements or for which no test results have been filed with the Director. All such tests shall be made by competent testing laboratories at the expense of the owner.

## ARTICLE 2703. LOADS AND FORCES.

(a) **Dead Load, Live Load and Other Forces.** The dead load, live load, snow load if any, wind force and other forces due to extraordinary conditions, to be assumed in design, shall be as specified in Chapter 23.

(b) **Impact.** For structures carrying live loads which induce impact or vibration, the assumed live load shall be increased sufficiently to provide for same.

If not otherwise specified, the increase shall be:

|                                                                                   |              |
|-----------------------------------------------------------------------------------|--------------|
| For supports of elevators .....                                                   | 100 per cent |
| For traveling crane supports girders and their connections .....                  | 25 per cent  |
| For supports of light machinery, shaft or motor driven units, not less than ..... | 20 per cent  |



For supports of reciprocating machinery or power driven units, not less than ..... 50 per cent  
 For threaded hanger rods supporting floors and balconies ..... 33 1/3 per cent  
 (c) **Crane Runway Horizontal Forces.** The lateral force on crane runways to provide for the effect of moving crane trolleys shall, if not otherwise specified, be twenty per cent (20%) of the sum of the weights of the lifted load and of the crane trolley (but exclusive of other parts of the crane), applied at the top of rail one-half (1/2) on each side of runway; and shall be considered as acting in either direction normal to the runway rail.

The longitudinal force shall, if not otherwise specified, be taken as ten per cent (10%) of the maximum wheel loads of the crane applied at the top of rail.

#### ARTICLE 2704. MEMBERS SUBJECT TO REVERSAL OF STRESS.

(a) **Section of Member.** The sectional area of the portion between connections, of members subject to reversal of stress, need not be increased by reason of the reversal, but shall be sufficient in area and disposition to provide for the maximum compression, and the maximum tension, separately.

(b) **Reinforcements at Connections.** The sectional area of members subject to loads (other than wind loads) producing alternating tensile and compressive stresses shall be augmented, at the approach to a connection, by riveting or welding on additional material, so that the augmented section shall comply with the following rule:

To the net total compressive stress, and to the net total tensile stress, add arithmetically fifty per cent (50%) of the smaller of these two; and proportion the connected material, and the connecting rivets, bolts, pins or welds, for each of the two increased stresses thus separately obtained at the unit stresses prescribed in Article 2708 (a).

If the reversal may be expected to occur over 100,000 times in the life of the building, the unit stresses in the connected material and in the connecting rivets, bolts, pins or welds shall not exceed seventy-five per cent (75%) of those specified in Article 2708 (a). Sharp notches, copes and other sudden changes of cross section shall be particularly avoided in and adjacent to such connections.

#### ARTICLE 2705. COMBINED STRESSES.

(a) **Axial and Bending.** Members subject to both axial and bending stresses shall be so proportioned that the quantity  $\frac{f_a}{F_a} + \frac{f_b}{F_b}$  shall not exceed unity, in which:

$F_a$  = axial unit stress that would be permitted by this Code if axial stress only existed.  
 $F_b$  = bending unit stress that would be permitted by this Code if bending stress only existed.

$f_a$  = axial unit stress (actual) = axial stress divided by area of member.  
 $f_b$  = bending unit stress (actual) = bending moment divided by section (modulus) of member.

(b) **Shear with Tension or Compression.** Rivets, bolts and welds subject to shearing and externally applied tensile or compressive forces shall be so proportioned that the combined unit stress will not exceed the unit allowed for shear in Article 2708 (a).

#### ARTICLE 2706. COMPOSITE BEAMS.

(a) **Definition.** The term "composite beam" shall apply to any rolled or fabricated steel floor beam entirely encased in a poured concrete haunch at least four inches wider, at its narrowest point than the flange of the beam; supporting a concrete slab on each side without openings adjacent to the beam; provided that the top of the beam is at least one and one-half inches (1 1/2") below the top of the slab and at least two inches (2") above the bottom of the slab; provided that a good grade of stone or gravel concrete, with Portland cement, is used; and provided that the concrete haunch has adequate mesh, or other reinforcing steel, throughout its whole depth and across its soffit.

(b) **Design Assumptions.** Composite beams may be figured on the assumption that:

1. The steel beam carries unassisted all dead loads prior to the hardening of the concrete, with due regard for any temporary support provided, and
2. The steel and concrete carry by joint action all loads, dead and live, applied after the hardening of the concrete.

(c) **Unit Stresses.** The total tensile unit stress in the extreme fibre of the steel beam thus computed shall not exceed 20,000 pounds per square inch, (Article 2708 (a)).

The maximum stresses in the concrete, and the ratio of Young's (moduli) for steel and concrete, shall be as prescribed in Chapter 26 governing the design of reinforced concrete.

(d) **End Shear.** The web and the end connections of the steel beam shall be designed to carry the total dead and live load, except as this may be reduced by the provision of other proper support.

**ARTICLE 2707. EFFECTIVE SPAN LENGTH.**

(a) **Simple Spans.** Beams, girders and trusses shall ordinarily be designed on the basis of simple spans whose effective length is equal to the distance between centers of gravity of the members to which they deliver their end reactions.

(b) **End Restraint.** When designed on the assumption of end restraint full or partial, due to continuous, semi-continuous or cantilever action, the beams, girders and trusses, as well as the sections of the members to which they connect, shall be designed to carry the shears and (moments) so introduced, as well as all other forces without exceeding at any point the unit stresses prescribed in Article 2708 (a); except that some non-elastic but self-limiting deformation of a part of the connection may be permitted when this is essential to the avoidance of overstressing of a weld.

**ARTICLE 2708. ALLOWABLE UNIT STRESSES.**

Except as provided in this Article under "Bending", under "Wind Only" and under "Wind and Other Forces", all parts of the structure shall be so proportioned that the unit stress in pounds per square inch shall not exceed the following values:

**(a) Structural Steel Rivets, Bolts and Weld Metal****(1) TENSION –**

|                                                                            |        |
|----------------------------------------------------------------------------|--------|
| Structural Steel, net section .....                                        | 20,000 |
| Butt Welds, section through throat .....                                   | 20,000 |
| Rivets, on area based on nominal diameter .....                            | 20,000 |
| Bolts and other threaded parts, on nominal area<br>at root of thread ..... | 20,000 |

**(2) COMPRESSION –**

|                                                   |                     |
|---------------------------------------------------|---------------------|
| Columns, gross section for axially loaded columns | 12                  |
| with values of $1/r$ not greater than 120 .....   | $17,000 - 0.485r^2$ |

For axially loaded bracing and other secondary

|                                                     |        |
|-----------------------------------------------------|--------|
| members with values of $1/r$ greater than 120 ..... | 18,000 |
|-----------------------------------------------------|--------|

$$\frac{1}{18,000r^2}$$

$$18,000r^2$$

in which 1 is the unbraced length of the column, and r is the corresponding radius of gyration of the section, both in inches.

|                                              |        |
|----------------------------------------------|--------|
| Plate Girder Stiffeners, gross section ..... | 20,000 |
|----------------------------------------------|--------|

|                                                                                    |        |
|------------------------------------------------------------------------------------|--------|
| Webs of Rolled Sections at toe of fillet (Crippling, See<br>Article 2719 (h) ..... | 24,000 |
|------------------------------------------------------------------------------------|--------|

|                                                      |        |
|------------------------------------------------------|--------|
| Butt Welds – Section through throat (Crushing) ..... | 20,000 |
|------------------------------------------------------|--------|

**(3) BENDING –**

Tension on extreme fibre of rolled sections, plate girders,  
and built-up members.

|                             |        |
|-----------------------------|--------|
| (See Article 2719 (a) ..... | 20,000 |
|-----------------------------|--------|

Compression on extreme fibre of rolled sections, plate  
girders, and built-up members.

|                                                 |        |
|-------------------------------------------------|--------|
| With $\frac{1d}{bt}$ not in excess of 600 ..... | 20,000 |
|-------------------------------------------------|--------|

|                                             |                                    |
|---------------------------------------------|------------------------------------|
| With $\frac{1d}{bt}$ in excess of 600 ..... | $\frac{12,000,000}{\frac{1d}{bt}}$ |
|---------------------------------------------|------------------------------------|

$$\frac{1d}{bt}$$

in which 1 is the unsupported length and d the depth, of the member; b is the width, and t the thickness, of its compression flange; all in inches; except that 1 shall be taken as twice the length of the compression flange of a cantilever beam not fully stayed at its outer end against translation or rotation.

|                                       |        |
|---------------------------------------|--------|
| Stress on extreme fibre of pins ..... | 30,000 |
|---------------------------------------|--------|

Fiber stresses in butt welds, due to bending, shall not exceed the values prescribed for tension and compression, respectively.

Fully continuous beams and girders may be proportioned for negative moments which are maximum at interior points of support, at a unit

bending stress twenty per cent (20%) higher than above stated; provided that the section modulus used over supports shall not be less than that required for the maximum positive moments in the same beam or girder, and provided that the compression flange shall be regarded as unsupported from the support to the point of contraflexure. For columns proportioned for combined axial and bending stresses, the maximum unit bending stress  $F_b$ , Article 2705 (a) may be taken at 24,000 pounds per square inch, when this stress is induced by the gravity loading of fully or partially restrained beams framing into the columns.

(4) **SHEARING** —

|                                                                                                                                                                                                                 |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Rivets .....                                                                                                                                                                                                    | 15,000 |
| Pins, and turned bolts in reamed or drilled holes .....                                                                                                                                                         | 15,000 |
| Unfinished bolts .....                                                                                                                                                                                          | 10,000 |
| Webs of beams and plate girders, gross section .....                                                                                                                                                            | 13,000 |
| Weld Metal on section through throat or fillet weld,<br>or on faying surface area of plug or slot weld .....                                                                                                    | 13,600 |
| surface area of plug or slot weld .....                                                                                                                                                                         | 13,600 |
| on section through throat of butt weld .....                                                                                                                                                                    | 13,600 |
| (Stress in a fillet weld shall be considered as shear on the throat, for any direction of applied stress. Neither plug nor slot welds shall be assigned any values in resistance to stresses other than shear.) |        |

(5) **BEARING** —

|                                                                 | Double Shear | Single Shear |
|-----------------------------------------------------------------|--------------|--------------|
| Rivets .....                                                    | 40,000       | 32,000       |
| Turned bolts in reamed or drilled holes .....                   | 40,000       | 32,000       |
| Unfinished bolts .....                                          | 25,000       | 20,000       |
| Pins .....                                                      |              | 32,000       |
| Contact Area                                                    |              |              |
| Milled stiffeners and Other Milled<br>Surfaces .....            |              | 30,000       |
| Fitted Stiffeners .....                                         |              | 27,000       |
| Expansion rollers and rockers<br>(pounds per linear inch) ..... |              | 600d         |
| in which d is diameter of roller or rocker in inches.           |              |              |

(b) **Cast Steel.** Compression and Bearing, same as for Structural Steel. Other Unit Stresses, seventy-five per cent (75%) of those for Structural Steel.

(c) **Cast Iron.** On cast columns, with square or fixed ends:  $P=9,000-401/r$  with a minimum gross diameter of six inches (6") and with the ratio  $1/r$  never in excess of 70.

In the foregoing formulas "P" equals the maximum unit working stress in pounds per square inch; 1 equals the unsupported length of the column or compression member in inches; and r equals the least radius of gyration of the column or compression member.

(d) **Masonry Bearing.** See Chapters 24 and 26 for Masonry and Concrete bearing values.

(e) **Wind Only.** Members subject only to stresses produced by wind forces may be proportioned for unit stress thirty-three and one-third per cent (33-1/3%) greater than those specified for dead and live load stresses. A corresponding increase may be applied to the allowable unit stresses in their connecting rivets, bolts or welds.

(f) **Wind and Other Forces.** Members subject to stress produced by a combination of wind and other loads may be proportioned for unit stresses thirty-three and one-third per cent (33-1/3%) greater than those specified for dead and live load stresses, provided the section thus required is not less than that required for the combination of dead load, live load, and impact (if any). A corresponding increase may be applied to the allowable unit stresses in their connecting rivets, bolts or welds.

(g) **Effective Areas of Weld Metal.** The effective area of butt and fillet welds shall be considered as the effective length of weld times the effective throat thickness.

The effective shearing area of plug and slot welds shall be considered as the nominal cross sectional area of the hole or slot, in the plane or the faying surface.

The effective area of fillet welds in holes and slots shall be computed as above specified for fillet welds, using for the effective length, the length of center line of the weld through the center of the plane through the throat. However, in the case of overlapping fillets the effective area shall not exceed the nominal cross-sectional area of the hole or slot, in the plane of the faying surface.

The effective length of a fillet weld shall be the overall length of full-size fillet, including returns.

The effective length of a butt weld shall be the width of the part joined when ends of the weld are made as specified in Article 2726 (k), final paragraph. A transverse skewed butt weld shall not be assumed in computations to be longer than the width of the joint or piece perpendicular to the direction of stress.

The effective throat thickness of a fillet weld shall be the width shortest distance from the root to the face of the diagrammatic weld. (The effective throat thickness of an equal leg 45 degree fillet weld is 0.707 times the nominal size of the weld.)

The effective throat thickness of a complete-penetration butt weld (i.e., a weld conforming to the requirements of Article 2726 (k) 2nd paragraph) shall be the thickness of the thinner part joined.

The effective throat thickness of an incomplete-penetration butt weld (i.e., a butt weld not conforming to the requirements of Article 2726 (k), 2nd paragraph, but conforming to same Article, 3rd paragraph) shall, for design purposes, be considered as seventy-five per cent (75%) of the thickness of the thinner part joined.

#### ARTICLE 2709. SLENDERNESS RATIO.

(a) The ratio of unbraced length to the least radius of gyration  $\frac{l}{r}$  for compression members and for tension members other than rods shall not exceed:

|                                                              |     |
|--------------------------------------------------------------|-----|
| For main compression members .....                           | 120 |
| For bracing and other secondary members in compression ..... | 200 |
| For main tension members .....                               | 240 |
| For bracing and other secondary members in tension .....     | 300 |

(b) The slenderness ratio of a main compression may exceed 120, but not 200, provided that it is not ordinarily subject to shock or vibratory loads but provided that its unit stress under full design loading shall not exceed the following fraction of that stipulated under Article 2708 (a) (2) for its actual ratio  $Z/r$

$$1.6 \sim \left( \frac{Z}{200r} \right)$$

#### ARTICLE 2710. DEPTH RATIO.

(a) **Simple Spans.** The depth of beams and girders in floors shall if practicable be not less than 1/24 of the span, and where subject to shocks or vibrations not less than 1/20. If members of less depth are used, the unit stress in bending shall be decreased in the same ratio as the depth is decreased from that above recommended.

The depth of roof purlins shall, if practicable, be not less than 1/24 of the span, and in no case less than 1/30 of the span, except in the case of corrugated sheeting roofs, with a slope not less than 4-1/4 in 12.

Beams and girders supporting plastered ceilings shall, if practicable, be so proportioned that the maximum live load deflection will not exceed 1/360 of the span.

(b) **Restrained and Continuous Spans.** Minimum depth-ratios for restrained and continuous spans shall, if practicable, be such that the deflections at critical points will be not greater than those of simple spans of the minimum depth-ratio recommended under Sub-Article (a).

(c) **Secondary Tension Members.** The horizontal projection of the length of bracing and secondary members in tension, other than rods, shall, if practicable, not exceed ninety (90) times the depth.

#### ARTICLE 2711. MINIMUM THICKNESS OF MATERIAL.

(a) **General.** The minimum thickness required for protection against crippling, buckling and shear shall be as prescribed in paragraphs (b) and (c) of this Article and in paragraph (b) of Article 2719, respectively. Those stipulations assume that the material is straight and true as erected, within the limits prescribed in Article 2726 (o), and is not reduced by corrosion.

No further stipulations as to minimum thickness shall apply to steelwork exposed to conditions no more seriously corroding than an indoor atmosphere controlled for human comfort, subject always to the requirements of Article 2727 (a).

The following stipulations (1) and (2) as to minimum thickness shall apply to exterior steelwork enclosed in a non-impervious envelope or exposed to frequent rain or snow, and to interior steelwork subject to atmospheric exposure more corrosive than that mentioned in the preceding paragraph.

- (1) Columns, studs, lintels, girders and beams; exterior trusses, exterior bracing members; one-fourth inch (1/4") minimum.
- (2) Purlins, girts, trusses and bracing members sheltered from direct exposure to rain and snow; three-sixteenths inch (3/16") minimum.

The controlling thickness of rolled shapes, for the purposes of stipulations (1) and (2), shall be taken as the mean thickness of their flanges, regardless of web thickness.

Steelwork exposed to industrial fumes or vapor shall be given special protection.

(b) **Projecting Elements Under Compression.** Projecting elements of members subjected to axial compression or compression due to bending shall have ratios of width to thickness not greater than the following:

Single angle struts 12.

Double-angle struts, angles or plates projecting from girders, columns or other compression members; compression flanges of beams; stiffeners on plate girders; flanges or stems of tees; 16.

The width of plates shall be taken from the free edge to the first row of rivets or welds; the width of legs of angles, channels and tees, and of the stems of tees, shall be taken as the full nominal dimension; the width of flanges of beams and tees shall be taken as one-half the full nominal width. The thickness of a sloping flange shall be measured halfway between a free edge and the corresponding face of the web.

When a projection element exceeds the width-to-thickness ratio prescribed in the preceding paragraph, but would conform to same and would satisfy the stress requirements with a portion of its width considered as removed, the member will be considered acceptable without the actual removal of the excess width.

(c) **Compression Members.** In compression members the unsupported width of web, cover or diaphragm plates between the nearest lines of rivets or welds, or between the roots of the flanges in case of rolled sections, shall not exceed forty (40) times the thickness.

When the unsupported width exceeds this limit, but a portion of its width no greater than forty (40) times the thickness would satisfy the stress requirements, the member will be considered acceptable.

The unsupported width of cover plates perforated with a succession of access holes, only the least net width across holes being assumed available to resist compression, may exceed forty (40), but shall not exceed fifty (50), times the thickness.

#### ARTICLE 2712. GROSS AND NET SECTIONS.

(a) **Definitions.** The gross section of a member at any point shall be determined by summing the products of the thickness and the gross width of each element as measured normal to the axis of the member. The net section shall be determined by substituting for the gross width the net width computed in accordance with Sub-Articles (c) to (g) of this Article.

(b) **Application.** Unless otherwise specified, tension members shall be designed on the basis of net section. Columns shall be designed on the basis of gross section. Beams and girders shall be designed in accordance with Article 2719 (a).

In determining the net section across plug or slot welds the weld metal shall not be considered as adding to the net area.

(c) **Net Width.** In the case of a chain of holes extending across a part in any diagonal or zigzag line, the net width of the part shall be obtained by deducting from the gross width the sum of the diameters of all the holes in the chain, and adding, for each gage space in the chain, the quantity,

$$\frac{s^2}{4g}, \text{ where}$$

s = Logitudinal spacing (pitch) in inches of any two successive holes.

g = Transverse spacing (gage) in inches of the same two holes.

The critical net section of the part is obtained from that chain which gives the least net width.

(d) **Angles.** For angles, the gross width shall be the sum of the widths of the legs less the thickness. The gage for holes in opposite legs shall be the sum of the gages from back of angle less the thickness.

(e) **Splice Members.** For splice members, the thickness considered shall be only that part of the thickness of the member which has been developed by rivets or welds beyond the section considered.

(f) **Size of Holes.** In computing net area, the diameter of a rivet hole shall be taken as one-eighth inch (1/8") greater than the nominal diameter of the rivet.

(g) **Pin Holes.** In pin connected tension members, other than forged eyebars, the net section across the pin hole, transverse to the axis of the member, shall be not less than one-hundred thirty-five per cent (135%), and the net section beyond the pin hole, parallel with the axis of the member, not less than ninety per cent (90%), of the net section of the body of the member.

In all pin-connected riveted members, the net width across the pin hole, transverse to the axis of the member, shall not exceed eight (8) times the thickness of the member at the pin, unless lateral buckling is prevented.

#### ARTICLE 2713. EXPANSION.

(a) **Transverse Expansion.** No provision for transverse expansion in structures need be made in wall bearing spans of fifty feet (50') and under. Wall bearing spans of over fifty feet (50') and up to and including one hundred feet (100') shall slide on smooth surfaces at one end. Wall bearing spans of over one hundred feet (100') shall have expansion rollers or rockers at one end. Expansion ends shall be secured against lateral movement; fixed ends against movement in any direction.

(b) **Longitudinal Expansion.** Provision shall be made for longitudinal expansion of the structure. All expansion provisions shall be figured for 100 degrees F. variation in temperature and for a coefficient of expansion of 0.0000065 per degree per unit of length. Expansion joints in buildings having masonry wall enclosures shall be so spaced as to inhibit visible cracking of the walls.

#### ARTICLE 2714. CONNECTIONS.

(a) **Minimum Connections.** Connections carrying calculated stresses, except for lacing, sag bars, and girts, shall be designed for not less than 10,000 pounds, if welded; or if riveted or bolted, shall have no fewer than two rivets or two bolts.

(b) **Eccentric Connections.** Members meeting at a point shall have their gravity axis meet at a point if practicable; if not, provision shall be made for bending stresses due to the eccentricity.

(c) **Placement of Rivets and Welds.** The rivets or welds at the ends of any member transmitting stresses into that member should preferably have their centers of gravity on the gravity axis of the member; otherwise, provision shall be made for the effect of the resulting eccentricity. Pins may be so placed as to counteract the effect of bending due to dead load.

(d) **Unrestricted Members.** Except as otherwise indicated by the designer, all connections of beams, girders or trusses shall be designated as flexible and may ordinarily be proportioned for the reaction shears only. If, however, the eccentricity of the connection is excessive, provision shall be made for the resulting (moment).

Flexible beam connections shall permit the ends of the beam to rotate sufficiently to accommodate its deflection by providing for a horizontal displacement of the top flange as determined as follows:

- (e) = .007d if the beam is designed for full uniform load and for live load deflection not exceeding 1/360th of the span (See Article 2710 (a); or  
e =  $f \times L$  if the beam is designed for full uniform load producing 3,625,000 the unit stress  $f$  at mid span;

where  $e$  = the horizontal displacement between the top and bottom of the beam at its end, in inches.

$f$  = the flexural unit stress in the beam at mid span; p.s.i.

$d$  = the depth of the beam, in inches.

$L$  = the span of the beam, in feet.

(e) **Restrained Members.** When beams, girders or trusses are subject both to reaction shear and end (moment) due to full or partial end restraint, or to continuous or cantilever construction, their connections shall conform to the requirements of Article 2705 (b).

(f) **Fillers.** In riveted construction, when rivets carrying computed stress pass through fillers, the fillers shall be extended beyond the connected member and the extension secured by enough rivets to distribute the total stress in the member uniformly over the combined section of the member and filler.

Fillers under the stiffeners on riveted plate girders, at end bearings or at points of concentrated loads, shall be secured by sufficient rivets to prevent excessive bending and bearing stresses.

In welded construction, when a filler is used between two parts connected in shear, there shall be sufficient welding to transfer the shearing stress from one part to the filler and from the filler to the other part. Fillers of less than one-fourth inch ( $\frac{1}{4}$ " ) thickness shall not be used to transfer stress, but shall be trimmed flush with the welded edges of the stress-carrying element and the sizes of the welds along the edges shall be increased over the required sizes by an amount equal to the thickness of the filler.

(g) **Connections of Tension and Compression Members in Trusses.** The connections at ends of tension or compression members in trusses shall either develop the full effective strength of the material, or they shall develop the strength required by the total stresses; but in no case shall such strength developed be less than fifty per cent (50%) of the effective strength of the material connected.



(h) **Milled Joints in Compression Members.** Where compression members are in full-milled bearing on base plates, and where full-milled tier-building columns are spliced, there shall be sufficient rivets, bolts or welds to hold all parts securely in place.

Where other compression members are spliced by full-milled bearing the splice material and its riveting or welding shall be arranged to hold all parts in line and shall be proportioned for fifty per cent (50%) of the computed stress.

All the foregoing joints shall be proportioned to resist any tension that would be developed by specified wind forces acting in conjunction with seventy-five per cent (75%) of the calculated dead load stress and no live load, if this condition will produce more tension than with full dead load and live load applied.

(i) **Combinations of Welds.** If two or more of the general types of weld (butt, fillet, plug, slot) are combined in a single joint, the effective capacity of each shall be separately computed with reference to the axis of the group, in order to determine the allowable capacity of the combination.

#### **ARTICLE 2715. RIVETS AND BOLTS.**

(a) **Diameter.** In proportioning and spacing rivets, the nominal diameter of the undriven rivet shall be used.

(b) **Effective Bearing Area.** The effective bearing area of pins, bolts, and rivets shall be the diameter multiplied by the length in bearing; except that for countersunk rivets half the depth of the countersink shall be deducted.

(c) **Double and Single Shear Bearing.** Only that portion of a rivet or bolt shall be considered in double shear bearing, which lies between two portions which share the reaction therefrom. The remainder of the rivet or bolt shall be considered in single shear bearing.

(d) **Long Grips.** Rivets which carry calculated stress, and the grip of which exceeds five diameters, shall have their number increased one per cent (1%) for each additional one-sixteenth inch ( $1/16''$ ) in the rivet grip. Special care shall be used in heating and driving such rivets.

(e) **Unfinished Bolts.** If unfinished bolts are provided with washers under nuts, and have unthreaded shanks extending completely through the joined parts, the shearing and bearing values elsewhere prescribed for unfinished bolts may be increased one-eighth ( $1/8$ ).

(f) **Turned Bolts.** Turned bolts in close fitting holes as specified in Article 2726 (c), may be used in shop or field work where it is impracticable to drive satisfactory rivets. The finished shank shall be long enough to provide full bearing, and washers shall be used under the nuts to give full grip when the nuts are turned tight.

The term "turned bolts", as used in this Code, embraces all bolts regardless of the manufacturing process which have a tolerance on the nominal diameter of 0 over, .006" under, and which have "regular semi-finished" heads conforming to "Wrench-Head Bolts and Nuts and Wrench Openings" of the American Institute of Bolt, Nut and Rivet Manufacturers.

#### **ARTICLE 2716. SPACING AND RIVETS.**

(a) **Minimum Pitch.** The minimum distance between centers of rivet holes shall preferably be not less than three (3) times the diameter of the rivet.

(b) **Maximum Pitch in Compression Member.** The maximum pitch in the line of stress of compression members composed of plates and shapes shall not exceed sixteen (16) times the thickness of the thinnest outside plate or shape, nor twenty (20) times the thickness of the thinnest enclosed plate or shape, with a maximum of twelve inches (12).

At right angles to the direction of stress, the distance between lines of rivets shall not exceed thirty-two (32) times the thickness of the thinnest plate where there is more than one ply. For angles in built-up sections with two gage lines, with rivets staggered, the maximum pitch in the line of stress in each gage line shall not exceed twenty-four (24) times the thickness of the thinnest plate with a maximum of eighteen inches (18").

(c) **End Pitch in Compression Members.** The pitch of rivets at the ends of built compression members shall not exceed four diameters of the rivets for a length equal to one and one-half ( $1\frac{1}{2}$ ) times the maximum width of the member.

(d) **Two-Angle Members.** In tension members composed of two angles, a pitch of three feet six inches ( $3'6''$ ) will be allowed, and in compression members, two feet no inches ( $2'0''$ ), but the ratio  $1/r$  for each angle between rivets shall be not more than three-fourths ( $3/4$ ) of that for the whole member.

(e) **Minimum Edge Distance.** The minimum distance from the center of any punched rivet hole to any edge shall be that given in Table No. 27-A.

TABLE No. 27-A

| Rivet Diameter<br>Inches | Minimum Edge Distance (Inches) for Punched Holes |                             |                                           |
|--------------------------|--------------------------------------------------|-----------------------------|-------------------------------------------|
|                          | In Sheared<br>Edge                               | In Rolled Edge<br>of Plates | In Rolled Edge<br>of Structural<br>Shapes |
| $\frac{1}{2}$            | 1                                                | $\frac{7}{8}$               | $\frac{3}{4}$ *                           |
| $\frac{5}{16}$           | $1\frac{1}{8}$                                   | 1                           | $\frac{7}{8}$ *                           |
| $\frac{3}{8}$            | $1\frac{1}{4}$                                   | $1\frac{1}{8}$              | 1                                         |
| $\frac{7}{16}$           | $1\frac{1}{2}$                                   | $1\frac{1}{4}$              | $1\frac{1}{8}$ *                          |
| 1                        | $1\frac{3}{4}$                                   | $1\frac{1}{2}$              | $1\frac{1}{4}$ *                          |
| $1\frac{1}{8}$           | 2                                                | $1\frac{3}{4}$              | $1\frac{1}{2}$ *                          |
| $1\frac{1}{4}$           | $2\frac{1}{4}$                                   | 2                           | $1\frac{3}{4}$ *                          |

\*May be decreased  $\frac{1}{8}$ -inch when holes are near end of beam.

(f) **Minimum Edge Distance in Line of Stress.** The distance from the center of any rivet under computed stress, and that end or other boundary of the connected member toward which the pressure of the rivet is directed, shall be not less than the shearing area of the rivet shank (single or double shear respectively) divided by the plate thickness.

This end distance may however be decreased in such proportion as the stress per rivet is less than that permitted under Article 2708 (a); and the requirement may be disregarded in case the rivet in question is one of three or more in a line parallel to the direction of stress.

(g) **Maximum Edge Distance.** The maximum distance from the center of any rivet to the near edge shall be twelve (12) times the thickness of the plate, but shall not exceed six inches (6").

#### ARTICLE 2717. WELDS.

(a) **Types of Welds.** Butt, fillet, plug or slot welds, or a combination of these types, may be used in making joints and joining component parts.

(b) **Qualification of Weld Details.** The details of all joints (including for butt welds the groove form, root face, and root spacing) to be employed under this specification without qualifications shall comply with all of the requirements for joints which are accepted without qualification test under the "Code for Arc and Gas Welding in Building Construction" of the American Welding Society.

No Joint form not included in the foregoing shall be employed until it shall have been qualified to the satisfaction of the Director in accordance with the "Standard Qualification Procedure" of the American Welding Society.

(c) **Minimum Size of Fillet Welds.** The relation between weld size and the maximum thickness of material on which various sizes of fillet welds may be used shall, where practicable, conform to the following table:

| Size of Fillet<br>Inches | Maximum Thickness of Part<br>Inches |
|--------------------------|-------------------------------------|
| $\frac{3}{16}$ .....     | $\frac{1}{2}$                       |
| $\frac{1}{4}$ .....      | $\frac{3}{4}$                       |
| $\frac{5}{16}$ .....     | $1\frac{1}{4}$                      |
| $\frac{3}{8}$ .....      | 2                                   |
| $\frac{1}{2}$ .....      | 6                                   |
| $\frac{5}{8}$ .....      | Over 6                              |

(d) **Maximum Effective Size of Fillet Welds.** The maximum size of a fillet weld that may be assumed in the design of a connection shall be such that the stresses in the adjacent base material do not exceed the values allowed in Article 2708 (a).

The maximum size fillet weld applied to a nominally square edge of plate of section shall be one-sixteenth inch ( $1/16$ ") less than the nominal thickness of the edge, and the size of fillet weld used along the toe of an angle or the rounded edge, of a flange shall not exceed three-fourths ( $\frac{3}{4}$ ) the nominal thickness of the angle leg or three-fourths ( $\frac{3}{4}$ ) the nominal edge thickness of the flange; except that when required by the design conditions and specially designated on the drawings, fillet welds equal in size to the edge of a plate or rolled section may be used provided that the weld is built out in such a manner as to insure

full throat thickness, full fusion area, and no injury to the base metal that will reduce its thickness adjacent to the weld.

(e) **Length of Fillet Welds.** The minimum effective length of a strength fillet weld shall be not less than four (4) times the nominal size, or else the size of the weld shall be considered not to exceed one-fourth ( $\frac{1}{4}$ ) of its effective length.

The effective length of any segment of intermittent fillet welding shall be not less than four times the weld size with a minimum of one and one-half inches ( $1\frac{1}{2}$ ").

If longitudinal fillet welds are used alone in end connections, the length of each fillet weld shall be not less than the perpendicular distance between them.

(f) **End Returns of Fillet Welds.** Side or end fillet welds terminating at ends or sides, respectively, of parts or members shall, wherever practicable, be returned continuously around the corners for a distance not less than twice the nominal size of the weld. This provision, shall apply to side and top fillet welds connecting brackets; beam seats and similar connections, at the tension side of such connections, on the plane about which bending (moments) are computed. End returns shall be indicated on the design and detail drawings.

(g) **Plug and Slot Welds.** Plug or slot welds or fillet welds in holes or slots, may be used in plates not more than one inch (1") thick, where subject principally to shearing stresses or where needed to prevent buckling of lapped parts.

The diameter of the holes for plug welds and the width of slot welds shall be not less than the thickness of the part containing the hole or slot, plus five-sixteenths inch ( $5/16$ ") rounded to the next greater odd sixteenth. The diameter of plug welds and the width of slot welds shall not be greater than two and one-fourth ( $2\frac{1}{4}$ ) times the thickness of the weld metal.

The maximum length of slot welds shall not exceed ten (10) times the thickness of the part containing the slot.

#### **ARTICLE 2718. SPACING OF WELDS.**

(a) **Longitudinal Fillet Welds.** The transverse spacing of longitudinal fillet welds used in end connections shall not exceed eight inches (8") unless the design otherwise prevents excessive transverse bending in the connection.

(b) **Intermittent Fillet Welds.** Intermittent fillet welds may be used to transfer calculated stress across a joint or faying surface when the strength required is less than that developed by a continuous fillet weld of the smallest practicable size. The clear spacing in the direction of stress, between the effective lengths of such segments at the edges of plates and at the unsupported edges of rolled shapes carrying calculated stress, shall not exceed the following number times the thickness of the thinner part joined: for compression, sixteen (16); for tension, twenty-four (24); and shall in no case be more than twelve inches (12"). The effective length of longitudinal fillet welds at the ends of built-up members shall be not less than the width of the component part joined.

(c) **Lap Joints.** The minimum width of laps, on lap joints, shall be five (5) times the thickness of the thinner part joined and not less than one inch (1"). Lap joints joining plates or bars subjected to axial stress shall be fillet welded along the edge of both lapped parts except where deflection of the lapped parts is sufficiently restrained to prevent opening of the joint under maximum loading.

(d) **Slot Welds.** The clear distance from the edge of a slot to the adjacent edge of the slotted part, and the clear distance between adjacent slots, measured in a direction perpendicular to that of the main stress, shall be not less than five (5) times the thickness of the slotted part nor less than twice the width of the slot.

(e) **Stitch Welds.** If two or more plates or rolled shapes are used to build up a member, sufficient stitch welding (of the fillet, plug, or slot type) to make the parts act in unison shall be provided as follows, except where transfer of calculated stress between the parts joined requires closer spacing:

1. For plates, the longitudinal clear spacing between stitch welds shall not exceed the provisions of Sub-Article (b) of this Article and the transverse spacing shall not exceed thirty-two (32) times the thickness of the thinner plate joined.

2. For members composed of two or more rolled shapes, in contact one with another, the longitudinal spacing of stitch welds shall not exceed twenty-four inches (24") or the limits prescribed in (3).

3. For members composed of rolled shapes, separated one from the other by a gusset plate, the component parts shall be stitched together at intervals such that the critical ratio  $l/r$ , for each component, between stitching, shall not exceed three-fourths ( $\frac{3}{4}$ ) the critical ratio for the whole member.

#### **ARTICLE 2719. PLATE GIRDERS AND ROLLED BEAMS.**

(a) **Proportioning.** Riveted and welded plate girders, cover-plated beams, and rolled beams shall in general be proportioned by the (moment) of inertia of the gross section. No

deduction shall be made for standard shop or field rivet holes in either flange; except that in special cases where the reduction of the area of either flange by such rivet holes, calculated in accordance with the provisions of Article 2712, exceeds fifteen per cent (15%) of the gross flange area, the excess shall be deducted. If such members contain other holes as for bolts, pins, counter-sunk rivets, or plug or slot welds, the full deduction for such holes shall be made. The deductions thus applicable to either flange shall be made also for the opposite flange if the corresponding holes are there present.

(b) **Web.** Plate girder webs shall have a thickness of not less than  $1/170$  of the unsupported distance between flanges.

(c) **Flanges.** The thickness of outstanding parts of flanges shall conform to the requirements of Article 2711 (c).

Each flange of welded plate girders should in general consist of a single plate rather than two (2) or more plates superimposed. The single plate may comprise a series of shorter plates, laid end to end and butt welded at their junctions.

Unstiffened cover plates on riveted girders shall not extend more than sixteen (16) times the thickness of the thinnest outside plate beyond the outer row of rivets connecting them to the angles. The total cross-sectional area of cover plates of riveted girders shall not exceed seventy per cent (70%) of the total flange area.

If the girder is subjected to substantial fluctuations in loading, stiffeners, lateral plates or other appurtenant material shall not be welded to the tension flange, except at points where the maximum flange stress is less than half the allowable.

(d) **Flange Development.** Rivets and welds connecting flange to web, or cover plates to flange, shall be proportioned to resist the maximum horizontal shear at the plane in question, resulting from the bending forces on the girder. Additionally, rivets and welds connecting flange to web shall be proportioned to transmit any loads applied directly to the flange.

(e) **Stiffeners.** Bearing stiffeners shall be placed in pairs on the webs of plate girders at unframed ends and at points of concentrated loads. Such stiffeners shall have a close bearing against the loaded flanges, and shall extend as closely as possible to the edge of the flange plates or flange angles. They shall be designed as column subject to the provisions of Article 2708 (a); assuming the column section to comprise the pair of stiffeners and a centrally located strip of the web equal to not more than twenty-five (25) times its thickness at interior stiffeners or a strip equal to not more than twelve (12) times its thickness when the stiffeners are located at the end of the web. The column length shall be taken as not less than three-fourths ( $3/4$ ) of the length of the stiffeners in computing the ratio  $l/r$ . Only that portion of the stiffeners outside of the angle fillet or the flange-to web welds shall be considered effective in bearing. Angle bearing stiffeners shall not be crimped.

If  $\frac{h}{t}$  is equal to or greater than 70, intermediate stiffeners shall be required at all

points where  $v$  exceeds  $\frac{64,000,000}{(h/t)^2}$  in which

$h$  = the clear depth between flanges, in inches.

$t$  = the thickness of the web, in inches.

$v$  = the greatest unit shear in the panel, in pounds per square inch under any condition of complete or partial loading.

The clear distance between intermediate stiffeners, when stiffeners are required by the foregoing, shall not exceed eighty-four inches (84") or that given by the formula

$$d = \frac{11,000 t}{\sqrt{v}} \text{ where}$$

$d$  = the clear distance between stiffeners, in inches.

Intermediate stiffeners may be applied in pairs, one on each side of the web, or if preferred may alternate on opposite side of the web.

Intermediate angle stiffeners may be crimped over the flange angles. Intermediate stiffeners employed to stay the web plate against buckling, and not for transfer of concentrated loads from flange to web, shall be of a section not less than that required by the formula.

$I_s = 0.0000016 H^4$ , in which

$H$  = Total depth of web.

$I_s$  = Moment of inertia of the stiffeners or stiffener (figured with a common axis at the centerline of web for stiffeners in pairs and with the axis at the interface between stiffener and web for single stiffeners).

Rivets connecting stiffeners to the girder web shall be spaced not over eight (8) times their diameter, or more closely if so required in order to transmit the stress due to concentrated loads. If intermittent fillet welds are used, their spacing shall conform to the provisions of Article 2718 (b).

(f) **Splices.** Web splices in plate girders and in beams shall be proportioned to transmit the full shearing and bending stresses in the web at the point of splice. Web splices in welded girders shall preferably be complete penetration butt welds.

If the flanges are spliced, the splices shall either develop the full effective strength of the material or they shall develop the strength required by the total stresses, but in no case shall the strength developed be less than fifty per cent (50%) of the effective strength of the material spliced, nor shall butt welded joints be only partially welded.

(g) **Horizontal Forces.** The flanges of plate girders supporting cranes or other moving loads shall be proportioned to resist the horizontal forces produced by such loads (See Article 2703 (c)).

**Web Crippling Beams.** Rolled beams shall be so proportioned that the compressive stress at the web toe of the fillets, resulting from concentrated loads not supported by bearing stiffeners, shall not exceed the value of 24,000 pounds per square inch allowed in Article 2708 (a).

The governing formulas shall be:

$$\text{For interior loads } \frac{R}{t(N + 2K)} = \text{not over } 24,000$$

$$\text{For end-reactions } \frac{R}{t(N + K)} = \text{not over } 24,000$$

where

R = concentrated interior load or end reaction, in pounds.

t = thickness of web, in inches.

N = length of bearing, in inches.

k = distance from outer face of flange to web toe of fillet, in inches.

#### ARTICLE 2720. SEPARATORS.

(a) Where two or more rolled beams or channels are used to form a girder, they shall be connected together at intervals or not more than five feet (5'). Through-bolts and separators may be used provided that in beams having a depth of twelve inches (12") or more, no fewer than two (2) bolts shall be used with each separator. When concentrated loads are carried from one beam to the other, or distributed between the beams, diaphragms shall be used designated with sufficient stiffness to distribute the load. Where beams are exposed they shall be sealed against corrosion of interior surfaces, or spaced sufficiently far apart to permit cleaning and painting.

#### ARTICLE 2721. TIE PLATES.

(a) **Compression Members.** The open sides of compression members, built up from plates or shapes shall be provided with lacing having tie plates at each end, and at intermediate points if the lacing is interrupted. The plates shall be as near the ends as practicable. In main members carrying calculated stress the end tie plates shall have a length of not less than the distance between the lines or rivets or welds connecting them to the segments of the member, and intermediate ones of not less than one-half (½) of this distance. The thickness of the plates shall be not less than one-fiftieth (1/50) of the distance between the lines or rivets or welds connecting them to the segments of the members. In riveted construction, the rivet pitch in the plates shall be not more than six (6) diameters and the tie plates shall be connected to each segment by at least three (3) rivets. In welded construction, the welding on each line connecting a tie plate shall aggregate not less than one-third (1/3) the length of the plate.

(b) **Tension Members.** Tie plates shall be used to secure the parts of tension members built up from plates or shapes. They shall have a length not less than two-thirds (2/3) of the length specified for tie plates in compression members. Otherwise they shall conform to the requirements of Article 2721 (a).

#### ARTICLE 2722. LACING.

(a) **Spacing.** Lacing bars (which term comprehends for the purpose of this Article flat bars, angles, channels or other shapes employed as lacing) of compression members shall be so spaced that the ratio  $l/r$  of the flange included between their connections shall be not over three-fourths (¾) of the critical ratio for the member as a whole.

(b) **Proportioning.** Lacing bars shall be proportioned to resist a shearing stress normal to the axis of the member equal to two per cent (2%) of the total compressive stress in the member.

Lacing bars shall preferably be arranged in single system, for which the ratio  $l/r$  shall not exceed 140. For double lacing this ratio shall not exceed 200. Double lacing bars shall be joined at their intersections.

In determining the section required for lacing bars, the compression formula shall be used,  $l$  being taken as the unsupported length of the lacing bar between rivets or welds connecting it to the segments, for single lacing, and seventy per cent (70%) of that distance for double lacing.

(c) **Inclination.** The inclination of lacing bars to the axis of the member shall preferably be not less than 60 degrees for single lacing and 45 degrees for double lacing. When the distance between the lines of rivets or welds in the flanges is more than fifteen inches (15"), the lacing shall preferably be double or be made of angles.

(d) **Perforated Cover Plates.** The function of the plates and lacing may be assumed to be performed by the material in continuous cover plates perforated with a succession of access holes, the net width of which plates across holes is assumed available to resist axial stress, provided that; the ratio of length (in direction of stress) to width of holes shall not exceed 2; the clear distance between holes in the direction of stress shall be not less than the transverse distance between nearest lines of connecting rivets or welds; and the periphery of the holes at all points shall have a minimum radius of one and one-half inches ( $1\frac{1}{2}$ ").

#### **ARTICLE 2723. CAMBER.**

(a) **Shown on Plans.** Cambering, if any, of trusses, beams or girders shall be called for on the design plans.

(b) **Trusses and Girders.** Trusses of eighty feet (80') or greater span should generally be cambered for approximately the dead load deflection. Crane girders of seventy-five feet (75') or greater span should generally be cambered for approximately the dead and half live load deflection.

(c) **Beams.** Specified camber for rolled beams over fifteen inches (15") in depth, shall be only that offered as cold cambering at the mill.

(d) **Camber for Other Trades.** If camber is required in order to bring a loaded member into proper relation with the work of other trades, as for the attachment of runs of sash, the requirements shall be set forth on the plane and on the detail drawings.

(e) **Erection.** Required camber of trusses shall be shown on the erection diagram. If camber involves the erection of any member under a straining force, this shall be noted on the erection diagram.

#### **ARTICLE 2724. COLUMN BASES.**

(a) **Loads.** Proper provision shall be made to transfer the column loads, and moments if any, to the footings and foundations.

(b) **Alignment.** Column bases shall be set level and to correct elevation with full bearing on the masonry.

(c) **Finishing.** Column bases shall be finished to accord with the following requirements:

(1) Rolled steel bearing plates, two inches (2") or less in thickness may be used without planing, provided a satisfactory contact bearing is obtained, rolled steel bearing plates over two inches (2") but not over four inches (4") in thickness, may be straightened by pressing; or, if presses are not available, by planing on all bearing surfaces, to obtain a satisfactory contact bearing; rolled steel bearing plates, over four inches (4") in thickness, shall be planed on all bearing surfaces (except as noted under 3).

(2) Column bases other than rolled steel bearing plates shall be planed on all bearing surfaces (except as noted under 3).

(3) The bottom surfaces of bearing plates and column bases which rest on masonry foundations and are grouted to insure full bearing contact need not be planed.

#### **ARTICLE 2725. ANCHOR BOLTS.**

**Anchor Bolts** Anchor bolts shall be designed to provide resistance to all conditions of tension and shear at the bases of columns, including the net tensile components of any bending (moments) which may result from fixation or partial fixation of columns.

#### **ARTICLE 2726. FABRICATION.**

(a) **Workmanship.** All workmanship shall be equal to the best practice in modern structural shops.

(b) **Straightening.** All material shall be clean and straight. If straightening or flattening is necessary, it shall be done by a process and in a manner that will not injure the material. Sharp kinks or bends shall be cause for rejection.

(c) **Gas Cutting.** The use of a cutting torch is permissible if the metal being cut is not carrying substantial stress during the operation. Gas-cut edges which will be subjected to substantial tensile stress shall be cut by a mechanically-guided torch, or if hand cut shall be carefully examined and any nicks removed. The radii of re-entrant gas-cut fillets shall be as large as practicable, but never less than one inch (1"). Edges and grooves may be prepared for welding by gas cutting, as defined in Article 2726 (h).

(d) **Planing of Edges.** Planing or finishing of sheared edges of plates or shapes, or of edges gas-cut with a mechanically guided torch, will not be required unless specifically called for on the drawings, or included in a stipulated edge preparation for welding.

(e) **Riveted Construction-Holes.** Holes for rivets or unfinished bolts shall be one-sixteenth inch (1/16") larger than the nominal diameter of the rivet or bolt, if the thickness of the material is not greater than the nominal diameter of the rivet or bolt plus one-eighth inch (1/8"), the holes may be punched.

If the thickness of the material is greater than the nominal diameter of the rivet or bolt plus 1/8 inch, the holes shall be either drilled from the solid, or subpunched and reamed. The die for all sub-punched holes, and the drill for all sub-drilled holes, shall be at least 1/16 inch smaller than the nominal diameter of the rivet or bolt.

Drifting to enlarge unfair holes shall not be permitted. Holes that must be enlarged to admit the rivets shall be reamed. Poor matching of holes shall be cause for rejection.

Holes for turned bolts shall be drilled or reamed truly cylindrical and not more than 1/50 inch larger than the external diameter of the bolt. Drilling or reaming for turned bolts shall be done after the parts to be connected are assembled; except that if such drilling or reaming after assembly is impracticable, it may be done through steel templates with hardened bushings.

(f) **Riveted Construction-Assembling.** All parts of riveted members shall be well pinned or bolted and rigidly held together while riveting. Drifting done during assembling shall not distort the metal or enlarge the holes.

(g) **Riveting.** Rivets shall be driven by power riveters, of either compression or manually-operated type, employing pneumatic, hydraulic or electric power. After driving they shall be tight and their heads shall be in full contact with the surface.

Rivets shall ordinarily be hot-driven, in which case their finished heads shall be of approximately hemispherical shape and shall be of uniform size throughout the work for the same size rivet, full, neatly finished and concentric with the holes. Hot-driven rivets shall be heated uniformly to a temperature not exceeding 1950°F; they shall not be driven after their temperature has fallen below 1000°F.

Rivets may be driven cold if approved measures are taken to prevent distortion of the riveted material. The requirements for hot-driven rivets shall apply except as modified in the "Tentative Specifications for Cold Riveted Construction" of the American Institute of Bolt, Nut and Rivet Manufacturers.

(h) **Welded Construction-Preparation of Material.** Surfaces to be welded shall be free from loose scale, slag, rust, grease, paint and any other foreign material, except that mill scale which withstands vigorous wire brushing may remain. A light film of linseed oil may be disregarded, joint surfaces shall be free from fins and tears. Preparation of edges by gas cutting shall, wherever practicable, be done with a mechanically guided torch.

(i) **Welded Construction-Assembling.** Parts to be fillet welded shall be brought in as close contact as practicable and in no event shall be separated more than 3/16 inch. If the separation is 1/16 inch or greater, the size of the fillet welds shall be increased by the amount of the separation. The separation between faying surfaces of lap joints shall not exceed 1/16 inch. The fit of joints at contact surfaces which are not completely sealed by welds, shall be close enough to exclude water after painting.

Butting parts to be butt welded shall be carefully aligned. Misalignments greater than one-eighth inch (1/8") shall be corrected and, in making the correction, the parts shall not be drawn into a sharper slope than two degrees (7/16 inch in 12 inches).

The work shall be positioned for flat welding whenever practicable.

In assembling and joining parts of a structure or of built-up members, the procedure and sequence of welding shall be such as will avoid needless distortion and minimize shrinkage stresses. Where it is impossible to avoid high residual stresses in the closing welds of a rigid assembly, such closing welds shall be made in compression elements.

In the fabrication of cover-plated beams and built-up members, all shop splices in each component part shall be made before such component part is welded to other parts of the member.

(j) **Welded Construction—Temperatures.** No welding shall be done when the temperature of the base metal is lower than 0°F. At temperatures between 32°F and 0°F, the surface of all areas within three inches (3") of the point where a weld is to be started, shall be heated to a temperature at least warm to the hand before welding is started.

When welds are being made in parts thicker than one and one-half inches (1½") the temperature of the base material adjacent to the welding shall be at least 70°F.

(k) **Welding.** The technique of welding employed, the appearance and quality of welds made, and the methods used in correcting defective work shall conform to the "Code for Arc and Gas Welding in Building Construction" of the American Welding Society, Section 4 "Workmanship".

All complete-penetration butt welds, except when produced with the aid of backing material or welded in the flat position from both sides in square-edge material not more than five-sixteenths inch (5/16") thick with root opening not less than one-half the thickness of the thinner part joined, shall have the root of the initial layer gouged or chipped out on the back side before welding is started from that side, and shall be so welded as to secure sound metal and complete fusion throughout the entire intended cross section. Butt welds made with the use of a backing of the same material as the base metal shall have the weld metal thoroughly fused with the backing material. Backing strips may be removed by means of gas cutting, after welding is completed, provided no injury is done to the base and weld metal and the weld surface is left flush or slightly convex, with full throat thickness.

Incomplete-penetration butt welds shall be made with as nearly complete penetration and internal soundness as the formation of the joint and the method of welding will permit. (Article 2700 (g), final paragraph).

To insure soundness, the ends of butt welds that carry stresses approaching the maximum allowable working stress shall be extended past the edges of the parts joined, by means of short extension bars providing a similar joint preparation and having a width not less than the thickness of the thicker part joined. Where the metal is not more than ¾ inch in the thickness, the extension bars may be omitted if the ends of the butt weld are chipped or cut down to solid metal and side welds are applied to fill out the ends to the same reinforcement as the faces of the weld. If extension bars are removed upon completion of the weld, the ends of the weld shall be left smooth and flush with the edges of the abutting parts.

(l) **Welded Construction—Peening.** Where required, multiple-layer welds may be peened with light blows from a power hammer, using an elongated round-nose tool. Peening shall be done after the weld has cooled to a temperature warm to the hand. Care shall be exercised to prevent scaling, flaking or cold working of weld and base metal from over-peening.

(m) **Finishing.** Compression joints depending upon contact bearing shall have the bearing surfaces machined to a common plane after the members are completed.

(n) **Lacing Bars.** The ends of lacing bars shall be neat and free from burrs.

(o) **Tolerances.** Finished members shall be true to line and free from twists, bends and open joints.

Compression members may have a lateral variation not greater than 1/1000 of the axial length between points which are to be laterally supported.

A variation of 1/32 inch is permissible in the overall length of members with both ends milled.

Members without milled ends which are to be framed to other steel parts of the structure may have a variation from the detailed length not greater than 1/16 inch for members 30 feet or less in length, and not greater than 1/8 inch for members over 30 feet in length.

(p) **Castings.** Steel castings shall be annealed.

## ARTICLE 2727. SHOP PAINTING.

(a) **Shop Coat.** After inspection and approval and before leaving the shop, all steel work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust spatter, slag or flux deposit, oil, dirt and other foreign matter. Except where encased in concrete, and excepting edges and surface areas adjacent to edges, to be field welded, all steel work shall be given one coat of approved metal protection, applied thoroughly and evenly and well worked into the joints and other open spaces. All paint shall be applied to dry surfaces.

(b) **Inaccessible Parts.** Parts inaccessible after assembly shall be given two coats of shop paint, preferably of different colors.

(c) **Contact Surfaces.** Contact surfaces shall be cleaned, by effective means, before assembly, but not painted.

(d) **Finished Surfaces.** Machine-finished surfaces shall be protected against corrosion by a suitable coating.



(e) **Surfaces To Be Field Welded.** Surfaces which are to be welded after erection shall where practicable not receive a shop coat of paint. If painted, such paint shall be removed before field welding, for a distance of at least two inches (2") on either side of the joint.

#### **ARTICLE 2728. ERECTION.**

(a) **Bracing.** The frame of steel skeleton buildings shall be carried up true and plumb, and temporary bracing shall be introduced wherever necessary to take care of all loads to which the structure may be subjected, including equipment, and the operation of same. Such bracing shall be left in place as long as may be required for safety.

(b) **Adequacy of Temporary Connections.** As erection progresses, the work shall be securely bolted up, or welded, to take care of all dead load, wind and erection stresses.

(c) **Erection Stresses.** Wherever piles of material, erection equipment or other loads are carried during erection, proper provision shall be made to take care of stresses resulting from the same.

(d) **Alignment.** No riveting or welding shall be done until as much of the structure as will be stiffened thereby has been properly aligned.

(e) **Field Connection.** All field connections may be made with unfinished bolts, except as follows:

Rivets or welds shall be used for the following connections: except that turned bolts may be used in lieu of rivets as specified in Article 2715 (f):

Column splices in all tier structures 200 feet or more in height.

Column splices in tier structure 100 to 200 feet in height, if the least horizontal dimension is less than 40 per cent of the height.

Column splices in tier structures less than 100 feet in height, if the least horizontal dimension is less than 25 per cent of the height.

Connections of all beams and girders to columns, and of any other beams and girders on which the bracing of columns is dependent, in structures over 125 feet in height.

Roof-truss splices and connections of trusses to columns, column splices, column bracing, knee braces and crane supports, in all structures carrying cranes of over 5-ton capacity.

Connections for supports of running machinery, or of other live loads which produce impact or reversal.

Any other connections stipulated on the design plans.

For the purpose of this Article the height of a tier structure shall be taken as the vertical distance from the curb level to the highest point of the roof beams, in the case of flat roofs, or to the mean height of the gable, in the case of roofs having a rise of more than  $2\frac{2}{3}$  in 12. Where the curb level has not been established, or where the structure does not adjoin a street, the mean level of the adjoining land shall be used instead of curb level. Penthouses may be excluded in computing the height of structure.

(f) **Field Riveting.** Rivets driven in the field shall be heated and driven with the same care as those driven in the shop.

(g) **Field Welding.** All field assembly and welding shall be executed in accordance with the requirements for shop fabrication, excepting such as manifestly apply to the shop conditions only.

Any shop paint on surfaces adjacent to joints to be field welded shall be thoroughly removed to expose clean steel for a distance of at least two inches (2") on either side of the joint.

(h) **Field Painting.** All field rivets, field bolts and field welds, also all serious abrasions to the shop coat, shall be spot painted with the material used for the shop coat, or an equivalent, and all mud and other firmly attached and objectionable foreign materials shall be removed, before general field painting.

#### **ARTICLE 2729. STEEL JOIST CONSTRUCTION.**

(a) **Scope.** Steel joist construction as governed by the requirements of this Article shall be that type of construction in which decks or top slabs are supported by separate steel members herein referred to as "steel joints", spaced not farther apart than twenty-four inches (24") on centers in floors and thirty inches (30") on centers in roofs, but in no case spaced farther apart than the safe span of the top slab, deck or floor. Such steel joists may be made of hot or cold-formed sections, strip or sheet steel, riveted or welded together, or by expanding.

Where steel joists are used in at wider spacings than specified in the paragraph above, the construction shall not be considered as "steel joist construction" and shall not be subject to the requirements of this Article.

Steel joist construction may be used in all buildings of human occupancy. Steel joist construction may be used in buildings of store, manufacturing, storage or warehouse

occupancy; but where such buildings are subject to unusual concentrated or moving loads, use of steel joist construction for floors shall be limited to live loads not exceeding one hundred twenty-five pounds (125 lbs.) per square foot and adequate top slab and lateral support shall be provided to support and distribute such loads.

(b) **Material.** Steel shall conform to the requirements of "Standard Specifications for Structural Steel for Bridges and Buildings", (A.S.T.M.) except that joists formed of strip or sheet steel shall conform to Grade C of A.S.T.M. "Tentative Specifications for Light Gauge Structural Quality, Flat, Hot-Rolled, Carbon Steel."

(c) **Design and Maximum Stress.** Open web steel joists shall be designed as a truss, solid web steel joists as a beam. Deck or top slabs over steel joists shall not be assumed to carry any part of the compression stress in the steel joists.

For steel meeting the requirements of Article 2729 (b), the maximum design stress shall not exceed 18,000 lbs. per square inch.

Compression chords and diagonals of open web steel joists shall not have a ratio of length (clear distance between welds or attachments) to least radius of gyration in excess of 120, nor shall the unit compression stress exceed 15,000 pounds per square inch.

Joists and component parts of joists formed of strip or sheet steel shall be designed in accordance with recognized engineering practice provided the unit design stress shall in no case exceed the yield strength of the steel divided by 1.85.

(d) **Protective Coating.** All steel joists shall receive one coat of asphalt base paint applied by dipping or spraying, or an equivalent protective covering, before leaving the shop.

(e) **Manufacture.** All joints of the members that comprise a steel joist shall be made by connecting the members directly to one another by fusion or resistance welds, or by rivets.

In the case of expanded steel joists, a portion of the metal may be left intact to form a connection.

In the case of nailer joists, wood nailer strips shall be firmly attached to the top chord of the joist. Such nailer strips shall be of good grade wood at least  $1\frac{1}{2}'' \times 1\frac{1}{2}''$  in net section.

(f) **Anchorage.** The ends of steel joists shall extend a distance of at least four inches on to masonry or reinforced concrete supports and at least two and one-half inches on steel supports, except that where opposite joists butt over a steel support and positive approved means of attachment to the steel support is furnished which will prevent displacement of the member, a shorter bearing length may be used if it provides the necessary bearing area. Every third steel joist bearing on concrete or masonry supports shall be anchored thereto with an anchor equivalent to a  $\frac{3}{8}$  inch round. The ends of all steel joists supported on masonry walls shall be bedded in mortar.

All steel joists supported on steel beams shall be secured thereto with an anchor made of not less than a  $\frac{3}{16}$  inch round bar fastened over the flanges of the supporting beams or other equivalent approved attachment, except that in the case of buildings having a height of more than twice the least dimension of the base, each steel joist shall be welded, bolted or riveted to the supporting steel work.

(g) **Span.** The span of steel joists in steel joist construction shall not exceed 24 times the depth of the steel portion of the steel joist.

(h) **Bridging.** As soon as steel joists have been erected and before application of construction loads, bridging shall be installed between them. This bridging shall be adequate to safely support the top chords or flanges against lateral movement during the construction period and shall hold the steel joists in an approximately vertical plane passing through the bearings. The steel joists at the ends of panels shall be braced laterally by anchors or ties at each line of bridging.

The number of lines of bridging shall be: one row, near the center, for spans up to fourteen feet (14'); two rows, approximately one-quarter ( $\frac{1}{4}$ ) span apart, for spans fourteen to twenty-one feet (14' to 21'); and three rows for spans twenty-one to thirty-two feet (21' to 32').

In the case of nailer steel joists carrying a wood deck, the wood deck may be used as the top member of the bridging system.

(i) **Ceiling Protection.** Where fire-resistive construction is required, steel joists shall be protected on the underside with a fire-resistive ceiling and shall have a reinforced concrete or gypsum top slab, all as is necessary for the assembly to provide the required degree of fire resistance, provided that where wood-joist construction is permitted, steel joists may have a wood nailing strip attached to the top chord or top flange and a wood floor may be used, and provided further that where steel joists are used in places where unprotected wood joists are permitted, no ceiling protection need be provided.

(j) **Decks or Top Slabs.** Decks or top slabs over steel joists may be of concrete or gypsum poured on metal lath centering or other equally suitable permanent centering, or on removable centering, provided the top chords or flanges of the steel joists are stayed laterally by the top slab.

Precast concrete top slabs, precast gypsum top slabs, wood decks, or steel decks may be used over steel joists provided they are securely anchored to the top chords or flanges of the joists.

(k) **Accepted Practice.** In the absence of specific requirements, as provided in this Article, steel joist construction shall be governed by accepted engineering practice as defined in the "Standard Specifications for Steel Joist Construction" of the Steel Joist Institute.

#### ARTICLE 2730. FORMED STEEL CONSTRUCTION.

(a) **General.** Structural panels, decks or members formed of sheet or strip steel, less than three-sixteenths inch (3/16") thick, used for load-carrying purposes, shall be designed in accordance with recognized engineering practice unless otherwise specified herein.

The "Specification for the Design of Light Gauge Steel Structural Members" of the American Iron and Steel Institute shall be accepted as recognized engineering practice.

(b) **Stresses and Material.** The unit design stress shall in no case exceed the minimum yield strength of the steel divided by 1.85. For steel conforming to Grade C (minimum yield point 33,000 lbs. per sq. in.) of "Tentative Specifications for Light Gauge Structural Quality Flat, Hot-Rolled Carbon Steel" (A.S.T.M.) the maximum working stress shall not exceed 18,000 lbs. per square inch.

(c) **Design.**

i. **Members in Flexure.** The structural properties of compression elements which are stiffened along both longitudinal edges and which have a ratio of flat width (w) to thickness (t) not exceeding twenty-five (25) may be based upon the full cross-section of the element; but where that ratio exceeds twenty-five (25), the effective width (b) of such elements shall be reduced when calculating the structural properties, the reduction varying according to the actual unit compression stress ( $f_c$ ) in the element and the ratio of flat width (w) to thickness (t) in accordance with the design specifications cited in Article 2730 (a). The b/t ratio of effective width to thickness for  $f_c = 18,000$  PSI is given in Table No. 27-B for various w/t ratios.

Exception: The structural properties of ribbed steel roof deck construction shall be calculated in accordance with Article 2730 (f).

TABLE 27-B  
Effective Design Width (b) where the actual compress  $f_c = 18,000$  lbs. psi. for  
Compression Elements Stiffened Along Both Longitudinal Edges

| w/t | b/t for             |                           | w/t | b/t for             |                           |
|-----|---------------------|---------------------------|-----|---------------------|---------------------------|
|     | Load Determinations | Deflection Determinations |     | Load Determinations | Deflection Determinations |
| 25  | 25.0                | 25.0                      | 100 | 47.0                | 59.1                      |
| 30  | 27.5                | 28.4                      | 120 | 48.5                | 62.8                      |
| 35  | 30.0                | 31.5                      | 140 | 49.7                | 64.2                      |
| 40  | 32.4                | 34.8                      | 160 | 50.5                | 65.8                      |
| 45  | 35.1                | 38.0                      | 180 | 51.2                | 67.0                      |
| 50  | 37.3                | 41.3                      | 200 | 51.8                | 68.0                      |
| 90  | 40.5                | 47.2                      | 250 | 52.8                | 69.8                      |
| 70  | 42.8                | 51.4                      | 300 | 53.4                | 71.0                      |
| 80  | 44.5                | 55.3                      | 400 | 54.2                | 72.5                      |
| 90  | 45.9                | 57.1                      | 500 | 54.7                | 73.4                      |

For compression elements which are stiffened along one longitudinal edge only, the allowable unit design stress,  $f_c$ , shall be as given by the following formulas, where  $f_b$  is the maximum unit stress specified in Article 2730 (b), w is the flat width of the element and t is its thickness.

(1) For w/t not over 12:  $f_c = f_b$

(2) For w/t over 12 but not over 30:

$$f_c = (1.67 f_b - 5430) - (1/18) (f_b - 8150) (w/t)$$

(3) For w/t over 30 but not over 60:

$$f_c = 12,600 - 148.5 (w/t)$$

For laterally unbraced compression flanges of I-shaped flexural members (not including multiple-web decks, inverted U-shaped or box-type members, not curved or arch members), the maximum stress (lbs. per sq. in.) shall not exceed the stresses specified in Article 2730 (b) nor  $f_c$  where

$$f_c = \frac{250,000,000}{(L/r)^2}$$

- L = unbraced length of member, in inches  
 r = radius of gyration of the member about its gravity axis, parallel to the web, in inches.

2. **Axially Loaded Compression Members.** For axially loaded compression members formed of Grade C steel (Article 2730 (b)) in which the ratio of flat width to thickness does not exceed twenty-five (25) for elements stiffened along both longitudinal edges nor twelve (12) for elements stiffened along only one longitudinal edge, the allowable load, P, in pounds, divided by the full unreduced cross-sectional area, A, of the member in square inches, or the unit stress.

$\frac{P}{A}$  shall be:

$$\text{For } \frac{L}{r} \text{ of 132 or less } \frac{P}{A} = 15,300 - 0.437 \left( \frac{L}{r} \right)^2$$

$$\text{For } \frac{L}{r} \text{ greater than 132: } \frac{P}{A} = \frac{134,000,000}{\left( \frac{L}{r} \right)^2}$$

Where the ratio of flat width to thickness is greater than specified above, reduction of load capacity shall be made according to the design of specifications of American Iron and Steel Institute cited in Article 2730 (a). The provisions of those specifications shall also govern the  $\frac{P}{A}$  limits for steel of other than Grade C.

The slenderness ratio of unsupported length to radius of gyration of compression members shall not exceed the following limits:

Columns, and other primary compression members,

Except as otherwise provided in this Article ..... 120 maximum

Load-bearing studs ..... 160 maximum

Secondary members ..... 200 maximum

During construction (temporary) ..... 300 maximum

(d) **Braced Wall Studs.** Sheathing or wall material attached to studs may be considered as furnishing adequate lateral support in the plane of the wall when the material and its attachments to the stud meet the following requirements:

- (1) Material shall be attached to both faces or flanges of the stud.
- (2) Spacing of the attachments of the material to and along the stud shall not exceed "a" in the following formula:

$$a = r \sqrt{\frac{E}{f_y}}$$

$$\text{where } r = \sqrt{\frac{I}{A}}; \text{ the radius of gyration corresponding to } I, \text{ the moment}$$

of inertia of the stud about its axis perpendicular to the wall;  
 A being the area of the stud; both in inches.

$f_y$  = yield point of the steel, psi

E = Modulus of Elasticity of the steel, psi

(3) The modulus of elastic support, k, to be exerted by the wall material and its attachments to the stud shall not be less than

$$k = \frac{f_y a A^2}{240,000,000 I}$$

where the terms are as designated above, and "a" is the spacing of attachments along the stud in inches (a = 1 for continuous attachment)

k = F/y where F is the force (lbs.) that produces an elongation of "y" (inches) of a strip of wall material of width "a" and of length equal to the distance between adjacent studs. (See design specifications cited in Article 2730 (a)).

(4) The Lateral force,  $F$ , which each single attachment of the wall material shall be capable of exerting on the stud in the plane of the wall (in order to prevent lateral buckling of the stud) shall be not less than:

$$F = \frac{k e P}{2 \sqrt{E I k/a - P}}$$

Where

$P$  = the design load on the stud (pounds)

$I$  = the moment of inertia (about axis perpendicular to the wall, inch units)

$e$  = (stud length (inches  $\div$  240)

Other terms—as designated in (b) and (c).

(e) **Thickness.** Steel of quality as specified in Article 2730 (b), used to form individual structural (load-carrying) members, shall be of thickness not less than 18 U. S. Standard Gage, provided that use of material of less thickness may be approved by the Director after tests as specified in Article 2730 (i).

Exceptions: Steel used to form load-carrying panels, including ribbed steel roof-deck constructed such as defined in Article 2730 (f) shall be not less than 22 U. S. Standard Gage.

(f) **Ribbed Steel Roof Deck Construction.** The requirements of this Article 2730 (f) shall govern only ribbed steel roof-deck construction that has longitudinal ribs which bear on supports and which are spaced not over six inches (6") on centers and that has a span not exceeding ten feet, no inches (10'-0").

1. **Properties.** For the purpose of determining the structural properties of such steel roof decks, the effective width of the top flange between ribs shall be limited to the widths prescribed below:

**Thickness of Deck Metal**  
 # 18 U. S. Standard Gage  
 # 20 U. S. Standard Gage  
 # 22 U. S. Standard Gage

**Width of Top Flange Effective**  
 3/4 of the clear, flat width of flange  
 5/8 of the clear, flat width of flange  
 1/2 of the clear, flat width of flange

In lieu of designing according to the above provisions, tests in accordance with Article 2730 (i) may be made to determine the structural properties of a steel roof deck, approval to be based on the maximum allowable unit stress and maximum deflection specified herein.

2. **Moment and Deflection Coefficients.** Where ribbed steel roof-deck units extend over three or more spans, a moment coefficient of 1/10 and a deflection coefficient of 3/384 shall be used provided deck units are welded to the supports. All other steel roof-deck installations shall be designed as simple spans.

3. **Anchorages.** Steel roof-deck units shall be anchored to the supporting framework to resist the following gross uplifts:

45 pounds per sq. ft. for eave overhang and monitor roofs;  
 30 pounds per sq. ft. for all other roof areas.

The dead load of the roof-deck construction may be deducted from the above uplift forces.

(g) **Deflection.** The deflection of structural panels, decks or members formed of light gage strip or sheet steel, under live load, shall not exceed 1/240 of the clear span except that where plastered ceilings are directly attached to or supported by such panels, decks or members the maximum deflection shall not exceed 1/360 of the clear span.

(h) **Protection.** All structural panels, decks or members formed of light gage strip or sheet steel shall have one shop coat of paint or equivalent protection.

(i) **Tests.** At the discretion of the Director, tests may be required to demonstrate that the construction meets the requirements herein specified, or certified reports of such tests conducted by an approved and recognized testing laboratory may be accepted.

Where tests are made to determine the structural properties of panels, decks or members formed of light gage strip or sheet steel in lieu of the design procedure specified herein, such tests shall be performed on simple spans, supported on knife edges, with concentrated loads applied at the quarterpoints or with uniform loading applied pneumatically or by other approved method that assures uniformity of load distribution. The allowable loads shall be based on the maximum allowable unit stresses and deflections specified herein, or the allowable load shall be that test load at which permanent deflection equal to five per cent (5%) of the test load deflection occurs divided by 1.85.

**PART X**  
**DETAILED REGULATIONS**  
**CHAPTER 28 – EXCAVATION, FOOTINGS AND FOUNDATIONS**

**ARTICLE 2801. SUBSOIL INVESTIGATION**

Soil subsidence is a major characteristic of drained wetlands. Most of the land covered by this Code was formerly swamp or marsh. After drainage and air drying, any organic layers in such soils may lose more than half of their original volume the first one to three years. This initial subsidence is due to loss of groundwater buoyance, consolidation, and compaction. After initial subsidence in organic soils, lowering of soil surface levels will usually continue at a rather uniform rate due to biochemical oxidation of organic materials. Subsidence, due to biochemical activities, in thick organic soil may progress at a rate of up to one inch or more a year until mineral material or the water table is reached. Planning should be based on a detailed soil survey and on-site examination.

Except as provided for small structures, undisturbed soil boring shall be made under the direction of a Louisiana Registered Civil Engineer, or Louisiana Registered Architect, experienced in soil mechanics. Number and depth of borings shall be influenced by the importance, type, size, and location of the structure. The classification of the soil at each building site shall be based on observation and any necessary tests of the materials disclosed by borings or excavations made in appropriate locations. Additional studies may be necessary to evaluate bearing capacity, compressibility, or other pertinent characteristics of the foundation materials.

A minimum of one soil boring for structures under three stories and not over 10,000 square feet floor area, two soil borings for other structures less than 15,000 square feet of ground floor and one additional boring for each 15,000 square feet of ground floor area. Laboratory tests shall be made on the undisturbed samples and an engineering analysis establishing soil bearing capacity, pile load capacity, depth of foundation, expected settlement, depth of the ground water table, and the like, as applicable all under the direction of the Civil Engineer or Architect. The investigation shall include a consideration of the effect of moisture variation on the soil-bearing capacity, compressibility and volume change (expansiveness). Soils that swell more than three percent from air dry to saturation under a surcharge load of sixty pounds per square foot (60 psf) shall be classed as expansive.

When expansive soils (some types of clays) are present, special provisions should be considered in the foundation design and construction to safeguard against damage due to this expansiveness. These special provisions may include, but are not limited to, preconstruction chemical stabilization of the soil, post-tensioned concrete slab, extra-deep grade beams or pier-supported floor construction. The Director may require a special investigation and report to provide this design and construction criteria.

The data contained in the Soil Survey Map for East Bank dated September, 1977 and Soil Survey Map for West Bank dated September, 1978 prepared by the United States Department of Agriculture, Soil Conservation Service, will be acceptable in lieu of individual subsoil investigation or load test for a small building containing not more than 7,500 square feet of total floor area, not greater than three stories, or higher than 35 feet. However, on-site soil investigation is encouraged.

**ARTICLE 2802. EXCAVATIONS.**

(a) **Design.** All excavations for structures covered by this code shall be designed in accordance with established Engineering principles. The design shall utilize soil characteristics determined by borings and laboratory tests (see Article 2801). In the case of a retained or braced excavation, the designs shall give due consideration to all structural elements of the bracing system. The Director may accept other adequate proof as to the effects of the soil and applied forces on the braced or unbraced excavations. The results of such designs shall be filed with the Director when requested.

(b) **Protection of Life and Property.** All excavations shall be protected and guarded against danger to life and property. The construction materials employed in a permanent excavation, retained or braced, shall be capable of resisting the attrition of the environmental elements to which they will be exposed.

**ARTICLE 2803. FOUNDATIONS.**

Foundations shall be built upon naturally solid ground or upon properly compacted fill material, or shall be built with pilings. Foundations shall be constructed of masonry, plain concrete, reinforced concrete, or of piling materials described in this chapter. Masonry units

used in foundations shall be laid up in portland cement mortar. Any person contemplating a foundation which may make use of, be adjacent to, or involve public property shall ascertain in advance of such operations the existence of public or private underground or overhead utilities which may be occupying said public property. Such a person shall secure proper approval from the public or private agencies concerned and shall observe all precautions necessary to avoid damage or disturbance to said utilities (telephone, telegraph, sewerage, drainage, water, gas, electricity, and the like). Refer to Article 4401 (h).

All references in this Chapter to National Standards are identified in Article 213.

Footings, foundations and curtain walls shall comply with the requirements of Section 505, Rat-Proofing.

Pile foundations shall be required for structures, including any building, except those located in areas with soils designated Group A by the United States Department of Agriculture.

Exceptions:

1. Temporary structures with length of life specified.
2. One-story detached accessory buildings of Type V conventional wood frame construction not on a slab foundation with an area not exceeding 600 square feet.
3. Structures for which a complete soil analysis, prepared by a Louisiana Registered Civil Engineer or Louisiana Registered Architect, concludes that the proposed foundations are adequate to provide support for the structure without excessive differential or overall settlement or movement.

A variance may be granted for an addition to an existing structure provided it can be shown that to place only the proposed construction on a different type of foundation would probably cause excessive differential settlement or movement between the various sections of the completed structure. To prevent the possibility of differential settlement, it is recommended that the addition have similar spread footings or be supported on piles with lengths and loadings identical to the original.

Due to the inherent qualities of many soils, subsidence may not be totally preventable; however, if foundations are designed and built according to good building standards, it should be possible to hold differential settlement to a minimum and within acceptable limits.

#### **ARTICLE 2804. SPREAD FOUNDATIONS.**

(a) **Design.** Footings are to be so designed that the allowable bearing capacity of the soil shall not be exceeded.

(b) **Soil Bearing Capacity.**

1. The Director may accept the soil bearing capacity established by the engineering analysis (see Article 2801) as meeting minimum requirements.

2. In addition to the engineering analysis, or in lieu thereof, the Director may require, load bearing tests of the soil made under the direction of an approved testing laboratory or a Louisiana Registered Civil Engineer or Louisiana Registered Architect to determine the allowable bearing capacity of the soil. The method of testing shall be in accordance with ASTM D1194, "Standard Method of Test for Bearing Capacity of Soil for Static Load on Spread Footings." On all tests the location of the ground water table shall be noted. The allowable soil bearing shall be one-half the load at the yield point. However, settlement of the test plate at the allowable load shall not exceed one-quarter of the gross settlement.

3. The Director may accept other adequate proof as to the soil bearing capacity at a particular location.

4. The allowable unit soil pressure upon every footing for small structures shall not exceed the values set forth in Ord. 13798 for Table 28-A, unless data to substantiate the use of higher values is submitted to and approved by the Director.

5. The base area of the footing, of all structures shall be designed in the following manner: The area of the footing which has the largest percentage of live load to total load shall be determined by dividing the total load by the allowable soil load. From the area thus obtained, the dead load soil pressure of such footings is determined and the area of all other footings of the structure shall be determined on the basis of their respective dead loads only and such dead load soil pressure. In no case shall the load per square foot under any portion of any footing, due to the combined dead, live wind and/or any other loads, exceed the safe sustaining power of the soil upon which the footing rests. The total reduced live load occurring in the column immediately above the footing shall be the live load used in the above computation. Actual heavy storage loading remaining constant and continuous over a period of time exceeding three months, shall be considered as dead load.

**ARTICLE 2805. PILE FOUNDATION.****(a) Design.**

1. Piles shall be designed to include all weights and forces applied to their butts including the weight of mats or caps and the weight of earth or fill on top of the mats or caps considering the effect of buoyancy; the weight of the piles shall be given due consideration in the foundation design. In cases where piles are loaded eccentrically, due provisions shall be made for such eccentricities.

2. The minimum pile spacing shall be either 3'0" or as determined by the expression.

$$SPAC = 0.05(L_1) + 0.025(L_2) + 0.0125(L_3),$$

in which

SPAC = Center to center of piles, feet

$L_1$  = Pile penetration up to 100 feet

$L_2$  = Pile penetration from 101 to 200 feet

$L_3$  = Pile penetration beyond 201 feet

Greater spacing than the minimum value may be required in order to satisfy group perimeter shear as provided in Article 2805 (c) and to assure that piles will not interfere with or intersect each other during installation.

3. Piles extending above the ground surface, surrounded by very soft soil or standing in free water, that are used as load-carrying members, shall be designed structurally in their unrestrained length in accordance with applicable column formulas as referenced in this Code; due consideration to effective unsupported length must be given. Location of pile fixity shall be determined with due regard to soil properties. See also Article 2805(b).

4. Where the soil boring records of site conditions indicate possible deleterious action on pile materials because of soil constituents, changing water levels, electrolysis, corrosion, or other factors, such materials shall be adequately protected. The effectiveness of such methods or processes for the particular purpose shall have been thoroughly established by satisfactory service records or other evidence which demonstrated the effectiveness of such protective measures. Cut-off of untreated wood piles shall not be higher than the lowest ground water level anticipated for the life of the building as determined by an engineering investigation or established data, but in no case shall the cut-off be less than 7 feet below natural ground surface. Structural steel piles driven below the permanent water table and also into natural soil need not be protected against electrolysis and/or corrosion.

**(b) Pile Load Capacity for a Single Pile.**

1. The load capacity for a single pile shall be determined by a load test made under the direction of an approved laboratory or a Louisiana Registered Civil Engineer or Architect. The load capacity for a single pile shall be established by any one of the following methods:

Method 1 - When the total test load applied equals twice the proposed load capacity for a single pile it shall be left in place at least 48 hours, the last 24 of which shall be free from settlement. If after deducting rebound following the total release of this load, the net settlement at the top of the pile does not exceed 0.01 inch per ton of total test load, the pile shall be considered adequate to support the proposed load capacity for a single pile.

Method 2 - Where the pile is loaded to failure, the loading value where the load settlement curve begins to show an accelerated deviation from its previous trend may be considered the "yield point" for the given soil and pile; one-half of this value, or one-half of the value at which the net settlement is estimated as one-half inch, whichever is the smaller, shall be considered as the load capacity for a single pile.

Method 3 - The failure load of a pile, half of which shall be used as the load capacity for a single pile, shall be defined as that load which produces a settlement or movement of the tip equal to one-quarter inch. The movement of the tip can be determined by actual measurement or by either of the following two load distribution cases, both involving the measurement of the butt movement. In each case the failure load shall be defined as that load producing a movement of the butt equal to the elastic deflection of the pile under the failure load plus one-quarter inch.

Arbitrary Load Distribution Case - In determining the elastic deflection of the pile, the assumption may be made that the soil-pile friction value is constant from tip to butt and that tip bearing is ignored. For a prismatic pile of one material, the butt movement shall be calculated by the expression:

$$D_f = \frac{P_f L}{2AE} + 0.25 \text{ inch, in which}$$

$D_f$  = Butt movement, inches

$P_f$  = Failure load, kips



- L = Pile length, inches  
 A = Pile cross sectional area, square inches  
 E = Modulus of Elasticity, kips per square inch

**Actual Load Distribution Case** – In determining the elastic deflection of the pile, the actual distribution of stress into the soil may be used providing that soils data as required by Article 2801, has been secured.

2. A variation of the load capacity of a load tested pile or a variation of the length of a load tested pile shall be allowed without additional load tests. The variations shall be limited to piles that derive their load capacity predominantly from side skin friction and further limited to a change of the load capacity for a single pile of not more than 20% or to a change in length of not more than 10%. The basis for either shall be the data developed by the engineering analysis (see Article 2801). An increase in load capacity (not exceeding the 20% stipulated above) for a single pile shall be accompanied by an increase in the length of the load tested pile; a decrease in the length (not exceeding the 10% stipulated above) of the load tested pile shall be accompanied by a decrease in the load capacity for a single pile.

3. Where the number of piles required for a structure is 100 or less, the load per pile does not exceed 150 pounds per square foot of effective pile surface, and the actual pile penetration into the supporting soil is not less than 50 feet, the Director may waive, upon specific request, the load test requirements. The basis for this shall be the data developed by the engineering analysis (see Article 2801). The allowable load on a single pile shall not exceed the value determined by the engineering analysis.

4. The Director may, upon specific request, accept as adequate proof of the load capacity of a single pile, load tests of piles on immediately adjacent property, but not to exceed 300 feet distant in any direction measured from the location of the prior test, provided that these tests have been performed on the same type piles that are to be used at the newer location and that adequate soil information (see Article 2801) establishes soil similarity at both locations. The variations described in 2805 (b) 2 shall not be permitted in conjunction with this provision.

**(c) Pile Capacity for Pile Groups.** The supporting value of piles depending solely on friction when driven in clusters or groups shall be investigated on the basis of group perimeter shear by the expression:

$$Q_a = \frac{P \times L \times c}{(FSF)} + \frac{2.6 q_u (1+0.2w)A}{(FSB)}$$

$Q_a$  = Allowable load-carrying capacity of pile groups, pounds

P = Perimeter distance of pile group, feet

L = Length of pile, feet

c = Average (weighted) cohesion of shear strength of material between surface and depth of pile tip, pounds per square foot

$q_u$  = Average unconfined compressive strength of material in the 30-foot zone immediately below pile tips, pounds per square foot

w = Width of base of pile group, feet

b = Length of base of pile group, feet

A = Base area of pile group, square feet

(FSF) = Factor of safety for the friction area = 2

(FSB) = Factor of safety for the base area = 3

The soil properties (c and  $q_u$ ) used in this formula shall be based on data accumulated from borings and laboratory test in quantity described in Article 2801. In the application of this formula, the weight of the piles, pile caps and mats, considering the effect of buoyancy, shall be included.

#### **(d) Pile Splices.**

1. Splices shall be such that the resultant vertical and lateral loads at the splices are adequately transmitted. Splices shall be so constructed as to provide and maintain the joint integrity and position of the component parts of the pile during installation and subsequent thereto.

2. Technical data shall be submitted to the Director of the Department of Safety to substantiate the suitability of the splice(s) for the proposed application.

3. The Director shall maintain a file of permitted splices so that repetitive submissions of technical data will not be necessary, unless factors involving a particular application so warrant.

(e) **Notification to Parish.** The Director shall be notified by the party installing the piles at least 24 hours in advance of any pile driving.

#### **ARTICLE 2806. TIMBER PILES.**

##### **(a) Treated Timber Piles.**

1. Piles in this category shall conform with the requirements of ASTM D25 "Standard Specification for Round Timber Piles." Treated timber piles shall be limited to those species permitted in AWP Standard C3. Piles for land or fresh water use shall comply with the requirements of AWP Standards C1 and C3 for "Land and Fresh Water Piles." Piles for use in salt water shall comply with the requirements of AWP Standards C1 and C3 for "Marine Piles." The care and handling of treated timber piles shall comply with the requirements of AWP Standard M4. When required, treated timber piles shall be inspected in accordance with AWP Standard M2.

2. Adequate proof in accordance with AWP Standard M1 identifying the supplier, species, preservative and retention shall be furnished.

3. Stresses at any section of a treated timber pile shall not exceed the values in the following table except that the allowable load on a single treated timber pile shall not exceed 25 tons in compression.

| <b>ALLOWABLE UNIT STRESSES FOR TREATED TIMBER PILES FOR NORMAL<br/>DURATION OF LOAD DETERMINED IN ACCORDANCE WITH ASTM D2899<br/>"METHOD FOR ESTABLISHING UNIT STRESSES FOR ROUND TIMBER PILES"</b> |                                                           |                             |                                          |                                                                |                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------|------------------------------------------|----------------------------------------------------------------|---------------------------------------------------|
| <b>Species</b>                                                                                                                                                                                      | <b>Compression<br/>Parallel to<br/>Grain<br/><br/>psi</b> | <b>Bending<br/><br/>psi</b> | <b>Horizontal<br/>Shear<br/><br/>psi</b> | <b>Compression<br/>Perpendicular<br/>to Grain<br/><br/>psi</b> | <b>Modulus<br/>of<br/>Elasticity<br/><br/>psi</b> |
| Pacific<br>Coast<br>Douglas<br>Fir                                                                                                                                                                  | 1250                                                      | 2450                        | 115                                      | 230                                                            | 1,500,000                                         |
| Southern<br>Pine<br>(Longleaf,<br>Slash,<br>Loblolly,<br>Shortleaf)                                                                                                                                 | 1200                                                      | 2400                        | 110                                      | 250                                                            | 1,500,000                                         |

4. The allowable unit stresses for treated timber piles of other species shall be determined in accordance with ASTM D2899 "Method for Establishing Unit Stresses for Round Timber Piles."

5. Treated timber piles shall be spliced in accordance with the requirements of Article 2805 (d).

##### **(b) Untreated Timber Piles.**

1. Piles in this category shall conform with the requirements of ASTM D25 "Standard Specification for Round Timber Piles."

2. The allowable unit stresses at any section of an untreated timber pile shall be as shown in Article 2806 (a) 3, and in Article 2806 (a) 4 and shall be adjusted upward by dividing the tabulated values by 0.90 for Pacific Coast Douglas Fir and by 0.85 for Southern Pine, except that the allowable load on a single untreated timber pile shall not exceed 30 tons in compression.

3. Untreated timber piles shall be spliced in accordance with the requirements of Article 2805(d).

##### **(c) Wood-Concrete Composite Piles.**

1. A wood-concrete composite pile is defined as a pile having an untreated timber pile lower section and a steel-cased cast-in-place concrete upper section. The butt of the untreated lower section shall be located in accordance with the requirements of Article 2805 (a) 4. The two sections shall be joined by a mechanical connector.

2. The timber section shall conform to the requirements of Article 2806 (b); the concrete of the steel-cased cast-in-place concrete upper section shall conform to the requirements of Article 2807 (c); the steel casing shall be a minimum of 11 inches (I.D.) and sufficiently water tight to exclude water and foreign matter during the placing of concrete. The connector shall be manufactured or fabricated of structural grade steel and shall consist, in general, of a driveshoe

of 12 gage or thicker material which is firmly attached to the steel casing. The drive-shoe shall be capable of penetrating a minimum of 4 inches into the wood section.

3. The allowable unit stresses in the timber section shall conform to the requirements of Article 2806 (b); the allowable unit stresses in the concrete of the steel-cased cast-in-place concrete upper section shall conform to the requirements of Article 2807 (c); the concrete in the steel-cased cast-in-place concrete upper section shall have a minimum design cylinder strength at 28 days of 2500 psi; the wood concrete composite pile shall not be designed for single pile capacity in excess of 25 tons in compression nor shall it be designed for uplift loads.

4. Except as provided for in this section, the pile splice connector shall conform to the requirements of Article 2805 (d). The splice shall withstand a minimum moment capacity of 4 foot kips, with no applied axial load and with the steel casing removed. The splice shall withstand a minimum tensile force of 20 kips with the steel casing removed.

## ARTICLE 2807. CONCRETE PILES.

(a) **Precast or Cast-in-place Concrete Piles.** Precast or cast-in-place concrete piles shall be symmetrical about at least two mutually perpendicular axis or shall be a polygon having equal sides, and shall be of materials complying with requirements for portland cement, fine aggregates and reinforcement as specified in ACI 318. The compressive strength of concrete shall be determined by tests as specified in ACI 318.

(b) **Precast Concrete Piles.** Precast concrete piles shall be cast a minimum of 14 days prior to driving, shall be cast with concrete having a minimum cylinder strength of 3000 psi, at 28 days age and shall be designed to resist stresses induced by handling, transporting and driving as well as by loads. Precast concrete piles shall be spliced in accordance with the requirements of Article 2805 (d). In addition to the requirements of ACI 318, the minimum standards contained in Article 2807 (a) shall be satisfied.

1. Non-prestressed precast concrete piles shall be limited to a pile load capacity for a single pile by the following expression: (modified, if necessary, by the requirements of Article 2805 (a) 3.)

$$P_a = A_c (0.33f'_c) + 0.40f_{yr}A_r, \text{ in which}$$

$$P_a = \text{Allowable pile design load, pounds}$$

$$A_c = \text{Area of concrete, square inches}$$

$$f'_c = \text{Concrete 28-day strength, pounds per square inch}$$

$$f_{yr} = \text{Yield stress of reinforcing steel, pounds per square inch}$$

$$A_r = \text{Area of reinforcing steel, square inches}$$

2. Prestressed precast concrete piles shall be limited to a pile load capacity for a single pile by the following expression: (modified, if necessary by the requirements of Article 2805 (a) 3)

$$P_a = A_c (0.33f'_c - 0.27f_{pe}), \text{ in which}$$

$$P_a = \text{Allowable pile design load, pounds}$$

$$A_c = \text{Area of concrete, square inches}$$

$$f'_c = \text{Concrete 28-day strength, pounds per square inch}$$

$$f_{pe} = \text{Effective prestress on the gross section after prestress losses, pounds per square inch.}$$

The maximum permitted value for  $f'_c$  shall be 7000 psi and the minimum permitted value for  $f_{pe}$  shall be 700 psi.

(c) **Cast-in-Place Concrete Piles.** Cast-in-place concrete piles shall employ concrete with a minimum cylinder design strength at 28 days of 3000 psi and shall not employ concrete with a cylinder design strength at 28 days in excess of 5000 psi; the concrete shall have a minimum slump of 4 inches; reinforcing, when used, shall comply with the applicable sections of this code; cast-in-place concrete piles employing casings, either structural or non-structural, shall have the casings driven for their full length in contact with the surrounding soil and left permanently in place. The casings shall have a sealed tip and shall be sufficiently strong to resist

collapse and sufficiently watertight to exclude water and foreign material during the placing of concrete; cast-in-place concrete piles employing non-structural casings or uncased cast-in-place concrete piles shall be installed in such order and with such spacing as to insure against distortion of the pile being installed or to the piles already in place; no pile shall be driven within the noticeable heave range of a pile filled with concrete less than 24 hours old.

1. Cast-in-place concrete piles employing structural casings shall have steel pipes or steel casings meeting requirements of one of the following Standard Specifications of the American Society for Testing and Materials, except that the specified minimum yield stress shall not exceed 50,000 psi:

- ASTM A252 — Specification for Welded and Seamless Steel Pipe Piles
- ASTMA283 — Specification for Low and Intermediate Tensile Strength Carbon Steel Plates of Structural Quality
- ASTM A366 — Specification for Cold-Rolled Carbon Steel Sheets, Commercial Quality
- ASTM A569 — Specification for Hot-Rolled Carbon Steel Sheets and Strip, Commercial Quality
- ASTM A570 — Specification for Hot-Rolled Carbon Steel Sheets and Strip, Structural Quality
- ASTM A611 — Specification for Steel, Cold-Rolled Sheet, Carbon, Structural Quality

Cast-in-place concrete piles employing structural casings shall be limited to a pile capacity for a single pile by the following expression: (modified, if necessary, by the requirements of Article 2805 (a) 3)

$$P_a = 0.275f'_c A_c + 0.35f_{ys} A_s + 0.40f_{yr} A_r, \text{ in which}$$

$P_a$  = Allowable pile design load, pounds

$f'_c$  = Concrete 28-day strength, pounds per square inch

$A_c$  = Area of concrete, square inches

$f_{ys}$  = Yield stress of the structural casing, pounds per square inch

$f_{yr}$  = Yield stress of the reinforcing, pounds per square inch

$A_s$  = Areas of the steel casing, square inches

$A_r$  = Area of the reinforcing, square inches

No portion of the applied load shall be assumed to be taken by structural casings having a nominal wall thickness of less than 3/16 inch; for the purpose of determining calculated load, that portion of structural casings located above the lowest ground water level anticipated for the life of the building, shall have its nominal wall thickness assumed reduced by 1/16 inch; piles of uniform section shall have a minimum nominal diameter of 8 inches. Cast-in-place concrete piles employing minimum structural casings shall have their casings spliced in accordance with the requirements of Article 2805 (d).

2. Cast-in-place concrete piles employing non-structural casings shall be limited to pile capacity for a single pile by the following expression: (modified, if necessary, by the requirements of Article 2805 (a) 3.)

$$P_a = 0.250f'_c A_c + 0.40f_{yr} A_r$$

(terms as defined in Article 2807 (c) 1)

No portion of the applied load shall be assumed to be taken by the non-structural casings; piles of uniform or of varying sections shall have a minimum nominal diameter of 8 inches. The splice of the casings need of a cast-in-place pile employing non-structural casings need not comply with the requirements of Article 2805 (d).

3. Uncased cast-in-place concrete piles (employing neither structural nor non-structural casings) shall be limited to a pile capacity for a single pile by the following expression: (modified, if necessary by the requirements of Article 2805 (a) 3)

$$P_a = 0.225f'_c A_c + 0.35f_y A_r$$

(terms as defined in Article 2807 (c) 1)

These piles shall be limited to a minimum design diameter of 10 inches. Placement in the ground shall be in such a manner as to insure the exclusion of any foreign matter and to secure a full-sized shaft. The splice of uncased cast-in-place concrete piles shall comply with the requirements of Article 2805 (d). Uncased cast-in-place piles shall be subject to the following special procedure:

Two five-pile groups, with piles similar to those being installed in the manner contemplated for the building piles and at the same spacing, shall have the center pile of each group test loaded in accordance with the requirements of this Code; after load testing, two piles from each group shall be extracted and measured for dimension changes: a maximum deviation, of 10% smaller than the design diameter will be permitted; or 30% larger than the design diameter of the pile will be permitted, however, local bulges with a maximum length along the axis of the pile of three times its design diameter will be permitted, provided any bulges do not exceed 100% of the design diameter and the axis of the pile is not deflected; inclusion of mud or foreign matter in the concrete amounting to more than 10% of any cross section will be cause for rejection. This special procedure will be waived if satisfactory evidence of five comparable, local installations is presented and each is supported by comprehensive load test data.

#### ARTICLE 2808. STEEL PILES.

(a) Steel used in steel piles shall conform to one of the following standard specifications of the American Society for Testing and Materials:

ASTM A36 - Specification for Structural Steel

ASTM A572 - Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality

ASTM A252 - Specification for Welded and Seamless Steel Pipe Piles

(b) Steel piles shall be rolled "H" sections, or "built-up" sections consisting of various structural shapes and/or plates, or pipe piles. The rolled "H" or the "built-up" sections shall conform to A.I.S.C. Specifications for width-to-thickness ratios, shall employ thicknesses of at least 3/8 inch, and shall be symmetrical about at least two mutually perpendicular axis. Pipe piles to be installed open-ended shall have a minimum nominal wall thickness of 0.25 inch, for diameters 14 inches and less, and 0.375 inch for diameters greater than 14 inches.

(c) Steel piles shall be limited to a pile load capacity for a single pile by the following expression: (modified, if necessary by the requirements of Article 2805 (a) 3)

$$P_a = 0.50f_y A_p, \text{ in which}$$

$P_a$  = Allowable pile design load, pounds

$f_y$  = Specified minimum yield strength of the steel, pounds per square inch

$A_p$  = Cross sectional area of the pile, square inches

The specified minimum yield strength of the steel shall not exceed 50,000 psi.

(d) Steel piles shall be spliced in accordance with the requirements of Article 2805 (d).

#### ARTICLE 2809. SPECIAL PROVISIONS FOR HIGH CAPACITY PILES, WHICH APPLY ONLY TO THE TRANSFER OF STRESS INTO THE PILE CAPS.

At the option of the Louisiana Registered Civil Engineer responsible for the foundation design, the use of High Capacity Piles may be employed, in which event, all applicable provisions of this Article shall apply.

(a) In the case of concrete piling, the load of the pile shall be transferred to the concrete foundation over the area of the pile butt providing that:

1. An allowable working stress of  $0.80f'_c$  in the concrete foundation is not exceeded.
2. The distance from the centerline of pile to the edge of the concrete foundation is at least 2'6".
3. The minimum  $f'_c$  of the concrete foundation is 3000 psi.
4. The minimum embedment of the pile into the concrete foundation is 6 inches.
5. The maximum pile dimension is 18 inches.

6. Two-way continuous reinforcing is placed 2 inches above the pile butt and its area per lineal foot in each direction shall be at least equal to the design pile load in kips divided by 3 times the yield stress of the reinforcing in kips per square inch.

(b) In the case of steel piling, the load of the pile shall be transferred to the concrete foundation in either of two ways:

1. By bearing through a steel cap plate of at least the same dimension as the pile secured to and properly bearing on the pile butt and into the concrete mat foundation providing that:

(A) An allowable working stress of  $0.80f'_c$  in the concrete foundation is not exceeded.

(B) The distance from the centerline of pile to the edge of the concrete foundation is at least 2'6".

(C) The minimum  $f'_c$  of the concrete foundation is 3000 psi.

(D) The minimum embedment of the pile into the concrete foundation is 6 inches.

(E) The maximum pile dimension is 18 inches.

(F) Two-way continuous reinforcing is placed 2 inches above the pile butt and its area per lineal foot in each direction shall be at least equal to the design pile load in kips divided by 3 times the yield stress of the reinforcing in kips per square inch.

2. By direct transfer from the pile itself into the concrete foundation providing that:

(A) An allowable working stress of 12,000 psi in the concrete foundation is not exceeded.

(B) The minimum concrete foundation thickness is 4 feet.

(C) The distance from the centerline of pile to the edge of the concrete foundation is at least 2'6".

(D) The minimum  $f'_c$  of the concrete foundation is 3000 psi.

(E) The minimum embedment of the pile into concrete foundation is 6 inches.

(F) The maximum pile dimension is 18 inches.

(G) The maximum thickness of pile material is 5/8 inch.

(H) Two-way continuous reinforcing is placed 2 inches above the pile butt and its area per lineal foot in each direction shall at least be equal to the design pile load in kips divided by 3 times the yield stress of the reinforcing in kips per square inch.

(c) For either concrete or steel pilings any other approach following a rational analysis utilizing accepted rules and theories of engineering mechanics and strength of materials as well as recognized allowable stresses of materials as referenced in this Code shall be submitted to the Director for evaluation and approval.

#### ARTICLE 2810. SPECIAL PILES AND SPECIAL CONDITIONS.

The use of types of piles not specifically mentioned in Chapter 28 and the use of piles under conditions not specifically covered in Chapter 28, shall be permitted, subject to the approval of the Director, upon submission of acceptable test data, calculations and other information relative to the properties and load-carrying capacity of such piles. Test data shall consist of at least 5 consecutive field tests which shall include but shall not be limited to the driving, loading, extraction and examination of the piles. The calculations shall follow rational engineering analysis.

#### ARTICLE 2811. COMBINATION PILES.

Individual sections of a combination pile shall comply with the requirements for piles of that type of section. Splices shall be in accordance with the requirements of Article 2805 (d).

#### ARTICLE 2812. LIGHTLY LOADED PILES.

(a) **General Requirements.** Lightly loaded piles shall comply with all applicable requirements of this chapter except as provided in this article. Piles shall be held in line or adequately tied together at their butt end by means of continuous reinforced concrete or equivalent concrete around their perimeter. All piles for a building or structure shall extend to the same depth unless adequate provisions for differential settlement within the building or structure have been made. The Director shall be notified by the party installing the piles at least 24 hours in advance of any pile driving.

(b) **Design Requirements.** The requirements of Article 2805 (b) 3 are applicable for lightly loaded piles except that the value of 150 pounds per square foot shall be 85 pounds per square foot, the penetration of not less than 30 feet, or the values in the table in Article 2813 may be used. The minimum pile spacing shall be 24 inches on center.

(c) **Size Requirements.** Except as provided herein piles depending predominantly on side skin friction for their load-carrying capacity shall have minimum butt diameter of 8 inches and a minimum tip diameter of 6 inches; piles depending predominantly on tip bearing for their load-carrying capacity shall have a minimum tip diameter of 6 inches with a natural taper to the butt.

(d) **Driving and Length Requirements.** Driving and Length Requirements. Except as noted in Article 2812 (c), and unless driven to substantial refusal, the minimum pile length shall be 30 feet. When substantial refusal is encountered between 7 and 30 feet below natural ground surface, the load bearing capacity of the pile shall be determined by the Engineering News Record Formula, but in no case shall the allowable capacity of a single pile exceed 8 tons for a Class 5 pile and shall not exceed 5 tons for a Class 9 pile. When substantial refusal is encountered at less than 7 feet below natural ground surface, piles shall be jetted into the sand strata for a distance of not less than 2 feet. Substantial refusal shall be defined as a resistance determined by the Engineering News Record Formula for the design load of pile.

(e) **Material Requirements.** Lightly loaded wood piles shall conform to the "Specifications for Round Timber Piles" (A.S.T.M.d25) except for size. All piles shall be treated with creosote, creosote solutions or oil borne preservatives in accordance with A.W.P.A. Standard C3 except that an 8 pound per cubic foot retention shall be permitted with a 2 1/2 inch penetration or 85% of sap wood. The director may require written certification that all piles meet Article 2813 specifications.

## **ARTICLE 2813. RESIDENTIAL AND SMALL FOUNDATIONS**

(a) **General.** This section of the code covers the following: I - Occupancy (Residence 1-4 units, J - Occupancy (Accessory Building not to exceed 1,000 square feet), and all other structures, including small commercial which do not exceed 5,000 square feet in gross floor area and do not exceed 35 feet in height. This section of the building Code addresses the challenge of designing foundations compatible with our unique soils. Among the problems associated with the urban development of our soils are: Initial and continued soils subsidence, high shrink-swell potential of firm clays, severe wetness, low bearing strength, the necessity of having to add fill material and continuous lowering of the water table. Because of these potential problems, design of foundations should be based on an onsite subsoil investigation whenever possible, as per Article 2801 of the Code.

(b) **Pile Foundations.** All areas having soils which contain one or more of the above mentioned limitations that may occur as a result of man or nature should have a properly designed pile supported foundation. The unincorporated areas of Jefferson Parish, as outlined on the U.S. Soil Conservation Survey East Bank of Jefferson Parish Soil Map, September, 1977, and on the U.S. Soil Conservation Survey West Bank of Jefferson Parish Soil Map, September, 1978, delineate areas where pile foundations are required and where pile foundations are not required, but recommended. All areas not covered by the maps shall require a subsoil investigation as per Article 2801 of the Code.

1. Residential piles shall comply with all applicable requirements of this chapter as provided in this article. Piles shall be properly held in line or adequately tied together at their butt end by means of continuous reinforced concrete or equivalent construction. Pile butts shall be protected by a minimum of 3 inches of concrete around their perimeter. All piles for a building or a structure should extend to the same depth unless adequate provisions for a differential settlement within the building or structure have been made. The Director shall be notified by the party installing the piles at least 24 hours in advance of any pile driving. Accessory buildings with a foundation not similar to that of the main building. Furthermore, such accessory buildings which do not exceed 1,000 square feet of gross floor area shall be exempt from said piling requirements.

2. When pile foundations are required, maximum design load capacities have been established for various types and embedments of piles. These values are tabulated for each area which requires pile foundations and are shown on the U.S. Soil Conservation Survey Maps of the East Bank of Jefferson Parish, September, 1977, and the West Bank of Jefferson Parish, September, 1978. In soil type (13) Sharkey Clay, a special foundation may be used in lieu of a pile supported foundation, provided the foundation design is prepared by or under the direct supervision of a Louisiana Registered Civil Engineer or Louisiana Registered Architect experienced in soil mechanics; such drawings and specifications shall be designated per lot and square and be imprinted with his seal, and these plans shall be approved by the Department of Inspection & Code Enforcement, prior to issuance of the building permit. (See TABLE #1 FOLLOWING)

Table #1

## EAST BANK OF JEFFERSON PARISH

| Soil Types | Pile Type | Pile Tip<br>Embedment<br>In Feet | Maximum Allowable<br>Single Pile Load<br>Capacities Without<br>Investigation or<br>Load Tests |
|------------|-----------|----------------------------------|-----------------------------------------------------------------------------------------------|
| 11         | Class 9   | 30'                              | 2.5 Tons                                                                                      |
|            | Class 5   | 30'                              | 3 Tons                                                                                        |
|            | Class 5   | 35'                              | 4 Tons                                                                                        |
|            | Class 5   | 40'                              | 5 Tons                                                                                        |
| 1,3        | Class 9   | 30'                              | 3 Tons                                                                                        |
| 5,20       | Class 5   | 30'                              | 4 Tons                                                                                        |
|            | Class 5   | 35'                              | 5 Tons                                                                                        |
| 13         | Class 9   | 30'                              | 4 Tons                                                                                        |
|            | Class 5   | 30'                              | 5.5 Tons                                                                                      |

## WEST BANK OF JEFFERSON PARISH

| Soil Types | Pile Type | Pile Tip<br>Embedment<br>In Feet | Maximum Allowable<br>Single Pile Load<br>Capacities Without<br>Investigation or<br>Load Tests |
|------------|-----------|----------------------------------|-----------------------------------------------------------------------------------------------|
| 1,2 & 8    | Class 9   | 30'                              | 2 Tons                                                                                        |
|            | Class 5   | 30'                              | 2.5 Tons                                                                                      |
|            | Class 5   | 35'                              | 3 Tons                                                                                        |
|            | Class 5   | 40'                              | 4 Tons                                                                                        |
| 4, 18 & 20 | Class 9   | 30'                              | 2.5 Tons                                                                                      |
|            | Class 5   | 30'                              | 3 Tons                                                                                        |
|            | Class 5   | 35'                              | 4 Tons                                                                                        |
|            | Class 5   | 40'                              | 5 Tons                                                                                        |
| 3, 9 & 13  | Class 9   | 30'                              | 3 Tons                                                                                        |
|            | Class 5   | 30'                              | 4 Tons                                                                                        |
|            | Class 5   | 35'                              | 5 Tons                                                                                        |

NOTES: Class 9 piles shall have a minimum tip diameter of 4 3/4 inches with a natural taper to the butt.

Class 5 piles shall have a minimum tip diameter of 6 inches and a minimum butt diameter of 8 inches.

Areas not specifically covered by the U.S. Soil Conservation Survey Maps, East Bank (September, 1977) and West Bank (September, 1978) shall require a subsoil investigation.

The Standards of the Code regarding the need for a pile foundation or the maximum design load capacity for the particular type of pile may be superseded by a subsoil investigation which is performed in accordance with Article 2801 or a pile load test which is performed in accordance with Article 2805 provided the subsoil investigation or pile load test is located within a 150 foot radius of the proposed foundation for a single boring or pile test. This distance can be increased to a 300 foot radius for a multi-soil borings or pile tests that recommended the same design load. The Director at his discretion may waive the distance requirement provided a written request, which demonstrates just cause for the waiver, is presented by a Louisiana Registered Civil Engineer or Louisiana Registered Architect experienced in soil mechanics.

3. Class 9 piles shall be treated timber poles having a minimum tip diameter of 4.75 inches



with a natural taper to the butt. Class 5 piles shall be treated timber poles having a minimum tip diameter of 6 inches and a minimum butt diameter of 8 inches. The minimum pile spacing shall be 24 inches on center.

4. Unless driven to substantial refusal, the minimum pile length shall be 30 feet. When substantial refusal is encountered between 7 and 30 feet below natural ground surface, the load bearing capacity of the pile shall be determined by the Engineering News Record Formula, but in no case shall the allowable capacity of a single pile exceed 8 tons. When substantial refusal is encountered at less than 7 feet below natural ground surface, piles shall be jetted into the sand strata for a distance of not less than 2 feet. Substantial refusal shall be defined as a resistance determined by the Engineering News Record Formula for the design load of the pile.

5. Class 9 piles shall conform to the "Specifications for Round Timber Piles" (A.S.T.M., d25) except for size which is stated above. All piles shall be treated with cresote, creosote solutions or oil borne preservatives in accordance with A.W.P.A. Standard C3 except that an 8 pound per cubic foot retention shall be permitted with a 2½ inches penetration or 85% of sap wood. The Director may require a written certification that all piles meet Chapter 28 specifications.

(c) Site Filling. The use of the pile capacities contained in this article shall be limited only to situations in which downdrag is not a significant factor. Design use of these capacities shall be limited to areas where fill is less than 2 feet in thickness unless the area is brought to grade for an adequate preload period prior to driving piles. Recommended preload periods are as follows:

| Fill Thickness | Preload       |
|----------------|---------------|
| 2 to 3 feet    | 2 to 3 months |
| 3 to 4 feet    | 3 to 6 months |
| 4 to 5 feet    | 6 to 9 months |

Specific considerations must be made for construction over filled canals, ditches, or unusual local conditions. The thickness of the fill shall be measured from the natural ground surface. This shall be determined with a minimum of 5 elevations taken on each corner of the structure and in the middle of the structure.

#### **ARTICLE 2814. WIND PRESSURE AND COMBINED LOADS**

Bearing values of soil and piles, including pile stresses, may be increased 33.3% when subjected to wind and other loads. In no case shall the combined load of the soil or pile, nor shall the resulting design be less than required if wind were neglected.



## CHAPTER 29 – WALLS AND PARTITIONS

### SOLID MASONRY WALLS.

#### ARTICLE 2901. GENERAL PROVISIONS.

All materials used in solid masonry walls shall conform in all respects to the requirements for such materials in Chapters 24 and 26.

(a) Solid masonry walls shall be supported at right angles to the wall face at intervals not exceeding the ratio of unsupported height or length of the wall (whichever is the lesser) to thickness, as set forth in Table No. 24-H, except as specifically provided in Article 2903. Such lateral support may be obtained by masonry cross walls, piers or buttresses when the limiting distance is measured horizontally or by floors or roof when the limiting distance is measured vertically. Sufficient bonding and anchoring of horizontal and vertical framing members to the wall shall be provided to resist the assumed wind forces acting in an outward direction. Floors and roofs shall be so constructed and anchored to such walls as to form a continuous and sufficient anchorage across the building from wall to wall. Anchoring of wood framing to masonry walls shall be as specified in Chapter 25. Piers or buttresses relied upon for lateral support shall have sufficient strength and stability to transfer the wind force acting in either direction to the ground. When walls are dependent upon floors for their lateral support provision shall be made in the building to transfer the lateral forces resisted by all floors to the ground.

(b) Corbels may be built only into solid masonry walls twelve inches (12") or more in thickness. The projection for each course in such corbel shall not exceed one inch (1"), and the maximum projection shall not exceed one-third the total thickness of the wall when used to support structural members and not more than six inches (6") when used to support a chimney built into the wall. The top course of all corbels shall be a header course.

#### ARTICLE 2902. WORKING STRESSES.

The maximum allowable compressive stresses in solid masonry due to combined live, dead and other loads shall not exceed those specified in Article 2411 and 2413.

#### ARTICLE 2903. THICKNESS OF EXTERIOR WALLS OTHER THAN SKELETON CONSTRUCTION.

(a) **Solid Masonry Bearing Walls.** The thickness of solid masonry walls shall be sufficient at all points to keep the combined stresses due to live, dead and other loads for which the building is designed within the limits specified in Articles 2411 and 2413.

The minimum thickness of solid masonry exterior, bearing or party walls shall be not less in thickness than specified in Table No. 29-C; provided, that in no case shall the uppermost thirty-five feet (35') of such walls be less than twelve inches (12") in thickness, and each successive thirty-five feet (35') or fractions thereof measured downward from the top shall be increased not less than four inches (4") in thickness.

Solid masonry bearing walls above roof level, twelve feet (12') or less in height, enclosing penthouses or roof structures may be eight inches (8") thick and may be considered as neither increasing the height nor requiring any increase in the thickness of the wall below, provided the requirements for allowable stresses are complied with.

Exceptions: 1. The top story exterior or bearing walls of a building not exceeding four (4) stories or fifty-five feet (55') in height may have a wall thickness equal to the least dimension as set forth in Table No. 24-H, provided that such wall does not exceed twelve feet (12') unsupported height and that the roof beams or trusses are so placed or constructed as not to develop any direct thrust against the wall. Also, the top story walls of a building not exceeding three (3) stories or thirty-five feet (35') in height, or the walls of any one-story building may have a thickness equal to the least dimension as set forth in Table No. 24-H.

2. Exterior walls for Group I Occupancies shall be as specified in part (c) of this Article.

3. Solid masonry exterior bearing or party walls constructed as specified in part (d) of this Article may be of lesser thickness.

4. The thickness of grouted brick masonry walls may be two inches (2") less than required by this sub-section, but in no case less than as set forth in Table No. 24-H.

(b) **Non-Bearing Walls.** Non-bearing walls of solid masonry shall be not less in thickness than specified in Table No. 29-C; provided, that in no case shall the uppermost fifteen feet (15') of such wall be less than eight inches (8") thick and that each successive fifty feet (50') or fraction thereof measured downward from the top shall be increased not less than four inches (4") in thickness. Wire mesh may be used to resist tensile stresses when embedded in plaster applied to the surface of the wall.

Exceptions: Solid masonry non-bearing walls for Group I Occupancies not over three (3) stories high shall be as specified in part (c) of this Article.

(c) **Walls for Group I Occupancies.** In Group I Occupancies not more than three stories in height, masonry walls may be of eight inches (8") nominal thickness when not over thirty-five feet (35') in height. Such walls in one-story single-family dwellings, and one-story private garages, may be of six inches (6") nominal thickness when not over nine feet (9') in height, provided that when gable construction is used, an additional six feet (6') is permitted to the peak of the gable.

This exception shall not apply to cavity walls or stone masonry.

(d) **Stiffened Walls.** Where solid masonry bearing or non-bearing walls are strengthened laterally by masonry pilasters or buttresses or cross walls, the thickness specified in Sub-sections (a), (b), and (c) of this Article may be reduced, or the heights increased, between stiffeners, provided that no part of such stiffened wall shall be less than the minimum thickness set forth in Table No. 24-H; and the buttresses or pilasters themselves must be not less than four inches (4") thicker than the wall supported. The clear space or distance between stiffeners shall not exceed the ratio of Table No. 24-H increased by one-third (1/3) based on the thickness of wall between buttresses. The width of the pilaster or buttress shall not be less than one-tenth (1/10) of the clear space between them, and the height of such buttresses or pilasters shall not exceed the limits set forth in Table No. 24-H (substituting buttress thickness for wall thickness), but the walls supported by same may be carried up to the height of their pilasters or buttresses.

Where solid masonry bearing walls are stiffened at distances not greater than twelve feet (12') apart (clear distance between stiffeners) by solid masonry cross walls not less in thickness than required by Table No. 29-A or by internal or external solid masonry offsets or returns at least two feet (2') deep and not less in thickness than required by Article 2901 (a), or twelve feet (12') vertically by reinforced concrete floors or roof, they may be twelve inches (12") thick for the uppermost seventy feet (70'), measured downward from the top of the wall, and shall be increased four inches (4") in thickness for each successive seventy feet (70') or fraction thereof. Principal beams, girders and trusses shall rest on the buttresses or pilasters.

In one-story buildings having walls not over sixteen feet (16') high to the under side of girders or trusses and pilasters as above provided for an eight inch (8") wall between pilasters, such walls may be considered as bearing walls for roof loads and parapet walls only. All materials used in solid masonry walls shall conform in all respects to the requirements of such materials in Chapters 24 and 26.

(e) **Grouted Brick Masonry.** All brick in the outer tiers shall be laid with full head and bed joints of Type A or B mortar, and all interior joints shall be filled with grout. Brick in the interior tiers shall be placed or floated in grout poured between the two outer tiers. One of the outer tiers may be carried up not more than three courses before grouting but the other shall be carried up not more than one course above the grout. Each pour of grout shall be stopped at least one and one-half inches (1 1/2") below the top and properly stirred. The longitudinal joints shall be not less than three-fourths inch (3/4") wide. Head or end joints shall be not less than one-half inch (1/2") wide. Bonding headers shall not be used.

(f) **Reinforced Brick Masonry.** Only grouted brick masonry shall be used.

The thickness of grout or mortar between brick and steel shall be not less than one-fourth inch (1/4") except that one-fourth inch (1/4") bars may be laid in one-half inch (1/2") horizontal mortar joints. Vertical reinforcing shall be accurately placed and held in position before brickwork is started. Horizontal reinforcement may be placed as the brickwork progresses.

In addition to the minimum required reinforcement, at least one (1) one-half inch (1/2") bar or equivalent shall be placed on all sides of every opening which exceeds twenty-four inches (24") in either dimension. The bars shall extend twenty-four inches (24") beyond the corners of the opening.

(g) **Change in Thickness.** When a change in thickness due to minimum thickness requirements occurs between floor levels, the greater thickness shall be carried to the higher floor level.

## ARTICLE 2904. BOND.

In all solid unit masonry walls at least every sixth course on both sides of the wall shall be a header course or there shall be at least one full header in every seventy-two square inches (72 sq. in.) of each wall surface. In walls more than twelve inches (12") thick the inner joints of header courses shall be covered with another header course which shall break joints with the course below.

Where running bond is used, every sixth course on each face shall be bonded into the backing by using a full header course at right angles to the face behind split brick.

#### **ARTICLE 2905. PIERS.**

The unsupported height of isolated piers shall not exceed ten (10) times their least lateral dimension. Piers of solid unit masonry shall be laid up in cement mortar.

Walls in which the openings are of such an extent as to leave relatively narrow sections exceeding ten feet (10') in height shall have such narrow sections computed and constructed as for isolated piers.

Every pier whose width is less than three (3) times its thickness shall be designed and constructed as required for columns if such piers is a structural member.

#### **ARTICLE 2906. CHASES AND RECESSES.**

There shall be no chases in eight inch (8") walls or within the required area of any pier, and no chase in any wall or pier shall be deeper than one-third (1/3) the wall thickness. No horizontal chase shall exceed four feet (4') in length nor shall the horizontal projection of any diagonal chase exceed four feet (4'). No vertical chase shall be closer than two feet (2') to any pilaster, cross wall, and wall or other stiffener.

Recesses for stairways or elevators may be made in walls but in no case shall the walls at such points be less than the required thickness of walls of the fourth story above the ground floor unless reinforced by additional piers, by steel or reinforced concrete columns and girders, securely anchored to the walls on each side of such recesses. Recesses for alcoves and similar purposes shall have not less than eight inches (8") of material at the back. Such recesses shall be not more than eight feet (8') in width and shall be arched over or spanned with lintels.

The aggregate area of recesses and chases in the wall of any one story shall not exceed one-fourth (1/4) the whole area of the face of the wall in that story.

No chases or recesses shall be permitted in any wall which will reduce the fire-resistance of such wall below the minimum specified in this Code.

Openings for doors and windows shall have well buttressed arches or lintels of masonry, or of metal with bearing at each end of not less than four inches (4") on the wall.

The maximum percentage of openings in the horizontal cross section of any wall shall not exceed fifty per cent (50%) unless the wall is increased four inches (4") in thickness or such portions of the wall between openings shall be as required for piers in Article 2905.

In dwellings not over two (2) stories high, chases not over four inches (4") deep, thirty inches (30") wide, and twenty-four inches (24") high, may be built in eight inch (8") walls, and provided that chases below windows may equal the width of the opening above. The back and sides of such chases in exterior walls shall be made water resistant and insulated.

#### **HOLLOW WALLS AND CAVITY WALLS.**

#### **ARTICLE 2907. GENERAL PROVISIONS.**

(a) **Hollow Walls.** Walls or hollow clay tile, of concrete block or tile, hollow walls of solid masonry units and hollow monolithic plain concrete walls shall be supported at right angles to the face at intervals not exceeding the ratio of unsupported height or length of the wall (whichever is the lesser) to thickness, as set forth in Table No. 24-H.

The general provisions relating to solid masonry walls shall apply to hollow walls as included in this Article; provided, that corbeling from hollow walls shall not be permitted except when such corbels are constructed of solid masonry or reinforced concrete.

Where air spaces are built into the wall the area of such air spaces combined with the area of the cellular space in the tile used in the construction of the wall shall not exceed forty-five per cent (45%) of the gross cross-sectional area of the wall.

Masonry walls composed of a combination of solid and hollow units shall be not less in thickness than the minimum thickness required for hollow walls as provided in Article 2909.

All materials used in walls of hollow clay tile or concrete block or tile, hollow walls of solid masonry units and hollow monolithic concrete walls shall conform in all respects to the requirements in Chapter 24 and 26 for such materials.

Hollow masonry walls may be stiffened as provided in Article 2903 (d), and in addition, the cellular spaces of all pilasters and buttresses must be filled solidly with concrete or Type A mortar; in which case, the allowable load may be increased twenty-five per cent (25%), except that unfilled hollow pilasters or buttresses may be used if their height does not exceed fifty per cent (50%) of that allowed by Table No. 24-H. Pilasters or buttresses themselves shall be adequately bonded together, and shall also be properly bonded into the wall supported by them.

(b) **Cavity Walls.** In cavity walls neither the facing nor the backing shall be less than four inches (4") in thickness, and the cavity shall be not less than two inches (2"), nor more than three inches (3") in width. The facing and backing of cavity walls shall be securely tied together

with suitable non-corrosive bonding ties of adequate strength. There shall be at least one three-sixteenths inch (3/16") diameter steel rod or equivalent metal tie for each three square feet (3 sq. ft.) of wall surface placed in the horizontal mortar joints of the facing and backing. Where hollow masonry units are laid with cells vertical, rectangular ties shall be used. The ends of ties shall be bent to 90 degree angles to provide hooks not less than two inches (2") long. Additional bonding ties shall be placed around the perimeter of all openings and shall be spaced not more than three feet (3') apart and within one foot (1') of the opening.

#### **ARTICLE 2908. WORKING STRESSES.**

The maximum allowable compressive stresses in walls of hollow tile, concrete block or tile, hollow walls of brick or hollow monolithic plain concrete walls due to combined live, dead and other loads shall not exceed those specified in Chapters 24 and 26.

#### **ARTICLE 2909. THICKNESS AND HEIGHT OF WALLS OTHER THAN SKELETON CONSTRUCTION.**

Walls of hollow clay tile and concrete block or tile, hollow walls of solid masonry units and hollow monolithic concrete walls shall be not less in thickness than as specified in Table No. 29-B provided, that in no case shall the uppermost twenty-five feet (25') of such walls be less than twelve inches (12") in thickness, and each successive twenty-five feet (25') or fraction thereof measured downward from the top shall be increased not less than four inches (4") in thickness.

When a change in thickness due to minimum thickness requirements occurs between floor levels the greater thickness shall be carried to the higher floor level.

Exceptions: 1. Walls constructed with either hollow clay tile, as specified in Article 2405 for exterior and bearing walls or hollow concrete block or tile as specified in Article 2406 may be of the same thickness as solid masonry walls when not exceeding two stories in height, and such walls shall be laid in cement mortar proportioned as specified in Article 2410. One-story private garages and one-story residences may have bearing and non-bearing walls of hollow tile, concrete block or tile, hollow brick or hollow monolithic plain concrete walls six inches (6") thick.

2. Cavity walls ten inches (10") in thickness shall not exceed twenty-five feet (25') in height, and in no case shall any cavity wall exceed thirty-five feet (35') in height.

#### **ARTICLE 2910. BOND.**

All hollow masonry units in a wall shall have all contact surfaces solidly embedded in mortar and laid with a full bond.

Where two or more hollow units are used to make up the thickness of a wall the inner and outer courses shall be bonded at vertical intervals not exceeding three courses by lapping at least one cell completely over a cell of the unit below.

Where walls of hollow masonry units are decreased in thickness, a course of solid masonry not less than four inches (4") in height shall be interposed between the wall section below such point and that next above, or special units or construction shall be used to adequately transmit the loads from the shells above to those below.

#### **ARTICLE 2911. BEAM SUPPORTS.**

Suitable provision shall be made in hollow walls or walls of hollow units at each line of floor joists or beams to shut off the spaces above from those below with incombustible material.

Except where hollow units having at least three cells in each eight inches (8") of thickness are laid with cells horizontal, joists, beams or other structural members shall not be seated directly on hollow walls or walls of hollow units, but shall be supported on at least three courses of brick or equivalent concrete or metal plate of sufficient thickness and size to distribute the load to the webs and shells in such a manner as not to exceed the allowable unit stress.

#### **ARTICLE 2912. PIERS.**

Hollow clay tile or concrete block or tile, except hollow clay tile as specified in Article 2405 for exterior, and bearing walls, and special hollow concrete block or tile, as specified in Article 2406, shall not be used for isolated piers. Wall sections greater in height than ten (10) times their least dimension and two feet (2') or less in width shall be considered as isolated piers. Isolated piers shall be laid up in cement mortar, and the cellular spaces of same must be filled solidly with concrete or Type A mortar; in which case the allowable load may be

increased twenty-five per cent (25%), except that unfilled hollow piers may be used if their unsupported height does not exceed fifty per cent (50%) of the allowable height of solidly filled piers.

#### **ARTICLE 2913. CHASES AND RECESSES.**

Chases and recesses in walls of hollow tile, hollow concrete block or tile, or in hollow walls of brick shall not exceed in extent those permitted for solid masonry walls under the same conditions. Chases and recesses shall not be cut in walls of the above types, but may be built in. No chases or recesses shall be permitted in any wall which will reduce the fire-resistance of such wall below the minimum specified in this Code.

Reinforced tile lintels over openings made by filling the cells of the hollow units with cement mortar or concrete and inserting reinforcing bars may be used. Such lintels shall be computed as reinforced concrete beams on the basis of the enclosed concrete or mortar.

#### **REINFORCED CONCRETE WALLS.**

#### **ARTICLE 2914. GENERAL PROVISIONS.**

The general provision of Chapter 26 of this Code shall apply to the design and construction of reinforced concrete walls provided that where any conflict may occur the provisions of Articles 2914 to 2918, inclusive, shall govern.

Walls shall be designed for any lateral or other loads to which they are subjected. Proper provision shall be made for eccentric loads and wind stresses.

The maximum allowable compressive stress in reinforced concrete bearing walls with minimum reinforcement as required by Article 2916 shall not exceed  $0.2f'_c$  when the unsupported height does not exceed ten (10) times the thickness nor  $0.11f'_c$  when the unsupported height is twenty-five (25) times the thickness with allowable stresses proportional between these limits. When the reinforcement in bearing walls is designed, placed and anchored in position as for columns, the working stresses shall be on the basis of formulas in Chapter 26 for columns. In the case of concentrated loads, the length of the wall to be considered as effective for each shall not exceed the center to center distance between loads, nor shall it exceed the width of the bearing plus four (4) times the wall thickness. Ratio of ( $P_g$ ) as defined in Chapter 26 shall not exceed 0.04.

#### **ARTICLE 2915. MINIMUM THICKNESS.**

Reinforced concrete bearing walls shall have a thickness of at least one twenty-fifth (1/25) of the unsupported height or width, whichever is the shorter; however, approved buttresses, built-in columns, or piers designed to carry all the vertical loads, may be used in lieu of increased thickness.

Bearing walls of reinforced concrete shall be not less than six inches (6") in thickness for the uppermost fifteen feet (15') of their height; and for each successive twenty-five feet (25') or fraction thereof downward, the minimum thickness shall be increased one inch (1").

Panel and enclosure walls of reinforced concrete shall have a thickness of less than five inches (5") and not less than one-thirtieth (1/30) the distance between the supporting or enclosing members.

Exterior basement walls, foundation walls, and party walls shall be not less than eight inches (8") thick.

#### **ARTICLE 2916. ANCHORAGE AND REINFORCEMENT.**

Reinforced concrete walls shall be anchored to concrete floors, columns, pilasters, buttresses and intersecting walls with reinforcement at least equivalent to three-eighths inch (3/8") round bars eighteen inches (18") on centers for each layer of wall reinforcement.

Reinforced concrete walls shall be reinforced with an area of steel in each direction, both vertical and horizontal, at least equal to 0.0025 times the cross-sectional area of the wall if of bars, and 0.0018 times the area if of electrically welded wire fabric. The wire of the welded fabric shall be of not less than No. 10 W. & M. gage. Walls more than eight inches (8") in thickness shall have the reinforcement for each direction placed in two (2) layers parallel with the faces of the wall. One layer consisting of not less than one-half (1/2) and not more than two-thirds (2/3) the total required shall be placed not less than one and one-half inches (1-1/2") nor more than one-third (1/3) the thickness of the wall from the exterior surface. The other layer, comprising the balance of the required reinforcement, shall be placed not less than three-fourths inch (3/4") and not more than one-third (1/3) the thickness of the wall from the interior surface. If used, bars shall be not less than the equivalent of three-eighths inch (3/8")

round bars, nor shall they be spaced more than eighteen inches (18") on centers. Welded wire reinforcement for walls shall be in flat sheet form.

#### **ARTICLE 2917. PIERS.**

The unsupported height of piers of reinforced concrete walls shall not exceed ten (10) times their least dimension, unless designed as reinforced concrete columns.

Walls in which the openings are of such an extent as to leave relatively narrow sections exceeding ten (10) times their least dimension in height shall be considered as piers.

#### **ARTICLE 2918. CHASES AND RECESSES.**

Chases and recesses shall be as permitted in solid masonry walls in Article 2906.

Openings for doors and windows shall have reinforced concrete lintels designed as specified in Chapter 26, or fire-protected steel lintels as specified in Chapter 27.

#### **STONE WALLS.**

#### **ARTICLE 2919. QUALITY OF MATERIAL.**

Stone used in masonry wall construction shall be at least equal in strength to the minimum specified for plain concrete in Article 2407.

#### **ARTICLE 2920. WORKING STRESSES.**

The maximum allowable compressive stresses in rubble stonework due to combines live, dead and other loads shall not exceed those specified in Articles 2411 and 2413.

#### **ARTICLE 2921. LATERAL SUPPORT AND THICKNESS.**

Rubble stone walls shall be four inches (4") thicker than is required for solid brick or concrete walls of the same respective heights, but in no part less than sixteen inches (16").

The minimum thickness for walls or piers of ashlar masonry properly bonded shall be the same as required for solid brick walls and piers under similar conditions.

The lateral support for stone walls shall conform to the same requirements specified for solid masonry walls in Article 2901.

#### **ARTICLE 2922. BOND.**

Bond stones extending through the wall and uniformly distributed shall be provided to the extent of not less than twenty per cent (20%) of the area, and there shall be at least one bond stone for every five (5) stretchers.

#### **ARTICLE 2923. CHASES AND RECESSES.**

Chases and recesses in stone walls shall not exceed in extent those permitted for solid masonry walls under the same conditions.

#### **VENEERED WALLS.**

#### **ARTICLE 2924. GENERAL.**

(a) **Limitations.** Veneer shall not be assumed to add to the strength of any wall.

(b) **Height.** Exterior veneer shall not be attached to wood at any point more than twenty feet (20') above the adjacent ground elevation, except that this height may be increased to 35 feet maximum when the veneer is anchored to the frame work with continuous galvanized steel wire reinforcement of not less than 0.20 pounds per lineal foot, and firmly secured to the framework with heavy duty galvanized staples or galvanized nails (2 inch minimum penetration), anchored 32 inches on center maximum. Said steel reinforcing shall not exceed 16 inches on center, measured vertically.

(c) **Horizontal Forces.** Veneer shall not be assumed to resist horizontal forces, except as specifically provided in Article 2925.

(d) **Exceptions.** The limitations in this Chapter shall not apply to interior veneer of units five-eighths inch (5/8") or less in thickness.

#### **ARTICLE 2925. VENEER COMPOSED OF MASONRY UNITS.**

(a) **Scope.** The provisions of this Article shall apply to all veneer which is constructed of masonry conforming to the requirements of Chapter 24.



(b) **Vertical Loads.** No veneer shall support any vertical load other than the dead load of the veneer above. Veneer above openings shall be supported upon lintels of incombustible material.

(c) **Anchorage.** Masonry veneer shall be attached to the supporting wall with corrosion-resistant metal ties capable of resisting a horizontal force equal to four (4) times the weight of the attached veneer.

Veneer ties shall be not less in thickness than No. 6 W. & M. gage wire. Veneer ties shall be spaced not more than twenty-four inches (24") apart horizontally, and not more than twelve inches (12") apart vertically.

Veneer ties shall be attached to a continuous horizontal tie not less in thickness than No. 8 W. & M. gage wire and embedded in a horizontal joint.

(d) **Support.** The weight of masonry veneer shall be supported upon footings or other incombustible structural supports spaced not over twelve feet (12') vertically above a point twenty feet (20') above the adjacent ground elevation.

Exception: The weight of masonry veneer attached to wood frame walls shall be supported entirely upon footings.

#### **ARTICLE 2926. VENEER COMPOSED OF NON-STRUCTURAL UNITS.**

(a) **Scope.** The provisions of this Article shall apply to all veneer of materials not regulated by the requirements of Chapter 24.

(b) **Loads and Stresses.** For the purpose of this Article, veneer of non-structural units shall not be assumed to support any superimposed loads.

(c) **Anchorage.** Non-structural material used as veneer shall be anchored to the supporting wall by corrosion-resistant metal ties not less in thickness than No. 9 W. & M. gage wire, and spaced not more than twelve inches (12") apart both horizontally and vertically.

Exception: Approved units or units of flat tile, stone or terra cotta, having a face area not exceeding five hundred forty square inches (540 sq. in.), which are manufactured with scored surface, may be cemented to a masonry or concrete wall or to exterior plaster with Type A portland cement mortar, provided the mortar bond is sufficient to withstand shearing stress of fifty pounds (50 lbs.) per square inch after curing for twenty-eight (28) days. Complete technical data substantiating the above requirements shall be submitted to the Director for approval.

#### **ARTICLE 2927. GLASS VENEER.**

(a) **General.** In addition to the general requirements of this Chapter, all veneer of glass shall comply with the regulations in this Article.

(b) **Minimum Thickness.** The minimum thickness of glass veneer shall be eleven thirty-seconds inch (11/32").

(c) **Area and Dimensions.** The maximum area of a single section of glass shall not exceed eight square feet (8 sq. ft.).

The maximum length of any section of glass veneer shall be forty-eight inches (48").

(d) **Edges.** All edges of each plate of glass veneer shall be ground square and a slight arris. All exposed external corners or angles shall be rounded to a radius of one-eighth inch (1/8") to three-sixteenths inch (3/16"). It shall be unlawful to use miter joints.

(e) **Backing.** Glass veneer may be placed only against substantial, rigid, incombustible surfaces of true plane, plumb and straight. The backing shall in any case provide rigidity and stability equal to or greater than that provided by one-inch (1") thick cement mortar on wire lath secured to studs spaced twelve inches (12") or less on center. It shall be unlawful to use wood backing surfaces, regardless of whether they are fire-proofed.

When portland cement is used, the surface shall have trowel finish. In no event shall cement having an integral water-proofing agent be used.

No lime or gypsum shall be added to cement plaster mix. Where round corners occur the radius of the backing shall be established by template and conform to the radius of the glass and finish not more than five-eighths inch (5/8") from back of glass at any point.

(f) **Setting.** Glass veneer shall be set only when the backing is thoroughly dry and after the application of a thorough and uniform bond coat of material approved by the Director. The bond coat shall be such as to effectively seal the pores of the backing and to insure against the absorption of the vital properties of the mastic cement.

Mastic cement approved by the Director shall be applied to the back surface of each plate of the glass veneer, which veneer shall be applied to the backing with a substantial and uniform pressure over its entire area sufficient to flatten out the lumps of mastic cement to a thickness of between three-eighths inch (3/8") and five-eighths inch (5/8"). Sufficient mastic cement shall be applied to insure that at least forty per cent (40%) of the total area of the section is bonded to

the backing. The bond coat and the mastic cement shall be certified to be of such composition as to insure close affinity between the two materials.

Abutting edges of glass veneer shall be ground square and uniformly buttered with an approved pointing compound. Where glass veneer extends to the sidewalk surface each such section shall rest on a continuous metal angle with a face lip, securely anchored to the backing, with one-half inch (1/2") space between sidewalk and bottom of angle.

The joint between the bottom edge of the angle and the top of the sidewalk shall be caulked with a water-proof compound. Where glass veneer is applied above the base course, the mastic cement binding shall be supplemented by the use of a metal lip angle of a design approved by the Director. Angles shall be located in each vertical or horizontal edge of each section of veneer and shall be secured through the backing directly into the wall behind by means of expansion or toggle bolts in a manner satisfactory to the Director. Angles shall be of at least No. 16 U.S. gage, and shall hold the glass in a vertical plane independently of the mastic cement. All glass edges abutting metal shall be thoroughly buttered with an approved water-proof pointing compound.

Where glass veneer units abut each other, they shall be cushioned in the intervening joint with a continuous layer of cork tape of the same character. In all cases where cork tape is used, it shall be buttered over its full area with an approved water-proof pointing compound. All cork tape shall be set one-eighth inch (1/8") back of the front face of the glass veneer.

Where the glass veneer is confined between non-resilient materials at ends, expansion shall be provided for by means of an expansion joint at each end of one-quarter inch (1/4") or more throughout the entire height of the veneer. Expansion joint shall be caulked with a water-proof compound.

(g) **Setting Awning Brackets and Boxes.** All awning brackets shall be so set as to be free of contact with the glass veneer and not rest on it or against it. The weight of the glass veneer above awning boxes shall be carried by a continuous steel angle attached to the wall by anchors.

(h) **Hanging Signs.** Signs shall be hung on structural glass veneer only in a manner approved by the Director, rules and regulations governing which shall be promulgated from time to time. Under no circumstances are signs to be so hung that their weight bears directly against glass veneer surfaces. They must either hang free of the glass veneer or their weight borne by grounds set in the back wall.

(i) **Shelf Angles.** On all glass veneer starting on a line with the top of the bulkhead facing or at a maximum of thirty-six inches (36") above the sidewalk line, the mastic cement binding shall be supplemented by the use of approved corrosion resistant metal shelf angles secured to the backing. These angles shall be located in the horizontal joints in every course.

(j) **Mechanical Fastening.** Where glass veneer is applied at an elevation higher than eight feet (8') above the sidewalk level, the mastic cement shall be supplemented by the use of approved corrosion-resistant metal fastenings on each vertical or horizontal edge of each glass unit. Such fastenings shall be not less than two inches (2") in length and shall be of thickness not less than No. 18 U.S. gage. Fastenings shall be so designed as to furnish bearing support and also hold the veneer in a vertical plane independently of the mastic cement.

All such fastening shall be secured through the backing directly into the wall beyond by means of approved anchors or toggle bolts in a manner satisfactory to the Director. Where a continuous fastening member is used, it must be secured to the backing at least every thirty inches (30").

(k) **Flashing.** Upon the completion of glass veneer installation, exposed edges shall be flashed with corrosion-resistant sheet metal and caulked with a waterproof compound and their application shall be approved by the Director.

## ARTICLE 2928. METAL VENEERS.

Metal veneers that are exposed to the weather shall be of corrosion-resistant metal, or of metal covered front and back with porcelain enamel or given other approved treatment or coating to render them corrosion-resistant.

Metal veneers shall be securely attached to the supporting masonry or framing members with corrosion-resistant metal ties or by other approved devices or methods. Such attachments and their supports shall be capable of resisting a horizontal force equal to the wind loads specified in this Code, but in no case less than twenty pounds (20 lbs.) per square foot.

No metal attachment shall have a cross-sectional area less than provided by No. 9 B.W. gage wire (0.173 sq. in.). Attachments shall be spaced not more than twenty-four inches (24") apart horizontally, and not more than sixteen inches (16") apart vertically, but where units exceed four square feet (4 sq. ft.) in area, there shall be not less than four (4) attachments per unit.

All metal or wood supports for metal veneers shall be protected against the effects of moisture; metal supports shall be protected by painting, or equivalent protection; wood

supports shall have been given approved preservative treatment.

All joints and edges in metal veneers that are exposed to the weather shall be caulked or pointed with approved durable water-proofing material, or shall be protected by other approved means to prevent penetration of moisture.

No masonry back-up shall be required for metal veneers except as is necessary to meet the fire-resistant requirements of this Code.

#### **ARTICLE 2929. CERAMIC AND PORCELAIN TILE AND TERRA COTTA LESS THAN ONE INCH THICK.**

The backing for this type of veneer shall be 1:2 cement mortar not less than one inch (1") thick, and shall be reinforced with four inch (4") galvanized welded wire reinforcing securely fastened to masonry with approved corrosion-resistant anchors. The mortar shall be worked to a true plane surface, given a trowel finish and then surface scratched to receive a setting bed.

A setting bed not less than three-eighths inch (3/8") thick shall be applied, and shall be cement mortar mixed in proportions of not less than one (1) part cement to two (2) parts sand, with waterproofing compound added. Sand shall be screened through a twenty (20) mesh screen.

Tile or terra cotta units shall be not larger than one hundred and forty-four square inches (144 sq. in.) in area, and shall be scored or keyed on the back surface.

In addition to the three-eighths inch (3/8") setting bed, veneer less than one inch (1") thick shall be provided with mechanical anchorage of either the continuous angle or pin and rosette type, or other approved mechanical anchor device. In all cases, holes for attachment screws or bolts shall be accurately drilled, using a drill slightly smaller in diameter than the attachment bolt or screw shields, and shall be drilled to not less than one inch (1") in depth. All parts of the mechanical anchorage device used shall be made of corrosion-resistant metal. At least one attachment screw or expansion bolt shall be provided for each square foot of veneering.

See Article 2926, under "Exceptions," for requirements of units exceeding one hundred forty-four square inches (144 sq. in.).

#### **ARTICLE 2930. MARBLE VENEERS.**

(a) **Class "A" Marble.** Class "A" marble shall be hard, sound marble, and free of any unsound lines. It shall be of uniform thicknesses and sizes.

(b) **Sizes and Thicknesses.** Minimum thicknesses shall be seven-eighths inch (7/8"), and maximum size of pieces fifteen square feet (15 sq. ft.), with lengths not exceeding five feet (5'). Where total continuous height of marble above sidewalk is over thirty-five feet (35'), lower supporting portion shall be increased to one and one-fourth inch (1-1/4") in thickness.

(c) **Materials.** Only Class "A" sound marble shall be used in such work without reinforcing. Other classes of marble may be used but only if lined with marble or slate strips three inches by seven-eighths inches (3" x 7/8"), fastened to back of marble across the lines of unsoundness, or if solidly backed with seven-eighths inch (7/8") marble or slate slabs. Backing or strips in such cases shall be attached in the manufacturer's shop before shipment by means of use of approved stone cement.

(d) **Backing.** Backing of main front of building shall be either brick or tile and shall be back from finished marble face two inches (2") from Class "A," and three inches (3") for unsound lined marbles.

(e) **Base and Jamb.** Marble veneers under and over glass show windows inside of vestibules may be fastened to wood studding, if the studding is properly cross-braced and spaced on not more than twelve inch (12") centers. Wood head jams shall be hung on metal rods of sufficient strength, which shall be bolted to floor slab above. Studding shall be kept back two inches (2") and three inches (3") from finished marble face, same as required for brick or tile.

(f) **Fastening and Plaster.** Plaster of paris or quick-setting molding plaster shall be used for anchor spots on back of marble and face of brick or tile wall. Anchors shall be of non-ferrous metal and not less than No. 8 B&S gage wire. Holes in backing shall be large enough to hold supply of plaster with excelsior in which the looped end of anchor wire is set. All anchor wire used in edges of marble for proper ties shall be securely wedged into holes by means of lead plugs or by other approved methods. Each piece of marble having eighteen inches (18") as its least dimension shall have four (4) supporting anchors. All other pieces less than eighteen inches (18") wide shall have three (3) anchors.

Marble slabs as they are erected shall have edges buttered with waterproof cement, forced against adjoining pieces to leave only proper joint between marble edges. Joints between marble slabs shall not be less than one-sixteenth inch (1/16") or greater than one-eighth inch (1/8").

(g) Iron Work. Iron work behind marble or in connection with marble shall be painted with rust-resisting paint before start of marble setting.

## **FACED WALLS.**

### **ARTICLE 2931. QUALITY OF MATERIAL.**

Material used in the backing and facing of faced walls shall conform in all respects to the requirements prescribed for such materials in Chapters 23 through 27.

Materials used for facing shall be not less than two and one-fourth inches (2-1/4") thick, and in no case less in thickness than one-eighth (1/8) the height of the unit. Spandrel and other recessed panels, when approved, may be higher than eight (8) times their thickness, provided they are of the minimum thickness required in this paragraph.

### **ARTICLE 2932. WORKING STRESSES.**

The maximum allowable compressive stresses on faced walls due to combined live, dead and other loads shall not exceed those permitted for masonry of the type which forms the backing. Where bonded to the backing as provided in Article 2934, the full cross section of the facing may be considered in computing bearing strength.

### **ARTICLE 2933. THICKNESS.**

Faced walls shall be not less in thickness than is required for masonry walls of the type which forms the backing. Where bonded to the backing as provided in Article 2934, the facing may be considered a part of the wall thickness.

### **ARTICLE 2934. BOND.**

Solid unit masonry facing or cellular architectural terra cotta facing, with all voids filled solidly with masonry or concrete grout shall be bonded to walls of solid masonry of hollow clay tile, or of concrete block or tile with at least one header course in every six courses, or there shall be at least one full length header in every seventy-two square inches (72 sq. in.) of wall surface.

Stone ashlar facing or cellular architectural terra cotta facing with all voids filled solidly with masonry or concrete grout shall have at least fifteen per cent (15%) of the superficial area not less than two and one-fourth inches (2-1/4") thicker than the remainder of the facing to form bond units, which shall be uniformly distributed throughout the wall.

Every projection stone, and, except when alternate courses are full bond courses, every stone not a bond stone, shall be securely anchored to the backing with substantial non-corrodible metal anchors with a cross section of not less than two-tenths square inch (2/10 sq. in.) There shall be at least one (1) anchor to each stone and not less than two (2) anchors for each stone more than two feet (2') in length and three feet (3') in superficial area. Facing stones not over twelve square feet (4 sq. ft.) of superficial face area.

When walls of structural clay tile or hollow concrete masonry units are faced with hollow units the facing units shall be bonded to the backing as required by Article 2910.

Facing of grouted masonry construction as specified in Articles 2411 (b) and 2903 (c) need be neither bonded nor anchored, provided the bond of grout to facing unit will develop a strength in shear of not less than fifty pounds (50 lbs.) per square inch, as called for under "Exception," Article 2926.

## **SPECIAL WALL REQUIREMENTS.**

### **ARTICLE 2935. SOLID MASONRY WALLS.**

No eight inch (8") wall shall be broken into, subsequent to the building, for the insertion of structural members. A separation of not less than four inches (4") of solid masonry shall be provided in walls between combustible members which may enter such walls from opposite sides.

### **ARTICLE 2936. HOLLOW MASONRY WALLS.**

When combustible or unprotected steel building members frame into the hollow part of hollow masonry walls of thicknesses not greater than twelve inches (12"), they shall not project more than four inches (4") into the walls and shall be so spaced that the distance between embedded ends is not less than four inches (4"). The space above, below and between such members shall be filled solidly with burnt clay materials, mortar, concrete or equivalent fire-resistive materials, to a depth of not less than four inches (4") on all sides of the member.

All open cells in tile or blocks occurring at wall ends shall be filled solid with concrete or cement mortar for at least a depth of six inches (6"), or closure tile set in the opposite direction shall be used.

#### **ARTICLE 2937. PARTY WALLS AND FIRE WALLS.**

Party walls and fire walls which carry any loads other than their own weight shall conform to the requirements for load-bearing walls.

Party walls and fire walls of other than solid masonry must be faced with at least four inches (4") of brick on each side, bonded to the backing as required, and must have a thickness at least four inches (4") greater than specified for solid masonry bearing walls.

Party walls and fire walls shall extend at least three feet (3') above the roof, except where the roof is of fire-resistive construction, in which case, the party walls may be carried up tightly against the underside of the roof slabs.

For openings in party walls and fire walls the provisions of Article 103 "Definitions-Building" and Article 504 and Article 2945 shall apply.

Fire walls must be designed as far as practicable to effectively prevent the passage of fire from one section of a building to another. Fire walls subdividing the area of Type IV and Type V buildings shall be of masonry and 4-hour fire-resistance and shall extend 3 feet above roof and 18 inches outside of the side wall and any other frame portion, roof overhang, balconies, galleries, or other frame attachments to the building. If it is desired to have a continuous balcony or gallery and an opening is placed in the fire wall such opening must be protected by a Class B fire door automatically operated, unless the alternate method is employed.

As an alternate method, when fire wall does not extend through the wall, fire walls including parapet may extend 5 feet on each side of the fire wall along face of building. If there is a balcony, gallery, porch or roof in front of this 10-foot fire wall on face of building, it is required to be of noncombustible or fire-resistive construction and the ceiling shall have a barrier extending 18 inches down from ceiling to prevent the passage of fire from one section to the adjoining section.

Alternate methods of construction may be submitted if in the opinion of the authorities having jurisdiction the objectives are accomplished.

Exception 1. In the case of warehouses for combustible fibers or any equally combustible or flammable material, the fire wall shall extend 5-feet above the roof and must otherwise comply with the requirements of the National Fire Protection Association for storage and handling of combustible fibers.

Exception 2. For fire wall requirements under townhouses, Group I Occupancy, See Article 1401, Exception 1.

#### **ARTICLE 2938. PARAPET WALLS.**

On all buildings, exterior or party walls required to have a fire-resistance rating of 2 hours or more shall project above the roof as parapets and these parapet walls shall be not less than 3 feet above the roof immediately adjacent thereto, and when exceeding six times their thickness in height shall be laterally supported. All parapet walls shall have a coping of incombustible materials.

Exceptions:

- (a) Parapets are not required on street front walls.
- (b) 3' parapet walls are not required for buildings 20 feet or less in height.
- (c) Parapets are not required on walls of other than masonry construction.
- (d) Parapets are not required where the roof constructions is of fire-resistive construction, in which case the wall may be carried up tightly against the underside of the roof slab. In all other cases, parapet walls must extend a minimum height of 8" above flat roof or 8" above any roof or other construction with 10' of property line.

On Group H and I Occupancies not more than three (3) stories high, exterior and party walls shall extend above combustible roofs to a height not less than twenty-four inches (24") above the roof; where the pitch of the roof exceeds three inches (3") in twelve inches (12"), such walls may terminate at the upper side of the roof boards.

#### **ARTICLE 2939. WINDOWLESS WALLS.**

Buildings exceeding two (2) stories in height or in excess of two thousand square feet (2000 sq. ft.) in area on any floor above the first or ground floor, hereafter erected or altered so that suitable access to each story above the basement or cellar is not provided on at least one (1) side of the building shall be equipped throughout with approved automatic sprinklers. Suitable access shall be deemed as requiring a usable opening through the wall at each story, at least thirty-two inches (32") wide, forty-eight inches (48") high, and with the sill not more than thirty-two inches (32") above the floor; the openings shall be so spaced that there will be at least one opening for each fifty feet (50') of frontage.

Where building alterations are such as to result in the closing of openings on street fronts or other access openings of more than fifty per cent (50%) of the present openings of any story other than the ground floor and the building is not equipped with approved automatic sprinklers, all vertical openings in the building shall be enclosed as required by this Code under "Occupancies."

## **PARTITIONS.**

### **ARTICLE 2940. BEARING PARTITIONS.**

All interior bearing walls, which do not extend through more than one story, shall be considered as bearing partitions.

Solid masonry bearing partitions shall be not less than eight inches (8") thick and those of hollow clay tile, concrete block or tile or hollow walls of brick shall be not less in thickness than one-eighteenth (1/18) of the height between floors or floor beams, but never less than eight inches (8").

### **ARTICLE 2941. NON-BEARING PARTITIONS.**

Brick non-bearing partitions shall be not less than three and three-fourths inches (3-3/4") thick for a height not exceeding twelve feet (12') between floors or floor beams or roofs. Non-bearing partitions of hollow clay tile, concrete block or tile, plain concrete, hollow walls of brick or of gypsum block or other similar materials shall be built solidly against the floor and ceiling construction below and above, and shall not exceed the unsupported height shown in Table No. 29-C.

Solid or hollow non-bearing partitions of reinforced plaster shall have a thickness of not less than one eighty-fourth (1/84) of the unsupported height, but never less than one and one-half inches (1-1/2") for solid partitions, nor have a shell thickness of less than three-fourths inch (3/4") for hollow partitions. Vertical channels used in such partitions shall be of not less than three-fourths inch (3/4") in depth, weighing three hundred pounds (300 lbs.) per one thousand lineal feet (1,000 lin. ft.) and shall be spaced not more than twenty-four inches (24") on center.

Solid or hollow non-bearing partitions of reinforced gunite shall have a thickness of not less than one-seventieth (1/70) of the unsupported height but never less than one and one-half inches (1-1/2") for solid partitions, nor have a shell thickness of less than three-fourths inch (3/4") for hollow partitions. Vertical channels shall be installed in gunite partitions as specified for plaster partitions above. Solid non-bearing partitions of gypsum lath and plaster shall have a thickness of not less than two inches (2") and shall not exceed twelve feet (12') in height. Such partitions shall be constructed of not less than three-eighths inch (3/8") gypsum lath ceiling height in length and plastered each side with gypsum plaster sanded 1:2 to a total thickness of two inches (2"). Where a one-hour fire rating is not required, the brown coat of plaster may be sanded 1:3. Such partitions shall be secured to floor and ceiling with wood or metal runners.

## **FOUNDATION WALLS.**

### **ARTICLE 2942. FOUNDATION WALLS.**

Solid masonry foundation walls and those of concrete block or coursed stone shall be not less in thickness than the wall immediately above and in no case less than twelve inches (12") thick unless otherwise specified in this Chapter, except that when the space enclosed within the foundation is not excavated, they may be eight inches (8") if included within the allowable height of eight inch (8") walls, and if the walls supported by such foundation are not more than eight inches (8") in thickness. When built of concrete cast in place, foundation walls shall be at least as thick as the walls supported, but in no case less than six inches (6"). When built of rubble stone, they shall be at least sixteen inches (16") thick. Rough or random rubble without bonding or level beds shall not be used as foundations for walls exceeding thirty-five feet (35') in height, nor shall coursed bonded rubble walls be used as foundations for walls exceeding seventy-five feet (75') in height.

Foundations for walls of hollow clay tile, concrete block or tile and hollow walls of brick shall be of the same thickness, respectively, as required in the paragraph above, and shall be built of brick, stone, concrete (plain or reinforced), hollow clay tile, concrete block or tile, or as a hollow wall of brick. Tile foundation walls shall be not less than twelve inches (12") thick.

When the stresses due to earth pressure and superimposed building load exceed the maximum working stress permitted in this Code for the materials used, and the additional stresses are not otherwise provided for, the wall thickness shall be increased to bring the stresses within the required limits.

Foundation walls shall not be constructed of gypsum, or sand-lime brick.

Materials for foundation walls shall be equal in quality in all respects to those required for exterior bearing walls, except that mortar used for exterior foundation walls below grade shall be portland cement mortar.

Foundations built of masonry units, whether hollow or solid, shall be sealed below any woodwork with a cement wash or equally effective seal.

## **PANEL AND ENCLOSURE WALLS.**

### **ARTICLE 2943. PANEL AND ENCLOSURE WALLS.**

Panel and enclosure walls in skeleton framed buildings shall be not less than eight inches (8") thick if of solid brick, hollow clay tile, concrete block or tile, plain concrete or hollow walls of brick, nor less than one-twentieth (1/20) the distance between supporting or enclosing members. Panel and enclosure walls reinforced concrete shall be not less than five inches (5") thick nor less than one-thirtieth (1/30) the distance between the supporting or enclosing members, and sufficiently reinforced to resist the wind pressure specified in Article 2307, from either direction. Panel and enclosure walls of reinforced gunits shall be not less than four inches (4") thick and shall be reinforced as required for reinforced concrete walls. Other types of incombustible walls may be used in accordance with the provisions of Article 211.

Enclosure walls shall be securely fastened to the adjoining framing members.

When panel or enclosure walls are built monolithic with columns or bearing walls, they may be reinforced to carry their own weight.

## **MISCELLANEOUS REQUIREMENTS.**

### **ARTICLE 2944. ANCHORING OF WALLS.**

All walls shall be securely anchored and bonded at points where they intersect and where they abut or adjoin the frame of a skeleton framed building.

When walls are not built at the same time the perpendicular joint shall be regularly toothed with not less than four inch (4") offsets and the joints shall be provided with anchors not less than two inches by three-eighths inch (2" x 3/8") metal with ends bent up not less than two inches (2"), or with cross pins to form anchorage. Such anchors shall be not less than three feet (3') long extending eighteen inches (18") in from each side of the joint, and spaced not more than three feet (3') apart in the direction of the height of the wall.

Reinforcing in concrete walls shall be extended not less than twenty-four inches (24") around all corners and wall intersections.

### **ARTICLE 2945. USE OF EXISTING WALLS.**

(a) An existing masonry wall may be used in the renewal or extension of the building providing it meets the requirements of this Code, and is structurally sound or can be made so by reasonable repairs. Existing walls which are structurally sound but which are of insufficient thickness when increased in height shall be strengthened by an addition of the same material not less than eight inches (8") in thickness laid up in Portland cement mortar, or the wall may be built out with gunite to the thickness required for a new wall of that height. Foundations and lateral supports shall be provided as required for newly constructed walls under similar conditions. All additions or linings shall be thoroughly bonded into existing masonry by toothings to assure action of wall and lining. Such toothings shall be distributed uniformly throughout the wall and shall aggregate in vertical cross-sectional area not less than fifteen per cent (15%) of the total vertical area of the wall or lining.

(b) Existing masonry walls on property lines may have new openings installed therein provided the provisions of both paragraph (a), above, and Article 504, 3rd paragraph, are complied with.

TABLE No. 29-A—MINIMUM THICKNESS, SOLID MASONRY BEARING WALLS.

| STORIES       | NOMINAL THICKNESS IN INCHES |    |    |    |    |    |    |    |
|---------------|-----------------------------|----|----|----|----|----|----|----|
| 8th.....      | 12                          |    |    |    |    |    |    |    |
| 7th.....      | 12                          | 12 |    |    |    |    |    |    |
| 6th.....      | 12                          | 12 | 12 |    |    |    |    |    |
| 5th.....      | 16                          | 12 | 12 | 12 |    |    |    |    |
| 4th.....      | 16                          | 16 | 12 | 12 | 12 |    |    |    |
| 3rd.....      | 16                          | 16 | 16 | 12 | 12 | 12 |    |    |
| 2nd.....      | 20                          | 16 | 16 | 16 | 12 | 12 | 12 |    |
| 1st.....      | 20                          | 20 | 20 | 16 | 16 | 16 | 12 | 12 |
| Basement..... | 20                          | 20 | 20 | 20 | 16 | 16 | 16 | 12 |
| Stories.....  | 8                           | 7  | 6  | 5  | 4  | 3  | 2  | 1  |

TABLE No. 29-B—MINIMUM THICKNESS—HOLLOW WALLS.

| STORIES       | NOMINAL THICKNESS IN INCHES |    |    |    |    |    |    |    |
|---------------|-----------------------------|----|----|----|----|----|----|----|
| 8th.....      | 12                          |    |    |    |    |    |    |    |
| 7th.....      | 12                          | 12 |    |    |    |    |    |    |
| 6th.....      | 16                          | 12 | 12 |    |    |    |    |    |
| 5th.....      | 16                          | 16 | 12 | 12 |    |    |    |    |
| 4th.....      | 20                          | 16 | 16 | 12 | 12 |    |    |    |
| 3rd.....      | 20                          | 20 | 16 | 16 | 12 | 12 |    |    |
| 2nd.....      | 24                          | 20 | 20 | 16 | 16 | 12 | 12 |    |
| 1st.....      | 24                          | 24 | 20 | 20 | 16 | 16 | 12 | 12 |
| Basement..... | 28                          | 24 | 24 | 20 | 20 | 16 | 16 | 12 |
| Stories.....  | 8                           | 7  | 6  | 5  | 4  | 3  | 2  | 1  |



Table No. 29-C — LOAD BEARING MASONRY WALLS

| TYPE OF MASONRY                                                                                                  | Max. Ratio<br>Unsupported<br>Height or<br>Length to<br>Thickness | Maximum Unsupported Height              |                     |                    | Clear Spacing<br>Between Pilasters |                        | Minimum*<br>Pilaster<br>Dimension | Bonding                 |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------|---------------------|--------------------|------------------------------------|------------------------|-----------------------------------|-------------------------|
|                                                                                                                  |                                                                  | Without<br>Pilasters                    | Hollow<br>Pilasters | Solid<br>Pilasters | Uniform<br>Load                    | Concen-<br>trated Load |                                   |                         |
| <b>SOLID MASONRY</b>                                                                                             | <b>20</b>                                                        |                                         |                     |                    |                                    |                        |                                   | <b>Article 2904</b>     |
| (a) 8" Brick                                                                                                     |                                                                  | 13'-4"                                  |                     | 20'-0"             | 13'-4"                             | 17'-10"                | 4"x22"                            |                         |
| (b) 12" Brick                                                                                                    |                                                                  | 20'-0"                                  |                     | 26'-8"             | 20'-0"                             | 26'- 8"                | 4"x32"                            |                         |
| (c) 16" Brick                                                                                                    |                                                                  | 26'-8"                                  |                     | 33'-4"             | 26'-8"                             | 35'- 7"                | 4"x43"                            |                         |
| <b>HOLLOW MASONRY</b>                                                                                            | <b>18</b>                                                        |                                         |                     |                    |                                    |                        |                                   | <b>Article 2910</b>     |
| (a) 8" Conc. Blk. or Tile                                                                                        |                                                                  | 12'-0"                                  | 15'-0"              | 18'-0"             | 12'-0"                             | 16'-0"                 | 4"x20"                            |                         |
| (b) 12" Conc. Blk. or Tile                                                                                       |                                                                  | 18'-0"                                  | 21'-0"              | 24'-0"             | 18'-0"                             | 24'-0"                 | 4"x30"                            |                         |
| (c) 16" Conc. Blk. or Tile                                                                                       |                                                                  | 24'-0"                                  | 27'-0"              | 30'-0"             | 24'-0"                             | 32'-0"                 | 4"x39"                            |                         |
| <b>COMBINATION — SOLID AND HOLLOW MASONRY UNITS</b>                                                              |                                                                  |                                         |                     |                    |                                    |                        |                                   |                         |
| See Hollow Masonry Above Bonding per Article 2904 header course every 6th course or 72 square inch wall surface. |                                                                  |                                         |                     |                    |                                    |                        |                                   |                         |
| <b>CAVITY WALLS</b>                                                                                              | <b>12</b>                                                        |                                         |                     |                    |                                    |                        |                                   | <b>Article 2907 (b)</b> |
| (a) 10" Cavity                                                                                                   | (4" Brick +<br>4" Brick)                                         | 10'-0"                                  |                     | 14'-0"             | 10'-0"                             | 16'-8"                 | 4"x20"                            |                         |
| (b) 14" Cavity                                                                                                   | (4" Brick +<br>8" Conc. Blk.)                                    | 14'-0"                                  |                     | 18'-0"             | 14'-0"                             | 18'-8"                 | 4"x22"                            |                         |
| <b>FACE WALLS</b>                                                                                                | Dep't of Backing                                                 |                                         |                     |                    |                                    |                        |                                   |                         |
| (a) 8" Brick                                                                                                     | 20                                                               | See above Masonry 8" Brick              |                     |                    |                                    |                        |                                   |                         |
| (b) 8" Conc. Blk. or Tile                                                                                        | 18                                                               | See above Hollow 8" Conc. Blk.          |                     |                    |                                    |                        |                                   |                         |
| (c) 12" Brick                                                                                                    | 20                                                               | See above Solid Masonry 12" Brick       |                     |                    |                                    |                        |                                   |                         |
| (d) 12" Conc. Blk. or Tile                                                                                       | 18                                                               | See above Hollow Masonry 12" Conc. Blk. |                     |                    |                                    |                        |                                   |                         |

(1) Dimensions shown are for pilasters with concentrated loads. Decrease width for uniform load spacing.

(2) Increased thickness of pilaster allows an increase to height of pilaster. See Arts. 2903 (d) and 2907 (a).

\*For story thickness see Table Nos. 29-A and 29-D.

Note—For 2-story buildings( 12" walls first floor, 8" walls second floor; or 8" with pilaster first floor, 8" second floor.)  
Residences, 8" three stories if not over 35' in height.

## CHAPTER 30—ENCLOSURE OF VERTICAL OPENINGS

### ARTICLE 3001. WHEN REQUIRED.

Vertical openings are required to be enclosed in certain buildings, depending upon the occupancy of the buildings, height of building, or the type of construction. The vertical openings required to be enclosed are specified under Occupancy in Chapters 5 through 16, and the construction of such enclosures are to be as outlined under "Types of Construction" in Chapters 17 through 22.

### ARTICLE 3002. STAIRWAY, RAMP AND ELEVATOR ENCLOSURES.

When vertical openings are required to be enclosed, such enclosure shall extend from the lowest point to the highest point required.

Stairway or ramp enclosures shall also include a complete passageway not less in width at any point than the required width of such stairway or ramp. The enclosure shall include all landings and parts of floors between stairways which lie in the path of travel.

When the enclosure is of two-hour fire-resistive construction all doors opening into such enclosure shall be metal or metal-clad as specified in Article 4306. When the enclosure is of one-hour fire-resistive construction the doors opening into the enclosure may be of metal or metal covered or solid wooden doors of the flush type of nominal thickness of one and three-fourths inches (1 $\frac{3}{4}$ "). All doors shall be self-closing and be kept normally closed. Windows in such enclosures shall be allowed only in exterior walls and shall be of wire glass with metal frames and sash.

Exceptions: 1. Openings in enclosure walls which are the exterior walls of the building facing directly on a street or court, or are more than twenty feet (20') from an adjacent lot line, may have such protection of openings omitted.

2. Enclosing walls of elevator shafts may consist of wire glass set in metal frames on the entrance side only, where permitted under Article 4701.

Exit enclosures shall not be used for storage in any manner whatsoever, and shall not contain any material or equipment likely to cause fire, explosion or panic.

Elevator shafts extending through more than two (2) stories shall be equipped with an approved means of adequate ventilation to and through the main roof of the building. In Shaftways for elevators, there shall be at least one (1) door in every thirty feet (30') of height. All openings shall be protected as required in Article 3401. An elevator shaft that does not extend to the bottom of a building shall be enclosed at its lower point to provide fire resistance not less than that required for the lowest floor to or through which the elevator passes, but such shaft floor construction shall have a fire-resistive rating of not less than one-hour. Elevator machinery compartments shall be as required by Article 4701.

Vertical enclosures that are required to extend through the roof, and which are to be enclosed at the top, must be provided with a skylight of at least one-eighth (1/8) of the area of the shaft in the top story, but not less than four square feet (4 sq. ft.) and glazed as required by Article 3402; provided that the skylight may be replaced by a window or windows of plain glass (protected with wire mesh as specified in Article 3402), of equivalent area in the side of the penthouse (or in the side of the shaft), if the sill of such window or windows is not less than two feet (2') above the roof and the window or windows do not face a lot line within ten feet (10'), or may be replaced by approved means of ventilation.

A vertical enclosure or shaft that does not extend through the roof shall have the top enclosed with a form of construction having a fire-resistance rating equal to that of the walls of the shaft.

In every building where the enclosing walls of shafts or vertical openings are open to the outer air at the top, parapet walls or handrails shall be provided as specified in Chapters 17 through 22 of this Code.

The same requirements shall apply to moving stair enclosures as apply to stairway enclosures; except that in Types I and II Construction the moving stair opening need only be enclosed by a minimum of one-hour fire-resistive, partitions equipped with self-closing doors, at the top of each moving stair flight, provided such moving stair is not used as a required means of exit.

### ARTICLE 3003. OTHER VERTICAL OPENINGS.

Trash and rubbish chutes in connection with incinerators shall be constructed in accordance with recognized good practice, Compliance with the requirements of N.F.P.A. standard for Incinerators, Rubbish Handling (No. 82, 82A) will be considered compliance with the above.

Laundry chutes shall comply substantially with the rules for rubbish chutes, except that service openings and discharge openings need not be separated from the remainder of the building as required for rubbish chutes.

Vent shafts, as defined in Article 103(b), shall have a cross-sectional area of not less than one-fifth ( $1/5$ ) of a square foot for every foot of height of shaft, but not less than nine square feet (9 sq. ft.) in any case. No such shaft shall be less than two feet (2') in its least dimension. Unless open to the outer air at the top for its full area, such shaft shall be covered by a skylight glazed with plain glass not to exceed one-eighth inch ( $1/8''$ ) in thickness and protected with wire screen as specified in Article 3402, and having a net area of fixed louvre openings equal to the maximum required shaft area.

Ventilating skylights, meeting the requirement of Article 3402, may be used when ventilation equal in net efficiency to the louvre is provided, or else mechanical ventilation to provide the necessary air changes, employing the proper quantities of outside air, and designed as specified in Chapter 48 shall be permitted as an alternative.

All shafts, ducts, chutes and other vertical openings not covered in Article 3002 shall have enclosing walls conforming to the requirements specified under Type of Construction of building in which they are located when they exceed nine square feet (9 sq. ft.) in area, and all other shafts shall be lined with sheet metal having lock jointed or riveted seams and joints. Combustible material of partitions and floors through which the ducts pass shall be kept at least three inches (3") from the metal lining or be protected by not less than three-eighths inch ( $3/8''$ ) of plaster, one-fourth inch ( $1/4''$ ) of asbestos or plasterboard. Openings between any ducts and the floor construction through which they pass shall be filled with mortar or other incombustible material supported by wire baskets that prevent the passage of fire. All doors opening into such vertical shafts shall be of metal or shall be covered on the shaft side by not less than one-fourth inch ( $1/4''$ ) of asbestos, and not less than 26 U. S. gauge metal returned around all edges and well fastened to the door. Windows in such shafts shall be wire glass and metal frames and sash, or such frame and sash may be of wood entirely clad with metal of not less than 26 U. S. gauge.

If a shaft or raceway intended to enclose pipes, conduits, wires or other building services, penetrates rated barriers between portions of the building, such as floors, walls, or partitions, such enclosures shall be fire-stopped at or near the rated barriers so as to prevent the shaft or raceway conveying fire, gas or smoke through the rated barriers. Such fire-stopping shall be of non-combustible material, so designed as to be easily removed for alterations or repairs to the building services, and easily replaced.

#### **ARTICLE 3004. SURFACE FINISH.**

Interior of all vertical openings shall not be finished with any type of material or surface coating which gives off poisonous fumes or gases when subjected to a temperature of 300° Fahrenheit, or less.

#### **ARTICLE 3005. MONUMENTAL STAIRS AND ESCALATORS.**

No enclosures shall be required for a flight of monumental stairs or escalators (except in Group D Occupancies) from the main street entrance floor to the next above or to a basement, if such stairs or escalators are not a part of the required exit way and the stairways or escalators are effectively cut off at either floor from the corridors or stairways serving above the second floor by a partition having a fire-resistance rating of not less than one hour. Escalators (in other than Group D Occupancies) that go through more than one floor and are not required exits, need not be enclosed in sprinklered buildings of Type I construction, and sprinkler heads in escalator soffits and around perimeter of opening shall be spaced not more than 5 feet apart and not more than 18 inches from face of opening.

The special provisions of the Building Exit Code headed "Special Provisions for Escalator Openings" are acceptable.

## CHAPTER 31—FLOOR CONSTRUCTION

### ARTICLE 3101. GENERAL.

Floor construction shall be of materials and construction as specified under Occupancy in Part VI and under Types of Construction in Part VIII.

All floors shall be so framed and tied into the framework supporting walls as to form an integral part of the whole building. Fire-resistive standards of floor construction are specified in Article 4303.

The type of floor construction used shall provide means to keep the beams and girders from spreading by installing ties or bridging.

See Article 3205 for false or suspended ceilings under floors.

The space between required or provided ceilings and combustible floor construction shall be fire stopped with approved noncombustible material to form areas of not more than 1500 square feet, no dimension of which shall exceed 50 feet, except that in Type I and Type II buildings where a ceiling is not required fire stopping will not be required.

### ARTICLE 3102. CONCRETE FLOORS.

Concrete slab floors shall be not less than two inches (2") thick. Topping when poured monolithic with the slab may be included as a structural part of the slab. Sleepers for the nailing of a wood floor shall not decrease the required structural depth of the slab unless placed in the direction of span and then shall not be placed more than one-half inch ( $\frac{1}{2}$ ") into the slab. Concrete joists shall be solidly bridged for lateral support as follows:

One row of concrete bridging shall be placed in clear spans of fifteen feet (15') to twenty-four feet (24'); two rows of bridging shall be placed in all clear spans of twenty-four feet (24') or more. Bridging shall be reinforced continuously top and bottom with not less than one-half inch ( $\frac{1}{2}$ ") round rod or the equivalent area in other shapes. Such bridging shall be the full depth and width of the joists.

### ARTICLE 3103. STEEL JOISTED AND CELLULAR STEEL FLOORS.

(a) **Steel Joisted Floors.** Steel joisted floors shall consist of steel joists as specified in Article 2729. When used in Type I or Type II buildings, they shall have a reinforced concrete or gypsum slab not less than two inches (2") thick placed on and secured to the top thereof, and a fire-resistive ceiling as specified in Article 4303 on the under side thereof, fully covering and protecting the joists; however when such joists are used in places where unprotected wood joists are permitted, the steel joists need not be protected with fire-resistive materials as specified above.

Gypsum slabs shall not be directly exposed to weather or used where subject to frequent or continuous wetting.

The reinforced concrete or gypsum slab placed on and secured to the top of the steel joists shall be sufficiently reinforced to support all dead, live and other loads between joists. Joists shall be securely cross bridged at intervals not to exceed eight feet (8') along the joist length. The lateral unsupported length of the top chord of any steel joist shall not exceed forty (40) times the width of the compression flange.

Bridging shall be provided during the period of construction to adequately support the top chord or flange against lateral movement and such bridging shall be designed to hold each joist in a vertical plane. Sufficient permanent bridging shall be installed to laterally stay the joists and to transmit any horizontal forces in either direction perpendicular to the direction of the joists. Such bridging shall consist of solid concrete sections, structural steel shapes or plates, portal bridging, diagonal rods, or other bridging which will provide equal stiffness. Any row of bridging shall be capable of transferring five hundred (500) pounds from each joist to the adjoining joists.

#### (b) Cellular Steel Floors.

1. **General.** Cellular steel floor construction shall consist of sheet or strip steel formed into an integrated system of parallel steel beams which combine the function of load-bearing members and continuous deck spanning between main supporting girders, beams, or walls.

Where a specific degree of fire-resistance is required, cellular steel floors shall have a top deck or slab and shall be protected on the underside by a fire-resistive ceiling. The assembly shall provide the prescribed fire-resistance rating in accordance with the requirements of Article 4303.

2. **Physical Properties.** The steel used in the manufacture of steel floor units shall be equal to the requirements of A. S. T. M. "Tentative Specifications for Structural Quality Light Gage Flat, Hot-Rolled Carbon Steel Sheets," Grades A, B, or C.

3. **Minimum Thickness** The thickness of the steel used in the manufacture of steel floors shall be not less than U. S. Standard Gage No. 18.

4. **Design.** Cellular steel floors shall admit of a rational analysis, and such floor assemblies shall have been tested and certified by a recognized testing agency to substantiate stress values used.

Flexural stress values shall not exceed sixty per cent (60%) of the yield point specified for the grade steel permitted in Sub-Article 2 of this Article.

When plastered ceilings are suspended from steel sub-floor units, the maximum permissible deflection due to the full live load after the plaster is applied shall not exceed 1/360 of the span.

#### ARTICLE 3104. MILL CONSTRUCTED FLOORS.

Mill constructed floors shall be not less than three inches (3") nominal splined or tongued and grooved plank covered with one inch (1") nominal flooring laid crosswise or diagonal. Top flooring shall not extend closer than one-half inch (½") to walls to allow for swelling in case the floor becomes wet. Such one-half inch (½") space shall be covered by a molding fastened to the wall and so arranged that it will not obstruct the swelling or shrinking movements of the floor. Corbeling of masonry walls under floor planks may be used in place of such molding.

If laminated floors are used, at least two laminations at the wall shall be omitted until after glazing and roofing has been completed.

#### ARTICLE 3105. WOOD JOISTED FLOORS.

Wood joisted floor shall be framed, constructed and anchored to supporting wood stud or masonry walls as specified in Chapter 25. Wood joisted floors need not be fire-protected on the under side except where specifically required under Occupancy in Chapters 5 through 15, or Type of Construction in Chapters 17 through 22.

#### MAXIMUM SPANS FOR WOOD GIRDERS

| Size<br>in<br>Inches | Maximum Clear Spans  |     |                                |     | Size<br>in<br>Inches | Maximum Clear Spans  |     |                                |     |
|----------------------|----------------------|-----|--------------------------------|-----|----------------------|----------------------|-----|--------------------------------|-----|
|                      | 1-story<br>dwellings |     | 1½ and 2<br>story<br>dwellings |     |                      | 1-story<br>dwellings |     | 1½ and 2<br>story<br>dwellings |     |
|                      | Ft.                  | In. | Ft.                            | In. |                      | Ft.                  | In. | Ft.                            | In. |
| 4 x 6                | 5                    | 0   | 4                              | 0   | 4 x 10               | 8                    | 0   | 7                              | 0   |
| 6 x 6                | 6                    | 0   | 5                              | 2   | 6 x 8                | 8                    | 0   | 7                              | 0   |
| 4 x 8                | 6                    | 4   | 5                              | 6   | 6 x 10               | 9                    | 0   | 8                              | 0   |

**NOTE:** The above spans are based on a minimum fiber stress at 1,200 pounds. When the allowable fiber stress of the species of wood used is other than 1,200 pounds, spans shall not exceed those determined by established engineering practice. (See Article 213).

If the total of the spans of joists framing into the girder on both sides exceeds 24' 2", or if loads are concentrated, the size and span of the girders shall be determined by established engineering practice.

Table No. 31-A gives the maximum allowable spans for floor joists, using an eleven hundred pound per square inch bending grade (1100#) as per Table No. 25-A, and based on a live load of forty pounds (40#) per square foot uniformly distributed. Spans for joists with plastered ceilings are based on deflection or stress, whichever span is the lesser.

Joists of other grades, other woods and other sizes may be used, in which case they shall not be stressed to exceed the maximum allowable fiber stress as specified in Chapter 25.

Floor joists shall have a clearance of not less than eighteen inches (18") between the bottom of the joists and the surface of the ground underneath.

Joists under bearing partitions shall be installed as specified in Chapter 25. All joists, beams and girders shall be framed away at least two inches (2") from all flues and chimneys and at least four inches (4") from the back of any fireplace. All wood floor joists having a span of more than eight feet (8') shall have a bridging as specified in Chapter 25.

Solid blocking not less than two inches (2") nominal in thickness and full depth of the joists shall be provided in the following places: Over all bearing walls, bearing partitions, around all stairways or other vertical openings; and over all girders, except when joists are not ceiled on the underside thereof. Such solid blocking shall serve as the required bridging specified in Chapter 25.

**ARTICLE 3106. PLYWOOD FLOORING.**

Where used as flooring, plywood shall be of the minimum thickness specified in Table No. 31-B.

**TABLE No. 31-A—ALLOWABLE SPAN8 FOR FLOOR JOISTS.**

| Size of Joists<br>(Inches) | Spacing of Joists,<br>Center to Center<br>(Inches) | Maximum Allowable Span—Feet and Inches* |                                    |
|----------------------------|----------------------------------------------------|-----------------------------------------|------------------------------------|
|                            |                                                    | Plastered Ceiling<br>Below              | Without Plastered<br>Ceiling Below |
| 2 x 6                      | 12                                                 | 10-5                                    | 11-6                               |
|                            | 16                                                 | 9-8                                     | 10-0                               |
|                            | 24                                                 | 7-6                                     | 8-3                                |
| 2 x 8                      | 12                                                 | 13-10                                   | 15-2                               |
|                            | 16                                                 | 12-1                                    | 13-3                               |
|                            | 24                                                 | 9-11                                    | 10-11                              |
| 2 x 10                     | 12                                                 | 17-5                                    | 19-1                               |
|                            | 16                                                 | 15-2                                    | 16-8                               |
|                            | 24                                                 | 12-6                                    | 13-9                               |
| 2 x 12                     | 12                                                 | 20-11                                   | 22-11                              |
|                            | 16                                                 | 18-3                                    | 20-1                               |
|                            | 24                                                 | 15-1                                    | 16-7                               |
| 2 x 14                     | 12                                                 | 24-4                                    | 26-7                               |
|                            | 16                                                 | 21-4                                    | 23-5                               |
|                            | 24                                                 | 17-8                                    | 19-5                               |
| 3 x 6                      | 12                                                 | 12-4                                    | 14-5                               |
|                            | 16                                                 | 11-3                                    | 12-7                               |
|                            | 24                                                 | 9-5                                     | 10-4                               |
| 3 x 8                      | 12                                                 | 16-4                                    | 18-11                              |
|                            | 16                                                 | 14-11                                   | 16-7                               |
|                            | 24                                                 | 12-6                                    | 13-9                               |
| 3 x 10                     | 12                                                 | 20-6                                    | 23-7                               |
|                            | 16                                                 | 18-10                                   | 20-10                              |
|                            | 24                                                 | 15-9                                    | 17-3                               |
| 3 x 12                     | 12                                                 | 24-6                                    | 28-2                               |
|                            | 16                                                 | 22-7                                    | 24-11                              |
|                            | 24                                                 | 18-11                                   | 20-9                               |
| 3 x 14                     | 12                                                 | 28-7                                    | .....                              |
|                            | 16                                                 | 26-4                                    | 28-11                              |
|                            | 24                                                 | 22-1                                    | 24-2                               |

\*Based upon 1100 f grade lumber and live load of 40 pounds per square foot.

NOTE: If stress and loading other than noted are used, same shall be clearly identified on the product and on the construction documents. (See Article 215).

**TABLE No. 31-B—MINIMUM THICKNESS OF PLYWOOD.**

| PLYWOOD<br>THICKNESS<br>(Inches) | LIVE LOADS<br>(Lbs. per sq. ft.) |              |
|----------------------------------|----------------------------------|--------------|
|                                  | 20                               | 40           |
| 5/16.....                        | 18 inch span                     | 12 inch span |
| 3/8.....                         | 22 inch span                     | 16 inch span |
| 1/2.....                         | 27 inch span                     | 21 inch span |
| 5/8.....                         | 33 inch span                     | 24 inch span |

**ARTICLE 3201. GENERAL.**

All roofs shall be so framed and tied into framework and supporting walls as to form an integral part of the whole building.

**ARTICLE 3202. CONSTRUCTION.**

The general requirements for construction of floors as specified in Chapter 31 shall apply to roofs except that in Type II buildings, the roof sheathing shall be not less than two inches (2") nominal in thickness, and except that concrete or gypsum roof slabs shall be not less than two inches (2") in thickness.

Gypsum slabs shall not be directly exposed to the weather or used where subject to frequent or continuous wetting.

Roof trusses shall have all joints well fitted and shall have all tension members well tightened before any load is placed on the truss. Diagonal and sway bracing shall be used to brace all roof trusses. The allowable working stresses of materials in trusses shall be as specified in Chapters 25 and 27. The minimum net section of the members after framing shall be used in determining the strength of the truss at any point.

**ARTICLE 3203. DESIGN.**

The design of the roof construction shall be in accordance with engineering regulations for the materials used.

Table No. 32-A gives the maximum allowable spans for ceiling joists and roof rafters, using an eleven-hundred pound per square inch bending grade (1100#) as per Table No. 25-A, and based on ceiling joists with plaster and no live load, and roof rafters with light weight roofings for roof slopes of six inches in twelve inches and greater; and less than six inches in twelve inches.

Joists or rafters of other grades, other woods and other sizes may be used, in which case they shall not be stressed to exceed the maximum allowable fiber stress as specified in Chapter 25. (See Article 213).

The allowable span of roof rafters shall be measured from plate to ridge, except that where rafters are braced to ceiling joists and a complete truss is formed, the span shall be considered as the distance between intersecting points of trussing.

Roof framing and trussing shall be thoroughly and effectively angle braced. Roof joints when supported on a ribbon board shall be well nailed to the stud.

Where there is no ceiling or attic and the joists are exposed and used primarily as ties between the side walls, the spacing between the joists shall not exceed forty-eight inches (48").

**ARTICLE 3204. ROOF COVERINGS.**

Roof covering shall be required over all combustible roof construction and shall be of one of the classes set forth in Article 4305, as required under Occupancy in Chapters 5 through 15, and Type of Construction in Chapters 17 through 22.

**ARTICLE 3205. ATTICS SEPARATION AND VENTILATION.**

(a) **Access.** All buildings shall have access provided to the attic space by means of a stairway, a permanent ladder or a scuttle. The openings provided through the ceiling for such access into the attic space shall be not less than two feet by three feet (2' x 3'), and shall be located in the hallway or corridor of all Type III, IV, and V buildings three (3) or more stories in height. Thirty-inch minimum clear head room shall be provided above the access opening.

All apartment buildings with two (2) or more apartments, one (1), two (2), or three (3) stories in height shall have exterior roof feet (2' x 3'). Thirty-inch minimum clear head room shall be provided above the access opening. Attics with a maximum vertical clear height than 18" need not be provided with access openings.

For ladder requirements see Articles 3305 (N), 5026 (d), 4828 and Chapter 51, Section 1211A.

(aa) **Areas.** In wood frame roof construction where ceilings occur, the attic spaces or spaces between ceilings and the under side of roofs shall be divided into horizontal areas of not more than twenty-five hundred square feet (2500 sq. ft.), with tight one inch (1") partitions of matched wood, or of approved incombustible materials. All openings through these partitions shall be protected by self-closing doors of the same thickness and materials as the partition.

In buildings with no ceilings and having rooms with floor areas of over thirty thousand square feet (30,000 sq. ft.), tight draft stops shall be installed to prevent a free current of air from the roof. These draft stops in trussed roofs shall extend from the roof down to the bottom chord of the truss and shall divide the under roof or attic into sections not to exceed

twenty thousand square feet (20,000 sq. ft.) in area.

(b) **False or Suspended Ceilings.** Concealed spaces exceeding one foot (1') above false or suspended ceilings shall be divided into horizontal areas of not more than one thousand five hundred square feet (1,500 sq. ft.), with not more than fifty feet (50') in any direction, with partitions and openings protected as in (aa) above.

Exception: Where the entire attic is equipped with an approved automatic fire-extinguishing system, the attic space may be divided into areas not to exceed 9000 square feet.

(c) **Ventilations.** Where determined necessary by the Building Official due to atmospheric or climatic conditions, enclosed attics and enclosed rafter spaces formed where ceilings are applied direct to the underside of roof rafters, shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain. The net free ventilating area shall be not less than 1/150 of the area of the space ventilated, except that the area may be 1/300 provided at least 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. See Free Area Chart Below.

## FREE AREA CHART

(Square inches of free area required for adequate ventilation of attic areas.)

| LENGTH<br>(in feet) | WIDTH (in feet) |     |     |     |     |     |     |     |     |     |     |      |
|---------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|                     | 20              | 22  | 24  | 26  | 28  | 30  | 32  | 34  | 36  | 38  | 40  | 42   |
| 20                  | 192             | 211 | 230 | 250 | 269 | 288 | 307 | 326 | 346 | 365 | 384 | 403  |
| 22                  | 211             | 232 | 253 | 275 | 296 | 317 | 338 | 359 | 380 | 401 | 422 | 444  |
| 24                  | 230             | 253 | 276 | 300 | 323 | 346 | 369 | 392 | 415 | 438 | 461 | 484  |
| 26                  | 250             | 275 | 300 | 324 | 349 | 374 | 399 | 424 | 449 | 474 | 499 | 524  |
| 28                  | 269             | 296 | 323 | 349 | 376 | 403 | 430 | 457 | 484 | 511 | 538 | 564  |
| 30                  | 288             | 317 | 346 | 374 | 403 | 432 | 461 | 490 | 518 | 547 | 576 | 605  |
| 32                  | 307             | 338 | 369 | 399 | 430 | 461 | 492 | 522 | 553 | 584 | 614 | 645  |
| 34                  | 326             | 359 | 392 | 424 | 457 | 490 | 522 | 555 | 588 | 620 | 653 | 685  |
| 36                  | 346             | 380 | 415 | 449 | 484 | 518 | 553 | 588 | 622 | 657 | 691 | 726  |
| 38                  | 365             | 401 | 438 | 474 | 511 | 547 | 584 | 620 | 657 | 693 | 730 | 766  |
| 40                  | 384             | 422 | 461 | 499 | 538 | 576 | 614 | 653 | 691 | 730 | 768 | 806  |
| 42                  | 403             | 444 | 484 | 524 | 564 | 605 | 645 | 685 | 726 | 766 | 806 | 847  |
| 44                  | 422             | 465 | 507 | 549 | 591 | 634 | 676 | 718 | 760 | 803 | 845 | 887  |
| 46                  | 442             | 486 | 530 | 574 | 618 | 662 | 707 | 751 | 795 | 839 | 883 | 927  |
| 48                  | 461             | 507 | 553 | 599 | 645 | 691 | 737 | 783 | 829 | 876 | 922 | 968  |
| 50                  | 480             | 528 | 576 | 624 | 672 | 720 | 768 | 816 | 864 | 912 | 960 | 1008 |

### HOW TO USE THE FREE AREA CHART

Measure length and width of each rectangular or square attic space.

Locate length dimension on vertical column, width dimension on horizontal column. Intersection of columns on chart shows the required free area of ventilation for the space, expressed in square inches.

For crawl spaces or for roof slopes with less than 3'-0" rise above eaves without a vapor barrier; multiply the figures obtained from the chart by two.

### REMEMBER:

At least 50% of required ventilation must be at the highest part of the roof practicable. Provide cross ventilation for each separate space.

(d) **Mansard Roofs.** Mansard roofs shall be draft stopped every twenty-five feet (25'). Draft stops shall be installed as defined in paragraph aa of this article. Apartment draft stop shall be at each division wall of each apartment and shall not be spaced more than twenty-five feet (25') on center. Draft stop shall be from the top most part of the roof to the underside of the overhang.



(j) **Posting of Room Capacity.** Any room having an occupant load of more than 50 where fixed seats are not installed, and which is used for classroom, assembly, or similar purpose, shall have the capacity of the room posted in a conspicuous place near the main exit from the room. Approved signs shall be maintained in a legible manner by the owner or his authorized agent, and shall indicate the number of occupants permitted for each room use.

(k) **Changes in Elevation.** Within a building, changes in elevation of less than 12 inches along any exit serving a tributary occupant load of 10 or more shall be by ramps.

Exception: Group I Occupancies and along aisles adjoining seating areas.

## ARTICLE 3302. EXITS REQUIRED

(a) **Number of Exits.** Every building or usable portion thereof shall have at least one exit, and shall have not less than two exits where required by Table No. 33-A.

In all occupancies, floors above the first story having an occupant load of more than 10 shall not have less than two exits.

Each mezzanine used for other than storage purposes, if greater in area than 2000 square feet or if more than 60 feet in any dimension shall not have less than two stairways to an adjacent floor.

For special requirements for Groups A,B,C,D, and E Occupancies, and open parking garages, see Articles 3315, 3316, 3317, 3318, 3319. For stage exits, see Article 3907.

Every story or portion thereof, having an occupant load of 500 to 999 shall have not less than three exits.

Every story or portion thereof, having an occupant load of 1000 or more shall have not less than four exits.

The number of exits required from any story of a building shall be determined by using the occupant load of that story, plus the percentages of the occupant loads of floors which exit through the level under consideration as follows:

1. Fifty percent of the occupant load in the first adjacent story above (and the first adjacent story below, when a story below exits through the level under consideration.)

2. Twenty-five percent of the occupant load in the story immediately beyond the first adjacent story.

The maximum number of exits required for any story shall be maintained until egress is provided from the structure. (See Article 3311).

For purposes of this Article basements or cellars and occupied roofs shall be provided with exits as required for stories. Floors above the second story, basements and cellars used for other than service of the building shall have not less than two exits.

Exception: Except as provided in Table No. 33-A, only one exit shall be required for a basement or cellar of a Group I Occupancy. See Article 1404 for emergency exits from sleeping rooms.

(b) **Width.** The total width of exits in feet shall be not less than the total occupant load served divided by 50. Such width of exits shall be divided approximately equally among the separate exits. The total exit width required from any story of a building shall be determined by using the occupant load of that story, plus the percentages of the occupant loads of floors which exit through the level under consideration as follows:

1. Fifty percent of the occupant load in the first adjacent story above (and the first adjacent story below, when a story below exits through the level under consideration).

2. Twenty-five percent of the occupant load in the story immediately beyond the first adjacent story.

The maximum exit width required from any story of a building shall be maintained.

(c) **Arrangement of Exits.** If only two exits are required they shall be placed a distance apart equal to not less than one-half of the length of the maximum over-all diagonal dimension of the building or area to be served measured in a straight line between exits.

Exception: Where exit enclosures are provided as the required means of egress and are interconnected by a corridor conforming to the requirements of Article 3304 (g), exit separations may be measured in a direct line of travel within the exit corridor. Enclosure walls shall be not less than 30 feet apart at any point in a direct line of measurement.

Where three or more exits are required, they shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.

(d) **Distance to Exits.** The maximum distance of travel from any point to an exterior exit door, horizontal exit, exit passageway, or an enclosed stairway in a building not equipped with an Automatic Fire Extinguishing system throughout, shall not exceed 150 feet or 200 feet in a building equipped with an automatic fire-extinguishing system throughout. These distances may be increased 100 feet when the last 150 feet is within a corridor, complying with Article 3304.

On a one-story airplane Group G Occupancy classified as a factory or warehouse and in one-story airplane hangers the exit travel distance may be increased to 400 feet if the building is

equipped with an automatic fire-extinguishing system throughout and provided with smoke and heat ventilation.

In a building equipped with a complete automatic fire-extinguishing system the distance from exits may be increased to 200 feet.

(e) **Exits Through Adjoining or Accessory Areas.** Exits from a room may open into an adjoining or intervening room or area provided such adjoining room is accessory to the area served and provides a direct means of egress to an exit corridor, exit stairway, exterior exit, horizontal exit, exterior exit balcony or exit passageway.

Exception: Exits are not to pass through kitchens, storerooms, restrooms, closets or spaces used for similar purposes.

Lobbies, lobbies and reception rooms constructed as required for corridors shall not be construed as intervening rooms.

## ARTICLE 3303. DOORS

(a) **General.** This Article shall apply to every exit door serving an area having an occupant load of more than 10, or serving hazardous rooms or areas. Buildings or structures used for human occupancy shall have at least one exit door which meets the requirements of Paragraph (d). Paragraphs (h) and (i) shall apply to all doors, regardless of occupant load.

(b) **Swing.** Exit doors shall swing in the direction of exit travel when serving any hazardous area or when serving an occupant load of 50 or more.

Double acting doors shall not be used as exits serving a tributary occupant load of more than 100; nor shall they be used as a part of a fire assembly, nor equipped with panic hardware. A double acting door shall be provided with a view panel of not less than 200 square inches.

(c) **Type of Lock or Latch.** Exit doors shall be openable from the inside without the use of a key or any special knowledge or effort.

Exception: This requirement shall not apply to exterior exit doors in a Group F or G Occupancy if there is a readily visible, durable sign on or adjacent to the door, stating "THIS DOOR TO REMAIN UNLOCKED DURING BUSINESS HOURS." The sign shall be in letters not less than 1 inch high on a contrasting background. The Locking device must be of a type that will be readily distinguishable as locked. The use of this Exception may be revoked by the Director for due cause.

Manually operated edge or surface mounted flush bolts and surface bolts are prohibited. When exit doors are used in pairs and approved automatic flush bolts are used, the door leaf having the automatic flush bolts shall have no door knob or surface mounted hardware. The unlatching of any leaf shall not require more than one operation.

(d) **Width and Height.** Every required exit doorway shall be of a size as to permit the installation of a door not less than 3 feet in width and not less than 6 feet 8 inches in height. When installed in exit doorways, exit doors shall be capable of opening at least 90 degrees and shall be so mounted that the clear width of the exitway is not less than 28 inches. In computing the exit width required by Article 3302 (b), the net dimension of the exitway shall be used.

(e) **Door Leaf Width.** No leaf of an exit door shall exceed 4 feet in width.

(f) **Special Doors.** Revolving, sliding and overhead doors shall not be used as required exits. Approved power operated doors may be used for exit purposes.

(g) **Egress from Door.** Every exit door required by this Article shall give immediate access to an approved means of egress from the building.

(h) **Change in Floor Level at Doors.** Regardless of the occupant load, there shall be a floor or landing on each side of a door. The floor or landing shall be not more than 1 inch lower than the threshold of the doorway. Where doors open over landings, the landing shall have a length of not less than 5 feet.

Exceptions: 1. Where the door opens into a stair of a smokeproof enclosure, the landing need not have a length of 5 feet.

2. In Group I Occupancies and within individual units of Group H Occupancies, a door may open on the top step of a flight of stairs or on an exterior landing provided the door does not swing over the top step or exterior landing and the landing is not more than 7½ inches below the floor level.

3. In Group I Occupancies, screen doors and storm doors may swing over stairs or steps.

(i) **Door Identification.** Exit doors shall be so marked that they are readily distinguishable from the adjacent construction.

(j) **Additional Doors.** When additional doors are provided for egress purposes they shall conform to all provisions of this Chapter.

Exception: Approved revolving doors having leaves which will collapse under opposing pressures may be used in exit situations provided: 1. Such doors have a minimum width of 6 feet 6 inches.

2. They are not used in occupancies where exits are required to be equipped with panic

hardware.

3. At least one conforming exit door is located adjacent to each revolving door installed in a building.

4. The revolving door shall not be considered to provide any exit width.

#### **ARTICLE 3304. CORRIDORS AND EXTERIOR EXIT BALCONIES**

(a) **General.** This Article shall apply to every corridor serving as a required exit for an occupant load of 10 or more persons, except that the width of corridors in dwelling units shall be as indicated in Paragraph (b). For the purpose of this Article the term "corridor" shall include "exterior exit balcony" and any covered or enclosed exit passageway including walkways, tunnels and malls.

Foyers, lobbies and reception rooms meeting the construction requirements of corridors as specified in this Article may be classed as corridors.

Partitions, rails, counters and similar space dividers not over 5 feet in height above the floor shall not be construed to form corridors.

(b) **Width.** Every corridor shall be not less in width than 44 inches. For special requirements for Groups C and D Occupancies, see Articles 3317 and 3318. Regardless of the occupancy load, corridors in dwelling units shall be not less than 36 inches in width.

(c) **Height.** Corridors and exterior exit balconies shall have a clear height of not less than 7 feet measured to the lowest projection from the ceiling.

(d) **Projections.** The required width of corridors shall be unobstructed.

Exception: Trim handrails, and doors when fully opened, shall not reduce the required width by more than 7 inches. Doors in any position shall not reduce the required width by more than one-half.

(e) **Access to Exits.** When more than one exit is required, they shall be so arranged that it is possible to go in either direction from any point in a corridor to a separate exit, except for dead ends permitted by this Article. When a corridor or exterior exit balcony is accessible to an elevator, changes in elevation of the floor shall be made by means of a ramp.

(f) **Dead Ends.** Corridors with dead ends are permitted when the dead end does not exceed 20 feet in length.

(g) **Construction.** Walls of corridors serving an occupant load of 30 or more shall be of not less than one hour fire-resistive construction and the ceilings shall be not less than that required for a one-hour fire-resistive floor or roof system.

Exceptions: 1. One-story buildings housing Group G Occupancies.

2. Corridors more than 30 feet in width where occupancies served by such corridors have at least one exit independent from the corridor.

3. Exterior sides of exterior exit balconies.

When the ceiling of the entire story is an element of a one-hour fire-resistive floor or roof system, the corridor wall may terminate at the ceiling. When the room side fire-resistive membrane of the corridor wall is carried through to the underside of a fire-resistive floor or roof above, the corridor side of the ceiling may be protected by the use of ceiling materials as required for one-hour floor or roof system construction or the corridor ceiling may be of the same construction as the corridor walls.

Ceilings of noncombustible construction may be suspended below the fire-resistive ceiling.

(h) **Openings.** Where corridor walls are required to be of one-hour fire-resistive construction by Paragraph (g) above, every door opening shall be protected by a tight-fitting smoke barrier and fire assembly having a fire protection rating of not less than 20 minutes when tested in accordance with Fire Tests of Building Construction and Materials, Standard Method E119-71 of the ASTM without the hose stream test. Doors shall be maintained self-closing or shall be automatic closing in accordance with Article 4306. Interior openings shall be protected by approved ¼ inch thick wired glass set in steel frames. The total area of all openings, other than doors, in any portion of an interior corridor shall not exceed 25 percent of the area of the corridor wall of the room which it is separating from the corridor.

Exception: Protection of openings in the interior walls of exterior exit balconies is not required.

(i) **Location on Property.** Exterior exit balconies shall not be located in an area where openings are required to be protected due to location on the property.

#### **ARTICLE 3305. STAIRWAYS**

(a) **General.** Every stairway serving any building or portion thereof shall conform to the requirements of this Article.

Exception: Stairs or ladders used only to attend equipment are exempt from the requirements of this Article.

(b) **Width.** Stairways serving an occupant load of more than 50 shall not be less in width than 44 inches. Stairways serving an occupant load of 50 or less may be 36 inches wide. Private stairways serving an occupant load of less than 10 may be 32 inches wide.

Trim shall not reduce the required width by more than 3½ inches. Handrails may project from each side of a stairway a distance of 3½ inches into the required width.

(c) **Rise and Run.** The rise of every step in a stairway shall not exceed 7½ inches and the run shall be not less than 10 inches. The largest tread width or riser height within any flight of stairs shall not exceed the smallest by more than ¼ inch.

Exception: Private stairways serving an occupant load of less than 10 and stairways to unoccupied roofs may be constructed with an 8-inch maximum rise and 9-inch minimum run.

(d) **Winding Stairways.** In Group I Occupancies and in private stairways in Group H Occupancies, winders may be used if the required width of run is provided at a point not more than 12 inches from the side of the stairway where the treads are the narrower, but in no case shall any width of run be less than 6 inches at any point.

(e) **Circular Stairways.** Circular stairs may be used as an exit providing the minimum width of run is not less than 10 inches and the smaller radius is not less than twice the width of the stairway. The largest tread width or riser height within any flight of stairs shall not exceed the smallest by more than ¼ inch.

(f) **Landings.** Every landing shall have a dimension measured in the direction of travel equal to the width of the stairway. Such dimension need not exceed 4 feet when the stair has a straight run. Landings, when provided, shall not be reduced in width by more than 3½ inches by a door when fully open. See Article 3303 (h).

Exception: Stairs serving an unoccupied roof are exempt from these provisions.

(g) **Basement Stairways.** Where a basement stairway and a stairway to an upper story terminate in the same exit enclosure, an approved barrier shall be provided to prevent persons from continuing on into the basement. Directional exit signs shall be provided as specified in Article 3312 (b).

(h) **Distance Between Landings.** There shall be not more than 12 feet vertically between landings.

(i) **Handrails.** Stairways shall have handrails on each side, and every stairway required to be more than 88 inches in width shall be provided with not less than one intermediate handrail for each 88 inches of required width. Intermediate handrails shall be spaced approximately equal within the entire width of the stairway.

Handrails shall be placed not less than 30 inches nor more than 34 inches above the nosing of treads. They shall be continuous the full length of the stairs except for private stairways at least one handrail shall extend not less than 6 inches beyond the top and bottom risers and end shall be returned or shall terminate in newel posts or safety terminals.

Exception: 1. Stairways 44 inches or less in width and stairways serving one individual dwelling unit in Group H or I occupancies may have one handrail, except that such stairways open on one or both sides shall have handrails provided on the open side or sides.

2. Stairways having less than four risers need not have handrails. Handrails projecting from a wall shall have a space of not less than 1½ inches between the wall and the handrail.

(j) **Guardrails.** All unenclosed floor and roof openings; open and glazed sides of landings; balconies or porches which are more than 30 inches above grade; and roofs used for other than service of the building, shall be protected by a guardrail. Guardrails shall be not less than 42 inches in height. Open guardrails and stair railings shall have intermediate rails or an ornamental pattern such that no object 9 inches in diameter can pass through. The height of stair railings may be specified in Article 3305 (i).

Exceptions: 1. Guardrails need not be provided on the loading side of loading docks.

Exceptions: 2. Guardrails in all Group I and J Occupancies or any residential use which does not serve an occupancy load exceeding 10 persons shall not be less than 36 inches in height.

(j-1) **Spiral Stairways.** In Group I and J Occupancies spiral stairways may be installed. Such stairways may be used for required exits when the area served is limited to 400 square feet.

The tread must provide a clear walking area measuring at least 26 inches from the outer edge of the supporting column to the inner edge of the handrail. A run of at least 7½ inches is to be provided at a point 12 inches from where the tread is the narrowest. The rise must be sufficient to provide 6 foot 6 inch headroom. The rise shall not exceed 9½ inches.

(k) **Exterior Stairway Protection.** All openings in the exterior wall below or within 10 feet, measure horizontally, of an exterior exit stairway serving a building over two stories in height shall be protected by a self-closing fire assembly having a three-fourths hour fire-resistive rating.

Exception: Openings may be unprotected when two separated exterior stairways serve an exterior exit balcony.

(l) **Stairway Construction-Interior.** Interior stairways shall be constructed as specified in Part VIII of this Code.

Where there is enclosed usable space under stairs the walls and soffits of the enclosed space shall be protected on the enclosed side as required for one-hour fire-resistive construction. See Article 3308.

All required interior stairways which extend to the top floor in any building four or more stories in height shall have provided at the highest point of the stair shaft an approved hatch openable to the exterior not less than 16 square feet in area with a minimum dimension of 2 feet.

Exception: The hatch shall not be required on smoke-proof enclosures or on stairways that extend to the roof with an opening onto that roof.

(m) **Stairway Construction-Exterior.** Exterior stairways shall be of noncombustible material except that on Type III buildings not exceeding two stories in height, and on Type V buildings, they may be of wood not less than 2 inches in nominal thickness.

Exterior stairways shall not project into yards where protection of openings is required.

Where there is enclosed usable space under stairs, the walls and soffits of the enclosed space shall be protected on the enclosed side as required for one-hour fire-resistive construction.

(n) **Access to Roof.** In every building four or more stories in height, one stairway shall extend to the roof surface, unless the roof has a slope greater than 4 in 12.

With the exception of a single story H, I, and J Occupancies, every building which has on its roof, mechanical, electrical, or plumbing equipment or apparatus, shall have on its roof a hinged trap door with a permanent ladder leading to it or a suitable ladder must be available at all times that can be placed to the roof scuttle or hinged trap door for inspection or maintenance purposes. Such scuttle or trap door shall be covered on the top and edges with sheet metal or other approved fire-resistive material, and the clear opening for same shall be at least two feet by three feet (2'x3') in size. Stairway leading to roofs of buildings when provided in lieu of the above shall have signs conspicuously placed with letters not less than four inches (4") high indicating such access at the ground floor level.

Where roofs are used for roof gardens or similar occupancies, stairways shall be provided through the roof by means of a penthouse, all in compliance with requirements for other parts of the building. See Articles 5026D, 4828, and Chapter 51, Section 1211A.

(o) **Headroom.** Every required stairway shall have a headroom clearance of not less than 6 feet 6 inches. Such clearances shall be established by measuring vertically from a plane parallel and tangent to the stairway tread nosing to the soffit above at all points.

## ARTICLE 3306. RAMPS

(a) **General.** Ramps used as exits shall conform to the provisions of this Article.

(b) **Width.** The width of ramps shall be as required for stairways.

(c) **Slope.** Ramps required by Table No. 33-A shall not exceed a slope of one vertical to 10 horizontal. The slope of other ramps shall not exceed one vertical to 8 horizontal.

(d) **Landings.** Ramps having slopes greater than one vertical to 15 horizontal shall have landings at the top and bottom and at least one intermediate landing shall be provided for each 5 feet of rise. Top landings and intermediate landings shall have a dimension measured in the direction of ramp run of not less than 5 feet. Landings at the bottom of ramps shall have a dimension in the direction of ramp run of not less than 6 feet.

Doors in any position shall not reduce the minimum dimension of the landing to less than 42 inches and shall not reduce the required width by more than 3½ inches when fully open.

(e) **Handrails.** Ramps having slopes exceeding one vertical to 15 horizontal shall have handrails as required for stairways, except that intermediate handrails shall not be required.

(f) **Construction.** Ramps shall be constructed as required for stairways.

(g) **Surface.** The surface of ramps shall be roughened or shall be of nonslip materials.

## ARTICLE 3307. HORIZONTAL EXIT

(a) **Used as a Required Exit.** If conforming to the provisions of this Chapter, a horizontal exit may be considered as a required exit.

(b) **Openings.** All openings in a wall which provides a horizontal exit shall be protected by a fire assembly having a fire-resistance rating of not less than one and one-half hours. Such fire assembly shall be maintained self-closing or shall be automatic closing as provided in Article 4306.

(c) **Discharge Areas.** A horizontal exit shall lead into a floor area having capacity for an occupant load not less than the occupant load served by such exit. The capacity shall be determined by allowing 3 square feet of net clear floor area per ambulatory occupant and 20 square feet per nonambulatory occupant. The area into which the horizontal exit leads shall be provided with exits other than additional horizontal exits as required by Article 3302.

## ARTICLE 3308. EXIT ENCLOSURES

(a) **General.** Every interior stairway, ramp, or escalator shall be enclosed as specified in this Article.

Exceptions: 1. In other than Group D Occupancies, an enclosure will not be required for a stairway, ramp, or escalator serving only one adjacent floor and not connected with corridors or stairways serving other floors. For enclosure of escalators serving Groups F and G Occupancies, See Chapter 17.

2. Stairs in Group I Occupancies and stairs within individual apartments in Group H Occupancies need not be enclosed.

(b) **Enclosure Construction.** Enclosure walls shall be of not less than two-hour fire-resistive construction in buildings more than four stories in height and shall be of not less than one-hour fire-resistive construction elsewhere.

(c) **Openings into Enclosures.** There shall be no openings into exit enclosures except exit doorways and openings in exterior walls. All exit doors in an exit enclosure shall be protected by a fire assembly having a fire-protection rating of not less than one hour where one-hour shaft construction is permitted and one and one-half hours where two-hour shaft construction is required. Doors shall be maintained self-closing or shall be automatic closing by means of products of combustion detectors other than heat as provided for in Article 4306. The maximum transmitted temperature and point shall not exceed 450° F above ambient at the end of 30 minutes of the fire exposure specified in Fire Tests of Door Assemblies Standard Method E152-58 of the ASTM and 10(b)-1970 of the Underwriters' Laboratories, Inc.

(d) **Extent of Enclosure.** Stairway and ramp enclosures shall include landings and parts of floors connecting stairway flights and shall also include a corridor on the ground floor leading from the stairway to the exterior of the building. Enclosed corridors or passageways are not required from unenclosed stairways. Every opening into the corridor shall comply with the requirements of Article 3308 (c).

Exception: In office buildings classed as a Group F, Division 2 Occupancy a maximum of 50 percent of the exits may discharge through a street floor lobby provided the required exit width is free and unobstructed and the entire street floor is protected with an automatic fire-extinguishing system.

(e) **Barrier.** A stairway in an exit enclosure shall not continue below the grade level exit unless an approved barrier is provided at the ground level to prevent persons from accidentally continuing into the basement.

(f) **Use of Space Under Stair.** There shall be no enclosed usable space under stairways in an exit enclosure, nor shall the open space under such stairways be used for any purpose.

## ARTICLE 3309. SMOKEPROOF ENCLOSURES

(a) **General.** A smokeproof enclosure shall consist of vestibule and continuous stairway enclosed from the highest point to the lowest point by walls of two-hour fire-resistive construction. The supporting frame shall be protected.

(b) **Where Required.** Where a floor of any story is located more than 75 feet above the highest grade, one of the required exits shall be a smokeproof enclosure. When a smokeproof enclosure is required it shall be used to meet the requirements of Article 3305 (n).

(c) **Construction.** Stairs in smokeproof enclosures shall be of non-combustible construction.

(d) **Outlet.** A smokeproof enclosure shall exit into a public way or into an exit passageway leading to a public way. The exit passageway shall be without other openings and shall have walls, floors, and ceiling of two-hour fire resistance.

(e) **Barrier.** A stairway in a smokeproof enclosure shall not continue below the grade level unless an approved barrier is provided at the ground level to prevent persons from accidentally continuing into the basement.

(f) **Access.** Access to the stairway shall be by way of a vestibule or by way of an open exterior balcony of noncombustible materials.

(g) **Smokeproof Enclosures by Natural Ventilation.** 1. Doors. Doors to both the vestibule and to the stairway shall have a one-hour fire-resistive rating and have closing devices as specified in Article 3309 (h) 6.

2. Open air vestibule. The vestibule shall have a minimum of 16 square feet of opening, in a wall facing an exterior court, yard or public way at least 20 feet in width.

(h) **Smokeproof Enclosures by Mechanical Ventilation.** 1. Doors. The door from the building into the vestibule shall have a one and one-half-hour fire-resistive rating and have closing devices as specified in Article 4306.

The door from the vestibule to the stairway shall be a tight-fitting door equal to not less than an exterior type solid wood door without voids, assembled with exterior type glue, 1-3/4

inch minimum thickness set in a steel frame. Wired glass, if provided, shall not exceed 100 square inches in area and shall be set in a steel frame. The door shall be provided with a drop sill or other provisions to minimize air leakage.

2. Vestibule Size. The vestibule shall have a minimum dimension of 44 inches in width and 72 inches in direction of exit travel.

3. Vestibule ventilation. The vestibule shall be provided with not less than one air change per minute and the exhaust shall be 150 percent of the supply. Supply air shall enter and exhaust air shall discharge from the vestibule through separate, tightly constructed ducts used only for that purpose. Supply air shall enter the vestibule within 6 inches of the floor level. The top of the exhaust register shall be located at the top of the smoke trap but no more than 6 inches down from the top of the trap and shall be entirely within the smoke trap area. Doors, when in the open position, shall not obstruct duct openings. Duct openings may be provided with controlling dampers, if needed, to meet the design requirements but are not otherwise required.

NOTE: For buildings where such air changes would result in excessively large duct and blower requirements, a specially engineered system may be used. Such an engineered system shall provide 2500 cfm exhaust from a vestibule when in emergency operation and shall be sized to handle three vestibules simultaneously and the smoke detector located outside each vestibule shall release to open the supply and exhaust duct dampers in that affected vestibule.

4. Smoke trap. The vestibule ceiling shall be at least 20 inches higher than the door opening into the vestibule to serve as a smoke and heat trap and to provide an upward moving air column.

5. Stair shaft air movement system. The stair shaft shall be provided with mechanical supply and exhaust air. There shall be a minimum of 2500 cfm discharge at the top of the shaft. The supply shall be sufficient to provide a minimum of .05 inch of water column with respect to atmospheric pressure with all doors closed and a minimum of .10-inch water column difference between the stair shaft and the vestibule.

6. Exit doors. The exit doors into the vestibule and into the stair shaft shall close automatically when released by activation of a detector meeting the requirements of Article 4306. The door holding devices shall be of an approved type which will release the doors so that they will close in the event of a power failure.

7. Operation of ventilating equipment. Vestibule and stair shaft mechanical ventilation may be inactive or may operate at reduced levels for normal operations as approved by the Director; but when the detectors referred to in paragraph 6 either fail or are activated, the mechanical equipment shall operate at the levels specified in paragraphs 3 and 5.

8. Standby power. Mechanical ventilation equipment shall be provided by an approved self-contained generator set to operate whenever there is a loss of power in the normal house current. The generator shall be in a separate room having a minimum one-hour fire-resistive occupancy separation and shall have a minimum fuel supply adequate to operate the equipment for two hours.

9. Acceptance and testing. Before the mechanical equipment is accepted by the Director, it shall be tested in his presence to confirm that the mechanical equipment is operating in compliance with these requirements.

10. Emergency Lighting. The stair shaft and the vestibule shall be provided with emergency lighting. The standby generator which is installed for the smokeproof enclosure mechanical ventilation equipment may be used for standby emergency lighting power supply.

11. Air-conditioned buildings. In buildings with air conditioning systems or pressure air supply, serving more than one story, a detector of products of combustion other than heat conforming to the requirements of Article 4306 shall be placed in the return air prior to exhausting from the building or being diluted by outside air. Upon activation the detector shall cause the return air to exhaust completely from the building without any recirculation through the building. Such devices may be installed in each room or space served by a return air duct.

## ARTICLE 3310. EXIT COURTS

(a) **General.** Every exit court shall discharge into a public way or exit passageway.

(b) **Width.** Exit court minimum widths shall be determined in accordance with provisions of Article 3302 based on the tributary occupancy load and such required width shall be unobstructed except for projections permitted in corridors in Article 3304.

Where the width is reduced from any cause the reduction shall be effected gradually by a guardrail at least 3 feet in height and making an angle of not more than 30° with the axis of the exit court.

(c) **Number of Exits.** Every exit court shall be provided with exits as determined by Article 3302.

(d) **Openings.** All openings into an exit court less than 10 feet wide shall be protected by fire assemblies having not less than a three-fourths hour fire-protection rating.

Exception: Openings more than 10 feet above the floor of the exit court may be unprotected.

#### **ARTICLE 3311. EXIT PASSAGEWAYS**

(a) **Discharge.** The walls of exit passageways shall be without openings other than required exits and shall have walls, floors, and ceilings of the same period of fire resistance as required for the walls, floors and ceilings of the building served with a minimum of one-hour fire-resistive construction. Exit openings throughout the enclosing walls of exit passageways shall be protected by fire assemblies having a three-fourths-hour fire-protection rating.

(b) **Detailed Requirements.** Exit passageways shall have width, height, and other construction requirements as required for corridors in Article 3304.

#### **ARTICLE 3312. EXIT SIGNS AND ILLUMINATION**

(a) **Exit Illumination.** Exits shall be illuminated at any time the building is occupied with light having an intensity of not less than one footcandle at floor level.

Exception: Group I Occupancies.

Exit illumination shall be provided with separate circuits or separate sources of power (but not necessarily separate from exit signs) when these are required for exit sign illumination. See Article 3312 (c).

(b) **Exit Signs.** At every required exit doorway, and wherever otherwise required to clearly indicate the direction of egress, an exit sign with letters at least 5 inches high shall be provided from all areas serving the occupant load specified in this paragraph. In interior stairways the floor level leading direct to the exterior shall be clearly indicated.

Group A Occupancies and Groups B, D and H Occupancies with an occupant load of more than 50.

All other occupancies serving an occupant load of more than 100.

Exception: Main exterior exit doors which obviously and clearly are identifiable as exits need not be sign posted when approved by the Director.

(c) **Illumination of Signs.** Exit signs serving the occupant loads specified in this paragraph shall be lighted with two electric lamps of not less than 15 watts each in the following manner:

1. Two separate sources of supply shall be provided for the following occupancies:

A. Group A Occupancies.

B. Divisions 1 and 2 of Group B Occupancies with an occupant load over 500 persons, except churches with an occupant load of less than 750 persons.

C. Group D Occupancies with an occupant load over 100 persons.

2. Separate circuits, one of which shall be separated from all other circuits in the building and independently controlled, shall be required for the following occupancies:

A. Groups B,C,F and G Occupancies with an occupant load over 300 persons.

B. Groups E and H Occupancies with an occupant load over 100 persons.

C. Group D Occupancies with an occupant load over 50 persons.

#### **ARTICLE 3313. AISLES**

(a) **General.** Every portion of every building in which are installed seats, tables, merchandise, equipment or similar materials shall be provided with aisles leading to an exit.

(b) **Width.** Every aisle shall be not less than 3 feet wide if serving only one side, and not less than 3 feet 6 inches wide if serving both sides. Such minimum width shall be measured at the point farthest from an exit, cross aisle, or foyer and shall be increased by 1½ inches for each 5 feet in length toward the exit, cross aisle, or foyer.

With continental spacing, as specified in Article 3314 (a), side aisles shall be not less than 44 inches in width.

(c) **Distances to Nearest Exit.** In areas occupied by seats, and in Groups A and B Occupancies without seats, the line of travel to an exit door by an aisle shall be no more than 150 feet.

(d) **Aisle Spacing.** With standard spacing, as specified in Article 3314 (a), aisles shall be so located that there will be not more than six intervening seats between any seat and the nearest aisle.

With continental spacing, as specified in Article 3314 (a), the number of intervening seats may be increased to 29 where exit doors are provided along each side aisle of the row of seats at the rate of one pair of exit doors for each five rows of seats. Such exit doors shall provide a minimum clear width of 66 inches.



(e) **Cross Aisles.** Aisles shall terminate in a cross aisle, foyer, or exit. The width of the cross aisle shall be not less than the sum of the required width of the widest aisle plus 50 percent of the total required width of the remaining aisles leading thereto. In Groups A, B, and C Occupancies, aisles shall not provide a dead end greater than 20 feet in length.

(f) **Vomitories.** Vomitories connecting the foyer or main exit with the cross aisles shall have a total width not less than the sum of the required width of the widest aisle leading thereto plus 50 percent of the total required width of the remaining aisles leading thereto.

(g) **Slope.** The slope portion of aisles shall not exceed 1 foot fall in 8 feet.

#### **ARTICLE 3314. SEATS**

(a) **Seat Spacing.** With standard seating the spacing of rows of seats shall provide a space of not less than 12 inches from the back of one seat to the front of the most forward projection of the seat immediately behind it as measured horizontally between vertical planes.

With continental seating, the spacing of rows of unoccupied seats shall provide a clear width measured horizontally as follows (automatic or self-rising seats shall be measured in the seat-up position, other seats shall be measured in the seat-down position):

Eighteen inches clear for rows of 18 seats or less

Twenty inches clear for rows of 35 seats or less

Twenty-one inches clear for rows of 45 seats or less

Twenty-two inches clear for rows of 46 seats or more.

(b) **Bleacher Seats.** Seats used in grandstands, bleachers and reviewing stands shall conform to Article 3321.

#### **ARTICLE 3315. EXITS: GROUP A OCCUPANCIES**

(a) **Main Exit.** Every Group A Occupancy shall be provided with a main exit.

The main exit shall be of sufficient width to accommodate one-half of the total occupant load but shall be not less than the total required width of all aisles, exit passageways, and stairways leading thereto, and shall connect to a stairway or ramp leading to a public way.

(b) **Side Exits.** Every auditorium of a Group A Occupancy shall be provided with exits on each side. The exits on each side of the auditorium shall be of sufficient width to accommodate one-third of the total occupant load served. Side exits shall open directly to a public way or into an exit court, approved stairway, exterior stairway or exit passageway leading to a public way. Side exits shall be accessible from a cross aisle.

(c) **Balcony Exits.** Every balcony having an occupant load of more than 10 shall be provided with a minimum of two exits. Balcony exits shall open directly onto an exterior stairway or into an approved stairway or ramp. When there is more than one balcony, exits shall open into an exterior or enclosed stairway or ramp. Balcony exits shall be accessible from a cross aisle. The number and distribution of exits shall be as otherwise specified in this Chapter.

(d) **Panic Hardware.** An exit door from a Group A Occupancy having an occupant load of more than 100 shall not be provided with a latch or lock unless it is panic hardware.

#### **ARTICLE 3316. EXITS: GROUP B OCCUPANCIES**

(a) **Group B, Divisions 1, 2, and 3.** Group B, Divisions 1 and 2 Occupancies shall have exits as required by Article 3315. In Group B, Division 3 Occupancies having an occupant load of more than 100, exit doors shall not be provided with a latch or lock unless it is panic hardware.

Exception: Group B, Division 2 and 3 Occupancies, such as restaurants, bars, bowling alleys, auditoriums and similar commercial uses, and in churches, panic hardware may be omitted from the main exit when the main exit consists of a single door or one pair of doors. A key locking device may be used in place of the panic hardware provided there is a readily visible metallic sign adjacent to the doorway stating "THIS DOOR MUST REMAIN UNLOCKED DURING BUSINESS HOURS." The sign shall be in letters not less than 1 inch high on a contrasting background. When unlocked, a single door and each leaf of a pair of doors must be free to swing without operation of any latching device. The locking device on a pair of doors must be arranged so that when one leaf is unlocked, the other is free to swing. Flush, edge or surface bolts or any other type of device that may be used to close or restrain the doors other than by operation of the locking device are prohibited. The use of this Exception may be revoked by the Building Official for due cause.

(b) **Group B, Division 4.** In Group B, Division 4 Occupancies having an occupant load of more than 100, exit doors shall not be provided with a latch or lock unless it is panic hardware. Panic hardware may be waived on gates surrounding stadiums, when the gates are under

constant immediate supervision while the public is present and provided safe dispersal areas based upon 3 square feet per occupant are located between the stadium and the fence. The required dispersal area shall be located not less than 50 feet from the stadium. Sec Article 3321 for exits from dispersal areas.

(c) **Skating Rinks.** Skating rinks shall be located at or near the adjacent ground level and exits shall be by means of ramps.

#### **ARTICLE 3317. EXITS: GROUP C OCCUPANCIES**

(a) **Definitions.** For the purpose of this Article, the following definitions apply:

**Room:** A room is a space or area bounded by any obstructions to exit passage which at any time enclose more than 80 percent of the perimeter of the area. In computing the unobstructed perimeter, openings less than 3 feet clear width and less than 6 feet 8 inches high shall not be considered.

**Interior Room.** A room whose only means of egress is through an adjoining or intervening room which is not an exit corridor.

**Separate Exit System.** A path of exit travel separated in such a manner from other required exits as to provide an atmospheric separation which precludes contamination of both paths by the same fire.

(b) **Separate Exit Systems Required.** Every room with an occupant load of more than 300 shall have one of its exits into a separate exit system. When three or more exits are required from a room, no more than two required exits shall enter into the same exit system.

(c) **Distance to Exits.** 1. No point in a room in a building shall be more than 75 feet from a minimum protection as provided by an exit corridor, enclosed stairway, or exterior of the building.

Exception: In buildings not more than two stories in height, an increase to 90 feet is permitted when the building is protected throughout with detectors of products of combustion other than heat. When the building is protected throughout by a complete automatic fire-extinguishing system, the distance may be increased to 110 feet. For buildings over two stories in height, sprinkler provisions only shall apply.

2. No point in an unsprinklered building shall be more than 150 feet from either an exterior exit door, a horizontal exit, exit passageway or enclosed stairway all measured along the line of travel. In a building protected throughout with an automatic fire-extinguishing system this may be increased to 225 feet. In buildings not more than two stories in height protected throughout with detectors of products of combustion other than heat, the distance may be increased to 175 feet.

(d) **Exits Through Adjoining Rooms.** Interior rooms may exit through adjoining or intervening rooms provided the total distance of travel through such rooms to an exit corridor does not exceed that specified in paragraph (c) 1 above and is a direct, obvious and unobstructed means of travel. Such paths of exit travel shall not pass through kitchens, storerooms, rest rooms, closets, laboratories using hazardous materials, industrial shops or other similar spaces.

Foyers and lobbies constructed as required for exit corridors shall not be construed as adjoining or intervening rooms.

Where the only means of exit from a room is through an adjoining or intervening room, detectors of products of combustion other than heat shall be installed in the area of the common atmosphere through which the exit must pass. The detectors shall actuate alarms audible in the interior room and shall be connected to the school fire alarm system.

Exceptions: 1. Where the aggregate occupant load of the interior room or rooms is less than 10.

2. Where the enclosures forming interior rooms are less than two-thirds of the floor to ceiling height and do not exceed 8 feet.

3. Rooms used exclusively for mechanical and public utility service to the buildings.

(e) **Corridors and Exterior Exit Balconies.** The width of a corridor in a Group C, Division 1 occupancy shall be the width required by Article 3302, plus 2 feet, but no corridor shall be less than 6 feet wide.

Exception: When the number of occupants served is less than 100, the corridor may be 44 inches wide.

Corridor walls shall be of not less than one-hour fire-resistive construction with openings protected as required in Article 3304 (g).

Exception: When each room used for instruction has at least one exit door directly to the exterior at ground level and when rooms used for assembly purposes have at least one half of the required exits directly to the exterior at ground level, one-hour fire-resistive construction of corridor walls and ceilings is not required.

There shall be no change in elevation of less than 2 feet in a corridor or exterior balcony unless ramps are used.

(f) **Exit Serving Auditoriums in Group C, Division 1 Occupancy.** An exit serving both an auditorium and other rooms need provide only for the capacity of whichever requires the greater width if the auditorium is not to be used simultaneously with the other rooms.

(g) **Stairs.** Each floor above or below the ground floor level shall have not less than two exits stairs and the required exit width shall be equally divided between such stairs, provided that no stair serving an occupant load of more than 100 shall be less than 5 feet in clear width.

Exception: This paragraph does not apply to rooms used for maintenance, storage, and similar purposes

(h) **Doors.** The width of exit doors shall be sufficient to accommodate the occupant load served.

(i) **Basement or Cellar Rooms.** Exit stairways from the cellar or basement shall open directly to the exterior of the building without entering the first floor corridor.

(j) **Panic Hardware.** Exit doors from rooms having an occupant load of more than 100, and from corridors, shall not be provided with a latch or lock unless it is panic hardware.

(k) **Fences and Gates.** School grounds may be fenced in and gates equipped with locks, provided safe dispersal areas located not less than 50 feet from the buildings are available for persons between buildings and fence. Dispersal areas shall be based upon an area of not less than 3 square feet per occupant. Gates shall not be permitted across corridors or passageways leading to such dispersal areas unless they comply with exit requirements. See Article 3321 for exits from dispersal areas.

#### **ARTICLE 3318. EXITS: GROUP O OCCUPANCIES**

(a) **Separate Access.** Every room in a Group D Occupancy shall have access to at least two approved means of egress from the building without passage through intervening rooms other than corridors or lobbies. All required exterior exit doors shall open in direction of exit travel.

(b) **Minimum Size of Exits.** Every exit opening through which patients are transported in wheelchairs, stretchers or beds shall be of sufficient width to permit the ready passage of such equipment, but shall have a clear width of not less than 44 inches. There shall be no projections within the 44-inch clear width.

(c) **Corridors.** The minimum clear width of a corridor shall be 44 inches, except that corridors serving any area housing one or more nonambulatory persons shall be not less than 8 feet in width. There shall be no change of elevation in a corridor serving nonambulatory persons unless ramps are used.

In Group D, Division 1 Occupancies such as jails, prisons, reformatories and similar buildings with open barred cells forming corridor walls, the corridors and cell doors need not be fire-resistive.

(d) **Basement Exits.** One exit accessible to every room below grade shall lead directly to the exterior at grade level.

(e) **Ramps.** Group D, Division 2 Occupancies housing nonambulatory patients shall have access to a ramp leading from the first story to the exterior of the building at the ground floor level.

(f) **Hardware.** Exit doors serving an occupant load of more than 50 shall not be provided with a latch or lock unless it is panic hardware. Patient room doors shall be readily openable from either side without the use of keys.

Exception: No requirements of this Chapter shall be so construed as to prohibit the construction of cell blocks in jails, or prevent the use of any safety devices where it is necessary to forcibly restrain the inmates.

(g) **Locking Devices.** In buildings housing occupancies in which the personal liberties of inmates or patients are restrained within the building, the exterior doors may be fastened with locks, provided that room doors shall not be fastened by other means than doorknobs or similar devices which can be opened readily from the corridor side without the use of keys or any special knowledge or effort.

#### **ARTICLE 3319. EXITS: GROUP E OCCUPANCIES**

Every portion of a Group E Occupancy having a floor area of 200 square feet or more shall be served by at least two separate exits.

In Divisions 1 and 2, no part of any room shall be more than 75 feet from an exit.

Doors leading to a corridor of fire-resistive construction shall have a minimum three-fourths hour fire protection rating; shall have not more than 100 square inches of wired

glass set in steel frames; shall be maintained self-closing or shall be automatic closing as required by Article 4306; and shall open in the direction of exit travel.

#### ARTICLE 3320. SPECIAL HAZARDS

(a) **Boiler, Furnace and Incinerator Rooms.** Except in Group I Occupancies, any room containing a boiler, furnace, incinerator, or other fuel-fired equipment must be provided with two means of egress when both of the following conditions exist:

1. The area of the rooms exceeds 500 square feet, and
2. The largest piece of fuel-fired equipment exceeds 400,000 B.T.U. per hour input capacity.

If two means of egress must be provided, one may be a fixed ladder. The means of egress must be separated by a horizontal distance not less than half the greatest horizontal dimension of the room. Where oil-fired boilers are used, a 6 inch non-combustible sill (dike) shall be provided. There shall be no interior openings between a Group E Occupancy and an incinerator room.

(h) **Cellulose Nitrate Handling.** Where cellulose nitrate is handled in film laboratories, projection rooms and film processing rooms, two exits shall be provided. Doors shall be self-closing and have a fire-protection rating of one-hour.

#### ARTICLE 3321. REVIEWING STANDS, GRANDSTANDS AND BLEACHERS

(a) **Scope.** Reviewing stands, grandstands and bleachers shall conform to the provisions of this Article.

(b) **Definitions.** For the purpose of this Article certain terms are defined as follows:

**Bleachers.** Bleachers are seating facilities without backrests in which less than 3 square feet is assigned per person for computing the occupant load.

**Footboards.** Footboards are that part of a raised seating facility other than an aisle or cross aisle upon which the occupant of the stands walks to reach a seat or upon which he may rest his feet.

**Grandstands.** Grandstands are seating facilities wherein an area of 3 square feet or more is provided for each person and where rows of seats are on an increasing height level by a terraced arrangement of walking platforms and seats.

**Open Air Grandstands and Bleachers.** Open air grandstands and bleachers shall refer to seating facilities which are located so that the side toward which the audience faces is unroofed and without an enclosing wall.

**Permanent.** Permanent stands are those seating facilities which remain at a location for more than 90 days.

**Reviewing Stands.** Reviewing stands are elevated platforms accommodating not more than 50 persons. Seating facilities, if provided, are normally in the nature of loose chairs. Reviewing stands accommodating more than 50 persons shall be regulated as grandstands.

**Safe Dispersal Area.** Safe dispersal area shall mean an area which will accommodate a number of persons equal to the total capacity of the stand and building which it serves in such a manner that no person within the area need be closer than 50 feet from the stand or building. Dispersal areas are based upon an area of not less than 3 square feet per person.

**Temporary.** Temporary seating facilities are those which are intended for use at a location for not more than 90 days.

(c) **Height of Grandstands and Bleachers.** See Article 702 (c).

(d) **Design Requirements.** See Chapter 23.

(e) **General Requirements.** 1. Row spacing. There shall be a clear space of not less than 12 inches measured horizontally between the back or backrest of each seat and the front of the seat immediately behind it. The minimum spacing of rows of seats measured from back to back shall be:

- A. Twenty-two inches for seats without backrests.
- B. Thirty inches for seats with backrests.
- C. Thirty-three inches for chair seating.

2. Rise between rows. The maximum rise from one row of seats to the next shall not exceed 16 inches unless the seat spacing from back to back measured horizontally is 40 inches or more.

3. Seating capacity determination. Where bench type seating is used, the number of seats shall be based on one person for each 18 inches of length of the bench.

4. Aisles. A. Aisles required. Aisles shall be provided in all seating facilities except that aisles may be omitted when all of the following conditions exists:

- (i) Seats are without backrests.
- (ii) The rise from row to row does not exceed 12 inches per row.

(iii) The number of rows does not exceed 11 in height.

(iv) The top seating board is not over 10 feet above grade.

(v) The first seating board is not more than 20 inches above grade.

B. Obstructions. No obstruction shall be placed in the required width of any aisle or exitway.

C. Width. Aisles serving seats on both sides shall have a minimum width of 42 inches. When serving seats on only one side, the aisle shall have a minimum width of 36 inches.

5. Cross aisles and vomitories. Cross aisles and vomitories shall be not less than 54 inches in clear width and shall extend to an exit, enclosed stairway or exterior perimeter ramp.

6. Stairs and ramps. All stairs and ramps shall have a maximum rise and run as provided in Article 3305 (c) and Article 3306, except those within the seating area shall not exceed 8 inches. When an aisle terminates at an elevation more than 8 inches above grade, the aisle shall be provided with a stairway or ramp whose width is not less than the width of the aisle.

7. Guardrails. Perimeter guardrails or enclosing walls shall be provided for all portions of elevated seating facilities more than 30 inches above grade. Construction of guardrails shall comply with Articles 3305 (j) and 2304.

Exception: Guardrails at the front and not at the end of an aisle may have a height of 36 inches and need not meet the 9 inch maximum spacing specified in Article 3305 (j); however a midrail shall be installed.

8. Toeboards. A 4-inch high vertical barrier shall be installed along the edge of walking surfaces wherever guardrails are required.

9. Footboards. Footboards shall be provided for all rows of seats above the third row or beginning at such a point where the seating plank is more than 2 feet above grade. Where the same platform is used for both seating and footrests, footrests will not be required provided each level or platform is not less than 24 inches wide. Footboards in bleachers at a level below the seat board it serves are not to be considered as walking platforms but shall be not less than a structural grade of 2-inch by 8-inch lumber or equivalent. When bleachers exceed 11 rows in height, a walking platform not less than 18 inches in width shall be provided.

(f) **Special Requirements.** 1. Grandstands and bleachers within buildings. Grandstands within a building shall comply with the other applicable Articles of Chapter 33.

Exception: When seats are without backrests there may be nine seats between any seat and an aisle.

2. Open air grandstands and bleachers. A. Number of seats between aisles. The number of seats between any seat and aisle shall not be greater than 20 when the seats are without backrests and nine if the seats have backrests.

B. Dead ends. Dead ends in vertical aisles shall not exceed a depth of 16 rows for permanent grandstands and 26 rows for temporary grandstands.

C. Distance to exit. The line of travel from any seat to a safe dispersal area exit ramp, enclosed stairway or vomitory shall not be more than 200 feet. When the seats have no backrests, the distance may be measured by direct line.

D. Safe dispersal area. Each safe dispersal area shall have a minimum of two exits. If more than 6000 persons are to be accommodated within a dispersal area, there shall be a minimum of three exits and for more than 9000 persons there shall be at least four exits. The aggregate clear width of exits from a safe dispersal area shall be determined on the basis of not less than one exit unit of 22 inches for each 500 persons to be accommodated and no exit shall be less than 44 inches in width.

E. Two exits required. Two exits shall be provided from every stand which accommodates more than 300 persons.

F. Three exits required. Three exits shall be required where a grandstand or section thereof accommodates more than 1000 persons.

G. Four exits required. Four exits shall be provided where a grandstand or section thereof accommodates more than 3000 persons.

H. Determination of exit width. The total width of exits in feet shall be not less than the total occupant load served divided by 150 when exiting by stairs and divided by 200 when exiting by ramps, corridors, tunnels or vomitories.

I. Minimum exit width. No exit shall be less than 42 inches in width.

# AND EGRESS FACILITIES

| Use <sup>1</sup>                                       | Minimum of Two Exits Other Than Elevators Are Required Where Number of Occupants Is Over | Square Feet Per Occupant | Egress by Means of a Ramp or an Elevator Must be Provided for the Physically Handicapped as Indicated |
|--------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------|
| Aircraft Hangars (no repair)                           | 10                                                                                       | 500                      | Yes                                                                                                   |
| Auction Rooms                                          | 30                                                                                       | 7                        | Yes                                                                                                   |
| Assembly Areas, Concentrated Use (Without fixed seats) | 50                                                                                       | 7                        | Yes <sup>3 4</sup>                                                                                    |
| Auditoriums                                            |                                                                                          |                          |                                                                                                       |
| Bowling Alleys (Assembly areas)                        |                                                                                          |                          |                                                                                                       |
| Churches and Chapels                                   |                                                                                          |                          |                                                                                                       |
| Dance Floors                                           |                                                                                          |                          |                                                                                                       |
| Lodge Rooms                                            |                                                                                          |                          |                                                                                                       |
| Reviewing Stands                                       |                                                                                          |                          |                                                                                                       |
| Stadiums                                               |                                                                                          |                          |                                                                                                       |
| Assembly Areas, Less Concentrated Use                  | 50                                                                                       | 15                       | Yes <sup>3</sup>                                                                                      |
| Conference Rooms                                       |                                                                                          |                          |                                                                                                       |
| Dining Rooms                                           |                                                                                          |                          |                                                                                                       |
| Drinking Establishments                                |                                                                                          |                          |                                                                                                       |
| Exhibit Rooms                                          |                                                                                          |                          |                                                                                                       |
| Gymnasiums                                             |                                                                                          |                          |                                                                                                       |
| Lounges                                                |                                                                                          |                          |                                                                                                       |
| Skating Rinks                                          |                                                                                          |                          |                                                                                                       |
| Stages                                                 |                                                                                          |                          |                                                                                                       |
| Children's Homes and Homes for the Aged                | 5                                                                                        | 80                       | Yes <sup>5</sup>                                                                                      |
| Classrooms                                             | 50                                                                                       | 20                       | Yes                                                                                                   |
| Dormitories                                            | 10                                                                                       | 50                       | Yes <sup>5</sup>                                                                                      |
| Dwellings                                              | 10                                                                                       | 300                      | No                                                                                                    |
| Garage, Parking                                        | 30                                                                                       | 200                      | Yes <sup>6</sup>                                                                                      |
| Hospitals and Sanitariums—                             |                                                                                          |                          |                                                                                                       |
| Nursing Homes                                          | 5                                                                                        | 80                       | Yes                                                                                                   |
| Hotels and Apartments                                  | 10                                                                                       | 200                      | Yes in Hotels and Apartments of more than 3 stories                                                   |
| Kitchen—Commercial                                     | 30                                                                                       | 200                      | No                                                                                                    |
| Library Reading Room                                   | 50                                                                                       | 50                       | Yes <sup>3</sup>                                                                                      |
| Locker Rooms                                           | 30                                                                                       | 50                       | Yes                                                                                                   |
| Mechanical Equipment Room                              | 30                                                                                       | 300                      | No                                                                                                    |
| Nurseries for Children (Day-care)                      | 6                                                                                        | 50                       | Yes                                                                                                   |
| Offices                                                | 30                                                                                       | 100                      | Yes <sup>5</sup>                                                                                      |
| School Shops and Vocational Rooms                      | 50                                                                                       | 50                       | Yes                                                                                                   |
| Stores—Retail                                          |                                                                                          |                          |                                                                                                       |
| Sales Rooms                                            |                                                                                          |                          |                                                                                                       |
| Basement                                               | 7                                                                                        | 20                       | Yes                                                                                                   |
| Ground Floor                                           | 50                                                                                       | 30                       | Yes                                                                                                   |
| Upper Floors                                           | 10                                                                                       | 50                       | Yes                                                                                                   |
| Warehouses                                             | 30                                                                                       | 300                      | Yes <sup>5</sup>                                                                                      |
| All Others                                             | 50                                                                                       | 100                      |                                                                                                       |

<sup>1</sup> Refer to Articles 3318 and 3319 for other specific requirements.

<sup>2</sup> Elevators shall not be construed as providing a required exit.

<sup>3</sup> Access to secondary areas on balconies or mezzanines may be by stairs only.

<sup>4</sup> Reviewing stands, grandstands and bleachers need not comply.

<sup>5</sup> Access to floors other than that closest to grade may be by stairs only.

<sup>6</sup> Access to floors other than that closest to grade and to garages used in connection with apartment houses may be by stairs only.

<sup>7</sup> See Article 3302 for basement exit requirement.

**ARTICLE 3401. DOORS AND WINDOWS.**

(a) **Doors.** Fire doors, where required, shall be as specified in Article 4306. All such doors shall be self-closing and if not kept normally closed shall be arranged to close automatically by the operation of an approved fusible link or other heat or smoke actuated device.

(b) **Windows.** Windows required to have metal frames shall be constructed of either steel or wrought iron rolled shapes, or of hollow galvanized sheet iron, as specified in Article 4306.

When wire glass is required, it shall mean glass the thickness of which at the thinnest point shall be not less than one-fourth inch ( $1/4''$ ), and in which a wire netting is embedded. Wire glass shall be set with putty and metal stops.

**ARTICLE 3402. SKYLIGHTS.**

All skylights constructed with metal frames shall be substantially built with interlocking seams. Frames of skylights shall be designed to carry loads required for roofs as specified in Article 2305. All skylights, the glass of which is set at an angle of less than 25 degrees from the horizontal, if located above the first story, shall be set at least one foot (1') above the roof. The curbs on which the skylight rests shall be constructed as required for inner court walls, or for masonry.

When wire glass is required for skylights, the size shall not exceed seven hundred and twenty square inches (720 sq. in.) in area, or forty-eight inches (48'') in any dimension in any panel. All glass in skylights shall be wire glass, except that skylights over vertical shafts extending through two or more stories shall be glazed with plain glass not to exceed one-eighth inch ( $1/8''$ ) in thickness; provided, that wire glass may be used if ventilation equal to not less than one-eighth ( $1/8$ ) the cross sectional area of the shaft, but never less than four square feet (4 sq. ft.) is provided at the top of such shaft.

Any glass not wire glass shall be protected above and below with a screen constructed of wire not smaller than No. 12 B. & S. gauge, with a mesh not larger than one inch (1''). The screen shall be substantially supported below the glass.

Skylights installed for the use of photographers may be constructed of metal frames and plate glass without wire netting.

Ordinary glass may be used in the roofs and skylights for greenhouses, provided the height of the greenhouse at the ridge does not exceed twenty feet (20') above the grade. The use of wood in the frames of skylights will be permitted in greenhouses outside of the commercial areas of the Parish, if the height of the skylight does not exceed twenty feet (20') above the grade, but in other cases metal frames and metal sash bars shall be used.

Glass used for the transmission of light, if placed in floors or sidewalks, shall be supported by metal or reinforced concrete frames, and such glass shall be not less than one-half inch ( $1/2''$ ) in thickness. Any such glass over sixteen square inches (16 sq. in.) in area shall have a wire mesh embedded in the same, or shall be provided with a wire screen underneath as specified for skylights in this Article. All portions of the floor lights or sidewalk lights shall be of the same strength as is required by this Code for floor or sidewalk construction, except in cases where the floor is surrounded by a railing not less than three feet, six inches ( $3'6''$ ) in height, in which case the construction shall be calculated for not less than roof loads.

**ARTICLE 3403. WINDOWLESS WALLS.**

For windowless wall requirements, the provisions of Article 2939 shall apply.

### ARTICLE 3501. CONSTRUCTION.

Construction of walls and floors in bay and oriel windows shall conform to the construction allowed for exterior walls and floors of the type of construction of the building to which they are attached. The roof covering of a bay or oriel window shall conform to the requirements for roofing of the main roof of the building.

All exterior balconies attached to or supported by masonry walls shall have brackets or beams constructed of wire, steel, concrete or other incombustible material. All railings for balconies or porches shall be not less than three feet (3') in height above the floor of such balcony or porch. (See Article 2304.)



**ARTICLE 3601. PENTHOUSES AND ROOF STRUCTURES.**

No penthouse or other projection above the roof shall exceed twenty-eight feet (28') above the roof when used as an enclosure for tanks or for elevators which run to the roof. The aggregate area of all penthouses and other roof structures shall not exceed thirty-three and one-third per cent (33-1/3%) of the area of the roof. When same exceeds thirty-three and one-third per cent (33-1/3%), it shall be considered a story.

Roof structures shall be constructed as required in Articles 1815, 1915, 2015, 2115, and 2215.

Walls of roof structures parallel or within 4 feet of inside property lines of buildings whose exterior walls are required to be of masonry construction are required to be constructed the same as the wall immediately below. Such wall shall project 2 feet above the roof and 2 feet beyond the sides of such structure; the side projection shall not be required when the adjoining side walls are of masonry. Walls other than those occurring within 4 feet of an exterior wall in Type II or III buildings, shall be of not less than one-hour fire-resistive construction. The restrictions of this paragraph shall not prohibit the placing of wood flagpoles or similar structures on the roof of any building.

See Chapter 48 for requirements of roof structures connected with air conditioning, mechanical refrigeration and attic ventilation.

Openings in enclosure walls of penthouses and other roof structures shall be protected as required for openings in the exterior walls of the building.

**ARTICLE 3602. TOWERS AND SPIRES.**

Towers and spires when enclosed shall have exterior walls as required for the building to which they are attached. Towers not enclosed and which extend more than seventy-five feet (75') above grade shall have their framework constructed of iron, steel or reinforced concrete. No tower or spire shall occupy more than one-fourth (1/4) of the street frontage of any building to which it is attached and in no case shall the base area exceed sixteen hundred square feet (1600 sq. ft.) unless it conforms entirely to the type of construction requirements of the building to which it is attached, and is limited in height as a main part of the building. If the area of the tower or spire exceeds one hundred square feet (100 sq. ft.) at any horizontal cross section, its supporting frame shall extend directly to the ground.

Skeleton towers used as wireless masts and placed on the roof of any building shall be constructed entirely of incombustible materials when more than twenty-five feet (25') in height, and shall be directly supported on an incombustible framework to the ground. They shall be designed to withstand a wind load from any direction as specified in Article 2307 in addition to any other loads.

## ARTICLE 3701. CHIMNEYS.

Chimneys shall be constructed in conformance with requirements of the Building Code of the National Board of Fire Underwriters, except as specified in this Chapter.

The walls of all chimneys whether used for appliances using coal, coke, wood, gas or oil shall be built of brick, concrete, stone, hollow tile of clay or concrete or of concrete blocks; provided, that a metal smokestack or a patent chimney as specified in Articles 3702 and 3704, respectively, may be used.

Flue lining shall be made of fire clay or of other suitable refractory clays adapted to withstand reasonably high temperatures and flue gasses and shall have a softening point not lower than 1994 degrees Fahrenheit. Flue linings shall be not less than five-eighths inch (5/8") in thickness and shall be built in as the outer walls of the chimney are constructed. All joints and spaces between the masonry and lining shall be thoroughly slushed and grouted full as each course of masonry is laid. Cracked, broken or otherwise defective linings shall not be used. Flue linings shall start from a point not less than eight inches (8") below the smoke pipe intakes or in the case of fireplaces from the apex of the smoke chamber and shall be continuous to a point not less than four inches (4") above the enclosing walls. Flue lining may be omitted in brick chimneys for Group I Occupancies provided the walls of the chimneys are not less than eight inches (8") thick and that the inner course shall be of fire brick with a fire-resistance equal to that required for flue linings.

The walls of brick chimneys shall be not less than three and three-fourths inches (3-3/4") thick and shall be lined except as provided above. All brick work shall be laid with full mortar joints, and shall be struck smooth where exposed to the weather. No mortar lining shall be permitted.

Concrete chimneys cast in place shall be suitably reinforced vertically and horizontally. The walls shall be not less than three and three-fourths inches (3-3/4") thick and shall have a flue lining as specified above; provided, that flue linings may be omitted in reinforced concrete chimneys for Group I Occupancies when the walls of such chimneys are not less than six inches (6") thick.

Hollow blocks or hollow tile of clay or concrete shall not be used for the walls of an independent chimney, but may be used for chimneys built in connection with exterior or party walls of hollow units for buildings not exceeding three stories in height. The outer eight inches (8") of such a wall may serve as the outside wall of the chimney.

Chimneys shall extend at least three feet (3') above the highest point where it passes through the roof of a building and at least two feet (2') higher than any roof within ten feet (10') of such chimney.

Chimneys shall be built upon solid masonry or reinforced concrete foundations properly proportioned to carry the weight imposed without settlement or cracking. The chimney shall carry no load except its own weight, and such load shall be transmitted to the foundation in such manner as to prevent the shearing or falling off of any part of the chimney.

Flues shall be built as nearly vertical as possible and in no case at an angle greater than thirty degrees (30°) from the vertical.

When any single flue has an effective area exceeding two hundred square inches (200 sq. in.) the wall shall be not less than eight inches (8") thick and shall have flue lining as specified in this Article, except that when flues become too large for fire clay flue lining, such flues shall be lined with fire brick for a distance of at least twenty-five feet (25') from the point of intake.

There shall be but one connection to a flue irrespective of whether the fuel used be coal, coke, wood, or oil. Ordinary and low pressure heating devices burning solid fuels shall have a minimum effective flue area of not less than the following, and such area shall be provided by a flue having its short dimension not less than two-thirds (2/3) the long dimension.

|                                                       |            |
|-------------------------------------------------------|------------|
| Small special stoves and heaters .....                | 28 sq. in. |
| Stoves, ranges and room heaters .....                 | 40 sq. in. |
| Fireplace (at least 1/12 the fireplace opening) ..... | 50 sq. in. |
| Warm air furnaces, steam and hot water boilers .....  | 70 sq. in. |

All flues to which large ranges, heating furnaces, boilers, automatic gas water heaters or fireplaces are to be connected, shall be subjected to a smoke test before acceptance but the test shall not be made until the mortar has thoroughly seasoned. Such test shall be made by the mason contractor in the presence of the Director.

## ARTICLE 3702. SMOKESTACKS.

Steel or iron smokestacks may be used in place of brick chimneys specified in Article 3701, in which case the thickness of the metal shall be not less than one-eighth inch (1/8").

Such stacks when used for manufacturing, for high pressure boilers, furnaces or other similar heating or manufacturing appliances, shall be lined with fire brick for a distance of not less than twenty-five feet (25') from the place where the smoke pipe enters and shall be protected on the outside up to and through the roof of the building with eight inches (8") of masonry or a metal shield which provides an eight inch (8") ventilated air space between such shield and the steel or iron stack; provided, that a metal smokestack when located inside of a vent shaft having masonry enclosing walls not less than eight inches (8") thick and having an air space between the walls and the stack on all sides may have such masonry or metal shield protection omitted. All stacks shall be properly guyed.

Smokestacks constructed of not less than No. 10 U. S. Gauge steel, with either welded or riveted joints, may be mounted directly upon industrial heating or power boilers which are designed to support the stack load. A clearance of not less than six inches (6") shall be maintained at all times around such smokestack and any flammable material within twelve inches (12") of such smokestack shall be protected by one-fourth inch (1/4") of asbestos covered by sheet metal.

#### **ARTICLE 3703. GAS FLUES AND VENTS.**

Gas flues and vents shall comply with the requirements of Article 5225.

#### **ARTICLE 3704. SPECIAL DESIGN CHIMNEYS.**

Patent chimneys may be used, except for oil burners, when complying with the requirements of this Code and are approved by the Underwriters' Laboratories, Inc.

Chimneys may be built of other materials than specified in this Chapter provided they meet all the requirements of Article 211.

#### **ARTICLE 3705. SMOKE PIPES AND THIMBLES.**

All smoke pipes for apparatus or appliances having a rated output of over 500,000 BTU per hour shall be as short and straight as possible. Smoke pipes for appliances, furnaces, boilers or apparatus burning solid, liquid, or gas fuel, and with a rated output of over 500,000 BTU per hour, shall be constructed of black iron of not less than 14 U. S. Gauge or masonry and shall fit tightly into the chimney. Galvanized iron shall not be used.

Smoke pipes shall enter the side of chimneys through a fire clay or metal thimble or a flue-ring of masonry. The top of smoke pipe intakes shall be set not less than eighteen inches (18") below sheet metal ceilings, wood lath and plaster or exposed wood framing.

Neither the intake pipe nor the thimble shall project in the flue. No woodwork shall be placed within six inches (6") of the thimble. When a smoke pipe enters a chimney breast through a studded-off chimney partition, the thimble shall be kept six inches (6") clear of all woodwork.

#### **ARTICLE 3706. FIREPLACES.**

All fireplace walls shall be not less than eight inches (8") thick and if built of stone or hollow units shall be not less than twelve inches (12") thick. The faces of all such minimum thickness walls exposed to fire shall be lined with fire brick, soap stone, cast iron or other suitable fire-resistive material. When lined with four inches (4") of fire brick, such lining may be included in the required minimum thickness. All fireplaces shall be connected to a regulation chimney as specified in Article 3701, or to a patent chimney as specified in Article 3704.

All fireplaces and chimney breasts shall have trimmer arches or other approved fire-resistive construction supporting hearths. The arches and hearths shall be not less than twenty inches (20") wide measured from the face of the chimney breast and not less than twelve inches (12") wider than the fireplace opening on each side. The arches shall be of brick, stone or hollow tile not less than four inches (4") thick. A flat stone or reinforced concrete slab may be used to carry the hearth instead of an arch if it be properly supported and a suitable fill provided between it and the hearth. Hearths shall be of brick, stone, tile or concrete. Wood centering under a trimmer arch shall be removed after the masonry has thoroughly set.

False fireplaces for gas or electrical heaters shall not be constructed in imitation of fireplaces unless complying with all the requirements for fireplaces. Gas and electrical space heaters may be installed in recesses not more than six inches (6") in depth, provided the entire recess is constructed of incombustible material. Such recesses shall be labeled by means of a metal plate bearing the words "For Gas and Electrical Appliances Only."

No heater burning solid or liquid fuel shall be placed in a fireplace which does not comply with the requirements of this Article. No such heaters shall be connected to a gas vent flue. No wood shall be placed within eight inches (8") of the jambs or within twelve inches (12") of the top or arch of any fireplace opening.

#### **ARTICLE 3707. WARM AIR FURNACES.**

Warm air furnaces designed to burn solid or liquid fuel shall be encased in a double metal shield with an air space between and shall be protected with at least three inches (3") of sand or equivalent insulation on top and shall rest on masonry or concrete floors. No wood partitions shall be built within seven feet (7') of the front or four feet (4') of the sides of the outer shield of such furnaces, but the distance to the partitions at the side may be reduced to two feet (2') if they are covered with sheet metal or metal lath and plaster. The distance from the top shield of such furnace to any ceiling or framing of wood above shall be not less than twenty-four inches (24") unless such wood ceiling or framing is protected with not less than one-hour fire-resistive construction as specified in Article 4302.

Every furnace designed to burn solid or liquid fuel shall set upon a masonry floor or be placed on a bed of not less than four inches (4") of masonry and every portion thereof including the smoke pipe shall be at least two feet (2') from any combustible material or such combustible material shall be protected by a covering of not less than No. 24 U. S. Gauge galvanized iron, furred with metal furring not less than one and one-half inches (1-1/2") from such combustible construction or shall be entirely covered by one-hour fire-resistive construction. Any such furnace set in masonry shall be completely and tightly covered with at least four inches (4") of brick, concrete, tile, sand or a combination of such materials. Every such furnace shall be connected to a regulation chimney as specified in Article 3701.

An air supply for combustion shall be provided for every warm air furnace. Such supply shall be from outside the building into the furnace space through one or more openings. Such openings shall have a net area of not less than four hundred square inches (400 sq. in.). No obstruction of any kind shall be placed over such openings except wire netting with openings not less than one-half inch (1/2") square. Air used for conveying heat and for ventilation may be taken from outside the building, from inside the building or from both sources. Where such air is taken from inside the building or from both inside and outside the buildings, it shall be conducted to the furnace by means of ducts of incombustible material.

The furnace room or rooms shall be located in the basement or cellar of any building having a gravity system and the least horizontal dimension of such room shall be six feet (6'). The floor of the furnace room shall be not less than seven feet (7') in the clear below the bottom of the lowest joists of any floor under which lateral heat pipes from the furnace or furnaces are taken and such floor shall be constructed of incombustible materials.

Gas-fired warm air furnaces shall meet the requirements of Article 5222.

#### **ARTICLE 3708. SOURCES OF HEAT.**

Sources of heat and flame not specifically mentioned herein shall be constructed and so protected as to prevent heating any wood or other combustible material used in the construction of floors, ceilings, partitions or other parts of a building to a temperature of over 125° F., when in full operation, and shall be so constructed as not to be liable to undue corrosion or deterioration and not subject to accidental overturn or other disarrangement conducive to dangerous conditions.

#### **ARTICLE 3709. INCINERATORS.**

Incinerators which are an integral part of the building shall have the enclosing walls of the fire boxes or combustion chamber of solid masonry or reinforced concrete not less than eight inches (8") in thickness where the horizontal area does not exceed fifteen square feet (15 sq. ft.) and not less than twelve inches (12") in thickness where the combustion chamber is of greater area. The inner four inches (4") of such combustion chamber walls shall be of fire brick laid in fire clay or cement mortar, but the walls surrounding the ash chamber below the fire grate need not be so lined. The inner walls of any combustion chamber shall not be offset in excess of one inch (1") for every three inches (3") of rise in the height of the wall unless supported by reinforced concrete or structural steel.

The chimney for every incinerator shall be constructed as specified in Article 3701, with an approved spark arrester placed over the top of the chimney.

#### **ARTICLE 3710. OIL BURNERS.**

Stoves, furnaces and other heating or power apparatus in which oil burners are installed shall be constructed and erected as required for simple apparatus using solid fuel.

Oil burning apparatus using commercial fuel oil, furnace oil, diesel oil or other flammable liquids shall be constructed and installed in compliance with the regulations outlined in the standards listed in Article 215.

#### ARTICLE 3711. LOW PRESSURE STEAM HEATING PLANTS.

Steam heating plants, for not more than fifteen (15) pounds pressure, and hot water heaters using solid or liquid fuel, shall rest upon masonry or reinforced concrete floors and shall be protected on the outside by asbestos. The clearance of wooden partitions, ceilings, and other combustible materials shall be the same as given for warm air furnaces.

#### ARTICLE 3712. STOVES.

All stoves used for heating, cooking or laundry purposes using solid or liquid fuel shall have all combustible partitions in back of and extending not less than twelve inches (12") beyond each side of such stove protected by not less than one-hour fire-resistive construction as specified in Chapter 43. Such stoves shall be securely supported at least twelve inches (12") above any wood floors by metal supports and there shall be a metal and asbestos pad at least three-eighths inch (3/8") thick below such stove extending at least six inches (6") beyond each side and at least twelve inches (12") in front of such stove. Such stoves shall not be placed nearer than six inches (6") to any combustible partitions.

All such stoves shall be connected by a smoke pipe to a chimney meeting the requirements specified in Article 3701.

#### ARTICLE 3713. WARM AIR DUCTS AND APPURTENANCES.

For gravity systems no leader heat pipes shall be over twenty feet (20') in length measured horizontally, except where a booster fan is installed when such length shall not exceed forty feet (40'). All such pipes under first floor joists shall have a uniform rise of at least one inch (1") per lineal foot of horizontal run. Warm air pipes and appurtenances serving first floor rooms shall have a minimum cross sectional area in square inches of not less than the cubic foot capacity of the room or rooms in which registers are located, divided by 40; provided, that no leader pipe shall have a net area less than fifty square inches (50 sq. in.). Risers and appurtenances serving floors above the first floor shall have a net area of not less than two-thirds (2/3) that required to serve the first floor.

Registers shall be located in or near the wall of the room nearest the furnace. No register shall be located in outside walls except in cases of absolute necessity. Where double registers are supplied by one leader pipe, each register shall have a capacity of not less than two-thirds (2/3) the area of the leader pipe. When necessary to install appurtenances in an outside wall at least the weather side shall be covered with air-cell asbestos paper.

Ninety degree (90°) bends in round pipe shall be made by not less than four (4) piece elbows. Sixty degree (60°) bends shall be made by means of not less than three (3) piece elbows. All warm air pipes and fittings, cold air pipes and fittings, cold air or recirculating pipes, ducts, boxes and fittings shall be made of bright tin or galvanized iron. All such appurtenances except leader heat pipes under the first floor shall be covered with two (2) thicknesses of asbestos paper weighing at least eight (8) pounds to one hundred square feet (100 sq. ft.) or with air-cell asbestos insulation, or shall be double walled with a one-fourth inch (1/4") space between the inner and outer walls. Horizontal warm air pipes shall be kept at least three inches (3") from any combustible material or shall be protected with an asbestos shield and a one inch (1") air space. Air-cell asbestos paper not less than one-fourth inch (1/4") in thickness shall be securely cemented around all leader pipes.

All riser pipes shall be braced or held in place by means of metal strips securely fastened to the pipe and shall in no case be held in place by nailing diagonally through the corners of such pipe. No joint shall depend wholly upon solder to make it tight. All leader pipes shall be securely fastened in place by means of wire or metal strips.

In the installation of "Y" runs or branch runs, the cross sectional area of the warm air pipe at the furnace shall equal in square inches the cubic contents of all the rooms served by such warm air pipe divided by 40. Sizes of branch runs shall be determined in the same manner on the basis of the room or rooms served. Branches from trunk lines shall be taken off in a generally horizontal plane at an angle not less than forty-five degrees (45°) from the line of the pipe. Fifteen degrees (15°) "Y" branches may be permitted in forced draft systems. Riser pipes shall not be taken off the top of the first floor register boxes.

When warm air pipes and appurtenances are to be installed in a building, the joists and studs shall be so arranged as to provide not less than fourteen inches (14") clear space in continuous horizontal runs and/or vertical risers from the furnace to the register served.

## CHAPTER 38—FIRE EXTINGUISHING APPARATUS

### ARTICLE 3801. AUTOMATIC SPRINKLERS: WHERE REQUIRED.

Approved system of automatic sprinklers shall be installed as specified in this Chapter in the following places:

1. In basements having an area exceeding 3500 square feet, when used for the manufacture, sale or storage of combustible goods or merchandise. In public buildings, institutional buildings and residence buildings (such as hotels and apartments), the automatic sprinkler equipment will be required only in such portions as are used for storage purposes or as work shops. When the ceiling of such basement is 3 feet or more above grade and has suitable access to the outside, automatic sprinklers are required only in areas having an active fire hazard as determined by the Director.

2. In buildings of Group A, B and C Occupancy: Under the gridiron, under the stage floor, under all fly and tie galleries, in all dressing rooms, storerooms, property rooms, carpenter shops, paint shops, passageways and all places back of the proscenium wall. A line of sprinklers shall be installed on the stage side of, and immediately back of the proscenium curtain and not more than five feet (5') above the proscenium arch.

Over enclosed platforms, having a floor area in excess of one thousand square feet (1000 sq. ft.) and over any usable space under such platforms.

In assembly rooms having an occupant load of more than 500, enclosed platforms less than one thousand square feet (1000 sq. ft.) and more than five hundred square feet (500 sq. ft.) in area, together with all dressing-room sections, workshops and storerooms.

3. In all Group E Occupancies occupied wholly or in part as a planing mill, box factory, wood working establishment where lumber is made into a finished product and in which more than five (5) power operated wood working machines, exclusive of saws, are used, producing shavings or similar waste.

4. In all Group E Occupancies occupied wholly or in part as a mattress factory used to manufacture, assemble or renovate mattresses or stuffed furniture using cotton, silk, floss, mohair, or other like material for packing or stuffing.

5. In all Group E Occupancies used as film exchanges using Nitro-Cellulose film and in buildings storing, handling, or processing cellulose nitrate plastics.

6. In Group B and C Occupancies in any enclosed occupied space below or over a stairway, except where the entire construction is as required for Type 1 Buildings, and in all portions of basements or cellars used for storage or maintenance work rooms.

7. In building with Windowless Walls, automatic sprinklers shall be installed as required in Article 2939.

8. See Article 902 for sprinkler requirements for nursing, convalescent, old age homes, child boarding homes, and day nurseries.

### ARTICLE 3802. DETAILED REQUIREMENTS.

Every automatic sprinkler system required by this Code shall comply in all respects with the "Regulations of the National Board of Fire Underwriters" recommended by the National Fire Protection Association for the "Installation of Sprinkler Equipment."

Exceptions: A single water supply equal to the primary supply required by such regulations may be accepted as complying with the requirements of this Code. In no case where a connection to a city water main constitutes the source of supply shall such connection be less than four inches (4") in diameter.

Sprinklers required in paragraph 6, Article 3801, may be supplied from the domestic water system and need not comply with the provisions of this Article except as to pipe sizes and spacing of heads, provided that where the domestic water supply has a pressure less than fifteen (15) pounds per square inch, an approved automatic chemical extinguisher for each twenty-five hundred square feet (2500 sq. ft.) of floor area may be used in lieu of sprinklers.

The alarm valve required for a standard automatic sprinkler system shall not be required in the cellars of Group C, D, E, F, G, and H Occupancies where the area of such cellar is less than three thousand square feet (3000 sq. ft.)

### ARTICLE 3803. DRY STANDPIPES FOR LARGE HOSE (2½"): WHERE REQUIRED.

Every building exceeding fifty feet (50') in height shall be equipped with one or more dry standpipes for large hose (2½"), regardless of whether or not the building is equipped with automatic sprinklers; but when wet standpipes for small hose (1½") are required, the same pipe system may serve for both large and small hose. When wet standpipe is required, or provided for, a dry standpipe is not required if the system is designed to supply standard fire department hose streams, as required in Article 3804. This shall not be construed as eliminating the requirements of Article 3806 (i) for a positive water supply.

## ARTICLE 3804. DETAILED REQUIREMENTS.

(Note: National Board of Fire Underwriters' requirements in the National Building Code are acceptable.)

(a) **Construction.** Dry standpipes shall be of wrought iron or galvanized steel and together with fittings and connections shall be of sufficient strength to withstand three hundred pounds (300 lbs.) of water pressure to the square inch when ready for service, without leaking at the joints, valves or fittings.

Tests shall be conducted by the owner or contractor in the presence of a representative of the Fire Department whenever deemed necessary and ordered by the Director. The tests shall be applied at the top and bottom connections of such standpipes and the owner or contractor shall be responsible for any damage caused by breakage or faulty installation while such tests are being conducted. After such standpipes have been tested, the owner or contractor shall remove all water therefrom.

(b) **Size.** Dry standpipes shall be of such a size as to be capable of delivering 250 gallons per minute from each of any three outlets simultaneously under the pressure created by one fire engine or pumper, based on the existing equipment available. No part of a dry standpipe system other than hose connections shall be less than three inches (3") in diameter.

(c) **Number Required.** Every building exceeding fifty feet (50') in height where the area of any floor above the second floor is ten thousand square feet (10,000 sq. ft.) or less shall be equipped with not less than one dry standpipe and an additional standpipe shall be installed for each additional ten thousand square feet (10,000 sq. ft.) or fraction thereof.

(d) **Location.** Standpipes shall be located within stairway enclosures or as near such stairways as possible or shall be on the outside of, embedded within, or immediately inside of an exterior wall and within one foot (1') of an opening in a stairway enclosure or the balcony or vestibule of a smokeproof tower or an outside exit stairway.

(e) **Siamese Connections.** All four inch (4") dry standpipes shall be equipped with a two-way Siamese fire department connection. All five inch (5") dry standpipes shall be equipped with a three-way Siamese fire department connection and all six inch (6") dry standpipes shall be equipped with a four-way Siamese fire department connection. All Siamese inlet connections shall be located on a street front of the building and not less than one foot (1') nor more than four feet (4') above the grade and shall be equipped with clapper-checks and substantial plugs. All Siamese inlet connections shall be recessed in the wall or otherwise substantially protected.

(f) **Outlets.** All dry standpipes shall extend from the ground floor to and over the roof and shall be equipped with a two and one-half inch (2½") outlet not more than four feet (4') above the floor level at each story. All dry standpipes shall be equipped with a two-way two and one-half inch (2½") outlet above the roof. All outlets shall be equipped with gate-valves with substantial chains.

(g) **Threads.** All hose threads in connection with such standpipe installations shall be uniform with that used by the local fire department.

(h) **Signs.** An iron or bronze sign with raised letters at least one inch (1") high shall be rigidly attached to the building adjacent to all Siamese connections and such sign shall read: "CONNECTION TO DRY STANDPIPE."

## ARTICLE 3805. WET STANDPIPES FOR SMALL HOSE (1½"): WHERE REQUIRED.

Every Group A, B, and C Occupancy exceeding both one story and 50 feet in height, shall be equipped with one or more wet standpipes with standard Jefferson Parish hose connections, extending from the cellar or basement into the topmost story.

Exceptions: 1. Provide wet standpipes in Group A, B, or C Occupancies less than 50 feet in height when having a seating capacity of more than 500 people in any one room above the first floor. Water may be supplied from domestic system by connection, without reduction, direct to main service supply. Siamese connection not needed.

2. Wet standpipes are not required for one story churches and one story gymnasium type buildings exceeding 50 feet in height.

3. On all permanent stages arranged or intended for theatrical, operatic or similar performances, one 2½ inch standpipe on each side of stage is required. Water may be supplied from sprinkler system.

Every Group D, E, F, G, and H Occupancy exceeding 50 feet in height and every Group E and F Occupancy over 20,000 square feet in area (in unsprinklered) shall be equipped with one or more standpipes extending from the cellar or basement into the topmost story.

## ARTICLE 3806. DETAILED REQUIREMENTS.

(a) **Construction.** Interior wet standpipes shall be constructed as required for dry standpipes.

(b) **Size.** Interior wet standpipes shall have an internal diameter sufficient to deliver 50 gallons of water per minute under 30 pounds per square inch pressure at the hose connection, based on the available water supply. Buildings of Groups A and B Occupancies shall have wet standpipe systems capable of delivering the required quantity and pressure from any two outlets simultaneously, for all other occupancies only one outlet need be figured to be open at one time. In no case shall the internal diameter of a wet standpipe be less than two inches (2").

Any approved formula which determines pipe sizes on a pressure drop basis may be used to determine pipe sizes for wet standpipe systems. The Director may require delivery and pressure tests on completed wet standpipe systems before approving such systems.

(c) **Number Required.** Wet standpipes shall be located so that any portion of the building can be reached therefrom with a 25 foot stream from a hose not exceeding 75 feet in length.

(d) **Location.** In Groups A, B and C Occupancies, outlets shall be located as follows:

On each side of the stage, on each side of the rear of the auditorium and on each side of the rear of the balconies. Where seating capacities are less than 500 the number of locations noted above may be reduced upon the approval of the Director. In Group D, E, F, G and H Occupancies, the location of all interior wet standpipes shall be approved by the Director.

(e) **Siamese Connections.** All interior wet standpipes shall be equipped with a Siamese fire department inlet connection located on the street front of the building and such connection shall have two inlets for buildings five stories or less in height, three inlets for buildings six to ten stories inclusive in height, and four inlets for buildings more than ten stories in height.

(f) **Outlets.** All interior wet standpipes shall be equipped with a one and one-half inch (1½") straightway composition gate-valve in each story including the basement or cellar of the building and located not less than one foot (1') nor more than five feet (5') above the floor.

(g) **Threads.** All hose threads in connection with the installation of such standpipes, including valves and reducing fittings, shall be uniform with that used by the local fire department.

(h) **Signs.** An iron or bronze sign with raised letters at least one inch (1") high shall be rigidly attached to the building adjacent to all Siamese connections and shall read: "CONNECTION TO WET STANDPIPE."

(i) **Water Supplies.** All interior wet standpipes shall be connected to a street water main of not less than four inches (4") in diameter or when the water pressure is insufficient to maintain thirty (30) pounds pressure at the highest hose outlet such standpipe shall be connected to a pressure tank, gravity tank or fire pump. Such supply shall be sufficient to furnish at least thirty (30) pounds pressure at the topmost standpipe outlet.

When more than one interior wet standpipe is required in the building, such standpipes shall be connected at their bases or at their tops by pipes of equal size.

Should an auxiliary supply of non-potable water be considered advisable, the domestic supply system shall be completely separated from the fire protection supply.

(j) **Pressure and Gravity Tanks.** Tanks shall have a capacity sufficient to furnish at least two hundred fifty (250) gallons per minute for a period of not less than ten (10) minutes. Such tanks shall be located so as to provide not less than twenty-five (25) pounds pressure at the topmost hose outlet for its entire supply. Discharge pipes from pressure tanks shall extend two inches (2") into and above the bottom of such tanks. All tanks shall be equipped with a manhole, ladder and platform, drain pipe, water and pressure gauges. Every pressure tank shall be tested in place after installation and proved tight by a hydrostatic pressure fifty per cent (50%) in excess of the working pressure required. Where such tanks are used for domestic purposes, the supply pipe for such purposes shall be located at or above the center line of such tanks and the tank shall be adequately protected against the entrance of contamination. Incombustible supports shall be provided for all such supply tanks and not less than a three foot (3') clearance shall be maintained over the top and under the bottom of all pressure tanks.

(k) **Fire Pumps.** Fire pumps shall have a capacity sufficient to furnish at least two hundred fifty (250) gallons per minute with a pressure of not less than twenty-five (25) pounds at the topmost hose outlet. The source of supply for such pumps shall be a street water main of not less than four inches (4") diameter or a well or cistern containing a one-hour supply. Such pumps shall be supplied with an adequate source of power and shall be automatic in operation.



(l) **Hose and Reels.** Each nose outlet of all interior wet standpipes shall be supplied with a hose not less than one and one-half inches (1½") in diameter. Such hose shall be equipped with a suitable brass or bronze nozzle and shall be not over seventy-five feet (75') in length. An approved standard form of wall hose reel or rack shall be provided for the hose and shall be located so as to make the hose readily accessible at all times and shall be recessed in the walls or protected by suitable cabinets.

#### **ARTICLE 3807. BASEMENT PIPE INLETS.**

Basement pipe inlets shall be installed in the first floor of every store, warehouse or factory where there are cellars or basements under same, except where in such cellars or basements there is installed an automatic sprinkler system as specified by this Code, or where the cellars or basements are used for banking purposes, safe deposit vaults or similar uses.

All basement pipe inlets shall be of cast iron, steel, brass or bronze with lids of cast brass or bronze and shall consist of a sleeve not less than eight inches (8") in diameter through the floor extending to and flush with the ceiling below and with a top flange, recessed with an inside shoulder, to receive the lid and flush with the finished floor surface. The lid shall be a solid casting and have a ring lift recessed in the top thereof, so as to be flush. The lid shall have the words "Fire Department Only. Do Not Cover Up." cast in the top thereof. The lid shall be installed in such a manner as to permit its removal readily from the inlet.

The location of such basement pipe inlets shall be approved by the Director and shall be kept readily accessible at all times to the Fire Department.

#### **ARTICLE 3808. APPROVALS.**

All fire extinguishing apparatus, including automatic sprinklers, wet and dry standpipes, automatic chemical extinguishers, basement pipe inlets and the appurtances thereto shall meet the approval of the Chief of the Fire Department and the General Superintendent of the Sewerage District as to installation and location, and shall be subject to such periodic tests as they may require.

#### **ARTICLE 3809. FIRE EXTINGUISHING EQUIPMENT.**

For fire extinguishing equipment required during construction see Article 301.

## CHAPTER 39—STAGES AND PLATFORMS

### ARTICLE 3901. STAGE VENTILATORS.

Over the stage there shall be provided one or more ventilators of metal or other noncombustible material, equipped with movable shutters or sash, having an aggregate clear area of not less than one-tenth (1/10) of the area of the stage, constructed to open automatically and instantly by approved heat-actuated devices. Suitable means for manual operation shall be provided in addition.

If glass is used in the construction, only wire glass shall be used in such parts where the breaking of glass would cause it to fall on the stage.

### ARTICLE 3902. GRIDIRONS.

Gridirons, fly galleries and pin-rails shall be constructed of incombustible materials, and fire-protection of steel and iron may be omitted. Gridirons and fly galleries shall be designed to support not less than seventy-five pounds (75 lbs.) live load per square foot.

The main counter-weight sheave beam shall be designed to support a horizontal and vertical uniformly distributed live load equal to not less than five pounds (5 lbs.) per square foot over the area of the gridiron directly back of the proscenium opening.

### ARTICLE 3903. ROOMS ACCESSORY TO STAGE.

In buildings having a stage as defined in Article 103, dressing rooms, scene docks, property rooms, and other compartments appurtenant to the stage shall be separated from each other and from the stage by one-hour fire-resistive noncombustible partitions, with ceilings, if any, of one-hour fire-resistive construction; openings to be protected with one-hour approved doors.

No such rooms shall be placed over or under the stage.

Unless they are ventilated by windows, dressing rooms shall be ventilated by a mechanical air-conditioning or ventilating system providing not less than six (6) changes of air per hour.

### ARTICLE 3904. PROSCENIUM WALLS.

Buildings having a stage area as defined in Article 103 shall be separated from all other parts of the building by walls of not less than two-hour fire-resistive noncombustible construction. Such separating walls shall extend from the foundation to at least four feet (4') above the roof, except when the roof is of fireproof or semi-fireproof construction, in which case the walls shall be carried up tightly against the underside of the roof slab.

Proscenium walls may have, in addition to the main proscenium opening, one opening at the orchestra pit level and not more than two openings at the stage floor level, each of which shall be not more than twenty-five square feet (25 sq. ft.) in area, and these openings shall be protected by single Class "A" fire doors. The proscenium opening, which shall be the main opening for viewing performances, shall be provided with a self-closing fire-resistive curtain as provided in Chapter 41.

### ARTICLE 3905. STAGE FLOORS AND ROOFS.

All parts of stage floors shall be of Type I Construction, except that part of the stage extending back from and the full width of the proscenium opening, which may be constructed of steel or heavy timbers covered with a wood floor of not less than two-inch (2") nominal thickness; with one-hour fire-resistive protection on underside, if employed as a usable space. No part of the combustible construction, except the floor finish, shall be carried through the proscenium opening. All parts of the stage floor shall be so designed to support not less than one hundred twenty-five pounds (125 lbs.) per square foot.

Openings through stage floors shall be equipped with tight-fitting trap doors of wood not less than two inches (2") nominal thickness.

The roof over the stage shall be of fireproof construction.

### ARTICLE 3906. PLATFORMS.

Walls and ceiling of a platform in an assembly room shall be protected on the platform side with one-hour fire-resistive construction.

Any usable space under a raised platform of an assembly room shall be of one-hour fire-resistive construction throughout, except that a chair storage area under the platform having headroom of not more than four feet (4') need not be protected.

### ARTICLE 3907. STAGE EXITS.

At least one exit two feet and six inches (2'6") wide shall be provided from each side of the stage opening directly or by means of a passageway not less than three feet (3') in

width to a street or exit court. An exit stair not less than two feet six inches (2'6") wide shall be provided for egress from each fly gallery. Each tier of dressing rooms shall be provided with at least two means of egress each not less than two feet six inches (2'6") wide. All such stairs shall be constructed as specified in Chapter 33. The stairs required in this Article need not be enclosed.

#### **ARTICLE 3908. MISCELLANEOUS.**

All shelving and closets in dressing rooms, property rooms, or storage rooms shall be constructed of metal, slate, or other noncombustible material.

The troughs or frames for footlights shall be of noncombustible material. The suspension lines of border lights shall be of wire for at least ten feet (10') from the frames. The switchboard for the electrical equipment of the stage shall be so located that it will be accessible at all times, and will be protected from falling objects and from the storage or placing of stage equipment against it.

#### **ARTICLE 3909. FLAME-PROOFING REQUIREMENTS.**

No combustible scenery, drops, props, decorations, or other combustible effects shall be placed on any stage or enclosed platform unless it is treated with an effective fire-retardant solution and maintained in a non-flammable condition as approved by the Fire Department.

#### ARTICLE 4001. GENERAL.

(a) **Scope.** The provisions of this Chapter shall apply only where nitro-cellulose film is used.

(b) **Projection Room Required.** Every motion picture machine using nitro-cellulose films, together with all electrical devices, rheostats, sewing machines and all such films present in any Group A, B, or C Occupancy, shall be enclosed in a projection room large enough to permit the operator to walk freely on either side and back of the machine.

#### ARTICLE 4002. CONSTRUCTION.

Every projection room shall be of not less than one-hour fire-resistive construction throughout, and the walls, ceiling and floor shall be finished with incombustible material.

The ceiling shall be not less than eight feet (8') from the finished floor. The room shall have a floor area of not less than eighty square feet (80 sq. ft.) and forty square feet (40 sq. ft.) for each additional machine.

#### ARTICLE 4003. EXITS.

Every projection room shall have at least two (2) doorways separated by not less than one-third (1/3) the perimeter of the room, each at least thirty inches (30") wide and eighty inches (80") high.

The entrances to the projection room shall be protected by one-hour fire-resistive doors as specified in Article 4306. Such doors shall open outward, be self closing and lead to proper exits as required in Chapter 33 and shall not be equipped with any latch. The maximum width of such door need be no more than thirty inches (30").

#### ARTICLE 4004. PORTS AND OPENINGS.

(a) **Types.** Ports in projection room walls shall be of three kinds: projection ports; observation ports; and combination ports used for both observation and for stereoptican, spot or floodlight machines.

(b) **Ports Required.** There shall be provided for each motion picture projector not more than one projection port, which shall be limited in area to one hundred and twenty square inches (120 sq. in.) and not more than one observation port, which shall be limited in area to two hundred square inches (200 sq. in.). There shall be not more than three combination ports, each of which shall not exceed thirty inches (30") by twenty-four inches (24"). Each port opening shall be completely covered with a single pane of glass not less than one-quarter inch (1/4") in thickness.

(c) **Shutters.** Each port and every other opening in projection room walls, including any fresh-air inlets, but excluding exit doors and exhaust ducts, shall be provided with a shutter of not less than No. 10 U. S. gauge sheet metal or its equivalent large enough to overlap at least one inch (1") on all sides of such opening. Shutters shall be arranged to slide without binding in guides constructed of material equal to the shutters in strength and fire resistance. Each shutter shall be equipped with a 160-degree Fahrenheit fusible link, which when fused by heat will cause closure of the shutter by gravity. There shall also be a fusible link located over the upper magazine of each projector, which, upon operating, will close all the shutters. In addition, there shall be provided suitable means for manually closing all shutters simultaneously from any projector head and from a point within the projection room near each exit door. Shutters on openings not in use shall be kept closed.

#### ARTICLE 4005. VENTILATION.

(a) **Inlet.** A fresh-air inlet from the exterior of the building not less than one hundred and forty-four square inches (144 sq. in.) and protected with wire netting shall be installed within two inches (2") of the floor in every projection room, the source of which shall be remote from other outside vents or flues.

(b) **Outlets.** Ventilation shall be provided by one or more mechanical exhaust systems which shall draw air from each arc lamp housing and from one or more points near the ceiling. Systems shall exhaust to outdoors either directly or through a noncombustible flue used for no other purpose. Exhaust capacity shall be not less than fifteen cubic feet (15 cu. ft.) nor more than fifty cubic feet (50 cu. ft.) per minute for each arc lamp plus two hundred cubic feet (200 cu. ft.) per minute for the room itself. Systems shall be controlled from within the enclosure and have pilot lights to indicate operation. The exhaust system serving the projection room may be extended to cover rooms associated therewith such as rewind rooms. No dampers shall be installed in such exhaust systems.

Ventilation of these rooms shall not be connected in any way with ventilating or air-conditioning systems serving other portions of the building.

(c) **Exhaust Ducts.** Exhaust ducts shall be of incombustible material, and shall either be kept one inch (1") from combustible material or covered with one-half inch (1/2") of incombustible heat-insulating material.

#### **ARTICLE 4006. REGULATION OF EQUIPMENT.**

(a) **Shelves and Fixtures.** All shelves, fixtures, and fixed equipment in a projection room shall be constructed of incombustible materials.

(b) **Films.** All films not in actual use shall be stored in metal cabinets having individual compartments for reels or shall be in I. C. C. shipping containers. Metal used in the construction of cabinets shall be not less than U. S. S. G. No. 18. No solder shall be used in the construction of such metal cabinets.

#### **ARTICLE 4007. SANITARY REQUIREMENTS.**

Every projection room shall be provided with an unenclosed water closet and lavatory.

## ARTICLE 4101. GENERAL REQUIREMENTS.

(a) The proscenium opening shall be provided with a curtain of non-combustible material constructed on a rigid steel frame, having a lap of two feet (2') at the top and eighteen inches (18") at each side, sliding at each side in a rigid steel groove, which shall have a minimum depth of twelve inches (12"). The curtain grooves shall be securely fastened to the proscenium wall and the curtain at its lowest position shall rest on masonry at least twelve inches (12") thick extending from the foundation to the curtain or upon a strip of linoleum, cork or rubber composition directly affixed to such masonry.

(b) The proscenium curtain shall be so arranged and maintained that, in case of fire, it will be released automatically and instantly by an approved heat-actuated device, and will descend safely and close completely the proscenium opening. It shall also be equipped with effective devices to permit prompt and immediate closing of the proscenium opening by manual means.

(c) No part of such curtain shall be supported or fastened to combustible material.

(d) The curtain with its mounting shall be so designed as to close the opening, prevent the passage of flame, hot gases and smoke from a severe fire on the stage and to show no glow on the auditorium side for a period of thirty (30) minutes.

(e) Complete details of any proposed proscenium curtain and curtain installation, including mechanism and structural supports shall be submitted, together with satisfactory proof that such installation meets the requirements as to strength, fire-resistance and smoke-tightness when subjected to a fire test with exposing temperatures reaching not less than 1700° F. at the end of thirty (30) minutes. Approval shall be obtained before erection is started. After completion, operating tests of the curtain shall be made and approval of its functioning obtained before a public performance is staged.

(f) Curtains of other designs shall be submitted for approval and test, as required in Article 211.

## FIRE-RESISTIVE STANDARDS FOR FIRE PROTECTION

## CHAPTER 42—GENERAL

## ARTICLE 4201. FIRE-RESISTIVE CONSTRUCTION DEFINED.

Building materials, systems, units and forms of construction as regulated by this Code shall be classified as "four-hour fire-resistive construction," "three-hour fire-resistive construction," "two-hour fire-resistive construction" and "one-hour fire-resistive construction," for fire-resistive purposes and protection. Materials, systems, units and forms of construction, in order to be classed as four-hour, three-hour, two-hour, or one-hour fire-resistive construction, shall meet the respective requirements for such rating as specified in the "Standard Methods of Fire Tests of Building Construction and Materials," (A. S. T. M.)

Any materials, systems, units or forms of construction which meet the requirements of the aforesaid standard specifications shall be accepted as fire-resistive construction of the degree specified, if and when they shall be shown by an authoritative test conducted in accordance with all of the provisions of such aforesaid specifications, to possess such fire-resistance.

## ARTICLE 4202. FIRE-RESISTIVE MATERIALS.

The following materials, combinations of materials, systems and units shall be classed as fire-resistive materials:

- Brick
- Concrete brick, block or tile
- Gypsum block or tile
- Gypsum (plain or reinforced)
- Gypsum plaster board (or lath) and plaster
- Gypsum vermiculite plaster
- Hollow clay tile
- Metal
- Metal and asbestos
- Metal lath and plaster
- Portland cement concrete (plain or reinforced)
- Sand-lime brick.

## ARTICLE 4203. FIRE-RESISTIVE CONSTRUCTION.

All fire-resistive construction of burned clay, concrete or gypsum units or other similar units shall be solidly bedded and laid in gypsum mortar, lime-cement mortar or cement mortar (gypsum units shall be laid in gypsum mortar only). All such units shall be thoroughly bonded together by broken joints in alternate courses or by sufficient metal ties or bonds.

All concrete, gunite, gypsum or similar protection for steel or iron structural members which is cast, poured or similarly applied, shall be reinforced at the edges of such members in a manner sufficient to prevent cracking and disintegration of such protection. All such applied fire protection materials shall be reinforced by metal rods, wire or mesh to provide against cracking and disintegration of the protecting material.

All plaster fire protection shall consist of gypsum mortar, portland cement mortar or other equally fire-resistive material. Gypsum plaster only shall be used for plastering on gypsum units. When plaster is used for fire protection of ceilings, it shall be reinforced with metal mesh or lath when the plaster is more than one inch (1") thick. Gunite applied to masonry need not be reinforced and when properly bonded shall be considered a part of the required thickness.

## ARTICLE 4204. APPROVED STANDARDS.

Fire resistance ratings of The National Board of Fire Underwriters, as listed in Appendix A of the National Building Code, will be accepted as good practice. (See Article 215.)

## ARTICLE 4301. GENERAL.

In addition to all the other requirements of this Code, fire-resistive materials shall meet the requirements for fire-resistive construction given in this Chapter.

## ARTICLE 4302. FIRE-RESISTIVE MATERIALS.

(a) **General.** Materials used for fire-resistive purposes shall be limited to those specified in this Chapter unless accepted under the procedure given in Article 4302 (b).

(b) **Tests.** For the purpose of determining the degree of fire resistance afforded, the materials of construction listed in this Chapter shall be assumed to have the fire-resistance ratings indicated. Any material or assembly of materials of construction tested in accordance with the requirements of the A. S. T. M. "Standard Methods of Fire Tests of Building Construction and Materials," shall be rated for fire resistance in accordance with the results of such tests, provided that it also meet the performance standards as specified in Article 211.

(c) **Lath.** Gypsum lath shall be not less than three-eighths inch ( $3/8''$ ) in thickness and shall be perforated with holes not less than three-fourths inch ( $3/4''$ ) diameter. There shall be one hole for not more than each sixteen square inches (16 sq. in.) of lath surface. Gypsum lath shall comply with provisions of the "Standard Specifications for Gypsum Lath" (A. S. T. M.)

Metal or wire lath shall weigh not less than two and two-tenths pounds ( $2-2/10$  lbs.) per square yard. Metal or wire mesh where used as ties in concrete shall weigh not less than one and one-half pounds ( $1-1/2$  lbs.) per square yard. Where used as ties for plaster, it shall weigh not less than two and two-tenths pounds ( $2-2/10$  lbs.) per square yard and have not less than two and one-half ( $2-1/2$ ) meshes per inch or equivalent.

(d) **Plaster.** Plaster, in order that it may be considered as adding to the fire resistance of walls and partitions, shall be gypsum or portland cement plaster applied to an average thickness of not less than one-half inch ( $1/2''$ ). Plaster on ceilings over one inch ( $1''$ ) in thickness, as measured to the plaster base, shall have an additional layer of metal lath, wire or metal mesh embedded not more than three-fourths inch ( $3/4''$ ) from the surface and securely tied into the supporting members.

Required fire-resistive plastering or stucco on the outside of exterior masonry walls may be omitted from inaccessible portions of the wall provided the inside plastering opposite the inaccessible portions is doubled in thickness.

(e) **Concrete.** Grade A concrete is concrete containing not less than six (6) sacks of portland cement per cubic yard, and in which at least sixty per cent (60%) of the coarse aggregate consists of pumice, limestone, calcareous gravel, trap rock, blast furnace slag, or burned clay or shale.

Grade B concrete is concrete containing not less than five (5) sacks of portland cement per cubic yard, and in which at least sixty per cent (60%) of the coarse aggregate consists of granite, sandstone, cinders or a mixture of any of these aggregates with aggregates for Grade A concrete.

Grade C concrete is any concrete not classed as Grade A or B.

Where the classification is in doubt, concrete shall be assumed to be Grade C unless tests on the aggregates by an approved agency prove otherwise.

(f) **Pneumatically Placed Concrete.** Pneumatically placed concrete without coarse aggregate shall be classified as Grade A, B or C concrete in accordance with the aggregate used.

(g) **Vermiculite.** Vermiculite, when used as an aggregate with plaster, shall conform in particle size to A. S. T. M. "Standard Specifications for Sand for Use in Plaster." The weight shall be not less than seven and one-half ( $7-1/2$ ) nor more than ten (10) pounds per cubic foot, as determined by measurement in a cubic foot box using the shoveling procedure as outlined in A. S. T. M. "Standard Method of Test for Unit Weight of Aggregate."

When vermiculite is used in place of sand, the first coat on all types of lath shall be mixed in the proportion of one hundred pounds (100 lbs.) of neat gypsum plaster to not more than two and one-half cubic feet ( $2-1/2$  cu. ft.) of vermiculite; the first coat on masonry surfaces (except monolithic concrete) and the second coat in all three coat work shall be mixed in the proportion of one hundred pounds (100 lbs.) of neat gypsum plaster to not more than three and one-half cubic feet ( $3-1/2$  cu. ft.) of vermiculite. If used for the third coat, same shall be mixed in the proportion of one hundred pounds (100 lbs.) of neat gypsum plaster to not more than one and one-half cubic feet ( $1-1/2$  cu. ft.) of vermiculite.



#### **ARTICLE 4303. PROTECTION OF STRUCTURAL MEMBERS.**

##### **(a) Protective Coverings.**

1. **Thickness of Protection.** The thickness of fire-resistive materials for protection of structural members shall be not less than that set forth in Table No. 43-A, except as modified in this Article. The figures shown shall be the net thickness of the protecting materials and shall not include any hollow space back of the protection.

2. **Unit Masonry Protection.** Unit masonry protection for metal columns shall have metal ties embedded in each transverse joint, where joints are more than sixteen inches (16") apart, and shall be spaced not more than sixteen inches (16") in other cases. Soffit tile protecting beam and girder flanges shall be tied to the flange. Ties shall have a cross-sectional area equal to that of No. 8 gauge wire.

3. **Reinforcement for Cast-in-Place Protection.** Cast-in-place protection for metal structural members shall be reinforced at the edges of such members with wire or mesh with a maximum spacing of six inches (6") wound around or attached to the member. The sum of the cross-sectional area in each direction shall be not less than 0.025 square inches per foot.

4. **Embedment of Pipes.** Conduits and pipes shall not be embedded in required fire protection of structural members.

5. **Column Protection.** Where the fire-resistive covering on columns is exposed to an injury from moving vehicles, the handling of merchandise, or by other means, it shall be jacketed to a minimum height of six feet (6') from the floor with an adequate protective covering.

##### **(b) Protected Members.**

1. **Attached Metal Members.** The edges of lugs, brackets, rivets, and bolt heads attached to structural members may extend to within one inch (1") of the surface of the fire-protection.

2. **Reinforcing.** Thickness of protection for concrete or masonry reinforcement shall be measured to the outside of the reinforcement; stirrups and ties may project not more than one-half inch (1/2") into the protection.

3. **Steel Studs and Joists.** Steel studs and joists are not required to have individual protection when part of an assembly which has a fire-resistive rating.

#### **ARTICLE 4304. WALLS AND PARTITIONS.**

(a) **General.** Fire-resistive walls and partitions shall have the ratings set forth in Table No. 43-B.

(b) **Combustible Members.** Combustible members framed into a wall shall be protected at their ends by not less than one-half (1/2) the required fire-resistive thickness of such wall.

#### **ARTICLE 4305. FLOORS, ROOFS AND CEILINGS.**

(a) **General.** Fire-resistive floors or ceilings shall have the ratings set forth in Table No. 43-C.

(b) **Ceilings.** Where a ceiling of lath and plaster as approved for one-hour fire-resistive construction as specified in this Chapter is used below slabs or structural members not otherwise required to be protected by such a ceiling, the required thickness of slab and fire-protection of structural members may be reduced one-half inch (1/2") but in no case shall the slab thickness be less than two inches (2").

(c) **Unusable Space Above or Below.** In one-hour fire-resistive construction the ceiling may be omitted over unusable space and flooring may be omitted where unusable space occurs above.

(d) **Fixtures.** Where the integrity of the fireproofing is effected by the installation of lighting fixtures, the fire protection surrounding the fixtures must be equivalent to the unpierced portion of the ceiling.

#### **ARTICLE 4306. ASSEMBLIES FOR PROTECTION OF OPENINGS.**

(a) **Fire-Resistive Doors.** One-hour fire-resistive doors shall be constructed as specified for one of the following types, 1, 2 or 3, or any door which will successfully pass the one-hour fire test specified in Article 4201, and all such doors to receive the one-hour rating, shall be hung in place as specified in this Article.

Fire-resistive doors used for openings in stairways, enclosures, smokeproof towers, corridors and passageways, moving picture booths, room partitions, exterior walls facing streets or more than twenty-five feet (25') from adjacent property lines and for "Ordinary Occupancy Separation" as specified in Article 503, shall be constructed as specified for one of the following types: 1, 2, 3, 4, 5, or 6, or any door which will provide equivalent protection against fire when hung in place as specified in this Article.

1. Tin-clad wood-core doors with the core made of three plies of wood one inch (1") nominal in thickness and covered with sheet metal, the door to be constructed in accordance with the "Underwriters' Standard for Tin-Clad Fire Doors and Shutters."

2. Sheet metal doors constructed of two sheets of not less than No. 26 U. S. Gauge corrugated sheet metal, one sheet on each side of a structural steel frame, corrugations vertical on one side and horizontal on the other and having not less than one-sixteenth inch (1/16") of asbestos placed in between the two metal sheets.

3. Sheet metal doors constructed of two sheets of metal of not less than No. 26 U. S. Gauge fastened to a structural steel frame in such manner as to leave a one inch (1") space in the panels, which space shall be filled with asbestos and with a one-eighth inch (1/8") asbestos covering on the stiles and structural steel frame.

4. Tin-clad wood-core doors made of two plies of wood one inch (1") nominal in thickness and covered with sheet metal, the door to be constructed in accordance with the "Underwriters' Laboratories Standard for Tin-Clad Fire Doors and Shutters."

5. Sheet metal doors as specified in paragraph 3 above, but with one-fourth inch (1/4") of asbestos placed between the metal sheets in the panels and with no asbestos required on the stiles and structural frame.

6. Metal-clad doors which shall be wood panel doors with frame not less than one and three-fourths inches (1-3/4") in thickness and with wood panels not less than three-fourths inch (3/4") in thickness, the whole door covered with not less than No. 26 U. S. Gauge Metal. The panels of such doors shall fit into the frame not less than three-fourths inch (3/4") and all joints of metal shall be lapped and nailed tightly to the wood frame.

In all cases metal shall be fastened to the wood or metal frame by nailing, bolting or riveting and no solder shall be used on any door except for filling of joints.

Glass panels of one-fourth inch (1/4") wire glass shall be permitted in any of the above doors except when such doors are used on all openings for the stage portion of any Group A occupancy or for openings in "Special Occupancy Separations" as specified in Article 503. Such glass panels shall be not more than seven hundred and twenty square inches (720 sq. in.) in area, not exceed fifty-four inches (54") in height or forty-eight inches (48") in width. Grooves not less than three-fourths inch (3/4") in depth and three-eighths inch (3/8") in width providing not less than five-eighths inch (5/8") of bearing for the glass shall be required.

Fire doors bearing the label of the Underwriters' Laboratories, Incorporated, may be accepted as meeting the requirements of any of the above doors.

Hardware for sheet metal and tin-clad fire doors referred to in Paragraphs Nos. 1, 2, 3, and 4, shall be made of good quality malleable iron not less than one-fourth inch (1/4") thick or of flat rolled structural steel not less than three-eighths inch (3/8") thick; tubular steel track made of at least one-eighth inch (1/8") steel may be used. Sliding tracks shall be supported so that a wall fastening is directly opposite each door hanger when door is in a closed position. Hangers supporting doors shall be fastened to the door with not less than three one-half inch (1 1/2") bolts extending through the door. Latches for fire doors shall be not less than two and one-half inches by three-eighths inch (2-1/2" x 3/8"), and latch bars shall be not less than one and one-half inches by one-fourth inch (1-1/2" x 1/4").

Hardware for swinging hollow metal and metal-clad doors as referred to in Paragraphs 5 and 6 shall be made as follows:

**Hinges.** For doors not exceeding eight feet (8') in height the hinges shall be of steel or bronze. If made of steel they may be either full, half surfaced, or butt hinges four and one-half inches by four and one-half inches (4-1/2" x 4-1/2") and not less than one-eighth inch (1/8") in thickness. If made of bronze, they shall be butt hinges four and one-half by four and one-half inches (4-1/2" x 4-1/2") and not less than three-sixteenths inch (3/16") in thickness. When bronze hinges are used, a steel stud and socket shall be provided at each hinge. The studs shall be attached to the rear jamb and shall engage a socket at least three-fourths inch (3/4") deep in the rear edge of the door.

**Locks.** Doors shall be provided with a mortise or unit lock which has a latch bolt with a throw of not less than three-fourths inch (3/4").

When mounted in pairs the normally standing door shall have a push bolt at the top and at the bottom which has a throw of not less than three-fourths inch (3/4").

Special locking devices shall be provided as required in Chapters 5 through 15 and as provided in Articles 3304, 3311 and 3315.

**Astragals.** Swinging fire doors mounted in pairs shall be provided with at least one astragal attached to one door and overlapping the opposite door at least three-fourths inch (3/4"). The above provision need not apply when the doors meet on a mullion.

Fire doors required by this Code shall be installed in the manner prescribed in the "Regulations for the Protection of Openings in Walls and Partitions Against Fire," of the

National Board of Fire Underwriters, recommended by the National Fire Protection Association.

All fire doors shall be so hung that when closed they will fit tightly into place against the wall or frame so as to prove an effective stop for fire and smoke. Space around fire doors necessary for their operation shall at all times be kept unobstructed and when deemed necessary by the Director, a screen or railing protection shall be installed to insure no storing or placing of material against any fire door which would prevent its operation in case of emergency.

(b) **Fire-Resistive Shutters.** One-hour fire-resistive shutters shall be constructed as specified for any one of the types of fire-resistive doors specified in Sub-Article (a) of this Article.

(c) **One-Hour Fire-Resistive Windows.** One-hour fire-resistive windows shall have frames and sash of solid metal bars or hollow metal forms fabricated by pressing, welding or crimping together but not by the use of solder or other fusible alloy. All glass used in fire-resistive windows shall be wire glass and shall be not less than one-fourth inch (1/4") in thickness and no one light shall exceed seven hundred and twenty square inches (720 sq. in.) in area. Grooves three-fourths inch (3/4") in depth shall be provided and glass so arranged as to have not less than five-eighths inch (5/8") of bearing in hollow metal frames and with grooves not less than one-half inch (1/2") and with glass provided with not less than three-eighths inch (3/8") of bearing in windows of solid metal section. Continuous glazing angles shall be provided on the inside. Fire-resistive windows with hollow metal frames shall be limited to a maximum size of sixty square feet (60 sq. ft.) with a six-foot (6') maximum width and a ten-foot (10') maximum height for double hung and counterbalanced windows and to a maximum size of seventy square feet (70 sq. ft.) with a seven-foot (7') maximum width and ten foot (10') maximum height for stationary windows. Solid metal section windows shall be limited to a maximum size of eighty-four square feet (84 sq. ft.) in area with a maximum dimension in either direction of twelve feet (12'). Multiple section windows of these above sizes may be used when hollow metal or solid section mullions are provided. Hollow metal mullions shall be limited to a maximum length of twelve feet (12') and shall be used for non-bearing purposes only. Solid section mullions when used in lengths exceeding twelve feet (12') shall be fire-protected as required in Article 4301 in accordance with the fire-resistive construction of the building in which they are placed.

Where fire-resistive windows are required by this Code, wood sash and plain glass may be substituted when protected as specified in Sub-Articles (a) and (b) of this Article.

Fire-resistive windows bearing the label of the Underwriters' Laboratories, Incorporated, may be accepted as one-hour fire-resistive windows.

(d) **Closing Devices.** Automatic fire doors shall be designed to close automatically when the temperature of a heat-actuated device reaches 165 degrees Fahrenheit or 50 degrees above maximum room temperature under normal conditions. Heat-actuated devices shall be installed, one on each side of the wall at the top of the opening and one on each side of the wall at ceiling height where the ceiling is more than three feet (3') above the opening.

Interconnected doors shall be designed so that both doors will close automatically by the action of any of the heat-actuated devices.

Self-closing doors shall be designed to close by gravity or by the action of a mechanical device. Self-closing doors shall have no attachments capable of preventing the operation of the closing devices.

(e) **Definition.** The word "metal" in this article means steel or an approved equivalent.

## **ARTICLE 4307. ROOF COVERINGS.**

(a) **General.** Roof coverings for all buildings shall be either "Fire Retardant" or "Ordinary" roofings as specifically required either by Location in Part VII, or by Type of Construction in Part VIII. The roof covering shall be securely fastened to the supporting roof construction.

(b) **Composition Roofing Materials.** 1. **Definitions.** Felt is the dry or de-saturated product produced by "felting" vegetable or animal fibers or other suitable materials or by "felting" not less than eighty-five per cent (85%) by weight of asbestos fibers.

**Roofing Felt** is felt saturated with a bituminous compound.

**Roll Roofing** is felt saturated with a bituminous saturant, then coated on both sides with a bituminous coating and then surfaced on both sides with powdered talc, mica or other suitable mineral matter; provided, that such roll roofing need not be coated or surfaced if felt is produced from asbestos and two or more layers are used in combination.

**Felt Membrane** is felt saturated with bituminous saturant, then coated on one or both sides with a bituminous coating.

2. **Physical Properties:** Materials used in composition roofing shall conform to the requirements set forth in the "Standard for Class C Asphalt, Rag Felt, Sheet Roofing and Shingles," published by the Underwriters' Laboratories, Incorporated.

3. **Method of Laying.** Where there is not a ceiling underneath, a layer of unsaturated building paper weighing not less than five pounds to each one hundred square feet (100 sq. ft.) of such paper shall be laid over wood decks before the laying of composition fire retardant roof covering, except asphalt shingles.

Built-up composition roofings shall be thoroughly mopped between layers with an approved bituminous compound so that no layer touches unmopped the layer next above.

Gravel top covering shall mean flowing a coat of an approved bituminous compound and completely covering with gravel, crushed rock, crushed brick, other crushed earthenware of similar mineral surfacing material, a sufficient quantity being embedded in the bituminous compound in accordance with good standard practice.

4. **Tests.** Test methods, used to determine the specific requirements for physical properties of roll roofing, roofing felt, or felt membrane given in this Article shall be those methods set forth in the "Tentative Methods of Testing Felted and Woven Fabrics Saturated with Bituminous Substances for Use in Waterproofing and Roofing," (A. S. T. M.).

(c) **Fire Retardant Roofings.** "Fire retardant" roofing shall be any roof covering which meets the requirements specified for any one of the following roofings, 1 to 7 inclusive, or shall be any roofing meeting the requirements of the Class A or B specifications of the Underwriters' Laboratories, Incorporated.

1. Any built-up composition roofing consisting of layers of roofing felt, roll roofing, felt membrane or gravel, the sum of whose fire retardant values as given in Table No. 43-D, equals not less than 15 including a top covering selected from parts (b) or (c) of said table.

2. Hydraulic compressed rigid shingles not less than one-eighth inch (1/8") thick, composed of Portland cement and asbestos fibers, laid over a layer of saturated felt weighing not less than 14 pounds to the one hundred square feet (100 sq. ft.), or hydraulic compressed rigid sheets not less than seven thirty-seconds inch (7/32") thick, composed of Portland cement and asbestos fibers. The aforesaid felt may be omitted when the compressed shingles are placed over an existing roof covering.

3. Asphalt-saturated mineral-surfaced prepared composition shingles laid so there are not less than two thicknesses at any point. The combined weight of such shingles shall be not less than 200 pounds to the one hundred square feet (100 sq. ft.) of complete roof area.

4. Concrete slab or concrete tile roofs, constructed as specified in Chapter 26 without additional roof covering.

5. Metal roof covering of corrugated, standing seam or flat type of not less than No. 26 U. S. gauge metal. All flat metal roof covering shall be laid on solid sheathing. Corrugated or standing seam metal roof covering shall be designed to support the required live load between supporting members.

6. Slate shingles securely fastened with proper nails or with copper nails and No. 14 B. and S. gauge copper wire, with nails of such length as to provide not less than three-fourths inch (3/4") of penetration into the nailing strips or sheathing. Under all such shingles there shall be placed at least one layer of asphalt saturated felt weighing not less than 30 pounds to 108 square feet; except that for Group I and J Occupancy no felt is required.

7. Clay roof tile securely fastened with copper nails or copper wire; provided that for roofs not exceeding a rise of eight inches (8") in twelve inches (12"), galvanized iron nails may be used, and provided further, that tile with projection lugs need not be nailed or wired in place. Wire shall be not smaller than No. 14 B. and S. Gauge. Nails shall penetrate the supporting roof construction not less than three-fourths inch (3/4").

Roofing tile other than flat pan tile with or without flanges, or flat shingle tile, or flat decorative tile, shall satisfy the following strength requirements: When supported on the turned down edges at points six inches (6") each side of the center of the tile, giving four points of support and a span of twelve inches (12") and loaded with a concentration at the center, the average breaking load per tile for five representative tile tested shall be not less than four hundred pounds (400 lbs.) and the breaking load for any individual tile tested shall be not less than three hundred and fifty pounds (350 lbs.).

Roof tile shall not absorb more than fifteen per cent (15%) of the dry weight of the tile during a forty-eight (48) hour immersion test.

Under all burned clay units, there shall be placed not less than two layers of asphalt saturated rag felt, each layer weighing not less than fourteen pounds (14 lbs.) to one hundred square feet (100 sq. ft.) solidly mopped between the surfaces with asphalt.

(d) **Ordinary Roofings.** "Ordinary" roofings shall be any roof covering which meets the requirements specified for any one of the following roofings, 1 and 2, or shall be any roofing meeting the Class C Specifications of the Underwriters' Laboratories, Inc.

1. Any composition roofing or any built-up composition roofing consisting of layers of roofing felt, roll roofing, felt membrane or gravel, the sum of whose fire-retardant values as given in Table No. 43-D equals not less than 10.

2. Asphalt shingles laid in one or more layers.

3. No roofs of buildings located within the Parish of Jefferson shall be covered with wood shingles or other wood roof covering.

(c) **Roofings for Group J Occupancies.** On buildings housing Group J, Division 1 Occupancies, any composition roofing having a fire-retardant value as given in Table No. 43-D, equal to not less than six (6), unless otherwise required because of location as specified in Parts VII and VIII of this Code.

**ARTICLE 4308. ALTERNATE RATINGS.**

Fire-resistive ratings and/or standards not specifically covered by this Chapter may be submitted for consideration accompanied by substantiating data, in accord with the procedure specified in Article 211.

**TABLE No. 43A—MINIMUM PROTECTION OF STRUCTURAL PARTS BASED  
ON TIME PERIODS FOR VARIOUS INCOMBUSTIBLE  
INSULATING MATERIALS.**

| Structural Parts<br>To be Protected                                                                            | Insulating Material<br>Used                                                                     | Minimum thickness of material<br>in inches for the following fire-resistive periods. |               |       |       |
|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------|-------|-------|
|                                                                                                                |                                                                                                 | 4 hr.                                                                                | 3 hr.         | 2 hr. | 1 hr. |
| Steel or Cast Iron Columns;<br>Projecting Steel Beam or<br>Girder Flanges; All Mem-<br>bers of Primary Trusses | Grade A concrete                                                                                | 2                                                                                    | 2             | 1½    | 1     |
|                                                                                                                | Grade B concrete                                                                                | 2½                                                                                   | 2             | 1½    | 1½    |
|                                                                                                                | Grade C concrete                                                                                | 3                                                                                    | 2½            | 2     | 1½    |
|                                                                                                                | Brick of clay, shale, concrete or<br>sand-lime                                                  | 3¾                                                                                   | 3¾            | 2¼    | 1¼    |
|                                                                                                                | Clay tile, clay tile and concrete<br>or concrete block (see note 2)                             | 4 or<br>2 pl.                                                                        | 4 or<br>2 pl. | 2     | 2     |
|                                                                                                                | Solid gypsum blocks                                                                             | 2 pl.                                                                                | 2 pl.         | 2     | 2     |
|                                                                                                                | Hollow gypsum blocks                                                                            | 3 pl.                                                                                | 3             | 2     | 2     |
|                                                                                                                | Poured gypsum                                                                                   | 2                                                                                    | 1½            | 1     | 1     |
|                                                                                                                | Metal lath and gypsum vermiculite<br>plaster**                                                  | 1                                                                                    |               |       |       |
|                                                                                                                | Metal lath and Portland cement<br>plaster                                                       | 2¾*                                                                                  |               |       |       |
|                                                                                                                | Metal lath and gypsum plaster                                                                   | 2¼*                                                                                  |               |       |       |
| Webs of Steel Beams and<br>Girders                                                                             | Grade A concrete                                                                                | 2                                                                                    | 1½            | 1     | 1     |
|                                                                                                                | Grade B concrete                                                                                | 2½                                                                                   | 2             | 1½    | 1     |
|                                                                                                                | Grade C concrete                                                                                | 3                                                                                    | 2½            | 1½    | 1     |
|                                                                                                                | Brick of clay, shale, concrete or<br>sand-lime                                                  | 3¾                                                                                   | 2¼            | 2¼    | 2¼    |
|                                                                                                                | Clay tile, clay tile and concrete<br>or concrete block                                          | 3 or<br>2 pl.                                                                        | 2             | 2     | 2     |
|                                                                                                                | Solid gypsum block                                                                              | 2 pl.                                                                                | 2             | 2     | 2     |
|                                                                                                                | Hollow gypsum block                                                                             | 3 pl.                                                                                | 2             | 2     | 2     |
|                                                                                                                | Poured gypsum                                                                                   | 2                                                                                    | 1½            | 1     | 1     |
|                                                                                                                | Metal lath and Gypsum Vermiculite<br>plaster                                                    | 1                                                                                    | ¾             | ¾     | ¾     |
|                                                                                                                | Metal lath and gypsum or Port-<br>land cement plaster                                           | 2                                                                                    |               |       |       |
|                                                                                                                |                                                                                                 | ¾                                                                                    |               |       |       |
| Reinforcing Steel in Re-in-<br>forced Concrete Columns,<br>Beams, Girders & Trusses                            | Grade A or B concrete                                                                           | 1½                                                                                   | 1½            | 1½    | 1     |
|                                                                                                                | Grade C concrete                                                                                | 2                                                                                    | 1½            | 1½    | 1     |
| Reinforcing Steel in Re-in-<br>forced Concrete Joists                                                          | Grade A or B concrete                                                                           | 1¼                                                                                   | 1¼            | 1     | ¾     |
|                                                                                                                | Grade C concrete                                                                                | 1¾                                                                                   | 1½            | 1     | ¾     |
| Ceiling Protection for Steel<br>Roof Members including<br>Steel Roof Trusses and<br>Secondary Trusses          | Metal or wire lath and gypsum<br>or cement plaster, concrete, burned<br>clay products or gypsum | 2                                                                                    | 1½            | 1     | ¾     |
|                                                                                                                | Suspended metal lath and gyp-<br>sum Vermiculite plaster                                        | 1                                                                                    | ¾             | ¾     | ¾     |
| Reinforcing and Tie Rods<br>in Floor and Roof Slabs                                                            | Grade A or B<br>Concrete                                                                        | 1                                                                                    | 1             | ¾     | ¾     |
|                                                                                                                | Grade C concrete                                                                                | 1¼                                                                                   | 1             | 1     | ¾     |
|                                                                                                                | Gypsum                                                                                          | 1                                                                                    | 1             | ¾     | ¾     |

**NOTE:** (1) pl. in above table shall be not less than ¼ in. gypsum or cement plaster.  
(2) Reentrant parts of protected members shall be filled solid for 4 and 3 hour  
protections.

\*Two 1" layers with ¾ in. air space between.

\*\*Columns protected with 1" vermiculite plaster on metal lath. Lath spaced  
1¼" from column. Space behind lath on flange face filled with plaster.

TABLE No. 43-B—RATE FIRE-RESISTIVE PERIODS FOR VARIOUS WALLS AND PARTITIONS

| MATERIAL                                                        | CONSTRUCTION                                                                          |                    | Minimum Finished Thickness face to face (including plaster where mentioned) in inches |       |       |         |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------|-------|-------|---------|
|                                                                 |                                                                                       |                    | 4 hr.                                                                                 | 3 hr. | 2 hr. | 1 hr.   |
| Brick of Clay, Shale, Sand-Lime or Concrete, and Plain Concrete | Solid unplastered                                                                     |                    | 8                                                                                     |       |       | 4*      |
|                                                                 | Solid plastered                                                                       |                    | 9                                                                                     |       | 5*    |         |
|                                                                 | Hollow (rowlock) unplastered                                                          |                    | 12                                                                                    | 10    | 8     |         |
|                                                                 | Hollow (rowlock) plastered                                                            |                    | 9                                                                                     |       |       |         |
| Hollow Clay Tile Wall                                           | End or side construction. One cell in wall thickness. Plastered                       |                    |                                                                                       |       |       | 3*      |
|                                                                 | End or side construction. Two cells in 8-in. or less thickness. Unplastered           |                    | 16                                                                                    | 12    |       | 6* or 8 |
|                                                                 | End or side construction. Two cells in 8-in. or less thickness. Plastered             |                    | 13                                                                                    | 9     | 7*    |         |
|                                                                 | End or side construction. Two cells in wall thickness. Unplastered                    |                    |                                                                                       |       | 6     |         |
| Hollow Clay Tile A.S.T.M. Load Bearing                          | End or side construction. Two cells in wall thickness. Plastered                      |                    |                                                                                       |       | 5*    |         |
|                                                                 | End or side construction. Three cells in 8-in. or less thickness. Unplastered         |                    | 12                                                                                    |       |       |         |
|                                                                 | End or side construction. Three cells in 8-in. or less thickness. Plastered one side. |                    |                                                                                       | 8½    |       |         |
|                                                                 | End or side construction. Three cells in 8-in. or less thickness. Plastered           |                    | 9                                                                                     |       |       |         |
|                                                                 | 4-in. brick and 4-in. tile plastered one side (tile side)                             |                    | 9                                                                                     |       |       |         |
| Concrete Block or Tile                                          | Aggregate—Expanded Slag, Burned Clay or Shale, Cinders                                | 1¼-in. face Shells | Unplastered                                                                           |       | 8     | 4†      |
|                                                                 |                                                                                       |                    | Plastered one side                                                                    | 8½    | 4½†   |         |
|                                                                 |                                                                                       | 1½-in. face Shells | Unplastered                                                                           | 12**  | 8     |         |
|                                                                 | 2½-in. face Shells                                                                    |                    | Plastered each side                                                                   | 9     |       |         |
|                                                                 |                                                                                       |                    | Unplastered                                                                           | 8     |       |         |
|                                                                 |                                                                                       |                    |                                                                                       |       | 8     | 4†      |
|                                                                 | Other Aggregates—                                                                     | 1⅝-in. face Shells | Plastered each side                                                                   | 9     | 5†    |         |
|                                                                 |                                                                                       |                    | Unplastered                                                                           | 12    | 8     |         |
|                                                                 |                                                                                       | 1¾-in. face Shells | Plastered each side                                                                   | 9     |       |         |
|                                                                 |                                                                                       | 2¼-in. face Shells | Unplastered                                                                           | 8     |       |         |

TABLE No. 43-B—RATE FIRE-RESISTIVE PERIODS FOR VARIOUS WALLS AND PARTITIONS—Continued

|                                                                                                                            |                                                                                                                                |     |    |    |         |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----|----|----|---------|
| Solid Concrete                                                                                                             | Reinforcement not less than 0.2% in each direction                                                                             | 6   | 5  | 4  | 2*      |
| Hollow Gypsum Blocks                                                                                                       | Unplastered                                                                                                                    | 6*  | 5* | 4* | 3*      |
|                                                                                                                            | Plastered each side                                                                                                            | 5*  | 4* | 4* | 3*      |
| Hollow Wall of Reinforced Pneumatically Placed Concrete                                                                    | Outer shell 2-in. thick for 10-in. wall and 1½-in. thick for 8-in. wall                                                        | 10* | 8* |    |         |
| Solid Gypsum or Portland Cement Plaster                                                                                    | Incombustible studding with metal or wire lath                                                                                 |     |    |    | 2*      |
|                                                                                                                            | Incombustible studding with metal or wire lath, neat wood fiber gypsum plaster.                                                |     |    | 2* |         |
|                                                                                                                            | Incombustible studding with metal or wire lath. ¾-in. sanded gypsum or portland cement plaster on each side                    |     |    |    | 3       |
|                                                                                                                            | Incombustible studding with metal or wire lath. 1-in. sanded gypsum or portland cement plaster on each side.                   |     |    | 4½ |         |
| Hollow Stud Partition with Sanded Gypsum or Gypsum Vermiculite Portland Cement Plaster on Each Side or Gypsum Wallboard    | Incombustible studding with metal or wire lath. ⅞-in. gypsum vermiculite plaster on each side                                  |     |    | 3  |         |
|                                                                                                                            | Incombustible studding with metal or wire lath. 1-in. gypsum vermiculite plaster on each side.                                 |     | 4½ |    |         |
|                                                                                                                            | Wood studs with metal or wire lath. Fire-stopped. ¾-in. plaster on each side                                                   |     |    |    | 3* or 5 |
|                                                                                                                            | Wood studs with metal or wire lath. Fire-stopped. 1-in. neat wood fiber plaster each side.                                     |     |    | 5* |         |
|                                                                                                                            | Wood studs with metal or wire lath. Fire-stopped. ⅞-in. gypsum vermiculite plaster on each side.                               |     |    | 5* |         |
| Hollow Stud Partition with Sanded Gypsum or Gypsum Vermiculite or Portland Cement Plaster on Each Side or Gypsum Wallboard | Wood studs with ¾-in. perforated gypsum lath. Fire-stopped. ½-in. gypsum plaster on each side.                                 |     |    |    | 3* or 5 |
|                                                                                                                            | Wood studs with space between filled with mineral wool bats*** nailed to studs, one-half inch (½") gypsum wallboard each side. |     |    |    | 4½      |
|                                                                                                                            | Wood studs with two layers of one-half inch (½") gypsum wallboard each side, joints staggered                                  |     |    |    | 5½      |

\*Shall be used for non-bearing purposes only.

\*\*8 in. for Expanded Slag.

\*\*\*Mineral or slag wool bats shall weigh not less than 1.0 lb. and glass wool bats not less than 0.6 lb. per sq. ft. of wall surface.

†¾-Inch Face Shells.



TABLE No. 43-C—MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS

| MATERIAL                                                                                           | CONSTRUCTION                                                                                                                                            | Minimum Thickness of Floor or Roof Slab in Inches |       |       |        | Minimum Thickness of Ceiling in Inches |       |       |       |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------|-------|--------|----------------------------------------|-------|-------|-------|
|                                                                                                    |                                                                                                                                                         | 4 hr.                                             | 3 hr. | 2 hr. | 1 hr.  | 4 hr.                                  | 3 hr. | 2 hr. | 1 hr. |
| Solid masonry, concrete or gypsum                                                                  | Slab or arch                                                                                                                                            | 4                                                 | 3     | 2½    | 2½     |                                        |       |       |       |
| Hollow masonry                                                                                     | Slab or arch with plaster ceiling                                                                                                                       | 4*                                                | 3½*   | 3*    | 3      | ¾                                      | ¾     | ¾     | ¾     |
| Reinforced concrete joists                                                                         | Slab, with suspended ceiling on metal or wire lath, gypsum or Portland cement plaster**                                                                 |                                                   |       | 2½    | 2      |                                        |       | ¾     | ¾     |
|                                                                                                    | Slab                                                                                                                                                    |                                                   |       |       | 3      |                                        |       |       |       |
| Steel joist or light steel construction, with attached or suspended ceiling of metal or wire lath. | Concrete or gypsum slab, with ceiling gypsum plaster                                                                                                    | 2½                                                | 2½    | 2¼    | 2      | 2                                      | 1†    | ¾     | ¾     |
|                                                                                                    | Concrete or gypsum slab, with ceiling gypsum vermiculite plaster                                                                                        | 2½                                                | 2½    | 2     | 2      | 1                                      | ⅞     | ¾     | ¾     |
|                                                                                                    | Concrete or gypsum slab, with ceiling Portland cement plaster**                                                                                         |                                                   |       |       | 2      |                                        |       |       | ¾     |
|                                                                                                    | T & G wood flooring on wood stripping, with ceiling gypsum plaster                                                                                      |                                                   |       |       | 1 nom. |                                        |       |       | ¾     |
| Steel roof deck on steel framing with suspended ceiling of metal or wire lath.                     | Fiberboard insulation or wood fiber and cement binder on top of deck, with ceiling gypsum plaster sanded 1:2                                            |                                                   |       | 1½    | 1      |                                        |       | ¾     | ¾     |
|                                                                                                    | Wood sheathing or fiberboard insulation on top of deck, with ceiling gypsum or Portland cement plaster**                                                |                                                   |       |       | 1      |                                        |       |       | ¾     |
| Wood joists                                                                                        | Sub-floor or 1" nom. boarding of ⅝" plywood, a layer of building paper and ½" T & G flooring, with attached ceiling of gypsum lath† and gypsum plaster. |                                                   |       |       | 1½     |                                        |       |       | ⅞     |
|                                                                                                    | Same floor with attached or suspended ceiling of metal lath and gypsum or Portland cement plaster**                                                     |                                                   |       |       | 1½     |                                        |       |       | ¾     |

**NOTE:**

\*Requires top covering of solid masonry equal to ¼ thickness of slab or arch.

\*\*Portland cement plaster with 15 pounds of hydrated lime and 3 pounds of asbestos fiber per bag of Portland cement.

†All joints reinforced with 3" strips of metal lath.

‡Neat wood fiber gypsum plaster.

TABLE No. 43-D—MINIMUM PHYSICAL PROPERTIES AND FIRE RETARDANT VALUE OF ROOFING MATERIALS.

| Ref-<br>erence<br>Number                       | Type of Roofing                                    | Min.<br>Wt. per<br>108<br>sq. ft. | Min.<br>Felt wt.<br>per 108<br>sq. ft. | Min.<br>Saturation<br>Percent-<br>age* | Fire<br>Retard-<br>ant<br>Value |
|------------------------------------------------|----------------------------------------------------|-----------------------------------|----------------------------------------|----------------------------------------|---------------------------------|
| (a) BASE SHEETS                                |                                                    |                                   |                                        |                                        |                                 |
|                                                | No. 15 Roofing Felt (Rag).....                     | 14                                | 5.6                                    | 140                                    | 3                               |
|                                                | No. 14 Roofing Felt (Asbestos).....                | 14                                | 9.5                                    | 40                                     | 5                               |
|                                                | No. 18 Felt Membrane (Asbestos).....               | 18                                | 8.5                                    | 50                                     | 5                               |
|                                                | No. 20 Felt Membrane (Rag).....                    | 20                                | 5.0                                    | 120                                    | 3                               |
|                                                | No. 40 Roll Roofing (Rag).....                     | 37                                | 7.5                                    | 140                                    | 6                               |
|                                                | No. 42 Roll Roofing (Rag).....                     | 40                                | 10.0                                   | 150                                    | 6                               |
|                                                | No. 30 Roofing Felt (Rag).....                     | 26                                | 10.0                                   | 150                                    | 6                               |
| (b) CAP SHEETS (MAY BE USED<br>AS BASE SHEETS) |                                                    |                                   |                                        |                                        |                                 |
|                                                | No. 16 Split Sheet Roofing<br>(2 layers min.)..... | 58 (each)                         | 10.0 (each)                            | 150                                    |                                 |
|                                                | No. 41 Roll Roofing (Asbestos).....                | 40                                | 13.0                                   | 50                                     | 4                               |
|                                                | No. 43 Built Up Felt (Asbestos).....               | 41                                | 6.4 (each)                             | 40                                     |                                 |
|                                                | No. 90 Mineral Surface (Rag).....                  | 87                                | 10.0                                   | 150                                    | 15                              |
|                                                | No. 14 (2 layers) Roofing Felt<br>(Asbestos).....  | .....                             | .....                                  | .....                                  | 9                               |
|                                                | No. 55 Roll Roofing Black Top<br>(Asbestos).....   | 50                                | 17.5                                   | 50                                     | 10                              |
|                                                | No. 35 Roll Roofing White Top<br>(Asbestos).....   | 30                                | 9.5                                    | 40                                     | 10                              |
| (c) GRAVEL AND CERAMIC MA-<br>TERIAL           |                                                    |                                   |                                        |                                        |                                 |
|                                                | Gravel.....                                        | 250                               | .....                                  | .....                                  | 5                               |
|                                                | Crushed Hard Burned Ceramic<br>Material.....       | 200                               | .....                                  | .....                                  | 4                               |

\*These figures shall be not less than 80% of the Kerosene value of the felt.  
**NOTE:** For Fire Retardant Roofings top covering shall be selected from (b) or (c).

## USE OR OCCUPANCY OF STREETS AND PROJECTIONS OVER PUBLIC PROPERTY

### CHAPTER 44—OCCUPANCY OF PUBLIC PROPERTY

#### ARTICLE 4401. REGULATIONS AND LIMITATIONS.

No portion of any building whatsoever nor any accessory thereto other than signs shall project over the public street or sidewalk except as specified in this Article.

Building permit in accordance with the provisions of Chapter 2 of this Code shall be secured prior to the erection of any awning, canopy, or hood affixed to any building or structure available to the public in general or affixed to any building or structure in such a manner that said awning, canopy, or hood will project over public property.

All balconies, awnings, canopies, hoods, cornices, marquees, etc., shall be adequately and securely fastened to the building or structure in accordance with the structural requirements of this Code.

(a) **Balconies Over Sidewalks.** Unroofed porches, balconies or oriel windows may extend not more than four feet six inches (4'6") over public streets or sidewalks, and, in no case, shall be less than nine feet (9') in the clear above the sidewalk or street level immediately below.

Exception. Balconies or galleries supported by columns at the outer edge may be allowed provided they conform to the structural requirements of the Code. The center line of the supporting column shall be not less than 18 inches nor more than 24 inches from the curb, and no portion of the structure shall extend closer than 9 inches to face of curb. In addition, such column supported structure must be approved by the Department of Streets, and by the Department of Utilities.

(b) **Awnings, Canopies and Hoods.** Awnings of combustible materials supported throughout on metal frames shall be not less than seven feet six inches (7'6") above the sidewalk immediately below and any fringe attached to such awning shall be not less than six feet six inches, (6'6") from the sidewalk level immediately below.

Lightweight movable or fixed awnings, canopies, or hoods constructed of non-combustible materials and shall be at least seven feet six inches (7'6") in the clear between the lowest point of any projection and the sidewalk immediately below.

All such awnings, canopies and hoods, and mention above, may extend over the sidewalk portion of a public street so that no portion of same is closer than 18 inches to curb.

All awnings, canopies and hoods which project over public property shall carry the imprint of the manufacturer, erector or repairer.

No awnings, canopies or hoods hereafter erected, altered or repaired shall be supported by posts, supports or portions of same attached to or set in the sidewalk, with the exception that canopies, curtains or vestibule awnings may be erected temporarily at entrance to assembly buildings, hotels, residences, or similar buildings, during bad weather or for specific occasions, not exceeding seventy-two (72) hours at a time, provided there is no interference with pedestrian traffic.

(c) **Cornices.** If more than nine feet (9') above the sidewalk, cornices constructed of fire-resistive materials may project over a public street no more than four feet (4').

(d) **Marquees.** A fixed awning or marquee projecting over the sidewalk shall conform to the following regulations:

1. Such awning or marquee shall be supported entirely from the building.
2. All combustible members of any fixed awning or marquee installed in the commercial sections shall be protected with not less than one-hour fire-resistive construction. All structural members shall be of incombustible material.

3. Such awning or marquee shall be at least nine feet (9') in the clear between the lowest point of any projection and the sidewalk immediately below and may extend to 18 inches from the curb; however, when awning or marquee is fourteen feet (14') in the clear above the sidewalk, it may extend within eighteen inches (18") of the sidewalk curb.

4. Every awning or marquee shall be so located as not to interfere with the operation of any exterior standpipes, stairways or exits from the building and such location shall meet the approval of the Director.

5. The roof of any such awning or marquee shall be sloped to down-spouts which shall conduct any drainage under the sidewalk to the curb.

(e) **Ornaments and Other Projections Over Sidewalks.** Water tables, belt courses, sills, bases, columns, pilasters, capitals or other decorative features shall not project more than six inches (6") beyond any lot line.

Vertical fins or sun shades must be constructed of incombustible material and may extend 3 feet beyond property lines. They shall be not less than 9 feet in the clear above the sidewalk or street level immediately below. These incombustible vertical fins are to have a minimum spacing of 22 inches, otherwise access is to be provided as required for windowless walls in Article 2939.

Open work solar screens must be constructed of incombustible material and may extend 3 feet beyond property lines. They shall be not less than 9 feet in the clear above the sidewalk or street level immediately below. A minimum of 22 inches shall be provided between the face of the building and such screen, and horizontal walkways with adequate drainage shall be provided at each floor level. Means of egress shall be provided at each floor level in accordance with Article 2939.

(f) **Show Windows Over Sidewalks.** No part of any show window, storefront or showcase except the sill, as provided in Sub-Article (e) of this Article, shall project beyond the property line.

(g) **Exterior Doors and Windows.** Doors in the commercial sections shall not project more than one foot (1') beyond the property line bordering a street and shall not project into any alley. Doors in buildings outside of the commercial sections which swing over the street property line shall be maintained normally closed.

Doors of garages shall not open out or tilt up over sidewalks, streets, alleys, or other public property. (See Article 1509.)

Windows, blinds, shutters, or jalousies projecting over public property shall have a sill height of not less than seven feet six inches (7'6") above the surface of the public way.

(h) **Space Below Sidewalk.** The space below the sidewalk level may be used for any purpose not inconsistent with any other requirements of this or other Ordinances, but the occupation of this space may be revoked by the Parish at any time, and the owner of the building occupying such space shall be required to pay all costs attendant therewith.

(i) **Projection Into Alleys.** No projection whatsoever shall be allowed in alleys except a curb or buffer block extending not more than nine inches (9") from the face of the building and not more than nine inches (9") above the adjacent alley grade.

(j) **Loading Platforms.** Loading platforms must be arranged to provide ample and sufficient space so that vehicles parked at the platform will not project on the public property.

(k) **Reviewing Stands.** Reviewing stands constructed over the sidewalks of the Parish of Jefferson or on privately owned property, or on sheds galleries, or other attachments of buildings, shall not be occupied, either by courtesy or for charge, unless the said stands or structures after completion, have been inspected by the Director or a Louisiana Registered Architect or a Louisiana Registered Civil Engineer, licensed to do business in the Parish of Jefferson and the stability of the same for whatever occupation will be made of them shall have been certified to by the Director or a Louisiana Registered Architect or Louisiana Registered Civil Engineer. A Building permit must be secured as set forth in Article 201.

It shall be the duty of the Director to furnish the Sheriffs' Department with the names of the persons, firms or corporations, who have complied with the provisions of the foregoing section of this Code.

It shall be the duty of the Sheriff not to allow any stand or similar structure to be occupied by persons which has not been reported to him by the Director as having complied with the provisions of this Article.

Design and construction of reviewing stands shall comply with the provisions of Article 507, and Article 804 (11).

(l) **Covered Walkways.** Covered walkways extending from the property line and over public property to not less than eighteen inches (18") from the curb may be constructed when specifically approved by the Department of Streets for occupancies permitted under the Zoning Law.

(m) **Curb Cuts.** Permission for curb cuts may be secured from the Department of Streets upon presentation of plot plan in triplicate indicating dimensions and location of proposed driveways.

(n) **Entrance Steps and Roof Overhangs.** Entrance steps and roof overhangs of existing structures which extend and project over public property (by sufferance of the Laws of Servitude of the State of Louisiana) may be reinstalled, repaired, rebuilt, remodeled or altered provided:

1. Materials and construction employed conform to the structural requirements of this Code.

2. Such alterations do not extend over public property a distance greater than the original projection, nor shall the projection exceed 40% of the banquette width.

3. Such alterations, paralleling the face of the structure, shall not extend beyond the width of the building, nor into the side alley area.

4. If used, railing shall be not less than 3 feet high.

5. Where steps lead toward each other, the lowest steps or risers shall be separated by a minimum of 3 feet 6 inches.

Awnings, canopies or hoods meeting the requirements of paragraph (b) may be attached to the facade of such structures provided:

1. Their total projection is 6 inches less than that of the steps, landings and platforms they shelter.

2. They do not extend beyond the side lines of the building.

3. Provisions are made to prevent their shedding water over public property.

## FENCES, SIGNS AND BILLBOARDS

## CHAPTER 45—FENCES

**ARTICLE 4501. GENERAL.**

A fence is an erection constructed of wood, metal, masonry, or other material between two (2) contiguous estates, so as to divide them, or on an estate, so as to divide one part from another. Fences shall be required to provide protection for construction and demolition (see Chapter 3), swimming pools (see Chapter 16), canals or ditches (see Ordinance No. 9581 and 9829), junk yards (see Ordinance No. 7138). The height of fences shall comply with the Zoning Ordinance. Fences shall be structurally sound and durable and in compliance with Chapter 23.

No fragile, readily flammable material such as paper, cloth or canvas shall constitute a part of any fence, nor shall such material be employed as an adjunct or supplement to any fence.

Fences over eight feet (8') in height shall not be of combustible material. Barbed wire or other material deemed hazardous by the Director shall not be placed less than seven feet (7') above the ground or grade along public thoroughfares, parks or any adjacent properties.

**ARTICLE 4502. FENCE PERMIT.**

Any person, firm or corporation proposing to erect or contracts to erect a fence for the purpose of dividing one estate from another or for the purpose of dividing one part of an estate from another, shall file an application for a fence permit with the Safety Department.

The application shall be in duplicate and contain a plot plan showing the location of the corner property boundary stakes; if no corner stakes are found a survey setting corner stakes shall be required; it shall set forth the type and height of the fence to be installed and locate the fence on the plot plan.

The application shall be signed by the owner and installer and shall be filed with the Safety Department no later than ten (10) days from commencement of installation of the fence.

The Safety Department shall not charge a fee for filing of an application for a fence permit seven feet (7') or under.

The owner and/or installer shall erect the fence in accordance with the Parish Comprehensive Zoning Ordinance.

# CHAPTER 46—SIGNS AND BILLBOARDS

## ARTICLE 4601. DEFINITIONS.

Whenever the word "sign" is used in this Code, it shall mean any word, model, character, illustration, device or representation in the nature of an advertisement or announcement attached to the outside of a building or structure or to the roof thereof.

Wherever the word "billboard" is used in this Code, it shall be taken to mean all display boards, screens and other devices or structures, independently supported or placed upon the ground, on which letters, characters, or illustrations are painted, printed, carved, stamped or raised thereon in paper or other materials attached thereto, with letters, indented design, usually used for advertising purposes, and have a face area of more than twenty-five square feet (25 sq. ft.).

## ARTICLE 4602. GENERAL REQUIREMENTS.

(a) **Locations Restrictions.** No sign or signs shall be hung, fixed or otherwise attached to any other sign where the additions exceed the widths or heights permitted for individual signs under this Chapter.

No sign or part of any sign of any description shall be attached to a fire escape or be so placed as to interfere with fire escape exits or other exits.

No signs of any construction whatever shall be placed so as to obstruct the free entrance of firemen and full use of any window, door or other means of access to a building, neither shall any signs be placed nearer than the minimum clearances listed in Table No. 46-A to any electric conductor or pole supporting such conductor. No sign, signboard or billboard shall be erected within the Parish of Jefferson which in any way endangers or conflicts with public safety or convenience.

TABLE No. 46-A — MINIMUM CLEARANCES BETWEEN SIGNS AND ELECTRIC LINES

| <u>Voltage of<br/>Electric Conductors</u> | <u>Horizontal<br/>Clearance</u>      | <u>Vertical<br/>Clearance</u>        |
|-------------------------------------------|--------------------------------------|--------------------------------------|
| <u>Service Drops</u>                      | <u>Feet</u>                          | <u>Feet</u>                          |
| 0 to 300 (to ground)                      | 1                                    | 1                                    |
| 300 to 8,700 (to ground)                  | 3                                    | 8                                    |
| 8,700 to 15,000 (to ground)               | 8                                    | 8                                    |
| <u>Pole Lines</u>                         |                                      |                                      |
| 0 to 8,700 (to ground)                    | 3                                    | 8                                    |
| 8,700 to 15,000 (to ground)               | 8                                    | 8                                    |
| 15,000 to 50,000 (to ground)              | 10                                   | 10                                   |
| Exceeding 50,000 (to ground)              | 10 plus 0.4"<br>per k v in<br>excess | 10 plus 0.4"<br>per k v in<br>excess |

(b) **Projection Over Public Property.** No sign shall project nearer than eighteen inches (18") to the curb line or more than ten feet (10') from the property line or have less than nine feet (9') clearance above the sidewalk.

No projecting sign shall have an area greater than one hundred and twenty square feet (120 sq. ft.)

All projecting signs shall be constructed of noncombustible material.

Exceptions: (1) Facings may be of approved slow-burning plastics.

(2.) The provisions of this article, except as to safety, shall not apply to a sign not more than ten square feet (10 sq. ft.) in area, announcing, without display or elaboration, only the name of the proprietor and the nature of his business; nor to a wall sign not exceeding one square foot (1 sq. ft.) of display surface on a residence building, stating merely the name and profession of an occupant; nor to a sign not exceeding ten square feet (10 sq. ft.) of display surface on a public building, giving the name and nature of the occupancy and information as to the conditions of use or admission; nor to a wall sign not exceeding two and one-half square feet (2½ sq. ft.) of display surface, nor to a ground sign, advertising in either case the sale or rental of the premises upon which it is maintained: nor to street signs erected by the municipality; nor to temporary signs or banners legally authorized.

(c) **Unsafe Signs.** Signs which may be dangerous in any manner whatsoever shall be replaced and made safe immediately or taken down by the owner, lessee, or occupant of the building, otherwise the sign shall be subject to the requirements of Article 305.

(d) **Identification of Signs.** Every sign hereafter erected, constructed or maintained, for which a permit is required, shall be plainly marked with the name of the person, firm or corporation erecting and maintaining such sign and shall have affixed on the front thereof the number of permit issued for said sign by the Director.

(e) **Structural Requirements.** All signs of any description shall be constructed and braced in accordance with the wind pressure and other requirements for strength and stability of this Code, except that no fastening, support or guy shall be of less strength than one-fourth inch (¼") diameter steel wire rope or equivalent. The fastenings shall be properly designed and secured to the masonry or other structure. In no case shall any signs whatsoever be secured with small wire, nails or sign hooks driven into the walls, or other structural parts of building or structure, or any other such similar or temporary construction. Expansion bolts, when permitted, shall extend at least four inches (4") in the masonry.

All chains, wire ropes, and other attachments shall be hot dipped galvanized or of a corrosive-resistant material. Other metal supports and braces shall be painted with a rust-inhibiting paint.

Where the supports must be fastened to hollow concrete block, hollow tile or wood walls, the supporting device shall be fastened securely in a manner approved by the Director.

For signs covered by this Article, the Director may require the plans to be certified by a Louisiana Registered Civil Engineer or a Louisiana Registered Architect.

(f) **Wind Pressure.** (Refer to Table 23-A)

#### **ARTICLE 4603. SKY OR ROOF SIGNS.**

A sky or roof sign shall be deemed to be any letter, word, model, sign or device in the nature of an advertisement, announcement or direction supported wholly or in part over or above any wall, building or structure. Such signs shall not be permitted unless written permission by the owner or proper representative of said building or structure is furnished with the application for permit, and no such permit will be granted unless such consent is filed.

Sky signs, including uprights, supports or braces, shall be constructed of metal; however, the facing may be of metal or slow burning approved plastics. No sky sign shall project beyond the property line, and, in addition, the requirements of the Zoning Laws shall be complied with. Lighting devices may project beyond the face of the sign if properly secured.

Sky signs which extend to an extreme height of more than twenty feet (20') above the roof shall be so constructed as to have their whole weight and loads transmitted directly upon adequate masonry walls or to columns. Any supporting connection for such signs to roof slabs, roof beams, etc., shall not be permitted. All features of design as required by this Code shall be complied with, and all plans for sky signs must be signed by a Louisiana Registered Civil Engineer or Louisiana Registered Architect.

Sky signs shall be so constructed as to have a clear space, except for the structure supporting said sign, of not less than five feet (5') between the roof and the lowest part of such sign. There shall be at least a five foot (5') clearance between the vertical supports. On a pitched roof, there must be an unobstructed clearance of thirty inches (30") above the ridge.

No sign shall be placed over the top of front wall or cornice of any building. There must be thirty inches (30") unobstructed vertical clearance above the top of any parapet.

No sign shall be so placed on the roof of any building as to prevent free passage from one part of the building to another.

#### **ARTICLE 4604. BILLBOARDS.**

No signs or billboards of wood or metal erected upon uprights or other supports extending into the ground or on the ground shall be at any point more than thirty-five feet (35') above the surface of the ground, with a clearance of at least thirty inches (30") between the bottom of the sign and the ground, but the intervening space may be filled with open lattice work or platform decorative trim. The billboard shall be properly supported and braced in accordance with the requirements of design in this Code.

In the commercial sections, no ground signs shall be constructed of combustible materials.

In the commercial sections, structural frames may be of wood or other similar combustible material, with sign facing covered with metal or other approved non-combustible material.

No billboard hereafter erected, altered or constructed, shall be located nearer to the street than the established property line or building line as authorized by law for that street. All locations of billboards shall be approved by the Director upon data furnished by the applicant.

Exception: Special permits may be issued by the Director for drive-in theater signs over thirty-five feet (35') in height, when no hazards are introduced.



#### **ARTICLE 4605. CLOTH SIGNS.**

It shall be unlawful for any person, firm or corporation to erect any sign within the Parish of Jefferson not conforming to the requirements of this Code, and no commercial advertising cloth signs will be permitted anywhere within the Parish limits.

Exception: The above does not apply to banners, streamers, or other non-commercial temporary display cloth signs erected over public property, streets, thoroughfares, etc.

#### **ARTICLE 4606. ELECTRIC SIGNS.**

Wherever the word "electric sign" is used in this Code, it shall mean any model, character, illustration, device or representation illuminated by means of electricity. All signs shall be properly and safely supported with fastenings, the strength of which shall be computed in accordance with the requirements of this Code, except that no signs shall be supported with fastenings of chains or wire rope less than one-fourth inch ( $\frac{1}{4}$ " ) in diameter or equivalent. All signs shall be of metal or other incombustible material. The electrical fittings and requirements shall be in accordance with Chapter 50 of this Code.

#### **ARTICLE 4607. PERMITS FOR SIGNS OR BILLBOARDS.**

No sign, signboard, or billboard, of any character shall be erected until permit therefor has been issued by the Director, for electrical signs. See additional requirements of Article 5033.

Application for signs, signboard, roof signs, and billboards shall be accompanied by full detail drawings and specifications in ink or blue print, in duplicate, showing length, weight, height of sign, size of guys, size of bolts and nuts, inscription on sign, owner, number of lights and watts of same, location of installation, name of contractor installing same, and manufacturer's name and address.

In addition to the above the following information shall be furnished:

(a) Size of all members of supporting framework and anchorage and computation therefor.

(b) A statement as to the structural adequacy of the building or buildings, or other structures on which the sky signs or roof signs are to be mounted to support and sustain such sky signs or roof signs.

For sign covered by this Article, the plans must be certified by a Louisiana Registered Civil Engineer, or Louisiana Registered Architect.

Exceptions: No permit shall be required for the signs and outdoor display structures listed below. Such exceptions, however, shall not be construed to relieve the owner of the sign from responsibility for its erection and maintenance in a safe manner.

(a) Signs painted on the surface of masonry, concrete frame, or other approved building walls.

(b) A non-internally illuminated sign not exceeding 6 square feet of display surface on a wall, or projecting from a wall of a building, giving the name and nature of the occupancy and not projecting over  $\frac{1}{2}$  foot over public property.

(c) A sign not exceeding  $2\frac{1}{2}$  square feet of display surface, advertising the sale or rental of the premises upon which it is maintained.

(d) Ground signs erected to announce the sale or rent of the property so designated, or construction ground signs, or other similar signs, which may be authorized by the Director in connection with construction operations.

(e) Street signs erected by the municipality.

(f) Temporary sign or banners legally authorized.

#### **ARTICLE 4608. MUNICIPAL, FEDERAL AND STATE GOVERNMENT SIGNS.**

Nothing in this Code shall be construed to prohibit the erection of municipal signs of a public nature over or on any public property, or of signs of the Federal, State, or Parish government or corporations indicating cable crossings, dangers, railroad crossing, etc.

#### **ARTICLE 4609. MARQUEE SIGNS.**

(a) Marquee signs constructed of noncombustible material may be attached to or hung from the sides and front of a marquee, and such signs may extend the entire length and width of said marquee, provided such signs shall be at least nine feet (9') in the clear between the lowest point of any projection and the sidewalk immediately below and do not occupy more than two-thirds ( $\frac{2}{3}$ ) of the width of the sidewalk, measured from the building. However, when such signs are twelve feet (12') in the clear above the sidewalk immediately below, they may extend within eighteen inches (18") of the sidewalk curb. No marquee sign shall extend outside the lines of the marquee to which it is attached.

(b) A marquee sign shall not be attached to or hung from any non-conforming marquee.

(c) All marquee signs shall meet all requirements of Article 4602 except where they are in conflict with this Article.

(d) Except where the marquee sign is less than two feet (2') high and the dead weight of the sign does not exceed five per cent (5%) of the dead weight of the marquee, all plans and specifications shall be accompanied by a stress analysis which shall show the stress in all members of the marquee, the anchorage of the marquee, and the structural members of the building supporting the marquee, in addition to the stress analysis of the sign. These stress analyses shall be computed for full live and dead load, and shall be made by and bear the signature or seal of a Louisiana Registered Architect or a Louisiana Registered Professional Engineer in Civil or Structural Engineering.

(e) Where combustible construction is permitted under the Code for marquees, marquee signs may also be of combustible material.

## PART XIV

# ELEVATORS, DUMBWAITERS, MECHANICAL AMUSEMENT DEVICES AND MOVING STAIRS

## CHAPTER 47—ELEVATORS, DUMBWAITERS, MECHANICAL AMUSEMENT DEVICES AND MOVING STAIRS

### ARTICLE 4701. ELEVATORS AND DUMBWAITERS.

#### (a) Elevators.

Carrying beams for the overhead machinery of all elevators shall be of reinforced concrete wrought iron, or steel. Steel, concrete, or iron guide rails must be provided for the car and counter weights of all elevators having a lift of over 50 feet in height. All counter weights shall be strongly bolted together.

A clear space not less than 2 feet 6 inches in depth and the full size of the shaft must be provided between the bottom of the shaft and the lowest point of the underside of the car floor when the car is at the limit of its descent for the installation of all elevators. This depth shall be increased when the speed of cars exceeds 200 feet per minute, in accordance with the requirements of "Safety Code for Elevators, Dumbwaiters and Escalators," approved by the American Standards Association. (See Article 215.)

At the top of the shaft, and under the suspension sheaves and beams of all elevators, where the operating machinery is not placed overhead, there shall be built a substantial working platform. The distance between the under side of this platform and the top of the cross head of the car when at the limit of its ascent shall be not less than 2 feet 6 inches, except that this distance shall be increased on all elevators having greater speed than 350 feet per minute, in accordance with the requirements of "Safety Code for Elevators, Dumbwaiters and Escalators." All doors or gates leading to an elevator shall be made so as to lock or bolt on the shaft side and arranged so as to be opened by the operator of the car only, except for emergency key devices as required by "Safety Code for Elevators, Dumbwaiters and Escalators," and where automatic push button elevators are used. All entrances to elevator cars must be provided with substantial folding or sliding gates or doors, and where floor tracks are used, the same must be countersunk. All folding gates over 3 feet wide at the entrance to shaft or car shall have top, bottom and center braces.

For elevator enclosure walls, see Chapter 30. The Director may grant permits for the repair or renewal of existing elevators or the installation of elevators in existing elevator shafts when the said existing elevators or said old elevator shafts shall be maintained in their present position without requiring new enclosure walls.

When the shaft does not extend to the floor of the cellar or lowest story, the bottom of the shaft shall be enclosed in fireproof material, as specified in Article 3002.

When the enclosure of an elevator has an opening to accommodate machinery for operating same, such as shafts, drums and cables, said machinery shall be enclosed in a similar manner to the shaft. All hatchways shall be enclosed with substantial guards or gates and shall be protected with standard fire doors. All passenger elevators in Type I, II, III and V buildings used for hotels, apartments, or tenements, hospitals and stores, shall be enclosed by fire-resistive partitions. Metal-clad doors may be used in all such buildings except that elevator enclosures for stores shall have approved standard fire doors. In other doors when glazed wire glass shall be used.

No elevator car shall have two-floor compartments.

All passenger elevators shall be equipped with adequate lighting, automatic stopping devices at top and bottom of run; also, safety brake operated by a governor on the floor and a safety brake device on the machine.

All freight elevators, except those provided with sliding doors similar to passenger elevators, shall have automatic gates on the hoistway, which are opened automatically by the car as it approaches the landing and closed automatically as the car leaves the landing.

Every elevator that is in actual operation must be immediately shut down and cease to operate when the result of an official inspection shows that a condition prevails which would endanger life or limb to continue to operate such elevator in its defective state; and the owner or lessee of any such elevator will be held strictly accountable for any accident wherein any person is injured during the operation of any such elevator that has been declared to be in an unsafe and dangerous condition by the Director, and the responsible person has been duly notified of its defective state.

The cars of all elevators must be constructed of non-combustible material, except that the interior trim and floor may be of wood, when supported by non-combustible materials.

No glass shall be used in elevator cars except to cover certificates, lighting fixtures and appliances necessary for the operation of the car; except in the lighting fixtures no piece of glass shall exceed one square foot (1 sq. ft.) in area.

Cars for passenger elevators shall be enclosed at sides and top, except the opening necessary for entrance or exit. An emergency exit is not considered a car opening, but emergency exits in roof of car must be provided.

No power elevator having a rated speed in excess of one hundred feet (100') per minute shall be controlled by a direct hand-operated rope, cable, or rod.

No car or counterweight cable shall be repaired or lengthened by splicing.

Compliance with the "Safety Code for Elevators, Dumbwaiters and Escalators," for the construction, installation, use, repair, and operation of elevators, dumbwaiters, hoists, and moving stairs, shall be deemed good practice and construed as compliance with the requirements of this Code. (See Article 215.)

#### (b) Dumbwaiters.

Dumbwaiters. A hoisting and lowering mechanism equipped with a car which moves in guides in a substantially vertical direction, the floor area of which does not exceed nine square feet (9 sq. ft.) whose internal height, whether or not provided with fixed or removable shelf or shelves, does not exceed four feet (4'), the capacity of which does not exceed five hundred pounds (500 lbs.), and which is used exclusively for carrying materials.

All dumbwaiter shafts hereafter placed in any building, except such as do not extend more than three (3) stories above the cellar or basement floor, except in private residences, shall conform with the enclosure requirements for freight elevator shafts. See Chapter 30.

**Electric Dumbwaiter.** A dumbwaiter in which the motion of the car is obtained through an electric motor directly applied to the dumbwaiter machinery.

**Pits and Over-Travel.** In the installation of dumbwaiters, a clearance shall be provided at the top and the bottom of the hoistway so that no part of the dumbwaiter car will come in contact with any fixed part of the dumbwaiter hoistway structure or fixed dumbwaiter machinery during normal operation. Adequate over-travel shall be provided at the top and the bottom of the hoistways for high-speed, high-rise dumbwaiters to allow for cable stretch. Limit switches operated by the dumbwaiter car shall be provided at the top and bottom of the hoistway to limit normal travel of electric dumbwaiter.

## ARTICLE 4702. INSPECTION AND FEES

Hereafter each elevator, dumbwaiter, mechanical amusement device, hoist, moving stair and sidewalk type elevators - fifteen feet (15'0) maximum lift, used or proposed to be used in the Parish of Jefferson, shall be thoroughly inspected by the Safety Department as to its design, construction, installation, condition, and operation. If it shall be found to be suitable and to conform to the requirements of this Article, the Director shall cause to be issued to the owner or user thereof, an inspection certificate specifying the maximum number of passenger or weight which said device may be allowed to carry. Such inspection certificate shall be valid for not more than TWELVE (12) MONTHS from its date and shall be posted in a conspicuous place in the elevator proper. The Director at any time may suspend and inspection certificate when in his opinion, the elevator, hoist, mechanical amusement device, or moving stair for which it was issued may not continue to be operated without danger to the public safety. Such suspension of an inspection certificate shall continue in effect until said elevator hoist, mechanical amusement device, or moving stair shall have been made to conform to the requirements of this Article.

Not more than TWELVE (12) MONTHS shall lapse between inspections of elevators, moving stairs, amusement devices, and other installations as listed in the American National Elevator Standard ANSI A17.1. Interval inspections as prescribed by the American National Standard Code for elevators, dumbwaiters, escalators and moving walks shall be prima facie evidence of compliance with this article. No amusement device shall be used after a shut-down of thirty (30) days or more, without a reinspection.

|                                                            |         |
|------------------------------------------------------------|---------|
| ELEVATORS - PASSENGER & FREIGHT 2 THRU 4 FLOORS .....      | \$20.00 |
| EACH FLOOR OVER 4 FLOORS, PER FLOOR .....                  | \$ 5.00 |
| MOVING STAIRS .....                                        | \$50.00 |
| BELT ELEVATORS (MANLIFTS) - 2 THRU 4 FLOORS .....          | \$20.00 |
| BELT ELEVATORS (MANLIFTS) - OVER 4 FLOORS, PER FLOOR ..... | \$ 5.00 |
| DUMBWAITERS - 2 THRU 5 FLOORS .....                        | \$10.00 |
| FOR EACH WORKMAN'S HOIST (PASSENGER) .....                 | \$50.00 |

|                                                |           |
|------------------------------------------------|-----------|
| FOR EACH BUILDERS HOIST .....                  | \$50.00   |
| MECHANICAL AMUSEMENT DEVICES .....             | \$10.00   |
| MECHANICAL AMUSEMENT DEVICES FOR CHARITY ..... | No Charge |

Every person, firm or corporation proposing to install or repair elevators, dumbwaiters, mechanical amusement devices and moving stairs shall file a written request for installation permit with the Director and pay the following fees.

Elevators, dumbwaiters and moving stairs, based on a number of floors served.

|                                                            |           |
|------------------------------------------------------------|-----------|
| ELEVATORS - PASSENGER & FREIGHT 2 THRU 4 FLOORS .....      | \$20.00   |
| EACH FLOOR OVER 4 FLOORS, PER FLOOR .....                  | \$ 5.00   |
| MOVING STAIRS .....                                        | \$50.00   |
| BELT ELEVATORS (MANLIFTS) - 2 THRU 4 FLOORS .....          | \$20.00   |
| BELT ELEVATORS (MANLIFTS) - OVER 4 FLOORS, PER FLOOR ..... | \$ 5.00   |
| DUMBWAITERS - 2 THRU 5 FLOORS .....                        | \$10.00   |
| FOR EACH WORKMAN'S HOIST (PASSENGER) .....                 | \$50.00   |
| FOR EACH BUILDERS HOIST .....                              | \$50.00   |
| MECHANICAL AMUSEMENT DEVICES .....                         | \$10.00   |
| MECHANICAL AMUSEMENT DEVICES FOR CHARITY .....             | No Charge |

Repair permit fees based on contract price shall be at the rate of \$3.00 for the first \$1,000.00 of cost or part thereof, plus \$1.00 for each additional \$1,000.00 cost or part thereof.

#### **ARTICLE 4703. MECHANICAL AMUSEMENT DEVICES.**

No mechanical amusement device shall be operated without a permit from the Director; further, it shall be unlawful to alter or modify the construction or design of any mechanical amusement device without obtaining a special permit from the Director. Approval of any mechanical amusement device will be for the structural features only and as to sufficiency of the design for ordinary use and shocks.

Every mechanical amusement device that is in actual operation must be immediately shut down and cease to operate when the result of an official inspection shows that a condition prevails which would endanger life or limb. The owner, lessee or manager of any such device wherein a person is injured during the operation, will be held strictly accountable for any accident if said device has been declared by the Director to be in unsafe and dangerous condition, and the responsible persons have been duly notified of the defective state.

#### **ARTICLE 4704. MOVING STAIRS.**

All moving stairs, to be acceptable under this Code, must be designed to safely carry the load, must be marked with the manufacturer's name, the load and the speed; must not exceed a greater than thirty degree (30°) angle from horizontal; must be twenty-four inches (24") to forty-eight inches (48") wide between hand rails. Hand rails must move at the same speed as stairway, and the stairwell must have solid, smooth sides, with no paneling. Treads and landings must be no-slip type. All moving stairs must have mechanical brakes, emergency stop buttons, speed governors and other safety devices, as required by the "Safety Code for Elevators, Dumbwaiters and Escalators," (A. S. A. A 17.1).

Moving stairs may be used as required stairways if moving in the direction of egress, or if equipped with stop devices at head of each flight provided they are properly enclosed. When not used as a required stairway, enclosure shall be required only at upper landing.

#### **ARTICLE 4705. MOVING STAIR ENCLOSURES.**

The same requirements shall apply to moving stair enclosures as apply to stairway enclosures, (See Articles 3002 and 3005).

#### **ARTICLE 4706. MANLIFTS.**

Manlifts shall be installed in accordance with the requirements of the "American Standard Safety Code for Manlifts" (A.S.A. A90.1) sponsored by the Association of Casualty and Surety Companies and the American Society of Mechanical Engineers.

**PART XV**  
**AIR CONDITIONING, HEATING, MECHANICAL**  
**REFRIGERATION, AND ATTIC VENTILATION**

**CHAPTER 48 – AIR CONDITIONING, HEATING, MECHANICAL**  
**REFRIGERATION, AND ATTIC VENTILATION**

**ARTICLE 4801. REVISION TO EXISTING INSTALLATIONS.**

The Director shall not issue a Certificate of Approval for any existing installation which may be reconstructed, replaced, relocated, or rearranged until the necessary corrections are made to comply with all the provisions of the Code.

**ARTICLE 4802. REFERRED RE-INSPECTION.**

When any part of or all of a mechanical installation is condemned by the Director, the owner, within five (5) days after receiving written notice thereof may file with the Director a petition in writing, for a review of said action. Upon receipt of such petition, the Director shall proceed at once to reinspect the installation and determine whether or not the mechanical installation conforms with this Code.

**ARTICLE 4803. GENERAL RE-INSPECTION.**

If, upon inspection, any dangerous installations are discovered, a written notice shall be served on the owner or occupant to have same corrected in accordance with the requirements of this Code. On failure of the owner or occupant to comply with such notice, the Director shall have the authority to give written notice to the Utility Company to cut off or disconnect utility services, or otherwise cause the operation to be discontinued, until the defects are corrected.

**ARTICLE 4804-A. LICENSE REQUIRED.**

Any person, firm or corporation who engages in the business of construction, assembling installations, re-installation, maintenance or repair of refrigeration or central air conditioning system except residential air conditioning under (2) two tons shall be required to secure a license or they shall be held in violation of this code.

**ARTICLE 4804-A-1. CLASSIFICATION OF REFRIGERATION AND AIR CONDITIONING LICENSED MECHANICS.**

**Class "A" Refrigeration License**

Any person, firm or corporation engaging in the business of, or contracting for the construction, assembling, installing or re-installation, maintenance or repair of refrigeration or central air conditioning system, except residential air conditioning under two (2) tons, shall be required to secure a license.

**Class "C" Maintenance Refrigeration and Air Conditioning Licensed Mechanics**

Any person who is employed as a maintenance refrigeration and air conditioning licensed mechanic by any person, firm, or corporation owning or operating any place of business, said license to be valid only while said maintenance mechanic remains in the employ of said person, firm, or corporation.

**ARTICLE 4804-B. APPLICANTS.**

Any person may apply for a license who meets the following requirements:

- A. Applicants must be of legal age.
- B. An applicant for a Class "A" license shall have at least 5 years' experience in the occupation or business governed by the license for which he is applying, or shall be a graduate of any licensed trade school with 3 years' experience, or an accredited college with one year experience in that class of occupation or business governed by the license for which he is applying. Three (3) letters of references shall be submitted from licensed contractors attesting to the applicant's experience and character. Applicant for license must have and maintain an established place of business in conformity with the zoning regulations of the Parish of Jefferson and have someone in attendance during regular business hours.
- C. Applications shall be notarized.
- D. An applicant for a Class "C" license must have had at least two (2) years experience in the class occupation in which he desires to engage. He shall also submit a letter

from the person, firm, or corporation in whose employ he shall serve as the maintenance refrigeration and air conditioning licensed mechanic, attesting to the applicant's experience and character.

#### **ARTICLE 4804-C. BOARD OF MECHANICAL EXAMINERS.**

A Board of Mechanical Examiners is hereby established for the purpose of examining all applicants for a license. The Board shall consist of five (5) members to-wit:

Chief Mechanical Inspector.

Three (3) licensed Refrigeration and Air Conditioning Contractors.

One (1) Mechanical Engineer, or a representative of the Refrigeration Industry, all of whom shall be residents of Jefferson Parish. Board members shall receive \$50.00 for each meeting and/or examination they attend; said monies are to be paid out of Parish funds. The number of meetings and examinations combined, shall be not less than four (4), nor to exceed twelve (12) annually.

#### **ARTICLE 4804-C-1. TERM OF OFFICE.**

The Chief Mechanical Inspector shall serve while holding his position. The appointments of the four (4) other members shall be made to run concurrently with the term of office of the members of the Governing Authority of the Parish of Jefferson. Whenever any member of the Board shall cease to be a resident of the Parish of Jefferson, his membership shall automatically be vacated, and any member may be removed for cause by the Governing Authority of the Parish of Jefferson. Each Member shall serve until his successor is appointed and qualifies. The Chief Mechanical Inspector shall receive no fee for his services on said board.

#### **ARTICLE 4804-D. EXAMINATIONS**

All applications for examinations shall be made to the Board of Examiners of the Parish of Jefferson. All licenses shall be signed and issued by the Director. The examination for a license shall consist of two (2) parts rated as follows:

(A) Knowledge of practical business procedure, 10%.

(B) Practical pipe, refrigeration – air conditioning installation questions, 90%.

Applicants shall be required to obtain a minimum of 70% to pass the examination.

In the event the applicant fails to pass the examination he shall be permitted to apply for further examination after ninety (90) days have expired from date of previous examination. There shall be no limit as to the number of examinations a person shall be allowed.

The applicant for a Class "C" license shall be required to take the following examination.

Practical pipe, refrigeration – air conditioning installation questions, 100%.

Applicants shall be required to obtain a minimum of 70% to pass the examination.

#### **ARTICLE 4804-E. EXAMINATION FEES.**

The fee for each examination and re-examination for all Class "A" licenses shall be Twenty-five Dollars (\$25.00).

The fee for each examination and re-examination for all Class "C" licenses shall be Twenty-five Dollars (\$25.00).

#### **ARTICLE 4804-E-1. REGISTRATION FEES.**

The initial registration fee for all Class "A" licenses shall be One Hundred Dollars (\$100.00).

The yearly renewal registration fee for all Class "A" licenses shall be Twenty-five Dollars (\$25.00).

The initial and yearly renewal registration fee for all Class "C" licenses shall be Twenty-five Dollars (\$25.00).

#### **ARTICLE 4804-E-2. PAYMENT OF FEES.**

The examination and re-examination fees and the initial registration fee shall be paid to the Jefferson Parish General Fund at the time the application for examination is presented.

The renewal registration fee shall be paid to the Jefferson Parish General Fund on or before the first regular day of business of each new year. If license is not secured before March 1, the renewal registration fee shall be Thirty-five Dollars (\$35.00).

A revival fee, in the amount of Twenty-five dollars, (\$25.00), in addition to the specified renewal fee, shall be assessed and collected from all licensees failing to apply for license renewal within the current year following expiration of license. All renewals and/or revival fees must be paid prior to filing of any jobs.

#### **ARTICLE 4804-F. REVOCATION OF LICENSE.**

Any license granted under this Chapter may be revoked or suspended by the Director if the holder of the license is proven guilty of violating any ordinance of law relating to these

rules and regulations or is guilty of any construction or any installation work which is dangerous to life or property, or for transferring or allowing directly or indirectly persons, firms or corporations other than the lawful holder to operate or to obtain permits to do work under said licenses. When a license is suspended, the Director shall have discretionary power as to the period of suspension. The period of suspension shall not exceed three (3) calendar months. When a license is revoked by the Director, the holder of the license after a period of three (3) calendar months from the date of revocation may appear before the Board of Mechanical Examiners for a re-examination and pay the fees required for the original license.

When a license is revoked or suspended, a new license will not be regranted or a license will not be reinstated until such a person, firm or corporation shall have corrected the faulty construction or other violation of these regulations.

Appeal from the decision of the Director may be taken within ten (10) days to the Board of Standards and Appeals.

#### **ARTICLE 4804-G. EXPIRATION AND RENEWAL OF CERTIFICATE.**

Each license shall expire on December 31, in year of its issuance, but no license shall expire before December 31. Each license shall be renewed yearly upon payment of a registration fee as required in Article 4804-E. Each license shall be renewed yearly without further examination. If licensee does not secure a license within five years after passing the refrigeration and air conditioning examination, or if licensee has not renewed his license for a period of five (5) years, all deposits, credits shall be returned and he shall be required to be re-examined in order to secure a current license.

#### **ARTICLE 4804-H. LICENSEES' AND OWNER'S RESPONSIBILITIES.**

Every person, firm or corporation licensed in accordance with these regulations shall be responsible for any defect of construction, installations and repairs of refrigeration or air conditioning system until such time as Certificate of Approval has been issued by the Director. Also, any and all defects that may have been concealed by such a person, firm or corporation and discovered by the Director after a Certificate of Approval has been issued shall be the responsibility of and corrected by said person, firm or corporation.

#### **ARTICLE 4804-I. PERMIT REQUIRED.**

Every person, firm or corporation proposing to install or repair air conditioning or mechanical refrigeration systems (except self-contained factory-built air conditioning units approved by the Underwriters' Laboratories, commonly referred to as "Window units" used in private residences and without ducts, provided any window or other air conditioning unit projecting over public property must obtain permit for said installation) shall file a written request for permit with the Director and pay the following fees based on the horsepower of the prime mover:

|                      |         |
|----------------------|---------|
| From 1 to 5 H.P.     | \$ 7.00 |
| From 6 to 10 H.P.    | \$14.00 |
| From 11 to 100 H.P.  | \$25.00 |
| From 101 to 500 H.P. | \$50.00 |
| Over 500 H.P.        | \$75.00 |

Alteration permits based on contract price shall be at the rate of \$3.00 for the first \$1,000.00 of cost or part thereof plus \$1.00 for each additional \$1,000.00 or part thereof.

For purposes of definition under this Code, one H.P. shall be considered to be equal to or less than 12,000 B.T.U. per hour.

Whenever any work for which a permit is required under the provisions of this Chapter has commenced without a proper permit authorizing same, an investigation shall be made. The investigation fee shall be not less than Seven Dollars (\$7.00) and not more than One Hundred Dollars (\$100.00), in addition to the original required permit fee. The amount of the investigation fee shall be determined by the Director.

#### **ARTICLE 4805. APPLICATION FOR PERMIT.**

Applications for permits to install mechanical equipment that falls within the scope of Chapters 47, 48, 52 and 53, shall be accompanied by two sets of drawings, and specifications, provided the cost of the work exceeds \$5,000.00. In the opinion of the Director, all such mechanical drawings and specifications shall bear the seal and signature of a Louisiana Registered Mechanical Engineer. Drawings and specifications may be required for work costing less than \$5,000, if the Director deems it necessary that such drawings and specifications be submitted for approval.

#### **ARTICLE 4806. ALL INSTALLATIONS TO CONFORM TO CODE-VIOLATIONS.**

All installations, erections, alterations, repairs, and modifications to plants coming within



the scope of this Chapter shall be installed in accordance with the requirements of this Code and it shall be the responsibility of the owner, his agent, engineer, architect, or contractor to file an application for inspection.

Any violation of this Code, including the obtaining of construction permits by false representation as to total cost or failure to follow the approved plans and specifications to the detail, shall be grounds for prosecution of the owner, his agent, architect, engineer, or contractor, severally, singly or jointly.

#### **ARTICLE 4807. APPROVAL CERTIFICATES.**

Certificates of Approval shall be issued by the Director.

The Approval Certificate shall contain mechanical data, owner's name, occupancy, the building's location by street and official number.

#### **ARTICLE 4808. MECHANICAL REFRIGERATION.**

The provisions of this Code shall apply to every refrigeration system employing a fluid which is vaporized and liquefied in its refrigerating cycle, which may be used for the extraction of heat, including the preparation and preservation of food, the cooling and dehumidification of air for industrial purposes and for comfort, and as an aid to or a part in a chemical process.

#### **ARTICLE 4809. STANDARDS OF DESIGN FOR ELECTRICAL INSTALLATION**

All electrical installations in a mechanical refrigeration or central air conditioning system shall conform to the National Electrical Code. Each branch circuit feeding each unit shall be fused and shall have a disconnect switch within visible sight of the unit it controls. It is not permissible for a refrigeration and air conditioning mechanic to enter a service panel for the purpose of installing, renewing to repairing any electrical wiring; however, it is permissible for a refrigeration and air conditioning mechanic to enter the separate disconnect switch furnished to the equipment by a licensed electrician. All connecting wire between the disconnect switch and electric motors shall be properly grounded in the disconnect switch furnished by a licensed electrician and installed in metal raceway or equal. Unless specifications, by the manufacturer, are listed on the equipment stating minimum wire size and maximum fuse size, branch and circuit conductors supplying a single motor compressor shall have an ampacity not less than 125% of either the motor compressor rated load current or the branch circuit selection current, whichever is greater. (N.E.C. - 440 - 32.)

#### **ARTICLE 4810. STANDARDS OF DESIGN AND INSTALLATION.**

Equipment. The design and installation of refrigeration equipment shall comply with the "Safety Code for Mechanical Refrigeration," (ASA B-9.1) of the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. and all pressure vessels used in refrigeration systems shall meet the requirements of ASME Unfired Pressure Vessel Code. Pressure Vessels, as called for by the respective Codes, shall be stamped "ASME" and "National Board."

Factory assembled equipment or component parts of an installation when assembled in accordance with this Code and bearing the label of or listing by Underwriters' Laboratories, Inc., or any other approved recognized testing laboratory having jurisdiction, maintaining factory inspection service and issuing regularly a list of inspected articles or devices, shall be accepted as having complied with the requirements of this Article. Pressure vessels shall comply with the first paragraph of this Article.

#### **ARTICLE 4810-A. REFRIGERANT PIPING.**

**Steel or Ferrous Piping.** Piping systems in which a volatile refrigerant and its vapor (excepting water and water vapor) are transported shall be fabricated in accordance with the requirements of Section V, "Refrigeration Piping Systems Code for Pressure Piping," (ASA B31.1), sponsored by the American Society of Mechanical Engineers. Such piping systems may be fabricated or repaired by the metallic arc welding process or by the oxy-acetylene welding process, provided the welded pipe pre-fabricator, contractor, or pipe welding operator has been certified in accordance with the Standard Welding Qualifications for Welding Procedure and Welding Operator, Manual Arc and Gas Welding of Ferrous Material, Section IX, A.S.M.E. Boiler Construction Code. Welded pipe, pre-fabricators, contractors and pipe welding operators who are qualified in accordance with the Standard Procedure Specifications of the National Certified Pipe Welding Bureau shall be accepted as having qualified with the requirements of this Article; however, they are required to file their qualifications with the Division of Regulatory Inspections.

For those local welding operators not qualified by the National Certified Pipe Welding Bureau, the Division of Regulatory Inspections shall accept and register operators who have been certified by any nationally recognized certifying agency acceptable to the Division. There shall be no charges or fees collected for this registration.

**Non-Ferrous Piping Systems.** Piping systems in which volatile refrigerants and their vapors (excepting ammonia) are transported may be constructed of copper, brass, or other approved, non-ferrous metal piping or tubing, shall be constructed of materials suitable for these specific purposes, and shall be installed in a workmanlike manner, and such material used, be approved in advance by the Division of Regulatory Inspections.

**Interpretation.** Any controversy as to the interpretation of this Article shall be brought before the Board of Standards and Appeals, and its decision shall be final.

**Re-Registration.** All certified welders must re-register with the Division of Regulatory Inspections within a period not to exceed 3 years from the date shown on their current registration certificate. At the time of re-registration, if in the opinion of the Director there is any doubt as to the qualification of the welding operator, he shall be re-certified.

#### **ARTICLE 4811. REFRIGERATION SYSTEMS CLASSIFICATION**

Refrigerating systems shall be classified as follows:

- Class A. Containing one thousand (1,000) pounds or more refrigerant.
- Class B. Less than one thousand (1,000) pounds, but more than one hundred (100) pounds refrigerant.
- Class C. Less than one hundred (100) pounds to twenty (20) pounds refrigerant, or five (5) H. P. or over of air conditioning or refrigeration.

#### **ARTICLE 4812. ANNUAL INSPECTION AND FEES.**

All refrigerating units Class A, B or C must be inspected annually by the Director.

For all purposes of determining annual inspection fees, the following table shall apply:

- Class A. Twelve Dollars (\$12.00).
- Class B. Eight Dollars (\$8.00)
- Class C. Five Dollars (\$5.00).

For the purpose of determining the fees to be charged in this Article the following rules shall govern:

##### **One (1) System:**

When one or more compressors or pressure imposing elements are connected together, and use a common condenser and receiver, they shall be considered as one system.

##### **Two (2) or More Systems:**

Whenever a compressor or pressure imposing element is acting as a separate unit, having its own condenser or receiver, each self-containing unit shall be considered as a system, shall require a separate certificate, and pay the fee for that class of system as required by this Code. When two or more systems are installed in the same location and no one system falls within Class C, the total amount of refrigerant contained in all units, or driving H. P. of the units, shall be added. If this sum exceeds 20 pounds, or 5 H. P. annual inspection fees shall be paid as required by Class A, B, or C.

#### **ARTICLE 4813. TESTS AND MARKING.**

(a) **Installation Test.** The installer of every Class A, B, or C system shall notify the Director not less than 12 hours previously, the day and hour on which the final tests are to be applied. Failure to so notify the Director shall be deemed a violation and subject the installer to a \$5.00 violation charge. The Director shall have all inspections made promptly, and he shall issue within 72 hours after the applications, a certificate of compliance and approval to the owner upon satisfactory completion of such tests. Sundays and holidays shall not be included in this 72-hour period. Tests of installations shall be made before the piping and connections of the system are covered and made inaccessible. Tests are to be made in accordance with the "Safety Code for Mechanical Refrigeration."

All rejections shall be made in writing to the owner, or his agent, listing points of defect.

(b) **Posting of Tests.** The owner shall post the Certificate of Approval in the machinery room within 20 feet of the pressure imposing element.

The Director shall maintain a permanent file and record of the Certificates of Approval.

(c) **Instructions.** Every owner of every Class "A," "B" or "C" system shall conspicuously post as near as practical to the unit the amount of refrigerant charge, kind of refrigerant, operating directions and precautions to be observed in case of a breakdown or leak, including the following:

1. Instructions for shutting down the system in case of an emergency.
2. The name, address and day and night telephone numbers for obtaining service.
3. The name, address and telephone number of the municipal inspection department having jurisdiction and instructions to notify said department immediately in case of emergency.
4. A sign showing location of main plant switch.
5. The name or license number of Operating Engineer in charge.

6. Location of nearest fire alarm box.
7. Phone numbers of physician and hospital.
8. Instructions for letting out refrigerant in case of fire.

#### ARTICLE 4814. COOLING TOWERS.

Forced or induced draft cooling towers, louver type towers including atmospheric towers or evaporative condensers, erected on buildings over 50 feet high shall have all structural members of structural steel, all heart tidewater red cypress, all heart redwood and approved non-leaching preservative pressure treated wood of not less than 10 pounds treatment, or masonry.

The basin shall be of steel plate not less than fourteen (14) gauge, or of other materials allowed for structural members.

The casing and fan ring shall be of steel plate not less than sixteen (16) gauge or equal thickness, or of asbestos board not less than three-eighths inch (3/8") thick.

All structural members shall be designed to withstand stresses due to wind pressure as specified in Table 23-A of Article 2311.

#### ARTICLE 4815. AIR CONDITIONING.

Air Conditioning is deemed an applicable term in all processing of air for industrial, commercial or human comfort, where the changing and control of temperature, moisture control and regulation, air movement and distribution and the introduction of outside air for ventilation are involved.

All central air conditioning installations shall conform to all the provisions of Chapter 48, Jefferson Parish Zoning Ordinances, and the Jefferson Parish Building Code.

#### ARTICLE 4816. CLASSIFICATION OF AIR CONDITIONING SYSTEMS.

Air Conditioning systems shall be classified under four general sub-headings:

- A-Refrigerant used.
- B-Method of application of refrigeration.
- C-Method of application of heating.
- D-Air distribution systems.

#### ARTICLE 4817. REFRIGERANT CLASSIFICATION.

Refrigerant classification shall be in accordance with the refrigerant used, which shall be classified as Group 1, Group 2 and Group 3 refrigerants as follows:

##### Group 1

|                                      |             |                                               |
|--------------------------------------|-------------|-----------------------------------------------|
| Carbon dioxide                       |             | CO <sub>2</sub>                               |
| Dichlorodifluoromethane              | (Freon-12)  | CCl <sub>2</sub> F <sub>2</sub>               |
| Dichloromonofluoromethane            | (Freon-21)  | CHCl <sub>2</sub> F                           |
| Monochlorodifluoromethane            | (Freon-22)  | CHClF <sub>2</sub>                            |
| Trichlorotrifluoromethane            | (Freon-113) | C <sub>2</sub> Cl <sub>3</sub> F <sub>3</sub> |
| Dichlorotetrafluoromethane           | (Freon-114) | C <sub>2</sub> Cl <sub>2</sub> F <sub>4</sub> |
| Dichloromethane                      |             |                                               |
| (Carrene No. 1) (Methylane chloride) |             | CH <sub>2</sub> Cl <sub>2</sub>               |
| Trichloromonofluoromethane           |             |                                               |
| (Freon-11) (Carrene No. 2)           |             | CCl <sub>3</sub> F                            |

##### Group 2

|                  |                                               |
|------------------|-----------------------------------------------|
| Ammonia          | NH <sub>3</sub>                               |
| Dichloroethylene | C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub> |
| Ethyl Chloride   | C <sub>2</sub> H <sub>5</sub> Cl              |
| Ethylene         | C <sub>2</sub> H <sub>4</sub>                 |
| Methyl chloride  | CH <sub>3</sub> Cl                            |
| Methyl formate   | HCOOCH <sub>3</sub>                           |
| Sulphur dioxide  | SO <sub>2</sub>                               |

##### Group 3

|           |                                    |
|-----------|------------------------------------|
| Butane    | C <sub>4</sub> H <sub>10</sub>     |
| Ethane    | C <sub>2</sub> H <sub>6</sub>      |
| Isobutane | (CH <sub>3</sub> ) <sub>3</sub> CH |
| Propane   | C <sub>3</sub> H <sub>8</sub>      |

#### ARTICLE 4818. METHOD OF APPLICATION OF REFRIGERATION.

- B-1 Unit System-Refrigerant classification in accordance with Article 4817.
- B-2 Direct System-Refrigerant classification in accordance with Article 4817.
- B-3 Indirect open spray with remote cooling of Liquid-Refrigerant classification in accordance with Article 4810 and 4817.
- B-4 Indirect closed surface System-Refrigerant classification in accordance with 4810 and 4817.

#### ARTICLE 4819. METHOD OF APPLICATION OF HEATING.

C-1 Indirect Heaters:

Use steam or hot water in closed elements. Refrigerant classification shall be in accordance with Articles 4810 and 4817. This includes Unit Heaters, Radiators, Converters and Blast Coils.

C-2 Direct Fired Heaters-No Ducts:

This includes Radiant Heaters, Floor Furnaces, Unit Heaters, and Circulating Heaters, installed in accordance with applicable sections of this Code.

C-3 Direct Fired Heaters with Ducts:

This includes Furnaces and Duct Heaters installed in accordance with applicable sections of this Code but limited to one (1) floor only, except in residences.

#### ARTICLE 4820. AIR DISTRIBUTION SYSTEMS.

D-1 Air distribution unit serving one (1) enclosure or room.

D-2 Air distribution unit serving one (1) floor.

D-3 Air distribution unit serving two (2) or more floors of a building.

#### ARTICLE 4821. OCCUPANCY CLASSIFICATION.

Occupancy Classifications shall be in accordance with Parts VI, Chapter 5 of this Code, with the following sub-divisions added.

Occupancy D-1 shall be sub-divided as follows:

D-1a, where only one (1) floor is involved.

D-1b, where two (2) floors not over seven thousand square feet (7,000 sq. ft.) each are involved and located outside of the commercial area.

D-1c, where two (2) or more floors are involved except as specified in D-1b above.

Occupancy D-2 shall be sub-divided as follows:

D-2a, Operating Rooms, Anesthetic Rooms, Delivery Rooms

D-2b, Wards and Private Rooms,

D-2c, Isolation Wards,

D-2d, Public Spaces and Service Areas.

Occupancies H-1 shall be sub-divided as follows:

H-1a, Hotels, Apartment Houses and Dormitories.

H-1b, Lodging Houses.

#### ARTICLE 4822. FRESH AIR REQUIREMENTS.

Where the supply air is treated by:

(1) Cleaning with air filters or washer.

(2) Cooling and dehumidification in summer, and heating or heating and humidification in winter.

The minimum fresh air requirements shall be five (5) cfm per person, provided that the total quantity of air circulated is at least fifteen (15) cfm per person, and also provided that the full fifteen (15) cfm per person of fresh air is supplied when the air does not receive the treatment above specified.

The above provision for supply of 15 cfm of fresh air per person may be waived when, as set forth elsewhere in this Code, the total usable area of ventilating openings, such as skylights or windows arranged for ventilation, is at least 1/8 of the area of the floor space.

**TABLE No. 48-A—APPLICATION OF REFRIGERATION, HEATING AND AIR DISTRIBUTION, PERMITTED FOR COMFORT AIR CONDITIONING.**

In accordance with Occupancy Classifications set forth in Table No. 5-A,  
Chapter 5, as modified above.

| Occu-<br>pancy | Method of Application<br>of Refrigeration | Method of Appli-<br>cation of Heat | Air Distribution<br>System | Remarks |
|----------------|-------------------------------------------|------------------------------------|----------------------------|---------|
| A-1            | B-1, B-2, B-3, B-4                        | C-1                                | D-1, D-2, D-3              |         |
| 2              | do                                        | do                                 | do                         |         |
| B-1            | do                                        | do                                 | do                         |         |
| 2              | do                                        | do                                 | do                         |         |
| C-1            | do                                        | C-1, C-2, C-3                      | do                         | ****    |
| 2              | do                                        | do                                 | do                         |         |
| 3              | do                                        | do                                 | do                         |         |
| 4              | NOT APPLICABLE                            |                                    |                            |         |
| D-1a           | B-1, B-2, B-3, B-4                        | C-1, C-2, C-3                      | D-1, D-2                   |         |
| 1b             | do                                        | do                                 | D-1, D-2, D-3              |         |
| 1c             | do                                        | do                                 | D-1, D-2                   |         |
| D-2a           | B-2, B-3, B-1*                            | C-1                                | D-1, D-2                   | **      |
| 2b             | B-1, B-2, B-3                             | C-1, C-2                           | do                         | ***     |
| 2c             | do                                        | do                                 | do                         |         |
| 2d             | do                                        | C-1, C-2, C-3                      | do                         |         |
| 3              | do                                        | C-1, C-2                           | do                         |         |
| 4              | do                                        | do                                 | do                         |         |
| E-1            | B-1, B-2, B-3, B-4                        | C-1                                | D-1, D-2, D-3              | ****    |
| 2              | do                                        | do                                 | do                         |         |
| 3              | B-1, B-2, B-3                             | do                                 | D-1, D-2                   |         |
| F-1            | B-1, B-2, B-3, B-4                        | C-1, C-2, C-3                      | D-1, D-2, D-3              |         |
| 2              | do                                        | do                                 | do                         |         |
| G-1            | B-1, B-2, B-3, B-4                        | C-1, C-2, C-3                      | D-1, D-2, D-3              |         |
| 2              | do                                        | do                                 | do                         |         |
| 3              | do                                        | do                                 | do                         |         |
| 4              | do                                        | do                                 | do                         |         |
| H-1            | B-1, B-2, B-3, B-4                        | C-1, C-2, C-3                      | D-1, D-2                   | †       |
| 2              | do                                        | C-1, C-2                           | D-1, D-2                   |         |
| I              | B-1, B-2, B-3, B-4                        | C-1, C-2, C-3                      | D-1, D-2, D-3              |         |
| J              | NOT APPLICABLE                            |                                    |                            |         |

\*If remotely installed.

\*\*In these areas re-circulation of air is prohibited and a positive means of exhaust must be provided.

\*\*\*Re-circulation of air shall be confined to this area only.

\*\*\*\*Garages exceeding 600 sq. ft. in floor area shall not be heated by open flame type heaters unless such appliances are mounted at least 8' above the floor.

\*\*\*\*\*For the application or installation of heating equipment in schools in this occupancy classification, see Article 808.

†C-3 installations. It is required that C-3 installations of direct fired heaters with ducts in H-1 occupancies shall be limited to serve each single apartment only.

## ARTICLE 4823. DUCT SYSTEMS FOR AIR CONDITIONING AND VENTILATING INSTALLATION.

Conformity of installation of duct systems with applicable paragraphs of N.F.P.A. Pamphlet No. 90-A, "Air Conditioning and Ventilating Systems Other Than Residence Type," as approved by the American Standards Association and as recommended by the National Fire Protection Association, and as clarified by this Chapter, shall be prima facie evidence that such installations are reasonably safe to persons and to property.

For Group I and J Occupancies, compliance with the requirements of N.F.P.A. Pamphlets No. 90-B, "Residence Type Warm Air Heating and Air Conditioning Systems," will be accepted.

The above pamphlets are hereby clarified in certain particulars: When there is a conflict or a difference of requirements between the specific detailed requirements of this Chapter and the requirements of the above mentioned pamphlets, the specific detailed requirements of this Chapter shall govern.

Approved fire dampers shall be provided at approximately the floor level where a single trunk duct or branch duct penetrates a floor of fireproof or semi-fireproof construction or in the instance of penetrating a floor of any construction provided all stair wells and elevator shafts within the area are enclosed by partitions that have a fire resistance rating of not less than one hour. Where such fire dampers are installed, no other fire dampers are required in branch ducts or room openings from such ducts.

It is not the intent of this Code to require any longer or greater fire-resistance qualities in fire doors or dampers in duct systems than are afforded by the walls, partitions or floors through which the duct passes.

In Group D, Divisions 1 and 2 and Group H, Divisions 1 and 2 occupancies, corridors, halls and passageways may be used as an integral portion of the return air system, if approved smoke-detector devices and approved thermo-disconnect devices are provided to automatically and instantaneously stop the fan in the presence of smoke and/or high temperature. Said devices shall be readily accessible for maintenance purposes. The smoke detector shall be located in the main return duct, so placed as to operate reliably in case of smoke in any part of the air stream.

## ARTICLE 4824. USE OF ALUMINUM AS A MATERIAL FOR HOT-AIR HEATING, VENTILATING OR COMFORT AIR CONDITIONING DUCTS.

Reference is made to Pamphlets No. 90-A and No. 90-B of the N.F.P.A. Aluminum alloy conforming to Federal Specifications QQ-A-359 or QQ-A-315 or grades known in the trade as 3S or 52S shall be deemed suitable non-combustible material for the construction of ducts in building of all types of construction. The following requirements shall be mandatory in every instance where aluminum is used in the construction of duct:

- (a) Gauges and Weights. Selection of materials for gauge and weight shall be in accordance with Table No. 48B.
- (b) Seams and Construction. Seams shall be of the type set forth in Table No. 48C. Bracing shall comply with the following:

### Maximum Duct

#### Side Inches

Up to 24"

24" to 32"

32" to 45"

45" to 60"

60" to 90"

90" up

### Bracing

None

1" angle 4' from slips

1¼" angle 4' on centers

1½" angle 2'8" on centers

2" angles 2'8" on centers

2½" angles 2'8" on centers.

Angles shall be not less than 1/8" thick.

- (c) Contact of aluminum with other ferrous material.

Direct contact of aluminum ducts to steel members or other dissimilar metal parts shall be avoided and when necessary, caulking materials, plastic materials or

tape materials approved for their qualities of preventing electrolysis shall be used in all such fitted or contact surfaces.

- (d) Contact of aluminum with concrete or masonry.

Aluminum surfaces placed in contact with concrete or masonry construction shall, before installation, be given a heavy coat of an alkali resisting bituminous paint.

- (e) Fastening Devices.

Aluminum duct work shall be assembled with bolts, nuts, screws and rivets of aluminum alloy; self-tapping sheet metal screws of steel cadmium plate may be also used.

- (f) Expansion.

All aluminum work shall be so designed and anchored that the work will not be objectionably distorted, nor the fastenings seriously stressed from the expansion and contraction of the metal.

- (g) Fire doors and fire dampers.

The use of aluminum of any weight or alloy is prohibited in the construction of fire doors or fire dampers in any duct system whatsoever. The ducts encasing the fire damper shall be constructed of sheet steel expanded at least one foot (1') above and below floors and on each side of partitions or walls.

TABLE No. 48-B  
GAUGES AND WEIGHTS FOR ALUMINUM DUCT WORK

| U. S. S.*<br>Gauge | B & S<br>Gauge | Thickness<br>Inches | Net lot<br>p. s. f.** | Round Ducts<br>Dia. Inches | Rectangular Ducts<br>Max. Side Inches |
|--------------------|----------------|---------------------|-----------------------|----------------------------|---------------------------------------|
| 26                 | 24             | .0201               | .287                  | Up to 16                   | Up to 12                              |
| 24                 | 22             | .0253               | .361                  | 16 to 32                   | 12 to 32                              |
| 22                 | 20             | .0320               | .456                  | 32 to 45                   | 32 to 45                              |
| 20                 | 18             | .0403               | .575                  | 45 to 60                   | 45 to 60                              |
| 18                 | 16             | .0508               | .724                  | 60 up                      | 60 up                                 |

\*Normally used steel sheet gages.

\*\*Weight for alloy 3S, Federal Specification QQ-A-359. Multiply by .97 for 52S, Federal Specification QQ-A-315.

TABLE No. 48-C  
SEAMS AND CONSTRUCTION—ALUMINUM DUCTS

| Round<br>Dia. Inches | Rectangular<br>Max. Side Inches | Type of Joint                               |
|----------------------|---------------------------------|---------------------------------------------|
| Up to 32             | Up to 30                        | S Slip                                      |
| 32 to 45             | 30 to 45                        | Bar Slip                                    |
| 45 to 60             | 45 to 60                        | 1½" Angle Bar Slip or<br>Angle Connections. |
| 60 up                | 60 to 90                        | 2" Angle Connections.                       |
|                      | 90 up                           | 2¼" Angle Connections.                      |

#### ARTICLE 4825. ATTIC VENTILATION.

The following requirements shall cover the installation of attic fans in dwellings, as a protection against fire. It is required that automatic means be provided for cutting off fan and closing ceiling opening in the event of fire, closing to be positive, by means of counterweighting the damper. A fusible link set to open at 135° F. is necessary for this purpose, and shall be installed in the air stream, preferably on suction side of the fan and shall operate a cut-off switch in series with fan motor. All wiring shall conform with Chapter 50 of this Code. The fan housing and grills may be built of material of the same fire resistance rating as the general construction of building.

Any fan or blower discharging hot air or offensive odors in such a way as to cause a nuisance to neighboring property, in the opinion of the Director, shall be re-installed or re-set to eliminate such nuisance.

#### ARTICLE 4826. BLOWER AND EXHAUST SYSTEMS FOR DUST, STOCK AND VAPOR REMOVAL OR CONVEYING, AND RESTAURANT COOKING EQUIPMENT.

The design and installation of systems coming within the scope of this Article, if in accordance with standards as set forth in N.F.P.A. Pamphlets No. 91 and No. 96, "Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying" and "Ventilation of Restaurant Cooking Equipment," shall be considered prima facie evidence of compliance with the requirements of this Code, with the following modifications. (The following referenced articles conform to the listing in the above-mentioned pamphlet.)

(a) When flammable solid materials or vapors are passed through the fans, the rotating element shall be of non-ferrous or non-sparking material, or the casing shall consist of or be lined with such material. Where there is a possibility of solid foreign material passing through the fan that would produce a spark, both the rotating element and the casing shall be constructed as required above.

(b) Ducts shall be constructed entirely of sheet metal, other than aluminum or aluminum alloy or other non-combustible material, and of adequate strength and rigidity to meet the conditions of service and installation requirements, and shall be properly protected where subject to mechanical injury. Minimum thickness for metal ducts are specified in Table No. 52-E and in Articles 421 and 422 of N.F.P.A. Pamphlet No. 91.

(c) Changes in size of ducts shall be by means of a taper transformation piece, which shall be gradual and wherever practical shall not deflect the air stream more than 30 degrees.

(d) Hoods over kitchen cooking equipment such as ranges, deep fryers and baking ovens used for commercial cooking in establishments such as restaurants, hotels, schools, and commercial cafeterias and other kitchens doing large volume cooking shall be constructed of sheet metal other than aluminum or not less than 22 U.S.S. gauge or other non-combustible materials with tight joints and have a clearance of at least eighteen inches (18") from any unprotected combustible building construction. This clearance may be reduced to three inches (3") if the combustible building construction is covered with one inch (1") mineral wool batts reinforced with wire mesh and in turn covered with not less than No. 22 gauge sheet steel. Each commercial kitchen exhaust hood shall be provided with grease trough extending entirely inside perimeter of hood with drain to grease container outside of hood.

(e) Hood shall project a minimum of not less than six inches (6") beyond the cooking equipment it is serving and shall be installed with a minimum clearance of six feet three inches (6'3") or maximum of seven feet (7') between bottom of hood and kitchen floor. The volume of air exhausted through kitchen hood should be not less than fifty cubic feet (50 cu. ft.) of air per minute, but preferably one hundred cubic feet (100 cu. ft.) or more per square foot of entering air hood area. Exhaust duct may serve one or more hoods or exhaust openings within one kitchen, but shall not be interconnected with an exhaust serving any other portion of building. Supply air openings, or fan supply system, shall be provided in kitchen to permit entry of air being exhausted through hood and/or other openings.

(f) The following practices shall not be permissible. Exhausting air through any unprotected wall of combustible construction. The type of protection as recommended by the N.F.P.A. shall govern.

(g) Range or grease filters if used, shall be of non-combustible construction, designed for the specific purpose and be installed according to manufacturer's recommendations.

(h) Ducts from kitchen exhaust systems in establishments as enumerated in (d) shall be constructed of No. 18 U.S.S. gauge or heavier sheet metal, other than aluminum, of minimum thickness, in accordance with Table No. 52-H, Article 5221 b (3) of this Code, with reasonably tight joints, but not soldered, and separated at least 18 inches from all unprotected combustible building construction. This clearance may be reduced to 3 inches if protected as outlined in (d). Inside laps of duct joints shall project in a direction against the air flow. Duct shall extend at least 2 feet above roof of any building of combustible



construction within 25 feet except by special permission.

(i) Horizontal ducts are to be equipped with drip pan under the entire length of duct. This drip pan shall have drain to grease container.

#### **ARTICLE 4827. OCCUPANCY SEPARATIONS.**

All air conditioning and mechanical equipment rooms, heating equipment rooms, and similar rooms, shall be constructed and separated from other occupancies as required by Chapters 5 through 15 and 52 of this Code.

#### **ARTICLE 4828. ARRANGEMENT AND ACCESS**

With the exception of a single story dwelling, every building which has on its roof, mechanical, electrical, or plumbing equipment or apparatus, shall have on its roof a hinged trap door with a permanent ladder leading to it or a suitable ladder must be available at all times that can be placed to the roof scuttle or hinged trap door for inspection or maintenance purposes. Such scuttle or trap door shall be covered on the top and edges with sheet metal or other approved fire-resistive material, and the clear opening for same shall be at least two feet by three feet (2' x 3') in size. Stairway leading to roofs of buildings when provided in lieu of the above shall have signs conspicuously placed with letters not less than four inches (4") high indicating such access at the ground floor level.

Where roofs are used for roof gardens or similar occupancies, stairways shall be provided through the roof by means of a penthouse, all in compliance with requirements for other parts of the building. See Article 3305 (n).

## **PART XVI**

### **LIQUID PETROLEUM GASES**

#### **CHAPTER 49—LIQUEFIED PETROLEUM GASES**

##### **ARTICLE 4901. REQUIREMENTS.**

Equipment for handling and use of liquefied petroleum gases shall conform to the regulations of the Louisiana Liquefied Petroleum Gas Commission.

## PART XVII

# ELECTRICAL RULES AND REGULATIONS

## CHAPTER 50—ELECTRICAL RULES AND REGULATIONS

### ARTICLE 5001. LICENSED ELECTRICIAN

A person holding an electrician's certificate from the Board of Electrical Examiners.

### ARTICLE 5002. LICENSE REQUIRED.

Any person, firm or corporation who engages in the business of constructing, installing, or repairing electrical wiring and equipment who is not or does not employ a Licensed Electrician shall be held in violation of this Code.

### ARTICLE 5003. CLASSIFICATION OF ELECTRICIANS.

**Class A Electrician** — Any person, firm or corporation engaging in the business of installing or contracting to install or repairing or contracting to repair electrical conductors, meters, generators, fixtures, signs, or any other electrical apparatus or material for all systems operating at a difference of potential of open circuit voltage over 32 volts.

**Class C Electrician** — Any person who is employed as a Maintenance Electrician by any person, firm or corporation owning or operating any place of business. Said certificate to be valid only while said Maintenance Electrician remains in the employ of said person, firm or corporation.

### ARTICLE 5004. APPLICANTS.

Any person may apply for an electrical license who meets the following requirements.

- A. Applicant must be of legal age.
- B. An applicant for a class A license must have passed the electrical examination described in Article No. 5008 and No. 5009 and shall have had at least 5 years experience in the occupation or business governed by the license for which he is applying; or shall be a graduate of any trade school or technical college of recognized standing and in addition shall have had one year of practical experience in that class of occupation or business governed by the license for which he is applying. Three letters of reference from certified electricians shall be submitted attesting to applicant's experience and character. Applicant must have and maintain an established place of business and have someone in attendance to receive complaints from the Department of Inspection and Code Enforcement or other persons concerned during regular business hours.
- C. An applicant for a Class C license must have had at least 5 years' experience under the supervision of a certified Journeymen Electrician in that particular line or class of occupation in which he desires to engage.

### ARTICLE 5005. BOARD OF ELECTRICAL EXAMINERS.

A Board of Electrical Examiners is hereby established for the purpose of examining all applicants for an electrician's license.

The Board shall consist of five (5) members to-wit:

The Chief Electrical Inspector, a representative of the Property Insurance Association of Louisiana, a representative of the local Electrical Utility Company, a local Electrical Contractor, and a representative of Labor; all of whom shall be residents of Jefferson Parish.

### ARTICLE 5006. TERM OF OFFICE.

(a) The Chief Electrical Inspector, the representative of the Louisiana Rating and Fire Prevention Bureau and the representative of the local Electrical Utility Company shall serve while holding their respective positions or appointments. The appointment of the Electrical Contractor and the representative of Labor shall be made to run concurrent with the term of office of the members of the Governing Authority of the Parish of Jefferson but any member may, for cause, be removed from office at any time by the said Governing Authority.

Whenever any member shall cease to be a resident of the Parish of Jefferson his membership shall automatically be vacated. In case of a vacancy, it shall be filled by the Parish Council.

### ARTICLE 5007. REMUNERATION OF BOARD.

The Board Members shall receive \$50.00 for each meeting or examination they attend, said members to be paid out of Parish Funds. The Chief Electrical Inspector shall receive no fee for his services on said Board.

The number of meetings and examinations combined shall not be less than four (4) nor to exceed twelve (12) annually.

#### **ARTICLE 5008. APPLICATION AND LICENSES.**

All applications for examinations shall be made to the Chief Electrical Inspector at least 15 days prior to date of examination and all licenses shall be signed by and issued by the Chief Electrical Inspector.

#### **ARTICLE 5009. EXAMINATIONS.**

The examination for Class A license shall be rated as follows:

- |                                                      |     |
|------------------------------------------------------|-----|
| a. National Electrical Code questions .....          | 35% |
| b. Practical wiring questions .....                  | 15% |
| c. Practical questions on electrical equipment ..... | 20% |
| d. Business procedure .....                          | 10% |
| e. Electrical takeoff .....                          | 20% |

The applicant for a Class C license shall be required to take the following examinations:

- |                                                      |     |
|------------------------------------------------------|-----|
| a. National Electrical Code questions .....          | 50% |
| b. Practical wiring questions .....                  | 25% |
| c. Practical questions on electrical equipment ..... | 25% |

#### **ARTICLE 5010. EXAMINATION FEES.**

The fee for each examination and re-examination for all Class "A" licenses shall be Twenty-five Dollars (\$25.00).

The fee for each examination and re-examination for all Class "C" licenses shall be Twenty-five Dollars (\$25.00).

#### **ARTICLE 5011. REGISTRATION FEES.**

The initial registration fee for all Class "A" licenses shall be One Hundred Dollars (\$100.00).

The yearly renewal registration fee for all Class "A" licenses shall be Twenty-five Dollars (\$25.00).

The initial and yearly renewal registration fee for all Class "C" licenses shall be Twenty-five Dollars (\$25.00).

A delinquent fee in the amount of ten dollars (\$10.00) in addition to the specified renewal fee, shall be assessed and collected from all licensees renewing their license after March 1st of the year following date of expiration, up to and including December 31 of the current licensing year. All jobs filed before September 1st of the preceeding year must be finaled before obtaining license.

A revival fee, in the amount of Twenty-five dollars (\$25.00), in addition to the specified renewal fee, shall be assessed and collected from all licensees failing to apply for license renewal within the current year following expiration of license. All renewals and/or revival fees must be paid prior to filing of any jobs.

#### **ARTICLE 5012. PAYMENT OF FEES.**

The examination and re-examination fees and the initial registration fee shall be paid to the Jefferson Parish General Fund at the time the application for examination is presented.

The renewal registration fee shall be paid to the Jefferson Parish General Fund on or before the first regular day of business of each new year. If license is not secured before March 1, the renewal registration fee shall be Thirty-five Dollars (\$35.00).

#### **ARTICLE 5013. LIMITATIONS OF LICENSE.**

Class A license shall be limited to operations described in section 5003.

Holders of this license shall not be in the employ of more than one electrical contracting firm or corporations at one time.

The holder of a Class C license shall not engage in the business of installing or repairing electrical wiring and apparatus outside the plant or premises of the person, firm or corporation by whom he is employed unless he also holds a Class A license.

#### **ARTICLE 5014. FAILURE TO PASS EXAMINATIONS.**

In the event the applicant fails to pass the examination he shall be permitted to take further examinations after ninety (90) days have expired from date of previous examination. There shall be no limit as to the number of examinations a person shall be allowed to undergo.

#### **ARTICLE 5015. REVOCATION OF LICENSES.**

Any license granted under this Chapter may be suspended or revoked for a period not

to exceed 3 months by the Board of Electrical Examiners if the holder of the license violates any ordinance or law relating to electrical wiring or is guilty of electrical construction which is dangerous to life or property, or for transferring or allowing directly or indirectly, firms, persons or corporations other than the lawful holder to operate, or to obtain permits to do work under said license, provided the holder of the license be found guilty by the Board of such violations.

When a license is revoked, a new license will not be granted to the same person, firm or corporation for a period of 30 days, nor until such person, firm or corporation shall have corrected the faulty construction or other violations. License will be reissued after applicant has taken an examination and paid the fees as required for the original license including the initial registration fee.

Appeal from the decision of the Board of Electrical Examiners may be taken within ten (10) days to the Board of Standards and Appeals upon recommendation of the Director.

#### **ARTICLE 5015-A. EXPIRATION AND RENEWAL OF LICENSES.**

Each license shall expire on December 31, in the year of its issuance, but no license shall expire before December 31. Each license shall be renewed yearly upon payment of a registration fee as required in Article 5011. Each license shall be renewed yearly without further examination. If an applicant does not secure a license within five years after passing the electrical examination, or, if licensee has not renewed his license for a period of five (5) years, all deposits, and credits shall be returned and he shall be required to be re-examined in order to apply for a current license.

#### **ARTICLE 5016. ELECTRICIAN'S AND OWNER'S RESPONSIBILITY.**

Every person, firm or corporation certified in accordance with these regulations shall be responsible for any defects of construction installed by him until such time as a Certificate of Approval has been issued by the Chief Electrical Inspector. Also, any and all defects that may have been concealed by such person, firm or corporation and discovered after a Certificate of Approval has been issued shall be the responsibility of and corrected by said person, firm or corporation.

After the issuance of the Certificate of Approval by the Chief Electrical Inspector, the person, firm or corporation in whose name the meter is contracted for, shall be responsible for all defects caused by such persons, firm or corporation.

Whenever an additional load or loads are added to an existing installation, the installer shall be responsible for the adequacy of the service conductors, feeders, sub-feeders and branch circuits. The total load shall be balanced as evenly as possible among all the feeders and branch circuits within the building.

No wiring or equipment may be concealed or completed before a permit has been issued and inspection made. All wiring and equipment concealed prior to inspection shall be made accessible upon demand of the Inspection Department, and it shall be the responsibility of and at the expense of any person, firm or corporation doing the work to remove any partition, parts of partition, or enclosures of a building or structure, or to excavate to expose any or all underground equipment, so that it can be determined if the installation meets all the requirements of the National Electrical Code.

#### **ARTICLE 5017. PERMIT REQUIRED.**

Every person, firm or corporation proposing to install, repair or alter any electrical equipment or wires, designated to carry electricity at a different potential of open circuit voltage, over 32 volts, for any purpose or service in, or on, any building or premise, shall file an application for a permit with the Chief Electrical Inspector. No work may commence until a permit has been issued.

The application for such permit shall contain a complete description of the installation, the repair or alteration as to the area of the building in square feet and number of outlets; the number and size of each circuit, feeder and subfeeder; the horsepower and voltage rating of each motor; the size of each motor circuit wiring; the number of fixtures and sockets; and all other appliances that will be installed, repaired or altered. The application shall also state for what purpose the building or premises is to be used after the electrical work is completed and shall give the name of the owner or owner's address, and the exact location of the building. All work shall be done in a workman-like manner and shall conform to all the requirements of this code. Faulty, or substandard work shall be cause for revoking permit, suspending or revoking license.

#### **ARTICLE 5018. HOLDER OF LICENSE AND SUPERVISOR.**

Each license issued in accordance with the provisions of this Chapter shall specify the name of the person, firm or corporation licensed, who shall be known as the holder of the

license, and shall specify the name of the person who has passed the examination, and such person shall be designated in the license as the supervisor of all work to be done under the license. The person designated as the supervisor may be a person in the employ of the holder of the license or, if the holder is a person, may be the holder himself or; if the holder is a firm, may be a member of the firm; or, if the holder is a corporation, may be an officer of the corporation. The same person shall not be designated as the supervisor in two or more licenses issued to different persons, firms or corporations. In the event that the business association with or employment of the supervisor by, the holder of the license shall terminate, said license shall become null and void one-hundred eighty (180) days after such termination.

#### **ARTICLE 5019. DRAWINGS AND SPECIFICATIONS.**

Applications for permits to install electrical wiring and equipment that fall within the scope of this chapter shall be accompanied by 2 sets of drawings and specifications. The following limits determine when Electrical Plans must be designed and stamped by Louisiana Registered Electrical Engineer:

1. Installation of over 200 ampere single phase electric service, or
2. Installation of over 150 ampere, three phase electric service, or

Drawing and specifications may be required for all work that the Director deems it necessary that such drawings and specifications be submitted for approval.

For construction of buildings within 8 feet of oil filled transformers, see Article 504, paragraph 7.

#### **ARTICLE 5020. CERTIFICATE OF APPROVAL.**

The Chief Electrical Inspector shall sign and issue all Certificates of Approval for the installation, repair or alteration of all electrical work. Said certificate shall not be issued until all work has been inspected by him and found to comply with all the requirements of this Code. Said certificate shall contain electrical data, name of the owner or owners, and exact location of the building or premises where the work was accomplished.

A register shall be kept in which shall be recorded the number of each building, by proper description, in which an inspection has been made with the name of the owner or owners of the buildings, the date same was inspected and the person or persons for whom such inspection was made and the amount collected for such inspection.

#### **ARTICLE 5021. TEMPORARY WIRING.**

All certificates of Approval issued for temporary wiring of any description may be revoked at the discretion of the Director, but all such permits shall automatically expire at the end of 30 days.

#### **ARTICLE 5022. CONNECTION OF POWER.**

The Director shall notify and authorize, in writing the Electric Utility Company to make the final connection to the Electric Utility Company's service facilities after he has issued a certificate of approval. No other person, firm or corporation shall be authorized to make the final connection.

The connection of electricity from private owned source of electric supply to electrical wiring system or equipment within or on any building or premises shall not be made until a special permit is secured from the Director authorizing such connection.

#### **ARTICLE 5023. AUTHORITY OF THE CHIEF ELECTRICAL INSPECTOR.**

The Chief Electrical Inspector shall have the right during reasonable hours to enter any building or premises in the discharge of his official duties, or for the purpose of making any inspections, reinspections, or test of the electrical equipment contained therein or its installation.

This authority may also be delegated to any of his assistants.

It shall be unlawful for any Person, Firm or Corporation to hinder or interfere with the inspector or inspectors in the discharge of their official duties under this ordinance.

#### **ARTICLE 5024. DISCONTINUANCE OF POWER.**

Whenever, in the opinion of the Chief Electrical Inspector, any electrical installation, wiring or appliance, in any building is unsafe or in a dangerous condition, or any electrical construction, installation or repair work has been installed, or is being used in violation of this Code, the Chief Electrical Inspector shall serve written notice to the person, firm or corporation using the unsafe or dangerous wiring or violating the provisions of this Code to correct such conditions within 48 hours, or within 10 days.

This period may not be extended except by special written permission from the Director.

Upon failure to comply with this notice, the Electric Utility Company shall discontinue the electrical service upon the request of the Director, until such time as corrections are made, and the Electrical Utility Company is notified in writing by the Director, the power may be reconnected.

For an appeal from the decision of the Director, see Article 402 of this Code.

#### **ARTICLE 5025. WORK BY OTHER THAN ELECTRICAL CONTRACTOR.**

No person, firm or corporation, erecting, repairing, or altering buildings, erecting signs, altering, changing, installing plumbing or engaged in any other work shall close in or conceal any wiring or raceways nor cut, break, destroy, disconnect or in any other manner interfere with the arrangements of any electrical conductors or appliances whatever inside or outside of any building or premises without receiving a permit from the Director. Before such permit will be issued, said person, firm or corporation shall serve the Director with a written notice at least 48 hours before such contemplated work is to commence, and the work of altering, changing or disconnecting such electrical conductors or appliances must be done under the supervision of a certified electrician; in addition, this work must be inspected by the Director before he issues said permit.

#### **ARTICLE 5026. BASIC STANDARDS.**

No electrical work for light, heat or power shall be installed or placed in, or on any building, structure or premises, unless this work is in conformity with the approved methods of construction. Compliance with the regulations as laid down in the National Electrical Code approved by the American Standards Association, shall be prima facie evidence of conformity with such approved methods.

All electrical devices, fittings, materials, equipment, and appliances shall be those approved for the purpose for which they are used. Such electrical devices, fittings, equipment, and appliances, that are constructed in conformity with the Standards of and are listed by the Underwriters' Laboratories, Inc., in their "List of Inspected Electrical Equipment" shall be prima facie evidence of conformity with the requirements of this Code.

Where recessed fixtures are installed in ceilings required to be of one-hour fire-protection, the recessed portion housing the fixtures must be similarly protected. Outlet boxes installed in such ceilings shall be limited to one outlet not over 16 square inches to each 90 square feet of the ceiling area.

Medium base pendant lamp holders shall be wired with approved heat resistant insulated fixture wire.

#### **ARTICLE 5026-A. INSTALLATION OF SERVICE ENTRANCE CONDUCTORS AND RACEWAYS.**

Entrance conductors for all buildings shall conform to the following:

For circuits not exceeding 600 volts the conductors may be installed in busways, or in rigid threaded metal conduit. Heavy wall threaded aluminum conduit may be used where the conduit does not penetrate the roof of the building or structure or support the service drop conductors. Service conductor raceways shall not penetrate a mansard type roof, but may, where the roof has a slope of 4" or less in 12" may be installed through the roof. Unfused conductors shall not enter any building or other structure excepting where the conductors terminate in the service equipment immediately behind the meter socket or box and under no condition exceed 12" penetration.

#### **ARTICLE 5026-B. GENERAL WIRING REQUIREMENTS.**

Every building exceeding 10,000 square feet gross area, the wiring system shall be installed in approved metallic raceway or metallic cable.

#### **ARTICLE 5026-C.**

Where used under concrete floor slabs at grade, conduits shall be hung at 5 foot intervals with at least 3/8" round galvanized steel hangers mounted into floor slab.

#### **ARTICLE 5026-D. STAIRWAY TO ROOF.**

With the exception of a single story dwelling, every building which has on its roof, mechanical, electrical, or plumbing equipment or apparatus, shall have on its roof a hinged trap door with a permanent ladder leading to it or a suitable ladder must be available at all times that can be placed to the roof shuttle or hinged trap door for inspection or maintenance

purposes. Such scuttle or trap door shall be covered on the top and edges with sheet metal or other approved fire-resistive material, and the clear opening for same shall be at least two feet by three feet (2' x 3') in size. Stairway leading to roofs of buildings when provided in lieu of the above shall have signs conspicuously placed with letters not less than four inches (4") high indicating such access at the ground floor level.

Where roofs are used for roof gardens or similar occupancies, stairways shall be provided through the roof by means of a penthouse, all in compliance with requirements for other parts of the building. See Article 3305 (n).

#### **ARTICLE 5026—E.**

In buildings of Type II and III, IV & V construction having a room or rooms with an occupancy load of 100 or more persons, the fixed wiring method for such room or rooms shall be metal raceways or non-metallic raceways encased in not less than two inches of concrete; Type A.L.S. Cable, Type C.S. Cable, or Type M.C. Cable.

#### **ARTICLE 5027. STANDARD ELECTRICAL MATERIALS.**

Before any electrical material, appliance, or apparatus is used, sold, replaced with new article, rented, given as a premium or placed on sale, it shall be constructed in conformity with Underwriters Laboratories Standards and labeled as such.

#### **ARTICLE 5028. CORRECTION DEVICES REQUIRED.**

No Certificate of Approval on new or repaired installations shall be issued for connection to the lines of any electrical Utility Company and no Consumer shall connect or cause to be connected to any such utilities' lines, any electrical discharge types of lamps, or lighting units having low power factor characteristics used for illuminating, decorating, advertising, or for any other purpose, unless such lamps or lighting units or group of such lamps or lighting units shall have been installed by the consumer in connection therewith, power factor corrective devices to increase the power factor of each lamp or lighting unit or each separately controlled group of lamps or lighting units to not less than ninety per cent (90%) lagging.

#### **ARTICLE 5029. DISPLAY OF ELECTRICIAN'S SIGN.**

Every place where work of an electrical nature is being done shall have displayed on a conspicuous place in front, a sign giving the name and address of the person, firm or corporation doing the work and the words "Certified Electricians" in letters not less than two inches (2") high. The display of such a sign by other than duly certified electricians shall constitute a violation of this Code.

#### **ARTICLE 5030. DISPLAY OF LICENSE.**

Every holder of a license shall keep his, their or its license displayed in a conspicuous place in his, their or its principal place of business.

#### **ARTICLE 5031. DECORATIVE LIGHTING.**

No person, firm or corporation shall install wiring of a temporary decorative character in or about any building or premises without having first procured from the Chief Electrical Inspector written permission authorizing such work to be installed and the Chief Electrical Inspector shall be authorized to grant written and limited approval for any temporary installations which may, in his opinion, be necessary. Temporary installations of decorative lighting of residences or their premises otherwise complying with this Code are exempt from this requirement.



#### ARTICLE 5032. MECHANICAL ATTIC VENTILATION.

Mechanical ventilation, which purges the attic of a house of hot air and at the same time creates a draft of air through one or more openings in the ceiling of the top floor by means of enclosed electrical fans, shall be safeguarded as follows:

- (a) The electrical construction shall be approved by the Chief Electrical Inspector.
- (b) For motors not in sight of the controller, the chamber must be insulated by slow burning material so fire in the motor would be confined to the chamber.
- (c) Install overload protection for the motor and provide type motor with built-in thermal cutout to prevent motor from over-heating.
- (d) A 135 degree F. approved fusible link shall be placed in the air stream just above the grille, to hold a trap door or self-closing louvre normally in an open position; trap door shall close upon failure of the fusible link.
- (e) A mechanically operated switch supplying the motor shall be located so that, as the trap door or louvre closes, the current to the fan motor is cut off.
- (f) All fixed electric space heating and A/C equipment, shall be furnished, in addition to the equipment described in Article 424 and 440 of the 1978 National Electric Code, with a separate disconnecting means and shall be located adjacent to and within sight of the unit it controls.

#### ARTICLE 5033. MINIMUM REQUIREMENTS FOR TEMPORARY POWER FOR CONSTRUCTION SITES

1. There shall be installed a pole of sufficient length to provide service drop conductors a minimum of 10 feet clearance above grade. The depth of the pole in the ground shall be of sufficient length to be structurally sound but not less than 4 feet. Poles shall be a minimum of 4" in dimension and shall be pressure treated with creosote or pentachlorophenol or equal and have a minimum of 12 pounds per cubic foot retention.

2. Service equipment shall consist of a weatherproof switch of adequate capacity to carry the connected load, but in no case less than 60 ampere capacity and equipped with a minimum of one 120 volt and one 240 volt receptacle. Each 120 volt receptacle shall be equipped with ground-fault circuit protection.

3. Meter sockets or boxes shall be mounted not less than 5½ feet or more than 6½ feet above grade and be equipped with a galvanized or aluminum conduit nipple 3½" long to allow for the ring on the meter socket.

4. Service riser shall be rigid metal conduit, not less than 1¼" trade size equipped with a weatherproof service head and be continuous from the meter socket to a height not less than 10 feet above grade.

5. The service grounding conductor shall be uninsulated copper not smaller than No. 6 B & S Gauge.

6. The grounding electrode shall be of galvanized steel or copperweld rod not less than 5/8" in diameter and at least 8 feet in length. The resistance to ground shall not exceed 25 ohms.

NOTE: All permanent conduits, containing unfused service conductors, installed on or entering any building or structure, moveable or stationary, shall be rigid steel threaded pipe, or aluminum threaded conduit as permitted in Article 5025-A.

#### ARTICLE 5034. EXIT AND EMERGENCY LIGHTING.

Exit and Emergency lighting to be installed as required by Article 3312, Ordinance 2225 of the Jefferson Parish Building Code.

Prior to installation, all plans of emergency and exit lighting systems shall be submitted to the Chief Electrical Inspector. Upon receipt, the Chief Electrical Inspector shall check same, and if in proper order, a permit to proceed with the installation shall be issued.

#### ARTICLE 5035. FEES.

There shall be charged each person, firm or corporation the following sum, viz:

##### SERVICES

|                 |         |
|-----------------|---------|
| 0 - 99 Amp      | \$ 3.00 |
| 100 - 199 Amp   | 4.00    |
| 200 - 399 Amp   | 6.00    |
| 400 - 799 Amp   | 10.00   |
| 800 - 1199 Amp  | 15.00   |
| 1200 - 1999 Amp | 25.00   |
| 2000 - 4999 Amp | 50.00   |
| Over 5000 -     | 100.00  |

|                  |         |
|------------------|---------|
| 1 Circuits ..... | \$ 3.00 |
| 2 Circuits ..... | 4.50    |
| 3 Circuits ..... | 6.00    |
| 4 Circuits ..... | 7.00    |

In addition to the 4-circuit fee of \$7.00, a \$1.00 fee shall be paid for each additional circuit more than 4.

Each main feeder, sub-main or branch circuit for power, light or any other purpose or service shall be considered as a circuit and each fused or other type of automatic cutout protected wire of a final branch multi-wire-circuit shall be charged for and considered a circuit within the meaning of the terms of this Code.

(b) Outlet Additions.

Charges shall be made for outlet extensions to old existing circuits as follows:

|                                |        |
|--------------------------------|--------|
| One (1) outlet .....           | \$0.50 |
| Additional outlets, each ..... | 0.05   |

The word "outlet" shall be held and construed to mean any point of an electrical circuit where a switch is installed or electricity is taken for light, power or any purpose or service.

(c) The following fees shall be additional to the heretofore provided circuit and outlet fees.

1. Fixtures, Receptacles, Socket and Receptacle Type Signs, Five (5) lights or less \$0.25. Miniature, Candelabra and Medium Base Sockets and Receptacles.

In addition to the twenty-five (\$0.25) fee, a fee of four cents (\$0.04) per additional socket or receptacle up to 100 sockets or receptacles. Above 100, each additional socket or receptacle three cents (0.03).

|                                                         |      |
|---------------------------------------------------------|------|
| Mogul Base sockets and Receptacles .....                | 0.50 |
| Gas Tube Signs and Fluorescent and Mercury Vapor Lamps: |      |

Outdoor Signs:

|                                                                                                                       |      |
|-----------------------------------------------------------------------------------------------------------------------|------|
| Using one transformer or ballast — each sign .....                                                                    | 3.00 |
| Using more than one transformer or ballast, a fee of \$1.00 shall be paid for each additional transformer or ballast. |      |

Portable and Fixture Type Gas Tube Signs and Floodlights.

|                                           |            |
|-------------------------------------------|------------|
| 500 watts or less .....                   | \$0.15 ea. |
| 500 watts to 1 KW .....                   | 0.50 ea.   |
| 1 KW or above .....                       | 2.00 ea.   |
| All spotlights and Search lights .....    | 2.50 ea.   |
| Mercury Lamp above 500 watts .....        | 1.00 ea.   |
| Fluorescent Fixtures, per lamp .....      | 0.10 ea.   |
| Light Standards on private property ..... | 1.00 ea.   |

Lighting fixtures not specifically mentioned in above schedule will be assessed a \$5.00 minimum inspection fee.

2. Motors, Portable and Stationary:

|                                                |               |
|------------------------------------------------|---------------|
| Up to (1) one H.P. ....                        | 0.50 ea.      |
| Each additional H.P. or fraction thereof ..... | 0.25 per H.P. |

3. Generators.

|                                    |           |
|------------------------------------|-----------|
| One (1) K.W. or less .....         | 1.00 ea.  |
| One (1) to eight (8) K.W. ....     | 4.00 ea.  |
| Eight (8) to thirty (30) K.W. .... | 10.00 ea. |
| Above thirty (30) K.W. ....        | 15.00 ea. |

4. Welding Machines.

|                               |          |
|-------------------------------|----------|
| One (1) to four (4) K.W. .... | 2.00 ea. |
| Above four (4) K.W. ....      | 4.00 ea. |

5. Electrical Heating Devices.

|                               |          |
|-------------------------------|----------|
| One (1) K.W. or less .....    | 0.50 ea. |
| One (1) to two (2) K.W. ....  | 1.00 ea. |
| Two (2) to ten (10) K.W. .... | 4.00 ea. |
| Above ten (10) K.W. ....      | 8.00 ea. |

6. Radio Receiver:

|                                                                                                                                       |                 |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Each receiver with or without antenna and equipment                                                                                   | 0.25 ea.        |
| 7. Radio Transmitting Sets:                                                                                                           |                 |
| Each Transmitter of 10 watts or less                                                                                                  | 6.00            |
| Each Transmitter above 10 watts                                                                                                       | 12.00           |
| (Motors, generators, circuits and outlets used in connection with transmitting sets shall be at heretofore provided in this Code.)    |                 |
| 8. Rectifiers, Industrial Types:                                                                                                      |                 |
| Resistance, mercury, bulb, liquid, or motor generator types, each                                                                     | 2.00            |
| 9. Transformers.                                                                                                                      |                 |
| 1.5 K.W. or less                                                                                                                      | 0.25 ea.        |
| 1.5 K.W. to 2 K.W.                                                                                                                    | 0.50 ea.        |
| 2 K.W. to 25 KVA                                                                                                                      | 2.00 ea.        |
| Above 25 KVA                                                                                                                          | 4.00 ea.        |
| 10. Motion Picture Machines and Equipment:                                                                                            |                 |
| Motion picture machines: including control and rheostat without electrical or mechanical sound reproducing equipment, each machine    | \$5.00          |
| Motion picture, electrical or mechanical sound reproducing sets, including equipment, each                                            | 10.00           |
| 11. Miscellaneous:                                                                                                                    |                 |
| Stage Sockets, each                                                                                                                   | 0.50            |
| Portable Cabinets, each                                                                                                               | 2.00            |
| Stereopticon Lights, each                                                                                                             | 2.00            |
| Arc Lights, each                                                                                                                      | 0.50            |
| X-Ray Machines, each                                                                                                                  | 2.00            |
| Electric Sound Reproducing Sets, other than motion picture type, each                                                                 | 2.00            |
| 12. Ceiling, Rotary and Exhaust Fans:                                                                                                 |                 |
| Ceiling and Exhaust Fans, apply motor fees.                                                                                           |                 |
| Small Rotary Fans, each                                                                                                               | 0.10            |
| 13. Temporary Decorative Wiring and Temporary Wiring:                                                                                 |                 |
| The fee for temporary decorative wiring for show windows, exhibitions, conventions, entertainments, and circuses shall be as follows: |                 |
| One (1) to twenty (20) Sockets                                                                                                        | 2.00            |
| Above twenty (20) to fifty (50) Sockets                                                                                               | 2.50            |
| Above fifty (50) Sockets, per Socket                                                                                                  | 0.03            |
| Charge for circuits                                                                                                                   | 0.50            |
| 14. Elevators.                                                                                                                        |                 |
| Passenger                                                                                                                             | per floor 10.00 |
| Freight                                                                                                                               | per floor 10.00 |
| Dumbwaiter                                                                                                                            | per floor 10.00 |
| Moving Stair:                                                                                                                         |                 |
| 2 to 4 Floors                                                                                                                         | 20.00           |
| Over 4 Floors                                                                                                                         | 40.00           |
| 15. Street Lights.                                                                                                                    |                 |
| (A) Service and First Standard Eight (\$8.00) Dollars                                                                                 |                 |
| (B) Each additional Standard Four (\$4.00) Dollars                                                                                    |                 |
| 16. Swimming Pools and Fountains:                                                                                                     |                 |
| (A) Permanently installed swimming                                                                                                    | 30.00           |
| (B) Wading or storable pools                                                                                                          | 15.00           |
| (C) Decorative fountains and reflection pools                                                                                         | 30.00           |

When any person, firm or corporation, after notice has been given by the Director, shall be found to have violated any of the requirements of this Code, or when through any such violation by any person, firm or corporation doing the work, it shall become necessary to make extra inspections, there shall be charged said person, firm or corporation for each extra inspection made necessary as a result of such violation or for alterations to work previously accepted or for the inspection of any electrical equipment governed by the provisions of this Code for which no fee is herein prescribed, a fee of \$15.00 for the first hour of inspection and \$10.00 for each additional hour or fraction of an hour thereof.

Whenever any work for which a permit is required under the provisions of this Chapter has been commenced without authorization or in violation of a permit, a special investigation shall be made. In addition to the permit fee an investigation fee shall be collected. When the final permit fee is less than \$25.00 the minimum investigation fee shall be \$25.00. When the final permit fee is above \$25.00 the investigation fee shall be \$25.00 plus 50% of the final permit fee.

The minimum fee for any service shall be \$5.00.

### **ARTICLE 5036. ELECTRICAL INSPECTION DEPOSIT FUND.**

Any person, firm or corporation applying for permits to be used under the provisions of this Code shall deposit and shall maintain on deposit with the Director, subject to provisions hereinafter contained, the sum of not less than Twenty-five Dollars (\$25.00), in legal tender, as a guarantee for the payment of all fees, permits and inspections that may become due and owed by said person, firm or corporation to the Division of Regulatory Inspections, and as further guarantee that all electrical work covered by said permits will be done in compliance with all the provisions and requirements of this Code, as well as the rules and regulations governing same.

Whenever, in pursuance of any of the provisions of this Code, it shall become necessary to deduct from the deposit made by any person, firm or corporation the amount of any fees or other charges which shall be due and owing to the Division of Regulatory Inspections (resulting assessments for additional fees for work not covered by installation permits and for any other charges which shall be due and owing to the Division of Regulatory Inspections, that are not paid within ten (10) days after presentation of bills for such additional assessments or fees) by such persons, firm or corporation, the Director shall draw a requisition against the said deposit.

No permit shall be issued to any person, firm or corporation, failing to make said payments within the ten (10) days prescribed or while the cash deposit of said person, firm or corporation is less than the specified minimum amount of Twenty-Five Dollars (\$25.00).

When any person, firm or corporation doing work under the provisions of this Code, having made deposits as aforementioned, shall have ceased to carry on all business, and when all work under permits issued shall have been completed, inspected and approved and when all fees and other charges due and owing to the Division of Regulatory Inspections by said person, firm or corporation shall have been paid, and if no charges be pending against said person, firm or corporation for any violation of any code, rule or regulation of the Parish of Jefferson pertaining to electrical work, then said person, firm or corporation shall be entitled to have returned to him the amount on deposit or such portion thereof as may remain to his credit after deductions therefrom as herein specified.

### **ARTICLE 5037. UNDERGROUND STREET LIGHTING SYSTEMS.**

Companies to approve Street Light plans add Louisiana Gas Company.

### **ARTICLE 5037--A. EXEMPTIONS.**

Nothing in this Code shall apply to:

- (A) Telephone and Telegraph Companies in the installation, maintenance, alteration or removal of wiring apparatus, devices, appliances, or equipment for telegraph, telephone, signal service, or central station protective service, used in conveying signals or intelligence, except where electrical work is done on the primary side of the source of power from the power company at a voltage of over 50 volts and which generates more than 500 watts of power.
- (B) Installations used by electric utility companies in the generation, transmission or distribution of electricity or the transmission of intelligence in the exercise of their function as electric utilities and located outdoors or in buildings used exclusively for that purpose, except where electrical work is done on the secondary side of the source of power from the power company for supplying current for lighting, appliance, Air Conditioning and heating circuits.
- (C) Electric railway companies in the installation, maintenance, repair or removal of

#### **ARTICLE 5038. UNDERGROUND STREET LIGHTING SYSTEMS.**

- (A) No person, firm or corporation, excepting those enumerated in Article 5037-A hereinabove, shall have the right to install any electrical conduit, wires, ducts, poles, light standards or equipment of any character for the transmission, distribution or utilization of electrical energy, or for the operation of signals or transmission of intelligence on, over or under the public streets, alleys, highways, parks, etc., in the unincorporated areas of Jefferson Parish without first obtaining from the Parish Council of the Parish of Jefferson, a permit for the particular installation so desired to be made and any such installation so made under such permit shall be in conformity with all rules, regulations and ordinances of the unincorporated areas of Jefferson Parish.
- (B) Any person, firm or corporation operating under such a permit, shall before placing any raceway, duct, conduit, or tubes under the public places, alleys and streets of the unincorporated areas of Jefferson Parish secure permission from the governing authority of the unincorporated areas of Jefferson Parish for such installation and shall submit to the Parish Engineer, Department of Safety, the Department of Water and the local Utility Company for approval a plot showing where such installations are to be made, the type and character of the work to be done and signed by the Developer or owner of plot before being submitted to Parish Departments. The approval of the Jefferson Parish Safety Department, Parish Engineer, the local Utility Companies (Electrical and Gas), and Water Department shall be secured prior to submitting the plans to the Parish Council and the Division of Regulatory Inspection for the permit necessary to make such installations. A copy of the approved plot, showing all details required by the Parish Engineer and the Division of Regulatory Inspections, shall be kept in their files.

Approved plot will be valid for a period of six months after date of approval by Chief of the Electrical Inspection Section.

#### **ARTICLE 5039. USE OF PUBLIC STREETS, ALLEYS, ETC.**

Any installation of raceway, tube, conduit or wires under the public places, alleys and streets shall be in accordance with this Ordinance and other Parish Ordinances covering the use of public places, alleys and streets.

#### **ARTICLE 5040. PERMIT, PLANS AND SPECIFICATIONS FOR STREET LIGHTING.**

The application for permit shall describe the work to be done and shall be made in writing. The permit when issued shall be issued to such applicant to cover such work as described and detailed.

Any changes or additions must be covered by additional permits at the time changes are to be made. The application shall be accompanied by such plans, specifications and schedules as may be necessary to determine whether the installation as described will be in conformity with the requirements of this Ordinance. If it shall be found that the installation as described will in general conform to the requirements of this Chapter and if the applicant has complied with all other provisions of the Ordinance of the Unincorporated areas of Jefferson Parish, a permit for such installation shall be issued; provided, however, that the issuance of a permit will not be taken as permission or as a license to violate any of the requirements of this or any other Ordinance of the unincorporated areas of Jefferson Parish.

#### **ARTICLE 5041. NOTICE BEFORE WORK IS CONCEALED.**

When any part of a wiring installation is to be buried or concealed from view, the person supervising and installing the duct or wiring shall notify the Electrical Division of the Division of Regulatory Inspections and such parts of the wiring installation shall not be concealed until they have been inspected and approved by the Inspection Department, provided that on such installation as the concealment of parts of the wiring must, in the discretion of the electrical inspector, necessarily proceed continuously, the person supervising and installing the wiring shall give the Inspection Department due notice and inspections shall be made periodically during the progress of the work. Where, in the discretion of the inspector, it is necessary, he shall post notice upon the premises stating that work is approved and may be covered; or is not approved and may not be covered until such further inspection as is necessary has been made. Any person removing, destroying, altering or defacing said notice without the consent of the Inspection Department shall be deemed guilty of an offense under this Ordinance, and any work described in said notice shall be stayed pending the further necessary inspection.

#### **ARTICLE 5042. GUARANTEE.**

The person, firm or corporation installing underground installations and in whose name the permit is issued shall guarantee to the Parish of Jefferson all work for a period of one (1) year from date of adoptance by the Jefferson Parish Council. **Warranty Bond must be furnished in the amount of One Thousand (\$1,000.00) Dollars for each circuit.**

#### **ARTICLE 5043. RACEWAYS.**

All underground conductors supplying current for street lighting systems shall be installed in a non-metallic flexible polyethylene coilable plastic duct and conductor type assembly pre-fabricated with conductors at the factory in one continuous length or equivalent thick walled water-tight raceway; except where run under paved or other completed streets the duct shall be run in metallic or P.V.C. schedule 40 or better raceway and the raceway shall be coated and wrapped with a protective coating. The coating shall be a type normally used for protection purposes and shall be applied in accordance with the manufacturers specifications. Where run under undeveloped or newly cut streets (not yet paved, blacktopped or graveled) they may be run in a non-metallic raceway encased in 4" of concrete; otherwise they shall be installed in a metallic raceway and be protected as described above. All raceways shall have a minimum trade size of 2" and be buried a minimum of 24" below grade. Where the raceway rises up to the light standard, it shall be encased in a minimum of 4" of concrete. All elbows or bends used in the system shall be 2" minimum galvanized or P.V.C. schedule 40 or better pipe encased in a minimum of 4" of concrete and duct installed in 2" conduit. Where the raceways enter the base of the light standard, they shall extend a minimum of 4" above the concrete base supporting the standard, be provided with insulated bushings to prevent abrasion to the conductors and the ends of each raceway shall be sealed with a standard sealing compound.

#### **ARTICLE 5044. SERVICE EQUIPMENT.**

The service equipment shall consist of a rigid 2" threaded service entrance conduit and fitting mounted on the utility company's pole to connect service wires with underground feeder wires. The service head at a height pre determined by the utility company standards. This service conduit shall be supported and grounded as required by the National Electrical Code. The service conductors shall be run in galvanized rigid threaded conduit from the service head to the junction box as shown on Drawing Page 50-15. This junction box to be furnished, installed, and contain a water tight fused connection maintained by L.P.&L.

#### **ARTICLE 5045. FEEDER CONDUCTORS.**

The underground feeder conductors and the grounding conductors shall be copper with Type (R.R.-U.S.E.) A.W., or R.H.W. insulation and shall be of sufficient size so that the voltage drop to the last light standard will not exceed 5%. The conductor size in any case shall not be smaller than No. 8 B & S gauge.

#### **ARTICLE 5046. RESPONSIBILITY FOR UNDERGROUND STREET LIGHT INSTALLATION.**

When any person, firm or corporation enters into an agreement with local electric utility company providing for rear lot line electric distribution it shall be the responsibility of that person, firm or corporation to install or cause to be installed an underground street lighting system.

#### **ARTICLE 5047. CONNECTIONS AT SERVICE POLE OR LIGHT STANDARD.**

All electrical connections shall be made with U. L. approved mechanical connectors and shall be made in the junction box at the base of the service pole or in the hand hole at the base of the light standard. "Y" type connection will be installed for feeders going up pole.

No splices or connections shall be made in conduit or raceways. Each connection shall be covered with insulation equal to the insulation of the conductor.

#### **ARTICLE 5048. GROUNDING OF SERVICE EQUIPMENT AT UTILITY COMPANY'S POLES.**

The service equipment shall be grounded at the Utility Company's pole to a driven electrode. There shall be run the length of the system an equipment grounding conductor of No. 8 B & S gauge copper for grounding all light standards, metallic sections of raceways and other metallic equipment. The equipment grounding conductors shall be an insulated conductor.

#### **ARTICLE 5049. STREET LIGHT STANDARDS.**

(A) Aluminum: Street Light Standards shall be fabricated of a spun aluminum pole approximately 20'0" in length with 7" diameter at bottom and 4" diameter at top. The pole shall be furnished with a pole cap, anchor base bottom and a six-foot continuous rise single bracket for 1-1/4" slip fitter mounting. No scroll brace or truss arm shall be used with the arm. The pole shall be designed for mounting on concrete base with anchor bolts. For locations where there exist similar light standards, standards shall match those existing in said street, upon approval by the Division of Regulatory Inspections.

#### **ARTICLE 5050. LUMINARIES.**

Luminaries shall be standard size street lighting luminaries equipped with aluminum head and separate aluminum reflector (with mogul screw multiple socket for Mercury Vapor 175 watt minimum lamp, each with individual Photo Cell Control and type V glassware), with automatic latch glassware fastener and with 1-1/4" slip fitter type mounting and wired for 2 wire 240 volt system.

#### **ARTICLE 5051. SPACING OF LIGHT STANDARDS.**

There shall be one standard installed at each intersection and spacing of standards shall not exceed 200 feet and shall not be less than 150 feet, except by special permission of the Department of Regulatory Inspection, Electrical Section

#### **ARTICLE 5052. STREET LIGHT FOUNDATIONS.**

Foundations shall be of concrete cast in place, depending on the design of the installation, one, two, or three 90 degree 2" galvanized or P.V.C. conduit bends shall be provided for raceway and shall be placed with the raceway extending 4" above the top of the foundation, and shall extend 6" from sides of the foundation, two (2') feet below grade in a line parallel with the curb line. A copper weld ground rod 5/8" long, shall be installed in foundation of each light standard, anchor bolts to be set in the concrete in accordance with plans furnished by the supplier of the street light standards. The top of the concrete foundation shall be level and shall be finished to 2 1/2" above grade. The size of the foundation, and the necessity for piling under the foundation will be determined by the Parish Engineer, at the time that plans for street lighting are approved. Any variation of above, as to specific type of foundations, to be approved by Parish Engineer and the Chief Electrical Inspector.

#### **ARTICLE 5053. SPECIAL STREET LIGHT INSTALLATIONS.**

When in the opinion of the Parish Engineer Light Standards, Luminaries and Lamps other than those specified herein are required for special lighting projects, the Parish Engineer will furnish detailed specifications for each project.

#### **ARTICLE 5054. LIABILITY FOR DAMAGES.**

This Chapter shall not be construed to relieve from or lessen the responsibility or liability of any party owning, operating, controlling or installing any electric wiring, electric devices, light standards and/or electric material, for damages to persons or property caused by any defect therein or by failure to provide adequate barricades, signs, lanterns, etc., along open trenches, and at obstructions, nor shall the Parish of Jefferson or any Officer or Employee of such Parish, be held as assuming such liability by reason of the inspection or reinspection authorized herein or by reason of the approval or disapproval of any equipment authorized herein.

#### **ARTICLE 5055. PENALTY.**

Any person, firm or corporation who shall violate any of the provisions of this Chapter shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of

not less than Ten (\$10.00) Dollars nor more than One Hundred (\$100.00) Dollars for each offense, together with the costs of prosecution, and in default of payment thereof by imprisonment for not less than ten (10) days nor more than thirty (30) days, and if such person, firm or corporation is the holder of a license of any class provided for in this Chapter, said license shall be revoked.

#### **ARTICLE 5056. UNDERGROUND ELECTRICAL AND TELEPHONE DISTRIBUTION SYSTEMS.**

(A) Any person, firm or corporation, excepting these enumerated in Section 5037 hereinabove, developing any new subdivision and/or resubdivision or land involving new streets shall provide underground (or rear line overhead wiring services) to each lot from an underground or overhead rear line distribution system, including any surface-mounted transformers and appurtenances, located along a rear yard or side yard, servitude or easement, or in a dedicated public street or in a servitude provided in the front yard area.

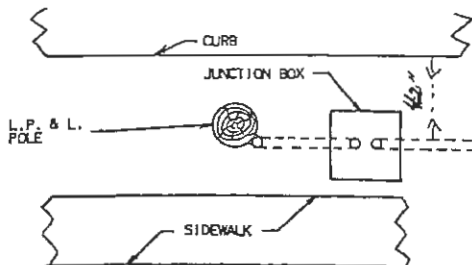
(B) Any such person, firm or corporation, developing any new subdivision and/or resubdivisions established in accordance with the above paragraph shall provide street lighting systems in accordance with the provisions of Section 5038 through Section 5055 of this Chapter.

(C) Where a complete underground or overhead rear line distribution system by the utility exists, street light connections shall be made in the utility junction box nearest the location of the first light standard. All other standards on the same circuit to be connected to conductors to be run parallel to the curb and forty-two inches (42") in rear thereof. Only one feed point per block will be allowed except, on circuits over 500 feet - or where conditions exist requiring special consideration as approved by Chief Electrical Inspector of Jefferson Parish.

Conductors to be used for street lighting circuits shall not be installed in any easement between side lot lines of adjoining properties. The utility company will be responsible for furnishing and installing a junction box and installing and maintaining a water-tight fused connection in said junction box, approved by the Division of Regulatory Inspections, Safety Department of Jefferson Parish.

NOTE: Wherever "galvanized two inch (2") piping" is mentioned in articles governing street lighting installations, wording to be changed to "2" galvanized conduit or schedule 40 P.V.C."

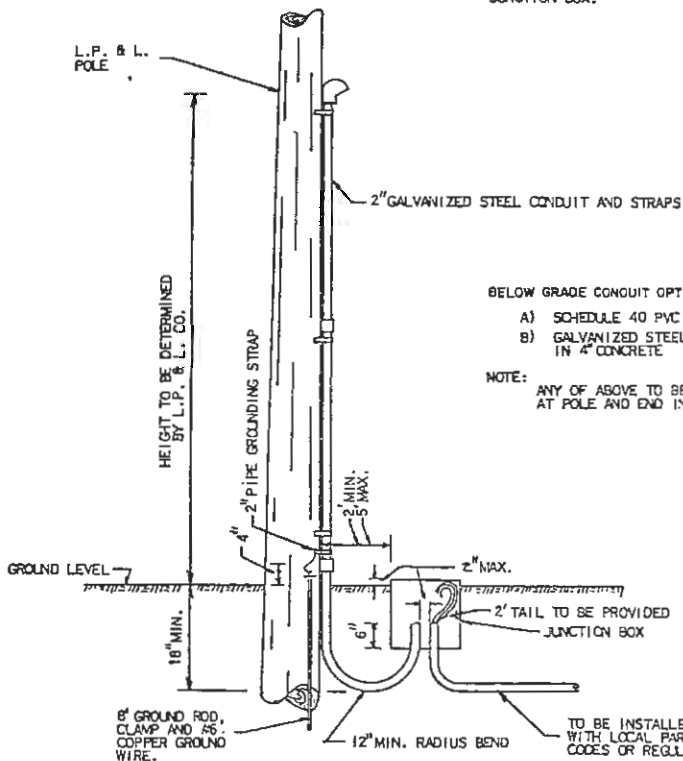




PLAN VIEW

CONTRACTOR TO FURNISH AND INSTALL CONDUIT, ELBOWS, CONDUIT STRAPS, WEATHERHEAD, GROUND ROD, ROD CLAMPS AND #6 GROUND WIRE WITH 2" PIPE GROUNDING STRAP.

L.P. & L. WILL INSTALL UNDERGROUND JUNCTION BOX, FEED POINT CONDUCTORS AND FUSES, AND ASSUME OWNERSHIP OF AND MAINTENANCE OF CONDUIT SYSTEM FROM WEATHERHEAD TO UNDERGROUND JUNCTION BOX.



PROFILE VIEW

BELOW GRADE CONDUIT OPTIONS:

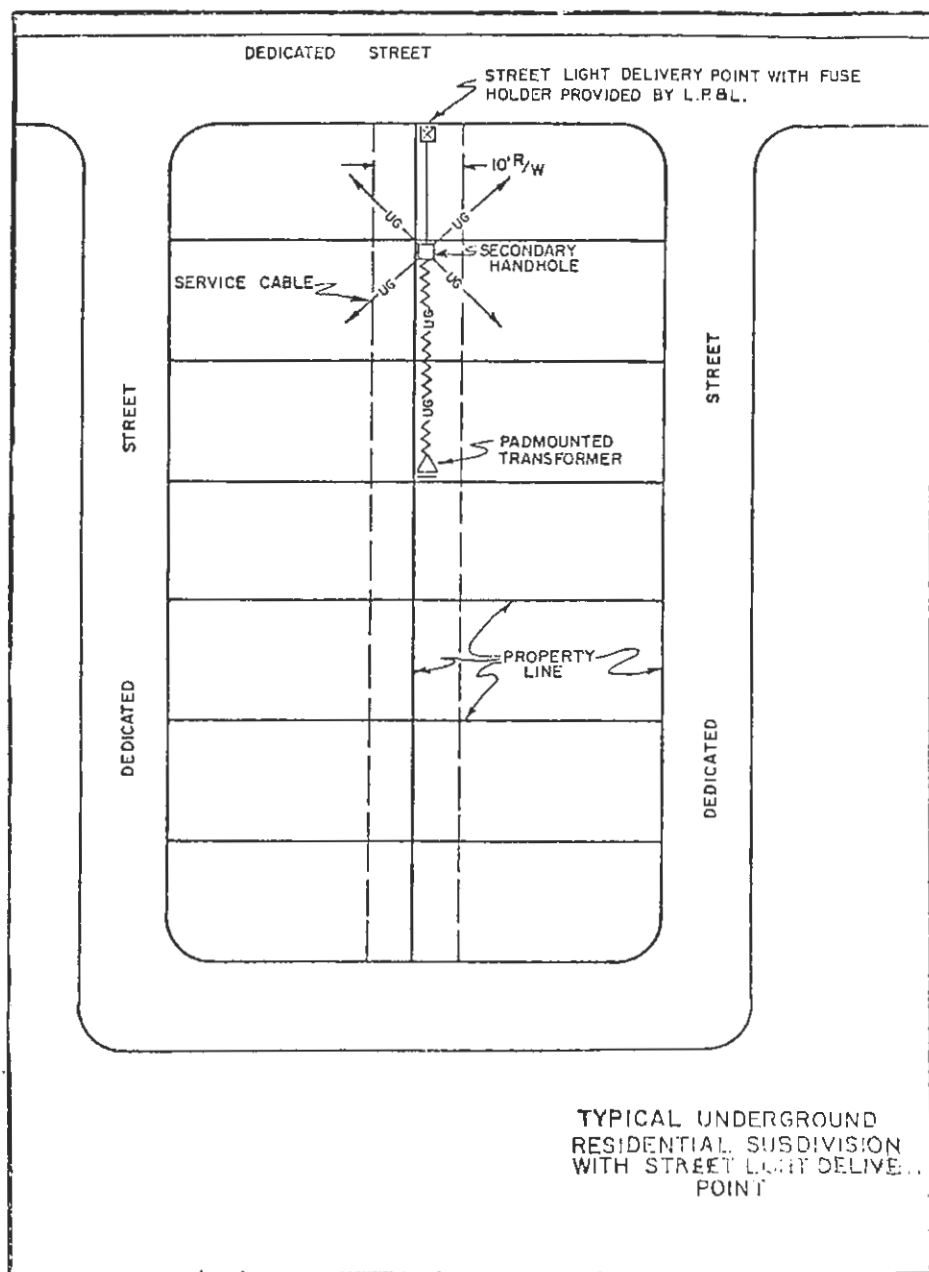
- A) SCHEDULE 40 PVC
- B) GALVANIZED STEEL CONDUIT ENCASED IN 4" CONCRETE

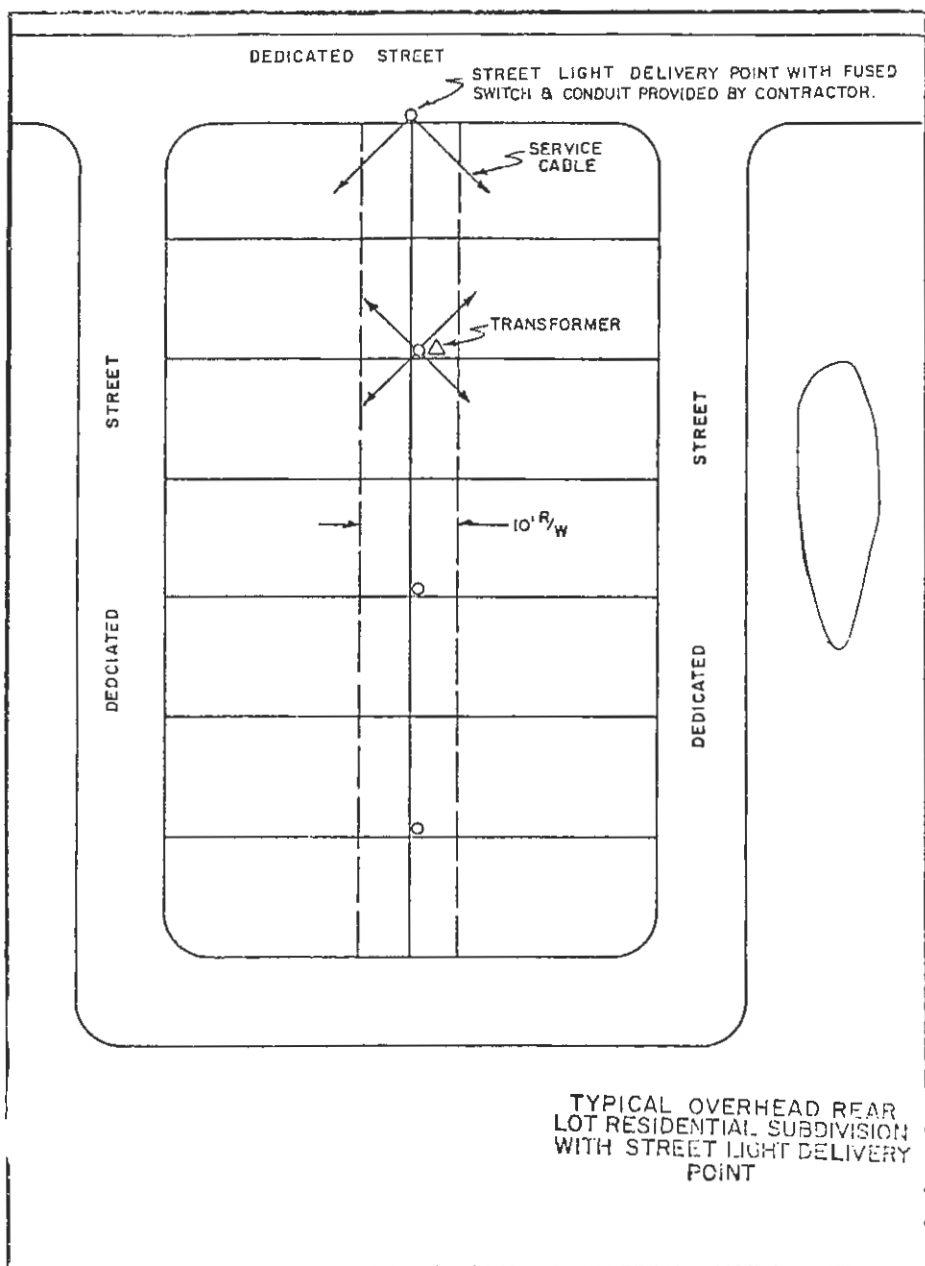
NOTE:

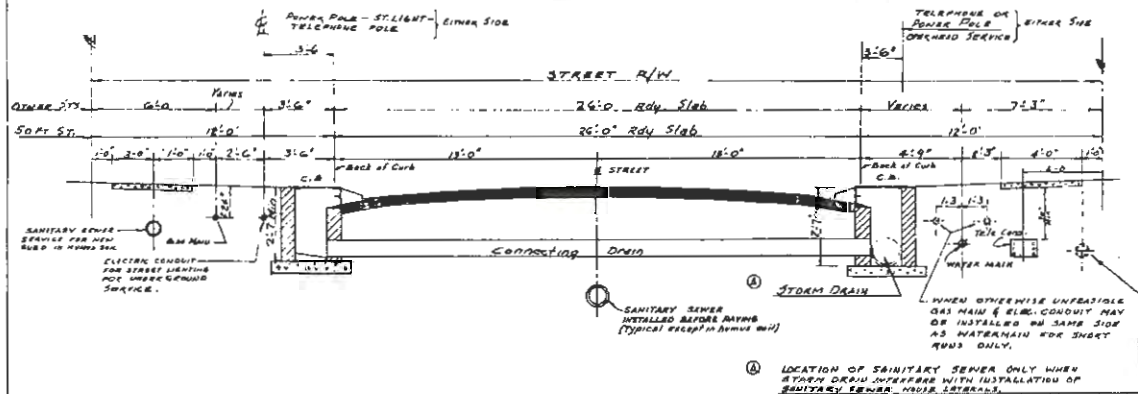
ANY OF ABOVE TO BEGIN 4" ABOVE GRADE AT POLE AND END IN JUNCTION BOX

TO BE INSTALLED IN ACCORD WITH LOCAL PARISH OR CITY CODES OR REGULATIONS.

TYPICAL DETAILS OF UNDERGROUND STREET LIGHT SERVICE FROM OVERHEAD DISTRIBUTION







APPROVALS

JEFFERSON WATER WORKS

LA POWER & LIGHT CO

DEPT OF REGULATORY INSPECTION

SEWERAGE DISTRICT

LOUISIANA GAS SERVICE

PARISH ENGINEER

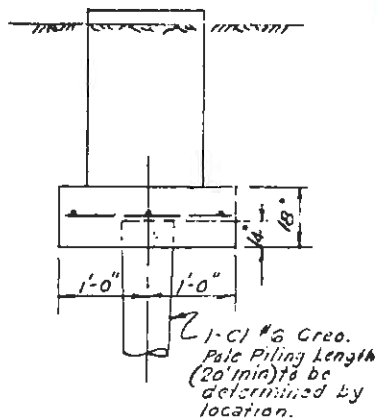
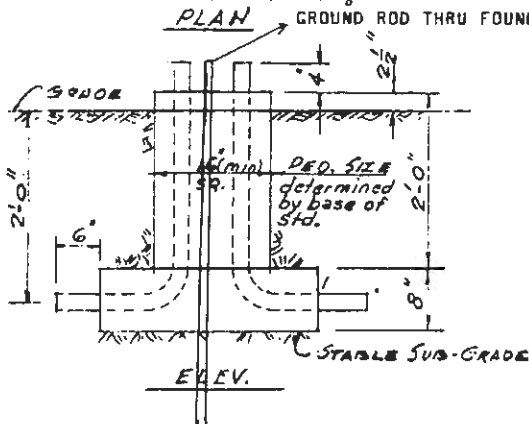
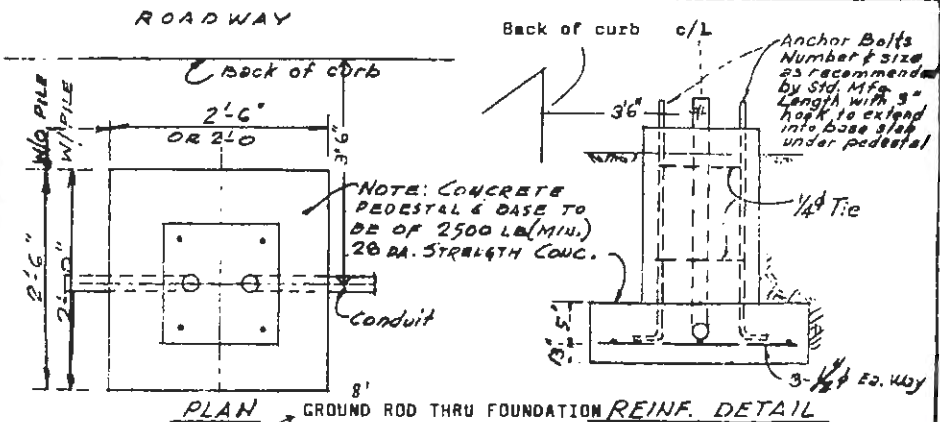
EAST JEFFERSON PARISH  
PROPOSED TYPICAL STREET SECTION  
SHOWING LOCATION OF ALL UTILITIES  
FOR NEW AREA DEVELOPMENT

NOTE: THE ABOVE REPRESENTS THE APPROVED TYPICAL INSTALLATION. WHERE CONDITIONS REQUIRE MODIFICATIONS OR CHANGES, THE AGENCY OR UTILITY COMPANY INVOLVED IS TO BE CONTACTED AND THE APPROVAL OF SAID AGENCY SECURED BEFORE MODIFICATIONS ARE MADE IN THE FIELD.

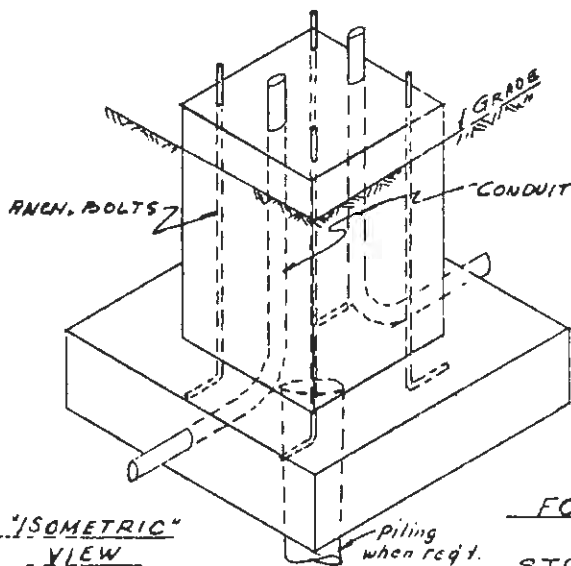
ROBERT E. GALLOWAY  
FORISM ENGINEERS - EAST MANL. JEFFERSON

OFFICE OF  
ROESSELE & GALLOWAY  
CONSULTING ENGINEERS  
3313 METAIRIE RD METAIRIE, LA

REV. OCT 10, 1958 - NOTED (A)  
DATE AUG. 25, 1958



NOTE: PILE REQUIRED GENERALLY WHERE NECESSARY FOR BUILDING FOUNDATION. CONSULT PARISH ENGINEER.



FOUNDATION PLAN  
FOR  
STREET LIGHT STANDARD

Rossie & Galley

**PART XVIII**  
**PLUMBING RULES & REGULATIONS**  
**CHAPTER 51 – PLUMBING RULES & REGULATIONS**

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## PLUMBING RULES & REGULATIONS

### CHAPTER 51 – PLUMBING RULES & REGULATIONS

#### SECTION I. GENERAL.

##### 1. GENERAL

For the purpose of this Code, the following terms shall have the meaning indicated in this Chapter.

No attempt is made to define ordinary words which are used in accordance with their established dictionary meaning, except where the word has been loosely used, and it is necessary to define its meaning as used in this Code to avoid misunderstanding.

Because the primary purpose is to define terms, rather than words, the definitions are arranged alphabetically, according to the first word of the term, rather than the noun.

#### SECTION II. DEFINITION OF TERMS.

##### 2. DEFINITION OF TERMS

**Administrative Authority.** The Administrative Authority is the department established and authorized by the Jefferson Parish Council, to administer and enforce the provisions of the Plumbing Code, as adopted, or amended.

**Air Gap.** An air gap in a water-supply system is the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood-level rim of the receptacle.

**Anchors.** See Supports.

**Approved.** Approved means accepted or acceptable under an applicable specification stated or cited in this Code, or accepted as suitable for the purpose used under procedures and powers of the administrative authority.

**Area Drain.** An area drain is a receptacle designed to collect surface or rain water from an open area.

**Backflow.** Backflow is the flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source or sources other than its intended source. (See Back siphonage.)

**Backflow Connection.** Backflow connection or condition is an arrangement whereby backflow can occur.

**Backflow Preventer.** A backflow preventer is a device or means to prevent backflow into the potable water system.

**Back-Siphonage.** Back-Siphonage is the flowing back of used, contaminated or polluted water from a plumbing fixture or vessel into a water-supply pipe due to a negative pressure in such pipe. (See Backflow.)

**Battery of Fixtures.** A "battery of fixtures" is any group of two or more similar adjacent fixtures which discharge into a common horizontal waste or soil branch.

**Branch.** A branch is any part of the piping system other than a main, riser, or stack.

**Branch Fixture.** See Fixture Branch.

**Branch Horizontal.** See Horizontal Branch.

**Branch Interval.** A branch interval is a length of soil or waste stack corresponding in general to a story height, but in no case less than 8 feet within which the horizontal branches from one floor or story of a building are connected to the stack.

**Branch Vent.** A branch vent is a vent connecting one or more individual vents with a vent stack or stack vent.

**Building.** A building is a structure built, erected, and framed of component structural parts designed for the housing, shelter, enclosure, or support of persons, animals, or property of any kind.

**Building Drain.** The building (house) drain is that part of the lowest piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building (house) sewer beginning 3 feet outside the building wall.

**Building Sewer.** The building (house) sewer is that part of the horizontal piping of a drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sewer, private sewer, individual sewage-disposal system, or other point of disposal.



**Building Storm Drain.** A building (house) storm drain is a building drain used for conveying rain water, surface water, ground water, subsurface water, condensate, cooling water, or other similar discharge to a building storm sewer or a combined building sewer, extending to a point not less than 3 feet outside the building wall.

**Building Storm Sewer.** A building (house) storm sewer is the extension from the building storm drain to the public storm sewer, combined sewer, or other point of disposal.

**Building Subdrain.** A building (house) subdrain is that portion of a drainage system which cannot drain by gravity, into the building sewer.

**Building Trap.** A building (house) trap is a device, fitting or assembly of fittings installed in the building drain to prevent circulation of air between the drainage system of the building and the building sewer.

**Circuit Vent.** A circuit vent is a branch vent that serves two or more traps and extends from in front of the last fixture connection of a horizontal branch to the vent stack.

**Code.** The word "code" when used alone shall mean these regulations, subsequent amendments thereto, or any emergency rule or regulation which the administrative authority having jurisdiction may lawfully adopt.

**Combination Fixture.** A combination fixture is a fixture combining one sink and tray or a two-or-three compartment sink or tray in one trap.

**Combined Building Sewer.** A combined building sewer is connecting two or more buildings into same sewer.

**Combination Waste and Vent System.** A combination waste and vent system is a specially designed system of waste piping embodying the horizontal wet venting of one or more sinks or floor drains by means of a common waste and vent pipe adequately sized to provide free movement of air above the flow line of the drain.

**Common Vent.** A common vent is a vent connecting at the junction of two fixture drains and serving as a vent for both fixtures.

**Conductor.** See Leader.

**Continuous Vent.** A continuous vent is a vertical vent that is a continuation of the drain to which it connects.

**Continuous Waste.** A continuous, waste is a drain from two or three fixtures connected to a single trap.

**Cross-connection.** A cross-connection is any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other water of unknown or questionable safety, whereby water may flow from one system to the other, the direction of flow depending on the pressure differential between the two systems. (See Backflow and Back-Siphonage.)

**Dead-End.** A dead end is a branch leading from a soil, waste, or vent pipe, building drain, or building sewer, which is terminated at a developed distance of 2 feet or more by means of a plug or other closed fitting.

**Developed Length.** The developed length of a pipe is its length along the center line of the pipe and fittings.

**Diameter.** Unless specifically stated, the term "diameter" is the nominal diameter as designed commercially.

**Double Offset.** A double offset is two changes of direction installed in succession or series in continuous pipe.

**Downspout.** See Leader.

**Drain.** A drain is any pipe which carries waste or waterborne waste in a building drainage system.

**Drainage System.** A drainage system (drainage piping) includes all the piping within public or private premises, which conveys sewage, rain water, or other liquid wastes to a legal point of disposal, but does not include the mains of a public sewer system or a private or public sewage-treatment or disposal plant.

**Dual Vent.** See Common Vent.

**Durham System.** Durham system is a term used to describe soil or waste systems where all piping is of threaded pipe, tubing, or other such rigid construction, using recessed drainage fittings to correspond to the types of piping.

**Effective Opening.** The effective opening is the minimum cross-sectional area at the point of water-supply discharge, measured or expressed in terms of (1) diameter of a circle, (2) if the opening is not circular, the diameter of equivalent cross-sectional area. (This is applicable to air gap.)

**Existing Work.** Existing work is a plumbing system or any part thereof which has been installed prior to the effective date of this code.

**Fixture Branch.** A fixture branch is a pipe connecting several fixtures.

**Fixture Drain.** A fixture drain is the drain from the trap of a fixture to the junction of

that drain with any other drain pipe.

**Fixture Supply.** A fixture supply is a water-supply pipe connecting the fixture with the fixture branch.

**Fixture Unit.** A fixture unit is a quantity in terms of which the load-producing effects on the plumbing system of different kinds of plumbing fixtures are expressed.

**Flood Level.** See Flooded.

**Flood-Level Rim.** The flood-level rim is the top edge of the receptacle from which water overflows.

**Flooded.** A fixture is flooded when the liquid therein rises to the flood level rim.

**Flush Valves.** A flush valve is a device located at the bottom of the tank for the purpose of flushing water closets and similar fixtures.

**Flushometer Valves.** A flushometer valve is a device which discharges a predetermined quantity of water to fixtures for flushing purposes and is actuated by direct water pressure.

**Frostproof Closet.** A frostproof closet is a hopper that has no water in the bowl and has the trap and the control valve for its water supply installed below the frost line.

**Grade.** Grade is the slope or fall of a line of pipe in reference to a horizontal plane, in drainage, it is usually expressed as the fall in a fraction of an inch per foot length of pipe.

**Grease Interceptor.** See Interceptor.

**Grease Trap.** See Interceptor.

**Hangers.** See Supports.

**Horizontal Branch.** A horizontal branch is a drain pipe extending laterally from a soil or water stack or building drain, with or without vertical sections or branches, which receives the discharge from one or more fixture drains and conducts it to the soil or waste stack or to the building (house) drain.

**Horizontal Pipe.** A horizontal pipe is any pipe or fitting which is installed in a horizontal position or which makes an angle of less than  $45^{\circ}$  with the horizontal.

**House Drain.** See Building Drain.

**House Sewer.** See Building Sewer.

**House Trap.** See Building Trap.

**Indirect Waste Pipe.** An indirect waste pipe is a pipe that does not connect directly with the drainage system but conveys liquid wastes by discharging into a plumbing fixture or receptacle which is directly connected to the drainage system.

**Individual Vent.** An individual vent is a pipe installed to vent a fixture, trap, and which connects with the vent system above the fixtures served or terminates in the open air.

**Industrial Wastes.** Industrial wastes are liquid wastes resulting from the processes employed in industrial establishments and are free of fecal matter.

**Insanitary.** Contrary to sanitary principles – injurious to health.

**Interceptor.** An interceptor is a device designed and installed so as to separate and retain deleterious, hazardous, or undesirable matter from normal wastes and permit normal sewage or liquid wastes to discharge into the disposal terminal by gravity.

**Leader.** A leader (downspout) is the water conductor from the roof to the building storm drain, combined building sewer, or other means of disposal.

**Liquid Waste.** Liquid Waste is the discharge from any fixture, appliance, or appurtenance, in connection with a plumbing system which does not receive fecal matter.

**Local Ventilating Pipe.** A local ventilating pipe is a pipe on the fixture side of the trap through which vapor or foul air is removed from a room or fixture.

**Loop Vent.** A loop vent is the same as a circuit vent except that it loops back and connects with a stack vent instead of a vent stack.

**Main.** The main of any system of continuous piping is the principal artery of the system, to which branches may be connected.

**Main Sewer.** See Public Sewer.

**Main Vent.** The main vent is the principal artery of the venting system, to which vent branches may be connected.

**May.** The word "may" is a permissive term.

**Offset.** An offset in a line of piping is a combination of elbows or bends which brings one section of the pipe out of line but into a line parallel with the other section.

**Person.** Person is a natural person, his heirs, executors, administrators, or assigns; and includes a firm, partnership or corporation, its or their successors or assigns. Singular includes plural; male includes females.

**Pitch.** See Grade.

**Plumbing.** Plumbing is the work or business of installing in buildings and on premises the pipes, fixtures, and other apparatus for supplying water and for removing liquid and water-borne wastes. The term is also used to denote the installed fixtures, drainage, vent, and water distribution systems of buildings and premises. The term does not include the community water supply distribution system.

**Plumbing Fixtures.** Plumbing fixtures are installed receptacles, devices, or appliances which are supplied with water or which receive or discharge liquids or liquid-borne wastes, with or without discharge into the drainage system with which they may be directly or indirectly connected.

**Plumbing Inspector.** See **Administrative Authority.**

**Plumbing System.** The plumbing system includes the drainage and vent system; the water supply distributing pipes; the fixtures and fixture traps; and the storm water drainage; with their devices, appurtenances, and connections. The term does not include the community water supply distributing pipes.

**Pool.** A pool is a water receptacle used for swimming or as a plunge or other bath, designed to accommodate more than one bather at a time.

**Potable Water.** Potable water is water which is satisfactory for drinking, culinary, and domestic purposes, and meets the requirements of the health authority having jurisdiction.

**Private or Private Use.** In the classification of plumbing fixtures, private applies to fixtures in residences and apartments and to fixtures in private bathrooms of hotels and similar installations where the fixtures are intended for the use of a family or an individual.

**Private Sewer.** A private sewer is a sewer privately owned and not directly controlled by public authority.

**Public or Public Use.** In the classification of plumbing fixtures, public applies to fixtures in general, toilet rooms of schools, gymnasiums, hotels, railroad stations, public buildings, bars, public comfort stations, or places to which the public is invited or which are frequented by the public without special permission or special invitation, and other installations (whether pay or free) where a number of fixtures are installed so that their use is similarly unrestricted.

**Public Official.** See **Administrative Authority.**

**Public Sewer.** A public sewer is a common sewer directly controlled by public authority.

**Relief Vent.** A relief vent is a vent the primary function of which is to provide circulation of air between drainage and vent systems.

**Return Offset.** A return offset is a double offset installed so as to return the pipe to its original alignment.

**Revent Pipe.** A revent pipe (sometimes called an individual vent) is that part of a vent pipe line which connects directly with an individual waste or group of wastes, underneath or back of the fixture, and extends either to the main or branch vent pipe.

**Rim.** A rim is an unobstructed open edge of a fixture.

**Riser.** A riser is a water-supply pipe which extends vertically one full story or more to convey water to branches or fixtures.

**Roof Drain.** A roof drain is a drain installed to receive water collecting on the surface of a roof and to discharge it into the leader (downspout).

**Roughing-in.** Roughing-in is the installation of all parts of the plumbing system which can be completed prior to the installation of fixtures. This includes drainage, water-supply, and vent piping, and the necessary fixture supports.

**Sand Interceptor.** See **Interceptor.**

**Sanitary Sewer.** A sanitary sewer is a pipe which carries sewage and excludes storm, surface, and ground water.

**Second-hand.** Second-hand as applied to material or plumbing equipment is that which has been installed, and has been used, removed, and passed to another ownership or possession.

**Separator.** See **Interceptor.**

**Septic Tank.** A septic tank is a water-tight receptacle which receives the discharge of a drainage system or part thereof, and is designed and constructed so as to separate solids from the liquid, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside of the tank through a system of open-joint or perforated piping, or disposal pit.

**Sewage.** Sewage is any liquid waste containing animal or vegetable matter in suspension or solution, and may include liquids containing chemicals in solution.

**Shall.** The word "shall" is a mandatory term.

**Side Vent.** A side vent is a vent connecting to the drain pipe through a fitting at an angle not greater than 45° to the vertical.

**Size of Pipe and Tubing.** See **Diameter.**

**Slope.** See **Grade.**

**Soil Pipe.** A soil Pipe is any pipe which conveys the discharge of water closets, urinals, or fixtures having similar functions, with or without the discharge from other fixtures to the building drain or building sewer.

**Soil Vent.** See **Stack-vent.**

**Stack.** A stack is the vertical main of a system of soil, waste, or vent piping.

**Stack Group.** Stack group is a term applied to the location of fixtures in relation to the

stack so that by means of proper fittings, vents may be reduced to a minimum.

**Stack-Vent.** A stack-vent (sometimes called a waste vent or soil vent) is the extension of a soil or waste stack above the highest horizontal drain connected to the stack.

**Stack-Venting.** Stack venting is a method of venting a fixture or fixtures through the soil or waste stack.

**Storm Drain.** See **Building Storm Drain.**

**Storm Sewer.** A storm sewer is a sewer used for conveying rain water, surface water, condensate, cooling water, or similar liquid wastes, exclusive of sewage and industrial waste.

**Subsoil Drain.** A subsoil drain is a drain which receives only subsurface or seepage water and conveys it to a place of disposal.

**Sump.** A sump is a tank or pit which receives sewage or liquid waste, located below the normal grade of the gravity system and which must be emptied by mechanical means.

**Supports.** Supports, hangers and anchors are devices for supporting and securing pipe and fixtures to walls, ceilings, floors, or structural members.

**Trap.** A trap is a fitting or device so designed and constructed as to provide, when properly vented, a liquid seal which will prevent the back passage of air without materially effecting the flow of sewage or waste water through it.

**Trap Seal.** The trap seal is the maximum vertical depth of liquid that a trap will retain, measured between the crown weir and the top of the dip of the trap.

**Vacuum Breaker.** See **Back-flow Preventer.**

**Vent Pipe.** See **Vent System.**

**Vent Stack.** A vent stack is a vertical vent pipe installed primarily for the purpose of providing circulation of air to and from any part of the drainage system.

**Vent System.** A vent system is a pipe or pipes installed to provide a flow of air to or from a drainage system or to provide a circulation of air within such system to protect trap seals from siphonage and back pressure.

**Vertical Pipe.** A vertical pipe is any pipe or fitting which is installed in a vertical position or which makes an angle of not more than  $45^{\circ}$  with the vertical.

**Waste.** See **Liquid Waste and Industrial Wastes.**

**Waste Pipe.** A waste pipe is a pipe which conveys only liquid waste, free of fecal matter.

**Water-distributing Pipe.** A water-distributing pipe in a building or premises is a pipe which conveys water from the water-service pipe to the plumbing fixtures and other water outlets.

**Water Main.** The water (street) main is a water-supply pipe for public or community use.

**Water Outlet.** A water outlet, as used in connection with the water distributing system, is the discharge opening for the water (1) to a fixture; (2) to atmospheric pressure (except into an open tank which is part of the water-supply system); (3) to a boiler or heating system; (4) to any water-operated device or equipment requiring water to operate, but not a part of the plumbing system.

**Water Riser Pipe.** See **Riser.**

**Water-service Pipe.** The water-service pipe is the pipe from the water main or other source of water supply to the building served.

**Water-supply System.** The water-supply system of a building or premises consists of the water-service pipe, the water-distributing pipes, and the necessary connecting pipes, fittings, control valves, and all appurtenances in or adjacent to the building or premises.

**Wet Vent.** A wet vent is a vent which receives the discharge from wastes other than water closets.

**Yoke Vent.** A yoke vent is a pipe connecting upward from a soil or waste stack to a vent stack for the purpose of preventing pressure changes in the stacks.

## **SECTION III. ADMINISTRATION.**

### **3.1 CHIEF PLUMBING INSPECTOR**

There shall be a Chief Plumbing Inspector who will be in charge of the Plumbing Department of Jefferson Parish. He shall be responsible for the enforcement of this Code, through approval of plans, tests and inspections.

### **3.2 MASTER PLUMBER**

Any person, firm or corporation engaged in the business of, or contracting for the construction, assembling, installing or repairing of plumbing fixtures, shall be licensed Master Plumber.

### **3.3 LICENSE REQUIRED**

Any person, firm or corporation who engages in the business of constructing, assembling,

installing or repairing of water, sewerage, or drainage pipes, or plumbing fixtures, who does not employ a licensed Master Plumber for direct supervision of same, shall be held in violation of this Code.

### **3.4 BOARD OF EXAMINERS OF PLUMBERS**

The Board of Examiners is hereby established for the purpose of examining all applicants for Master Plumber's License.

**3.4.1** The Board shall consist of 5 members, to-wit: the Chief Plumbing Inspector and four (4) Master Plumbers, or Louisiana Registered Mechanical Engineers, all of whom shall be residents of the Parish of Jefferson. Each Board Member shall receive \$50.00 for each meeting and/or examination attended; said monies to be paid out of Parish Funds. The number of meetings and examinations combined, shall not be less than four (4) nor to exceed twelve (12) annually.

### **3.5 TERM OF OFFICE**

The Chief Plumbing Inspector shall serve while holding his position. The appointments of the (4) other members shall be made to run concurrently with the term of office of the members of the Governing Authority of the Parish of Jefferson. Whenever any member of the Board shall cease to be a resident of the Parish of Jefferson, his membership shall automatically be vacated, and any member may be removed for cause by the Governing Authority of the Parish of Jefferson. Each Member shall serve until his successor is appointed and qualifies.

### **3.6 APPLICANTS**

Any person may apply for a Master Plumber's License who meet the following requirements:

(a) Applicant shall be of legal age.

(b) Be a citizen of the United States.

(c) Be a licensed journeyman plumber in the State of Louisiana for twenty-four (24) months or equivalent thereof.

(d) An applicant for license shall have at least 5 years experience in the occupation or business governed by the license for which he is applying, or shall be a graduate of any trade school or technical college of recognized standing, and in addition, shall have had one year's practical experience in that class of occupation or business governed by the license for which he is applying. Three letters of references shall be submitted attesting to the applicant's experience and character. At least one letter should be from his present or former employer, and the other two may be from licensed master plumbers. Applicant for license shall have and maintain an established place of business, not in violation of the zoning regulations of the Parish of Jefferson and have someone in attendance to receive complaints or notices from the Division of Regulatory Inspections or other persons concerned during regular business hours. All applications shall be notarized.

(e) Satisfactorily pass an examination.

(f) Applications must be submitted (30) days prior to examination.

### **3.7 EXAMINATION FEE**

The fee for each examination and re-examination for a Master Plumber's License, shall be Twenty-Five Dollars (\$25.00) and shall be paid to the Jefferson Parish General Fund for each examination on the date the applicant takes the examination.

### **3.8 EXAMINATION**

The examination for a Master Plumber's License consists of 3 parts and are graded as follows:

- |                                                                                                                   |     |
|-------------------------------------------------------------------------------------------------------------------|-----|
| (a) Business procedure (5) questions – Two points each .....                                                      | 10% |
| (b) Twenty (20) Practical questions – Two points each .....                                                       | 40% |
| (c) Drawing (5) Diagrams of various parts of plumbing installations,<br>ten points for each correct diagram ..... | 50% |

The applicant shall be required to obtain a minimum of 70% to pass the examination.

### **3.9 FAILURE TO PASS EXAMINATION**

In the event the applicant fails to pass the examination he shall be permitted to take further examinations after ninety (90) days have expired from date of previous examination.

**3.9.1** There shall be no limit to the number of examinations a person shall be allowed to undergo.

### **3.10 MASTER PLUMBER'S LICENSE**

A Master Plumber's License shall entitle the owner thereof to all rights and privileges of a Journeyman Plumber. All licenses issued during the year, unless sooner revoked, shall expire on December 31st of that year.

(1) A license once issued, may be renewed at any time during the months of January and February in the year following its issuance, upon payment of renewal fee herein specified, and such license may be renewed at any time after date of March 1st, by the payment of a renewal and delinquent fee.

(2) The renewal or revival fee, shall be paid before filing an application for permits after January 1st of each year. However, all jobs filed before September 1st of the previous year, shall be finalized before renewing his license.

(3) If a licensed Master Plumber fails to renew his license for 5 years, he shall be required to take a re-examination in order to apply for a license.

(4) After a plumber has passed a Jefferson Parish Plumbing Examination, he has 5 years to take out his license, if he fails to do so, he shall be required to take a re-examination in order to apply for a license.

### **3.11 MASTER PLUMBER'S FEES**

|                                |          |
|--------------------------------|----------|
| Master Plumber's License ..... | \$100.00 |
| Master Plumber's Renewal ..... | 25.00    |
| Examination Fee .....          | 25.00    |
| Revival Fee .....              | 25.00    |
| Delinquent Fee .....           | 10.00    |

These fees are to be paid to the Jefferson Parish General Fund.

(1) The renewal fee shall be paid annually before March 1st each year to entitle the Master Plumber to file permits to do work, and a Master Plumber delinquent after that date, shall be required to pay in addition to the \$25.00 Renewal Fee, a penalty of \$10.00, and should he fail to renew his license during the current year, he shall be required to pay in addition to the \$25.00 Renewal Fee, a penalty of \$25.00, Revival Fee, to qualify again.

### **3.12 MASTER PLUMBER'S REQUIREMENTS**

Every licensed Master Plumber shall have and maintain an established place of business, and have a sign displayed, and shall have someone in attendance. He shall have adequate equipment and tools, and show that he has paid Parish and State Licenses before any permit for work is granted. All plumbers shall have name, address, and phone number printed on truck which they use for work. The license of any person, firm or corporation shall be revoked for non-compliance with any of these regulations.

### **3.13 INSPECTION AND DEPOSIT FUNDS**

Any person, firm or corporation applying for permits to be used under the provisions of this Code, shall deposit and shall maintain on deposit with the Division of Regulatory Inspections, subject to provisions hereinafter contained, the sum of not less than Twenty-Five Dollars (\$25.00) nor more than One Hundred Dollars (\$100.00) in legal tender, as determined by the Director as a guarantee for payment of all fees, permits and inspections that may become due and owed by said person, firm or corporation, to the Division of Regulatory Inspections, and as further guarantee that all plumbing installations covered by said permits will be done in compliance with all provisions and requirements of this Code, as well as the rules and regulations governing same.

### **3.14 PERMITS**

Permits will be issued only to persons, firms or corporations employing a licensed Master Plumber.

### **3.15 AUTHORITY TO INSTALL PLUMBING**

No person shall install, construct, re-construct, alter or repair any plumbing system, or do any work in connection with the plumbing or plumbing systems connected to public sewers and water mains of Jefferson Parish, unless he is a licensed Master Plumber or is under the direct supervision of a Master Plumber.

### **3.16 FIRMS AND CORPORATIONS QUALIFICATIONS**

Any firm or corporation wishing to do business as such, shall file with the Division of

Regulatory Inspections a statement showing the composition of said firm, or if a corporation, a copy of its charter, and shall have at least one member or officer of said firm or corporation, a qualified licensed Master Plumber. Should such a member or officer of such a firm or corporation cease to represent it actively in its dealings with the Plumbing or other departments of the Division of Regulatory Inspections, then the license of such firm or corporation shall be void until another person has qualified as above described.

### **3.17 MASTER PLUMBER'S SIGN**

Each and every plumber licensed to do plumbing work, shall have displayed in a conspicuous place, in front of each and every place where plumbing work is being done by him, a sign, giving name and address of the firm doing the work, and the words "Licensed Master Plumber" in letters not less than two inches high, and the display of such sign by any one not duly licensed, shall constitute a violation of the plumbing rules and shall be punishable as such.

### **3.18 INVESTIGATION FEE**

Whenever any work for which a permit is required under the provisions of this Code, has commenced without a proper permit authorizing same, an investigation shall be made. The investigation fee shall be not less than Five Dollars (\$5.00), and not more than One Hundred Dollars (\$100.00), in addition to the original required permit fee. The amount of the investigation fee, shall be determined by the Chief Plumbing Inspector.

### **3.19 MASTER PLUMBER'S RESPONSIBILITY**

No person, firm or corporation, engaged in the Plumbing Business, shall allow his, her, or their name to be used by any other person, directly or indirectly, either to obtain a permit or permits, send in notice, make returns, or to do any work under his, her, or their license, under the penalty of having their license revoked.

### **3.20 SUSPENSION**

The license of any Master Plumber may be suspended by the Chief Plumbing Inspector and withdrawn by the Division of Regulatory Inspections for cause. See Article 401 and 402 in the Building Code.

(1) Any controversy as to the interpretation of this Code shall be brought before the Board of Standards and Appeals, and its decision shall be final.

### **3.21 LICENSED JOURNEYMAN PLUMBER**

A person having successfully met the requirements of the Louisiana State Board of Examiners of Journeyman Plumbers, and having in his possession a current license issued by said Board, shall be permitted, under supervision of a licensed master plumber, to construct, reconstruct, install, alter or repair any plumbing system or to do any plumbing work covered by this Code.

### **3.22 APPLICANTS FOR MAINTENANCE PLUMBER**

Any person may apply for a Maintenance Plumber's License, who meets the following requirements:

- (a) Applicant shall be of legal age.
- (b) Be a citizen of the United States.
- (c) Be a licensed journeyman plumber in the State of Louisiana for Twenty-four (24) months or equivalent thereof.
- (d) An applicant for Maintenance Plumber's License shall have at least 5 years experience in the Plumbing trade.
- (e) Satisfactorily pass an examination.
- (f) Applications must be submitted 30 days prior to examination.

### **3.23 MAINTENANCE PLUMBER'S FEES**

|                                     |         |
|-------------------------------------|---------|
| Maintenance Plumber's License ..... | \$25.00 |
| Maintenance Plumber's Renewal ..... | 25.00   |
| Examination Fee .....               | 25.00   |

### **3.24 MAINTENANCE PLUMBER'S EXAMINATION**

|                                                     |             |
|-----------------------------------------------------|-------------|
| (a) Experience .....                                | 25%         |
| (b) Twenty-Five (25) questions, 3 points each ..... | 75%         |
| <b>TOTAL .....</b>                                  | <b>100%</b> |

Applicant shall be required to have a minimum of 70 to pass examination.

### **3.25 MAINTENANCE PLUMBER'S RESPONSIBILITIES**

In hotels, office buildings, factories, hospitals, universities or similar buildings, the maintenance of existing plumbing systems may be performed by or under the supervision of a Licensed Maintenance Plumber in the employ of the person, firm or corporation responsible for such maintenance. His work, or that performed under his supervision, however, shall be limited to maintaining, repairing and/or replacing existing plumbing fixtures or pipes and shall not include the alteration, enlargement or addition of any part of the plumbing system. A Licensed Maintenance Plumber shall be permitted to perform only such plumbing maintenance work in or on the premises of his employer as specifically authorized by his license. It shall be the duty of the Licensed Maintenance Plumber to notify the Plumbing Department of any changes in his employment.

### **3.26 PLUMBING PLANS AND APPLICATIONS**

Before the processing with construction, alteration, reconstruction, repair (except as hereinafter provided) of any portion of the plumbing and drainage system in any building, suitable plans and specifications of all work proposed to be done shall be filed with the plumbing department and shall show clearly the size of pipe, kind of fittings, location of cleanouts, and all measurements of stacks, vents, and the location of rooms in which water closets and other fixtures are to be installed. Blanks furnished by the Plumbing Department, and properly signed by the owner, or authorized representative, shall be filed with the Division of Regulatory Inspections, by the Plumber. The blanks furnished by the Office of the Division of Regulatory Inspections, shall be properly filled out stating clearly the kind of work to be done and filed with the Division of Regulatory Inspections, during Office Hours of 8:30 A.M., until 4:30 P.M.

**3.26.1 Approval of Plans.** Plans and Specifications shall be submitted to the Plumbing Department for approval on all commercial buildings. Work described on approved plans, shall be started within six (6) months from the date of approval, or such plans shall again be presented for approval. The plans shall show a riser diagram, the size of water meter and the number of gallons of water per minute needed in the building at peak demand.

If water service to proposed building requires water service line larger than one (1) inch, drawing and specifications shall be prepared by, or under the direct supervision of a Louisiana Registered Mechanical Engineer. Plans shall bear the seal and signature of said Engineer.

(2) No filings are required in cases of repair or leaks on traps and faucets, etc.

### **3.27 AUTHORITY TO CHANGE PLANS**

No change or modification of approved plans will be permitted unless such change or modification be authorized by the owner or agent, submitted to and approved by the Inspection Department, and placed on file, as in the case of original work; and, further, no infraction of rules, not especially authorized in writing by the Chief Plumbing Inspector, shall be permitted.

(1) It shall be the responsibility of the Master Plumber to rectify any infraction of these rules and any work done by him or his workmen, even after the work has been passed upon, and final Certificate of Inspection has been issued, should it be proven that the Master Plumber or his workmen were at fault.

### **3.28 FIXTURES CONDEMNED**

Whenever any plumbing fixture in any building is condemned by the Plumbing Inspector on account of foul, unwholesome, imperfect or unsanitary condition, it shall be replaced by such equipment as required by these regulations.

### **3.29 VARIATIONS AND ALTERATIONS**

Where additional fixtures are required, or alterations are to be made, which cannot be practically constructed in accordance with all provisions of this Code, a permit of variation, in writing, may be issued by the Chief Plumbing Inspector for such work, if in his judgment, the conditions require it. Such additions or alterations shall be of a character that will make the plumbing system in the building, as a whole, conform to the intent of the sanitary requirements of this Code.



All plumbing and drainage work shall be done under the direct supervision of a Master Plumber for each class of work, and it shall be his responsibility to see that all work done by those under his direct supervision, complies with the requirements of this Code, and to remove any workman found incompetent.

### **3.31 AUTHORITY OF CHIEF PLUMBING INSPECTOR**

The Chief Plumbing Inspector shall have the authority to pass upon quality of material used and workmanship and the interpretation of the rules and regulations of this Code. Should a difference of opinion arise between the interpretation of the Master Plumber and that of the Chief Plumbing Inspector, the applicant may appeal the decision of the Chief Plumbing Inspector, to the Board of Standards & Appeals, giving full particulars relative to the subject case, with a copy of the Appeal furnished to the Chief Plumbing Inspector within 48 hours thereafter, otherwise, the decision of the Chief Plumbing Inspector, shall be final.

### **3.32 NOTIFICATION**

The office of the Chief Plumbing Inspector, shall be notified when the work is ready for inspection before 3:00 P.M., on the day previous to the one on which the inspection is desired. All work shall be left uncovered until inspected and approved. If any plumbing system or part thereof, which is installed, altered, or repaired, is covered before being inspected, tested and approved, as prescribed in this Code, it shall be uncovered for inspection after notice to uncover the work has been issued to the responsible party by the Chief Plumbing Inspector. Notices of violations shall be written and delivered, or mailed to the person responsible.

### **3.33 INSPECTION RECEIPT**

The Chief Plumbing Inspector or his representative conducting an inspection, shall give the Licensed Master or Licensed Journeyman Plumber an Inspection Receipt at the time of each inspection. This Inspection Receipt shall indicate the specific work inspected and shall be signed by the Licensed Master or Licensed Journeyman Plumber at the inspection. The Plumbing Inspector shall either approve or disapprove the work inspected and shall so indicate on the Inspection Receipt; and, if disapproved, shall indicate the specific reasons thereof.

### **3.34 DEFECTIVE PLUMBING**

Where there are valid reasons to believe that the plumbing system of any premise or building is defective, it shall be subject to test and inspection. Upon evidence that such plumbing does not comply with the intent of this Code, the owner shall be requested to have all defective plumbing corrected, as required in writing by the Chief Plumbing Inspector. After due notice, failure of the owner to comply, will give the Jefferson Parish Plumbing Department the right to order the discontinuance of water and/or sewer services to the property involved. The services shall remain discontinued until all requirements of the Plumbing Code have been met.

### **3.35 DEFECTS**

Any defects noted at time of inspection of work shall be corrected within forty-eight (48) hours. Failure on the part of the plumber to comply shall forfeit his right to file on any other work until corrections are made. A re-inspection shall be requested after corrections have been made to protect his rights to file on other work.

### **3.36 RESPONSIBILITY AND RE-TESTING**

It shall be the duty of the licensed master plumber to make sure that the plumbing system will stand the test prescribed before giving the notification.

(1) If the Chief Plumbing Inspector or his representative find that the work will not pass the test, the licensed master plumber shall be required to make the necessary corrections, and the work shall then be re-submitted for test or inspection.

### **3.37 TEST AND FINAL INSPECTIONS**

In any building where the plumbing systems have been thoroughly water tested by the plumber, in the presence of a Plumbing Inspector, a final inspection will be required only for the purpose of inspecting the connections and operating of all fixtures. Where fixtures are added to existing plumbing, and a water test cannot be conveniently applied, then a smoke, pressure or peppermint test shall be required, if such is found necessary.

### **3.38 INSPECTION FEES**

An inspection fee shall be paid prior to the issuance of any permits for the installation of plumbing systems installed in any building, under one roof. This charge will cover the approval of plans and all inspections, during the progress and completion of the work.

(1) Whenever more than one sewer connection is required for the same property, or additional plumbing is installed, or a building remodeled, or moved to another location, an additional charge shall be made, according to section 3.39.

### **3.39 FEES**

|                                                    |               |
|----------------------------------------------------|---------------|
| Each Fixture                                       | \$2.00        |
| Each Sewer Inspection                              | 2.00          |
| Water Meter for Gardens, Horses, etc.              | 5.00          |
| Lawn Sprinkler                                     | 5.00          |
| Swimming Pool                                      | 5.00          |
| Water Softener                                     | 5.00          |
| Separation of Water                                | 5.00          |
| Each Trailer                                       | 5.00          |
| Unnecessary Trips                                  | 5.00          |
| Special Inspection                                 | 10.00         |
| Transfer from Plumber to Plumber                   | 10.00         |
| Each Reduced Pressure Backflow Preventer 3/4" - 3" | 10.00         |
| Each Reduced Pressure Backflow Preventer 4" - 8"   | 20.00         |
| Investigation Fee                                  | 5.00 - 100.00 |

### **3.40 TRANSFER**

A transfer from one Licensed Master Plumber to another can only be made when the first plumber filing on job agrees to release job, has gone out of business, or is deceased; or by a directive from the proper authority.

(1) Transfers are permitted if the original plumber is notified in writing by the property owner, or private contractor, of the termination or cancellation of his contract, and a copy of said letter is furnished the Jefferson Parish Plumbing Department for its record. To verify the notice, the Chief Plumbing Inspector upon receiving a copy of letter from the owner, or private contractor, shall notify by Certified Mail, the original plumber of the transfer requested. After 72 hours, another licensed plumber shall file a new permit and take over job.

### **3.41 PENALTY**

A fine of not more than one hundred dollars or imprisonment for not less than thirty days, or both, shall be imposed for any violation of any provision of this Code, in conformity with Ordinance No. 2225 of Jefferson Parish Act 520 of 1952 session of Legislature.

## **SECTION IV. GENERAL REGULATIONS.**

### **4.1 APPROVED MATERIALS AND METHODS**

All plumbing systems, including repairs and additions, hereafter installed shall conform to the provisions of this Code.

### **4.2 SEWERAGE PIPING**

Horizontal sewerage piping shall be run in practical alignment at a uniform grade.

### **4.3 PIPE TRENCHES**

Water-service pipe or any underground water pipes shall not be run or laid in the same trench as a building sewer or drainage piping.

### **4.4 CHANGES IN DIRECTION**

**4.4.1 Fittings.** Changes in direction in drainage piping shall be made by the appropriate use of 45° wyes, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings. Single and double sanitary tees and short quarter bends may be used in drainage lines only where the direction of flow is from the horizontal to the vertical. P-traps and drum traps shall be connected to vertical stacks by sanitary tees and sanitary crosses only.

**4.4.2 Tees and Crosses.** Tees and crosses shall not be used in the horizontal sewerage system.

**4.4.3 Short Sweeps ¼ Bends.** Short sweep ¼ bends not less than 2 inches in diameter may be used in soil and waste lines where the change in the direction of flow is from either the horizontal to the vertical or from offsets between the ceiling and the next floor above.

#### **4.5 FITTINGS AND CONNECTIONS**

**(1) Fittings Prohibited.** No double-hub fitting shall be used as a drainage fitting. No running threads, bands, or saddles shall be used in the drainage system. No drainage or vent piping shall be drilled or tapped.

**4.5.2 Heal or Side-Inlet ¼ Bend.** A heel or side-inlet quarter bend shall not be used as a vent when the inlet is placed in a horizontal position.

**4.5.3 Obstruction to Flow.** No fitting, connection, device, or method of installation which obstructs or retards the flow of water, wastes, sewage, or air in the drainage or venting systems in an amount greater than the normal frictional resistance to flow, shall be used unless it is indicated as acceptable in this Code or is approved by the administrative authority as having a desirable and acceptable function and as of ultimate benefit to the proper and continuing functioning of the plumbing system. The enlargement of a 3-inch closet bend or stub to 4 inches shall not be considered an obstruction.

#### **4.6 REPAIRS AND ALTERATIONS**

**4.6.1 Existing Buildings.** In existing buildings or premises in which plumbing installations are to be altered, repaired, or renovated, necessary deviations from the provisions of this Code may be permitted, provided such deviations conform to the intent of the Code and are approved in writing by the administrative authority.

**4.6.2 Health or Safety.** Wherever compliance with all the provisions of this Code fails to eliminate or alleviate a nuisance which may involve health or safety hazards, the owner or his agent shall be ordered by the administrative authority to install such additional plumbing or drainage equipment as may be necessary to abate such nuisance.

#### **4.7 SEWER AND WATER PIPES**

Water service pipes, or any underground water pipes, shall not be run or laid in the same trench as the building sewer or drainage piping.

#### **4.8 TRENCHING, EXCAVATION AND BACKFILL**

**4.8.1 Tunneling and Driving.** Tunneling may be done in yards, courts, or driveways of any building site. When pipes are driven, the drive pipe shall be at least one size larger than the pipe to be laid.

**4.8.2 Open Trenches.** All excavations required to be made for the installation of a building-drainage system, or any part thereof beneath a building, shall be open trench work and shall be kept open until the piping has been inspected, tested, and accepted.

**4.8.3 Mechanical Excavation.** Mechanical means of excavation may be used..

**4.8.4 Backfilling.** Adequate precaution shall be taken to ensure proper compactness of backfill around piping without damage to such piping.

**4.8.5 Material Backfill.** Trenches, shall be backfilled in thin layers to 12" above the top of the piping with clean earth which shall not contain stones, boulders, cinder-fill, or other materials which would damage or break the piping or cause corrosive action. Mechanical devices such as bulldozers, graders, etc., may then be used to complete backfill to grade. Fill shall be properly compacted.

#### **4.9 STRUCTURAL SAFETY**

In the process of installing or repairing any part of a plumbing and drainage installation, the finished floors, walls, ceilings, tile work, or any other part of the building or premises which must be changed or replaced shall be left in a safe structural condition as determined by the proper administrative authority.

#### **4.10 WORKMANSHIP**

Workmanship shall conform to accepted good practice. All workmanship shall be of such character as to accomplish the results sought to be obtained in all sections of this Code.

#### **4.11 PROTECTION OF PIPES**

**4.11.1 Breakage and Corrosion.** Pipes passing under or through walls shall be protected from breakage. Pipes passing through or under cinder or concrete or other corrosive material, shall be

protected against external corrosion by protective coating, wrapping, or other means which will prevent such corrosion.

**4.11.2 Cutting or Notching.** No structural member shall be weakened or impaired by cutting, notching, or otherwise, except permitted by the administrative authority.

**4.11.3 Pipes Through Footings or Foundation Walls.** A soil, or waste pipe, or building drain passing under a footing or through a foundation wall, shall be provided with a relieving arch, or there shall be built into the masonry wall an iron pipe sleeve two pipe sizes greater than the pipe passing through, and in accordance with provisions of the Code.

**4.11.4 Freezing.** No water pipe shall be installed or permitted outside of a building unless adequate provision is made to protect same from freezing where necessary.

#### **4.12 SLEEVES**

Annular space between sleeves and pipes, shall be filled or tightly caulked with coal, tar, or asphaltum compound, lead or other material found equally effective and approved as such by the administrative authority.

#### **4.13 DAMAGE TO DRAINAGE SYSTEM OR PUBLIC SEWER**

It shall be unlawful for any person to deposit by any means into the building drainage system or sewer, any ashes, cinders, rags, or any inflammable, poisonous, explosive liquids, gases, oils, grease, or any other material which would, or could, obstruct, damage, or overload such systems.

#### **4.14 INDUSTRIAL WASTES**

Wastes detrimental to the public sewer system, or detrimental to the functioning of the sewage-treatment plant, shall be treated and disposed of as found necessary, and directed by the administrative authority, or other authority having jurisdiction.

#### **4.15 HORIZONTAL PIPE SUPPORTS**

Horizontal piping under all building slabs shall be supported at points sufficiently close to keep it in alignment and prevent sagging, but in no case at more than 5 feet. Pipes in the ground outside of all buildings shall be laid on a firm bed for their entire length.

#### **4.16 VERTICAL PIPE SUPPORTS**

Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents but in no case less than every other story height. (See Section 7.2).

#### **4.17 BASE OF STACKS**

Bases of Stacks shall be supported on substantial masonry piers, or metal supports, or by hangers.

#### **4.18 HANGERS AND ANCHORS**

Hangers and anchors shall be metal, of sufficient strength to support the pipe and its contents. They shall be securely attached to the building construction.

#### **4.19 STRAINS AND STRESSES**

All piping in a plumbing system shall be installed without undue strains and stresses and provision made for expansion, contraction, and structural settlement.

#### **4.20 DEAD ENDS**

In the installation or removal of any part of a drainage system, dead ends shall be avoided except where necessary to extend a cleanout so as to be accessible.

#### **4.21 TOILET FACILITIES FOR WORKMEN**

Suitable approved toilet facilities shall be provided and maintained in a sanitary condition for the use of workmen during construction.

#### **4.22 VENTILATION AND ILLUMINATION**

(a) Every bathroom or water-closet combination shall be provided with light and

ventilated by one or more windows opening to the outside of the building, or shall be ventilated by other means of ventilation.

(b) All bathrooms and water-closet compartments which are ventilated by mechanical ventilation, shall have fixed openings from adjacent rooms or corridors or from other approved sources ample to provide a sufficient inflow of air to make exhaust ventilation effective.

(c) Where a water-closet in a bathroom or water-closet compartment is completely enclosed by partitions, such enclosure shall be lighted and ventilated.

#### **4.23 VENTILATION DUCTS**

Ventilation ducts from fixtures and toilet rooms shall be exhausted to the outer air.

#### **4.24 RATPROOFING**

**4.24.1 Exterior Openings.** All exterior openings provided for the passage of piping shall be properly sealed with snugly fitting collars of metal or other approved ratproof material securely fastened into place.

**4.24.2 Interior Openings.** Interior openings through walls, floors and ceilings, shall be ratproofed.

#### **4.25 INDIVIDUAL SEWAGE DISPOSAL SYSTEMS**

**4.25.1 Installation.** When a public sewer is not available for use, drainage piping from buildings shall be connected to an individual sewage disposal system.

### **SECTION V. MATERIALS, WEIGHT AND QUALITY**

#### **5.1 MATERIALS**

**5.1.1 Minimum Standards.** The materials listed in this section shall conform at least to the standards cited when used in the construction, installation, alteration, or repair of any part of a plumbing system constructed, except that the Chief Plumbing Inspector may allow the extension, addition, or relocation of existing soil, waste, or vent pipes with materials of like grade or quality.

**5.1.2 Use of Materials.** All material shall conform to at least one of the standards listed in Table 5.5. Its use shall be further governed by the requirements imposed in other Sections of this Code. Materials not included in the table shall be used only as provided for in Section 5.1.1. Materials shall be free of manufacturing defects or damage, however occasioned, which would, or would tend to, render such materials defective, unsanitary, or otherwise improper to accomplish the purpose of this Code.

**5.1.3 Specifications for Materials.** Standard specifications for materials for plumbing installations are listed in Table 5.5.

(A) Abbreviations used in Table 5.5 refer to standards of specifications as identified below:

**A.S.A.:** American Standards approved by the American Standards Association, 70 East 45th Street, New York 17, New York.

**A.S.T.M.:** Standards and Tentative Standards published by the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania.

**F.S.:** Federal Specifications published by the Federal Specifications Board and obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

**A.W.W.A.:** Standards and Tentative Standards published by the American Water Works Association, 521 Fifth Avenue, New York 17, New York.

**C.S.:** Commercial Standards representing recorded voluntary recommendations of the trade, issued by the United States Department of Commerce, and obtainable from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

**M.S.S.:** Standards published by the Manufacturers Standardization Society of the Valve and Fittings Industry, 420 Lexington Avenue, New York 17, New York.

**S.P.R.:** Simplified Practice Recommendations representing recorded recommendations of the trade and issued by the U.S. Department of Commerce, Washington 25, D.C.

(B) A.S.T.M.: Standards are issued under fixed designations; the final number indicates the year of original adoption, or in the case of revision, the year of last revision. "T" indicates Tentative. In the CS series of standards, also, the final number indicates the year of issue. For Federal Specifications the year indicated in Table 5.5 or amendment.

(C) All standards and specifications for materials are subject to change. Designations carrying indication of the year of issue may thus become obsolete. Table 5.5 gives the full designations of standards current at the time this Code is printed.

**5.1.4 Identification of Materials.** Each length of pipe and each pipe fitting, trap, fixture and device used in a plumbing system shall have cast, stamped, or indelibly marked on it, the marker's mark or name, the weight and the quality of the product, when such marking is required by the approved standard which applies.

**5.1.5 Used Materials.** Used materials are prohibited in the water supply system unless thoroughly cleaned, sterilized or chlorinated to the satisfaction of the Board of Health and the Jefferson Parish Plumbing Department.

## 5.2 SPECIAL MATERIALS

### 5.2.1 Lead or Copper. (See Table 5.5) Sheet lead shall not be less than the following:

For safe pans — not less than 2½ pounds per square foot.

For flashings of vent terminals — not less than 2½ pounds per square foot.

Lead bends and lead traps shall be not less than 1/8 inch wall thickness.

Sheet copper shall be not less than 16 ounces per square foot for copper shower pans, flashings, and vent terminals when used in connection with DWV copper tubing.

(1) Roof flashings will be accepted in 2½ pounds per square foot sheet lead or sixteen ounce copper and shall be of thimble and counter flashing type.

(2) The roof flange shall be made so that a coverage at the base shall be of a width and length not less than eight (8) inches plus the diameter of the boot.

(3) The thimble shall have a minimum of six (6) inches from the base of the ridge (the highest junction point of the boot) to its top.

(4) The thimble shall have a minimum of six (6) inches from the turned in rim at the top to the bottom of the thimble.

(5) Adjustable flashings (ballast or rib type) shall have an oval opening at base. (This will allow the flange to take shape with the pitch of the roof.)

(6) All roof flashings shall be indelibly marked for identification.

**5.2.2 Caulking Ferrules.** Brass caulking ferrules shall be of brass pipe conforming to F.S. WWP-351 or heavy cast brass with weights and dimensions in accordance with the Table below. Seamless copper ferrules may be used in lieu of cast brass, provided they correspond in size and weight.

| Pipe Size<br>Inches | Actual Outside<br>Diameter Inches | Length<br>Inches | Weight        |
|---------------------|-----------------------------------|------------------|---------------|
| 2                   | 2-1/4                             | 4-1/2            | 1 lb.         |
| 3                   | 3-1/4                             | 4-1/2            | 1 lb. 12 ozs. |
| 4                   | 4-1/4                             | 4-1/2            | 2 lbs. 8 ozs. |

**5.2.3 Soldering Bushings.** Soldering bushings shall be of red brass in accordance with the following.

| Pipe Size<br>Inches | Minimum<br>Weight Each |    | Pipe Size<br>Inches | Minimum<br>Weight Each |    |
|---------------------|------------------------|----|---------------------|------------------------|----|
|                     | lb                     | oz |                     | lb                     | oz |
| 1-1/4               | 0                      | 6  | 2-1/2               | 1                      | 6  |
| 1-1/2               | 0                      | 8  | 3                   | 2                      | 0  |
| 2                   | 0                      | 14 | 4                   | 3                      | 8  |

**5.2.4 Floor Flanges.** Floor flanges for water closets or similar fixtures shall not be less than 1/8 inch thick for brass, 1/4 inch thick and not less than 2 inch caulking depth for cast iron or galvanized malleable iron; if of hard lead, they shall weight not less than 1 pound 9 ounces, and be composed of lead alloy with not less than 7.75 per cent antimony by weight. Flanges shall be soldered to lead bends and stubs or shall be caulked or screwed when used with other metals. Soldered flanges used with approved copper tube are permitted when a nonflexible joint can be used in fire resistive construction or concrete slab, but such soldered flange shall not be permitted in frame construction. Closet screws and bolts shall be brass. Approved plastic floor flanges shall be used when plastic soil pipe is used.

### 5.2.5 Cleanouts.

(a) Cleanout plugs shall be flanged type and shall be of brass and shall conform to Federal Specifications WW-P-401, Commercial Standards specifications 301-67T and Commercial Standards HS-67.

(b) Plugs may have raised square heads or countersunk.

(c) Countersunk heads should be used where raised heads may cause a hazard.

(d) Cleanouts used in conjunction with plastic shall be of same material as piping and

fittings used and shall be marked with name or type of plastic and manufacturer's name or trademark.

### 5.3 NEW MATERIALS AND METHODS

5.3.1 Approval. The use of any material, device, method of assembly, installations or appurtenances approved by the Chief Plumbing Inspector in writing shall be permitted.

### 5.4 APPROVED MATERIALS

All new material shall be approved by the Board of Standards and Appeals.

5.4.1 Specific Usage. Each Section of the Code indicates specifically the type of material permitted for the various parts of the plumbing system. Table 5.5 provides the specifications for each of those materials.

TABLE 5.5 STANDARDS FOR PLUMBING MATERIALS  
(3)

| Description                                                                                               | ASA<br>(USASI) | ASTM    | FS                | OTHER     |
|-----------------------------------------------------------------------------------------------------------|----------------|---------|-------------------|-----------|
| <u>Ferrous Pipe And Fittings:</u>                                                                         |                |         |                   |           |
| Cast iron soil pipe and fittings,                                                                         | A40.1-1935     | A74-42  | WW-P-401(3)-1951  | CS-188-64 |
| Cast iron water pipe                                                                                      | A21.2-1953     | None    | WW-P-421a-1955    | None      |
| Cast iron water pipe (cast in metal molds)                                                                | A21.6-1962     | None    | None              | None      |
| Cast iron water pipe (cast in sand lined molds)                                                           | A21.8-1962     | None    | None              | None      |
| Cast iron water pipe fitting                                                                              | A21.10-1964    | None    | None              | None      |
| Cast iron water pipe (2")                                                                                 | A21.12-1965    | None    | None              | None      |
| Cast iron pipe, drainage, vent & waste                                                                    | None           | None    | WW-P-356-1936     | None      |
| Cast iron pipe, pressure(50lb.)(gas and water)                                                            | None           | None    | WW-P-360a-1959    | None      |
| Cast iron (threaded) pipe                                                                                 | A40.5-1943     | None    | WW-P-356-1936     | None      |
| Cast iron (threaded) fittings                                                                             | B16.4-1963     | None    | WW-P-501c(1)-1957 | None      |
| Cast iron drainage fittings                                                                               | B16.12-1965    | None    | WW-F-491a(1)-1946 | None      |
| Galvanized pipe and fittings                                                                              | None           | None    | WW-P-406(1)-1945  | None      |
| Malleable iron fitting, (threaded) 150 lbs.                                                               | B16.3-1963     | None    | WW-P-521d-1959    | None      |
| Steel pipe                                                                                                | B36.1-1965     | A53-65  | WW-P-406a-1957    | None      |
| Steel pipe (seamless and welded, black and zinc coated) (galv.)                                           | B36.20-1964    | A120-65 | WW-P-406b-1961    | None      |
| Union, pipe steel, or malleable iron, threaded pipe connection 250 psi, WSP, 500 psi WOG (cold, nonshock) | None           | None    | WW-O-531a-1957    | None      |

TABLE 5.5 (Continued)

|                                                                                 |                         |         |                   |        |
|---------------------------------------------------------------------------------|-------------------------|---------|-------------------|--------|
| Unions; malleable iron or steel 300 lbs.                                        | None                    | None    | WW-U-536(1)-1933  | CS7-29 |
| Wrought-iron pipe                                                               | B36.2-1964              | A72-64T | WW-P-441b(1)-1953 | None   |
| Ferrous alloy pipe                                                              | None                    | A53-67  | WW-P-404C-1961    |        |
| Valves, cast iron, gate, 125 and 250 lb. threaded and flanged                   | None                    | None    | ASAD-36-1-1937    |        |
| Pipe fittings, bronze and ferrous (bushings, plugs and locknuts); threaded      | None                    | None    | WW-V-58(1)-1946   | None   |
| Nipples, pipe, threaded                                                         | None                    | None    | WW-P-471(1)-1946  | None   |
|                                                                                 | None                    | None    | WW-N-351a-1956    | CS5-46 |
| <u>Non-ferrous Metallic Pipe and Fittings:</u>                                  |                         |         |                   |        |
| Brass fittings for flared copper tube                                           | B16.26-1964             | None    | None              | None   |
| Welded brass tube                                                               | H36.1-1963 <sup>1</sup> | B135-63 | WW-T-791(1)-1933  | None   |
| Welded red brass pipe                                                           | H27.1-1963 <sup>1</sup> | B43-62  | WW-P-351(1)-1930  | None   |
| Brass or bronze flanges and flanged fittings, 150 and 300 lbs.                  | B16.24-1962             | None    | None              | None   |
| Brass or bronze screwed fittings, 125 and 250 lbs.                              | B16.15-1964             | None    | WW-P-460-1945     | None   |
| Cast-bronze solder-joint pressure fittings                                      | B16.18a-1967            | None    | None              | None   |
| General requirements for wrought seamless copper and copper alloy pipe and tube | H23.4-1964 <sup>1</sup> | B251-64 | None              | None   |
| Cast bronze solder-joint drainage fittings                                      | B16.23-1960             | None    | None              | None   |
| Copper pipe                                                                     | H26.1-1963 <sup>1</sup> | B42-62  | WW-P-377b(1)-1955 | None   |
| Copper pipe, threadless (TP)                                                    | H26.2-1963              | B302-62 | None              | None   |
| Seamless Copper tube                                                            | H23.3-1965              | B75-65  | WW-T-797a-1958    | None   |
| Welded copper tube                                                              | None                    | B447-67 | None              | None   |



TABLE 5.5 (Continued)

|                                                                                |             |                        |                   |                      |
|--------------------------------------------------------------------------------|-------------|------------------------|-------------------|----------------------|
| Seamless copper water tube, types K, L, M                                      | H23.1-1963  | B88-66A                | WW-T-799a(1)-1946 | None                 |
| Seamless copper drainage tube, type DWV                                        | H23.6-1963  | B306-66A               | None              | CS-229-60            |
| Copper (wrought) and wrought bronze solder joint fittings                      | B16.22-1963 | None                   | None              | None                 |
| Wrought copper joint drainage fittings                                         | B16.29-1966 | None                   | None              | None                 |
| Flared fittings for copper water tube                                          | B16.26-1958 | None                   | None              | None                 |
| Lead pipe and traps                                                            | None        | None                   | WW-P-325-1944     | CS-958-96-41         |
| Brass fittings for flared copper tube                                          | B16.26-1967 | None                   | None              | None                 |
| Unions, brass or bronze, 250 lbs.                                              | None        | None                   | WW-U-516-1933     | None                 |
| Valves, bronze; angle, check and globe, 125 and 150 lbs., threaded and flanged | None        | None                   | WW-V-51a(2)-1954  | None                 |
| Valves, bronze; gate, 125 and 150 lbs., threaded and flanged                   | None        | None                   | WW-V-54(2)-1954   | None                 |
| Pipe fittings, bronze and ferrous (bushings, plugs and locknuts); threaded     | None        | None                   | WW-P-471(1)-1946  | None                 |
| <b><u>Non-Metallic Pipe and Fittings:</u></b>                                  |             |                        |                   |                      |
| Asbestos cement non-pressure (sewer) pipe                                      | None        | C428-65T               | SS-P-331b(2)-1965 | None                 |
| Asbestos cement building sewer pipe <sup>2</sup>                               | None        | None                   | None              | None                 |
| Asbestos cement pressure (water) pipe                                          | None        | C-296-65T              | SS-P-351a-1953    | AWWA C400-64T        |
| Bituminized fiber sewer pipe and fittings                                      | None        | D1861-64<br>D1862-64   | SS-P-356-1955     | CS116-54<br>CS226-59 |
| Perforated bituminized fiber pipe for septic tank disposal fields              | None        | D2312-64T<br>D2313-64T | None              | None                 |

TABLE 5.5 (Continued)

|                                                                                                |             |                                                              |                      |                                                                                  |
|------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------|
| Clay drain tile                                                                                | A6.1-1963   | C4-62                                                        | SS-T-310-1942        | None                                                                             |
| Concrete sewer pipe, reinforced                                                                | None        | C76-65T                                                      | SS-P-375-1956        | None                                                                             |
| Concrete sewer pipe, non-reinforced                                                            | None        | C14-65                                                       | SS-P-371a-1956       | None                                                                             |
| Concrete pipe, pressure, reinforced concrete, pretensioned reinforcement (steel cylinder type) | None        | None                                                         | SS-P-381-1955        | None                                                                             |
| Perforated asbestos cement pipe                                                                | None        | C-508                                                        | None                 | None                                                                             |
| Plastic water service, acrylonitrile-butadiene styrene (ABS) pipe and fittings                 | None        | D1527-65T<br>D2282-65<br>D2465-65T<br>D2468-65T<br>D2469-65T | None                 | CS218-59<br>CS254-63<br>NSF 14<br>(1965)                                         |
| Plastic water service, polyethylene (PE) pipe and fittings                                     | B16.27-1962 | D2104-64T<br>D2239-65<br>D2447-65T                           | L-P-545<br>L-P-00315 | FHA-UM-31b<br>CS197-60<br>CS255-63<br>NSF 14<br>(1965)                           |
| Plastic water service, polyvinyl chloride (PVC) pipe and fittings                              | None        | D1785-64T<br>D2241-65<br>D2464-65T<br>D2466-65T<br>D2467-65T | L-P-540              | CS207-60<br>CS256-63<br>NSF 14<br>(1965)                                         |
| Plastic drain, waste and vent, acrylonitrile-butadiene-styrene (ABS) pipe and fittings         | None        | None                                                         | L-P-322a             | CS270-65<br>FHA UM-33<br>WPOA P3<br>17-65<br>WPOA I3<br>5-65<br>NSF 14<br>(1965) |

TABLE 5.5 (Continued)

|                                                                            |              |          |                   |                              |
|----------------------------------------------------------------------------|--------------|----------|-------------------|------------------------------|
| Plastic drain,waste and vent,polyvinyl chloride(PVC)pipe and fittings      | None         | None     | L-P-00320         | CS272-65<br>NSF 14<br>(1965) |
| Vitrified clay sewer pipe standard strength                                | A106.3-1965  | C13-64T  | SS-P-361b-1956    | None                         |
| Vitrified clay sewer pipe, extra strength                                  | None         | C200-65T | SS-P-361b-1956    | None                         |
| Vitrified clay sewer pipe, perforated standard strength                    | A106.1-1962  | C211-61T | None              | CS143-59                     |
| <u>Plumbing Fixtures:</u>                                                  |              |          |                   |                              |
| Drinking fountains                                                         | Z4.2-1942    | None     | None              | None                         |
| Enameled cast-iron plumbing fixtures                                       | None         | None     | None              | CS77-63                      |
| Earthenware(vitreous glazed)plumbing fixtures                              | None         | None     | None              | CS111-43                     |
| Formed metal porcelain enameled sanitary ware                              | None         | None     | WW-P-541b(2)-1958 | None                         |
| Heaters,water,instantaneous(steam-water converter type)                    | None         | None     | WW-H-191-1954     | None                         |
| Plumbing Fixtures(for land use)                                            | None         | None     | WW-P-541b(2)-1958 | None                         |
| Staple porcelain plumbing fixtures                                         | None         | None     | None              | CS4-29                       |
| Staple vitreous China plumbing fixtures                                    | None         | None     | None              | CS20-63                      |
| Stillls,water,portable(without Heating device)for U.S.P. "distilled water" | None         | None     | RR-S-726(1)-1950  | None                         |
| Porcelain-enameled tanks for domestic use                                  | None         | None     | None              | CS115-60                     |
| Gelcoated tubs and enclosures                                              | Z-124.1-1967 | None     | None              | None                         |
| Gelcoated shower and receptors                                             | Z-124.2-1967 | None     | None              | None                         |

TABLE 5.5 (Continued)

| <u>Miscellaneous Materials and Standards:</u>                                                                                 |                             |                   |                   |                 |
|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------|-------------------|-----------------|
| Automatic relief valves                                                                                                       | Z21.22-1964<br>Z21.22a-1965 | None              | None              | None            |
| Air gap standards                                                                                                             | A40.4-1942                  | None              | None              | None            |
| Backflow preventers                                                                                                           | A40.6-1943                  | None              | None              | None            |
| Brass cleanout plugs                                                                                                          | None                        | None              | WW-F-401(3)-1951  | None            |
| Caulking lead, type I                                                                                                         | None                        | None              | Q4-L-156(1)-1946  | CS94-41         |
| Cement lining                                                                                                                 | A21.4-1964                  | None              | WW-P-406a-1957    | None            |
| Coal-tar enamel, protective coating                                                                                           | None                        | None              | None              | AWWA<br>C204-51 |
| Fixture setting compound                                                                                                      | None                        | None              | HH-C-536a-1954    | None            |
| Flange dimensions, standard (classes 125<br>and 250 cast iron flanges, classes 150, 250<br>and 300 bronze flanges) (land use) | None                        | None              | WW-F-406a(1)-1943 | None            |
| Galvanized iron and steel sheets                                                                                              | G8.8-1937                   | A163-63           | Q4-1-716(3)-1948  | None            |
| Gaskets, plumbing-fixture-setting                                                                                             | None                        | None              | HH-G-116-1936     | None            |
| Grease interceptors                                                                                                           | None                        | None              | None              | PDI-G101        |
| Hangers and supports, pipe                                                                                                    | None                        | None              | WW-H-171B-1959    | None            |
| Hose clamps                                                                                                                   | None                        | None              | WW-C-440a-1959    | None            |
| Resilient joints                                                                                                              | None                        | C425-64           | None              | None            |
| Rubber gaskets (concrete sewer pipe)                                                                                          | None                        | C443-65           | None              | None            |
| Sheet brass                                                                                                                   | None                        | B36-61<br>B121-60 | QQ-B-613a-1957    | None            |
| Sheet copper                                                                                                                  | None                        | B152-60           | QQ-C-501          | None            |

TABLE 5.5 (Continued)

|                                                                                    |                                 |           |                   |               |
|------------------------------------------------------------------------------------|---------------------------------|-----------|-------------------|---------------|
| Sheet lead, Grade A                                                                | None                            | None      | QQ-L-201a(1)-1953 | None          |
| Soft solder                                                                        | None                            | B32-60aT  | QQ-S-571c-1958    | None          |
| Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic pipe and fittings | None                            | D2235-63T | None              | None          |
| Steel septic tanks                                                                 | None                            | None      | None              | CS177-51      |
| Traps, Steam, Thermostatic (for land use)                                          | None                            | None      | WW-T-696a-1956    | None          |
| Valve: radiator, air, thermostatic (gravity steam heating systems)                 | None                            | None      | WW-V-151(1)-1938  | None          |
| Domestic Hot Water Heaters                                                         | Z21.10.1-1962<br>Z21.10.1a-1962 | None      | W-H-196-1952      | None          |
| Water Hammer arrestors                                                             | None                            | None      | None              | PDI-WH<br>201 |

- (1) ASA H 23.4-1964 is applicable to and forms a part of the standards indicated.
- (2) Asbestos cement building sewer pipe in sizes 4", 5" and 6", classes 1500, 2400 and 3300 shall meet a minimum crushing strength of 1500 pounds per foot for class 1500, 2400 pounds per foot for class 2400 and 3300 pounds per foot for 3300, when tested in accordance with section 10 of ASTM C500-63T "Methods of Testing Asbestos and Cement Pipe". Standard lengths shall be 5, 6.5, 10 or 13 feet.
- (3) Inclusion of the above specifications in these rules shall not imply that all of the materials listed are approved without restriction for use in Jefferson Parish, or supercede specific requirements of the rules of the Plumbing dept.

**6.1 TIGHTNESS**

**6.1.1 Joints and Connections.** All joints and connections shall be made gas tight and watertight.

**6.2 TYPES OF JOINTS**

**6.2.1 Caulked Joints.** Caulked joints for cast-iron bell and spigot soil pipe shall be firmly packed with oakum or hemp and filled with molten lead not less than 1-inch deep and caulked tight, or an approved neoprene gasket. No paint, varnish or other coatings shall be permitted on the jointing material until after the joint has been tested and approved.

**6.2.2 Threaded Joints.** All screw joints shall be American National Taper Pipe Thread, ASA, B2.1-1945 or F.S. GGG-P 351A. All burrs shall be removed. Pipe ends shall be reamed or filed out to size of bore, and all chips shall be removed. Pipe joint cement and paint will be permitted only on male threads.

**6.2.3 Wiped Joints.** Joints in lead pipe or fittings, or between lead pipe or fittings brass or copper pipe, ferrules, solder nipples, bushings, or traps, shall be full-wiped joints. Wiped joints shall have an exposed surface on each side of a joint not less than 3/4-inch and a minimum thickness at the thickest part of the joint not less than 3/8-inch. Joints between lead pipes and cast-iron, steel, or wrought iron shall be made by means of a caulking ferrule, soldering nipple, or bushing.

**6.2.4 Soldered or Sweat Joints.** Soldered or sweat joints for tubing shall be made with approved fittings. Surfaces to be soldered or sweated shall be cleaned bright. The joints shall be properly fluxed and made with approved flux and solder. Joints in copper water tubing shall be made by the appropriate use of approved brass or wrought copper water fittings, properly sweated or soldered together.

**6.2.5 Flared Joints.** All flared joints for soft copper water tubing shall be made with fittings meeting approved standards. The tubing shall be expanded with a proper flaring tool.

**6.2.6 Brazed Joints.** Brazed joints shall be made in accordance with the provisions of Section 6 of the Code for Pressure Piping, ASA, B31.1-1942 (with 1944 and 1947 Supplements).

**6.2.7 Burned Lead Joints.** Lead "burned" joints shall be lapped and the lead shall be fused together to form a uniform weld at least as thick as the lead being joined.

**6.2.8 Plastic Joints.** ABS or PVC plastic joints shall be solvent cemented, using proper cement. All pipe cuts are to be square, both pipe and fittings thoroughly cleaned. Joints to be installed as per appendixes of ASTM Standard Specifications D-2661-68 for ABS and D-2665-68 for PVC or latest revisions thereof.

**6.2.9 No Hub Joints.** No hub joints for no hub pipe shall be made with approved fittings. Elastomer sleeve with a stainless steel clamp. The clamp joint shall conform to the cast iron soil pipe institute standard 301-67 T, and shall be labeled as required therein.

**6.3 USE OF JOINTS**

**6.3.1 Cast Iron Pipe.** Joints in cast iron pipe shall be either caulked, screwed, elastomer sleeve with stainless steel clamp, or the use of an approved type neoprene gasket that is compressed when the spigot is inserted into the bell as provided in Sections 6.2.1, 6.2.2 and 6.3.5. Elastomer sleeve with stainless steel clamp is prohibited for use in underground installation.

**6.3.2 Screw Pipe to Cast Iron.** Joints between wrought-iron, steel, brass or copper pipe, and cast-iron pipe shall be either caulked or threaded joints made as provided in Section 6.2.1 and 6.2.2, or shall be made with approved adapted fittings.

**6.3.3 Lead to Cast-Iron, Wrought-Iron or Steel.** Joints between lead and cast-iron, wrought-iron, or steel pipe shall be made by means of wiped joints to a caulking ferrule, soldering nipple, or bushing as provided in Section 6.2.3.

**6.3.4 Copper Water Tube.** Joints in copper tubing shall be made either by the appropriate use of approved compression fittings as provided in Sections 6.2.4 and 6.2.5.

**6.3.5 Elastomer Sleeve with Clamp.** Joints in cast iron may be made by the means of an approved elastomer sleeve secured by a stainless steel retaining clamp for above ground installations only and shall comply to installation suggestions for No-Hub Pipe and Fittings as adopted by the Cast Iron Soil Pipe Institute in their pamphlet No. 100, of 1967.

**6.3.6 No Hub Pipe.** No Hub pipe is prohibited for use in underground installations. When plain or no hub pipe and fittings are used, it shall be joined together by means of neoprene gasket and the 300 Series Stainless Steel Clamp. The pipe shall conform to A.S.T.M. Standard No. 301-67-T, and the Clamp Joint shall conform to the cast-iron soil pipe institute Standard

301-67-T, and shall be labeled as required therein. No other type gasket or clamp will be accepted.

**6.3.7 Plastic Connections to Non-Plastic.** When connecting plastic pipe to other types of pipe, use only approved type fittings and adapters designed for the specific transition intended.

## **6.4 SPECIAL JOINTS**

**6.4.1 Copper Tubing to Screwed Pipe Joints.** Joints from copper tubing to threaded pipe shall be made by the use of brass converter fittings. The joint between the copper pipe and the fitting shall be properly sweated or soldered, and the connection between the threaded pipe and the fitting shall be made with a standard pipe size screw joint.

**6.4.2 Expansion Joints.** Expansion joints shall be used and placed in accessible locations where computed expansion exceeds allowable maximums for each material. These may be in the form of expansion loops, especially under slabs or mechanical expansion joints in areas of easy access.

**6.4.3 Ground Joint Brass Connections.** Ground joint brass connections which allow adjustment of tubing, but provide a rigid joint when made up, shall not be considered as slip joints.

**6.4.4 Slip Joints.** In sewerage and water piping, slip joints may be used only on the inlet side of the trap or in the trap seal and on water piping of the exposed fixture supply. The use of a neoprene gasket for jointing cast-iron shall not be considered a slip joint.

**6.4.5 Compression joints.** Compression joints made of an approved type will be accepted on terra-cotta pipe for sewer lines, outside of the building only.

## **6.5 WATER CLOSET, PEDESTAL URINAL, AND TRAP STANDARD SERVICE.**

**6.5.1 Fixture Connections between pipes and water closets, floor outlet service sinks, pedestal urinals, and earthenware trap standards,** shall be made by means of brass, hard-lead, or iron flanges, caulked, soldered, or screwed to the sewer pipe. The connection shall be bolted, with an approved gasket or washer or setting compound, between the earthenware and the connection. The floor flange shall be set on an approved firm base.

**6.5.2 Water closets set on floors supported by wood frame construction** shall be connected to the sewer pipe by means of lead pipe with at least six (6) inches of lead pipe between the floor flange and the wiped joint at the brass ferrule. This requirement is inapplicable whenever said building is of fire resistive construction.

## **6.6 PROHIBITED JOINTS AND CONNECTIONS**

**6.6.1 Sewerage System.** Any fitting or connection which has an enlargement chamber or recess with a ledge, shoulder, or reduction of pipe area, which offers an obstruction to flow through the sewer, is prohibited.

**6.6.2** No fitting or connection which offers abnormal obstruction to flow shall be used. The enlargement of a 3-inch closet bend or stub to 4 inches shall not be considered an obstruction.

## **6.7 WATERPROOFING OF OPENINGS**

(1) Joints at the roof around vent pipes shall be made watertight by the use of lead or copper flashings. (Section 5.2.1). Exterior wall openings shall be made water tight.

## **6.8 INCREASERS AND REDUCERS**

(1) Where different sizes of pipes, or pipes and fittings, are to be connected, the proper size increasers or reducers or reducing fittings shall be used between the two sizes.

## **SECTION VII. HANGERS AND SUPPORTS**

### **7.1 STRAINS AND STRESSES**

**7.1.1 General.** Piping in a plumbing system shall be installed without undue strains and stresses, and provision shall be made for expansion, contraction, and structural settlement.

### **7.2 VERTICAL PIPING**

**7.2.1 Attachment.** Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.

**7.2.2 Cast-Iron Soil Pipe.** Cast-iron soil pipe shall be supported at not less than every story height and at its base.

**7.2.3 Screwed Pipe.** Screwed pipe (SPS) shall be supported at not less than every other story height, or as necessary to provide expansion.

**7.2.4 Copper Tubing.** Copper tubing shall be supported at each story for piping 1½ inches and over, and at not more than 4 foot intervals for 1¼ inches and smaller.

**7.2.5 Lead Pipe.** Lead pipe shall be supported at intervals not exceeding 4-feet.

**7.2.6 Plastic Pipe.** Plastic piping shall be supported at each story for piping 2 inch or larger and not more than 4 foot intervals for piping 1½ inch in diameter. Where the total height of a stack exceeds 40 feet, only the top 40 feet in height may be plastic pipe.

### **7.3 HORIZONTAL PIPING**

**7.3.1 Supports.** Horizontal piping shall be supported at sufficiently close intervals to keep it in alignment and prevent sagging.

**7.3.2 Cast-Iron Soil Pipe.** Cast-iron soil pipe shall be supported at not more than 5-foot intervals at all risers. Where used under concrete floor slabs on grade or fill, pipe shall be hung with at least 3/8 inch round galvanized or coated steel hangers secured in the slab above.

**7.3.3 Screwed Pipe.** Screwed pipe, (SPS) shall be supported at intervals not exceeding 5-feet.

**7.3.4 Copper Tubing.** Copper tubing shall be supported at approximately 6-foot intervals for piping 1½ inches and smaller and at 10-foot intervals for piping 2 inches and larger.

**7.3.5 Lead Pipe.** Lead pipe shall be supported by straps or otherwise for its entire length.

**7.3.6 In Ground.** Piping in the ground shall be laid on a firm bed for its entire length, except where support is otherwise provided, and which is adequate in the judgement of the Plumbing Inspector.

**7.3.7 Plastic Pipe.** Plastic pipe shall be supported at not more than five (5) foot intervals and at all risers.

**7.3.8 Plastic Pipe Underground.**

(a) Plastic pipe when installed underground shall be installed on a firm bed of earth, properly tamped and graded.

Additional selected backfill shall be placed by shovel at sides and over top of pipe at least 6" and hand tamped.

The remainder of the trench may be backfilled by any conventional means thereafter.

(b) Plastic pipe (underground soil, waste and vent piping under concrete slab). When used under concrete floor slabs on grade or fill, pipe shall be hung with at least 3/8 inch round galvanized or coated steel hangers secured in the slab above. Hangers shall be spaced at not more than 5 foot intervals and at all risers and shall have 6" long protective collars or half sleeves or plastic, not less than Schedule 40 pipe, between hangers and underground piping.

(c) A.B.S. D.W.V. Schedule 40, 270-65 plastic pipe and fittings or P.V.C.D.W.V. C-S 272-65 plastic pipe and fittings may be used for drains, waste and vents only. A.B.S. or P.V.C. Schedule 40 Plastic Pipe may be used underground or above ground.

### **7.4 HANGERS AND ANCHORS**

(1) **Material.** Hangers and anchors shall be of metal of sufficient strength to maintain their proportional share of the pipe alignment and prevent rattling.

**7.4.2 Attachment.** Hangers and anchors shall be securely attached to the building construction.

### **7.5 BASE OF STACKS**

**7.5.1 Supports.** Bases of stacks shall be supported on concrete, brick laid in cement mortar, metal brackets attached to the building construction, or by other methods, approved by the Chief Plumbing Inspector.

## **SECTION VIII. PLUMBING FIXTURES.**

### **8.1 GENERAL REQUIREMENTS — MATERIALS**

**8.1.1 Quality of Fixtures.** Plumbing fixtures shall have smooth impervious surfaces, be free from defects and concealed fouling surfaces, and, except as permitted elsewhere in this Code, shall conform in quality and design to one of the following standards; Staple Porcelain Plumbing Fixture, NBS Commercial Standard CS 4-29. Staple Vitreous China Plumbing Fixtures, NBS Commercial Standard CS 20-49.

Enameled Cast-Iron Plumbing Fixtures, NBS Commercial Standard CS77-48.

Earthenware (vitreous glazed) Plumbing Fixtures, NBS Commercial Standard CS 111-43.

Plumbing Fixtures (for) Land Use, F.S.WW-P-54 a-1947.



Formed Metal Porcelain enameled Sanitary Ware. NBS Commercial Standard CS 144-47.  
Plastic lavatories ANSI Z124.3 1976.  
Plastic tubs and enclosures ANSI Z124.1 1974.  
Plastic shower units. ANSI Z124.2 1977.  
Hospital Plumbing Fixtures, NBS Simplified Practice Recommendation R106-41.  
R106-41.  
Plumbing Fixtures, Fittings, Trim R227-47.  
Lavatory and Sink Traps, R 21-46.

**8.1.2 Alternate Materials.** Sinks and special-use fixtures may be made of soap-stone, chemical stoneware, or may be lined with lead, copperbase alloy, nickel-copper alloy, corrosion resisting steel, or other materials especially suited to the use for which the fixture is intended.

**8.1.3 Overflows.** When any fixture is provided with an overflow, the waste shall be so arranged that the standing water in the fixture cannot rise in the overflow when the stopper is closed, or remain in the overflow when the fixture is empty.

## **8.2 INSTALLATION**

**8.2.1 Cleaning.** Plumbing fixtures shall be installed in a manner to afford easy access for cleaning. Where practical, all pipes from fixtures shall be run to the nearest wall.

**8.2.2 Joints.** Where the fixture comes in contact with wall and floors, the joints shall be watertight.

**8.2.3 Securing Fixtures.** Floor outlet fixtures shall be rigidly secured to the floor by screws or bolts.

**8.2.4 Wall-hung Bowls.** Wall-hung water-closet bowls shall be rigidly supported by a concealed metal supporting member so that no strain is transmitted to the closet connection.

**8.2.5 Setting.** Fixtures shall be set level and in proper alignment with reference to adjacent walls.

**8.2.6 Connection.** The overflow pipe from a fixture shall be connected on the house or inlet side of the fixture trap, except that overflows or flush tanks may discharge into the water closets or urinals served by them, but it shall be unlawful to connect such overflows with any other part of the sewerage system.

**8.2.6A Connections.** Water supply connections shall conform to Section 13. Waste connections shall be through a grease trap or interceptor.

**8.2.7 Protection of Water Supply.** All plumbing fixtures shall be supplied with water through an air gap as prescribed in A.S.A. A40-4 1942. Where such installations are not feasible, they shall be provided with a backflow preventer.

## **8.3 PROHIBITED FIXTURES AND CONNECTIONS**

**8.3.1 Fixtures.** Pan, valve, plunger, offset, wash-out, latrine, frostproof, and other water closets having invisible seal, or an unventilated space, or having walls which are not thoroughly washed at each discharge, are prohibited. Any water closet which might permit siphonage of the contents of the bowl back into the tank is prohibited.

**8.3.2 Fittings Prohibited.** No saddle hubs, bands, combination ferrules, bends, double hubs, sanitary tees, or crosses, will be allowed on horizontal waste or soil lines. Short one-quarter bends on waste or soil lines will be permitted only where the change in direction of the flow is from horizontal to vertical and on closet vents used as a waste for a basin, bath, or similar fixtures.

## **8.4 WATER CLOSET COMBINATIONS**

**8.4.1 Types of Water Closets.** Water closet bowls shall be siphon jet, reverse trap, wash-down, or blowout type with floor outlets, or siphon jet or blow-out type with wall outlet. Water closet bowls and traps shall be made in one piece and shall be provided with integral flushing rims constructed so as to flush the entire interior of the bowl.

**8.4.2 Supports.** Wall hung water closet supports shall be of the concealed type and of metal designed so that no strain is transmitted to the piping.

**8.4.3 Public Use.** Water closet bowls for public use shall be of the elongated type with open front seats.

**8.4.4 Flushing Device.** Water closet tanks shall have a flushing capacity sufficient to properly flush the water closet bowls with which they are connected.

**8.4.5 Float Valves.** Float valves in lowdown tanks shall close tight and provide water to properly refill the trap seal in the bowl.

**8.4.6 Close-coupled Tanks.** The flush valve seat in close-coupled water closet combinations shall be 1-inch or more above the rim of the bowl, so that the flush-valve seats below the rim of the bowl shall be so constructed that in case of trap stoppage, water will not flow continuously over the rim of the bowl.

**8.4.7 Automatic Flush Valve.** Flushometers shall be so installed that they will be readily accessible for repairing. When the valve is operated, it shall complete the cycle of operation automatically, opening fully and closing positively under the service pressure. At each operation the valve shall deliver water in sufficient volume and at a rate which will thoroughly flush the fixture and refill the fixture trap. Means shall be provided for regulating flush-valve flow. Not more than one fixture shall be served by a single flush-valve. Protection against backflow shall be provided.

**8.4.8 Seats.** Water closets shall be equipped with seats of smooth nonabsorbent material. All seats of water closets provided for public use shall be of the open-front type. Integral water closet seats shall be of the same material as the fixtures.

## **8.5 URINALS**

**8.5.1 Flushing Rim and Trap.** Siphon jet, blowout and pedestal urinals shall have integral flushing rims and integral traps, except that washout and stall urinals may have separate traps. In the case of a stall urinal, a flushing rim is not required.

**8.5.2 Automatic Flushing Tanks.** Tanks flushing more than one urinal shall be automatic in operation and of sufficient capacity to provide the necessary volume to flush and properly cleanse and urinals simultaneously.

**8.5.3 Urinals Equipped with Automatic Flush Valves.** Flushometer shall be as prescribed in Section 8.4.7, and no valve shall be used to flush more than one urinal.

**8.5.4 Trough Urinals.** Trough urinals when used shall conform to the following requirements: They shall be not less than 6-inches deep and shall be furnished with one-piece backs and have strainers with outlets at least 1½ inches in diameter. The washdown pipe shall be perforated so as to flush with an even curtain of water against the back of the urinal. The pipe shall be securely clamped as high as practicable to the back of the urinal. Trough urinals, where so equipped, shall have flush valve or tanks with a flushing capacity of not less than 1½ gallons of water for each 2-feet of urinal length. Trough urinals shall be equipped with a vacuum breaker installed on the discharge side of the last valve and not less than 6-inches above the washdown pipe, except on urinals in which the washdown pipe is not exposed.

**8.5.5 Equivalent Length.** Trough urinals shall be figured on the basis of one (1) urinal for each 18 inches of length, except that:

- 24-inch urinal equals 1 urinal
- 36-inch urinal equals 2 urinals
- 48-inch urinal equals 3 urinals
- 60-inch urinal equals 4 urinals

**8.5.6 Floor Type Trough Urinals.** Floor type trough urinals are prohibited.

**(7) Public Wash Rooms.** All public wash rooms and toilet rooms shall have impervious floors, drained to a floor drain.

## **8.6 STRAINER AND FIXTURE OUTLETS**

(1) All plumbing fixtures, other than water closets, syphon-action washdown or blowout urinals, and fixtures with pop-up drains shall be provided with metal strainers having an approved waterway area, complying with Section 8.1.1. Strainers shall be required on fixtures in compliance with the sanitary plumbing code of the State of Louisiana.

## **8.7 LAVATORIES**

**8.7.1 Lavatory Waste and Overflow.** Lavatories shall be provided with waste outlets not less than 1¼ inches. Wastes may have open strainers or may be provided with stoppers. Waste plugs, when assembled, shall be installed so that the bottom edge of the overflow opening in the plug shall be below the bottom of the overflow channel to prevent the trapping of water. Overflow drains are optional on lavatories.

**8.7.2 Lavatories in Kitchens.** In all commercial kitchens there shall be a hand basin equipped with hot and cold water for the employees to wash their hands.

## **8.8 SHOWER RECEPTORS AND COMPARTMENTS**

**8.8.1 Shower.** All shower compartments except those having metal enameled receptors or other approved type water tight receptors, shall have a 2½ pound lead or 16 oz. copper shower pan, or an approved membrane water proofing pan as approved by the Chief Plumbing Inspector. The pan shall turn up on all sides at least 6-inches above the finished floor level. Traps shall be so constructed that the pan may be securely fastened to the trap at the seepage entrance, making watertight joint between the pan and the trap. Shower receptacle waste outlets shall not be less than 2-inches in diameter and have removable strainers.

**8.8.2 Construction.** Floors under shower compartments shall be laid on a smooth and structurally sound base and shall be lined and made watertight with sheet lead, copper, or other acceptable materials.

**8.8.3 Public or Institutional Showers.** Floors of public or institutional shower rooms shall be drained in such a manner that no waste water from any head will pass over areas occupied by other bathers.

## **8.9 KITCHEN SINKS**

(1) Kitchen sinks shall be connected to waste outlets not less than 1½ inches.

**8.9.2 Distance of Trap to Fixture.** The vertical distance from the fixture outlet to the trap, except clothes washers, shall not exceed 24"; however, the vertical distance may be increased to a maximum of 48" provided the trap, waste and vent is increased one pipe size. Kitchen equipment installed with more than 24" vertical distance shall be connected to not less than a 2" "P" trap, 2" waste and 2" vent. Vertical offsets will be permitted, provided the distance from the center line of the fixture drain to the center line of the trap inlet shall not exceed six (6) inches. The offset shall be made with short 1/8 bends or with 45° angle approved drainage fittings. This shall also apply to the vertical waste connection between drum traps and fixture outlets. This does not apply to fixture waste connected through an air gap.

## **8.10 FOOD WASTE -- GRINDER UNITS**

**8.10.1 Separate Connections.** Domestic food waste-disposal units need not be trapped separately from any other compartment of a multiple compartment sink. Units may have either automatic or hand-operated water supply control.

**8.10.2 Grease Interceptors.** No food-waste grinder shall be connected through a grease interceptor.

**8.10.3 Commercial-type Grinders.** Commercial-type food waste grinders shall be connected to not less than a 4-inch waste line. Each waste line shall be trapped and vented as provided in other sections of this Code.

**8.10.4 Approval of Commercial Type Grinders.** Each commercial food waste grinder shall be approved or rejected by the Chief Plumbing Inspector based on the report of the Engineering Department as to the available capacity in the sewer for additional discharge of such waste matter. Despite previous approval, food waste grinders found interfering with or interrupting the disposal of sewerage through the mains of the Parish of Jefferson shall be removed within a period of forty-eight (48) hours following receipt of written notification from the Chief Plumbing Inspector.

## **8.11 LAUNDRY TUBS, SLOP AND SERVICE SINKS**

**8.11.1** Laundry tubs or slop sinks shall be connected to a waste outlet not less than two inches in diameter.

**8.11.2** Service sinks shall be connected to a waste outlet not less than 2-inches in diameter.

## **8.12 BATH TUBS**

(1) Bathtubs shall be connected by either drum trap or "P" trap to a waste outlet of not less than 2-inches in diameter when a P trap is used.

All drum traps or "P" traps installed on bathtubs shall have either access panel or floor cleanout cover for the purpose of servicing and maintenance. Where cast-iron "P" traps with waste and overflow of 17 gauge material is used, an access panel is not required.

## **8.13 DRINKING FOUNTAINS**

The orifice of the nozzle shall be not less than 3/4 inch above the overflow level of the fixture.

## **8.14 FLOOR AND HUB DRAINS**

(1) **Floor Drains.** A floor drain in a roofed over area, or enclosed area, or any floor drain that is subject to receiving oil or contaminated waste, except those hub drains which may be connected to the storm drainage system, shall be properly trapped and vented. Both floor and hub drains shall be considered a plumbing fixture.

**8.14.2 Traps and Strainers.** Floor and hub drains shall have metal traps with a minimum water seal of 2-inches, and shall be provided with removable strainers. The open area of the strainers shall be at least 2/3 of the cross-section area of the drain line to which it connects.

**8.14.3 Size.** Floor and hub drains shall be of a size to serve efficiently the purpose for which it is intended.

## **8.15 DISHWASHING MACHINES**

**8.15.1 Protection.** Dishwashing machines shall meet the requirements of back siphonage and backflow.

**8.15.2 Installation.** Dishwashers of free standing models, either drawer, front fill, or top fill design shall be connected to the sanitary sewer system properly trapped and vented. The water supply to such dishwashers shall be protected against back siphonage by an approved air gap or vacuum breaker. Dishwashers may be connected to a garbage disposal unit, the connection will be permitted when safely high enough above the flood rim of the top filled designed unit. Domestic type dishwashers shall be connected to the sanitary sewer system and shall be properly trapped and vented with air gap or vacuum breaker on the water supply system.

**8.15.3 Waste on Commercial Dishwashers.** Commercial type dishwashing machines shall be connected through an air gap.

## **8.16 MULTIPLE SINKS**

**8.16.1 Circular Type.** Each 18 inches of wash sink circumference (circular type) shall be equivalent to one lavatory.

**8.16.2 Straight Line Type.** Multiple wash sinks of the straightline type shall have hot and cold combination spouts not closer than 18 inches from adjacent similar spouts, and each spout shall be considered the equivalent of one lavatory.

## **8.17 GARBAGE CAN WASHERS**

**8.17.1 Discharge.** Garbage can washers shall not discharge through a trap serving any other device or fixture.

**8.17.2 Baskets.** The receptacle receiving the wash from garbage cans shall be provided with a basket or similar device to prevent the discharge of large particles into the building sewer system.

## **8.18 LAUNDRY TRAYS**

**8.18.1 Waste Outlets.** Each compartment of a laundry tray shall be connected to a waste outlet not less than 1½ inches in diameter.

## **8.19 AIR CONDITIONING**

**8.19.1 Cooling Towers Required.** All air conditioning or refrigeration units in excess of three (3) tons, using water from the city water mains, shall be equipped with recycling cooling equipment, such as cooling towers or evaporative condensers, for the purpose of conserving water.

**8.19.2 Private Water Supply.** If water is supplied from sources independent of city water mains, such as private wells, for cooling purposes in air conditioning or refrigerating systems, and is not recycled, the Chief Plumbing Inspector shall determine the point or points where proper connections to its existing utility shall be permitted for such excessive discharge of waste water.

## **8.20 SPECIAL FIXTURES**

**8.20.1 Water and Drain Connections.** Baptiseries, ornamental and lily pools, aquariums, ornamental fountain-basins, and similar construction when provided with water supplies, shall be protected from back-siphonage.

**8.20.2 Approval.** Special fixtures requiring water and waste connections shall be submitted to the Chief Plumbing Inspector for approval.

## **8.21 CONDEMNED FIXTURES**

**8.21.1 Unsanitary Fixtures.** Wherever plumbing fixtures connected to any plumbing system in the Parish of Jefferson are condemned as being unsanitary, such fixtures shall be replaced with fixtures or equipment required by this Code.

## **8.22 USED FIXTURES**

**8.22.1 Used Fixtures.** Used or second hand plumbing fixtures may be used provided they meet the requirements of this Code.

## **8.23 MINIMUM FACILITIES**

**8.23.1 Minimum Facilities.** Where plumbing fixtures are installed, the minimum number of each type of fixture installed shall be in accordance with Table 8.23.2.

# REQUIREMENTS IN SCHOOLS, FACTORIES, ETC.

TABLE 8.23.2

| MINIMUM FACILITIES OF DESIGNED CAPACITY-2-                       |                                                                                                                                     |                                                        |                                                                                                           |                                                                                                                                                                                                                           |                                 |                              |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------|
| TYPE OF<br>BLDG. OR<br>OCCUPANCY                                 | WATER<br>CLOSETS-1-                                                                                                                 | URINALS 1-8-9                                          | LAVATORIES IN<br>REST ROOMS<br>1-4-5-10                                                                   | BATH TUBS OR<br>SHOWERS -1-                                                                                                                                                                                               | KITCHEN<br>SINKS 1-2            | DRINKING<br>FOUNTAINS<br>1-3 |
| Residence or<br>Dwelling or<br>Apart. Building<br>-7-            | 1 each dwelling<br>or apartment                                                                                                     |                                                        | 1 each dwelling<br>or apartment                                                                           | 1 each dwelling<br>or apartment                                                                                                                                                                                           | 1 each dwelling<br>or apartment |                              |
| Boarding Houses<br>Nursing Homes &<br>Similar<br>Occupancies -2- | 1 each 10 males<br>1 each 10 females                                                                                                |                                                        | 1 each 10 males<br>1 each 10 females                                                                      | 1 each 10 males<br>1 each 10 females                                                                                                                                                                                      | See Footnote<br>No. 2           |                              |
| Schools<br>Primary                                               | 1 each 30 females<br>1 each 60 males                                                                                                | 1 each 30 males<br>(See footnote No. 8<br>for females) | 1 each 75 pupils                                                                                          | None required ex-<br>cept for Gym or<br>Special purpose                                                                                                                                                                   | 1 each utility<br>kitchen       | 1 each<br>75 Persons         |
| Schools<br>Secondary                                             | 1 each 75 males<br>1 each 45 females                                                                                                | 1 each 45 males<br>(See footnote No. 8<br>for females) | 1 each 75 pupils                                                                                          | None required ex-<br>cept for Gym or<br>Special purpose                                                                                                                                                                   | 1 each utility<br>kitchen       | 1 each<br>75 Persons         |
| Dormitories                                                      | 1 each 10 males<br>1 each 8 females<br><br>(1 add'l. fixture<br>for each 25 males<br>(1 add'l. fixture<br>for each 20 fe-<br>males) | 1 each 25 males<br>(See footnote No. 8<br>for females) | 1 each 10 fe-<br>males<br>(1 add'l. each 15<br>females)<br>1 each 10 males<br>(1 add'l. each 20<br>males) | 1 for each 8 persons,<br>in the case of wom-<br>en's dormitories<br>additional bath tubs<br>should be installed<br>at the rate of 1 for<br>each 30 females.<br>Over 150 persons,<br>add 1 fixture for<br>each 20 persons. | 1 each utility<br>kitchen       | 1 each<br>75 Persons         |

Continued

Table 3.23.2 CONTINUED

|                                                                                                                   | Persons |                                                  | Fixtures                                                                                                                        |                                                  |                                                        |                                                                        |                                                                                                                                             |                      |                       |
|-------------------------------------------------------------------------------------------------------------------|---------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|
|                                                                                                                   |         | M. F.                                            |                                                                                                                                 | M. F.                                            |                                                        |                                                                        |                                                                                                                                             |                      |                       |
| Office or<br>Public<br>Buildings                                                                                  | 1-15    | 1 1                                              | Urinals may sub-<br>stitute for water<br>closets shall not<br>be reduced less<br>than 2/3 of the<br>number specified<br>herein. | 1-15                                             | 1 1                                                    |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 16-35   | 2 2                                              |                                                                                                                                 | 16-35                                            | 2 2                                                    |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 36-55   | 3 3                                              |                                                                                                                                 | 36-60                                            | 3 3                                                    |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 56-80   | 4 4                                              |                                                                                                                                 | 61-90                                            | 4 4                                                    |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 81-110  | 5 5                                              |                                                                                                                                 | 91-125                                           | 5 5                                                    |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 111-150 | 6 6                                              |                                                                                                                                 | (1 add'l, for each<br>45 persons over<br>125)    |                                                        |                                                                        |                                                                                                                                             |                      |                       |
| Manufacturing<br>Warehouses<br>Work Shops<br>Loft Buildings<br>Foundry<br>Mine and<br>Similar<br>Buildings<br>-3- | Persons |                                                  | Fixtures                                                                                                                        |                                                  | Same as above<br>Substitutions for<br>Office Buildings | 1 each 10 females<br>1 each 10 males<br>(1 each 15 add'l,<br>over 100) | 1 each 15 females<br>1 each 15 males<br>(when exposed to<br>heat or skin con-<br>tamination with<br>poisonous or irri-<br>tating materials) | 1 each<br>75 Persons |                       |
|                                                                                                                   |         | M. F.                                            |                                                                                                                                 | M. F.                                            |                                                        |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 1-9     | 1 1                                              |                                                                                                                                 |                                                  |                                                        |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 10-24   | 2 2                                              |                                                                                                                                 |                                                  |                                                        |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 25-49   | 3 3                                              |                                                                                                                                 |                                                  |                                                        |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 50-74   | 4 4                                              |                                                                                                                                 |                                                  |                                                        |                                                                        |                                                                                                                                             |                      |                       |
| 75-100                                                                                                            | 5 5     |                                                  |                                                                                                                                 |                                                  |                                                        |                                                                        |                                                                                                                                             |                      |                       |
| (1 add'l, for each<br>30 employees<br>over 100)                                                                   |         |                                                  |                                                                                                                                 |                                                  |                                                        |                                                                        |                                                                                                                                             |                      |                       |
| Public<br>Assembly and<br>Auditoriums<br>Restaurants &<br>Cafeterias                                              | Persons |                                                  | Fixtures                                                                                                                        |                                                  | Persons                                                | No. of<br>Fix.                                                         |                                                                                                                                             |                      |                       |
|                                                                                                                   |         | M. F.                                            |                                                                                                                                 | M. F.                                            |                                                        |                                                                        |                                                                                                                                             |                      |                       |
|                                                                                                                   | 1-100   | 1 1                                              | 1-200                                                                                                                           | 1                                                | 1-100                                                  | 1                                                                      |                                                                                                                                             |                      | 1 each<br>100 Persons |
|                                                                                                                   | 101-200 | 2 2                                              | 201-400                                                                                                                         | 2                                                | 101-200                                                | 1                                                                      |                                                                                                                                             |                      |                       |
|                                                                                                                   | 201-400 | 3 3                                              | 401-600                                                                                                                         | 3                                                | 201-400                                                | 2                                                                      |                                                                                                                                             |                      |                       |
|                                                                                                                   |         |                                                  |                                                                                                                                 |                                                  | 401-750                                                | 3                                                                      |                                                                                                                                             |                      |                       |
| Over 400-1 for<br>each additional<br>500 300                                                                      |         | Over 600-1 for each<br>additional<br>300 persons |                                                                                                                                 | Over 750-1 for<br>each additional<br>500 persons |                                                        |                                                                        |                                                                                                                                             |                      |                       |

Continued

Table 8.23.2 CONTINUED

| Drive-In<br>Theaters | Persons | Fixtures<br>M. F. | Persons                                                                                                                                                                                                                           | Male | Persons | No. of<br>Fix. |  |  |                       |
|----------------------|---------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|----------------|--|--|-----------------------|
|                      | 1-150   | 1 1               | 1-200                                                                                                                                                                                                                             | 1    | 1-200   | 1              |  |  |                       |
|                      | 151-300 | 2 2               | 201-750                                                                                                                                                                                                                           | 2    | 201-400 | 2              |  |  |                       |
|                      | 301-600 | 3 3               | Urinals for females<br>may be substituted<br>for water closets,<br>one for one except<br>that the number of<br>water closets in<br>such cases shall<br>not be reduced to<br>less than 2/3 of<br>the number speci-<br>fied herein. |      | 401-750 | 3              |  |  | 1 each<br>100 Persons |
|                      | 601-950 | 4 4               |                                                                                                                                                                                                                                   |      |         |                |  |  |                       |

## FOOTNOTES

1. The figures as shown are based upon one fixture being the minimum required for the number of persons indicated, or any fraction thereof.
2. No requirements have been given for hospitals, sanitariums, hotels, Motels, nor kitchen sinks for restaurants, cafeterias and Boarding Houses and each will have to be considered individually by the Chief Plumbing Inspector where the State Board of Health has prescribed minimum quantity requirements for a particular establishment, the Chief Plumbing Inspector - shall be governed by the minimum requirements as set forth by the State. No minimum requirements have been set forth for churches and each will have to be considered individually by the Supervisor of Plumbing.
3. See the American Standard Safety Code for Industrial Sanitation in Manufacturing Establishments (A. S. A. Z. 4. 1-1935).
4. Where there is exposure to skin contamination with poisonous infectious or irritating materials, then provide one lavatory, for each five (5) persons.
5. Eighteen inches of wash sink circumference (circular type) shall be equal to one lavatory. Straight type wash sinks, 18" spaces, with equivalent spouts shall be equal to one lavatory.
6. Drinking fountains shall not be installed in toilet rooms.
7. Laundry facilities for apartment buildings. See Section 12.51.
8. Urinals for females may be substituted for water closets, the substitution not to exceed more than one-third of the total provided.

Continued

## Table 8.23.2 CONTINUED

9. Trough urinals for men shall be equivalent to the following:
- |                                 |
|---------------------------------|
| 24-inch trough equals 1 urinal  |
| 36-inch trough equals 2 urinals |
| 48-inch trough equals 3 urinals |
| 60-inch trough equals 4 urinals |

10. Where the minimum requirement for lavatories is met by lavatories installed in rooms other than toilet rooms, then the number of lavatories in each toilet room may be reduced to one lavatory each three water closets or urinals or fraction thereof.

11. Urinals for females may be substituted for water closets, one for one, except that the number of closets in such cases shall not be reduced to less than two thirds of the number specified herein.

**GENERAL**

In applying this schedule of facilities, consideration must be given to the accessibility of the fixtures. Conformity purely on a numerical basis may not result in an installation suited to the need of the individual establishment. For example, schools should be provided with toilet facilities on each floor having classrooms.

Private markets shall have a closet and sink accessible with hot and cold water to sink, and also a floor drain when ice is used for refrigeration.

Where a building has been fitted out with plumbing in accordance with the regulations of Jefferson Parish Code for the use to which it is at the time applied and the building thereafter is used for different purposes wherein the rules of the Code require a different arrangement for plumbing, the said rules shall apply just as in the case of new plumbing to be installed on an existing job.

Minimum facility requirements included in this chart above shall be the responsibility of the property owner, and/or his authorized representative.

**LOCATIONS OF WATER CLOSETS OR URINALS:**

No water closets or urinals shall be permitted in food or drink handling establishments, or rooms occupied as living quarters, unless they are installed in a space separate from any space used for other purposes, by walls or partitions extending from the ceiling.

**TEMPORARY WORKING MEN FACILITIES**

Two water closets for each 30 workmen. Urinals may be substituted for water closets, but water closets shall not be reduced less than 2/3 of the total fixtures required.

Temporary sanitary toilet facilities may be used in lieu of sewer connected fixtures provided such temporary facilities are approved for use by the Board of Health.



## **SECTION IX. WASTE AND DRAINS.**

### **9.1 WASTE INTO DRAIN OR SEWER**

No waste pipe from any fixture shall enter the fresh-air inlet. No drain or sewer from any building shall pass under another building, unless approved by the Chief Plumbing Inspector, where permitted at all, it shall be cast-iron pipe.

### **9.2 DEFINING MAIN DRAINS, HOUSE DRAINS, SOIL AND WASTE PIPES.**

That portion of the main drain extending from a point three feet outside the building or structure line to the property line, is defined as the house sewer. The house drain is defined as the horizontal pipe inside of building to which are connected soil and waste pipes. Soil pipe is defined as the pipe receiving the discharge from water closets. Waste pipes are defined as pipes receiving the discharge from any fixture other than water closets.

### **9.3 BUILDING AND STRUCTURE DRAIN AND MAIN CLEANOUT**

The building sewer shall in every part have a downward inclination toward the public sewer of not less than one quarter of an inch in each one foot, and never less than 4" in diameter. The building sewer will, as far as possible, have a depth of three and one-half feet, to the top of the pipe, where it crosses the property line. Should a greater depth than three and one-half feet at the property line be desired, request shall be made upon the application card for the sewer connection, giving reason for extra depth, and if practicable, the desired depth will be given, otherwise the regulation 3½' depth will govern. The building sewer shall be provided with a six inch cleanout inside of the property line, not more than six feet from the same.

### **9.4 BUILDING OR STRUCTURE DRAIN THROUGH WALLS**

When a drain passes through a building or structure wall, it shall not be built in solid, but shall have at least a two-inch clearance, and the opening shall be covered by an arch or lintel, and the pipe shall be cast-iron.

### **9.5 OBJECTIONABLE MATTER INTO DRAINAGE CANALS**

The discharge of offensive and objectionable matter into the drainage canals within the Parish of Jefferson, is hereby prohibited. Water closets shall not discharge into such canals, and any existing connections of water closets to any drainage canal or ditch, shall be discontinued.

### **9.6 REFUSE FROM INDUSTRIAL OPERATIONS**

Objectionable materials from Industrial Operations or other Manufacturing Waste, or any other types of waste or materials giving off offensive odors or tending to putrefy in the canals or to form objectionable coatings on the sides or deposits in the bottom of the canals, shall not be discharged into said canals.

### **9.7 DISCHARGE OF STEAM INTO CANALS**

The discharge of condensing water or other water or liquid at a temperature of 110 degrees Fahrenheit is prohibited, and the discharge of any liquid at the temperature of over 100 degrees Fahrenheit shall be temporarily stopped whenever any work is to be done in the canals or sewers which necessitates such action, upon twenty-four hours written notice, and for so long a period as may be required.

### **9.8 NO CONNECTIONS SHALL BE MADE**

No connection shall hereafter be made to any sewer, water main or drainage canal without a written permit for such connection signed by the Director of the Department involved.

### **9.9 UNLAWFUL TO DISCHARGE**

It shall be unlawful to discharge into any water closet, or any opening or fixture connected to the Sewerage System, any rags, waste, large wads of paper, strings or similar objects, or any solid objects which would tend to obstruct the soil waste or discharge lines, or cause same to be done. Standard toilet tissue only shall be used in water closets.

### **9.10 VIOLATIONS OF THIS CODE**

Any violation of the provisions of this Code that affects or may affect the health and

welfare of the general public, shall not be permitted.

Notices of violations shall be written and delivered or mailed by the Plumbing Department to the person responsible.

## **SECTION X. WATER AND SEWER CONNECTIONS.**

### **10.1 APPLICATIONS FOR CONNECTIONS**

Applications for water connections to water mains shall be made to the Water Department on blanks furnished for that purpose, before the line is laid, setting forth clearly the buildings number, the size of tap, location of same, whether for one or more buildings, or if single or double, owner of premises and his address. Application will only be acted upon when the service line on the inside has been brought to the property line or to the street side on any foundation which may exist.

The Sewerage or Water Department shall install to the property line of each improved site, or site that is about to be improved, or site that is to be used for some special purpose, in streets where there are water mains and/or sewers, a sewer and a water connection, ample to serve such property, and the property owner shall be entitled to the installation of one meter connection and one sewer connection, after paying proper fee.

Applicants for more than one water connection, or more than one sewer connection, shall pay for the cost of labor and material for such installation.

### **10.2 SERVICE PIPES**

All work connected with or to be connected to the service pipes or water mains of the Parish of Jefferson, shall be done by a licensed Master Plumber, and all work shall be subject to inspection and approved by the Plumbing Department.

Any person, firm or corporation who shall interrupt or resist an inspection of his or their work so done, shall be liable to a forfeiture of his license.

Penalty for doing work without a license. See Article 401-402 of Building Code.

### **10.3 TAPS, METERS AND SERVICE PIPES**

No person, except an employee of the Water Department, shall under any circumstance, tap the street mains. The running of the service pipe from the street to the property line, and the installation of the stop cock and meter, is also to be done by regular employees of the Water Department, except in cases where it may be found expedient to grant plumbers special written permission by the Water Department, to do such work.

### **10.4 PIPE AND JOINTS**

All pipes connected with, or to be connected to the service pipes of the Water Department, shall be of strong or extra strong lead, brass, or copper, with well-made joints, threaded or wiped, or other approved materials.

### **10.5 WATER AND SEWER CONNECTIONS**

Every building or structure shall be separately and independently connected with the sewer and water mains, except in cases where there are two or more buildings on the same lot. Where several buildings adjoin each other on separate lots, or where they have access to an open alley, the owner, or owners of same may have all of them connected at their own responsibility, in one sewer or water line, to the street. In all such cases, all wastes, soil vents and water pipes, shall be separate and independent of each other. Where two buildings are connected to the sewer, or where two or more buildings are owned by different parties, the underground sewer shall not be less than six inches in diameter up to where it connects to the different properties. Where several buildings are connected to one water service, the pipes shall be laid underground and so arranged that each building can be separately controlled with a stop and waste cock, without interfering with any other.

### **10.6 PRIVATE WATER LINES**

Where private water lines are installed, they shall be installed in a trench cut to a uniform depth of at least 18 inches, and shall be of a cast iron, brass, lead of weight, not less than grade known as "strong," Type "L" or "K" Copper, or any other material approved by the Board of Standards & Appeals. Private water lines underground for hot or cold water shall be not less than three quarters of an inch in diameter, and in no case will used materials be allowed unless inspected and approved by an authorized representative of the Division of Regulatory

Inspections. All secondhand material used, shall be chlorinated, or otherwise satisfactorily sterilized to meet State Board of Health requirements, at the expense of the owner, under the inspection of the Division of Regulatory Inspection.

If water is supplied from sources independent of Jefferson Parish water mains, such as private wells, for cooling purposes in air-conditioning or refrigerating systems, and is not recycled, the Plumbing Department shall determine the point or points where proper connections to its existing utility shall be permitted for such excessive discharge of waste water.

Water service pipe from the street main to the water distribution system for the building served shall be of sufficient size to furnish an adequate flow of water to meet the requirements of the building at peak demand, and in no case shall be less than 3/4 inch.

**10.6A** Installation of over 1" pipe size water service from the meter needs a Mechanical Engineer's stamp.

## **10.7 WASTE DISCHARGE**

All fixtures shall discharge into a public sewer system, or in the absence of public sewer system, they shall discharge into a septic tank or some approved type of disposal system. Waste lines inside of the property line shall be cast-iron soil pipe or strong copper, which is known as Type "K" Copper, Terra-cotta, Transite, A.B.S. - D.W.V. Schedule 40-27065 Plastic Pipe and P.V.C.D.W.V. Schedule 40, C.S.-272-65 Plastic Pipe.

## **10.8 SHUT OFF VALVES**

All Water Closets, Lavatories, Sinks, Bidets, Urinals, Dishwashers, Drinking Fountains, Water Heaters, Chill Water Systems, A.C. Units, Swimming Pool, and Lawn Sprinkling Systems, shall have a separate shut-off valve, located near the fixture, equipment or systems supplied.

## **10.9 STOP COCK**

There shall be a stop and waste cock attached to every supply pipe, at a point close to where it leaves the ground, and sufficiently low and conveniently located, that the water may be readily cut-off at any time to permit draining of pipes.

## **10.10 TESTING WORK**

The Plumber may turn on the water after the connection is completed to test his work, but shall leave the stop-cock closed upon completion of test, unless specifically authorized in writing to leave it turned on by the Water Department.

## **10.11 INSTALLATION AND REPAIR OF METERS AND SERVICE PIPES**

No one shall tamper with, remove or attempt to adjust or make any repairs to any meter or stop-cock installed by the Water Department, except as provided for in Section 10.3, or any service pipe from the property line to the street main. Any Master Plumber or firm doing business as such who violates Section 10.3 shall be liable to forfeiture of his or their licenses. Said work may be done only by regular authorized employees of the Water Department, and all meters, whether paid for by the property owners, or by the Water Department, shall be installed by the Water Department.

When flush-o-meter valves are installed, the supply shall not be less than one inch in diameter for one; if more than one is installed, the supply shall be increased in size according to the number of units installed.

Water supply connections to Swimming Pools, Hospital Sterilizer, Bed-pan, Sterilizer, House Tanks, Water Cooling Devices and Plumbing Fixtures, shall have a check valve or vacuum breaker so as to make impossible the return of any liquid or waste from the above fixtures to the Water Supply System, either by gravity or syphonage and shall be subject to the approval of the Chief Plumbing Inspector.

All other water supplies, shall be distributed through pipe systems, entirely separate and independent of system carrying the City Water.

## **SECTION XI. INDIRECT AND SPECIAL WASTES**

### **11.1 INDIRECT WASTE PIPES**

**11.1.1** General. Wastes from the individual fixtures, devices, appliances or apparatus, covered

by this section, shall discharge to the building sewer system through individual air gaps.

**11.1.2 Food Handling.** Establishments engaged in the storage, preparation, selling, serving, processing, or otherwise handling of food, shall have the waste piping from all refrigerators, ice boxes, cooling or refrigerating coils, laundry washers, extractors, steam tables, egg boilers, coffee urns, or similar equipment, discharge indirectly into the sewer system through an approved non-splash air gap.

**11.1.3 Commercial Dishwashing Machines.** Dishwashing machines, except those in private living quarters or dwelling units, shall be indirectly connected, except that when a dishwashing machine is located adjacent to a floor drain, the waste from the dishwashing machine may be connected direct on the sewer side of the floor drain trap.

**11.1.4 Interceptor.** An interceptor or grease trap, may be placed on the outlet side of the dishwashing machine, or on the discharge side of the indirect waste receptor.

**11.1.5 Connection.** Indirect waste connections shall be provided for drains, overflows, or relief vents from the water supply system.

**11.1.6 Sterile Appliances.** Appliances, devices, or apparatus, such as stills, sterilizers, and similar equipment requiring water and waste, and used for sterile material, shall be indirectly connected or provided with an air gap between the trap and the appliance.

**11.1.7 Other Appliances.** Appliances, devices or apparatus not regularly classed as plumbing fixtures, but which have drips or drainage outlets, may be drained by indirect waste pipes discharging into an open receptacle as provided in Paragraph 11.1.2.

**11.1.8 Material and Size.** The material and size of indirect waste pipes shall be in accordance with the provisions of the other sections of this Code applicable to sanitary piping.

**11.1.9 Indirect Waste Trapped.** Any indirect waste pipe exceeding 2 feet in length shall be trapped.

**11.1.10 Maximum Length.** The maximum length of the indirect waste to vent shall not exceed 15 feet.

**11.1.11 Cleaning.** Indirect waste piping shall be so installed as to permit ready access for flushing and cleaning.

**11.1.12 Indirect Waste Vented.** Stacks serving indirect waste pipes, and receiving the discharge from drinking fountains or refrigerators on three or more floors, shall be independently vented to the outside air.

## **11.2 SPECIAL WASTES**

**11.2.1 Acid Waste.** Acid and chemical indirect waste pipes shall be of materials unaffected by the discharge of such wastes. Wastes of PH factor of 5.0 or less shall be considered acid.

**11.2.2 Neutralizing Device.** In no case shall corrosive liquids, spent acids, or other harmful chemicals, which might destroy or injure a sewer, soil, vent or waste pipe, or which might create obnoxious or toxic fumes, discharged into the plumbing system without being thoroughly diluted or neutralized by passing through a properly constructed and acceptable dilution or neutralizing device. Such device shall be automatically provided with a sufficient intake of diluting water or neutralizing medium, so as to make its contents non-injurious before being discharged into the soil or sewerage system.

**11.3 Condensers and Sumps.** No steam pipe shall connect to any part of the drainage or plumbing system, nor shall any water above 140° F. be discharged into any part of a drainage system. Such pipes may be indirectly connected by discharging into an interceptor and thence into the drainage system.

**11.4 Clear Water Wastes.** Water lifts, expansion tanks, cooling jackets, sprinkler systems, drip or overflow pans, or similar devices, which waste clear water only, may discharge on to a roof, into a sump, or so as to drain into a trapped fixture.

## **11.5 Swimming Pools**

**11.5.1 Swimming Pool Waste Water.** When swimming pool water is treated and recirculated and neither the swimming pool filter or swimming pool itself is enclosed, the waste water from swimming or wading pools, including pool drainage, back-wash from filters or water from scum gutter drains or floor drains, which serve the walks around pools, shall be connected indirectly to an existing building storm drain connection.

Where there is no existing building storm drain connection, and one is required, a permit to install same must be obtained from the Chief Plumbing Inspector. Installation shall be inspected by the Plumbing Department.

**11.6 Drinking Fountains.** May be installed with indirect wastes.

## **SECTION XII. SOIL AND WASTE PIPE.**

### **12.1 CAST IRON PIPE**

All cast-iron soil and waste pipe under buildings shall be bell and spigot. Where the total height of a stack exceeds forty (40) feet, the top forty (40) feet in height may be No Hub pipe, all below the top forty (40) feet and under the building to a point three (3) feet outside of the building, shall be bell and spigot cast-iron pipe caulked with Lead and Oakum.

### **12.2 SIZE OF SOIL AND WASTE PIPE**

Soil and waste pipes shall not be less than three (3) inches in diameter and then only where the waste and vent pipe combined is not more than thirty (30) feet in length. In any building having five or more floors and only one main soil stack, the stack shall not be less than five (5) inches in diameter. In a building where more than two (2) closets or their equivalent, discharge into a horizontal line, the line shall be four (4) inches in diameter; where more than twenty (20), the line shall be five (5) inches; where more than fifty (50), the line shall be six (6) inches; where more than one hundred (100), the line shall be eight (8) inches; and where more than two hundred fifty (250), the line shall be ten (10) inches in diameter.

### **12.3 MINIMUM SIZE OF SOIL AND WASTE STACKS**

No soil or waste stack shall be smaller downstream than the largest horizontal branch connected thereto, except that a 4" x 3" water closet connection shall not be considered a reduction in pipe size. No waste shall be smaller than 1½" pipe.

### **12.4 FUTURE FIXTURES**

Full size future openings shall be provided on each floor where no plumbing fixtures are presently installed, except where car storage is required. When provision is made for the future installation of fixtures, those provided shall be considered in determining the required size of the sewer pipes. Such installations shall include wastes, vents, hot and cold water and may be terminated with plugged fittings for the waste and vent stacks and hot and cold water supply lines. For future installations all vents shall be extended and connected as required.

### **12.5 UNDERGROUND SEWERAGE PIPING**

No portion of the sewerage system installed underground, or below the basement or cellar floor, shall be less than two (2) inches in diameter.

### **12.6 CLOSET INSTALLATION**

No water closet shall be installed on a building sewer branch that is less than three (3) inches in size.

One (1) bathroom group consisting of water closet, lavatory, and bathtub or shower stall may be installed on a three (3) inch underground sewer branch.

### **12.7 CONNECTION TO SOIL WASTE AND VENT**

All soil waste and vent pipes shall be as direct as possible, and connections to vertical stacks, shall be made with "Ys" and one-eighth bends or sanitary tees. Connections to vertical stacks, with horizontal soil and waste pipes, shall be made with one-eighth bends, "Ys" combination "Ys," or long sweep bends and offset with cleanout above the bend or offset.

### **12.8 WATER CLOSET UNIT**

The vent pipes from all earthenware closets having traps above the floor shall be taken from a point as near the fixture as possible.

### **12.9 SOIL PIPE SIZE AND WEIGHT**

All soil, waste, and vent pipes shall be sound, free from holes, and of uniform thickness, and shall conform at least to the following weight and depths of hub.

| Size Pipe | STANDARD<br>Weight Per Foot | Depth of Hub |
|-----------|-----------------------------|--------------|
| 2"        | 3-1/2 lbs.                  | 2-1/4"       |
| 3"        | 4-1/4 lbs.                  | 2-1/2"       |
| 4"        | 6-1/4 lbs.                  | 2-3/4"       |

5"  
6"

8-1/2 lbs.  
10-1/2 lbs.

2-15/16"  
3-1/4"

## 12.10 DURHAM SYSTEM

Where the Durham System is used for soil waste or vent pipes, they shall be of standard or extra heavy thickness, lap-welded wrought iron or steel. None but regular fittings may be used on vent lines. Cast-iron fittings need not be galvanized, but shall be given a thorough coating of some good protective paint inside and outside. All pipes shall be well reamed and threaded so as to insure a close and tight joint.

With the exception of conditions set forth above, the same rules which governs the installation of cast-iron pipes and fittings shall govern installation of the Durham System.

## 12.11 VENT PIPES

All vent pipes shall be carried undiminished in size, to a height at least nine inches above the roof. Where there are ventilating skylights or dormer windows, such vents shall continue at least nine inches above the top of the skylight or roof of the dormer window. Where a roof is used for drying purposes or promenades, all vent pipes shall extend at least six feet above said roof. There shall be no caps, cowls, ventilators, nor return bends on the ends of the vents above the roof. The mouth of all such vents shall be kept open. Iron, Copper or Brass baskets will be permitted to keep out obstructions. Vent pipes opening within ten (10) feet or under a window within the same radius, shall be carried up and continued above the roof. The top of any stack on a roof shall not terminate less than six feet from any wall or chimney flue. When required to offset any stack to come within the requirements of this Code, all work shall be done in the attic or under the roof, where practicable.

No offset from a building will be allowed, where more than one five-foot length of pipe is required, and then only when supported and braced by 1/4 x 1-1/2 inch flat iron braces. The intention of preceding sentence is that stacks cannot be off-set from a wall, but shall in all cases be carried up above same.

In the event that a new building is built higher than an adjoining existing building, windows shall not be located in the new building in conflict with the aforesaid ten foot radius, unless alterations in the vents are made to conform with this section.

## 12.11A ROOFS

With the exception of a single story dwelling, every building which has on its roof, mechanical, electrical, or plumbing equipment or apparatus, shall have on its roof a hinged trap door with a permanent ladder leading to it or a suitable ladder shall be available at all times that can be placed to the roof scuttle or hinged trap door for inspection or maintenance purposes. Such scuttle or trap door shall be covered on the top and edges with sheet metal or other approved fire-resistive material, and the clear opening for same shall be at least two feet by three feet (2' x 3') in size. Stairway leading to roofs of buildings when provided in lieu of the above shall have signs conspicuously placed with letters not less than four inches (4") high indicating such access at the ground floor level. Where roofs are used for roof gardens or similar occupancies, stairways shall be provided through the roof by means of a penthouse, all in compliance with requirements for other parts of the building.

## 12.12 VENTS USED FOR WASTE

Where a fixture is located more than eight feet from one main vent, the vent for such fixture shall be carried through the roof full size, or shall enter main stack at least one foot above the highest fixture. Two inch vent pipes shall not be used for waste lines, except a relief vent from a closet, which may be used as a waste for a basin, where both fixtures are located on the same floor.

## 12.13 VENT PIPES IN EXTENSIONS

Soil waste and vent pipes, in any building, when less than six feet away from main building wall, or within the 10' foot radius of a window, as prescribed in Section 12:11, shall extend above the roof of the main building.

## 12.14 WASTE AND TRAP LOCATION

The waste pipe of every sink, basin, bath, water closet, urinal and each set of wash trays, or other fixtures, shall be separately and effectually trapped and independently connected with the soil or waste lines, and the trap shall be as near as practicable to the fixture which it serves. In no case, shall a trap be more than two feet from the fixture, except where no more than

three wash trays, or wash stands are set together, they may have 1-1/2" connection to trap at end of fixture or where specifically provided for in this Code.

## 12.15 TRAPS, WASTES AND VENTS

| No. of Fixtures    | Traps          | Wastes       | Vents        |
|--------------------|----------------|--------------|--------------|
| 1 Basin            | 1½" P.         | 1½" x 20 ft. | 1½" x 20 ft. |
| 2 Basins — One     | 1½" P.         | 1½" x 20 ft. | 1½" x 30 ft. |
| 1 Dental Cuspidor  | 1½" Drum       | 1½" x 20 ft. | 1½" x 30 ft. |
| 4 Dental Cuspidors | 1½" Drum       | 2" x 20 ft.  | 1½" x 30 ft. |
| 1 Kitchen Sink     | 1½" P.         | 2" x 8 ft.   | 1½" x 30 ft. |
| 1 Service Sink     | 2" P.          | 2" x 8 ft.   | 1½" x 30 ft. |
| 1 Pantry Sink      | 1½" P.         | 2" x 8 ft.   | 1½" x 30 ft. |
| 1 Bath             | 1½" Drum       | 2" x 20 ft.  | 1½" x 30 ft. |
| 1 Bath             | 2" P.          | 2" x 20 ft.  | 2" x 30 ft.  |
| 1 Urinal           | 1½" P.         | 2" x 20 ft.  | 1½" x 30 ft. |
| 2 L. Tubs — One    | 1½" Drum or P. | 2" x 20 ft.  | 1½" x 30 ft. |

## 12.16 DRUM TRAPS AND CLOSET BENDS

Drum traps shall not be less than four inches in diameter. Iron closet bends can be used only in fire-resistive buildings, or buildings where the floors are not of wood. Iron drum traps shall be galvanized on the inside and have a brass cover with a standard male thread. Where iron drum traps are used on buildings, other than fire-resistive construction, they shall have a connection of lead pipe between the trap and the stack, at least twelve inches long. All drum traps shall be accessible for maintenance and cleaning, if not, an access panel 18" x 24" shall be provided.

In all underground installations, the waste arm on the sewer side of the drum trap, where cast-iron pipe is used, a six (6) inch by one and one half (1½) inch brass, copper or equivalent filler piece, will be permitted between the cast-iron waste arm and the drum trap. The distance of waste pipe from the fixture to the drum trap, shall be limited to twenty-four (24) inches from the center of the trap to the center of the vertical waste connection.

## 12.17 SINKS UNDER COUNTERS

Sinks under counters and all such drains, as pumps, refrigerators, etc., may be connected to a deep cast-iron sink with extra heavy waste and trap, or to a catch-basin properly trapped and vented. All connections for fixtures to the catch-basin or sinks, shall be trapped with a P-trap direct into the horizontal line, whenever the catch-basin on sink is more than fifteen (15) feet from any fixture, the waste line at the fixture end shall be vented with a two-inch vent. The above does not include any fixtures away from the counter, such as wash basins, urinals and similar fixtures.

## 12.18 OPENINGS LEFT OPEN

All openings left in soil, waste, or vent pipes for any purpose, and not used, shall be securely closed with suitable plugs. If lead pipe, the opening shall be wiped.

## 12.19 INSERTABLE JOINTS

Whenever it becomes necessary to remove part of the soil or waste pipe to obtain an opening, or for other purposes, and both ends are permanently fastened, an insertable joint of approval pattern shall be used.

## 12.20 TRAP SCREWS AND BUSHINGS

No trap with trap screw will be allowed under floors where inaccessible. All small traps, two inches or less, shall be trap screws, except traps that have a union coupling connected in the seal of the trap. All traps shall have at least two inch seals.

Brass concave bushings can be used only on nickel-plated "P" traps, and solder nipples on all lead traps. In each case, bushings or solder nipples, shall be accessible to the outside.

## 12.21 ACIDS AND SPECIAL PERMISSION

Where acids are used, a special permit may be obtained for use of terra-cotta pipe where the work is not of sufficient permanency to require the use of lead, duriron or its equivalent.

## **12.22 VENTING**

Each and every trap shall be installed on a continuous waste and vent and shall not be over sixty inches from the stack, unless revented, except kitchen sinks which shall not be over twenty-four inches. Lower fixtures shall be vented at least one foot above the height of the highest fixture, or independently through the roof with the following exceptions: Where two siphon jet or washdown closets are installed on a four-inch stack or larger, above each other, and each within five feet of the stack, the lower closet need not be revented. Where 3 or more closets are installed above each other, all shall be revented except the top two closets, provided the latter two are not over five feet from the stack. Where one closet is installed above two, two above two, or two above one on a vertical stack, the lower one or two shall be revented. Where batteries of closets are vented by the circuit or loop-vent system, the vent may be taken from the end of the line, and when vents are more than sixteen feet apart, a full size intermediate vent shall be installed. Where batteries of fixtures are installed above each other, an additional relief vent, one-half size of circuit or loop-vent, shall be installed between the first fixture and the stack. Where closets are to be revented, a fitting shall be inserted in the line, not over thirty inches from the closet connection and a two-inch revent taken from there to a point one foot above the highest fixture. Where wash stands or similar fixtures are to be vented by the circuit or loop-vent, a full size relief vent shall be installed for every eight fixtures. Where the wash-stands are installed above two drum traps and are directly connected to a two-inch stack, the drum traps need not be revented, provided all of the traps are not over sixty inches from the stack.

## **12.23 BRANCH VENTS**

The term "Branch Vent" applied to all vent pipes located between the fixtures and the point where the vent joins the main vertical stack or stack vent. The size of any branch vent pipe, shall not be less than the trap which it serves.

## **12.24 VENTILATION**

No brick, sheet-metal, earthen-ware, nor any chimney, nor pipes placed in a chimney, shall be used as a ventilator.

## **12.25 SIZES OF REVENT AND BRANCH VENTS**

Vent pipes shall extend at least nine inches through the roof. Single or combined vent pipes shall be connected at least one foot above the highest fixtures, with the main vertical vent pipe. They may be combined by branching together those which serve several traps, but the area of the combined vent pipes shall not be decreased. These vent pipes shall always have a continuous rise to avoid collecting water by condensation, and shall return to the main stack below the lowest fixture. Vent pipes shall be increased in size according to number of fixtures.

## **12.26 KITCHEN EQUIPMENT**

Kitchen equipemnt, such as food disposal unit, kitchen sink or dishwasher, discharging greasy waste, may be connected to a 2-inch waste above ground with a 1½" vent. The minimum size pipe underground shall be three (3) inches. The cleanout shall be three (3) inches with a 1½" vent.

## **12.27 KITCHEN SINK, DISHWASHER AND GARBAGE DISPOSAL**

When a kitchen sink, dishwasher and garbage disposal are connected to the same trap, the trap shall be 2-inches with 2-inch waste above ground, and one and one-half inch vent, not over thirty feet in height.

## **12.28 RELATIONS OF CLOSETS TO BASINS, ETC.**

In calculation of the relation of basins, baths, and similar fixtures toward water closets, it shall be reckoned that six basins, or three bathtubs or similar fixtures, shall be equal to one closet.

## **12.29 REQUIREMENTS IN SCHOOLS, FACTORIES, ETC.**

In schools, factories and other places where there are a large number of persons, there shall be at least one closet to each thirty persons, also one sink or wash-stand adjoining toilet room, with separate provision where both sexes occupy the building, and proper proportion for each sex. Meat Markets shall have a closet and sink accessible with hot and cold water to sink, and a floor drain.



All residences connected to the sewerage system shall have at least one closet, one lavatory, one tub or shower and one sink. Office, apartment, tenement or any building wherein the different floors are occupied by different parties or families, shall have at least one closet and one sink for each occupied floor, except where more than three families or nine individual roomers are on each floor, then in such cases, an additional closet shall be installed. All such fixtures shall be connected to the Jefferson Parish Water and Sewer System. All commercial buildings shall have at least one (1) water closet, one (1) lavatory and one (1) floor drain.

Where a building has been fitted out with plumbing in accordance with the regulations of the Division of Regulatory Inspections of Jefferson Parish, and approved for the purpose in which it was intended, and for which the permit was issued, and the building thereafter is used for different purposes wherein the rules of the Division require a different arrangement for plumbing, the new rules shall apply just as in the case of new plumbing to be installed on an existing job.

All buildings shall be connected to the Jefferson Parish Sewerage System that are within three hundred (300) feet of the sewer system.

**12.31****ICE CREAM FACTORIES, MILK DEPOTS, ETC.**

Ice cream factories, milk depots, dairies, etc., where milk, acid and the like are kept or used for any purposes, and where washing or clothes cleaning is done (private families excepted), the floor shall be cement, tile or marble, properly graded to a sump or floor drain properly connected with the sewer.

All fixtures in basements or cellars below the surface of the street, the top of which are less than twelve inches above the surface of the street, shall be taken on a branch line independent from that into which all fixtures from the floors above are connected. If desired, all such fixtures may discharge into a sump or pump into the sewer line. Connections in either case shall have a back water trap and positive valve on the sewer side. The positive valve, when open, shall be as near the size of the bore of the pipe as practical and shall have a wheel or handle to operate the same. The back-water trap shall have all joints in the body bolted instead of lugs. Samples of back-water traps shall be submitted for approval before being installed. All valves, traps, stop and waste cocks, etc., underground, shall be installed in boxes of brick, concrete or some suitable material with iron cover and so arranged as to be accessible at all times for operating and repairs.

**12.32****SEWERAGE MATTER**

All foul or waste or liquid refuse shall be carried into the sewer in each and every building connected with the sewer system. This includes the discharge from all water closets, sinks, bathtubs, dentists' and surgeons' sinks and cuspidors, and foul refuse from manufacturers when small in amount. The Division of Regulatory Inspections reserves the right, however, to require other means of removal in cases where such manufacturing wastes would overload or damage the sewerage system in any way.

**12.33****CESSPOOLS AND VAULTS**

When the plumbing system in a building has been connected to the Public Sewer System, any existing cesspools, earth closets and vaults shall be eliminated so as not to create a health hazard. The cesspools, earth closets and vaults shall be thoroughly cleaned, disinfected and filled with earth, cinders or gravel, well packed. All remaining flues and walls shall be thoroughly cleaned, disinfected, and the walls plastered, whitewashed or painted.

**12.34****SUPPLY PIPES**

Supply pipes shall be of cast-iron, wrought-iron, brass or lead of weight not less than "K" or "L" copper for underground or above ground. All underground water pipe shall be not less than three quarters of an inch in diameter. The pipe shall be of sufficient size to furnish an ample supply of water to properly operate each fixture and shall be laid with proper fall and provided with a stop and waste cock at the lowest point so that the entire system can be drained. Branch lines not terminating in a positive valve or cock, shall be supplied with an independent shut off.

Supply pipes shall not be less than three quarters of an inch in diameter and 1/2" fixture branch connections not over ten feet in length. Only (2) two fixtures are allowed on a 1/2 inch fixture branch.

## **12.35 LOCAL VENTS**

When vents are used on water closets or urinals, the vent shall enter a heated flue above all openings, or, if there is no such flue, it shall extend above roof, and have no connection whatever with counter vent pipes for traps, nor be connected to main stack. Not less than two-inch pipe shall be used for one closet, and where two, three or four vents enter a main vent, the latter shall be increased to at least three inches. Copper or galvanized wrought-iron pipes, may be used for local vent pipes, and shall be run as direct as possible and shall have a pitch towards the fixture to assist the draft and take care of condensation. When local vent pipes enter a flue, they shall be run into a copper or cast iron pipe cemented into the flue, and not projected beyond the face of same.

## **12.36 OLD WORK**

Where new soil or waste lines are installed in connection with old work, they shall be water tested when over six joints in length, in any case where practical.

Whenever a building has been moved to a new location or practically destroyed by fire or other causes, the test, inspections and inspection fees required shall be the same as in the case of new work, if so directed by the Chief Plumbing Inspector. If preliminary inspection, however, should show that such tests and inspections are not necessary, the Chief Plumbing Inspector shall have authority to omit such as are unnecessary and to pro-rate the inspection fee.

## **12.37 DRAINS**

Drains installed to service boilers, air conditioning or refrigerating equipment, drinking fountains, swimming pools, etc., that are not subject to oil or contaminated waste, shall be connected to the storm drain, and when so connected, shall be trapped and vented, and shall be subject to inspection as a plumbing fixture.

## **12.38 WASHING MACHINES**

Waste from washing machines, or laundry tubs may be connected to a two (2) inch sewer branch, not exceeding twenty (20) feet in length. Where greater length of the branch is necessary, the pipe size shall be increased to three (3) inches for the entire length of the branch. The cleanout shall be three (3) inches.

**12.38-A** The drain for all washing machines shall be a (2) two inch "P" trap and two (2) inch stand pipe.

## **12.39 REFRIGERATORS**

The drain pipe from refrigerators shall not be directly connected with the soil or waste pipe, or with the drain or sewer. It shall discharge into an open pan, with air space between the pan and the refrigerator, this pan to be trapped and counter-vented before entering a waste pipe. Waste from refrigerators in residences, need not be connected to sewers as above specified, unless required by the agent or owner of property.

"P" trap for A.C. drains shall be 1-1/2". If installed on a 3" or 4" vent, the "P" trap may be installed above the ceiling.

## **12.40 AIR CONDITION DRAINS**

Where necessary to install "P" traps for air-condition drains in walls or other concealed places, they shall be made readily accessible by providing opening of sufficient size to permit inspection, repairs or replacement. Openings for traps may be closed by installing readily removable paneling, hinged doors, or removable trap doors.

## **12.41 WATER HEATERS**

All types of water heaters, shall have installed on the cold water supply, within two (2) feet of the heater, and accessible panel for inspection and a positive shut-off valve, approved by the Plumbing Department. Storage tank heaters shall be equipped additionally with a relief valve of a type approved by the Division of Regulatory Inspections, set on the hot water delivery side, set at 80-100 lbs., with a minimum size drain pipe 3/4" diameter to the outside of the building.

Waste water from relief drain pipe, shall be directed to a point where no injury to persons or property will result. Electric Water Heaters shall not be installed under stairs except in "I" and "J" Occupancies. Gas Water Heaters or Gas Dryers shall not be installed under stairs.

**12.42****VERTICAL STACKS****NUMBER OF FIXTURES ALLOWED ON VERTICAL STACKS**

| Size of Soil Stacks in Inches . . . . .  | 3  | 4  | 5  | 6   | 8   |
|------------------------------------------|----|----|----|-----|-----|
| <b>NUMBER OF FIXTURES</b>                |    |    |    |     |     |
| Closets . . . . .                        | 2  | 30 | 60 | 120 | 300 |
| Closets and Lavatories . . . . .         | 2  | 25 | 50 | 100 | 250 |
| Closets and Tubs . . . . .               | 2  | 20 | 40 | 80  | 200 |
| Closets and Kitchen Sinks . . . . .      | 2  | 20 | 40 | 80  | 200 |
| Closets and Urinals . . . . .            | 2  | 20 | 40 | 80  | 200 |
| Closets, Tubs and Lavatories . . . . .   | 2  | 20 | 40 | 80  | 200 |
| Size of Waste Stacks in Inches . . . . . | 1½ | 2  | 2½ | 3   | 4   |
| <b>NUMBER OF FIXTURES</b>                |    |    |    |     |     |
| Lavatories . . . . .                     | 4  | 12 | 20 | 30  | 100 |
| Tubs . . . . .                           | 1  | 4  | 10 | 15  | 50  |
| Kitchen Sinks . . . . .                  | 1  | 4  | 10 | 15  | 50  |
| Service Sinks . . . . .                  | 0  | 3  | 5  | 10  | 30  |
| Laundry Tubs . . . . .                   | 1  | 4  | 10 | 15  | 50  |
| Urinals . . . . .                        | 0  | 3  | 5  | 10  | 30  |
| Dental Chairs . . . . .                  | 4  | 12 | 20 | 30  | 100 |

**12.43****VENTILATION OF TOILET ROOMS**

Water closets or urinals will not be permitted in any unventilated room or compartment. They shall be installed into a space which is well lighted and ventilated and be separated from any space used for other purposes, by walls extending from the floor to the ceiling. Toilet rooms may be ventilated to the outside by transoms, air ducts or shafts in size equal to the area of 144 square inches for one closet, and seventy-two square inches for each additional closet or urinal. No air shaft, duct or transom that ventilates either water closets or urinals shall discharge into another compartment or toilet room. The provisions of the preceding sentence shall not prevent the enlargement of the air shaft or duct to a size suitable and adequate to ventilate a series of closets and urinal compartments.

**12.44****ROOF FLANGES**

Roof flanges shall be of ten-ounce copper or sheet lead, or not less than 2½ pounds weight per square foot, and shall be of thimble and counter flashing type, except where the stack has to extend above the adjoining roof; in that event, the thimble shall be caulked into the hub of the stack. Any other roof joint may be used if sample has been submitted to and approved by the Chief Plumbing Inspector.

**12.45****CHARGE FOR UNNECESSARY TRIPS**

When the plumbing contractor or his representative request a meeting with the inspector on the job and fails to keep the appointment, a charge of \$5.00 shall be made for an unnecessary trip, however, should sufficient evidence be presented that failure to keep the appointment was beyond the control of the person who called it, the above charge may be rescinded by the Chief Plumbing Inspector.

**12.46****INTERCEPTORS AND SEPARATORS**

When required, interceptors (including grease, oil and sand interceptors, etc.), shall be provided, when in the judgment of the Chief Plumbing Inspector they are necessary for the proper handling of liquid wastes containing grease, flammable wastes, sand, and other ingredients harmful to the building sewer system, the public sewer or sewage treatment plant or process.

The size and type of each interceptor or separator shall be approved by the Chief Plumbing Inspector, in accordance with generally accepted standards set forth in this Code. No wastes other than those requiring treatment or separation, shall be discharged into any interceptor. No grease interceptor shall be used until it has been approved by the Chief Plumbing Inspector.

A mixture of light and heavy solids or liquids and solids having various specific gravities may be treated and then separated in an interceptor, as approved by the Chief Plumbing Inspector.

Two way cleanouts shall be installed on the sewer side of each grease trap, catch basin, dilution basin, etc. Grease traps shall be of an approved type and shall be used in hotels, restaurants, etc., and all places where cooking is done or meals served to the public. They shall be placed in the ground and shall be at least thirty-six (36) inches in diameter and thirty-six (36) inches deep, with connections into the top and extending downward on the inside to form a deep seal. The inlet connection shall be at least 2" above the outlet and the top of the baffle wall 2" below the bottom of the outlet. The baffle wall shall be of solid construction from its top to the bottom of the trap. Water jacket type grease traps shall not be permitted. The opening in cover shall not be less than twenty-four (24) inches in diameter. See Drawing on Page 51-65.

## 12.48

## BATH TUBS

Drum traps and "P" traps shall be connected to vertical stacks by sanitary tees or sanitary crosses only.

Bathtubs or showers trapped with a 2" "P" trap and vented with a 2" vent, may have one lavatory or one A.C. drain waste above the tub or shower. No lavatory or A.C. drain may discharge into a 2" vent when 2 tubs or 2 showers are vented by the same 2" vent. In buildings where two (2) bathtubs are back to back the outside of the tubs shall not be less than twenty-four (24) inches apart. Supplies for bathtubs and/or shower stalls shall not be installed on the outside wall. A shower head over a bathtub does not increase the fixture value.

## 12.49

## PLASTIC LAVATORIES, BATHTUBS, AND SHOWER UNITS

Plastic lavatories, bathtubs, and shower units are acceptable for installation, provided they meet the following standards:

- (a) Plastic tubs shall be ANSI Z124.1 1974, and shall be labeled by the manufacturer.
- (b) Plastic lavatories shall be ANSI Z124.3 1976, and shall be labeled by the manufacturer.
- (c) Plastic shower units shall be ANSI Z124.2 1977, and shall be labeled by the manufacturer.
- (d) The installation shall meet all requirements of Chapter 51, be rigidly connected to the plumbing system, and shall be equipped with the proper strainers.
- (e) Traps for bathtubs shall be either the conventional drum trap or a 2" "P" trap. When drum traps are used they shall be not less than 4" x 5" x 1½" size and the allowable distance from the center of the stack to the trap shall be not more than 60" and the distance from the trap to the center of the tub, not more than 24". When 2" "P" traps are used, the trap shall not be more than 60" from the stack. When a "P" trap is more than 60" from the stack it shall be vented with a 2" vent or with a 2" loop-vent. All connections shall be rigidly installed.

## 12.50

## LAWN OR ROOF SPRINKLERS

If lawn or roof sprinkler systems connected to the public water supply, plans and specifications for lawn or roof sprinkler systems and an application for inspection, shall be filed with the Plumbing Department by the licensed plumber proposing to do such work. Inspection of such systems shall include the vacuum breaker, positive valve, elevation and number of sprinkler heads, material, and source of water supply to insure that no cross connection exists. A Certificate of Approval shall be issued by the Chief Plumbing Inspector upon completion of a satisfactory inspection that such system is installed in accordance with the provision of this Code.

## 12.51

## TRAILER PARKS

Trailer park is a plot of ground upon which four (4) or more trailer homes are located as residences. The term mobile home park is now commonly used.

Trailer parks and trailers shall meet the standards of the Jefferson Parish Plumbing Code. **Water Supply.** Trailer parks shall have a water main of sufficient size to supply each trailer with an adequate flow of water at peak demand, and in no case shall the branch line be less than ¾ inch for each trailer with a stop and waste cock.

A Reduced Pressure Backflow Preventer shall be installed in the main water line. Hose connected faucets shall be provided with an approved type Vacuum Breaker.

**Sewer Connection.** Each trailer shall have a sewer connection not less than four (4) inches in diameter, with a four (4) inch "P" trap and a two (2) inch vent and that portion of the sewer outlet above ground level shall be protected by a concrete slab, 12 inches by 12 inches by 4 inches.

**Cleanout Boxes.** An approved Jefferson Parish cleanout box shall be installed over the main cleanout. Cleanout boxes shall be cast-iron or brass at least 1/2" thick, five (5) inches in depth and at least eight (8) inches inside diameter when cast-iron or plastic pipe is used and at least 1/2" thick, five (5) inches in depth and ten (10) inches inside diameter when terra cotta pipe is used. Cleanout boxes shall be installed over all exposed cleanouts. See Drawing on page 51-64.

## **12.52 NUMBER OF WASHERS REQUIRED FOR APARTMENTS**

| <b>Number of Apartments</b> | <b>Number of Washers</b> |
|-----------------------------|--------------------------|
| 1 - 5                       | 1                        |
| 6 - 10                      | 2                        |
| 11 - 20                     | 3                        |
| 21 - 30                     | 4                        |
| 31 - 40                     | 5                        |
| 41 - 50                     | 6                        |
| 51 - 60                     | 7                        |
| 61 - 70                     | 8                        |
| 71 - 80                     | 9                        |
| 81 - 100                    | 10                       |
| 101 - 120                   | 11                       |
| 121 - 140                   | 12                       |
| 141 - 160                   | 13                       |
| 161 - 180                   | 14                       |
| 181 - 200                   | 15                       |
| 201 - 220                   | 16                       |
| 221 - 240                   | 17                       |
| 241 - 260                   | 18                       |
| 261 - 280                   | 19                       |
| 281 - 300                   | 20                       |

## **SECTION XIII. BACKFLOW AND CROSS CONNECTIONS:**

### **13.1 AUTHORITY**

**13.1.1 Responsibility of the Directors.** The Directors, Department of Safety, Department of Water, and Department of State Board of Health, or their designated agent shall inspect the plumbing in every building or premises in this Parish as frequently as in his judgment may be necessary to ensure that such plumbing has been installed in such a manner as to prevent the possibility of pollution of the water supply of the Parish by the plumbing. The directors shall notify or cause to be notified in writing the owner or authorized agent of the owner of any such building or premises, to correct, within a reasonable time set by the Directors, any plumbing installed or existing contrary to or in violation of this ordinance, and which, in his judgment may therefore, permit the pollution of the Parish water supply, or otherwise adversely affect the public health.

**13.1.2 Insepection.** The Directors, or their designated agent, shall have the right of entry into any building, during reasonable hours, for the purpose of making inspection of the plumbing systems installed in such building or premises provided that with respect to the inspection of any single family dwelling, consent to such inspection shall first be obtained from a person of suitable age and discretion therein or in control thereof.

### **13.2 DEFINITIONS**

**13.2.1 Agency.** The Department of the municipal government invested with the authority and responsibility for the enactment and enforcement of this ordinance.

**13.2.2 Air Gap.** The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the receptacle.

**13.2.3 Approved.** Accepted by the Agency as meeting an applicable specification stated or cited in this ordinance, or as suitable for the proposed use.

**13.2.4 Auxiliary Supply.** Any water source or system other than the Parish water supply which may be available in the building or premises.

**13.2.5 Backflow.** The flow of water or other liquids, mixtures or substances into the

distributing pipes of a potable supply of water from any source or sources other than its intended source. Backsiphonage is one type of backflow.

**13.2.6 Backflow Preventer.** A device or means to prevent backflow.

**13.2.7 Backsiphonage.** The flowing back of used, contaminated or polluted water from a plumbing fixture or vessel or other sources into a water supply pipe due to a negative pressure in such pipe.

**13.2.8 Barometric Loop.** A loop of pipe rising approximately 35 feet, at its topmost point, above the highest fixture it supplies.

**13.2.9 Check Valve.** An automatically operated device which is designed to permit the flow of fluids in one direction and to close if there is a reversal of flow.

**13.2.10 Contamination.** See pollution.

**13.2.11 Cross-Connection.** Any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other water of unknown or questionable safety, steam, gases, or chemicals whereby there may be a flow from one system to the other. See Backflow and Backsiphonage.

**13.2.12 Drain.** Any pipe which carries waste water or water-borne wastes in a building drainage system.

**13.2.13 Fixture, Plumbing.** Installed receptacles, devices, or appliances supplied with water or which receive or discharge liquids or liquid-borne wastes.

**13.2.14 Flood Level Rim.** The edge of the receptacle from which water overflows.

**13.2.15 Hazard, Health.** Any conditions, devices, or practices in the water supply system and its operation which create, or, in the judgment of the Directors, may create, a danger to the health and well-being of the water consumer. An example of a health hazard is a structural defect in the water supply system, whether of location, design, or construction, which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources.

**13.2.16 Hazard, Plumbing.** Any arrangement of plumbing including piping and fixtures whereby a cross-connection is created.

**13.2.17 Hydropneumatic Tank.** A pressure vessel in which air pressure acts upon the surface of the water contained within the vessel, pressurizing the water distribution piping connected to the vessel.

**13.2.18 Inlet.** The open end of the water supply pipe through which the water is discharged into the plumbing fixture.

**13.2.19 Plumbing System.** Includes the water supply and distribution pipes, plumbing fixtures and traps; soil waste, and vent pipes; building drains and building sewers including their respective connections, devices, and appurtenances within the property lines of the premises, and water treating or water using equipment.

**13.2.20 Pollution.** The presence of any foreign substance (organic, inorganic, radiological or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water.

**13.2.21 Reduced Pressure Principle Backflow Preventers.** An assembly of differential valves and check valves including an automatically opened spillage port to the atmosphere designed to prevent backflow.

**13.2.22 Surge Tank.** The receiving, nonpressure vessel forming part of the airgap separation between a potable and an auxiliary supply.

**13.2.23 Vacuum.** Any pressure less than that exerted by the atmosphere.

**13.2.24 Vacuum Breaker, Nonpressure Type.** A vacuum breaker which is designed so as not to be subjected to static line pressure.

**13.2.25 Vacuum Breaker, Pressure Type.** A vacuum breaker designed to operate under conditions of static line pressure.

**13.2.26 Water, Potable.** Any water, which, according to recognized standards, is safe for human consumption.

**13.2.27 Water, Nonpotable.** Water which is not safe for human consumption or which is of questionable potability.

**13.2.28 City Water.** Any water which, according to recognized standards, is safe for human consumption as purified and transported by the Jefferson Parish Water Systems.

### **13.3 GENERAL (TECHNICAL) REQUIREMENTS**

**13.3.1 General.** A potable water supply system shall be designed, installed and maintained in such manner as to prevent contamination from nonpotable liquids, solids or gases, from being introduced into the potable water supply through cross-connections or any other piping connections to the system.

**13.3.2 Cross-Connections Prohibited.** Cross-connections between potable water systems and

other systems or equipment containing water or other substances of unknown or questionable safety are prohibited except when and where, as approved by the authority having jurisdiction, suitable protective devices such as the reduced pressure zone backflow preventer or equal are installed, tested and maintained to insure proper operation on a continuing basis.

**13.3.3 Interconnections.** Interconnection between two or more public water supplies shall be permitted only with the approval of the health authority having jurisdiction.

**13.3.4 Individual Water Supplies.** Cross-connections between an individual water supply and a potable public supply shall not be made unless specifically approved by the health authority having jurisdiction.

**13.3.5 Connection to Boilers.** Potable water connections to boiler feed water systems in which boiler water conditioning chemicals are introduced shall be made through an airgap or provided with an approved backflow preventer located in the potable waterline before the point where such chemicals are introduced.

**13.3.6 Prohibited Connections to Fixtures and Equipment.** Connections to the potable water supply system for the following is prohibited unless protected against backflow in accordance with Section 13 or as set out herein.

(a) Operating, dissection, embalming, and mortuary tables or similar equipment – in such installation the hose used for water supply shall terminate at least 12 inches away from every point of the table or attachments.

(b) Pumps for nonpotable water, chemicals or other substances – priming connections may be made only through an airgap.

(c) Building drainage, sewer or vent systems.

(d) Any other fixture or similar hazard.

**13.3.7 Refrigerating Unit Condensers and Cooling Jackets.** Except where potable water provided for a refrigerator condenser or cooling jacket is entirely outside the piping or tank containing a toxic refrigerant, with two separate thickness of metal separating the refrigerant from the potable water supply, inlet connection shall be provided with an approved check valve. Also adjacent to, and at the outlet side of the check valve, an approved pressure relief valve set to relieve at 5 lbs./psi above the maximum water pressure or at the point of installation shall be provided if the refrigeration units contain more than 20 pounds of refrigerants.

**13.3.8 Protection Against Backflow and Backsiphonage.**

**13.3.8.1 Water Outlets.** A potable water system shall be protected against backflow and backsiphoning by providing and maintaining at each outlet:

(a) Airgaps: An airgap as specified in Section 13.3.8.2 between the potable water outlet and the flood level rim of the fixture it supplies or between the outlet and any other source of contamination, or

(b) Backflow Preventer: An approved backflow preventer device or vacuum breaker to prevent the drawing of contamination into the potable water system.

**13.3.8.2 Minimum Required Airgap.**

(a) How Measured: The minimum required airgap shall be measured vertically from the lowest end of potable water outlet to the flood rim or line of the fixture or receptacle into which it discharges.

(b) Size. The minimum required airgap shall be twice the effective opening of a potable water outlet unless the outlet is a distance less than three times the effective opening away from a wall or similar vertical in which cases the minimum required airgap shall be three times the effective opening of the outlet. In no case shall the minimum required airgap be less than shown in the Table 13.3.8.2 "Minimum Airgap for Generally Used Plumbing Fixtures."

**TABLE 13.3.8.2A MINIMUM AIRGAP FOR GENERALLY USED PLUMBING FIXTURES**

| FIXTURE                                                                                                                                                        | Minimum Airgap                            |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------|
|                                                                                                                                                                | When not affected by near wall 1 (inches) | When affected by near wall 2 (inches) |
| Lavatories and other fixtures with effective openings not greater than ½" diameter .....                                                                       | 1.0                                       | 1.50                                  |
| Sink, laundry trays, goose-neck bath faucets and other fixtures with effective openings not greater than ¾" diameter .....                                     | 1.5                                       | 2.25                                  |
| Over rim bath fillers and other fixtures with effective openings not greater than 1" diameter .....                                                            | 2.0                                       | 3.0                                   |
| Drinking water fountains – single orifice 7/17" (0.437) diameter or multiple orifices having total area of 0.150 sq. in. (area of circle 7/16" diameter" ..... | 1.0                                       | 1.50                                  |
| Effective openings greater than 1" .....                                                                                                                       | (3)                                       | (4)                                   |

(1) Side walls, ribs, or similar obstructions do not affect airgaps when spaced from inside edge of spout opening a distance greater than 3 times the diameter of the effective opening for a single wall, or a distance greater than 4 times the diameter of the effective opening for 2 intersecting walls.

(2) Vertical walls, ribs, or similar obstructions extending from the water surface to or above the horizontal plane of the spout opening require a greater airgap when spaced closer to the nearest inside edge of spout opening than specified in note 1 above. The effect of 3 or more such vertical walls or ribs has not been determined. In such cases, the airgap shall be measured from the top of the wall.

(3) 2 times diameter of effective opening.

(4) 3 times diameter of effective opening.

**13.3.8.3 Approval Devices.** Before any device for the prevention of backflow or backsiphonage is installed, it shall have first been certified by a recognized testing laboratory acceptable to the agency Director. Devices installed in a building potable water supply distribution system for protection against backflow shall be maintained in good working condition by the person or persons responsible for the maintenance of the system.

The agency Director or his designee shall inspect routinely such devices and if found to be defective or inoperative shall require the replacement thereof.

#### **13.3.8.4 Installation of Devices.**

(a) **Vacuum Breakers:** Vacuum breakers shall be installed with the critical level at least 6 inches above the flood level rim of the fixture they serve and on the discharge side of the last control valve to the fixture. No shutoff valve or faucet shall be installed beyond the vacuum breaker. For closed equipment or vessels such as pressure sterilizers the top of the vessel shall be treated as the flood level rim but a check valve shall be installed on the discharge side of the vacuum breaker.

(b) **Reduced Pressure Principle Backflow Preventer:** A reduced pressure principle type backflow preventer may be installed subject to full static pressure.

(c) **Devices of All Types:** Backflow and backsiphonage preventing devices shall be accessibly located preferably in the same room with the fixture they serve. Installation in utility or service spaces, provided they are readily accessible, is also permitted.

#### **13.3.8.5 Tanks and Vats — Below Rim Supply.**

(a) Where a potable water outlet terminates below the rim of a tank or vat and the tank or vat has an overflow of diameter not less than given in Table 13.3.8.5A "Sizes of Overflow Pipes for Water Supply Tanks," the overflow pipe shall be provided with an airgap as close to the tank as possible.

**TABLE 13.3.8.5A SIZES OF OVERFLOW PIPES FOR WATER SUPPLY TANKS**

| Minimum Capacity of water supply line to tank | Diameter of overflow pipe (inches ID) | Maximum Capacity of water supply line to tank | Diameter of overflow pipe (inches ID) |
|-----------------------------------------------|---------------------------------------|-----------------------------------------------|---------------------------------------|
| 0 - 50 gpm                                    | 2                                     | 400 - 700 gpm                                 | 5                                     |
| 50 - 150 gpm                                  | 2½                                    | 700 - 1,000 gpm                               | 6                                     |
| 100 - 200 gpm                                 | 3                                     | Over 1,000 gpm                                | 8                                     |
| 200 - 400 gpm                                 | 4                                     |                                               |                                       |

(b) The potable water outlet to the tank or vat shall terminate a distance not less than 1½ times the height to which water can rise in the tank above the top of the overflow. This level shall be established at the maximum flow rate of the supply to the tank or vat and with all outlets except the airgap, overflow outlet closed.

(c) The distance from the outlet to the high water level shall be measured from the critical point of the potable water supply outlet.

**13.3.8.6 Protective Devices Required.** Approved devices to protect against backflow and backsiphonage shall be installed at all fixtures and equipment where backflow and/or backsiphonage may occur and where a minimum airgap cannot be provided between the water outlet to the fixture or equipment and its flood level rim.

(a) **Connections Not Subject to Back Pressure:** Where a water connection is not subject to back pressure, a nonpressure type vacuum breaker shall be installed on the discharge side of the last valve on the line serving the fixture or equipment. A list of some conditions requiring protective devices of this kind is given in Section 13.3.8.6a "Cross Connections Where Protective Devices are Required and Critical Level (C-L) Settings for Backflow Preventers." Critical Level (C-L) is defined as the level to which the backflow preventer (vacuum breaker)



may be submerged before backflow will occur. Where the C-L is not shown on the preventer, the bottom device shall be taken as the C-L.

**TABLE 13.3.8.6 A**  
**CROSS-CONNECTIONS WHERE PROTECTIVE DEVICES ARE REQUIRED**  
**AND CRITICAL LEVEL (C-L) SETTINGS FOR BACKFLOW PREVENTERS**

| <b>FIXTURE OR EQUIPMENT</b>                                  | <b>METHOD OF INSTALLATION</b>                                                                                                                                                                                                                      |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aspirators and ejectors                                      | C-L at least 6 in. above flood level of receptacle served.                                                                                                                                                                                         |
| Dental Units                                                 | On models without built-in vacuum breakers – C-L at least 6 in. above flood level rim of bowl.                                                                                                                                                     |
| Dishwashing machines                                         | C-L at least 6 in. above flood level of machine. Install on both hot and cold water supply line.                                                                                                                                                   |
| Flushometers (closet & Urinal)                               | C-L at least 6 in. above top of fixture supplies.                                                                                                                                                                                                  |
| Garbage can cleaning machine                                 | C-L at least 6 in. above flood level of machine install on both hot and cold water supply lines.                                                                                                                                                   |
| Hose outlets                                                 | C-L at least 6 in. above highest point on hose line.                                                                                                                                                                                               |
| Laundry machines                                             | C-L at least 6 in. above flood level of machine. Install on both hot and cold water supply lines.                                                                                                                                                  |
| Lawn sprinklers                                              | C-L at least 12 in. above highest sprinkler or discharge outlet.                                                                                                                                                                                   |
| Steam tables                                                 | C-L at least 6 in. above flood level.                                                                                                                                                                                                              |
| Tanks and vats                                               | C-L at least 6 in. above flood level rim or line.                                                                                                                                                                                                  |
| Trough urinals                                               | C-L at least 30 in. above perforated flush pipe.                                                                                                                                                                                                   |
| Flush tanks                                                  | Equip with approved ball cock. Where ball cocks touch tank water equip with vacuum breaker at least 1 in. above overflow outlets. Where ball cock does not touch tank water install ball cock outlet or provide vacuum breaker as specified above. |
| Hose bibbs (where aspirators or ejectors could be connected) | C-L at least 6 in. above flood level of receptacle served.                                                                                                                                                                                         |

(b) Connections Subject to Back Pressure: Where a potable water connection is made to line, fixture, tank, vat, pump, or other equipment with a hazard of backflow or backsiphonage where the water connection is subject to backpressure, and an airgap cannot be installed, the Director may require the use of an approved reduced pressure principle backflow preventer. A partial list of such connections is shown in Section 13.3.8.6b "Partial List of Cross-Connections Subject to Back Pressure."

**TABLE 13.3.8.6B PARTIAL LIST OF CROSS-CONNECTIONS WHICH MAY BE**  
**SUBJECT TO BACK PRESSURE**

|                                |                               |
|--------------------------------|-------------------------------|
| Chemical Lines                 | Pumps                         |
| Dock water outlets             | Steam lines                   |
| Individual water supplies      | Swimming pools                |
| Industrial process water lines | Tank and vats – Bottom inlets |
| Pressure tanks                 | Hose bibbs                    |

**13.3.8.7 Barometric Loop.** Water connections where an actual or potential backsiphonage hazard exists may in lieu of devices specified in Section 13.3.8.6 be provided with a barometric loop. Barometric loops shall precede the point of connection.

**13.3.8.8 Double Check-Double Gate Valves.** The Directors may authorize installation of approved, double check-double gate valve assemblies with test cocks as protective devices against backflow in connections between a potable water system and other fluid systems which present no significant health hazard in the judgment of the Directors.

**13.3.8.9 Low Pressure Cutoff Required on Booster Pumps.** When a booster pump is used on a water pressure booster system and the possibility exists that a positive pressure of 10 psi or less may occur on the suction side of the pump, there shall be installed a low pressure cutoff on the booster pump to prevent the creation of a vacuum or negative pressure on the suction side of the pump, thus cutting off water to the other outlets.

## **13.3 MAINTENANCE REQUIREMENTS**

**13.4.1 General Requirements.** It shall be the responsibility of building and premise owners to maintain all backflow preventers and vacuum breakers within the building or on the premises in good working order and to make no piping or other arrangements for the purpose of bypassing backflow devices.

**13.4.2 Reduced Pressure Principle Backflow Preventers.** Periodic testing and inspection schedules shall be established by the Director for all reduced pressure type preventers and the interval between such testing and inspections and overhauls of each device shall be established in accordance with the age and condition of the device. Testing and inspection intervals shall not exceed 1 year, and overhaul intervals shall not exceed 5 years. These devices shall be inspected frequently after the initial installation to assure that they have been installed properly and that debris resulting from the installation has not interfered with the functioning of the device. The testing procedures shall be in accordance with the manufacturer's instructions where approved by the Directors.

## **13.5 CROSS-CONNECTIONS AND STORAGE TANKS**

1. The definition of a cross connection, as based upon the U.S. Department of Health Education and Public Welfare's Public Health Service, is any physical connection or arrangement of pipes between two otherwise separate water supply systems, one of which contains potable water and the other water of unknown or questionable safety, whereby water may flow from one system to the other, the direction of flow depending on pressure differential between the two systems.

2. No cross connection shall be permitted to be made between any system of piping supplied by water from the mains of the Waterworks Department and any other sources of supply, either public or private; or any secondary supplies known to be unsafe for drinking water, such as shallow wells, reused industrial supplies, raw surface water or swimming pools.

3. Where city water is used as an auxiliary supply to a roof or suction tank, which is also supplied by water from any other source, such tank shall not be of the pressure type but open. The delivery of city water shall be above the tank flow line and controlled by same type of automatic valve.

4. It shall be unlawful, also, to maintain storage tanks supplied only with city water, unless the tanks are satisfactorily built, and covered so as to prevent the entrance of contamination. They shall also be subject to periodical inspection by the Waterworks Department and maintained in a manner wholly satisfactory to the standards and requirements of the State Department of Health. Pumps taking suction from the City supply, serving such building storage, shall be installed or operated only upon permit from the Water Department subject to their approval as to size, capacity and valving arrangements.

5. It shall be unlawful for anyone to interconnect private supplies, including deep well systems, with the Waterworks Department system except as hereinafter provided.

(a) Correction and maintenance, shall be performed in a manner satisfactory to the State Department of Health and the Waterworks Department of Jefferson Parish, of all existing sanitary defects in and around the private supply system.

(b) Provision to be made for complete bacteriological analysis by the Waterworks Department of the supply involved, in accordance with the standard methods of water analysis of the American Public Health Association. This requirement means not less than four analyses each month of two standard samples, or more often if the analysis warrant.

(c) Provision by the owner of the private system involved to pay an equitable pro rata part of the cost of all inspections and testing herein required. The rates and method of paying for the same shall be determined by the Waterworks Department subject to the approval of the Director of Water.

6. Should any system supplied by Parish water be operated in violation of any provision of this article, it shall be the duty of the Waterworks Department to completely disconnect all service lines serving such system until this section is properly complied with. Any cost of such disconnection and the estimated cost of reconnection must be paid by the consumer before service shall be restored.

## **13.6 VIOLATIONS AND PENALTIES**

**13.6.1 Notification of Violation.** The Directors shall notify the owner, or authorized agent of the owner, of the building or premises in which there is found a violation of this ordinance, of such violation. The Directors shall set a reasonable time for the owner to have the violation removed or corrected. Upon failure of the owner to have the defect corrected by the end of the specified time interval, the Director may, in his judgment an imminent hazard exists, cause

the water service to the building or premises to be terminated, and/or recommend such additional fines or penalties to be invoked as herein may be provided.

**13.6.2 Fines.** The owner or authorized agent of the owner responsible for the maintenance of the plumbing systems in the building who knowingly permits a violation to remain uncorrected after the expiration of time set by the Directors shall, upon conviction thereof by the court, be required to pay a fine of not more than \$100.00 and/or be sentenced to imprisonment for not more than thirty (30) days for each violation. Each day of failure to comply with the requirements of the Ordinance, after the specified time provided under 13.5.1, shall constitute a separate violation.

## **13.7 PERMITS**

**13.7.1 Permits, Installations and Inspections.** The plumbing contractor will secure a plumbing permit from the Plumbing Section of Jefferson Parish.

**13.7.2 Records and Tests.** Upon receipt of notice from the Inspector, a permanent record file is set up in the Cross Connection Control Group. In order to insure backflow prevention devices continue to operate satisfactorily, it will be necessary that they be periodically tested. Such tests will be conducted in accordance with manufacturer's performance standards and test procedures.

1. Inspectors assigned to the Cross Connection Control Group will conduct the test.
2. All such periodic testing and overhauling shall be at the customer's expense.
3. Testing and inspection intervals shall not exceed one (1) year, and overhaul intervals shall not exceed five (5) years.
4. A certified tester shall test all reduce pressure backflow preventers.

**13.7.3 Vacuum Breakers.** For all hose connected faucets, except as otherwise specifically set forth herein, every water outlet threaded for a hose attachment, except for hose attachments used for automatic clothes washing machines only, shall be provided with an approved type Vacuum Breaker securely attached to the body of the faucet.

### **13.7.4 Fees.**

|                                                           |         |
|-----------------------------------------------------------|---------|
| Each Reduced Pressure Backflow Preventer 3/4" to 3" ..... | \$10.00 |
| Each Reduced Pressure Backflow Preventer 4" to 8" .....   | \$20.00 |

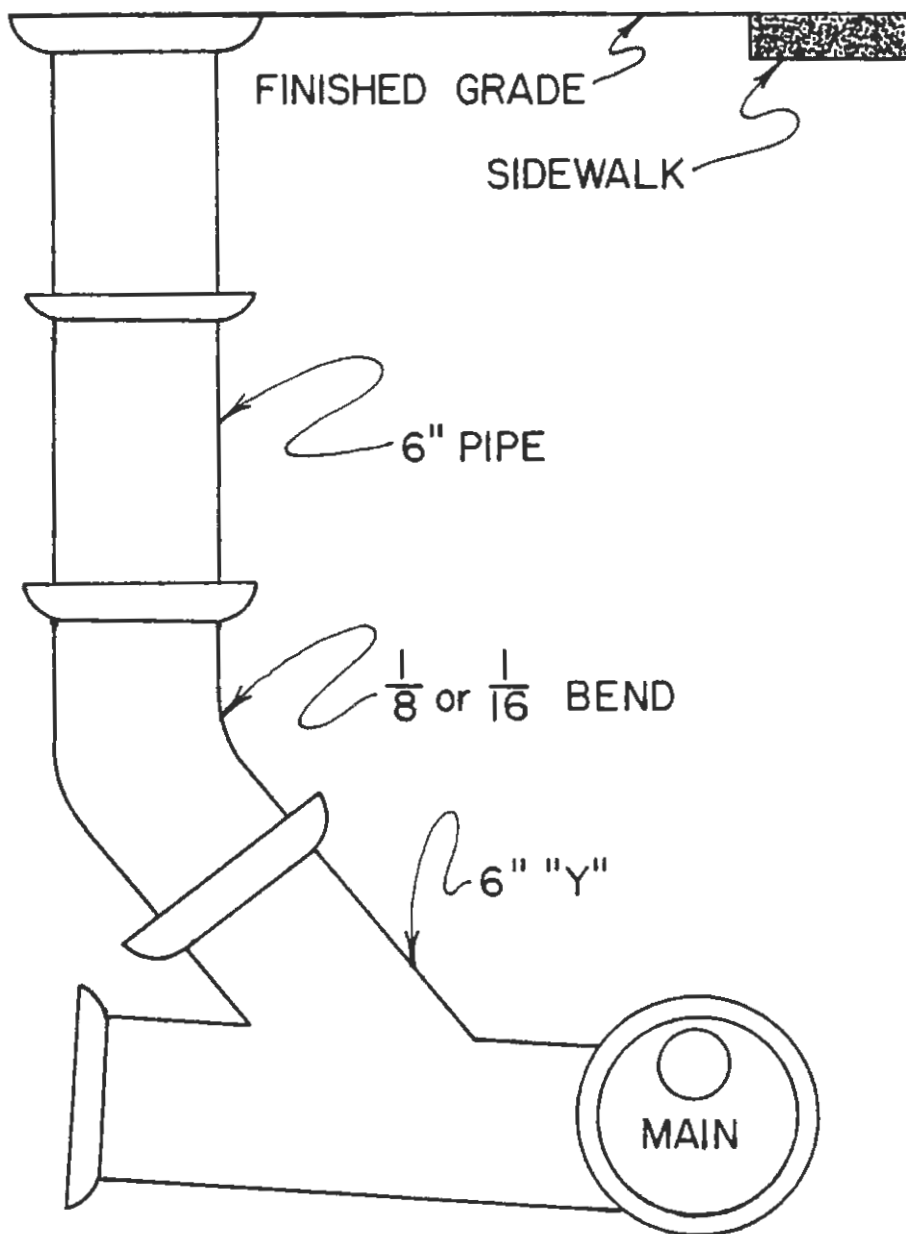
## **SECTION XIV. CLEANOUTS AND CLEANOUT BOXES**

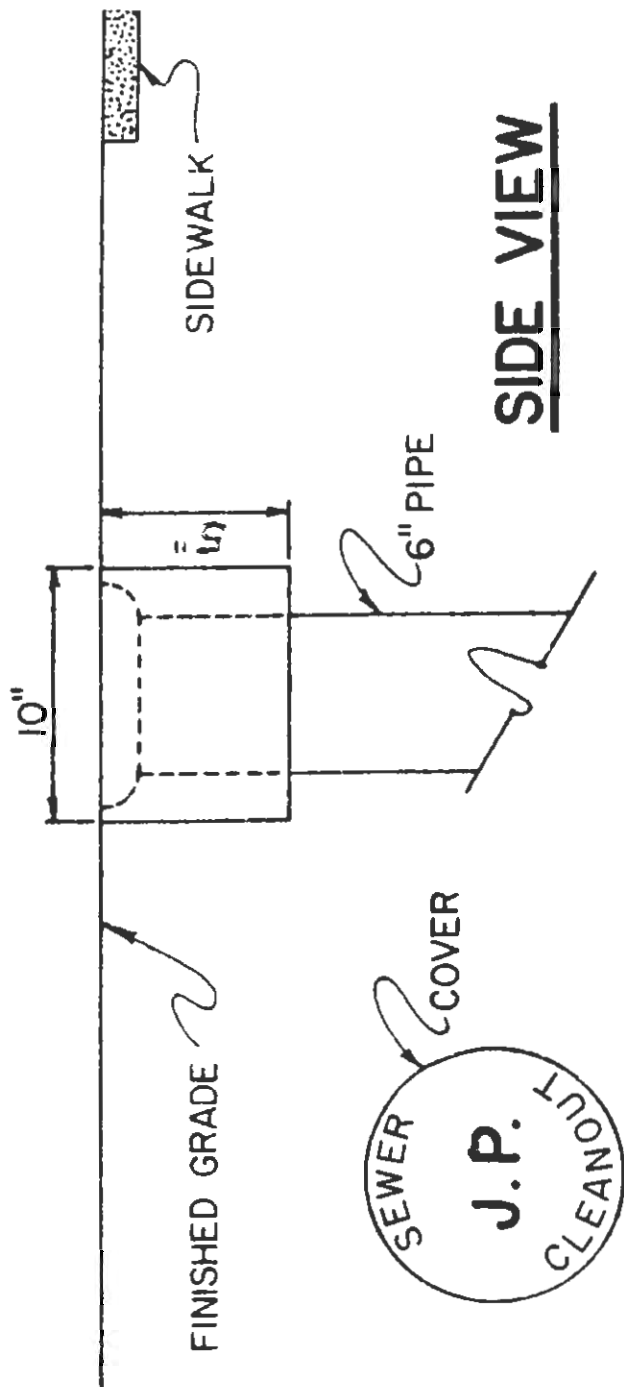
(A) Absolutely no cleanouts will be permitted in inaccessible places. An accessible cleanout shall be required at the base of each stack, where practical. A cleanout shall be placed at the end of the main trunk line outside of the building and shall be brought to the surface and covered with an approved cleanout box.

(B) Cleanouts, shall be easy of access in all cases where practical, and shall be placed at each change in direction of soil and waste lines, when more than one eighth (1/8) bend turn is made in the lines. In long horizontal lines, cleanouts shall not be spaced more than 50' in lines less than 4" in diameter, 75' in lines 4" normal size and 100' in lines larger than five (5) inches. Cleanouts on all underground lines shall be accessible to the surface and covered with an approved cleanout box. When cast-iron pipe is used, cleanouts shall be of heavy brass or cast-iron body, with brass flange cover, and brass male thread, at least three-sixteenths (3/16) of an inch thick. The cleanout cover shall have a solid (square, hexagon or octagon) head. The head shall be a minimum of 3/4" diameter and 3/8" high for a 2" pipe, and a minimum of 1" diameter and 1/2" high for a 4" pipe. There shall be a six (6) inch main cleanout installed in the building sewer system at no more than six (6) feet inside the property line. The cleanout shall be accessible to the surface on a 90 degree angle. The top of the pipe shall be parallel to the finished grade. All cleanouts shall be water tight.

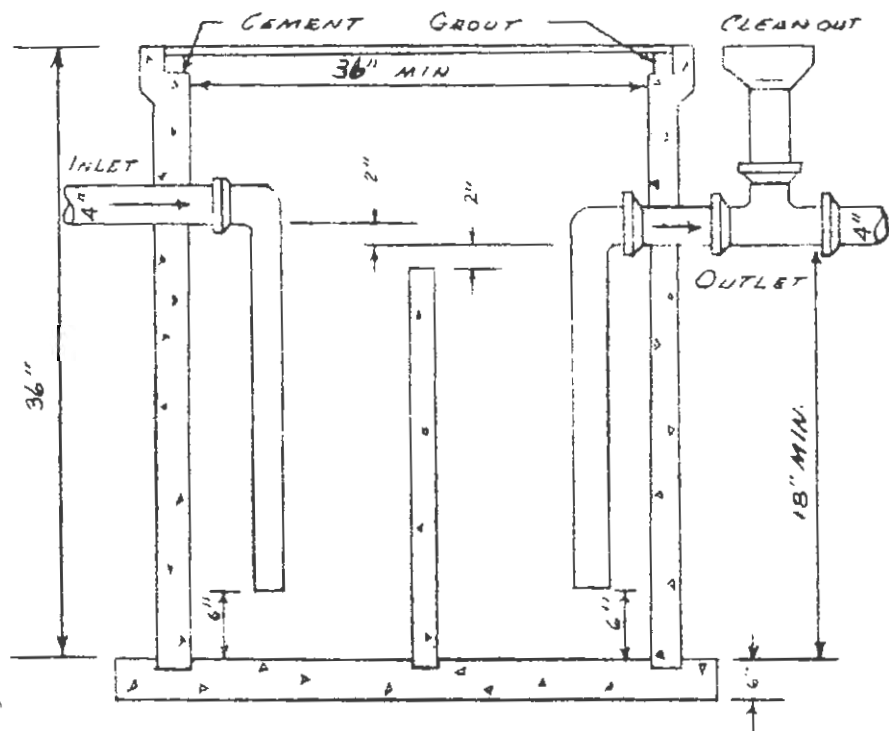
(C) A cleanout conforming with the general regulations shall be placed just inside the property where the change of grade is made. If for any reason the property owner prefers to make the change of grade and place the cleanout just outside the property line, he may be permitted to do so, providing the cost thereof is paid by the owner and the responsibility for any accidents or damage due to such placing or to its maintenance is assumed by him.

(D) An approved Jefferson Parish cleanout box shall be installed over the main cleanout. Cleanout boxes shall be cast-iron or brass at least 1/2" thick, five (5) inches in depth and at least eight (8) inches inside diameter when cast-iron or plastic pipe is used and at least 1/2" thick, five (5) inches in depth and ten (10) inches inside diameter when terra cotta pipe is used. Cleanout boxes shall be installed over all exposed cleanouts, excepting under buildings which are less than three and one half feet above the ground. See Drawing on page 51-64.





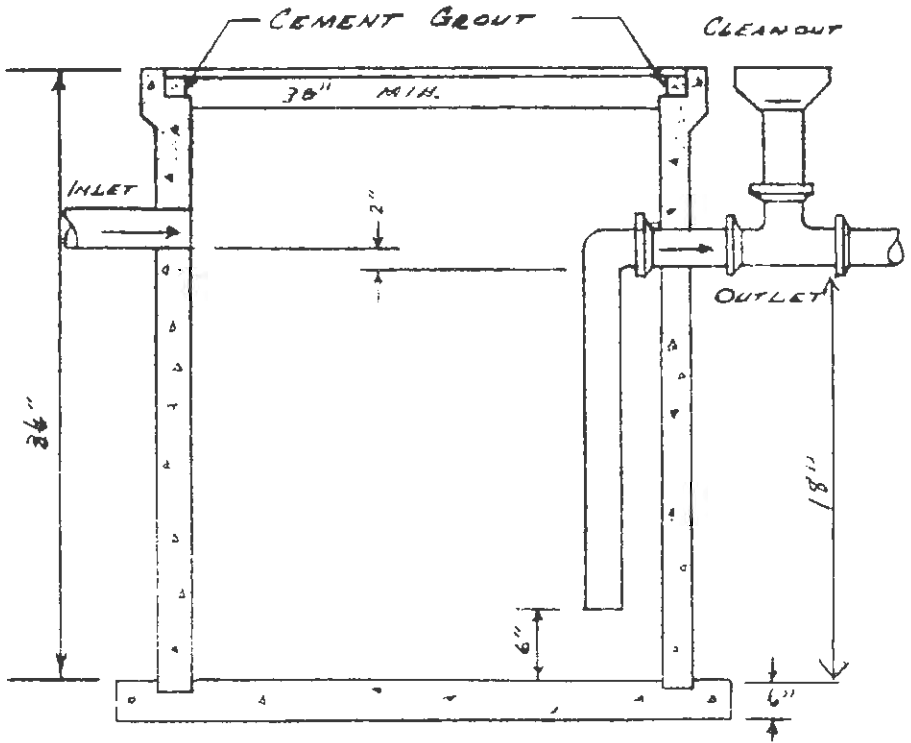
# GREASE TRAP



The bottom of the inlet connection shall be not less than 2 inches above the bottom of the outlet connection.

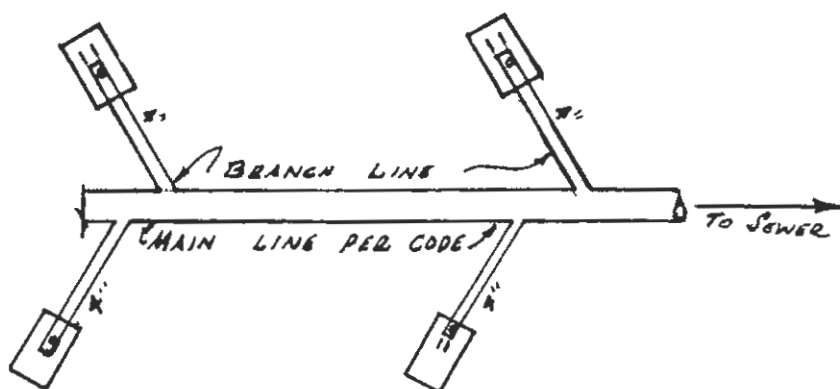
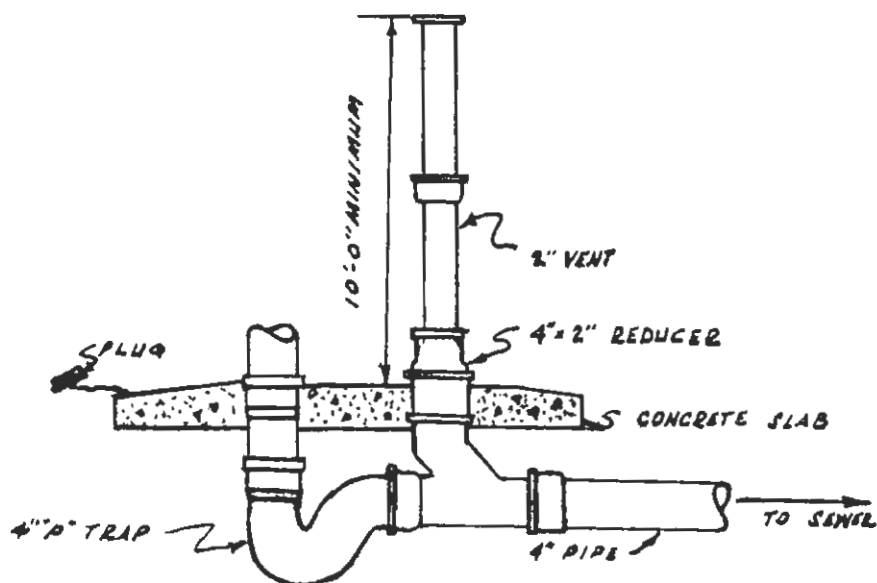
The opening in the cover shall be not less than twenty-four (24) inches in diameter.

# CATCH BASIN



The bottom of the inlet connection shall be not less than 2 inches above the bottom of the outlet connection.

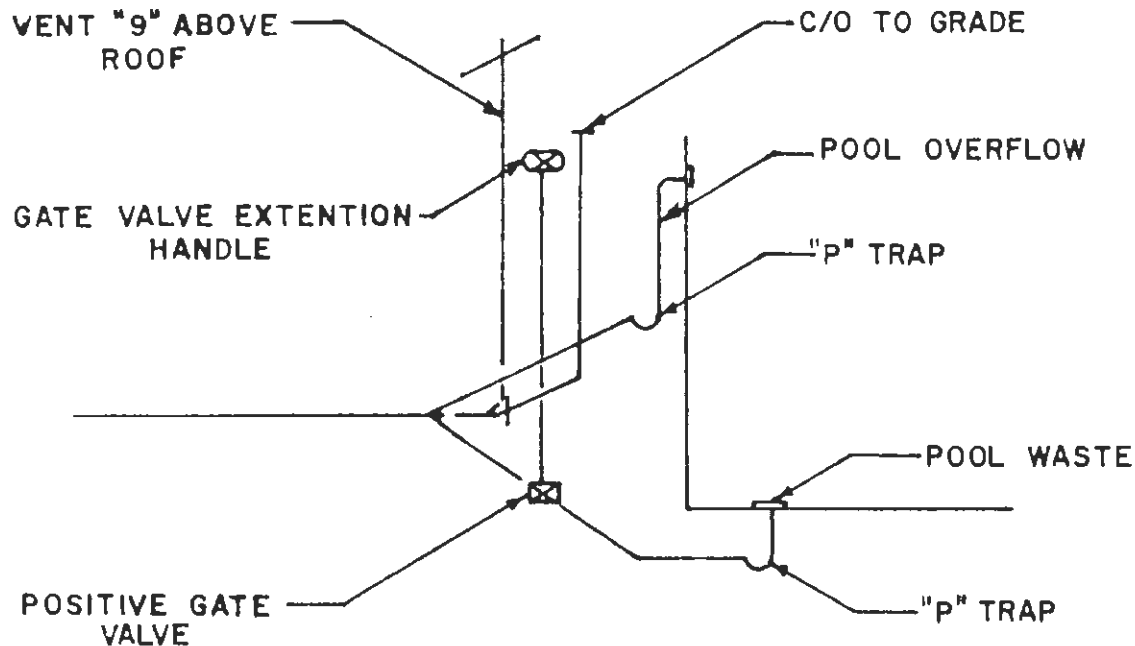
The opening in the cover shall be not less than twenty-four (24) inches in diameter.



Typical connections for  
trailers or trailer court



# A PERMISSABLE INSTALLATION OF OVERFLOW AND WASTE OUTLET FOR BAPTISMAL POOLS



ALL PIPE, FITTINGS, TRAPS, AND VALVES SHALL COMPLY  
WITH PLUMBING CODE



**PART XIX**  
**CHAPTER 52 – GAS RULES AND REGULATIONS**  
**GAS AND ELECTRIC APPLIANCES**

**ARTICLE 5201. DEFINITIONS.**

The following definitions apply to these rules and regulations:

**Appliance.** A device using gas as a fuel to produce heat, light, power or refrigeration.

**Automatic Control.** A device or devices installed on an appliance to accomplish, without manual attention, a complete turn-on or shut-off of gas to the main burner or burners, or to regulate the supply of gas to the main burner or burners.

**The British Thermal Unit (B.T.U.).** The amount of heat required to raise the temperature of one pound of pure water one degree Fahrenheit at 60° Fahrenheit.

**Central Heating Plant.** Equipment centrally located, designed to heat buildings in part or in whole, where by means of pipes or ducts, water, steam or air is used as a medium for conveying the heat so generated to radiators or registers to be liberated in those portions of the building to be heated.

**Chimney.** That part of a building which contains a flue or flues for transmitting products of combustion from a furnace, fireplace, boiler or any appliance to the outer air.

**Company.** Any person, firm or corporation now or hereafter engaged as a public utility in the business of furnishing gas to domestic, commercial or industrial consumers within the Parish of Jefferson.

**Drip.** A short piece of pipe, capped at one end, and connected at the other end to low points in fuel lines for the purpose of catching condensation formed in the fuel lines.

**Flue.** A conduit for conveying the products of combustion or fumes to the outer air.

**Fuel Line.** Any gas piping system extending from the meter to outlets supplying appliances or other gas burning equipment.

**Gas.** A natural gas, manufactured gas or a mixture of the two gases, which may be used to produce light, heat, power or refrigeration. (See Chapter 49).

**Meter.** A device installed by the Company for measuring the quantity of gas used by the consumer.

**Outlet.** The end of a particular branch of a fuel line at which an appliance is connected, or is to be connected.

**Pilot Light.** The flame from a small burner having control independent from the main burner or burners which is utilized to ignite the main burner or burners of an appliance, or the flame from the main burner or burners of an appliance resulting from the diversion of a limited amount of gas through a bypass when the main gas supply is shut off, which flame is utilized to maintain ignition of the main burner or burners.

**Pipe Dope.** Standard compounds used as a pipe and fitting thread lubricant for gas service.

**Range.** This word designates a cooking appliance consisting of an oven or ovens, and/or additional top or side burners for other cooking purposes.

**Space Heater.** Individual gas heating appliance, vented or unvented, and used for heating a room or rooms which is self-contained and connected to a gas outlet, such as:

Radiant heaters, reflector heaters, gas steam radiators, gas warm air radiators, gas unit heaters, gas floor heaters, or floor furnaces.

**Special Equipment.** Special gas fired commercial and industrial equipment consisting of boilers for other than central heating plants, various types of ovens, processing equipment, sterilizing equipment, gas illuminated fixtures clothes dryers other than domestic type for private residence and other such commercial and industrial gas fired equipment.

**Valve.** A ground key cylinder or plug type cock.

**Vent.** Opening in an appliance through which the products of combustion may escape or any duct carrying or conveying smoke, gases and vapors.

**Water Heater.** A tank, system of coils or combination of both, containing water, which is heated by the combustion of gas.

**ARTICLE 5202. LICENSED GASFITTER.**

A person holding a gasfitter's license from the Board of Mechanical Examiners.

**ARTICLE 5203. LICENSE REQUIRED.**

Any person, firm or corporation who engages in the business of constructing, assembling,

installing, or repairing gas piping, gas appliances and/or water heaters who does not employ a Licensed Gasfitter shall be held in violation of this Code.

#### **ARTICLE 5204. CLASSIFICATION OF GASFITTERS.**

**Class A Master Gasfitter:** Any person, firm or corporation engaging in the business of or contracting for the construction, assembling, installing or repair of gas piping, gas appliances and/or water heaters.

**Class C Maintenance Gasfitter:** Any person who is employed as a Maintenance Gasfitter by any person, firm or corporation owning or operating any place of business. Said license to be valid only while said Maintenance Gasfitter remains in the employ of said person, firm or corporation.

#### **ARTICLE 5205. APPLICANTS.**

Any person may apply for a license who meets the following requirements:

- A. Applicants must be of legal age.
- B. An applicant for a Class "A" license shall have at least 5 years' experience in the occupation or business governed by the license for which he is applying, or shall be a graduate of any licensed trade school with 3 years' experience, or an accredited college with one year experience in that class of occupation or business governed by the license for which he is applying. Three letters of reference shall be submitted from licensed contractors attesting to the applicant's experience and character. Applicant for Class "A" license must have and maintain, an established place of business in conformity with the zoning regulations of the Parish of Jefferson, and have someone in attendance during regular business hours.
- C. Applications shall be notarized.
- D. An applicant for a Class "C" license must have had at least two years experience in the class occupation in which he desires to engage. He shall also submit a letter from the person, firm or corporation in whose employ he shall serve as a Maintenance Gasfitter, attesting to the applicants experience and character.

#### **ARTICLE 5206. BOARD OF GAS, MECHANICAL EXAMINERS.**

A Board of Gas Mechanical Examiners is hereby established for the purpose of examining all applicants for a license. The Board shall consist of five (5) members, to-wit:

Chief Mechanical Inspector

Three (3) Master Gasfitters.

One (1) Mechanical Engineer, or a representative of the Gas Industry, all of whom shall be residents of Jefferson Parish. Board members are to be appointed by the Governing Authority. Board members shall receive \$50.00 for each meeting or examination they attend; said monies are to be paid out of Parish funds.

The number of meetings and examinations combined shall be not less than four (4) nor to exceed twelve (12) annually.

#### **ARTICLE 5207. TERM OF OFFICE.**

The Chief Mechanical Inspector shall serve while holding his position. The appointments of the four (4) other members shall be made to run concurrently with the term of office of the members of the Governing Authority of the Parish of Jefferson. Whenever any member of the Board shall cease to be a resident of the Parish of Jefferson, his membership shall automatically be vacated, and any member may be removed for cause by the Governing Authority of the Parish of Jefferson. Each Member shall serve until his successor is appointed and qualifies.

#### **ARTICLE 5208. APPLICATION FOR LICENSE.**

All applications for examination shall be made to the Mechanical Inspection Department and all licenses shall be signed and issued by the Chief Mechanical Inspector.

#### **ARTICLE 5209. EXAMINATIONS**

All applications for examinations shall be made to the Board of Examiners of the Parish of Jefferson. All licenses shall be signed and issued by the Director. The examination for a license shall consist of two (2) parts rated as follows:

(A) Knowledge of practical business procedure, 10%.

(B) Practical questions of gas appliances and pipe installation, 90%.

Applicants shall be required to obtain a minimum of 70% to pass the examination.

In the event the applicant fails to pass the examination he shall be permitted to apply for further examination after ninety (90) days have expired from date of previous examination.

There shall be no limit as to the number of examinations a person shall be allowed.

The applicant for a Class "C" license shall be required to take the following examination. Practical questions of gas appliances and pipe installation 100%.

Applicants shall be required to obtain a minimum of 70% to pass the examination.

**The applicant for a Class "C" license shall be required to take the following examination:**

- (a) Practical experience, maximum ..... 50%
- (b) Practical pipe installation questions ..... 25%
- (c) Practical questions of gas appliances ..... 25%

Applicants shall be required to obtain a minimum of 70% to pass the examination.

#### **ARTICLE 5210. EXAMINATION FEES.**

The fee for each examination and re-examination for all Class "A" licenses shall be \$25.00.

The fee for each examination and re-examination for all Class "C" Gasfitters' licenses shall be \$25.00.

#### **ARTICLE 5211. REGISTRATION FEES.**

The initial registration fee for all Class "A" licenses shall be One Hundred Dollars (\$100.00).

The yearly renewal registration fee for all Class "A" licenses shall be Twenty-five Dollars (\$25.00).

The initial and yearly renewal registration fee for all Class "C" licenses shall be Twenty-five Dollars (\$25.00).

#### **ARTICLE 5212. PAYMENT OF FEES.**

The examination and re-examination fees and the initial registration fee shall be paid to the Jefferson Parish General Fund at the time the application for examination is presented.

The renewal registration fee shall be paid to the Jefferson Parish General Fund on or before the first regular day of business of each new year. If license is not secured before March 1, the renewal registration fee shall be Thirty-five Dollars (\$35.00).

A revival fee, in the amount of Twenty-five dollars, (\$25.00), in addition to the specified renewal fee, shall be assessed and collected from all licensees failing to apply for license renewal within the current year following expiration of license. All renewals and/or revival fees must be paid prior to filing of any jobs.

#### **ARTICLE 5213. LIMITATIONS OF LICENSE.**

Class "A" license shall be limited to operations described in Article 5204. Holders of these licenses shall not be in the employ of more than one gas contracting firm or corporation at one time.

The holder of a Class "C" license shall not engage in the business of installing or repairing gas piping or appliances outside the plant or premises of the person firm or corporation by whom he is employed.

#### **ARTICLE 5214. FAILURE TO PASS EXAMINATION.**

In the event the applicant fails to pass the examination, he shall be permitted to apply for further examination after ninety (90) days have expired from date of the previous examination. There shall be no limit as to the number of examinations a person shall be allowed to undergo.

#### **ARTICLE 5215. REVOCATION OF LICENSE.**

Any license granted under this Chapter may be revoked by the Director if the holder of the license violates any ordinance or law relating to gas rules and regulations or is guilty of any construction or any gas installation work which is dangerous to life or property, or for transferring or allowing directly or indirectly persons, firms or corporations other than the lawful holder to operate or to obtain permits to do work under said license, provided the holder of the license be found guilty of such violations.

When a license is revoked, a new license will not be granted to the same person, firm or corporation for a period of thirty (30) days or more, nor until such person, firm or corporation shall have corrected the faulty construction or other violations of these regulations. License will be re-issued after applicant has taken an examination and paid the fees required for the original license.

The Director shall have discretionary power to withhold the granting of a new license subsequent to revocation of the original license for cause, for a period not to exceed three (3) calendar months.

Appeal from the decision of the Director may be taken within ten (10) days to the Board of Standards and Appeals.

**ARTICLE 5216. EXPIRATION AND RENEWAL OF LICENSE.**

Each license shall expire on December 31, in the year of its issuance, but no license shall expire before December 31. Each license shall be renewed yearly upon payment of a registration fee as required in Article 5211. Each license shall be renewed yearly without further examination. If licensee does not secure a license within five (5) years after passing the Gasfitters' examination, or if licensee has not renewed his license for a period of five (5) years, all deposits, credits shall be returned and he shall be required to be re-examined in order to secure a current license.

**ARTICLE 5217. GASFITTER'S AND OWNER'S RESPONSIBILITIES.**

Every person, firm or corporation certified in accordance with these regulations shall be responsible for any defects of construction, installation and repairs of gas piping, appliances and water heaters until such time as a Certificate of Approval has been issued by the Director. Also, any and all defects that may have been concealed by such person, firm or corporation and discovered by the Director after a Certificate of Approval has been issued shall be the responsibility of and corrected by said person, firm or corporation.

After the issuance of the Certificate of Approval by the Director, the person, firm or corporation in whose name the meter is contracted for, shall be responsible for all defects caused by such person, firm or corporation.

**ARTICLE 5218. EXEMPTIONS.**

The licensing requirements set forth herein shall not apply to the installation of gas supply facilities or to emergency repairs to a public utility installation by the Company or its employees in the gas supply or gas service operations.

**ARTICLE 5219. FUEL LINES.**

(a) **Installation.** Installation must conform to recognized good practice.

(b) **Material.** All main fuel lines and branches from meter to outlets shall be of not less than standard weight, rigid, iron or steel pipe and fittings. Cast iron pipe may be used for underground installations only when such installations are specifically approved. Copper tubing of adequate size installed entirely outside a building may be used to connect appliances and/or fixtures located outside a building. Copper tubing shall be standard grade K or L, or equivalent, having a minimum wall thickness in compliance with A.S.T.M. specifications. See Article 5223. Flexible connections for special conditions may be used when such connections are properly identified and approved for the pressure involved.

(c) **General Construction Methods.** All gas piping shall be rigidly supported, and the distance between supports no greater than listed in Table No. 52-A.

**TABLE No. 52-A**

| Size Pipe         | Maximum Distance<br>Between Supports |
|-------------------|--------------------------------------|
| $\frac{1}{2}$ "   | 6'                                   |
| $\frac{3}{4}$ "   | 7'                                   |
| 1"                | 8'                                   |
| 1 $\frac{1}{4}$ " | 9'                                   |
| 1 $\frac{1}{2}$ " | 10'                                  |
| 2"                | 10'                                  |
| 3"                | 10'                                  |
| 4" and up         | 10'                                  |

All gas piping shall be properly drained to as few points as possible, and drips placed at these points to act as storage for condensate. Pipes shall be so installed as to drain towards the meter, where drip shall be installed. Whenever it is necessary to drain a pipe to a different point in the system or where, in order to avoid an obstruction, it is necessary to offset the pipe, a drip should be installed at the lowest point. Sags or traps shall not be permitted. As few drips as possible shall be installed. The drip shall be readily accessible in order to drain same at intervals. If placed under a chain wall, house, or in other places difficult to reach, the drip shall be extended to an accessible point. The diameter of the pipe constituting the drip shall not be less than that of the line that it serves, and the minimum length of the drip shall be as shown in Table No. 52-B.

Fuel lines shall not be installed underground or in concealed places, such as floors, ceilings, or partitions, unless such installations are made in an approved manner.

Concealed piping installed in accordance with NBFU Pamphlet No. 54, "Standard of the National Board of Fire Underwriters for the Installation of Gas Piping and Gas Appliances in Buildings," will be accepted. (See Article 215.)

TABLE No. 52-B

| Size of Pipe<br>to be<br>Drained | PIPE SIZE OF DRIP |      |     |        |        |     |        |     |     |     |     |     |
|----------------------------------|-------------------|------|-----|--------|--------|-----|--------|-----|-----|-----|-----|-----|
|                                  | 1/2"              | 3/4" | 1"  | 1 1/4" | 1 1/2" | 2"  | 2 1/2" | 3"  | 4"  | 5"  | 6"  | 8"  |
| 1/2"                             | 12"               | 6"   | 3"  |        |        |     |        |     |     |     |     |     |
| 3/4"                             |                   | 12"  | 7"  | 5"     | 3"     |     |        |     |     |     |     |     |
| 1"                               |                   |      | 12" | 8"     | 6"     | 3"  |        |     |     |     |     |     |
| 1 1/4"                           |                   |      |     | 12"    | 9"     | 5"  | 3"     |     |     |     |     |     |
| 1 1/2"                           |                   |      |     |        | 12"    | 7"  | 5"     |     |     |     |     |     |
| 2"                               |                   |      |     |        |        | 12" | 8"     | 6"  |     |     |     |     |
| 2 1/2"                           |                   |      |     |        |        |     | 12"    | 9"  | 5"  |     |     |     |
| 3"                               |                   |      |     |        |        |     |        | 12" | 7"  |     |     |     |
| 4"                               |                   |      |     |        |        |     |        |     | 12" | 8"  |     |     |
| 5"                               |                   |      |     |        |        |     |        |     |     | 12" |     |     |
| 6"                               |                   |      |     |        |        |     |        |     |     |     | 12" |     |
| 8"                               |                   |      |     |        |        |     |        |     |     |     |     | 12" |

Where an underground installation is unavoidable, the pipe (except cast iron) shall be encased in a 1:3 mixture of cement and sand, which coating shall be not less than one and one-half inches (1-1/2") in thickness, and extend a minimum of six inches (6") above ground level on pipe riser. (See Article 5223.) On installations of this nature, each drip shall be installed in a concrete pit or its equivalent.

Pre-cast concrete coated pipe may be used in lieu of field coated pipe provided: (1) pre-cast concrete coating is done in a workmanlike manner under controlled conditions, and concrete coating is equal in insulating quality to a 1:3 mixture of cement and sand; (2) the minimum thickness of coating is not less than one-half inch (1/2") for pipe sized up to and including two inches (2"), not less than three-quarter inch (3/4") for three-inch (3") and four-inch (4") pipe, and not less than one inch (1") for larger pipe; (3) that field-made joints have a thickness not less than the pre-coated section of pipe, and coating is applied and field tested in a manner satisfactory to the Director.

Black or galvanized iron pipe, plastic coated, or equal, including risers and joints, with the approval of the Director, shall be acceptable for underground fuel line installations.

All fuel lines that extend through a building wall to the outside shall be installed in a pipe nipple at least two (2) pipe sizes larger than the fuel line, the pipe nipple to be flush with the faces of the building wall. The void between the fuel line and pipe nipple shall be filled with an approved grout or fireproof waterproofing material.

No gas piping shall be installed or maintained in any chimney flue or separate appliance flue that is intended to or does carry products of combustion.

When air or oxygen under pressure is used to aid combustion, effective means shall be provided which will automatically prevent air from going back into the gas piping.

Every gas piping outlet or connection shall be capped or plugged when said outlet or connection is not connected to an appliance.

All outlets to appliances shall have a readily accessible cut-off valve installed in addition to the valve on the fixture.

(d) **Size of Fuel Lines.** On new systems of fuel piping, when all appliances are in use, the pressure loss between the pipe at the meter outlet and any appliance outlet shall not be greater than 0.2 inch water column.

In determining the size of pipe to meet this requirement, Table No. 52-C, shall be considered to be indicative of pressure losses in pipes of various sizes for proposed conditions of length and gas flow.



TABLE SHOWING MAXIMUM ALLOWABLE FLOW IN CU. FT. PER HOUR FOR GIVEN STRAIGHT LENGTHS OF VARIOUS SIZES OF PIPE AS INDICATED PRESSURE LOSSES

TABLE No. 52-C. 0.2 Inches of Water Column

| Length of Pipe Feet | DIAMETER OF PIPE, INCHES |      |     |        |        |      |        |      |        |        |        |        |
|---------------------|--------------------------|------|-----|--------|--------|------|--------|------|--------|--------|--------|--------|
|                     | 1/2"                     | 3/4" | 1"  | 1 1/4" | 1 1/2" | 2"   | 2 1/2" | 3"   | 4"     | 5"     | 6"     | 8"     |
| 15                  | 62                       | 168  | 350 | 620    | 960    | 2000 | 3500   | 5400 | 11,200 | 19,500 | 31,000 | 63,000 |
| 30                  | 43                       | 120  | 245 | 430    | 680    | 1400 | 2450   | 3800 | 7,900  | 13,500 | 21,500 | 44,000 |
| 45                  | 35                       | 98   | 200 | 355    | 530    | 1150 | 2000   | 3200 | 6,500  | 11,200 | 18,000 | 36,500 |
| 60                  | 30                       | 84   | 175 | 310    | 480    | 1000 | 1760   | 2700 | 5,600  | 10,000 | 15,500 | 31,500 |
| 75                  | 27                       | 76   | 155 | 275    | 430    | 890  | 1560   | 2450 | 5,000  | 8,800  | 13,700 | 28,000 |
| 90                  | 25                       | 70   | 145 | 250    | 395    | 810  | 1430   | 2260 | 4,550  | 8,000  | 12,500 | 26,000 |
| 105                 | 23                       | 64   | 132 | 232    | 370    | 750  | 1300   | 2100 | 4,200  | 7,200  | 11,500 | 24,000 |
| 120                 | 21                       | 60   | 125 | 215    | 340    | 700  | 1200   | 1950 | 4,000  | 6,700  | 11,000 | 22,000 |
| 150                 | 19                       | 54   | 110 | 195    | 310    | 630  | 1080   | 1750 | 3,550  | 6,100  | 9,800  | 20,000 |
| 180                 | 17                       | 49   | 100 | 175    | 280    | 570  | 960    | 1600 | 3,200  | 5,500  | 8,900  | 18,000 |
| 210                 | 16                       | 44   | 94  | 165    | 260    | 530  | 890    | 1450 | 3,000  | 5,200  | 8,200  | 16,500 |
| 240                 | 15                       | 43   | 88  | 155    | 240    | 500  | 840    | 1350 | 2,800  | 4,800  | 7,700  | 16,000 |
| 270                 | 14                       | 40   | 83  | 145    | 230    | 470  | 780    | 1300 | 2,650  | 4,600  | 7,100  | 15,000 |
| 300                 | 14                       | 38   | 79  | 138    | 215    | 440  | 750    | 1250 | 2,500  | 4,400  | 6,900  | 14,000 |
| 450                 | 11                       | 31   | 64  | 112    | 176    | 360  | 630    | 1000 | 2,050  | 3,700  | 5,600  | 11,500 |
| 600                 | 10                       | 27   | 56  | 97     | 152    | 315  | 530    | 860  | 1,750  | 3,100  | 4,900  | 10,000 |

Needle type manual control valves with packing glands are acceptable for use on special laboratory equipment, such as fume hoods or other laboratory equipment, provided the valve is so arranged that the pressure is not on the packing gland when shut, and further, that a plug type shut-off cock with handle is installed in plain view ahead of and in close proximity to the valve and with a permanent sign stating: "Close this valve when equipment is not in use."

The footage of straight pipe equivalent to ells and tees shall be considered to be as shown in Table No. 52-D.

A branch line supplying a single appliance shall not be less than the inlet connection of the appliance and never less than one-half inch (1/2"). See Article 5223.

The diameter of a branch line supplying two appliances shall be one pipe size larger than the largest inlet connection of either appliance.

A branch line supplying three (3) or more appliances shall not be less than one inch (1").

(e) **Steel or Ferrous Piping.** Piping systems in which a gaseous fuel is transported shall be fabricated in accordance with requirements of Section II, Gaseous and Air Piping Systems, "American Standard Building Code Requirements for Pressure Piping" ASA B31.1, sponsored by the American Society of Mechanical Engineers.

(f) **Welded Fuel Lines.** Fuel lines may be fabricated or repaired by the metallic arc welding process or by the oxy-acetylene welding process, provided the welded pipe pre-fabricator, contractor, or pipe welding operator has been certified in accordance with the Standard Welding Qualifications for Welding Procedure and Welding Operator, Manual Arc and Gas Welding or Ferrous Materials. Section IX, A.S.M.E. Boiler Construction Code.

Welded pipe pre-fabricators, contractors, and pipe welding operators who are qualified in accordance with the Standard Procedure Specifications of the National Certified Pipe Welding Bureau shall be accepted as having qualified with the requirements of this Article; however, they are required to file their qualifications with the Division of Regulatory Inspections.

For those local welding operators not qualified by the National Certified Pipe Welding Bureau, the Division of Regulatory Inspections shall accept and register operators who have been certified by any nationally recognized certifying agency acceptable to the Division. There shall be no charges or fees collected for this registration.

(g) **Interpretation.** Any controversy as to the interpretation of this Article shall be brought before the Board of Standards and Appeals, and its decision shall be final.

(h) **Re-Registration.** All certified welders must re-register with the Division of Regulatory Inspections within a period not to exceed three (3) years from the date shown on their current registration certificate. At the time of re-registration if in the opinion of the Director there is any doubt as to the qualifications of the welding operator, he shall be re-certified.



| Size of Fitting | Equivalent Length of<br>Straight Pipe—Feet |
|-----------------|--------------------------------------------|
| 1/2"            | 1                                          |
| 3/4"            | 1                                          |
| 1"              | 2                                          |
| 1 1/4"          | 2                                          |
| 1 1/2"          | 3                                          |
| 2"              | 5                                          |
| 2 1/2"          | 7                                          |
| 3"              | 9                                          |
| 4"              | 13                                         |
| 5"              | 19                                         |
| 6"              | 24                                         |
| 8"              | 35                                         |

## ARTICLE 5220. WATER HEATERS

All water heaters with heating capacity not in excess of 58.5 KW electric input, 200,000 BTU per hour gas input, 120 gallon storage, or 205° F storage temperature shall meet A.G.A. approval requirements, including the installation of an A.G.A. approved and listed temperature and pressure relief valve. All fired pressure vessels with capacities in excess of the above limits shall be approved and stamped by A.S.M.E. and shall be furnished with an A.S.M.E. approved and listed temperature and pressure relief valve.

(a) **Location.** The confined space enclosing a gas burning appliance which uses the surrounding combustion air shall be provided with two permanent openings, one commencing within 12 inches of the top and one commencing within 12 inches of the bottom of the enclosure, for the purpose of air ventilation of the enclosure. Fresh air shall be taken from exterior air openings. The free area of each opening shall be a minimum of one square inch per 2000 BTU per hour.

Openings shall be covered with screen (not smaller than 1/4 inch mesh) or louvers or grilles. Free area of wood louvers shall be estimated at 20 to 25 percent; metal louvers and grilles at 50 to 65 percent. Minimum dimension of any opening is 3 inches.

Water heaters, unless containing adequate fire protecting materials within themselves, shall not be installed nearer than six inches (6") to any wood wall or walls of plaster or combustible materials, nor nearer than three inches (3") to brick, protected wood or fire resistive walls. Installation shall be made in such manner that the automatic mechanism or other working parts are readily accessible for inspection, adjustment and maintenance.

Electric water heaters shall be installed in accordance with the 1975 edition of the National Electric Code and to conform with all the rules and regulations governing gas fired water heaters, eliminating combustion air and venting requirements.

The disconnecting means for the electric water heater shall be readily identified at the distribution panel.

Electric water heaters, pertinent plumbing, electrical, and mechanical equipment are required to be accessible. Accessibility is defined as follows: No portion of the main or subordinate structure has to be damaged to provide ample working room for installing, maintaining, repairing or replacing a heater or the electrical, plumbing or mechanical pertinent equipment.

(b) **Safety Appurtenances.** All water heaters hereafter installed shall have shutoff cocks installed in the gas line independent of the automatic mechanism. Such cocks shall be easily accessible and within reaching distance.

All instantaneous coil type water heaters shall have shutoff cocks installed in the cold water line easily accessible and within reaching distance of the water heater.

(c) **Relief Valves.** All new or used water heaters hereafter installed, repaired or renewed shall be equipped with an adequate temperature and pressure relief valve, or two separate valves can be used, located in the top of the heater tank, or in the top of the hot water line as close to the heater as conditions permit.

Pressure relief valves shall be fully automatic, self-closing, all-bronze in construction and designed with thermostat made of a nickel alloy.

With excessive pressure or temperature, the valve shall open automatically, and have sufficient area to let out enough water to restore the system to normal.

All valves shall be equipped with a lifting lever so that they can be properly tested at all times.

No valve shall be installed between the relief valve and the heater.

Pressure relief valves shall function at a maximum of 210° F. For small or radiant installations the Director may permit higher maximum temperature regulations.

Temperature relief valves shall function at a maximum of 180°F. For small or radiant installations the Director may permit higher maximum temperature regulations.

Waste lines of not less than the diameter of the relief valve outlet shall be provided to direct waste water outdoors, where possible, to within one foot of ground, always to a point where no injury to persons or property will result, but at a point where its discharge is readily seen and where its nuisance discharge will call attention to the problem.

There shall be no valves installed between relief valves and open ends, and open end of lines shall not be threaded. Waste line from relief valve shall be of noncorrosive pipe.

(d) **Safety Pilots.** All water heaters hereafter installed shall be equipped with a safety device, approved by the American Gas Association, which will automatically shut off gas to the main burner of the heater should the pilot become extinguished.

(e) **Thermostatic Control.** All water heaters hereafter installed or renewed shall be equipped with an approved thermostatic control valve in the gas supply line, designed to completely cut off the supply of gas to main burner or burners, at a temperature not to exceed 180° F.

(f) **Inspections.** All water heaters that do not come under the provisions of Chapter 53 of this Code, located in a business or industrial establishment, or any place of public assembly, shall be inspected every two years. A certificate of approval shall be issued for each water heater inspected and approved every two years and the owner of the water heater or heaters shall pay a certificate fee as hereinafter provided under Article 5226 (d).

## **ARTICLE 5221. RANGES.**

(a) **Ranges for Residential Cooking.** Ranges, unless containing adequate fire protecting materials within themselves, shall be installed with rear of oven vent at least six inches (6") from wood walls or walls of plaster on combustible material, and at least three inches (3") from brick, protected wood or fireproof walls. Ranges unless containing adequate fire protection materials within themselves, or unless adequate fire protecting material has been applied to the wall, shall be installed so as to avoid temperatures in excess of 180°F. on adjacent combustible materials. If an exhaust fan is used in connection with a grease hood, the discharge flue shall extend at least two feet (2') above the roof. All joints in vent pipes shall be secured with screws. They shall also be taped or sealed.

### **(b) Ranges for Commercial Cooking.**

1. **Protection of Combustible Materials.** Ranges used for commercial cooking, such as in school cafeterias, hotels, restaurants, churches, and other establishments doing large-volume cooking, shall be supported at least six inches (6") above any wood floor and if less than twelve inches (12") above the floor, the wood shall be protected by a metal lined asbestos shield not less than one-quarter inch (1/4") thick. Such ranges shall be separated from wood partitions or other combustible material by not less than six inches (6"), and if nearer than twelve inches (12"), the combustible material shall be protected with a metal lined asbestos shield not less than one-quarter inch (1/4") thick. The distance from any such range to a wood ceiling or other combustible material above the range shall not be less than twelve inches (12") and if less than three feet (3'), the ceiling or combustible material above the range shall be protected with suitable fire-protective material.

2. **Hoods.** Ranges used for commercial cooking shall be provided with a ventilating hood and duct to take off smoke, gases, and vapors. The ducts shall be separate from any other ventilating system, provided, however, that a single flue may serve one or more hoods.

If an exhaust fan is used in connection with a grease hood, the discharge flue shall extend at least two feet (2') above any building within twenty-five feet (25') of same. If range oven is vented to outer atmosphere the rules in Article 5225 hereof shall be followed.

Hoods provided for commercial ranges shall be constructed of metal, masonry, or other approved materials, and if of metal, it shall not be less than No. 22 gauge thickness galvanized iron, or other equivalent corrosion resistant material.

Every ventilating hood shall be provided with a grease trough extending around the entire inside perimeter of the hood, draining to a grease container outside the hood.

3. **Ventilating Ducts.** Flues or ducts for any ventilating hood shall be constructed of metal, masonry, or other approved materials, and if of metal shall have not less than the thickness set forth in Table 52-E

**TABLE No. 52-E.**  
**DUCT THICKNESS**

| Maximum Width or Diameter of Duct (In Inches) | Minimum Thickness of Metal (U. S. Standard Gauge) |
|-----------------------------------------------|---------------------------------------------------|
| 12 - 20                                       | 22                                                |
| 30                                            | 20                                                |
| 48                                            | 18                                                |
| Over 48                                       | 16                                                |

The face of any square or rectangular metal duct which is more than thirty-six inches (36") in its greatest width shall have a standing seam at every lateral joint and at intervals not exceeding four feet (4').

Every duct shall be so constructed that grease or other material cannot become pocketed in any portion thereof.

A sufficient number of cleanout openings shall be provided in every duct to permit cleaning all portions of the interior of such duct system. All such openings shall be provided with tight-fitting metal doors.

All seams in any hood or duct shall be grease tight. Solder shall not be used for the purpose of making joints or seams grease tight.

Every hood and duct shall be securely attached to the building by means of non-combustible supports.

All flues shall be installed in accordance with the rules set forth in Article 5225 hereof.

**4. Insulation.** All combustible materials within eighteen inches (18") of any metal hood or duct shall be covered with a one-fourth inch (1/4") thickness of asbestos covered with sheet metal or other equivalent insulation.

All combustible materials within nine inches (9") of any metal hood or duct shall be covered with suitable fire-protective material.

Every hood or duct shall be at least four inches (4") from any combustible material.

#### **ARTICLE 5222. HEATING APPLIANCES, CENTRAL HEATING PLANTS, AND EQUIPMENT, GAS AND ELECTRIC.**

Central heating plants, gas-fired unit heaters, gas floor heaters, and permanently installed recessed gas wall heaters designed to burn gaseous fuels shall conform to the standards approved by the American Standards Association. Labels of American Gas Ass'n. or A. S. M. E. shall be considered as prima facie evidence that the devices bearing such label conforms with this Code.

All central type electric heaters shall be installed in accordance with the National Electric Code and conform to all the rules and regulations governing gas fired central heaters, eliminating combustion air and venting requirements. A separate disconnect shall be placed in sight of every central type electric heater installation.

(a). **Location.** Space heaters, unless containing protective insulation within themselves, shall be installed at least six inches (6") from unprotected wood walls or walls of plaster on combustible material and at least three inches (3") from brick, protected wood or fireproof walls, unless adequate fire protecting material has been applied to the wall. Space heaters containing adequate fire-protecting materials within themselves shall be installed so as to avoid temperatures in excess of 180°F. on adjacent combustible materials. No floor heater shall be installed in the floor of any aisle or passageway of any room used as a place of public assembly or in any exit from such room.

No floor heater shall be installed where it will extend below the floor into any space used for storage of inflammable materials or wastes, unless those portions of the floor heater extending below the floor are entirely encased within an air tight metal enclosure constructed of iron or steel of at least No. 20 U. S. Gauge in thickness. The enclosure shall be connected with the outside air through metal ducts of sufficient capacity to properly support combustion in such floor heater within the enclosure. The metal enclosure shall be made or installed so as to make the floor heater accessible for inspection or repair.

Every portion of the ground within twenty-four inches (24") horizontally from any floor heater which projects below the first floor of any building shall be excavated to a level not less than six inches (6") below the lowest portion of the floor heater: Such an excavation, if lined with not less than three inches (3") of concrete, shall not be required to extend more than twelve inches (12") in a horizontal direction from any gas control valve on the floor heater and not more than six inches (6") horizontally from any other portion of the heater.

Every appliance shall be accessible for inspection, repair, or replacement, and sufficient room shall be available to enable the operator to observe the firebox, burner, and pilot while starting the appliance.

An opening or door not less in size than two feet eight inches by six feet three inches (2'8" x 6'3") shall be provided for access to the room or space in which any heater, except a floor or attic heater, is installed.

(b) **Accessibility.** The space in which any attic heater or gas appliance is installed shall be accessible by an opening not less than eighteen by twenty-four inches (18" x 24") in any cross-section and shall have a permanent means of ingress by an affixed ladder or stairway. The passageway shall be continuous from the opening or trapdoor to the heater controls and valves, and the opening to the passageway shall be located not more than twenty feet (20') from the heater.

(c) **Central Heating Plant Enclosure.** Every central heating plant shall be installed in a room or space not less than six feet (6') in width and not less than forty-eight square feet (48 sq. ft.) in area with a ceiling height of not less than seven feet (7'), unless the heating plant is designed and approved for installation adjacent to combustible materials and is installed in accordance with the conditions of approval, as issued by the Director.

The top of every warm air gas heating plant shall be not less than nine inches (9") from protected combustible material nor less than twenty-four inches (24") from unprotected combustible material. The side walls of such heater shall be not less than six inches (6") from protected combustible material and not less than twelve inches (12") from unprotected combustible material. The clearances may be reduced for appliances which are designed and approved for installation adjacent to combustible materials and installed in accordance with the conditions of such approval, as issued by the Director.

(d) **Floor Protection.** Every floor of combustible construction under a gas-burning central heating plant shall be covered with not less than two inches (2") of structural tile, or equivalent, and one-fourth inch (1/4") of asbestos millboard, or other equivalent fire protective material. The floor protection shall project at least twelve inches (12") beyond all sides of the heater or to the heater enclosure. The floor covering may be omitted on a wood floor under any gas burning central heating plant, if the combustion chamber is not less than twenty-four inches (24") distant from the floor and is separated therefrom by a metal lined asbestos shield not less than one-quarter inch (1/4") thick.

Those heaters listed for installation on combustible floors also shall be protected by fireproof material projecting at least twelve inches (12") longer in each dimension than the heater being installed; however, this protection need not exceed the dimension of the enclosure of a heater room.

(e) **Safety Devices and Automatic Controls.** All automatically controlled space heaters shall be equipped with a safety feature, as approved by the American Gas Association, which will automatically shut off the main gas supply, should the pilot become extinguished.

Every warm air central heating plant burning gas fuel shall be equipped with an automatic device or devices designed to limit the maximum temperature in warm air pipes. Such devices shall be within twenty-four inches (24") of the point where the hot air pipe connects to the heater and shall be arranged to shut off the main fuel supply in the event that the temperature in the warm air pipe exceeds 250°F.

Where a gravity warm air heating system is installed with at least warm air outlet having an area of not less than thirty-five square inches (35 sq. in.) and permanently open and unobstructed, except by an open-faced grill, the automatic device will not be required. Such warm air outlet shall not be subject to control by any manually operated shutter, louver, or damper.

(f) **Air Supply for Combustion.** An air supply for combustion shall be provided for all fuel burning appliances or equipment. The air supply may be through one or more openings. No obstruction of any kind shall be placed over the openings except wire netting with openings not less than one-fourth inch (1/4") square. Openings shall have not less than the following **net free areas**:

No air supply opening shall be less than twenty square inches (20 sq. in.)

Where draft diverter is installed and the flue height is less than forty feet (40'), one square inch (1 sq. in.) free air opening shall be provided for each 2,000 B. T. U. input.

Where draft diverter is installed and the flue height is greater than forty feet (40'), one square inch (1 sq. in.) free air opening shall be provided for each 3,000 B. T. U. input.

Where no draft diverter is installed and the flue height is less than forty feet (40'), but over twenty feet (20') long, one square inch (1 sq. in.) free air opening shall be provided for each 5,000 B. T. U. input.

Where no draft diverter is installed and the flue height is less than twenty feet (20'), one square inch (1 sq. in.) free air opening shall be provided for each 3,000 B. T. U. input.

Where forced or induced draft is provided, or where flue height is greater than forty feet (40'), one square inch (1 sq. in.) free air opening shall be provided for each 10,000 B. T. U. input.

(g) **Circulating Air Supply.** Circulating air used for conveying heat and for ventilation

may be taken from outside the building, from inside the building, or from both sources. Where such air is taken from inside the building or from both inside and outside the building, it shall be conducted to the heating plant in ducts of incombustible material.

No damper shall be placed in any air intake, except that a diverting damper may be placed in a combination fresh air intake and return air intake so arranged that for all possible positions of the damper the cross-sectional net free area of the circulating air intake to the heating plant is not less than the total cross-sectional net free area of all hot air outlets at the heater.

No circulating air supply inlet for any forced air heating system shall be located closer than ten feet (10') from any fire box or vent opening of any warm air heating plant unless suitably separated so as to prevent inlet air from being contaminated by products of combustion, nor shall such circulating air supply inlet be located where it will pick up any objectionable odors, fumes, or inflammable vapors.

#### **ARTICLE 5223. SPECIAL EQUIPMENT.**

The use of underground copper tubing for outdoor gas illuminated fixtures shall be approved with the following provisions;

The gas fixture shall be installed completely outdoors and shall consume not more than 3 cubic feet of gas per hour. The tubing shall be continuous and shall be placed 9 inches or more underground, and shall not be installed under any building or portion of any building or structure. The connection to the fuel line shall be steel pipe with a stop-cock, stop-cock shall be installed to steel pipe. An orifice restrictor shall be installed after the stop-cock to limit the flow of gas to 5 cubic feet per hour or less. Connection from copper tubing to steel pipe shall be made above ground, or underground connection made with insulating fitting to avoid electrolytic action. Copper tubing extending above the ground shall be protected from mechanical injury by rigid support of other approved methods. The fixture shall have an accessible shut-off valve or cock.

When approved by the Director, polyethylene tubing may be used for conveying natural gas underground to outdoor appliances such as gas lights (for yard), gas grills and incinerators. Such tubing shall be manufactured in accordance with requirements for PE3306 tubing in specifications for Plastic Gas Pressure Tubing, Pipe and Fittings ASTM Designation D-2513-66T.

"The Polyethylene extrusion compound from which the tubing is made shall meet the requirements of Type III, Grade 3, as described in ASTM D-1248-60T." "Specification for Polyethylene Molding and Extrusion Compounds (which are referred to in CS255-63)."

The tubing shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions or other defects. It also shall be uniform in color, opacity, density and other physical properties.

The authority in charge may require that all connections be exposed until leak tests are witnessed. Permit shall be secured before making installation, and fees charged shall be the same as for special equipment not over 50,000 B.T.U., as shown in Article 5226.

Special gas burning equipment not specifically mentioned herein, such as boilers, various types of ovens, processing equipment and other commercial and industrial equipment shall be installed:

1. On a firm foundation, easily accessible and so that there will be ample space for inspection, repair or replacements, and general operation and observance.

2. In conformance with requirements of Article 5222, Sub-Articles (c), (d), and (f).

3. So as to meet all requirements provided in Chapter 37 of this Code, and conform to the requirements as indicated in the Building Code of the National Board of Fire Underwriters.

4. With venting in accordance with Articles 5224 and 5225.

#### **ARTICLE 5224. APPLIANCES, CENTRAL HEATING PLANTS AND EQUIPMENT WHICH SHALL BE CONNECTED TO A FLUE TO THE OUTER AIR.**

1. Water heaters.

2. Appliances having an approved rated input of over 50,000 B. T. U. per hour or more (domestic gas ranges excepted).

3. Appliances automatically controlled having an approved rated input of over 5,000 B. T. U. per hour or more. Automatically controlled appliances which use less than this amount shall be flue connected, unless equipped with an effective device, which, in the event that the constantly burning flame or pilot flame is extinguished, will automatically shut off the supply of gas to the main burner or burners.

4. Where more than one appliance is installed in the same room and these have an aggregate demand at approved input rating greater than 30 B. T. U. per hour, or more, per cubic foot of room content (domestic gas ranges excepted).

5. Appliances that depend on chimney action, additional to that produced in the appliance itself, to provide sufficient air for complete combustion of the gas at maximum input rating.

All appliances, the normal operation of which at a maximum input rating produces flue gas temperature in excess of 550°F. at the outlet of the vent connection, shall be vented into such lined chimneys or metal stacks as are provided for in this Code. (See Articles 3701 and 3702).

Conformity of installation of venting gas appliances with part V, "Venting of Appliances," of the N.B.F.U. Pamphlet No. 54, and as clarified or modified by this Chapter, shall be prima facie evidence that such installations are reasonably safe to persons and to property.

The above pamphlet is hereby clarified in certain particulars. When there is a conflict or difference of requirements between the specific detailed requirements of this Chapter and the requirements of the above mentioned pamphlet, the specific detailed requirements of this Chapter shall govern.

Appliances, the normal operation of which produce no temperatures above 550°F. at the outlet of the vent connection, shall be vented into flues of one of the following six types, subject to the conditions outlined therein.

**Type 1.** Lined brick or steel stacks as provided for in this Code. (See Articles 3701 and 3702).

**Type 2.** (a) Incombustible pipes of sufficient thickness, cross-sectional area, structural strength and heat insulating quality, as approved by the Director, to avoid temperatures in excess of 180°F. on adjacent combustible material. Such pipe shall employ bell and spigot or equivalent joints.

(b) Cement asbestos pipe listed and approved by Underwriters' Laboratories, Inc.

(c) Unglazed fire clay or concrete tile pipe not more than twenty-four inches (24") in length and not less than one-half inch (1/2") in thickness and having a sleeve or flanges at every joint in such flue pipe. Such sleeves or flanges shall project at least three-fourths inch (3/4") beyond the outer surface of the joint and shall securely join the sections of such flue, and all joints shall be well cemented. The sleeves or flanges shall be securely attached to the portions of the building or structure adjoining such flues and act as a spacer to provide an air space around such flue, or such flue may be entirely enclosed in a galvanized iron pipe with such sleeves or flanges separating the outer pipe at least one-half inch (1/2") from the clay or concrete flue.

(d) Where extending through from story to story, or from story to roof, located inside of partitions or walls, or extending through walls to the outside a one inch (1") clearance shall be provided between the flue and adjoining combustible materials.

**Type 3.** Outlet pipes equal to soil pipe or standard steam or water pipe having bell and spigot joints, screw joints, or the equivalent, and relatively low heat insulating value. Where extending through from story to story, or from story to roof, located inside of partitions or walls, or extending through walls to the outside, this type of flue shall be encased in an incombustible jacket with one inch (1") air space, the encasing jacket or duct to be open at the top and bottom and to be continuous its entire length.

**Type 4.** Flues composed of corrosion resisting metal pipe of minimum wall thickness equivalent to No. 24 gauge copper.

A flue of this type which passes through a floor, roof or wall of fireproof construction, or semi-fireproof construction, shall be guarded by a metal tube built into brickwork or other fireproofing materials; or when passing through unprotected wood, or plaster on combustible materials, shall be protected by a double metal ventilated thimble. Tubes or thimbles shall extend not less than three inches (3") beyond all sides of wall, floor or roof. The clearance between a metal flue and unprotected wood or plaster on combustible material shall be not less than nine inches (9") above the flue and six inches (6") below; or to either side, and between brick, fireproof or protected wood walls, not less than three inches (3"). Approved incombustible flues may be installed with a clearance in any direction.

**Type 5.** Flues of sufficient structural strength and so designed or protected as to not permit temperatures in excess of 180°F. on adjacent combustible materials, and conforming to the requirements as approved by the Director (See Article 215), may be used to convey products of combustion to the outer air when the above temperature conditions are met through their length.

**Type 6.** (a) Listed Type B and listed Type B-W gas vents when installed in accordance with their listing and the manufacturer's instruction.

(b) Type C vents shall be used only for runs directly from the space in which the appliance is located through the roof or exterior wall to outer air. Such vents shall not originate in any concealed space or inside wall.

(c) Flues of sufficient structural strength and so designed or protected as to not permit temperatures in excess of 180°F. on adjacent combustible materials, and conforming to the requirements as approved by the Director (see Article 215), may be used to convey products of combustion to the outer air when the above temperature conditions are met through their length.



**General.** The cross sectional area of any of the above types of flues shall not be less than that of the vent of the appliance that it serves.

Where flue piping is connected to an existing chimney flue, the end of the flue piping shall be flush with the inner surface of the chimney flue.

Where practical, the upper extremity of a flue shall be at least two feet (2') above the highest point of the roof or roofs within a radius of twenty-five feet (25'). At the upper extremity of the flue, a suitable protecting hood shall be installed. This height may be decreased provided vent is equipped with an approved type vent cap.

Flues shall be installed as nearly vertical as possible. Where offset, the offset portion of the flue shall be no longer than twenty feet (20'), rising with a minimum pitch of one-half inch (1/2") to the foot. The horizontal projected length shall not exceed the vertical length of the flue.

Provisions shall be made to remove condensate from the flue before such condensate reaches the appliance.

Flue installations shall be made with a down draft diverter, either as an integral part of the appliance or connected to the flue collar, and no damper or other obstruction shall be placed in any portion of the flue. Under no circumstances shall an appliance be vented into a flue conveying the products of combustion from liquid or solid fuels, unless the appliance is equipped with a device which will automatically close off the supply of gas to the main burner or burners when the pilot light is extinguished, and then only when the connection from the gas appliance to the flue is made at a point at least twelve inches (12") above the connection of the flue conveying products of combustion from such liquid or solid fuels.

The area of any flue shall be not less than the area of the largest vent connection inlet plus fifty per cent (50%) of the areas of all other additional inlets, provided that no gas flue shall have an area of less than twelve square inches (12 sq. in.) nor shall be less than two inches (2") in any internal dimension. No flue connection inlet shall be located at the bottom of any multiple gas flue, and any two inlets must be offset or staggered so that it will be impossible for any horizontal plane to pass through any part of both inlets.

**TABLE NO. 52 — F**  
**VENT CONNECTOR CLEARANCE FOR GAS APPLIANCES**

|                                               | Minimum Distance from<br>Combustible Material      |                                                              |
|-----------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|
|                                               | Listed Type B<br>Gas vented Mat-<br>erial (inches) | Vent Connectors of<br>other than Type B<br>Material (inches) |
| Listed boiler                                 | As listed                                          | 6                                                            |
| Listed warm air furnace                       | As listed                                          | 6                                                            |
| Listed water heater                           | As listed                                          | 6                                                            |
| Listed room heater                            | As listed                                          | 6                                                            |
| Listed floor furnace                          | As listed                                          | 6                                                            |
| Listed incinerator                            | NOT PERMITTED                                      | 18                                                           |
| Listed conversion burner<br>(with draft hood) | 6                                                  | 9                                                            |
| Unlisted Appliances having<br>draft hoods     | 6                                                  | 9                                                            |
| Unlisted appliances<br>without draft hoods    | NOT PERMITTED                                      |                                                              |

**ARTICLE 5226. PERMITS, TEST, CERTIFICATES, AUTHORIZATIONS, AND FEES.**

(a) **Permits.** It shall be unlawful to proceed with the installation of any gas fuel piping system, with the alteration or extension of such a system, or the connection to such a system of any appliance without having previously obtained a permit from the Director. Applications for permits shall be made in writing to the Director, giving such information as may be required by said Director showing that the work will be performed in accordance with the provisions of this Code. It shall be the duty of the Director to see that work which is being done and which requires a permit under the provisions of this Code, is authorized by such a permit, and where such work is being done without a permit, to promptly stop all such work and report the fact to the Director.

Upon completion of the installation of any gas fuel piping system, the alteration or

extension of such a system, or the connection to such a system of any appliance, it shall be the duty of the person, firm or corporation to notify the Director in writing who shall inspect the same within forty-eight (48) hours of the time such notice shall have been given, Sundays and holidays not included.

Whenever any work for which a permit is required under the provisions of this Chapter has commenced without a proper permit authorizing same, an investigation shall be made. The investigation fee shall be not less than Seven Dollars (\$7.00) and not more than One Hundred Dollars (\$100.00), in addition to the original required permit fee. The amount of the investigation fee shall be determined by the Director.

When schedules mechanical inspections do not meet the minimum requirements of the code and a re-inspection is necessary, a special investigation fee of \$7.00 shall be charged to the person requesting the re-inspection. Should the third request for a re-inspection fail to meet the minimum requirements of this code, he shall be officially notified that all future re-inspection fees shall be \$25.00 and the continuation of such work shall result in the suspension of his license.

Whenever the owner, builder or contractor requests an additional mechanical inspection for equipment not required to be installed by a license contractor and incomplete on the final inspection shall file a \$7.00 written request for each re-inspection.

Where gas service has been turned off because of apparent damage done to fuel piping by fire, floods, tornadoes, explosions, or other causes, it shall be necessary for the consumer to first obtain the proper permit from the Director before gas service can be restored to the fuel piping.

(b) **Tests.** Tests by the gasfitter in the presence of the Director shall be made of the piping system which must stand an air or gas pressure of at least three (3) times the expected service pressure, but never less than ten pounds (10 lbs.) per square inch gauge. This pressure must be maintained on the system for a period of fifteen minutes without showing a detectable drop when measured with an accurate and sensitive pressure indicating device, the scale of which is so graduated that variations in pressure may be accurately read. Water or other liquids shall not be used as a testing medium within gas piping.

(c) **Approval Certificates and Service Authorizations.** If the said installation, alteration, extension, or connection shall be found to be fully in compliance with the provisions of this Code, and all electrically controlled appliances have been inspected and approved, the Director shall issue to such person, firm or corporation, a certificate of inspection and approval. This certificate shall be taken as evidence that the work has been done and completed in accordance with the provisions of this Code, thus authorizing connection to the gas service of the Company. The Director shall send written notice of such authorization to the Company furnishing the gas service.

Only the Company shall turn on gas service to new installations or to other installations where, upon written notification by the Director, gas service has been turned off and a seal placed on the gas service cock by the Company.

(d) **Fees.** Before a person, firm or corporation shall proceed with a gas installation or repair, he shall file a written request for a permit with the Director and pay the following fees which are due and payable upon application for permits.

These fees shall cover all inspections of the work for which a permit is issued, as well as the issuance of the certificate of approval. For inspections of gas systems turned off because of fire, flood, or other causes, as described above under Permits, there shall be no charge.

#### PERMITS AND INSPECTION FEES

|                                                                                              |            |
|----------------------------------------------------------------------------------------------|------------|
| Gas Piping per 100' and 5 Outlets .....                                                      | \$ 7.00    |
| Each Water Heater required to be inspected every two (2) years, under Article 5220 (f) ..... | 2.00 each  |
| Water Heaters - Domestic - Gas and Electric .....                                            | 3.00 each  |
| Water Heaters - Commercial - Gas and Electric .....                                          | 7.00 each  |
| Floor Furnaces .....                                                                         | 3.00 each  |
| Panel Heaters .....                                                                          | 3.00 each  |
| Unit Heaters .....                                                                           | 7.00 each  |
| Gas Dryers - Commercial .....                                                                | 7.00 each  |
| Gas Dryers - Domestic .....                                                                  | 3.00 each  |
| Warm-Air Furnaces - not over 200,000 BTU Output - Gas and Electric .....                     | 7.00 each  |
| Warm-Air Furnaces - over 200,000 BTU Output - Gas and Electric .....                         | 15.00 each |
| Commercial Space Heaters, not over 50,000 BTU Output .....                                   | 5.00 each  |
| Commercial Space Heaters, over 50,000 BTU Output .....                                       | 7.00 each  |
| Commercial Ranges .....                                                                      | 7.00 each  |
| Commercial Ovens .....                                                                       | 7.00 each  |
| Domestic Ranges .....                                                                        | 3.00 each  |



|                                                            |           |
|------------------------------------------------------------|-----------|
| Domestic Ovens .....                                       | 3.00 each |
| Incinerators .....                                         | 7.00 each |
| Changing from Liquefied Petroleum Gas to Natural Gas ..... | 7.00 each |
| Special Equipment—                                         |           |
| As Defined in Article 5201, not over 50,000 BTU' .....     | 5.00 each |
| Special Equipment—                                         |           |
| As Defined in Article 5201, over 50,000 BTU .....          | 7.00 each |
| Special Inspections .....                                  | 7.00 each |
| Re-locating Meters .....                                   | 7.00 each |
| Changing Number, or Capacity of Meters .....               | 7.00 each |

Special Inspections include: Changing the number or capacity of meters, relocation of meters, additional trip or trips by the inspector necessitated by the fact that the work was not ready for inspection at the time he called in compliance with the notice hereinabove referred to; an additional special inspection fee shall be paid for each trip so made.

(e) **Inspection Deposit Fund.** Any person, firm or corporation applying for permits to be used under the provisions of this Code shall deposit and shall maintain on deposit with the Director, subject to provisions hereinafter contained, the sum of not less than Twenty-Five Dollars (\$25.00) nor more than One Hundred Dollars (\$100.00), in legal tender, as determined by the Director as a guarantee for the payment of all fees, permits and inspections that may become due and owed by said person, firm or corporation to the Division of Regulatory Inspections, and as further guarantee that all gas installations covered by said permits will be done in compliance with all the provisions and requirements of this Code, as well as the rules and regulations governing same. Permits will be issued only to persons, firms or corporations employing a Class "A" gasfitter.

Whenever, in pursuance of any of the provisions of this Code, it shall become necessary to deduct from the deposit made by any person, firm or corporation the amount of any fee or other charges which shall be due and owing to the Division of Regulatory Inspections resulting from assessments for additional fees for work not covered by installation permits and for any other charges which shall be due and owing to said Division that are not paid within ten (10) days after presentation of bills for such additional assessments or fees by such person, firm or corporation, the Director shall draw a requisition against the said deposit. Upon approval of said requisition by the Parish Finance Department, the Parish Finance Director shall pay the same out of the deposits against which it is drawn.

No permits shall be issued to any person, firm or corporation failing to make said payments within the ten (10) days prescribed or while the cash deposit of said person, firm or corporation is less than the specified minimum amount of Twenty-Five Dollars (\$25.00).

When any person, firm or corporation doing work under the provisions of this Code, having made deposits as aforementioned, shall have ceased to carry on all business and when all work under permits issued shall have been completed, inspected and approved and when all fees and other charges due and owing to the Division of Regulatory Inspections by said person, firm or corporation shall have been paid, and if no charges be then pending against said person, firm or corporation for any violation of any ordinance, rule or regulation of the Parish of Jefferson pertaining to gas installations, then said person, firm or corporation shall be entitled to have returned to him the amount on deposit or such portion thereof as may remain to his credit after deductions therefrom as herein specified.

#### **ARTICLE 5227. INSPECTION.**

If upon inspection any defective or dangerous installations or defective material is discovered, or if appliances are being utilized which are incapable of adjustment that will insure the complete combustion of gas, and such appliances are not installed in accordance with the provisions of this Code, a written notice shall be served on the owner or occupant to have same rectified in accordance with the requirements of this Code. On failure of the owner or occupant to comply with such notice, the Director shall give written notice to the Utility Company to discontinue the furnishing of gas service, which shall not be reconnected until the defects are rectified.

For an appeal from the decision of the Director, see Article 402.

#### **ARTICLE 5228. GAS DISTRIBUTION SYSTEMS.**

Drawings and specifications for installation of gas systems outside of a building or structure shall be prepared by or under the direct supervision of a Louisiana Registered Mechanical or Civil Engineer, and said drawings and specifications shall be imprinted with seal, stating that they comply with all Parish requirements to the best of his knowledge and belief, and that he is generally administering (not generally administering) the work. Said drawings and specifications are to be submitted at time of application for permit.

## CHAPTER 53

# RULES AND REGULATIONS FOR BOILERS, HEATING SYSTEMS, UNFIRED PRESSURE VESSELS, AND UNDERGROUND FUEL STORAGE TANKS

### ARTICLE 5301. REQUIREMENTS.

Each Boiler, Heating System or Unfired Pressure Vessel not exempted under Article 5304, used or proposed to be used in this Parish shall be thoroughly inspected by the Director as to its design, construction, installation, condition and operation; and, if it shall be found to be suitable and conform to the requirements of this Code, the Director shall cause to be issued to the owner or user thereof, an inspection certificate specifying the safe working pressure, location, year built, year installed and expiration date of the certificate. Such inspection certificate shall be posted in a conspicuous place adjacent to the Boiler, Heating System or Unfired Pressure Vessel for which it was issued. Not more than twelve (12) months shall elapse between any inspection of a Boiler, Heating System or Unfired Pressure Vessel.

### ARTICLE 5302. CERTIFICATE OF OPERATION.

It shall be a violation of this Code for any owner or user to operate within this Parish any Boiler, Heating System or Unfired Pressure Vessel required to be inspected, without first making application to the Director to have the Boiler, Heating System or Unfired Pressure Vessel inspected, and receiving a Certificate of Approval as required by this Code.

### ARTICLE 5303. DEFINITIONS AND CLASSIFICATIONS.

The following definitions and classifications apply to these rules and regulations:

**A.S.M.E.** This shall mean the American Society of Mechanical Engineers.

**National Board.** Under Chapter 53 this shall mean the National Board of Boiler and Pressure Vessel Inspectors.

**Power Boilers.** All Boilers that come within the scope of Section 1, A.S.M.E. "Boiler and Pressure Vessel Code", shall be classed as "Power Boilers".

**Miniature Boilers.** All Boilers that come within the scope of Section V, A.S.M.E. "Miniature Boiler Construction Code" shall be classed as "Miniature Boilers".

**Low Pressure Heating Boilers.** A vessel designed to heat buildings in part or in whole, where by means of pipes or ducts, water, steam or air is used as a medium for conveying the heat so generated to radiating surfaces or registers to be liberated in these portions of the building to be heated.

All Low Pressure Heating Boilers that come within the scope of Section IV, A.S.M.E. "Boiler and Pressure Vessel Code" shall be classed as "Low Pressure Heating Boilers."

**Unfired Pressure Vessels.** A vessel in which liquid, air gas, refrigerant or any other substance is stored under pressure. All Unfired Pressure Vessels that come within the scope of Section VIII, A.S.M.E. "Boiler and Pressure Vessel Code" shall be classed as an "Unfired Pressure Vessel."

### ARTICLE 5304. EXEMPTIONS.

This Code shall not apply to Boilers, Heating Systems or Unfired Pressure Vessels in marine or railroad service, which are under the inspection regulations of the United States Government. Low Pressure Boilers, Low Pressure Hot Water or Steam Heating Systems and Hot Water Supply Systems located in a private residence or dwelling of four (4) families or less are exempt from the annual fees and inspections required by this Chapter. However, the rules for installing, construction and stamping as required by Chapter 52 shall be complied with. Unfired Pressure Vessels of five cubic feet (5 cu. ft.) capacity or less designed for pressures not exceeding two hundred and fifty pounds (250 lbs.) will be exempt from annual inspections; provided they comply with the rules for construction and installation under Article 5305 as defined in Article 5303 and/or stamped with the U.M. Symbol as required by paragraph U-1 (G) of Section VIII, A.S.M.E. (Boiler and Pressure Vessel Code.)

### ARTICLE 5305. RULES FOR CONSTRUCTION, INSTALLATION AND STAMPING.

**Power Boilers.** In addition to the requirements of this Code, all Power Boilers shall be stamped "A.S.M.E." and "National Board". Installation and construction of Power Boilers in accordance with the requirements of Section 1, A.S.M.E. "Power Boiler Construction Code", shall be considered prima facie evidence of compliance with requirements of this Code.

**Miniature Boilers.** In addition to the requirements of this Code, all Miniature Boilers shall be stamped "A.S.M.E." and "National Board". Installation and Construction of Miniature

Boilers in accordance with the requirements of Section V, A.S.M.E. "Miniature Boiler Construction Code", shall be considered prima facie evidence of compliance with the requirements of this Code.

**Low Pressure Heating Boilers.** In addition to the requirements of this Code, the installation and construction of Low Pressure Heating Boilers shall be in accordance with the requirements of Section IV, A.S.M.E. "Boiler and Pressure Vessels Code", which shall be considered prima facie evidence of compliance with the requirements of this Code.

**Unfired Pressure Vessels.** In addition to the requirements of this Code, all unfired pressure vessels shall be stamped "A.S.M.E." and "National Board," provided that unfired pressure vessels constructed in accordance with A.S.M.E. Unfired Pressure Vessel Construction Code may be stamped "National Board" only if they were inspected during construction by a person holding a National Board commission and that such person is regularly employed by a state, a municipality, or an insurance company. Installation and construction of unfired pressure vessels shall be in accordance with the requirements of Section VIII, A.S.M.E. Unfired Pressure Vessel Construction "Boiler and Pressure Vessels Code," which shall be considered prima facie evidence of compliance with the requirements of this Code.

**Automatic Controls.** No gas-fired boilers or furnaces capable of consuming 400,000 B.T.U. or more per hour shall be installed, and no boiler or furnace designed for other fuels, having that B.T.U. capacity, shall be converted to the use of gas fuel, unless equipped with either a thermostatic pilot light, so constructed and adjusted that no gas can flow through the main burner unless the pilot light is burning; and a low water cut-off and excess pressure switch in the case of steam boilers, or an excess temperature cut-off for hot water boilers, to close the main gas supply valve within five (5) seconds of the failure of the pilot flame; or other similar approved types of safety devices serving this same end. The operation of the safety device shall not depend on the closing of an electric circuit to shutoff the main gas supply to the boiler or furnace. It shall be a misdemeanor punishable by forfeit of Operator's license issued under this Code for an operator to intentionally block or make inoperative the automatic controls on any gas furnace or burner capable of consuming 400,000 B.T.U. or more per hour.

**Steel or Ferrous Piping.** Piping systems in which steam is transported shall be fabricated in accordance with the requirements of Section I, Piping systems, "American Standard Building Code Requirements for Pressure Piping", (ASAB-31.1) sponsored by the American Society of Mechanical Engineers.

**Welded Steam Lines.** Steam piping systems in which steam is conveyed at pressures in excess of fifteen pounds (15 lbs.) per square inch gauge may be fabricated or repaired by the metallic arc welding process or by the oxy-acetylene welding process, provided the welded pipe pre-fabricator, contractor, or pipe welding operator has been certified in accordance with the Standard Welding Qualifications for Welding Procedure and Welding Operators, Manual Arc and Gas Welding or Ferrous Material, Section IX, ASME Boiler and Pressure Vessel Code.

Welded pipe pre-fabricators, contractors, and pipe welding operators who are qualified in accordance with the Standard Procedure Specifications of the National Certified Pipe Welding Bureau shall be accepted as having qualified with the requirements of this Article; however, they are required to file their qualifications with the Division of Regulatory Inspections.

For those local welding operators not qualified by the National Certified Pipe Welding Bureau, the Division of Regulatory Inspections shall accept and register operators who have been certified by any nationally recognized certifying agency acceptable to the Division. There shall be no charges or fees collected for this registration.

**Interpretation.** Any controversy as to interpretation of this Article shall be brought before the Board of Standards and Appeals, and its decision shall be final.

**Re-Registration.** All certified welders must re-register with the Division of Regulatory Inspections within a period not to exceed three (3) years from the date shown on their current registration certificate. At the time of re-registration, if in the opinion of the Director, there is any doubt as to the qualification of the welding operator, he shall be re-certified.

**Smoke Stacks, Chimneys and Vents.** These shall be constructed and installed as required under Chapter 37.

#### **ARTICLE 5306. OBJECTS SUBJECT TO ANNUAL INSPECTIONS.**

**Power Boilers, Miniature Boilers, Low Pressure Heating Boilers and Unfired Pressure Vessels.** Same as objects subject to Article 5305 and as defined in Article 5303 unless exempted under Article 5304.

#### **ARTICLE 5307. INSPECTIONS REQUIRED.**

Unless exempted under Article 5304, all Power Boilers, Miniature Boilers and Low Pressure Heating Boilers shall be inspected once externally and once internally at approximately six (6) month intervals.

All Unfired Pressure Vessels shall be inspected at least once annually. All Boilers. Heating

Systems or Unfired Pressure Vessels shall be inspected by the Director during their installation.

Re-inspection shall be made by the Director whenever he deems it necessary. The owner or user shall apply a Hydrostatic Test to a Boiler, Heating System or Unfired Pressure Vessel when advised to do so by the Director.

#### **ARTICLE 5308. OCCUPANCY SEPARATIONS.**

All boiler rooms, heating equipment rooms, furnace rooms, and similar rooms, shall be constructed and separated from other occupancies as required by Chapter 42, 43 and 52.

#### **ARTICLE 5309. ANNUAL CERTIFICATE FEES.**

The following fees shall be charged annually:

|                                                                       |        |
|-----------------------------------------------------------------------|--------|
| Boiler .....                                                          | \$8.00 |
| Heating System .....                                                  | 8.00   |
| Commercial Heaters .....                                              | 5.00   |
| Domestic Heaters, Used as Commercial Heaters--(2 Years) .....         | 2.00   |
| Hot Water Supply Systems Over 120 Gallons Capacity                    |        |
| Including Hot Water Boiler and Storage Tank .....                     | 5.00   |
| Unfired Pressure Vessels, That Can Be Inspected Externally Only ..... | 2.00   |
| Unfired Pressure Vessels, That Can Be Inspected                       |        |
| Externally and Internally .....                                       | 5.00   |

Every person, firm or corporation proposing to install or repair Boilers, Heating Systems, Hot Water Supply Systems or Unfired Pressure Vessels, shall file a written request for a permit with the Director and pay the following fees:

|                                                     |         |
|-----------------------------------------------------|---------|
| 10 to 100 Square Feet Heating Surface or Less ..... | \$ 8.00 |
| 101 to 500 Square Feet Heating Surface .....        | 15.00   |
| 501 to 1000 Square Feet Heating Surface .....       | 25.00   |
| Over 1000 Square Feet Heating Surface .....         | 50.00   |

Hot Water Supply Systems including Hot Water Boiler and Storage Tank based on Capacity in gallons of water:

|                         |         |
|-------------------------|---------|
| Up to 200 Gallons ..... | \$ 5.00 |
| Over 200 Gallons .....  | 10.00   |

Unfired Pressure Vessels based on cubic feet capacity:

|                          |         |
|--------------------------|---------|
| 5 to 20 Cubic Feet ..... | \$ 5.00 |
| Over 20 Cubic Feet ..... | 10.00   |

Repair permit fees based on contract price shall be at the rate of \$1.00 per Thousand Dollars of Cost.

#### **ARTICLE 5310. REVOCATION OF CERTIFICATES.**

When a Boiler, Heating System or Unfired Pressure Vessel is found to be in a dangerous condition and its continued operation would be a source of danger to life and property, the Director shall have the authority to immediately revoke the Certificate of Approval and the owner or user shall be ordered to cease operating same immediately.

If the owner or user refuses to comply with the order, the Director shall have the authority to order the Utility Company to disconnect the service from the building premises or structure where the dangerous boiler, heating system or unfired pressure vessel is being operated.

For Appeal from the decision of the Director, See Article 402.

#### **ARTICLE 5310-A. UNDERGROUND STORAGE TANKS.**

It shall be unlawful for any person, firm, or corporation to install or replace, any underground storage tanks for use in selling or storing petroleum products without first having secured a permit from the Director. The permit fee shall be \$10.00, plus \$2.00 for every tank installed. Each tank shall be tested with a minimum of four (4) pounds of air pressure, and all tests are to be witnessed by the Director.

All installations of underground tanks are to conform with the requirements as set forth in Jefferson Parish Ordinance 667 regulating the operation of garages and service stations in accordance with the provisions of Act 275 of the Legislature of the State of Louisiana.

## TRAILER COURT REGULATIONS

## CHAPTER 54—TRAILER COURT REGULATIONS

## ARTICLE 5401. DEFINITIONS.

The following definitions apply to these rules and regulations:

**Health Officer** shall mean the Jefferson Parish Health Officer or his authorized representative.

**Permit** shall mean a written approval issued by the Division of Regulatory Inspections of Jefferson Parish approving and authorizing the work. When the proposed work conforms with all requirements of this Chapter, **Trailer Court** shall mean any plot of ground upon which three or more trailer coaches occupied for dwelling or sleeping purposes are located, **Trailer Coach** shall mean any vehicle used or so constructed as to permit its being used as a conveyance upon the public streets or highway and duly licensable as such and constructed in such a manner as will permit occupancy thereof as a dwelling or sleeping place for one or more persons.

**Dependent Trailer Coach** shall mean a trailer coach which does not have a toilet and a bathtub or shower.

**Independent Trailer-Coach** shall mean a trailer coach that has a toilet and bathtub or shower.

**Trailer-Coach Space** shall mean a plot of ground within a trailer court designated for the accommodations of one trailer-coach.

**Service Building** shall mean a building housing toilet facilities for men and women with slop-water closet and laundry facilities and with separate bath or shower accommodations.

## ARTICLE 5402. PERMITS.

It shall be unlawful for any person to construct or alter any trailer court unless he holds a permit issued by the Division of Regulatory Inspections approving the construction and the materials to be used.

No permit shall be issued by the Division of Regulatory Inspections unless the application is accompanied by a petition signed by more than 50% of the property owners who own property zoned R-1 which is adjacent to and abutting the property sought to be used as a trailer court.

## ARTICLE 5403. INSPECTION.

The Division of Regulatory Inspections is hereby authorized and directed to make inspections in accordance with Ordinance No. 2225 to determine compliance with the requirements, rules and regulations of Ordinance No. 2225 and its amendments thereto.

## ARTICLE 5404. LOCATION, SPACE AND GENERAL LAYOUT.

The trailer court shall be located on a well drained site, shall be so located that its drainage will not endanger adjacent property and water supply and shall be in conformity with plans approved by Department of Regulatory Inspections and Health Officer.

Any lot or portion of ground proposed to be used for a trailer court shall have a minimum width of 200 feet front and rear and that no trailer parked thereon shall be parked closer to the street than the general set-back line of the surrounding property.

Each trailer-coach space shall contain a minimum of one thousand square feet, shall be at least 25 feet wide and shall have its boundaries clearly defined. The space shall abut on a driveway which shall have unobstructed access to a public street or highway. Trailer coaches shall be parked on each space so that there will be at least 15 feet clearance between coaches, 10 feet between coaches and any adjoining property line, 25 feet between coaches and any public street or highway and 15 feet between coaches and any building or structure. Sufficient area shall be provided for the parking of one motor vehicle for each trailer-coach space. Motor vehicles shall not be parked between trailer-coaches. A separate area shall be provided for recreational purposes and shall provide 100 square feet of open area for each trailer-coach space.

## ARTICLE 5405. SERVICE BUILDINGS.

Each trailer court shall be provided with one or more service buildings adequately equipped with flush-type toilet fixtures. No service building shall contain less than two toilets for women, one toilet for males, one lavatory and shower for each sex, one urinal for males.

Toilet facilities for males and females shall be separated, if located in the same building, by a sound resistant wall. Department trailer coaches shall be parked not more than 200 feet from the service building.

In addition to the above, the service building shall comply with the following:

- (a) Be located 15 feet or more from any trailer-coach space;
- (b) Be of permanent construction, and be adequately lighted;
- (c) Be of moisture-resistant material, to permit frequent washing and cleaning;
- (d) Have sufficient toilet and laundry facilities, according to requirements promulgated by the health officer, to serve adequately both males and females;
- (e) Have adequate heating facilities to maintain a temperature of 70° F during cold weather, and to supply a minimum of three gallons of hot water per hour per coach space during time of peak demands;
- (f) Have all rooms well ventilated, with all openings effectively screened;
- (g) Have at least one slop-water closet, supplied with hot and cold water, in a separate room.

#### **ARTICLE 5406. WATER SUPPLY.**

An adequate and safe water supply under pressure shall be supplied to each trailer-court, the source and distribution system shall be approved by the Health Officer, and the Water Districts. Each trailer-coach space should have a water-supply outlet. The distributing main shall be 1 inch diameter or larger, if necessary. A shut-off valve (not a stop and waste valve) shall be placed in the service line between the distributing main and the service connections. The service pipe shall extend vertically about six inches above grade terminating in hand wheel operated 3/4" valve outlets placed in horizontal position. Outlets should be threaded for metallic tube connections from trailer-coaches. The valve connections may be used for each riser service pipe. The valve assembly should be protected by a box with hinged cover. Check valves shall not be installed on the riser connection. Specific attention should be given to the possibility of back-siphonage. Any trailer-coach with fixtures from which back-siphonage may occur should not be connected to the court's water system until this defect has been corrected. All materials and construction for water systems, service lines, service connections shall conform to the requirements of this Chapter and Chapter 51.

#### **ARTICLE 5407. SEWERAGE DISPOSAL.**

Waste from toilets, slop-water closets, bathtubs, showers, lavatories and laundries shall be discharged into a public sewer system when such a system exists within 300 feet of the trailer court. When a public sewer system does not exist wastes shall be discharged into a private sewerage system consisting of collection lines, one or more septic tanks or disposal plants. The method of disposal, lines, construction, etc., shall meet with the approval of the Health Officer and the Sewerage Board if applicable. Each coach space shall be equipped with at least a 4" sewer connection with a trap installed on the collection line below the frost line. The riser shall extend vertically above the trap 6" above grade terminating in a standard quarter bend. The sewer connection should be protected by a concrete collar at least 3 inches deep and 12 inches square. The quarter bend shall be fitted with a standard ferrule, close nipple and increases or decreases fitted for a two to three inch hose coupling connection. An iron screw plug for use in plugging the sewer connection when not in use shall be anchored to the concrete collar. The connection between the coach drain and the sewer shall be water tight. This connection shall be of rigid pipe or an approved type of flexible hose, minimum—2 inches in diameter. The hose shall be equipped with hose couplings at either or both ends. A threaded connection shall be made at the sewer and either a threaded or a fitted and clamped or flanged connection at the coach drain. All sewer lines shall be laid in trenches separated at least 10 feet horizontally from any drinking water supply line under pressure at a grade which will insure a velocity of 2 feet per second when sewer is flowing full. All joints shall be made water tight. Manholes shall be provided at every change in direction, at every junction of 2 or more branch sewers. Cleanouts extending to grade may be used instead of manholes on 4 inch and 6 inch lines. They shall be provided wherever manholes would otherwise be necessary and at intervals of not more than 50 feet.

All cleanouts shall be capped with cleanout plugs.

Each sewer lateral serving a row of coaches shall be vented at its upper end, with not less than one vent of 4" diameter. When a septic tank is used as a means of disposal, all lines entering the tank shall be vented between the tank and the first trailer connection. All materials and construction for sewer system shall conform to the requirements of this Chapter and Chapter 51.

#### **ARTICLE 5408. FUEL.**

Cylinders containing liquified petroleum gas, to be used as fuel by trailer occupants shall be connected to the stoves or heaters of the trailer by copper or other metallic tubing to provide leak-proof connections. The cylinders shall be securely fastened in place, outside of and not less than 5 feet from any coach exit. State and Ordinance No. 2225 and its amendments thereto regulating the storing and handling of liquified petroleum gas and fuel oil shall be followed.

**ARTICLE 5409. FIRE PROTECTION.**

Where a public water system with a water main of 6 inches or larger is available to the court, standard fire hydrants should be located within 400 feet of each trailer-coach. Where individual water systems are provided, there should be adequate storage to meet possible fire demands, and an adequate number of hose connections shall be provided. A hose reel equipped with 75 feet of 1-1/2 inch hose shall be provided at the service building. Portable hand fire extinguishers shall be provided for each permanent structure not less than one unit for each 2500 square feet in the court area, and shall be inspected regularly and kept in good repair. Fires shall not be started except in stoves, incinerators, and other equipment specifically designed for such purposes; open fires shall never be permitted in the trailer-court area. All State requirements, and all regulations of Ordinance No. 2225 and its amendments shall apply in full.

**ARTICLE 5410. BUILDINGS.**

All buildings constructed on the Court shall be constructed in accordance with the requirements of the Parish Building Code.

**ARTICLE 5411. ELECTRICAL.**

A pole upon which the electrical service and equipment is to be installed shall be provided for each trailer. The service equipment shall be of adequate capacity to carry the connected load, but in no case shall it be less than 60 amperes capacity and be equipped with a minimum of one 115 volt and 230 volt (50 amp) weatherproof receptacles to be located in a single or a group of separate weatherproof enclosures, mounted on a treated board of sufficient size to adequately support the equipment.

The material used, and the installation as a whole shall comply with all requirements of the state, this code the National Electrical Code and Chapter 50. (See Article 5034).

**ARTICLE 5412. PLUMBING.**

All the plumbing and plumbing work shall comply with the requirements of the Parish Building Code.

**ARTICLE 5413. DRAWINGS AND SPECIFICATIONS.**

All of the provisions and requirements of Ordinance No. 2225 and its amendments shall apply to the proposed construction or alterations of buildings, structures, sewerage facilities, electrical facilities and water system for trailer courts.

**ARTICLE 5414. LIABILITY--ORINANCE ENFORCEMENT.**

All of the provisions and requirements of Ordinance No. 2225 and its amendments shall apply in all particulars to this chapter.

**ARTICLE 5415. INSPECTION FEES.**

For the construction, remodeling or alterations of trailer courts the inspection fees for the various classes of work such as electrical, building and plumbing, etc., shall conform to the fees set forth in the various chapters of this Code.

**ARTICLE 5416. DANGEROUS, UNSAFE, UNSANITARY CONDITIONS.**

All of the provisions of Ordinance No. 2225 and its amendments pertaining to dangerous, unsafe and unsanitary conditions and to the remedies thereof shall apply in all respects to the construction or operation of trailer courts.

**ARTICLE 5417. OWNER'S RESPONSIBILITY.**

All the requirements relative to property owner's responsibility as set forth in Ordinance No. 2225 and its amendments shall apply in full to this chapter.

**ARTICLE 5418. WIND LOADS.**

Mobile homes shall be rendered hurricane and windstorm resistive by the use of over-the-roof ties which are acceptable, or approved built in ties, with provisions for distributing the load of these ties, and provisions for the attachment of anchors so as to resist wind overturning and sliding as imposed by the design loads as follows:

|                                                                      |                              |
|----------------------------------------------------------------------|------------------------------|
| Horizontal                                                           | 25 lb/ft <sup>2</sup>        |
| Vertical (Horizontal projection)                                     | 15 lb/ft <sup>2</sup> uplift |
| Vertical Downward (normal unit stresses may be increased by 33-1/3%) | 30 lb/ft <sup>2</sup>        |

# BOARD OF EXAMINERS OF OPERATING ENGINEERS

## FUNCTIONS AND REGULATIONS OF THE BOARD OF EXAMINERS OF OPERATING ENGINEERS

### ARTICLE 5501.

An Ordinance for safeguarding person, property and promoting the welfare of the public, creating a Board of Examiners of Operating Engineers, for the purpose of inquiring into the physical well-being, mental capacity and technical proficiency of those persons engaged in the profession, trade, or calling of operating steam boilers, steam engines, internal combustion engines, refrigerating equipment, air conditioning or other equipment involving pressure in the unincorporated areas of the Parish of Jefferson.

The Board shall consist of seven (7) members, to wit:

The Chief Mechanical Inspector and six (6) additional members, all of whom shall be citizens of the United States and residents of the Parish of Jefferson, and to be appointed by the governing authority of Jefferson Parish.

All of the above-mentioned appointive Examiners shall hold a First Class Engineer's Stationary or Marine Certificate and all future appointed examiners shall hold a certificate from this Board.

### ARTICLE 5502. TERM OF OFFICE.

The Chief Mechanical Inspector shall serve throughout his term of office and shall be entitled to vote. The appointment of the other six (6) members of the Board shall be made to run concurrent with the term of office of the members of the governing authority of the Parish of Jefferson. Whenever any member of the Board shall cease to be a resident of the Parish of Jefferson, his membership shall automatically be vacated, and any member may be removed for cause by the Governing authority of the Parish of Jefferson.

Each member shall serve until his successor is appointed and qualifies. Said terms of office will terminate on December 31, of each respective year.

### ARTICLE 5503. DUTIES OF THE BOARD.

It shall be the duty of the Board, in accordance with such rules as it may formulate, to examine into the physical, mental, technical and practical experience and proficiency of all persons in the Parish of Jefferson, engaged in the profession, trade, or calling of operating steam boilers, steam engines, internal combustion engines, refrigerating equipment, air conditioning or other equipment involving pressure in the Unincorporated Areas of the Parish of Jefferson in accordance with the terms and provisions of this Code. It shall be the duty of said Board when it is satisfied that any person who shall have been examined by said Board as to his physical, mental, technical and practical experience and proficiency in the operation of steam boilers, steam engines, internal combustion engines, refrigerating equipment, air conditioning or other equipment involving pressure, in the Parish of Jefferson, to issue such person certificate evidencing the fact that such person is a qualified person to operate in the interest of public safety any steam boiler, steam engine, internal combustion engine, refrigerating equipment, air conditioning or other equipment involving pressure, in the Unincorporated Areas of the Parish of Jefferson, according to the classification for which said applicant was examined.

### ARTICLE 5504. BOARD MEETINGS.

The Board shall hold meetings at least four (4) times annually and upon call for the purpose of examining into the qualifications of all persons applying for a certificate of competency and proficiency to operate any equipment coming within the purview of the terms of this Code. A chairman shall be elected by the members of the Board annually, except that the Chief Mechanical Inspector shall not be eligible to serve as chairman. Four (4) members shall constitute a quorum. Each board member (except the Chief Mechanical Inspector) shall receive \$25.00 for each meeting or examination they attend; said monies are to be paid out of Parish funds.

### ARTICLE 5505. POWERS OF THE BOARD.

The Board shall have the power and authority to examine into the physical, mental, technical and practical experience and qualifications of all persons applying for certificates of competency and proficiency as operating engineers of steam boilers, steam engines, internal combustion engines, refrigerating equipment, air conditioning or other equipment, involving pressure, in the Parish of Jefferson, and likewise of all persons who shall apply for special



certificates and are not operating engineers. The Board shall be empowered to grant such certificates of competency and proficiency, according to the classifications established by this Code; and for cause may suspend or revoke any such certificate heretofore issued by it. Every application by any person for a certificate of competency and proficiency in the operation of any steam boiler, steam engine, internal combustion engine, refrigerating equipment, air conditioning or other equipment involving pressure, in the Unincorporated Areas of the Parish of Jefferson, either regular or special, shall be made on a printed form to be furnished by the Board and shall set forth therein such information as the Board may require.

The Board shall have the authority to select and adopt a suitable Official Seal for such purpose, use, and application as the Board deems proper.

#### **ARTICLE 5506. ADMINISTRATION—CERTIFICATE REQUIREMENTS.**

It shall be unlawful for any person, owner, occupant, firm, partnership, association, or corporation having control or management of any building or structure to operate or permit to be operated any steam boiler, steam engine, internal combustion engine, refrigeration system, air conditioning system, or other equipment involving pressure, in the Unincorporated Areas of the Parish of Jefferson without a properly qualified person having the necessary Certificate of Competency and Proficiency from the Board on the premises at all times while such equipment is in operation. Upon failure to comply with the above, thereby creating a dangerous and unsafe condition, the Director of the Department of Safety shall notify the owner in writing to correct such condition within 48 hours through 10 days as he may decree necessary. This period may not be extended except by special written permission from the Director of the Department of Safety. Upon failure to comply with this notice, the utility company upon written request of the Director, shall discontinue the electric or gas service, or both, until such time that a person with a valid Certificate of Competency and Proficiency is operating said plant, and the utility company is notified in writing that the electric or gas service, or both, may be restored.

For appeal from the decision of the Director, see Article 402.

#### **ARTICLE 5507. DEFINITIONS AND REFERENCES.**

See Articles 4817, 4818, 4820, 4821 and Table 48-A of this Code.

The tonnage and/or horsepower referred to in Article 5508 of this Code shall be in accordance with the Code of the A.S.H.R.A.E. The boilers referred to in this Code shall be in accordance with the Code of the A.S.M.E.

#### **ARTICLE 5508. EQUIPMENT AND SYSTEMS REQUIRING OPERATORS AND CLASSIFICATION OF CERTIFICATES.**

A first Class Operating Engineer's Certificate is required for an operator to operate the following:

- Steam Boilers – unlimited
- Steam Engines – unlimited
- Internal combustion engines – unlimited
- Refrigeration or air conditioning systems B 1, 2, 3, 4, 5, using Group 1, 2, 3, Refrigerants – unlimited
- Equipment involving pressure – unlimited

A Second Class Operating Engineer's Certificate is required for an operator to act as an assistant to and under a First Class Operating Engineer, or to operate the following without the supervision of a First Class Operating Engineer:

- Steam boilers up to 150 horsepower
- Steam engines up to 150 horsepower
- Internal combustion engines up to 150 horsepower
- Refrigeration systems and air conditioning systems B 2, 3, 4, 5, using Group 1, 2, 3 Refrigerants; a total of 150 horsepower, but not more than 15 systems
- Air conditioning systems B 1 using Group 1 Refrigerant; a total of 200 horsepower, not over 15 systems, maximum size of any individual unit 60 horsepower

A Third Class Operating Engineer's Certificate is required for an operator to act as an assistant to and under a Second Class Operating Engineer, or to operate the following without the supervision of a Second Class Operating Engineer:

- Steam boilers up to 75 horsepower
- Steam engines up to 75 horsepower
- Internal combustion engines up to 75 horsepower
- Refrigeration systems and air conditioning systems B 1, 2, 3, 4, 5, using Group 1, 2, 3 Refrigerants, a total of 75 horsepower

A Special Operator's Certificate is required for an operator to act as an assistant to and under a Third Class Operating Engineer, or to operate the following without the supervision of

a Third Class Operating Engineer:

Steam boilers containing more than 30 gallons of water and up to 240 square feet of boiler heating surface of any pressure above atmospheric pressure

Refrigeration or air conditioning systems using Group 2 or 3 Refrigerants from 5 to 20 horsepower

#### **ARTICLE 5509. ANNUAL COST OF CERTIFICATES.**

In order to defray the expenses of the Board in conducting the necessary examinations, every applicant for a certificate of competency and proficiency, either upon his original application or for a renewal thereof, shall be required to pay the following schedule of cost:

|                                                     |        |
|-----------------------------------------------------|--------|
| First Class Operating Engineer's Certificate .....  | \$6.50 |
| Second Class Operating Engineer's Certificate ..... | 5.50   |
| Third Class Operating Engineer's Certificate .....  | 4.00   |

Every applicant applying for a Special Certificate of Competency and Proficiency for those classes of operators provided for in Article 5508 of this code relative to boilers under 240 square feet of boiler heating surface and refrigeration systems up to 20 tons, and being duly certified .....\$3.00

#### **ARTICLE 5510. RENEWAL OF CERTIFICATE.**

Each certificate evidencing the necessary satisfactory qualifications of the applicant, according to the classifications stated therein shall expire one year from the date of its issuance, and must be annually renewed in order to permit the holder thereof to engage in the profession, trade, or calling of operating a steam boiler, steam engine, internal combustion engine, refrigerating equipment, air conditioning or other equipment involving pressure, in the Parish of Jefferson, according to the classification stated in said certificate.

#### **ARTICLE 5511. QUALIFICATIONS OF APPLICANTS.**

Any citizen in the United States, over the age of 18 years, and a resident of the Parish of Jefferson for at least 6 months prior thereto, may apply for an examination as heretofore set forth. The applicant, however, must have served the necessary apprenticeship, and must comply with the qualifications hereinafter set forth. The Board in its discretion may grant a special certificate to one not a citizen of the United States.

#### **ARTICLE 5512. APPRENTICESHIP REQUIREMENTS.**

Every applicant for a Certificate of Competency and Proficiency as a first-class engineer shall be an operating engineer, with 4 years' practice in the management, operation or construction of steam engines, boilers, internal combustion engines, refrigeration or air conditioning equipment; provided those who are graduates of a recognized technical college or trade school are required to have one year's practical experience. Every applicant for a Certificate of Competency and Proficiency as a second-class engineer shall be an operating engineer, having at least 3 years' practice in the management, operation or construction of steam engines, boilers, internal combustion engines, refrigeration or air conditioning equipment; provided those applicants who are graduates from a recognized technical college or trade school shall be required to have 6 months' practical experience.

Every applicant for a Certificate of Competency and Proficiency as a third-class engineer shall have at least 2 years' experience as an apprentice or junior engineer or fireman, etc., provided graduates of a recognized technical college or trade school are not required to have any practical experience.

Every applicant for a special Certificate of Competency and Proficiency to operate boilers, steam or internal combustion engines specified in Article 5508 of this Code, shall be an operating engineer, having at least 2 years' practical experience as an apprentice in the operation of steam engines, steam boilers, or internal combustion engines. Applicants for special certificates coming under the classifications of Article 5508 of this Code must, to the satisfaction of the Board, establish their familiarity with the operation of the equipment in their care; these applicants must furnish a recommendation from 2 citizens, one of whom shall be a licensed operating engineer, and the other his present or former employer.

#### **ARTICLE 5513. VALIDITY OF CERTIFICATES.**

Certificate of Competency and Proficiency as provided for in Article 5508 of this Code must bear at least 5 signatures, namely, the Chairman, or Acting Chairman and 4 other members of the Board. The Official Seal of the Board shall be placed on all certificates issued.

#### **ARTICLE 5514. REVOCATION OF CERTIFICATE.**

A Certificate may be suspended indefinitely or be revoked, in addition to other lawful reasons, for any of the following reasons:

Intemperance, incompetency, neglect of duty, failure to keep the apparatus in his charge in safe working order, or leaving a refrigeration, air conditioning, steam system, etc., in operation without providing a substitute holding the proper Certificate of Competency and Proficiency from this Board. No Certificate shall be suspended or revoked without first giving the accused person an opportunity to be heard by the Board in his own defense. Appeal from the decision of the Board of Examiners of operating Engineers may be taken within 10 days to the Board of Standards and Appeals through the Director of Safety.

#### **ARTICLE 5515. RIGHT TO ENTER PREMISES.**

Any member of the Board is empowered, upon showing his proper credentials, to visit any plant or place of business in charge of an engineer or operator holding a certificate of competency and proficiency, or any other plant where the engineer or operator thereof does not hold such certificate during the operating hours of such plant or place.

#### **ARTICLE 5516. CERTIFICATES DISPLAYED.**

Certificates of Competency and Proficiency of all successful applicants before the Board must be displayed in a conspicuous place in the engine or boiler room or mechanical equipment room.

#### **ARTICLE 5517. EXCEPTIONS.**

This Code does not apply in any way to engineers in charge of locomotives of franchised railroads, nor to engineers employed by a person, firm or corporation operating under Certificates of Convenience and Necessity, franchise or indeterminate permits, nor to engineers employed by the State of Louisiana, or any of its Boards, Commissions or agencies, nor to engineers in charge of steamboats and steamships.

Self-contained air conditioning units used for domestic, commercial, or industrial purposes having an aggregate of not over 50 horsepower using Group 1 Refrigerant shall be exempt from the provisions of this Code, provided they are protected with the necessary safety devices and are automatically controlled. In calculating the aggregate horsepower, units under 3 horsepower shall not be considered.

#### **ARTICLE 5518. PENALTY TO OWNER.**

Any person, firm or corporation owning or controlling any steam engine, steam boiler, internal combustion engine, or any other system coming within the provisions of this Code, who authorizes or permits any person not having a proper and valid Certificate of Competency and Proficiency as required under this Code, to take charge of or operate any steam engine, steam boiler, or any portion of a steam or internal combustion engine, air conditioning systems, refrigeration system, or equipment involving pressure, shall, upon the conviction thereof before any court of competent jurisdiction, be penalized as hereinafter set forth in Chapter 56.

#### **ARTICLE 5519. PENALTY TO ENGINEER.**

Any person engaged in the practice, calling, or profession as an engineer, engaged in the operation of any steam boiler, steam engine, internal combustion engine, refrigeration system, air conditioning system, or equipment involving pressure, under the terms of this Code, without being at the time the holder of a proper and valid certificate of competency and proficiency issued by the Board provided herein, shall, upon conviction thereof before any court of competent jurisdiction, be penalized as hereinafter set forth in Chapter 56.

## **PART XXII**

### **LIABILITY—ORDINANCE ENFORCEMENT**

#### **CHAPTER 56—LIABILITY—ORDINANCE ENFORCEMENT\***

##### **ARTICLE 5601. PARISH NOT LIABLE.**

Nothing contained in this Code shall be construed to relieve or lessen the responsibility or liability of any person for injury or damage to persons or property caused by or resulting from any defects of any nature in any work performed by said person or in any equipment owned, controlled, installed, operated, or used by him, nor shall the Parish of Jefferson, or any officer, agent or employee thereof, incur or be held to assume any liability by reason or in consequence of any permit, permission, certificate or inspection or approval authorized therein, or issued or given as herein provided, or by any reason of or in consequence of any things done or acts performed pursuant to any provisions of this Code.

##### **ARTICLE 5602. VIOLATIONS AND PENALTIES:**

Any person, persons, firms, partnership, corporation or other legal entities and any individual, representative and/or employee who assist in the operation or management in any manner who violates any provisions of this Code shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding One Hundred Dollars (\$100.00) or imprisoned for a term not exceeding ninety (90) days, or both, at the discretion of the Court having jurisdiction; and the continued violation shall be and constitute a separate offense under this Code for each and every day said violation of any provision shall continue.

##### **ARTICLE 5603. ORDINANCE ENFORCEMENT.**

The Office of Regulatory Inspections shall have, in addition to the responsibilities set forth herein, the responsibility for the direct performance of all functions assigned to the Office of Electrical Inspections as created by Ordinance No. 2225 adopted December 10, 1952, the Office of Plumbing Inspections as created by Ordinance No. 2225 adopted December 10, 1952 and the Office of Mechanical Inspections as created by Ordinance No. 2298 adopted August 27, 1953 and amending Ordinance No. 2225 adopted December 10, 1952, and its amendments.

The Director of Safety shall have direct charge of the coordination of all work and the supervision of all personnel of the Office of Electrical Inspections, the Office of Plumbing Inspections and the Office of Mechanical Inspections; and shall maintain all files and records of said Offices. The Director shall also collect all fees for inspections and permits authorized by the Ordinance referred to above, and shall deposit daily all sums collected with the Parish Treasurer or other official designated by the Governing Authority of the Parish.

##### **ARTICLE 5604. THE CODE OF THE UNINCORPORATED AREAS OF THE PARISH OF JEFFERSON BUILDINGS.**

The Jefferson Parish Building Code enacted by the Police Jury Ordinance No. 2225, as well as that Ordinance and all amendments to the Building Code are omitted from this Code but were exempted from the general repeal clause contained in the ordinance by which this Code was adopted and therefore remain in effect. The original Building Code, the Ordinance by which it was adopted and all ordinances amending that Code are on file in the office of the Clerk of the Council.

In addition, the Building Code is published in loose-leaf form and revised sheets are printed as amendments are made so that a copy, revised to date, may be obtained from the Department of Regulatory Inspections,

**ARTICLE 5701. DEFINITIONS.**

For purposes of this code "physically handicapped person" means any person suffering from a physical disability, including blindness, requiring the use of prosthetic equipment, including, but not limited to crutches, walkers, canes or wheelchairs.

Egress by means of a ramp or an elevator must be provided for the physically handicapped as indicated in Chapter 33, Table No. 33 - A.

**ARTICLE 5702 STANDARDS**

"Making buildings and facilities accessible to and usable by the physically handicapped," of the American National Standards Institute, ANSI A117.1 - 1961 (R1971) is hereby adopted, and the mandatory requirement therein, as well as those set forth herein shall be complied with.

Wherever ANSI A117.1 refers to "non-slip" it shall be interpreted as having a skid resistance of .5 or greater based on established testing procedure. Generally, most roughened "broom-finished" concrete surfaces are well above the .5 skid resistance.

Wherever ANSI A117.1 refers to "abrupt changes" the change shall be limited to no greater than 1/2" high.

**ARTICLE 5703. FEDERAL FLOOD INSURANCE**

An optimum standard would be to have no ramps, and instead to have all approaches, level, with difference in height accommodated by lifts and elevators, however, ramps may be necessary to get up to minimum floor elevation of an enclosed building, which shall comply with Ordinance No. 11881 as amended by Ordinance No. 11972.

**ARTICLE 5704. PUBLIC OWNED BUILDINGS**

For public buildings financed by tax monies, see Article 1595, 1596, and 1597 of the Fire Marshal Act, Louisiana Revised Statutes of 1950 as amended 1974, R.S. 40 1561, Chapter 7, Part 3.

**ARTICLE 5705. ASSEMBLY SEATING ACCOMMODATIONS.**

Places of assembly with fixed seating arrangements shall provide viewing positions for persons in wheelchairs in accordance with Table 57A.

Viewing positions for wheelchair persons shall be provided in a reasonable and convenient section or sections of the facility by providing clear space devoid of any fixed seating arrangements. These positions shall be located so as not to interfere with egress from any row of seats, shall be reached by means of ramps and/or elevators, and shall not infringe upon aisle requirements.

There shall not be steps in the aisles in the access route used by the physically handicapped to reach the performance viewing positions, but the aisles may be inclined.

**ARTICLE 5706. GROUPS F AND G OCCUPANCIES.**

Buildings with 5,000 square feet or less per floor, having accessibility at habitable grade levels, shall not be required to comply with the provisions of this section at floors above such levels except where an elevator is provided.

"Building of 5,000 square feet or less per floor" shall be interpreted to be gross square foot area, measured to the outside face of walls or centerline of firewalls.

Note: Where a building such as a shopping center or a multiple office is subdivided by code approved firewalls, such subdivision shall be considered as independent building with respect to the 5,000 square feet limitation.

**ARTICLE 5707. NON-PUBLIC AREAS.**

In building maintenance and storage area where only employees have occasion to enter and within which the work cannot reasonably be performed by the handicapped, the provisions of this section need not apply unless such areas provide the only path between areas normally used by the handicapped.

**ARTICLE 5708. GROUP H OCCUPANCIES**

Two-story and three-story buildings with less than 49 units, having accessibility at habitable grade levels, shall not be required to comply with the provisions of this part at floors above such levels except where a public elevator is provided.

Within living units, hallways having no walk-through openings in the sidewalls may be less than 44 inches wide, but shall not be less than 36 inches wide.

Within living units, toilet rooms providing 29-inch clear passage need not comply with the provisions of this section.

Apartment buildings with less than 49 units shall be exempted from this section. Apartment buildings with 49 units or more shall provide one unit and one parking space for each 50 units or fraction thereof.

#### **ARTICLE 5709. GROUP I AND J OCCUPANCIES.**

Group I and J occupancies shall be exempted from this section.

#### **ARTICLE 5710. ELEVATORS.**

If interior access in multi-story buildings is provided by elevator(s) at least one (1) elevator shall meet the requirements of this section.

"Elevator shall be interpreted to mean a public elevator (as opposed to freight or private) and only floors served need be accessible.

#### **ARTICLE 5711. PHONES.**

Where a public or pay phone is installed, five (5) percent or not less than one(1) telephone shall be accessible to, and usable by, physically handicapped persons.

#### **ARTICLE 5712. DRINKING FOUNTAINS.**

Where a drinking fountain is required, five (5) percent or not less than one (1) drinking fountain or other water dispensing means shall be accessible to, and usable by physical handicapped persons.

#### **ARTICLE 5713. REST ROOMS.**

All required restrooms shall be accessible, and each shall be provided with at least one accessible toilet stall complying with these standards. Access to such restrooms shall be marked by similar signs or symbols in all cases where the accessible restrooms are not immediately visible from all public areas on each floor.

"Restroom" shall be defined as a multiple station facility composed of a number of "toilet compartments or stalls"; a toilet compartment or stall is one-station facility and may include one water closet with or without one urinal. If more restrooms are provided than are the required minimum, only the required restrooms need be accessible, but each sex shall be provided with accessible facilities.

#### **ARTICLE 5714. CHECKOUT LANES.**

Buildings which include checkout lanes shall provide at least one (1) checkout lane, on each floor where such lanes are used, which is not less than thirty-six (36) inches wide.

#### **ARTICLE 5715. TURNSTILES.**

Buildings which utilize turnstiles to control traffic shall provide a clearly marked alternate route for the physically handicapped which is at least thirty-six (36) inches wide.

#### **ARTICLE 5716. BARRICADES.**

Barricades at common or emergency entrances and exists of establishments that are existing which would prevent a physically handicapped person from using such entrances or exists shall be removed.

#### **ARTICLE 5717. PARKING.**

A parking lot servicing each entrance described in this section shall have a number of parking spaces as set forth in Table 57 B identified by above grade signs as reserved for physically handicapped persons.

The required number of spaces in Table 57B is based upon the total parking required by the Zoning Ordinance. Nothing in this Section increases or decreases the total number of parking spaces required by the Zoning Ordinance. However the minimum width of the parking spaces for the handicapped shall comply with the greater requirements.

**TABLE 57A**  
**PLACES OF ASSEMBLY, ACCESSIBLE VIEWING POSITIONS**

| Capacity of Assembly Space |      | Number of Viewing Positions      |
|----------------------------|------|----------------------------------|
| up to                      | 25   | 1                                |
| 26 to                      | 50   | 2                                |
| 51 to                      | 75   | 3                                |
| 76 to                      | 100  | 4                                |
| 101 to                     | 150  | 5                                |
| 151 to                     | 200  | 6                                |
| 201 to                     | 300  | 7                                |
| 301 to                     | 400  | 8                                |
| 401 to                     | 500  | 9                                |
| 501 to                     | 1000 | 2% of total                      |
| Over                       | 1000 | 20 plus 1 for each 100 over 1000 |

**TABLE 57B**  
**ACCESSIBLE PARKING SPACES**

| Total Parking In Lot |      | Required Number of Accessible Spaces |
|----------------------|------|--------------------------------------|
| up to                | 25   | 1                                    |
| 26 to                | 50   | 2                                    |
| 51 to                | 75   | 3                                    |
| 76 to                | 100  | 4                                    |
| 101 to               | 150  | 5                                    |
| 151 to               | 200  | 6                                    |
| 201 to               | 300  | 7                                    |
| 301 to               | 400  | 8                                    |
| 401 to               | 500  | 9                                    |
| 501 to               | 1000 | 2% of Total                          |
| Over                 | 1000 | 20 plus 1 for each 100 over 1000     |









# SANITARY CODE STATE OF LOUISIANA

## Chapter X-A PLUMBING

Prepared and Promulgated  
by the

### Louisiana Health and Human Resources Administration

DIVISION OF HEALTH

In accordance with  
Revised Statutes of 1950,  
Title 40, Section 11  
as amended by Act 253 of 1972



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## CHAPTER X-A

# PLUMBING

### SECTION P1—DEFINITIONS

#### P1.1 GENERAL

P1.1.1 For the purpose of this code, the following terms shall have the meaning indicated in this chapter.

P1.1.2 No attempt is made to define ordinary words which are used in accordance with their established dictionary meaning except where the word has been loosely used and it is necessary to define its meaning as used in this code to avoid misunderstanding.

P1.1.3 Because the primary purpose is to define terms rather than words, the definitions are arranged alphabetically according to the first word of the term rather than the noun.

#### P1.2 DEFINITION OF TERMS

**Administrative Authority.** The administrative authority is the individual official, board, department, or agency established and authorized by a State, county, city, or other political subdivision created by law to administer and enforce the provisions of the plumbing code as adopted or amended.

**Air Gap.** An air gap in a water-supply system is the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood-level rim of the receptacle.

**Anchors.** See Supports.

**Approved.** Approved means accepted or acceptable under an applicable specification stated or cited in this code, or accepted as suitable for the purposed use under procedures and powers of the administrative authority.

**Area Drain.** An area drain is a receptacle designed to collect surface or rain water from an open area.

**Backflow.** Backflow is the flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source or sources other than its intended source. (See Back-siphonage.)

**Backflow Connection.** Backflow connection or condition is any arrangement whereby backflow can occur.

**Backflow Preventer.** A backflow preventer is a device or means to prevent backflow into the potable water system.

**Back-siphonage.** Back-siphonage is the flowing back of used, contaminated or polluted water from a plumbing fixture or vessel into a water-supply pipe due to a negative pressure in such pipe. (See Backflow.)

**Battery of Fixtures.** A "battery of fixtures" is any group of two or more similar adjacent fixtures which discharge into a common horizontal waste or soil branch.

**Boiler Blow-off.** A boiler blow-off is an outlet on a boiler to permit emptying or discharge of sediment.

**Branch.** A branch is any part of the piping system other than a main, riser, or stack.

**Branch Fixture.** See Fixture Branch.

**Branch Horizontal.** See Horizontal Branch.

**Branch Interval.** A branch interval is a length of soil or waste stack corresponding in general to a story height, but in no case less than 8 feet within which the horizontal branches from one floor or story of a building are connected to the stack.

**Branch Vent.** A branch vent is a vent connecting one or more individual vents with a vent stack or stack vent.

**Building.** A building is a structure built, erected, and framed of

component structural parts designed for the housing, shelter, enclosure, or support of persons, animals, or property of any kind.

**Building Drain.** The building (house) drain is that part of the lowest piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building (house) sewer beginning 3 feet outside the building wall.

**Building Sewer.** The building (house) sewer is that part of the horizontal piping of a drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sewer, private sewer, individual sewage-disposal system, or other point of disposal.

**Building Storm Drain.** A building (house) storm drain is a building drain used for conveying rain water, surface water, ground water, sub-surface water, condensate, cooling water, or other similar discharge to a building storm sewer or a combined building sewer, extending to a point not less than 3 feet outside the building wall.

**Building Storm Sewer.** A building (house) storm sewer is the extension from the building storm drain to the public storm sewer, combined sewer, or other point of disposal.

**Building Subdrain.** A building (house) subdrain is that portion of a drainage system which cannot drain by gravity into the building sewer.

**Building Trap.** A building (house) trap is a device, fitting, or assembly of fittings installed in the building drain to prevent circulation of air between the drainage system of the building and the building sewer.

**Circuit Vent.** A circuit vent is a branch vent that serves two or more traps and extends from in front of the last fixture connection of a horizontal branch to the vent stack.

**Code.** The word "code" when used alone shall mean these regulations, subsequent amendments thereto, or any emergency rule or regulation which the administrative authority having jurisdiction may lawfully adopt.

**Combination Fixture.** A combination fixture is a fixture combining one sink and tray or a two-or-three-compartment sink or tray in one unit.

**Combined Building Sewer.** A combined building sewer receives storm water and sewage.

**Combination Waste and Vent System.** A combination waste and vent system is a specially designed system of waste piping embodying the horizontal wet venting of one or more sinks or floor drains by means of a common waste and vent pipe adequately sized to provide free movement of air above the flow line of the drain.

**Common Vent.** A common vent is a vent connecting at the junction of two fixture drains and serving as a vent for both fixtures.

**Conductor.** See Leader.

**Continuous Vent.** A continuous vent is a vertical vent that is a continuation of the drain to which it connects.

**Continuous Waste.** A continuous waste is a drain from two or three fixtures connected to a single trap.

**Cross-connection.** A cross-connection is any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other water of unknown or questionable safety, whereby water may flow from one system to the other, the direction of flow depending on the pressure differential between the two systems. (See Backflow and Back-Siphonage.)

**Dead End.** A dead end is a branch leading from a soil, waste, or vent pipe, building drain, or building sewer, which is terminated at a developed distance of 2 feet or more by means of a plug or other closed fitting.

**Developed Length.** The developed length of a pipe is its length along the center line of the pipe and fittings.

**Diameter.** Unless specifically stated, the term "diameter" is the nominal diameter as designated commercially.

**Double Offset.** A double offset is two changes of direction installed in succession or series in continuous pipe.

**Downspout.** See Leader.

**Drain.** A drain is any pipe which carries waste water or water-borne waste in a building drainage system.

**Drainage System.** A drainage system (drainage piping) includes all the piping within public or private premises, which conveys sewage, rain water, or other liquid wastes to a legal point of disposal, but does not include the mains of a public sewer system or a private or public sewage-treatment or disposal plant.

**Dual Vent.** See Common Vent.

**Durham System.** Durham system is a term used to describe soil or waste systems where all piping is of threaded pipe, tubing, or other such rigid construction, using recessed drainage fittings to correspond to the types of piping.

**Effective Opening.** The effective opening is the minimum cross-sectional area at the point of water-supply discharge, measured or expressed in terms of (1) diameter of a circle, (2) if the opening is not circular, the diameter of a circle of equivalent cross-sectional area. This is applicable to air gap.)

**Existing Work.** Existing work is a plumbing system or any part thereof which has been installed prior to the effective date of this code.

**Fixture Branch.** A fixture branch is a pipe connecting several fixtures.

**Fixture Drain.** A fixture drain is the drain from the trap of a fixture to the junction of that drain with any other drain pipe.

**Fixture Supply.** A fixture supply is a water-supply pipe connecting the fixture with the fixture branch.

**Fixture Unit.** A fixture unit is a quantity in terms of which the load-producing effects on the plumbing system of different kinds of plumbing fixtures are expressed on some arbitrarily chosen scale.

**Fixture-Unit Flow Rate.** Fixture-unit flow rate is the total discharge flow in g.p.m. of a single fixture divided by 7.5 which provides the flow rate of that particular plumbing fixture as a unit of flow. Fixtures are rated as multiples of this unit of flow.

**Flood Level.** See Flooded.

**Flood-Level Rim.** The flood-level rim is the top edge of the receptacle from which water overflows.

**Flooded.** A fixture is flooded when the liquid therein rises to the flood-level rim.

**Flush Valves.** A flush valve is a device located at the bottom of the tank for the purpose of flushing water closets and similar fixtures.

**Flushometer Valve.** A flushometer valve is a device which discharges a predetermined quantity of water to fixtures for flushing purposes and is actuated by direct water pressure.

**Frostproof Closet.** A frostproof closet is a hopper that has no water in the bowl and has the trap and the control valve for its water supply installed below the frost line.

**Grade.** Grade is the slope or fall of a line of pipe in reference to a horizontal plane. In drainage it is usually expressed as the fall in a fraction of an inch per foot length of pipe.

**Grease Interceptor.** See Interceptor.

**Grease Trap.** See Interceptor.

**Hangers.** See Supports.

**Horizontal Branch.** A horizontal branch is a drain pipe extending laterally from a soil or waste stack or building drain, with or without vertical sections or branches, which receives the discharge from one or more fixture drains and conducts it to the soil or waste stack or to the building (house) drain.

**Horizontal Pipe.** A horizontal pipe is any pipe or fitting which is installed in a horizontal position or which makes an angle of less than 45° with the horizontal.

**House Drain.** See Building Drain.

**House Sewer.** See Building Sewer.

**House Trap.** See Building Trap.

**Indirect Waste Pipe.** An indirect waste pipe is a pipe that does not connect directly with the drainage system but conveys liquid wastes by discharging into a plumbing fixture or receptacle which is directly connected to the drainage system.

**Individual Vent.** An individual vent is a pipe installed to vent a fixture trap and which connects with the vent system above the fixtures served or terminates in the open air.

**Industrial Wastes.** Industrial wastes are liquid wastes resulting from the processes employed in industrial establishments and are free of fecal matter.

**Insanitary.** Contrary to sanitary principles—injurious to health.

**Interceptor.** An interceptor is a device designed and installed so as to separate and retain deleterious, hazardous, or undesirable matter from normal wastes and permit normal sewage or liquid wastes to discharge into the disposal terminal by gravity.

**Leader.** A leader (downspout) is the water conductor from the roof to the building storm drain, combined building sewer, or other means of disposal.

**Liquid Waste.** Liquid waste is the discharge from any fixture, appliance, or appurtenance, in connection with a plumbing system which does not receive fecal matter.

**Load Factor.** Load factor is the percentage of the total connected fixture unit flow rate which is likely to occur at any point in the drainage system. It varies with the type of occupancy, the total flow unit above this point being considered, and with the probability factor of simultaneous use.

**Local Ventilating Pipe.** A local ventilating pipe is a pipe on the fixture side of the trap through which vapor or foul air is removed from a room or fixture.

**Loop Vent.** A loop vent is the same as a circuit vent except that it loops back and connects with a stack vent instead of a vent stack.

**Main.** The main of any system of continuous piping is the principal artery of the system, to which branches may be connected.

**Main Sewer.** See Public Sewer.

**Main Vent.** The main vent is the principal artery of the venting system, to which vent branches may be connected.

**May.** The word "may" is a permissive term.

**Offset.** An offset in a line of piping is a combination of elbows or bends which brings one section of the pipe out of line but into a line parallel with the other section.

**Person.** Person is a natural person, his heirs, executors, administrators, or assigns; and includes a firm, partnership or corporation, its or their successors or assigns. Singular includes plural; male includes female.

**Pitch.** See Grade.

**Plumbing.** Plumbing is the work or business of installing in buildings and on premises the pipes, fixtures, and other apparatus for supplying water and for removing liquid and water-borne wastes. The term is also used to denote the installed fixtures, drainage, vent, and water distribution systems of buildings and premises. The term does not include the community water supply distribution system.

**Plumbing Fixtures.** Plumbing fixtures are installed receptacles, devices, or appliances which are supplied with water or which receive or discharge liquids or liquid-borne wastes, with or without discharge into the drainage system with which they may be directly or indirectly connected.

**Plumbing Inspector.** See Administrative Authority.



**Plumbing System.** The plumbing system includes the drainage and vent system; the water supply distributing pipes; the fixtures and fixture traps; and the storm water drainage; with their devices, appurtenances, and connections. The term does not include the community water supply distributing pipes.

**Pool.** A pool is a water receptacle used for swimming or as a plunge or other bath, designed to accommodate more than one bather at a time.

**Potable Water.** Potable water is water which is satisfactory for drinking, culinary, and domestic purposes, and meets the requirements of the health authority having jurisdiction.

**Private or Private Use.** In the classification of plumbing fixtures, private applies to fixtures in residences and apartments and to fixtures in private bathrooms of hotels and similar installations where the fixtures are intended for the use of a family or an individual.

**Private Sewer.** A private sewer is a sewer privately owned and not directly controlled by public authority.

**Public or Public Use.** In the classification of plumbing fixtures, public applies to fixtures in general toilet rooms of schools, gymnasiums, hotels, railroad stations, public buildings, bars, public comfort stations, or places to which the public is invited or which are frequented by the public without special permission or special invitation, and other installations (whether pay or free) where a number of fixtures are installed so that their use is similarly unrestricted.

**Public Official.** See Administrative Authority.

**Public Sewer.** A public sewer is a common sewer directly controlled by public authority.

**Relief Vent.** A relief vent is a vent the primary function of which is to provide circulation of air between drainage and vent systems.

**Return Offset.** A return offset is a double offset installed so as to return the pipe to its original alignment.

**Revent Pipe.** A revent pipe (sometimes called an individual vent) is that part of a vent pipe line which connects directly with an individual waste or group of wastes, underneath or back of the fixture, and extends either to the main or branch vent pipe.

**Rim.** A rim is an unobstructed open edge of a fixture.

**Riser.** A riser is a water-supply pipe which extends vertically one full story or more to convey water to branches or fixtures.

**Roof Drain.** A roof drain is a drain installed to receive water collecting on the surface of a roof and to discharge it into the leader (downspout).

**Roughing-in.** Roughing-in is the installation of all parts of the plumbing system which can be completed prior to the installation of fixtures. This includes drainage, water-supply, and vent piping, and the necessary fixture supports.

**Sand Interceptor.** See Interceptor.

**Sanitary Sewer.** A sanitary sewer is a pipe which carries sewage and excludes storm, surface, and ground water.

**Secondhand.** Secondhand as applied to material or plumbing equipment is that which has been installed, and has been used, removed, and passed to another ownership or possession.

**Separator.** See Interceptor.

**Sewage.** Sewage is any liquid waste containing animal or vegetable matter in suspension or solution, and may include liquids containing chemicals in solution.

**Shall.** The word "shall" is a mandatory term.

**Side Vent.** A side vent is a vent connecting to the drain pipe through a fitting at an angle not greater than 45° to the vertical.

**Size of Pipe and Tubing.** See Diameter.

**Slope.** See Grade.

**Soil Pipe.** A soil pipe is any pipe which conveys the discharge of water closets, urinals, or fixtures having similar functions, with or

without the discharge from other fixtures to the building drain or building sewer.

**Soil Vent.** See Stack-vent.

**Special Waste Pipe.** See Section P9.

**Stack.** A stack is the vertical main of a system of soil, waste, or vent piping.

**Stack Group.** Stack group is a term applied to the location of fixtures in relation to the stack so that by means of proper fittings, vents may be reduced to a minimum.

**Stack-vent.** A stack-vent (sometimes called a waste vent or soil vent) is the extension of a soil or waste stack above the highest horizontal drain connected to the stack.

**Stack Venting.** Stack venting is a method of venting a fixture or fixtures through the soil or waste stack.

**Storm Drain.** See Building Storm Drain.

**Storm Sewer.** A storm sewer is a sewer used for conveying rain water, surface water, condensate, cooling water, or similar liquid wastes, exclusive of sewage and industrial waste.

**Subsoil Drain.** A subsoil drain is a drain which receives only sub-surface or seepage water and conveys it to a place of disposal.

**Sump.** A sump is a tank or pit which receives sewage or liquid waste, located below the normal grade of the gravity system and which must be emptied by mechanical means.

**Supports.** Supports, hangers, and anchors are devices for supporting and securing pipe and fixtures to walls, ceilings, floors, or structural members.

**Trap.** A trap is a fitting or device so designed and constructed as to provide, when properly vented, a liquid seal which will prevent the back passage of air without materially affecting the flow of sewage or waste water through it.

**Trap Seal.** The trap seal is the maximum vertical depth of liquid that a trap will retain, measured between the crown weir and the top of the dip of the trap.

**Vacuum Breaker.** See Backflow Preventer.

**Vent Pipe.** See Vent System.

**Vent Stack.** A vent stack is a vertical vent pipe installed primarily for the purpose of providing circulation of air to and from any part of the drainage system.

**Vent System.** A vent system is a pipe or pipes installed to provide a flow of air to or from a drainage system or to provide a circulation of air within such system to protect trap seals from siphonage and back pressure.

**Vertical Pipe.** A vertical pipe is any pipe or fitting which is installed in a vertical position or which makes an angle of not more than 45° with the vertical.

**Waste.** See Liquid Waste and Industrial Wastes.

**Waste Pipe.** A waste pipe is a pipe which conveys only liquid waste, free of fecal matter.

**Water-distributing Pipe.** A water-distributing pipe in a building or premises is a pipe which conveys water from the water-service pipe to the plumbing fixtures and other water outlets.

**Water Main.** The water (street) main is a water-supply pipe for public or community use.

**Water Outlet.** A water outlet, as used in connection with the water distributing system, is the discharge opening for the water (1) to a fixture; (2) to atmospheric pressure (except into an open tank which is part of the water-supply system); (3) to a boiler or heating system; (4) to any water-operated device or equipment requiring water to operate, but not a part of the plumbing system.

**Water Riser Pipe.** See Riser.

**Water-service Pipe.** The water-service pipe is the pipe from the water main or other source of water supply to the building served.

**Water-supply System.** The water-supply system of a building or

premises consists of the water-service pipe, the water-distributing pipes, and the necessary connecting pipes, fittings, control valves, and all appurtenances in or adjacent to the building or premises.

**Wet Vent.** A wet vent is a vent which receives the discharge from wastes other than water closets.

**Yoke Vent.** A yoke vent is a pipe connecting upward from a soil or waste stack to a vent stack for the purpose of preventing pressure changes in the stacks.

## **SECTION P2—GENERAL REGULATIONS**

### **P2.1 APPROVED MATERIALS AND METHODS**

P2.1.1 All plumbing systems, including repairs and additions, hereafter installed shall conform to the provisions of this code.

### **P2.2 DRAINAGE PIPING**

P2.2.1 Horizontal drainage piping shall be run in practical alignment at a uniform grade. See Section P9 for specific slopes.

### **P2.3 PIPE TRENCHES**

P2.3.1 Water-service pipe or any underground water pipes shall not be run or laid in the same trench as a building sewer or drainage piping, except as provided in Section P8.

### **P2.4 CHANGES IN DIRECTION**

P2.4.1 **Fittings.** Changes in direction in drainage piping shall be made by the appropriate use of 45° wyes, long or shortsweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings. Single and double sanitary tees and short quarter bends may be used in drainage line only where the direction of flow is from the horizontal to the vertical. P-traps and drum traps shall be connected to vertical stacks by sanitary tees only.

P2.4.2 **Tees and Crosses.** Tees and crosses shall not be used in the horizontal drainage system.

P2.4.3 **Short Sweeps.** Short sweeps not less than 2 inches in diameter may be used in soil and waste lines where the change in direction of flow is from either the horizontal to the vertical or from the vertical to the horizontal and may be used for making necessary offsets between the ceiling and the next floor above.

### **P2.5 FITTINGS AND CONNECTIONS**

P2.5.1 **Fittings Prohibited.** No double-hub fitting shall be used as a drainage fitting. No running threads, bands, or saddles shall be used in the drainage system. No drainage or vent piping shall be drilled or tapped.

P2.5.2 **Heel or Side-inlet Bend.** A heel or side-inlet quarter bend shall not be used as a vent when the inlet is placed in a horizontal position.

P2.5.3 **Obstruction to Flow.** No fitting, connection, device, or method of installation which obstructs or retards the flow of water, wastes, sewage, or air in the drainage or venting systems in an amount greater than the normal frictional resistance to flow, shall be used unless it is indicated as acceptable in this code or is approved by the administrative authority as having a desirable and acceptable function and as of ultimate benefit to the proper and continuing functioning of the plumbing system. The enlargement of a 3-inch closet bend or stub to 4 inches shall not be considered an obstruction.

### **P2.6 REPAIR AND ALTERATIONS**

P2.6.1 **Existing Buildings.** In existing buildings or premises in which plumbing installations are to be altered, repaired, or renovated, necessary deviations from the provisions of this Code may be permitted, provided such deviations conform to the intent of the Code and are approved in writing by the administrative authority.

P2.6.2 **Health or Safety.** Wherever compliance with all the provisions of this Code fails to eliminate or alleviate a nuisance which may involve health or safety hazards, the owner or his agent shall be ordered by the administrative authority to install such additional

plumbing or drainage equipment as may be necessary to abate such nuisance.

## **P2.7 SEWER AND WATER PIPES**

P2.7.1 Water service pipes, or any underground water pipes, shall not be run or laid in the same trench as the building sewer or drainage piping, except as provided for in Paragraph P8.3.1 of this chapter.

## **P2.8 TRENCHING, EXCAVATION, AND BACKFILL**

P2.8.1 **Support of Piping.** All piping in trenches shall be supported throughout its entire length.

P2.8.2 **Tunneling and Driving.** Tunneling may be done in yards, courts, or driveways of any building site. When pipes are driven, the drive pipe shall be at least one size larger than the pipe to be laid.

P2.8.3 **Open Trenches.** All excavations required to be made for the installation of a building-drainage system, or any part thereof within the walls of a building, shall be open trench work and shall be kept open until the piping has been inspected, tested, and accepted.

P2.8.4 **Mechanical Excavation.** Mechanical means of excavation may be used.

P2.8.5 **Backfilling.** Adequate precaution shall be taken to ensure proper compactness of backfill around piping without damage to such piping.

P2.8.6 **Material Backfill.** Trenches shall be backfilled in thin layers to 12" above the top of the piping with clean earth which shall not contain stones, boulders, cinder-fill, or other materials which would damage or break the piping or cause corrosive action. Mechanical devices such as bulldozers, graders, etc., may then be used to complete backfill to grade. Fill shall be properly compacted.

## **P2.9 STRUCTURAL SAFETY**

P2.9.1 In the process of installing or repairing any part of a plumbing and drainage installation, the finished floors, walls, ceilings, tile work, or any other part of the building or premises which must be changed or replaced shall be left in a safe structural condition as determined by the proper administrative authority.

## **P2.10 WORKMANSHIP**

P2.10.1 Workmanship shall conform to accepted good practice.

P2.10.2 All workmanship shall be of such character as to accomplish the results sought to be obtained in all sections of this Code.

## **P2.11 PROTECTION OF PIPES**

P2.11.1 **Breakage and Corrosion.** Pipes passing under or through walls shall be protected from breakage. Pipes passing through or under cinder or concrete or other corrosive material, shall be protected against external corrosion by protective coating, wrapping, or other means which will prevent such corrosion.

P2.11.2 **Cutting or Notching.** No structural member shall be weakened or impaired by cutting, notching, or otherwise, except to the extent permitted by the proper administrative authority.

P2.11.3 **Pipes Through Footings or Foundation Walls.** A soil, or waste pipe, or building drain passing under a footing or through a foundation wall shall be provided with a relieving arch, or there shall be built into the masonry wall an iron pipe sleeve two pipe sizes greater than the pipe passing through, and in accordance with provisions of P2.14.

P2.11.4 **Freezing.** No water, soil or waste pipe shall be installed or permitted outside a building or in an exterior wall unless adequate provision is made to protect same from freezing where necessary.

## **P2.12 DAMAGE TO DRAINAGE SYSTEM OR PUBLIC SEWER**

P2.12.1 It shall be unlawful for any person to deposit by any means into the building drainage system or sewer any ashes; cinders; rags; inflammable, poisonous, or explosive liquids; gases; oils; grease; or any other material which would or could obstruct, damage, or overload such system or sewer.

P2.13 **INDUSTRIAL WASTES.** Wastes detrimental to the public sewer system or detrimental to the functioning of the sewage-treatment

plant shall be treated and disposed of as found necessary and directed by the administrative authority or other authority having jurisdiction.

**P2.14 SLEEVES.** Annular space between sleeves and pipes shall be filled or tightly calked with coal tar or asphaltum compound, lead, or other material found equally effective and approved as such by the administrative authority.

**P2.15 HORIZONTAL PIPES SUPPORT.** Horizontal piping shall be supported at points sufficiently close to keep it in alignment and prevent sagging but in no case at more than 5 foot intervals for cast-iron soil pipe and not exceeding 10 feet for other piping. Pipes in the ground shall be laid on a firm bed for their entire length.

**P2.16 VERTICAL PIPES SUPPORT.** Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents but in no case less than at every other story height.

**P2.17 BASE OF STACKS.** Bases of stacks shall be supported on substantial masonry piers, or metal supports, or by hangars, as approved by the administrative authority.

**P2.18 HANGERS AND ANCHORS.** Hangars and anchors shall be metal of sufficient strength to support the pipe and its contents. They shall be securely attached to the building construction.

**P2.19 STRAINS AND STRESSES.** All piping in a plumbing system shall be installed without undue strains and stresses and provision made for expansion, contraction, and structural settlement.

**P2.20 DEAD ENDS.** In the installation or removal of any part of a drainage system, dead ends shall be avoided except where necessary to extend a cleanout so as to be accessible.

**P2.21 TOILET FACILITIES FOR WORKMEN.** Suitable approved toilet facilities shall be provided and maintained in a sanitary condition for the use of workmen during construction.

#### **P2.22 LOCATION OF FIXTURES**

##### **P2.22.1 Ventilation and Illumination.**

(a) Every bathroom or water-closet combination shall be provided with light and ventilation by one or more windows opening to the outside of the building, or shall be ventilated by other approved means of ventilation.

(b) Artificial light to furnish not less than 4 foot-candles shall be provided.

(c) All bathrooms and water-closet compartments which are ventilated by mechanical ventilation shall have fixed openings from adjacent rooms or corridors or from other approved sources ample to provide a sufficient inflow of air to make exhaust ventilation effective.

(d) Where a water-closet in a bathroom or water-closet compartment is completely enclosed by partitions, such enclosure shall be separately lighted and ventilated.

**P2.23 VENTILATION DUCTS.** Ventilation ducts from fixtures and toilet rooms shall be exhausted to the outer air or form an independent system.

##### **P2.24 RATPROOFING**

**P2.24.1 Exterior Openings.** All exterior openings provided for the passage of piping shall be properly sealed with snugly fitting collars of metal or other approved ratproof material securely fastened into place.

**P2.24.2 Interior Openings.** Interior openings through walls, floors and ceilings shall be ratproofed in accordance with direction of the administrative authority.

## **SECTION P3—MATERIALS, WEIGHT AND QUALITY**

### **P3.1 MATERIALS**

**P3.1.1 Minimum Standards.** The materials listed in this chapter shall conform at least to the standards cited when used in the construction, installation, alteration, or repair of any part of a plumbing and drainage system constructed, except that the administrative

authority may allow the extension, addition, or relocation of existing soil, waste, or vent pipes with materials of like grade or quality, as permitted in Paragraph P2.6.

**P3.1.2 Use of Materials.** Each material listed in Table P3.5 shall conform to at least one of the standards cited opposite it. Its use shall be further governed by the requirement imposed in other chapters of the Code. Materials not included in the table shall be used only as provided for in Paragraph P3.1.1. Materials shall be free of manufacturing defects or damage, however occasioned, which would, or would tend to, render such materials defective, insanitary, or otherwise improper to accomplish the purpose of this Code.

**P3.1.3 Specifications for Materials.** Standard specifications for materials for plumbing installations are listed in Table P3.5. Products conforming at least to any of the specifications listed for a given material shall be considered acceptable.

**Note 1.** Abbreviations used in Table P3.5 refer to standards or specifications as identified below.

**ANSI** Standards approved by the American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018.

**ASTM** Standards and Tentative Standards published by the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pennsylvania, 19103.

**FS** Federal Specifications published by the Federal Specifications Board and obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402

**AWWA** Standards and Tentative Standards published by the American Water Works Association, 2 Park Ave., New York, N.Y. 10016.

**CS** Commercial Standards representing recorded voluntary recommendations of the trade, issued by the United States Department of Commerce and obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

**MSS** Standards published by the Manufacturers Standardization Society of the Valve and Fittings Industry, 420 Lexington Avenue, New York 17, New York.

**SPR** Simplified Practice Recommendations representing recorded recommendations of the trade and issued by the U. S. Department of Commerce, Washington 25, D. C.

**Note 2.** ASTM Standards are issued under fixed designations; the final number indicates the year of original adoption, or in the case of revision, the year of last revision. T indicates Tentative. In the CS series of standards, also, the final number indicates the year of issue. For Federal Specifications, the year indicated in Table P3.5 is that of the date of issue or that of the latest revision or amendment.

**Note 3.** All standards and specifications for materials are subjected to change. Designations carrying indication of the year of issue may thus become obsolete. Table P3.5 gives the full designations of standards current at the time this Code is printed. As provided in Paragraph P3.4.1, the administrative authority is required to review this table and have it brought up to date at intervals not exceeding two years.

**P3.1.4 Identification of Materials.** Each length of pipe, and each pipe fitting, trap, fixture, and device used in a plumbing system shall have cast, stamped, or indelibly marked on it the maker's mark or name, the weight, and the quality of the product, when such marking is required by the approved standard which applies.

**P3.1.5 Used Materials.** Used materials are prohibited, except as specifically permitted in other sections of this Code.

## **P3.2 SPECIAL MATERIALS**

**P3.2.1 Lead.** See Table P3.5. Sheet lead shall be not less than the following:

For safe pans—not less than 4 pounds per square foot.

For flashings of vent terminals—not less than 2½ pounds per square foot.

**P3.2.2 Calking Ferrules.** Brass calking ferrules shall be of red brass pipe conforming to F.S. WW-P-351 or of heavy cast red brass with weights and dimensions in accordance with Table P3.2.2. Seamless copper ferrules may be used in lieu of cast brass provided they correspond in size and weight.

**TABLE P3.2.2**

| Pipe Size<br>Inches | Actual Inside<br>Diameter Inches | Length<br>Inches | Weight       |
|---------------------|----------------------------------|------------------|--------------|
| 2                   | 2¼                               | 4½               | 1 lb.        |
| 3                   | 3¼                               | 4½               | 1 lb. 12 oz. |
| 4                   | 4¼                               | 4½               | 2 lb. 8 oz.  |

**P3.2.3 Soldering Bushings.** Soldering bushings shall be of red brass in accordance with the following.

| Pipe sizes<br>(inches) | Minimum<br>weight each<br>Lb. Oz. | Pipe sizes<br>(inches) | Minimum<br>weight each<br>Lb. Oz. |
|------------------------|-----------------------------------|------------------------|-----------------------------------|
| 1½                     | 0 6                               | 2½                     | 1 6                               |
| 1½                     | 0 8                               | 3                      | 2 0                               |
| 2                      | 0 14                              | 4                      | 3 8                               |

**P3.2.4 Floor Flanges.** Floor flanges for water closets or similar fixtures shall be not less than ⅛-inch thick for brass, ¼-inch thick and not less than 2-inch calking depth for cast iron or galvanized malleable iron. If of hard lead, they shall weigh not less than 1 pound 9 ounces and be composed of lead alloy with not less than 7.75 per cent antimony by weight.

Flanges shall be soldered to lead bends, or shall be calked or screwed to other metal.

Closet screws and bolts shall be brass.

**P3.2.5 Cleanouts.**

- Cleanout plugs shall be of brass, plastic or stainless steel.
- Plugs may have raised square heads or countersunk.
- Countersunk heads should be used where raised heads may cause a hazard.

**P3.3 NEW MATERIALS AND METHODS**

**P3.3.1 Approval.** The use of any material, device, method of assemblage, installation, appurtenance, which the administrative authority approves in writing may be permitted.

**P3.4 APPROVED MATERIALS**

**P3.4.1 Periodic Review.** Table P3.5 shall be reviewed by the administrative authority and brought up to date at intervals not exceeding two years.

**P3.4.2 Specific Usage.** Each section of the Code indicates specifically the type of material permitted for the various parts of the plumbing system. Table P3.5 provides the specifications for each of those materials.

**TABLE P3.5 Standards for Plumbing Materials**

| Materials                                                                   | See Sections P3.1.3 and P3.4.2 |                      |                 | Other Standards—<br>Remarks |
|-----------------------------------------------------------------------------|--------------------------------|----------------------|-----------------|-----------------------------|
|                                                                             | ANSI                           | ASTM                 | FS              |                             |
| <b>Nonmetallic Piping</b>                                                   |                                |                      |                 |                             |
| Asbestos Cement Pressure Water Pipe -----                                   |                                | C296-71              | SS-P-351c(1968) |                             |
| Asbestos Cement Building Sewer Pipe -----                                   |                                | C644-71 <sup>1</sup> |                 |                             |
| Asbestos Cement Sewer Pipe -----                                            |                                | C428-71              | SS-P-331c(1967) |                             |
| Bituminized Fiber Sewer Pipe<br>and Fittings -----                          |                                | D1861-69             |                 |                             |
| Clay Drain Tile -----                                                       | A6.1-1963                      | C4-62                |                 |                             |
| Clay Sewer Pipe -----                                                       | A106.3-1967                    | C13-69               |                 | CS 224-60                   |
|                                                                             |                                | C200-69              |                 | Extra Strength              |
| Concrete Sewer Pipe -----                                                   |                                | C14-70               |                 |                             |
|                                                                             |                                | C76-70               |                 | Reinforced                  |
| Acrylonitrile-Butadiene-Styrene (ABS)<br>Plastic Composite Sewer Pipe ----- |                                | D2680-70             |                 |                             |
| ABS Plastic Pipe and Fittings (DWV) -----                                   |                                | D2661-68             | L-P-322a-1966   | NSF 14                      |
| ABS Plastic Pipe (SDR-PR & Class T) -----                                   | B72.3-1967                     | D2282-71             |                 | NSF 14                      |
| ABS Plastic Pipe Schedules 40 and 80 -----                                  |                                | D1527-71             |                 | NSF 14                      |
|                                                                             |                                |                      |                 | CS 218-59                   |
| ABS Plastic Pipe Fittings<br>Socket Type Schedule 40 -----                  |                                | D2468-69             |                 | NSF 14                      |
| ABS Plastic Pipe Fittings<br>(Threaded Type) Schedule 80 -----              |                                | D2465-69             |                 | NSF 14                      |
| ABS Plastic Sewer Pipe -----                                                |                                | D2751-69             |                 |                             |
| ABS Plastic Pipe Fittings<br>Socket Type Schedule 80 -----                  |                                | D2469-69             |                 | NSF 14                      |
| Polybutylene (PB) Plastic Pipe (SDR-PR) -----                               |                                | D2662-68             |                 | NSF 14                      |
| PB Plastic Tubing -----                                                     |                                | D2666-68T            |                 | NSF 14                      |
| Polyethylene (PE) Plastic Pipe<br>and Fittings -----                        | B72.1-1967                     | D2239-69             | L-P-315a-1966   | NSF 14                      |



|                                                                            |               |           |               |              |
|----------------------------------------------------------------------------|---------------|-----------|---------------|--------------|
| PE Plastic Tubing -----                                                    |               | D2737-70  |               | NSF 14       |
| PE Plastic Pipe, Schedule 40 -----                                         |               | D2104-68  |               | NSF 14       |
|                                                                            |               |           |               | CS 197-60    |
| PE Plastic Pipe, Schedule 40 and 80<br>(outside diam.) -----               |               | D2447-68  |               | NSF 14       |
| Polyvinyl Chloride (PVC) Plastic Pipe<br>and Fittings (DWV) -----          | B72.2-1967    | D2665-68  | L-P-320a-1966 | NSF 14       |
| PVC Plastic Pipe (SDR-PR & Class T) -----                                  |               | D2241-69  |               | NSF 14       |
| PVC Plastic Pipe Schedules 40, 80, 120 -----                               |               | D1785-68  |               | NSF 14       |
| PVC Plastic Pipe Fittings<br>Schedule 80 (Threaded) -----                  |               | D2464-69  |               | NSF 14       |
| PVC Plastic Pipe Fittings<br>Schedule 40 (Socket Type) -----               |               | D2466-69  |               | NSF 14       |
| PVC Plastic Pipe Fittings<br>Schedule 80 (Socket Type) -----               |               | D2467-69  |               | NSF 14       |
| PVC Plastic Sewer Pipe -----                                               |               | D2729-68  |               |              |
| PVC Plastic Tubing -----                                                   |               | D2740-68  |               | NSF 14       |
| Solvent Cement for ABS Plastic Pipe<br>and Fittings -----                  |               | D2235-67  |               | NSF 14       |
| Solvent Cements for PVC Plastic Pipe<br>and Fittings -----                 |               | D2564-67  |               | NSF 14       |
| Styrene-Rubber Plastic Drain and<br>Building Sewer Pipe and Fittings ----- |               | D2852-69T |               |              |
| <b>Ferrous Pipe and Fittings</b>                                           | B16.1-1967    |           |               | AWWA C110-71 |
| Cast Iron Pipe Flanges and<br>Flanged Fittings -----                       | A21.10-1971   |           |               | AWWA C106-70 |
| Cast Iron Pressure Fittings<br>(Gray Iron and Ductile Iron) -----          | A21.6-1970    |           |               | AWWA C108-70 |
| Cast Iron Pressure Pipe (Water) -----                                      | A21.8-1970    |           |               | AWWA C112-70 |
| Cast Iron Screwed Fittings (Water) -----                                   | A21.12-1971   |           |               | CS 188-66    |
| Cast Iron Soil Pipe and Fittings -----                                     | B16.4-1971    | A74-69    |               |              |
| Cast Iron Soil Pipe (Threaded) -----                                       | A112.5.1-1971 |           |               |              |
|                                                                            | A40.5-43      |           |               |              |

TABLE P3.5—(Cont'd)

| Materials                                                              | See Sections P3.1.3 and P3.4.2              |          |                                  | Other Standards—<br>Remarks |
|------------------------------------------------------------------------|---------------------------------------------|----------|----------------------------------|-----------------------------|
|                                                                        | ANSI                                        | ASTM     | FS                               |                             |
| Cast Iron Threaded Drainage Fittings -----                             | B16.12-1971                                 |          | WW-P-501d-1967<br>WW-P-401c-1967 | AWWA C151-70                |
| Ductile Iron Pressure Pipe -----                                       | A21.51-1971                                 | A120-69  |                                  | AWWA H1-67                  |
| Galvanized Pipe and Fittings -----                                     | B36.20-1966                                 |          |                                  |                             |
| Gray Cast Iron Pipe -----                                              | A21.1-1967                                  |          | WW-P-491b-1967                   | CISPI-301-72 <sup>2</sup>   |
| Hubless Cast Iron Sanitary System<br>with No Hub System Fittings ----- |                                             |          | WW-P-406b(1)-1964                |                             |
| Malleable Iron Fittings (150 lbs.) -----                               | B16.3-1971                                  |          |                                  | AWWA C111-64                |
| Rubber Gasket Joint for Cast Iron Pipe -----                           | A21.11-1964                                 |          |                                  | AWWA C111-64                |
| Rubber Gasket Joints for Cast Iron<br>Pressure Pipe -----              | A21.11-1964                                 |          | WW-P-521e-1964                   |                             |
| Stainless Steel Pipe -----                                             | B36.19-1965                                 | A53-71   |                                  | AWWA C202-64                |
| Steel Pipe -----                                                       |                                             |          |                                  |                             |
| Steel Pipe Flanges and Fittings -----                                  | B16.5-1968<br>(Sup. B16.5a &<br>16.5b-1971) |          |                                  |                             |
| Wrought Iron Pipe -----                                                | B36.2-1969                                  | A72-68   |                                  |                             |
| <b>Nonferrous Pipe and Fittings</b>                                    |                                             |          |                                  |                             |
| Brass Fittings and Flared Copper Tube -----                            | B16.26-1967                                 |          |                                  |                             |
| Bronze Flanges and Flanged Fittings -----                              | B16.24-1971                                 |          |                                  |                             |
| Cast Bronze Fittings 150 and 300 lbs. -----                            | B16.15-1971                                 |          |                                  |                             |
| Cast Bronze Solder-Joint<br>Drainage Fittings (DWV) -----              | B16.23-1969                                 |          |                                  |                             |
| Cast Bronze Solder-Joint<br>Pressure Fittings -----                    | B16.18-1963                                 | B306-71b |                                  |                             |
| Copper Drainage Tube (DWV) -----                                       | H23.6-1967                                  |          |                                  |                             |

|                                                                                             |                         |         |                   |                                              |
|---------------------------------------------------------------------------------------------|-------------------------|---------|-------------------|----------------------------------------------|
| General Requirements for Wrought<br>Seamless Copper and Copper Alloy<br>Pipe and Tube ----- | H23.4-1971 <sup>3</sup> | B251-71 | WW-P-325a-1967    |                                              |
| Lead Pipe and Traps -----                                                                   |                         |         |                   |                                              |
| Seamless Brass Tube -----                                                                   | H36.1-1969              | B135-71 |                   |                                              |
| Seamless Copper Pipe -----                                                                  | H26.1-1967              | B42-71  |                   |                                              |
| Seamless Copper Tube -----                                                                  | H23.3-1970              | B75-71  |                   |                                              |
| Seamless Copper Water Tube (K,L,M) -----                                                    | H23.1-1970              | B88-71  |                   |                                              |
| Seamless Red Brass Pipe -----                                                               | H27.1-1967              | B43-70  |                   |                                              |
| Threadless Copper Pipe (TP) -----                                                           | H26.2-1967              | B302-70 |                   |                                              |
| Wrought Copper and Bronze Solder-Joint<br>Drainage Fittings -----                           | B16.29-1966             |         |                   |                                              |
| Wrought Copper and Bronze Solder-Joint<br>Pressure Fittings -----                           | B16.22-1963             |         |                   |                                              |
| <b>Miscellaneous</b>                                                                        |                         |         |                   |                                              |
| Air Gap Standards -----                                                                     | A40.4-1942              | A525-71 | QQ-C-40-1963      | AWWA C600-64<br>AWWA C104-71<br>AWWA C203-66 |
| Backflow Preventors -----                                                                   | A40.6-1943              |         |                   |                                              |
| Caulking Lead -----                                                                         |                         |         |                   |                                              |
| Caulking Materials (Water) -----                                                            |                         |         |                   |                                              |
| Cement Lining for Cast Iron Pipe -----                                                      | A21.4-1971              |         |                   |                                              |
| Coal Tar Enamel (Protective Coating) -----                                                  |                         |         |                   |                                              |
| Ferrous Plugs, Bushings and Locknuts<br>with Pipe Threads -----                             | B16.4-1971              |         |                   |                                              |
| Fixture Setting Compound -----                                                              |                         |         |                   |                                              |
| Floor Drains -----                                                                          | A112.21.1-1968          |         |                   |                                              |
| Galvanized Iron and Steel Sheets -----                                                      |                         |         |                   |                                              |
| Grease Interceptors -----                                                                   |                         |         |                   |                                              |
| Nipples, Pipe, Threaded -----                                                               |                         |         | HH-C-536a-1954    | PDI-G101 <sup>4</sup>                        |
| Pipe Fittings, Bronze and Ferrous (Bushings,<br>Plugs, and Locknuts) Threaded -----         |                         |         | WW-N-351b-1967    |                                              |
| Precast Jointing Material for Clay Pipe -----                                               |                         |         | WW-P-471a(2)-1964 |                                              |
| Rubber Gasket for Cast Iron Soil Pipe<br>and Fittings -----                                 |                         | C564-70 |                   | CS 181-52                                    |

TABLE P3.5—(Con'd)

| Materials                                                                             | See Sections P3.1.3 and P3.4.2                                                  |                     |                  | Other Standards—<br>Remarks |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------|------------------|-----------------------------|
|                                                                                       | ANSI                                                                            | ASTM                | FS               |                             |
| Sheet Brass -----                                                                     |                                                                                 | B36-71              |                  |                             |
| Sheet Copper -----                                                                    |                                                                                 | B152-71a<br>B248-71 |                  |                             |
| Sheet Lead -----                                                                      |                                                                                 |                     | QQ-L-201f-1965   |                             |
| Soft Solder -----                                                                     |                                                                                 | B32-70              |                  |                             |
| Unions, Brass or Bronze, 250 lbs. -----                                               |                                                                                 |                     | WW-U-516a-1967   |                             |
| Unions, Malleable Iron or Steel, 300 lbs. -----                                       |                                                                                 |                     | WW-U-536(1)-1933 |                             |
| Valves, Ball -----                                                                    |                                                                                 |                     | WW-V-35a-1965    |                             |
| Valves, Bronze (Check, Angle, Globe),<br>Threaded and Flanged, 125 and 150 lbs. ----- |                                                                                 |                     | WW-V-51a(2)-1954 |                             |
| Valves, Bronze, Gate, 125 and 150 lbs.,<br>Threaded and Flanged -----                 |                                                                                 |                     | WW-V-54c-1966    |                             |
| Valves, Cast Iron, Gate, 125 and 250 lbs.,<br>Threaded and Flanged -----              |                                                                                 |                     | WW-V-58a-1966    |                             |
| Water Hammer Arresters -----                                                          | A112.26.1-1969                                                                  |                     |                  | AWWA C111-64                |
| <b>Plumbing Fixtures</b>                                                              |                                                                                 |                     |                  |                             |
| Drinking Fountains -----                                                              | Z4.2-1942                                                                       |                     |                  |                             |
| Drinking Water Coolers, Self-Contained<br>Mechanically Refrigerated -----             | A112.11.1-1968                                                                  |                     |                  |                             |
| Earthenware (Vitreous Glazed)<br>Plumbing Fixtures -----                              |                                                                                 |                     |                  | CS 111-43                   |
| Enameled Cast Iron Plumbing Fixtures -----                                            |                                                                                 |                     |                  | CS 77-63                    |
| Hot Water Heaters -----                                                               | C72.1-1949<br>Z21.10.1-1971<br>Z21.10.2-1962<br>Z21.10.22-1963<br>Z21.10.3-1971 |                     |                  |                             |

|                                                                                                |             |  |                |                       |
|------------------------------------------------------------------------------------------------|-------------|--|----------------|-----------------------|
| Gel-Coated Glass-Fiber Reinforced Polyester Resin Bathtub Units .....                          | Z124.1-1967 |  |                |                       |
| Gel-Coated Glass-Fiber Reinforced Polyester Resin Shower Receptor and Shower Stall Units ..... | Z124.2-1967 |  |                |                       |
| Plumbing Fixtures for Land Use .....                                                           |             |  | WW-P-541c-1971 |                       |
| Porcelain Enameled Formed Steel Plumbing Fixtures .....                                        |             |  |                | PS 5-66 <sup>6</sup>  |
| Stainless Steel Plumbing Fixtures .....                                                        |             |  |                | CS 243-62             |
| Vitreous China Plumbing Fixtures .....                                                         |             |  |                | CS 20-63              |
| Cultured Marble Lavatories .....                                                               |             |  |                | PS 18-66 <sup>6</sup> |

<sup>1</sup>Asbestos cement building sewer pipe in sizes 4", 5", and 6", classes 1500, 2400, and 3300 shall meet a minimum crushing strength of 1500 pounds per ft. for class 1500, 2400 pounds per ft. for class 2400 and 3300 pounds per ft. for class 3300, when tested in accordance with section 10 of ASTM C500-70 "Methods of Testing Asbestos-Cement Pipe". Standard lengths shall be 5', 6.5', 10' and 13'.

<sup>2</sup>CISPI—Cast Iron Soil Pipe Institute Standard

<sup>3</sup>ANSI H23.4-1970 or ASTM B251-68a is applicable to and forms a part of the standards indicated.

<sup>4</sup>PDI—Plumbing and Drainage Institute Standard.

<sup>5</sup>National Bureau of Standards Product Standard.

<sup>6</sup>Standard of the International Association of Plumbing and Mechanical Officials, 5032 Alhambia Street, Los Angeles, Calif. 91609.

## SECTION P4—JOINTS AND CONNECTIONS

### P4.1 TIGHTNESS

P4.1.1 **Joints and Connections.** All joints and connections shall be made gastight and watertight. See Section P13.

### P4.2 TYPES OF JOINTS

P4.2.1 **Calked Joints.** Calked joints for cast-iron bell-and-spigot soil pipe shall be firmly packed with oakum or hemp and filled with molten lead not less than 1 inch deep. Lead shall be run in one pouring and calked tight. No paint, varnish or other coatings shall be permitted on the jointing material until after the joint has been tested and approved.

P4.2.2 **Threaded Joints.** All screw joints shall be American National Taper Pipe Thread, ASA B2.1-1945 or F.S. GGG-P 351a. All burrs shall be removed. Pipe ends shall be reamed or filed out to size of bore, and all chips shall be removed. Pipe joint cement and paint will be permitted only on male threads.

P4.2.3 **Wiped Joints.** Joints in lead pipe or fittings, or between lead pipe or fittings and brass or copper pipe, ferrules, solder nipples, bushings, or traps, shall be full-wiped joints. Wiped joints shall have an exposed surface on each side of a joint not less than  $\frac{3}{4}$ -inch and a minimum thickness at the thickest part of the joint not less than  $\frac{3}{8}$ -inch.

Joints between lead pipes and cast iron, steel, or wrought iron shall be made by means of a calking ferrule, soldering nipple, or bushing.

P4.2.4 **Soldered or Sweat Joints.** Soldered or sweat joints for tubing shall be made with approved fittings. Surfaces to be soldered or sweated shall be cleaned bright. The joints shall be properly fluxed and made with approved solder.

Joints in copper water tubing shall be made by the appropriate use of approved brass water fittings, properly sweated or soldered together.

P4.2.5 **Flared Joints.** All flared joints for soft-copper water tubing shall be made with fittings meeting approved standards. The tubing shall be expanded with a proper flaring tool.

P4.2.6 **Hot-poured Joints.** Hot-poured compound for clay or concrete sewer pipe shall not be water absorbent and when poured against a dry surface shall have a bond of not less than 100 pounds per square inch. All surfaces of the joint shall be cleaned and dried before pouring. If wet surfaces are unavoidable, a suitable primer shall be applied. Compound shall not soften sufficiently to destroy the effectiveness of the joint when subjected to a temperature of 160° F. nor be soluble in any of the waste carried by the drainage system. Approximately 25 per cent of the joint space at the base of the socket shall be filled with jute or hemp. A pouring collar, rope, or other device shall be used to hold the hot compound during pouring. Each joint shall be poured in one operation until the joint is filled. Joints shall not be tested until 1 hour after pouring.

P4.2.7 **Precast Joints.** Precast collars shall be formed in both the spigot and bell of the pipe in advance of use. Collar surfaces shall be conical with side slopes of 3° with the axis of the pipe, and the length shall be equal to the depth of the socket. Prior to making joint contact, surfaces shall be cleaned and coated with solvents and adhesives as recommended in the standard. When the spigot end is inserted in the collar, it shall bind before contacting the base of the socket. Material shall be inert and resistant to both acids and alkalis.

P4.2.8 **Brazed joints** shall be made in accordance with the provisions of Section 6 of the Code for Pressure Piping, ASA B31.1-1942 (with 1944 and 1947 Supplements).

P4.2.9 **Cement Mortar Joints.** Cement joints shall be used only when specifically permitted in other chapters of this Code or when approved by the administrative authority, as sufficient to accomplish the purpose of this Code. A layer of jute or hemp shall be inserted into the base of the joint space and rammed to prevent mortar from entering the interior of the pipe. Jute or hemp shall be dipped into a slurry sus-

pension of portland cement in water prior to insertion into bell. Not more than 25 per cent of the joint space shall be used for jute or hemp. The remaining space shall be filled in one continuous operation with a thoroughly mixed mortar composed of one part cement and two parts sand, with only sufficient water to make the mixture workable by hand. After one-half hour of setting, the joint shall be rammed around the entire periphery with a blunt tool to force the partially stiffened mortar into the joint and to repair any cracks formed during the initial setting period. The pipe interior shall be swabbed to remove any material which might have fallen into the interior. Additional mortar of the same composition shall then be troweled so as to form a 45° taper with the barrel of the pipe.

**P4.2.10 Burned Lead Joints.** Lead "burned" (welded) joints shall be lapped and the lead shall be fused together to form a uniform weld at least as thick as the lead being joined.

**P4.2.11 Asbestos Cement Sewer Pipe Joints.** Joints in asbestos cement pipe shall be made with sleeve couplings of the same composition as the pipe, sealed with rubber rings. Joints between asbestos cement pipe and metal pipe shall be made by means of an adapter coupling calked as required in Paragraph P4.2.1.

**P4.2.12 Bituminized Fiber Pipe Joints.** Joints in bituminized fiber pipe shall be made with tapered type couplings of the same material as the pipe. Joints between bituminized fiber pipe and metal pipe shall be made by means of an adapter coupling calked as required in Paragraph P4.2.1.

**P4.2.13 Elastomer Sleeve with Clamp Joints.** Joints in cast-iron soil pipe may be made by means of an approved elastomer sleeve secured by a stainless steel retaining clamp.

**P4.2.14 Elastomer Compression Joints.** Joints in cast-iron pipe may be made by the use of an approved elastomer gasket that is compressed when the spigot is inserted in the bell, when properly applied to suitable pipe and fittings.

**P4.2.15 Solvent Weld Joints.** All pipe cuts shall be square and smooth. All burrs shall be removed. All joining surfaces shall be free of foreign matter. No pipe shall be bent. Pipe shall be joined by approved fittings, and when joined shall be in alignment with proper slope, or plumb, if vertical. Pipe and fittings shall be so positioned that identifying marking shall be readily visible for inspection.

Solvent cement shall be lightly applied to the socket and more heavily to the male end of the pipe. The male end shall be inserted to the full depth of the socket. The excess solvent cement shall be immediately wiped off. No attempt to adjust a socket fitting shall be made after the solvent cement has set. (Depending on cement, temperature, and humidity, the time of initial setting ranges from 30 seconds to 2 minutes.)

#### **P4.3 USE OF JOINTS**

**P4.3.1 Clay Sewer Pipe.** Joints in vitrified clay pipe or between such pipe and metal pipe shall be made as provided in Paragraphs P4.2.6 and P4.2.7.

**P4.3.2 Concrete Sewer Pipe.** Joints in concrete sewer pipe or between such pipe and metal pipe shall be made as provided in Paragraphs P4.2.6 and P4.2.7.

**P4.3.3 Cast-Iron Pipe.** Joints in cast-iron pipe shall be calked, screwed, elastomer sleeve with clamp, or elastomer compression joints as provided in Paragraphs P4.2.1, P4.2.2, P4.2.13, P4.2.14.

**P4.3.4 Screw Pipe to Cast-Iron.** Joints between wrought-iron, steel, brass, or copper pipe, and cast-iron pipe shall be either calked or threaded joints made as provided in Paragraphs P4.2.1 and P4.2.2, or shall be made with approved adapter fittings.

**P4.3.5 Lead to Cast-Iron, Wrought-Iron or Steel.** Joints between lead and cast-iron, wrought-iron, or steel pipe shall be made by means of wiped joints to a calking ferrule, soldering nipple, or bushing as provided in Paragraph P4.2.3.

**P4.3.6 Copper Water Tube.** Joints in copper tubing shall be made either by the appropriate use of approved brass water fittings, properly sweated or soldered together or by means of approved compression fittings as provided in Paragraphs P4.2.4 and P4.2.5.

**P4.3.7 Plastic Pipe.** Joints in ABS and PVC (DWV) pipes and fittings shall be made by the solvent weld method as provided in Paragraph P4.2.15.

Joints in schedule 80 or 120 pipe may be made by threading, generally in accord with the method described in Paragraph P4.2.2, provided that only thread lubricants compatible with the pipe material may be used and that joints shall be tightened with strap wrenches not to exceed one full turn beyond hand tight.

**P4.3.8 Plastic Pipe to Other Materials.** Joints between plastic pipe and pipe of other materials shall be made by means of special adapters which connect to the materials by one of the appropriate methods described in Section P4.2.

#### **P4.4 SPECIAL JOINTS**

**P4.4.1 Copper Tubing to Screwed Pipe Joints.** Joints from copper tubing to threaded pipe shall be made by the use of brass converter fittings. The joint between the copper pipe and the fitting shall be properly sweated or soldered, and the connection between the threaded pipe and the fitting shall be made with a standard pipe size screw joint.

**P4.4.2 Brazing or Welding.** Brazing or welding shall be performed in accordance with the requirements of recognized published standards of practice and by licensed or otherwise qualified mechanics, except when it is determined by the administrative authority to be equivalent procedure for the purpose of this Code.

**P4.4.3 Expansion Joints.** Expansion joints must be accessible and may be used where necessary to provide for expansion and contraction of the pipes.

**P4.4.4 Ground Joint Brass Connections.** Ground joint brass connections which allow adjustment of tubing but provide a rigid joint when made up shall not be considered as slip joints.

**P4.4.5 Slip Joints.** In drainage and water piping, slip joints may be used only on the inlet side of the trap or in the trap seal, and on the exposed fixture supply. Fixtures having concealed slip joint connections shall comply with the provisions of P6.2.7.

#### **P4.6 WATER CLOSET, PEDESTAL URINAL, AND TRAP STANDARD SERVICE**

**P4.6.1** Fixture connections between drainage pipes and water closets, floor-outlet service sinks, pedestal urinals, and earthenware trap standards, shall be made by means of brass, hard-lead, or iron flanges, calked, soldered, or screwed to the drainage pipe. The connection shall be bolted, with an approved gasket or washer or setting compound between the earthenware and the connection. The floor flange shall be set on an approved firm base. The use of commercial putty or plaster is prohibited.

**P4.6.2** Water closets in frame construction where set on wood floors shall be connected to the drain pipe by means of lead pipe with at least six inches (6") of lead pipe between the floor flange and the wiped joint at the brass ferrule.

#### **P4.7 PROHIBITED JOINTS AND CONNECTIONS**

**P4.7.1 Drainage System.** Any fitting or connection which has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area, which offers an obstruction to flow through the drain, is prohibited.

**P4.7.2** No fitting or connection which offers abnormal obstruction to flow shall be used. The enlargement of a 3-inch bend or stub to 4 inches shall not be considered an obstruction.

#### **P4.8 WATERPROOFING OF OPENINGS**

**P4.8.1** Joints at the roof, around vent pipes, shall be made watertight by the use of lead, copper, galvanized-iron, or other approved



flashings or flashing material. Exterior wall openings shall be made watertight.

#### **P4.9 INCREASERS AND REDUCERS**

P4.9.1 Where different sizes of pipes, or pipes and fittings, are to be connected, the proper size increasers or reducers or reducing fittings shall be used between the two sizes.

### **SECTION P5—TRAPS, CLEANOUTS, INTERCEPTORS AND BACKWATER VALVES**

#### **P5.1 TRAPS—WHERE REQUIRED**

P5.1.1 **Fixture Traps.** Each plumbing fixture, except those having integral traps, shall be separately trapped by a water seal trap, placed as close to the fixture as possible.

(a) Provided a combination plumbing fixture may be installed on one trap, if one fixture is not more than 6 inches deeper than the other and the waste outlets are not more than 30 inches apart.

(b) Provided one trap may be installed for a set of not more than three single-compartment sinks or laundry trays or three lavatories immediately adjacent to each other in the same room, if the waste outlets are not more than 30 inches apart and the trap is centrally located when three compartments are installed.

(c) Provided that where a domestic dishwasher having a pump operated waste is installed adjacent to a properly trapped and vented sink, this dishwasher may be connected by a continuous waste to the fixture side of the sink trap, provided the total length of the continuous waste shall not exceed 60 inches (see P6.16). On old work, a 1½-inch P trap may be used for this connection. On new work, trap, waste, and vent sizes shall be computed in accordance with this Code.

(d) Provided one drum trap may be installed for a set of not more than 4 dental cuspidors or dental units. The length of the waste from the dental cuspidor or dental unit to the drum trap shall not exceed 15 feet.

P5.1.2 **Distance of Trap to Fixture.** The vertical distance from the fixture outlet to the trap weir shall not exceed 24 inches.

#### **P5.2 TYPE AND SIZE OF TRAPS AND FIXTURE DRAINS**

P5.2.1 **Trap Size.** The size (nominal diameter) of trap for a given fixture shall be sufficient to drain the fixture rapidly but in no case less than given in Section P9, Table P9.4.1.

P5.2.2 **Relation to Fixture Drains.** No trap shall be larger than the fixture drain to which it is connected.

#### **P5.2.3 Type of Traps**

(a) Fixture traps shall be self-cleaning other than integral traps without partitions or movable parts, except as specifically approved in other sections of this Code.

(b) Slip joints or couplings may be used on the trap inlet or within the trap seal of the trap.

(c) A trap integral with the fixture shall have a uniform interior and smooth waterway.

#### **P5.2.4 Drum Traps**

(a) Drum traps shall be 3 or 4 inches in diameter and shall be provided with a water seal of not less than 2 inches.

(b) The trap screw shall be one size less than the trap diameter.

#### **P5.3 GENERAL REQUIREMENTS**

P5.3.1 **Trap Seal.** Each fixture trap shall have a water seal of not less than 2 inches and not more than 4 inches, except where a deeper seal is found necessary by the administrative authority for special conditions.

#### **P5.3.2 Trap Cleanouts**

(a) Each fixture trap, except those cast integral or in combination with fixtures in which the trap seal is readily accessible or except when a portion of the trap is readily removable for cleaning purposes,

shall have an accessible brass trap screw of ample size protected by this water seal.

(b) Cleanouts on the seal of a trap shall be made tight with threaded cleanout plug and approved washer.

**P5.3.3 Trap Level and Protection.** Traps shall be set true with respect to their water seals, and when necessary, they shall be protected from freezing.

#### **P5.4 PROHIBITED TRAPS**

**P5.4.1 Types Prohibited.** No form of trap which depends for its seal upon the action of movable parts shall be used. No form of trap with partitions, except in a trap integral with a fixture, shall be used. No crown vented trap, S-trap, bell trap, or running trap shall be installed. No fixture shall be double trapped.

#### **P5.5 PIPE CLEANOUTS**

**P5.5.1 Location.** Cleanouts shall not be more than 75 feet apart in horizontal drainage lines of the building drain, 4-inch nominal diameter or less; and not more than 100 feet apart for larger pipes.

**P5.5.2 Underground Drainage.** Cleanouts, when installed on an underground drain, shall be extended to or above the finished grade level directly above the place where the cleanout is installed; or may be extended to the outside of the building when found necessary by the administrative authority.

**P5.5.3 Change of Direction.** Cleanouts shall be installed at each change of direction of the building drain greater than 45°.

**P5.5.4 Concealed Piping.** Cleanouts on concealed piping shall be extended through and terminate flush with the finished wall or floor; or pits or chases may be left in the wall or floor, provided they are of sufficient size to permit removal of the cleanout plug and effective cleaning of the system.

**P5.5.5 Base of Stacks.** A cleanout shall be provided at or near the foot of each vertical waste on soil stack. For buildings with a floor slab on fill or ground or with less than 18-inch crawl space under the floor, the following will be acceptable in lieu of a cleanout at the base of the stack: The building drain may be extended to the outside of the building and terminated in an accessible cleanout or an accessible cleanout installed in the building drain downstream from the stack not more than 8 feet outside the building wall.

**P5.5.6 Building Drain Junction.** There shall be a cleanout near the junction of the building drain and the building sewer, a cleanout with a Y branch inside the building wall, or a cleanout in the building sewer at the property line.

**P5.5.7 Direction of Flow.** Every cleanout shall be installed so that the cleanout opens in a direction opposite to the flow of the drainage line or at right angle thereto.

**P5.5.8 Cleanout plugs** shall not be used for the installation of new fixtures or floor drains except where approved in writing by the administrative authority.

#### **P5.6 PIPE CLEANOUTS—GENERAL REQUIREMENTS**

**P5.6.1 Material and Design.** The bodies of cleanout ferrules shall conform in thickness to that required for pipe and fittings of the same material, and extend not less than ¼-inch above the hub. For new work, the cleanout plug shall be of heavy brass not less than ½-inch thick and shall be provided with raised nut or recessed socket for removal. Both ferrule and plug shall have American National Tapered Pipe Threads. Heavy lead plugs may be used for repairing a cleanout where necessary.

#### **P5.7 SIZE OF CLEANOUTS**

**P5.7.1 Small Pipes.** Cleanouts shall be of the same nominal size as the pipes up to 4 inches, and not less than 4 inches for larger piping.

**P5.7.2 Larger Pipes.** For underground piping over 10 inches, manholes shall be provided and located at each 90° change in direction and at intervals of not more than 150 feet.

**P5.7.3 Covers.** Metal covers shall be provided for manholes.

## **P5.8 CLEANOUT CLEARANCES**

**P5.8.1 Large Pipes.** Cleanouts on 3-inch or larger pipe shall be so installed that there is a clearance of not less than 18 inches for the purpose of rodding.

**P5.8.2 Small Pipes.** Cleanouts smaller than 3 inches shall be so installed that there is a 12-inch clearance for rodding.

**P5.8.3 Calking.** Cement, plaster, or any other permanent finishing material shall not be placed over a cleanout plug.

**P5.8.4 Concealment.** Where it is necessary to conceal a cleanout plug, a covering plate or access door shall be provided which will permit ready access to the plug.

**P5.9 Deleted**

## **P5.10 ACIDPROOF TRAPS**

**P5.10.1** Where a vitrified-clay, or other brittleware, acidproof trap is installed underground, it shall be embedded in concrete to a thickness of 6 inches from the bottom and sides of the trap.

## **P5.11 INTERCEPTORS AND SEPARATORS**

**P5.11.1 When Required.** Interceptors (including grease, oil, and sand interceptors, etc.) shall be provided when, in the judgment of the administrative authority, they are necessary for the proper handling of liquid wastes containing grease, flammable wastes, sand, and other ingredients harmful to the building drainage system, the public sewer or sewage treatment plant or process.

**P5.11.2 Approval.** The size, type, location, and venting of each interceptor or separator shall be approved by the administrative authority in accordance with generally accepted standards, and no waste detrimental to the action of the interceptor shall be discharged into it.

**P5.11.3 Separation.** A mixture of light and heavy solids or liquids and solids having various specific gravities may be treated and then separated in an interceptor as approved by the administrative authority in accordance with Paragraph P5.11.2.

## **P5.12 GREASE INTERCEPTORS**

**P5.12.1 Commercial Buildings.** A grease interceptor shall be installed in the waste line leading from sinks, drains, or other fixtures in the following establishments when, in the judgment of the administrative authority, a hazard exists: Restaurants, hotel kitchens or bars, factory cafeterias or restaurants, clubs or other establishments where grease can be introduced into the drainage system in quantities which can effect line stoppage or hinder sewage disposal.

**P5.12.2 Residential Units.** A grease interceptor is not required for individual dwelling units or any private living quarters.

## **P5.13 OIL SEPARATOR**

**P5.13.1** An oil separator shall be installed in the drainage system or section of the system where, in the judgment of the administrative authority, a hazard exists or where oils or other flammables can be introduced or admitted into the drainage system by accident or otherwise. (See P5.27)

## **P5.14 SAND INTERCEPTORS**

**P5.14.1 Commercial Installations.** Sand and similar interceptors for heavy solids shall be so designed and located as to be readily accessible for cleaning, and shall have a water seal of not less than 6 inches.

## **P5.15 VENTING INTERCEPTORS**

**P5.15.1 Relief Vent.** Interceptors shall be so designed that they will not become air-bound if closed covers are used. Each interceptor shall be properly vented as required by the administrative authority. (See P5.11.2)

## **P5.16 ACCESSIBILITY OF INTERCEPTOR**

**P5.16.1** Each interceptor shall be so installed as to provide ready accessibility to the cover and means for servicing and maintaining the interceptor in working and operating condition. The use of ladders or the removal of bulky equipment in order to service interceptors shall constitute a violation of accessibility.

## **P5.17 INTERCEPTOR'S EFFICIENCY**

**P5.17.1 Flow Rate.** Interceptors shall be rated and approved for their efficiency as directed by the administrative authority and in accordance with standard practice.

**P5.18 APPROVAL.** No grease interceptor shall be approved until it has successfully passed a testing and rating procedure approved by the administrative authority.

**P5.19 WATER CONNECTION.** Water connection for cooling or operating an interceptor shall be such that backflow can not occur.

**P5.20 LAUNDRIES**

**P5.20.1 Interceptors.** Commercial laundries shall be equipped with an interceptor having a removable wire basket or similar device which will prevent strings, rags, buttons or other materials detrimental to the public sewerage system from passing into the drainage system.

**P5.20.2 Intercepting Device.** The basket or device shall prevent passage into the drainage system of solids  $\frac{1}{2}$ -inch or larger in size. The basket or device shall be removable for cleaning purposes.

**P5.21 BOTTLING ESTABLISHMENTS**

**P5.21.1 Bottling Plants.** Bottling plants shall discharge their process wastes into an interceptor which will provide for the separation of broken glass or other solids, before discharging liquid wastes into the drainage system.

**P5.22 SLAUGHTERHOUSE**

**P5.22.1 Separators.** Slaughtering-room drains shall be equipped with separators which shall prevent the discharge into the drainage system of feathers, entrails, and other materials likely to clog the drainage system.

**P5.22.2 Interceptors.** Slaughtering and dressing-room drains shall be provided with interceptors approved by the administrative authority, in accordance with Paragraph P5.11.1.

**P5.23 WASTE FOOD GRINDERS**

**P5.23.1 Discharge.** The wastes from garbage grinders may discharge directly through a properly vented trap to the building drainage system.

**P5.24 Deleted**

**P5.25 APPROVAL.** The administrative authority shall determine where and what type of interceptor is necessary, except that interceptors shall not be required for private living quarters or residential units.

**P5.26 MAINTENANCE**

**P5.26.1 Cleaning.** Interceptors shall be maintained in efficient operating condition by periodic removal of accumulated grease.

**P5.27 OIL INTERCEPTORS**

**P5.27.1 Where Required.** Oil separators shall be installed when required by the administrative authority and shall conform to the requirements of Paragraphs P5.27.2, P5.27.3 and P5.27.4.

**P5.27.2 Minimum Dimension.** Oil separators shall have a depth of not less than 2 feet below the invert of the discharge drain.

**P5.27.3 Motor Vehicle Storage.** Interceptors shall have a capacity of 6 cubic feet where not more than 3 vehicles are serviced; and 1 cubic foot in net capacity shall be added for each additional vehicle up to 10 vehicles. Where more than 10 vehicles are serviced, the administrative authority shall determine the size of the separator required.

**P5.27.4 Motor Vehicle Servicing.** Where storage facilities are not maintained, as in repair shops, the capacity of the separator shall be based on a net capacity of 1 cubic foot for each 100 square feet of surface to be drained into the interceptor, with a minimum capacity of 6 cubic feet.

**P5.28 SPECIAL TYPE SEPARATORS.** Before installing any special type separator a drawing including all pertinent information shall be submitted for approval of the administrative authority, as being in accordance with this Code.

**P5.29 BACKWATER VALVES**

**P5.29.1 Fixtures Subject to Backflow.** The installation of back-

water devices shall be in accordance with lawful requirements of the administrative authority having jurisdiction over the public sewer system.

**P5.29.2 Fixture Branches.** Backwater valves shall be installed in the branch of the building drain which receives only the discharge from fixtures located within such branch and below grade.

**P5.29.3 Material.** All bearing parts of backwater valves shall be of corrosion-resistant material.

**P5.29.4 Backwater Valves** shall be so constructed as to ensure a mechanical seal against backflow.

**P5.29.5 Diameter.** Backwater valves, when fully opened, shall have a capacity not less than that of the pipes in which they are installed.

**P5.29.6 Location.** Backwater valves shall be so installed as to provide ready accessibility to their working parts.

## SECTION P6—PLUMBING FIXTURES

### P6.1 GENERAL REQUIREMENTS—MATERIALS

**P6.1.1 Quality of Fixtures.** Plumbing fixtures shall have smooth impervious surfaces, be free from defects and concealed fouling surfaces, and, except as permitted elsewhere in this code, shall conform to the standards cited in Table P3.5, Standards for Plumbing Materials.

**P6.1.2 Alternate Materials.** Sinks and special-use fixtures may be made of soapstone, chemical stoneware, or may be lined with lead, copper-base alloy, nickel-copper alloy, corrosion-resisting steel, or other materials especially suited to the use for which the fixture is intended.

**P6.1.3 Overflows.** When any fixture is provided with an overflow, the waste shall be so arranged that the standing water in the fixture can not rise in the overflow when the stopper is closed, or remain in the overflow when the fixture is empty.

### P6.2 INSTALLATION

**P6.2.1 Cleaning.** Plumbing fixtures shall be installed in a manner to afford easy access for cleaning. Where practical, all pipes from fixtures shall be run to the nearest wall.

**P6.2.2 Joints.** Where the fixture comes in contact with wall and floors, the joints shall be watertight.

**P6.2.3 Securing Fixtures.** Floor-outlet fixtures shall be rigidly secured to the floor by screws or bolts.

**P6.2.4 Wall-hung Bowls.** Wall-hung water-closet bowls shall be rigidly supported by a concealed metal supporting member so that no strain is transmitted to the closet connection.

**P6.2.5 Setting.** Fixtures shall be set level and in proper alignment with reference to adjacent walls. (See Paragraphs P4.6.1 and P4.6.2.)

**P6.2.6 Connection.** The overflow pipe from a fixture shall be connected on the house or inlet side of the fixture trap, except that overflows or flush tanks may discharge into the water closets or urinals served by them, but it shall be unlawful to connect such overflows with any other part of the drainage system.

**P6.2.7 Connections.** Fixtures having concealed slip-joint connections shall be provided with an access panel or utility space so arranged as to make the slip connections accessible for inspection and repair, where required by the administrative authority.

**P6.2.8 Protection of Water Supply.** All plumbing fixtures shall be supplied with water through an air gap as prescribed in A.S.A. A40.4-1942. Where such installations are not feasible, they shall be provided with a backflow preventer as described and to be installed in accordance with the provisions of A.S.A. A40.6-1943. (See Section P14.)

### P6.3 PROHIBITED FIXTURES AND CONNECTIONS

**P6.3.1 Fixtures.** Pan, valve, plunger, offset, washout, latrine, frost-proof, and other water closets having an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge, are prohibited. Any water closet which might permit siphonage of the contents of the bowl back into the tank is prohibited.

## **P6.4 WATER CLOSET COMBINATIONS**

**P6.4.1 Types of Water Closets.** Water closet bowls shall be siphon jet, reverse trap, wash-down, or blowout type with floor outlet, or siphon jet or blowout type with wall outlet. Water closet bowls and traps shall be made in one piece and shall be provided with integral flushing rims constructed so as to flush the entire interior of the bowl. Water closet bowls for public use shall be elongated type with open front seat.

**P6.4.2 Supports.** Wall hung water closet supports shall be of the concealed type and of metal designed so that no strain is transmitted to the piping.

**P6.4.3 Public Use.** Water closet bowls for public use shall be of the elongated type.

**P6.4.4 Flushing Device.** Water closet tanks shall have a flushing capacity sufficient to properly flush the water closet bowls with which they are connected.

**P6.4.5 Float Valves.** Float valves in lowdown tanks shall close tight and provide water to properly refill the trap seal in the bowl.

**P6.4.6 Close-coupled Tanks.** The flush valve seat in close-coupled water closet combinations shall be 1 inch or more above the rim of the bowl, so that the flush-valve will close even if the closet trapway is clogged, or any closets with flush valve seats below the rim of the bowl shall be so constructed that in case of trap stoppage, water will not flow continuously over the rim of the bowl.

**P6.4.7 Automatic Flush Valve.** Flushometers shall be so installed that they will be readily accessible for repairing. When the valve is operated, it shall complete the cycle of operation automatically, opening fully and closing positively under the service pressure. At each operation the valve shall deliver water in sufficient volume and at a rate which will thoroughly flush the fixture and refill the fixture trap. Means shall be provided for regulating flush-valve flow. Not more than one fixture shall be served by a single flush valve. Protection against backflow shall be provided as specified in Paragraph P8.5.1.

**P6.4.8 Seats.** Water closets shall be equipped with seats of smooth nonabsorbent material. All seats of water closets provided for public use shall be of the open-front type. Integral water closet seats shall be of the same material as the fixture.

## **P6.5 URINALS**

**P6.5.1 Flushing Rim and Trap.** Siphon jet, blowout, and pedestal urinals shall have integral flushing rims and integral traps, except that washout and stall urinals may have separate traps. In the case of a stall urinal, a flushing rim is not required.

**P6.5.2 Automatic Flushing Tank.** Tank flushing more than one urinal shall be automatic in operation and of sufficient capacity to provide the necessary volume to flush and properly cleanse all urinals simultaneously.

**P6.5.3 Urinals Equipped with Automatic Flush Valves.** Flushometers shall be as prescribed in Paragraph P6.4.7, and no valve shall be used to flush more than one urinal.

**P6.5.4 Trough Urinals.** Trough urinals when used shall conform to the following requirements: They shall not be less than 6 inches deep and shall be furnished with one-piece backs and have strainers with outlets at least 1½ inches in diameter. The washdown pipe shall be perforated so as to flush with an even curtain of water against the back of the urinal. This pipe shall be securely clamped as high as practicable to the back of the urinal. Trough urinals, where so equipped, shall have tanks with a flushing capacity of not less than 1½ gallons of water for each 2 feet of urinal length.

**P6.5.5 Equivalent Length.** Trough urinals shall be figured on the basis of one (1) urinal for each 18 inches of length, provided that

- 24-inch urinal equals 1 urinal
- 36-inch urinal equals 2 urinals
- 48-inch urinal equals 2 urinals
- 60-inch urinal equals 3 urinals
- 72-inch urinal equals 4 urinals

**P6.5.6 Floor-type Urinals.** Floor-type trough urinals are prohibited.

**P6.5.7 Surrounding Materials.** Wall and floor space to a point 1 foot in front of the urinal lip and 4 feet above the floor, and at least 1 foot to each side of the urinal, shall be lined with nonabsorbent material.

**P6.6** All public wash rooms and toilet rooms shall have impervious floors, drained to a floor drain.

#### **P6.7 STRAINERS AND FIXTURE OUTLETS**

**P6.7.1** All plumbing fixtures, other than water closets and syphon-action washdown or blowout urinals, shall be provided with metal strainers having an approved waterway area, complying with P6.1.1.

#### **P6.8 LAVATORIES**

**P6.8.1 Lavatory Waste.** Lavatories shall be provided with waste outlets not less than 1½ inches. Wastes may have open strainers or may be provided with stoppers. Waste plugs, when assembled, shall be installed so that the bottom edge of the overflow opening in the plug shall be below the bottom of the overflow channel to prevent the trapping of water.

#### **P6.9 SHOWER RECEPTORS AND COMPARTMENTS**

**P6.9.1 Shower.** All shower compartments, except those built directly on the ground or those having prefabricated receptors, shall have a lead or copper shower pan or the equivalent thereof or as determined by the administrative authority. The pan shall turn up on all sides at least 6 inches above the finished floor level. Traps shall be so constructed that the pan can be securely fastened to the trap at the seepage entrance, making a watertight joint between the pan and the trap. Shower receptacle waste outlets shall not be less than 2 inches in diameter and have removable strainers.

**P6.9.2 On the Ground.** Shower receptors built on the ground shall be constructed from dense nonabsorbent and noncorrosive materials and shall have smooth impervious surfaces, or as provided in Paragraph P6.9.1.

**P6.9.3 Dimensions.** Shower compartments shall have not less than 1,024 square inches in floor area; and if rectangular, square or triangular in plan, shall be not less than 30 inches in the shortest dimension.

**P6.9.4 Construction.** Floors under shower compartments shall be laid on a smooth and structurally sound base and shall be lined and made watertight with sheet lead, copper, or other acceptable materials. Shower compartments located in basements, cellars, or in other rooms in which the floor has been laid directly on the ground surface need not be lined.

**P6.9.5 Public or Institution Showers.** Floors of public shower rooms shall be drained in such a manner that no waste water from any head will pass over areas occupied by other bathers.

**P6.9.6 Walls.** Shower compartments shall have walls constructed of smooth, noncorrosive and nonabsorbent waterproof materials to a height of not less than 6 feet above the floor.

**P6.9.7 Joints.** Built-in tubs with overhead showers shall have waterproof joints between the tub and walls, and the walls shall be waterproof.

#### **P6.10 SINKS**

**P6.10.1 Sinks** shall be provided with waste outlets not less than 1½ inches. Waste outlets may have open strainers or may be provided with stoppers.

**P6.11.2 Grease Interceptors.** No food-waste-grinder shall be connected through a grease interceptor.

**P6.11.3 Commercial-type Grinders.** Commercial-type food-grinders shall be provided with not less than a 2-inch waste line. Each waste

line shall be trapped and vented as provided in other sections of this Code.

#### **P6.12 LAUNDRY TUBS AND SERVICE SINKS**

P6.12.1 Each compartment of a laundry tub or slop sink shall be provided with a waste outlet not less than 1½ inches and with stoppers.

P6.12.2 Each service sink shall be provided with a waste outlet not less than 2 inches in diameter.

#### **P6.13 BATH TUBS**

P6.13.1 Bath Tubs shall be provided with a waste outlet not less than 1½ inches.

#### **P6.14 DRINKING FOUNTAINS**

P6.14.1 The orifice of the nozzle shall be not less than ¾ inch above the overflow level of the structure. (See P14.3)

#### **P6.15 FLOOR DRAINS**

P6.15.1 A Floor Drain shall be considered a plumbing fixture.

P6.15.2 Trap and Strainers. Floor drains shall have metal traps and a minimum water seal of 2 inches and shall be provided with removable strainers. The open area of the strainer shall be at least 2/3 of the cross-section area of the drain line to which it connects. The administrative authority may require the installation of deep seal traps if such installation appears to be desirable and necessary.

P6.15.3 Size. Floor drains shall be of a size to serve efficiently the purpose for which it is intended.

#### **P6.16 DISHWASHING MACHINES**

P6.16.1 Protection. Domestic dishwashing machines shall meet the requirements in Paragraph P8.4.

P6.16.2 Separate Trap. Each unit shall be separately trapped or discharge indirectly into a properly trapped and vented fixture except as provided in P5.1.1 (c).

P6.16.3 Air Gap. Commercial dishwashing machines shall be connected through an air gap or as provided in Section P7, Indirect and Special Wastes.

P6.16.4 Hot Water. Dishwashing machines or similar dishwashing equipment not in private living quarters or dwelling units shall be provided with water at 180° F. for sterilization.

#### **P6.17 MULTIPLE WASH SINKS**

P6.17.1 Circular Type. Each 18 inches of wash sink circumference (circular type) shall be equivalent to one lavatory.

P6.17.2 Straightline Type. Multiple wash sinks of the straightline type shall have hot and cold combination spouts not closer than 18 inches from adjacent similar spouts, and each spout shall be considered the equivalent of one lavatory.

#### **P6.18 GARBAGE CAN WASHERS**

P6.18.1 Discharge. Garbage can washers shall not discharge through a trap serving any other device or fixture.

P6.18.2 Grease Interceptor. The discharge from a garbage can washer shall be connected through a grease interceptor.

P6.18.3 Baskets. The receptacle receiving the wash from garbage cans shall be provided with a basket or similar device to prevent the discharge of large particles into the building drainage system.

P6.18.4 Connections. Water supply connections shall conform to Paragraph P8.4.

#### **P6.19 LAUNDRY TRAYS**

P6.19.1 Waste Outlets. Each compartment of a laundry tray shall be provided with a waste outlet not less than 1½ inches in diameter and with a stopper.

P6.19.2 Overflows. Laundry tray overflows shall conform to the requirements of Paragraph P6.1.3.

#### **P6.20 SPECIAL FIXTURES AND SPECIALTIES**

P6.20.1 Water and Drain Connections. Baptistries, ornamental and lily pools, aquaria, ornamental fountain basins, and similar constructions when provided with water supplies shall be protected from back-siphonage as required in Paragraph P8.4.



P6.20.2 **Approval.** Specialties requiring water and waste connections shall be submitted for approval of the administrative authority.

P6.21 **MINIMUM FACILITIES**

P6.21.1 Wherever plumbing fixtures are installed, the minimum number of each type of fixture installed shall be in accordance with Table P6.21.1.

TABLE P6.21.1 Minimum Facilities<sup>1 2</sup>

| Type of Building or Occupancy                                                                                       | Water Closets                                                 | Urinals <sup>3</sup>                                                                                                                                                                                                                                        | Lavatories                                                                               | Bath Tubs or Showers                                                                                                              | Drinking Fountains <sup>4</sup> |   |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---|
| Residence or Dwelling or Apartment Building <sup>7</sup>                                                            | 1 for each dwelling or apartment unit.                        |                                                                                                                                                                                                                                                             | 1 for each dwelling or apartment unit                                                    | 1 for each dwelling or apartment unit                                                                                             |                                 |   |
| Schools<br>Primary                                                                                                  | 1 for each 30 girls or fraction of 30.<br>1 for each 60 boys. | 1 for each 30 boys                                                                                                                                                                                                                                          | 1 for each 75 pupils                                                                     | None required except for Gymnasiums or special purpose                                                                            | 1 for each 75 pupils            |   |
| Secondary                                                                                                           | 1 for each 75 boys.<br>1 for each 45 girls.                   | 1 for each 45 boys<br>See Footnote No. 10                                                                                                                                                                                                                   | 1 for each 75 pupils                                                                     |                                                                                                                                   | 1 for each 75 pupils            |   |
| Office Buildings or Public Buildings                                                                                | No. of Persons                                                | Whenever urinals are provided, one water closet less than the number specified herein may be provided for each urinal; except that the number of water closets in such case shall not be reduced to less than $\frac{2}{3}$ of the number specified herein. | No. of Persons                                                                           | No. of Fixtures                                                                                                                   |                                 |   |
|                                                                                                                     | 1- 15 .....                                                   |                                                                                                                                                                                                                                                             | 1                                                                                        | 1- 15 .....                                                                                                                       | 1                               |   |
|                                                                                                                     | 16- 35 .....                                                  |                                                                                                                                                                                                                                                             | 2                                                                                        | 16- 35 .....                                                                                                                      | 2                               |   |
|                                                                                                                     | 36- 65 .....                                                  |                                                                                                                                                                                                                                                             | 3                                                                                        | 36- 60 .....                                                                                                                      | 3                               |   |
|                                                                                                                     | 56- 80 .....                                                  |                                                                                                                                                                                                                                                             | 4                                                                                        | 61- 90 .....                                                                                                                      | 4                               |   |
| 81-110 .....                                                                                                        | 5                                                             | 91-125 .....                                                                                                                                                                                                                                                | 5                                                                                        |                                                                                                                                   |                                 |   |
| 111-150 .....                                                                                                       | 6                                                             |                                                                                                                                                                                                                                                             |                                                                                          |                                                                                                                                   |                                 |   |
|                                                                                                                     | 1 fixture for each 40 additional persons.                     |                                                                                                                                                                                                                                                             | Over 125—1 for each 45 additional persons                                                |                                                                                                                                   |                                 |   |
| Manufacturing, <sup>3 4 5</sup> Warehouses, Workshops, Loft Buildings, Foundry, Mine, and Similar Type of Buildings | No. of Persons                                                | Same substitution as above.                                                                                                                                                                                                                                 | 1 for each 10 persons up to 100; and one for each 15 persons in addition. <sup>4 5</sup> | 1 shower for each 15 persons who may be exposed to excessive heat or to skin contamination with poisonous or irritating material. | 1 for each 75 persons           |   |
|                                                                                                                     | 1- 9 .....                                                    |                                                                                                                                                                                                                                                             |                                                                                          |                                                                                                                                   |                                 | 1 |
|                                                                                                                     | 10- 24 .....                                                  |                                                                                                                                                                                                                                                             |                                                                                          |                                                                                                                                   |                                 | 2 |
|                                                                                                                     | 25- 49 .....                                                  |                                                                                                                                                                                                                                                             |                                                                                          |                                                                                                                                   |                                 | 3 |
|                                                                                                                     | 50- 74 .....                                                  |                                                                                                                                                                                                                                                             |                                                                                          |                                                                                                                                   |                                 | 4 |
| 75-100 .....                                                                                                        | 5                                                             |                                                                                                                                                                                                                                                             |                                                                                          |                                                                                                                                   |                                 |   |
|                                                                                                                     | 1 fixture for each additional 30 employees.                   |                                                                                                                                                                                                                                                             |                                                                                          |                                                                                                                                   |                                 |   |

|                          |                                                                                                                                                                  |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                              |                                                                                                                                                                                              |                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Dormitories <sup>6</sup> | Male: 1 for each 10 persons<br>Female: 1 for each 8 persons<br>Over 10 persons, add 1 fixture for each 25 additional males; and 1 for each 20 additional females | No. of Persons<br>1-30 ..... 1<br>31-50 ..... 2<br>51-100 ..... 3<br>101-150 ..... 4<br>Over 150—1 for each additional 50 persons                                                                                                                                  | No. of Fixtures<br>1-30 ..... 1<br>31-50 ..... 2<br>51-100 ..... 3<br>101-150 ..... 4<br>Over 150—1 for each additional 50 persons                                                                                                                                 | 1 for each 12 persons. (Separate dental lavatories should be provided in community toilet rooms. A ratio of 3 dental lavatories for each 60 persons is recommended.) Add 1 lavatory for each 20 males; 1 for each 15 females | 1 for each 8 persons, in the case of women's dormitories additional bath tubs should be installed at the rate of 1 for each 30 females. Over 150 persons, add 1 fixture for each 20 persons. | 1 for each 75 persons  |
|                          | No. of Persons: Male: Female:<br>1-100 ..... 1 ..... 1<br>101-200 ..... 2 ..... 2<br>201-400 ..... 3 ..... 3<br>Over 400—1 for each additional 500 300           | No. of Persons<br>1-200 ..... 1<br>201-400 ..... 2<br>401-600 ..... 3<br>Over 600—1 for each additional 300 persons                                                                                                                                                | No. of Persons<br>1-200 ..... 1<br>201-400 ..... 2<br>401-600 ..... 3<br>Over 600—1 for each additional 300 persons                                                                                                                                                | No. of Persons<br>1-100 ..... 1<br>101-200 ..... 1<br>201-400 ..... 2<br>401-750 ..... 3<br>Over 750—1 for each additional 500 persons                                                                                       | No. of Fixtures<br>1-100 ..... 1<br>101-200 ..... 1<br>201-400 ..... 2<br>401-750 ..... 3<br>Over 750—1 for each additional 500 persons                                                      | 1 for each 100 persons |
| Drive-In Theatres        | No. of Persons: Male: Female:<br>1-150 ..... 1 ..... 1<br>151-300 ..... 2 ..... 2<br>301-600 ..... 3 ..... 3<br>601-950 ..... 4 ..... 4                          | No. of Persons<br>1-200 ..... 1<br>201-750 ..... 2<br>Urinals for females may be substituted for water closets, one for one, except that the number of water closets in such cases shall not be reduced to less than $\frac{1}{2}$ of the number specified herein. | No. of Persons<br>1-200 ..... 1<br>201-750 ..... 2<br>Urinals for females may be substituted for water closets, one for one, except that the number of water closets in such cases shall not be reduced to less than $\frac{1}{2}$ of the number specified herein. | No. of Persons<br>1-200 ..... 1<br>201-400 ..... 2<br>401-750 ..... 3                                                                                                                                                        | No. of Fixtures<br>1-200 ..... 1<br>201-400 ..... 2<br>401-750 ..... 3                                                                                                                       | 1 for each 100 persons |

<sup>1</sup>The figures as shown are based upon one fixture being the minimum required for the number of persons indicated, or any fraction thereof.

<sup>2</sup>No requirements have been given for Hospitals, Sanitariums, Rooming Houses or Hotels, and each will have to be considered individually by the administrative authority.

<sup>3</sup>See the American Standard Safety Code for Industrial Sanitation in Manufacturing Establishments (A.S.A. Z4.1-1935).

<sup>4</sup>Where there is exposure to skin contamination with poisonous infections or irritating material, then provide one lavatory for each 5 persons.

<sup>5</sup>Eighteen inches of wash sink circumference (circular type) shall be equal to one lavatory. Straight type wash sinks, 18" spaces, with equivalent spouts shall be equal to one lavatory.

<sup>6</sup>Drinking fountains shall not be installed in toilet rooms.

<sup>7</sup>Laundry facilities—one single compartment tray for each 10 apartments. Where automatic washing machines are to be provided, properly trapped and vented risers and hot and cold water connections shall be installed at the rate of one for each dwelling unit, or one for each 20 apartments.

Kitchen sinks—One for each dwelling or apartment unit.

<sup>8</sup>One kitchen sink for each utility kitchen.

<sup>9</sup>Urinals for females may be substituted for water closets, the substitution not to exceed more than one-third of the total provided.

General—In applying this schedule of facilities, consideration must be given to the accessibility of the fixtures. Conformity purely on a numerical basis may not result in an installation suited to the need of the individual establishment. For example, schools should be provided with toilet facilities on each floor having class rooms.

## SECTION P7—INDIRECT AND SPECIAL WASTES

### P7.1 INDIRECT WASTE PIPES

P7.1.1 **General.** Wastes from the following shall discharge to the building drainage system through an air gap serving the individual fixtures, devices, appliances or apparatus.

P7.1.2 **Food Handling.** Establishments engaged in the storage, preparation, selling, serving, processing, or otherwise handling of food shall have the waste piping from all refrigerators, ice boxes, rinse sinks, cooling or refrigerating coils, laundry washers, extractors, steam tables, egg boilers, coffee urns or similar equipment discharge indirectly into a water-supplied sink or receptor, and the outlet waste shall terminate at least 2 inches above the flood rim of such sink or receptor.

P7.1.3 **Commercial Dishwashing Machines.** Dishwashing machines, except those in private living quarters or dwelling units, shall be indirectly connected, except that when a dishwashing machine is located adjacent to a floor drain the waste from the dishwashing machine may be connected direct on the sewer side of the floor-drain trap.

P7.1.4 **Interceptor.** An interceptor may be placed on the outlet side of the dishwashing machine, or on the discharge side of the indirect waste receptor.

P7.1.5 **Connection.** Indirect waste connections shall be provided for drains, overflows, or relief vents from the water supply system.

P7.1.6 Appliances, devices, or apparatus such as stills, sterilizers, and similar equipment requiring water and waste and used for sterile material shall be indirectly connected or provided with an air gap between the trap and the appliance.

P7.1.7 Appliances, devices, or apparatus not regularly classed as plumbing fixtures but which have drips or drainage outlets, may be drained by indirect waste pipes discharging into an open receptacle as provided in Paragraph P7.1.2.

P7.1.8 **Material and Size.** The material and size of indirect waste pipes shall be in accordance with the provisions of the other sections of this Code applicable to sanitary drainage piping.

P7.1.9 **Indirect Waste Trapped.** Any indirect waste pipe exceeding 2 feet in length shall be trapped.

P7.1.10 **Maximum Length.** The maximum length of the indirect waste to vent shall not exceed 15 feet.

P7.1.11 **Cleaning.** Indirect waste piping shall be so installed as to permit ready access for flushing and cleaning.

P7.1.12 **Indirect Waste Vented.** Stacks serving indirect waste pipes and receiving the discharge from drinking fountains or refrigerators on three or more floors shall be independently vented to the outside air.

### P7.2 SPECIAL WASTES

P7.2.1 **Acid Waste.** Acid and chemical indirect waste pipes shall be of materials unaffected by the discharge of such wastes.

P7.2.2 **Neutralizing Device.** In no case shall corrosive liquids, spent acids, or other harmful chemicals which might destroy or injure a drain, sewer, soil, vent or waste pipe, or which might create noxious or toxic fumes, discharge into the plumbing system without being thoroughly diluted or neutralized by passing through a properly constructed and acceptable dilution or neutralizing device. Such device shall be automatically provided with a sufficient intake of diluting water or neutralizing medium, so as to make its contents noninjurious before being discharged into the soil or sewerage system.

P7.3 **CONDENSERS AND SUMPS.** No steam pipe shall connect to any part of a drainage or plumbing system, nor shall any water above 140°F. be discharged into any part of a drainage system. Such pipes may be indirectly connected by discharging into an interceptor and thence into the drainage system.

P7.4 **CLEAR WATER WASTES.** Water lifts, expansion tanks, cooling jackets, sprinkler systems, drip or overflow pans, or similar

devices which waste clear water only, may discharge onto a roof, into a sump, or so as to drain into a trapped fixture.

**P7.5 SWIMMING POOLS.** Piping carrying waste water from swimming or wading pools, including pool drainage, back-wash from filters, or water from scum gutter drains or floor drains which serve the walks around pools, shall be installed as an indirect waste pipe utilizing any existing circulation pump, if necessary, when the indirect waste pipe is below the sewer grade. Exceptions to this rule may be permitted by the administrative authority when the swimming water is treated and recirculated.

**P7.6 DRINKING FOUNTAINS** may be installed with indirect wastes.

#### **SECTION P8—WATER SUPPLY AND DISTRIBUTION**

**P8.1 WATER SUPPLY MANDATORY.** Every building in which plumbing fixtures are installed and which is for human occupancy or habitation shall be provided with an ample supply of pure and wholesome water.

**P8.2 NONPOTABLE WATER.** Nonpotable water may be used for flushing water closets and urinals and other fixtures not requiring potable water, provided such water shall not be accessible for drinking or culinary purposes.

**P8.2.1 Identification of Piping.** All piping conveying nonpotable water shall be adequately and durably identified by a distinctive yellow-colored paint so that it is readily distinguished from piping carrying potable water. (See ASA Z53.1-1945 Safety Color Code for Marking Physical Hazards.)

**P8.2.2 Private Water Supply.** No private water supply shall be interconnected with any public water supply without the specific approval of the State Health Officer.

#### **PROTECTION OF POTABLE WATER SUPPLY**

**P8.3 SEPARATE TRENCHES.** The horizontal distance between the underground water service pipe and the building drain or building sewer shall not be less than 6 feet, and the intervening space shall be undisturbed earth or filled with compacted earth; except as permitted in Paragraph P8.3.1.

**P8.3.1 One Trench.** Water service pipe may be placed in the same trench with the building drain and building sewer provided the following conditions are met:

(a) The bottom of the water service pipe must be at least 12 inches above the top of the sewer line at all points.

(b) The water pipe must be placed on a solid shelf excavated at the side of the common trench.

(c) The materials and joints of sewer and water service pipe shall be installed in such manner, and shall possess the necessary strength and durability, to prevent the escape of solids, liquids and gases therefrom under all known adverse conditions such as corrosion, strains due to temperature changes, settlement, vibrations and superimposed loads.

**P8.3.2 Combination Stop and Waste.** Combination stop and waste valves and cocks shall not be installed in an underground service pipe.

#### **P8.4 BACK-SIPHONAGE AND BACKFLOW**

**P8.4.1 Back-siphonage.** Potable water supply piping, water discharge outlets, backflow prevention devices, or similar equipment shall not be so located as to make possible their submergence in any contaminated or polluted liquid or substance.

**P8.4.2 Backflow.** The water distributing system shall be protected against backflow. Every water outlet shall be protected from backflow, preferably by having the outlet end from which the water flows spaced a distance above the flood-level rim of the receptacle into which the water flows sufficient to provide a "minimum required air

gap" as defined in ASA A40.4-1942. Where it is not possible to provide a minimum air gap, the water outlet shall be equipped with an accessibly located backflow preventer complying with ASA A40.6-1943, installed on the discharge side of the manual control valve. See Section P14.

Where it is not possible to provide a minimum air gap or backflow preventer, as may be the case with special appliances, only such arrangements as have been approved by the State Health Officer shall be used.

#### **P8.5 VACUUM BREAKERS AND AIR GAPS**

**P8.5.1 Flushometer.** Flushometer shall be equipped with an approved vacuum breaker. The vacuum breaker shall be installed on the discharge side of the flushing valve with the critical level at least 4 inches above the overflow rim of the bowl.

**P8.5.2 Flushing Tanks.** Flushing tanks shall be equipped with an approved ball-cock. The ball-cock shall be installed with the critical level of the vacuum breaker at least 1 inch above the full opening of the overflow pipe. In cases where the ball-cock has no hush tube, the bottom of the water supply inlet shall be installed 1 inch above the full opening of the overflow pipe.

**P8.5.3 Trough Urinals.** Trough urinals shall be equipped with a vacuum breaker installed on the discharged side of the last valve and not less than 6 inches above the washdown pipe, except in urinals in which the washdown pipe is not exposed.

**P8.5.4 Lawn Sprinklers.** Lawn sprinkler systems shall be equipped with a backflow preventer on the discharge side of each of the downstream control valves. The backflow preventer shall be at least 6 inches above the surrounding ground. Where combination control valves and backflow preventers are installed, the bottom of the valve shall constitute the bottom of the backflow preventer. (See Section P14.)

**P8.5.5 Valve Outlet.** Fixtures with hose attachments shall be protected by a backflow preventer installed 6 inches above the highest point of usage and on the discharge side of the valve.

**P8.6 WATER USED FOR PROCESSING.** Water used for the cooling of equipment or similar purposes shall not be returned to the potable water distribution system. When discharged to the building drainage system, the waste water shall be discharged through an indirect waste pipe or air gap.

#### **P8.7 WATER PUMPING AND STORAGE EQUIPMENT**

**P8.7.1 Pumps and Other Appliances.** Water pumps, tanks, filters, softeners, and all other appliances and devices shall be protected against contamination.

**P8.7.2 Pressure Tanks, Boilers and Relief Valves.** If the discharge or waste from such equipment is connected by piping to the drainage system, it shall be connected as an indirect waste.

**P8.7.3 Protection Against Freezing.** All piping, tanks, appliances and devices subjected to freezing temperatures shall be effectively protected.

**P8.7.4 Cleaning, Lining, Painting or Repairing Water Tanks.** A potable water supply tank used for domestic purposes shall not be lined, painted or repaired with any material which will either affect the taste or the potability of the water supply when the tank is returned to service. The tanks shall be disconnected from the system to prevent any foreign fluid or substance from entering the distribution piping during these operations.

**P8.7.5 House Tanks.** When the water pressure from the city mains during flow is insufficient to supply all fixtures freely and continuously, the rate of supply shall be supplemented by a gravity house tank or booster system.

**P8.7.6 Design.** All water supply tanks shall be supported in accordance with the building code or regulations which apply.

**P8.7.7 Auxiliary Pressure.** When the residual pressure in the system is below the minimum allowable at the highest fixture, when the

flow in the system is at peak demand, an automatically controlled pressure tank or gravity tank shall be installed, of sufficient capacity to supply sections of the building installation which are too high to be supplied directly from the public water main. Where auxiliary tanks are to be supplied by pumps drawing water from the public water supply distribution system, provision must be made to limit the pressure of the suction side of the pump to not less than 15 pounds per square inch.

**P8.7.8 Gravity and Suction Tanks.** Tanks used for domestic water supply, combined supply to fire standpipes and domestic water system, or to supply standpipes for fire-fighting equipment only, shall be equipped with tight covers which are vermin and rodent proof. Such tanks shall be vented with a return bend vent pipe having an area not less than one-half the area of the downfeed riser, and the vent opening shall be covered with a metallic screen of not less than 100 mesh. Soil or waste lines shall not be permitted to pass directly over such tanks.

**P8.7.9 Pressure Tanks.** Pressure tanks used for supplying water to the domestic water distribution system, combined supply to fire standpipes and domestic water supply system, or to supply standpipes for fire equipment only, shall be equipped with an acceptable vacuum breaking device located on the top of the tank. The air inlet of this device shall be covered with a metallic screen of not less than 100 mesh.

**P8.7.10 Overflow for Water Supply Tanks.** Overflow pipes for gravity tanks shall discharge above and within 6 inches of a roof or catch basin, or they shall discharge over an open water-supplied sink. Adequate overflow pipes, properly screened against the entrance of insects and vermin, shall be provided.

**P8.7.11 Tank Supply.** The water supply inlet within the tank shall be at an elevation not less than is required for an air gap in an open tank with overflow; but in no case shall the elevation be less than 4 inches above the overflow. (See Section P14.)

**P8.7.12 Drains.** Water supply tanks shall be provided with valved drain lines located at their lowest point and discharged as an indirect waste or as required for overflow pipes in Paragraph P8.7.10.

**P8.7.13 Size of Overflow.** Overflow drains for water supply tanks shall not be less than the following:

| Drain Pipe<br>(inches) | Tank Capacity<br>(gallons) | Drain Pipe<br>(inches) | Tank Capacity<br>(gallons) |
|------------------------|----------------------------|------------------------|----------------------------|
| 1                      | Up to 750                  | 2½                     | 3,001 to 5,000             |
| 1½                     | 751 to 1,500               | 3                      | 5,001 to 7,500             |
| 2                      | 1,501 to 3,000             | 4                      | Over 7,500                 |

Each drain line shall be equipped with a quick-opening valve of the same diameter as the pipe.

## **P8.8 DISINFECTION OF POTABLE WATER SUPPLY SYSTEM.**

**P8.8.1** The administrative authority having jurisdiction shall require when necessary that a potable water system, or any part thereof installed or repaired, be disinfected in accordance with one of the following methods before it is placed in operation:

**P8.8.2** The system, or part thereof, shall be filled with a solution containing 50 parts per million of available chlorine and allowed to stand 6 hours before flushing and returning to service.

**P8.8.3** The system, or part thereof, shall be filled with a solution containing 100 parts per million of available chlorine and allowed to stand 2 hours before flushing and returning to service.

**P8.8.4** In the case of a potable water storage tank, where it is not possible to disinfect as provided in Paragraphs P8.8.2 and P8.8.3, the entire interior of the tank shall be swabbed with a solution containing 200 parts per million of available chlorine, and the solution allowed to stand 2 hours before flushing and returning to service.

P8.8.5 In the case of potable water filters or similar devices, the dosage shall be determined by the administrative authority.

#### **P8.9 MATERIAL**

P8.9.1 **Water Distributing Pipe, Tubing and Fittings.** Materials for water distributing pipes and tubing shall be of brass, copper, cast-iron, wrought-iron, open-hearth iron, or steel, with appropriate approved fittings. All cast-iron pipe and fittings shall be coal-tar enamel coated. All threaded ferrous pipe and fittings shall be galvanized (zinc-coated) or cement lined. When used underground in soil known to be corrosive, all wrought ferrous pipe and fittings shall be coal-tar enamel coated, and the threaded joints shall be coated and wrapped after installation.

P8.9.2 **Allowance for Character of Water.** When selecting the material and size of pipe for water supply, due consideration must be given to the action of the water on the interior of the pipe, and of the soil, fill or other material on the exterior of the pipe. No piping materials shall be used which would produce toxic conditions in a potable water system.

P8.9.3 **Potable Water Material.** Piping material which has been used for other than a potable water supply shall not be used in a potable water supply system.

P8.9.4 **Water Service Pipe.** The water service pipe from the street main to point of entrance to the building shall be of asbestos-cement, brass, copper, cast iron, galvanized iron or steel, or plastic and shall be of sufficient size to furnish an adequate flow of water to meet the requirements of the building at peak demand, and in no case shall be less than  $\frac{1}{4}$  inch nominal diameter.

P8.9.5 If flush valves or other devices requiring a high rate of flow of water are used, the water service pipe must be designed to supply this flow. If of copper tubing, no lighter than "L" type will be permitted.

P8.10 **WATER SUPPLY CONTROL.** A main shutoff valve on the water service pipe shall be provided near the curb, and also an accessible shutoff valve with a drip valve shall be provided inside, near the entrance of service into each building, but above ground level.

P8.10.1 **Separate Controls for Each Family Unit.** In two-family or multiple dwellings, each family unit shall be controlled by an arrangement of shutoff valves which permit each group of fixtures, or the individual fixtures, to be shut off without interference with the water supply to any other family unit or other portion of the building.

P8.10.2 **Tank Controls.** Supply lines taken from pressure or gravity tanks shall be valved at or near their source. Supply lines from gravity tanks in the upper part of buildings shall be so arranged and valved that air may be admitted to the upper end of these lines when they are drained for repair or for other reason.

P8.10.3 Deleted

P8.10.4 **Individual Controls.** Individual controls shall be provided for all water closets.

P8.10.5 **Draining of Water Pipes.** All water pipes shall be so graded or pitched that the entire system or parts thereof can be drained.

P8.10.6 **Line Valves.** All valves in the water supply distribution system, except those immediately controlling one fixture supply, when fully opened shall have the cross-sectional area of the smallest orifice or opening through which the water flows at least equal to the cross-sectional area of the nominal size of the pipe in which the valve is installed.

#### **P8.11 WATER DISTRIBUTION**

P8.11.1 **Demand Load.** The demand load in the building water supply system is to be based on the number and kind of fixtures installed and the probable simultaneous use of these fixtures.

P8.11.2 **Procedure in Sizing Water Distribution System.** The sizing of the water distribution system shall conform to good engineering practice. (See Section P15.)



**P8.11.3 Size of Fixture Supply.** The minimum size of a fixture supply pipe shall be as follows:

| Type of Fixture or Device                    | Pipe Size (inches) |
|----------------------------------------------|--------------------|
| Bath tubs .....                              | 1/2                |
| Combination sink and tray .....              | 1/2                |
| Drinking fountain .....                      | 3/8                |
| Dishwasher (domestic) .....                  | 1/2                |
| Kitchen sink, residential .....              | 1/2                |
| Kitchen sink, commercial .....               | 3/4                |
| Lavatory .....                               | 1/2                |
| Laundry tray, (1, 2 or 3 compartments) ..... | 1/2                |
| Shower (single head) .....                   | 1/2                |
| Sinks (service, slop) .....                  | 1/2                |
| Sinks, flushing rim .....                    | 3/4                |
| Urinal (flush tank) .....                    | 1/2                |
| Urinal (direct flush tank) .....             | 3/4                |
| Water closet (tank type) .....               | 3/8                |
| Water closet (flush valve type) .....        | 1                  |
| Hose bibbs .....                             | 1/2                |
| Wall hydrant .....                           | 1/2                |

Fixtures not listed may be rated by comparing the fixture to a listed one using water in similar quantities and at a similar rate. For supply outlets likely to impose continuous demands, estimate continuous supply separately and add to the total demand for the fixture.

**P8.11.4 Minimum Pressure.** Minimum, fairly constant, service pressure at the point of outlet discharge shall be not less than 8 pounds per square inch for all fixtures except for direct flush-valves, for which it shall be not less than 15 pounds per square inch, and except where special equipment is used requiring higher pressures. In determining the minimum pressure, allowance shall be made for the pressure drop due to friction loss in the piping system during maximum demand periods as well as head, meter, and other losses in the system.

**P8.11.5 Street Pressure.** Where the street main has a wide fluctuation in pressure during the day, the system shall be designed for the minimum pressure available.

**P8.11.6 Pressure Hazard.** Air chambers or other approved mechanical devices shall be provided where water pressures are excessive so as to reduce water hammer to a degree that no pressure hazard to the piping system will exist.

#### **P8.12 HOT WATER DISTRIBUTION**

**P8.12.1 Hot Water Supply Piping.** The hot water supply piping shall be computed for sizing in similar manner as shown for the cold water system.

#### **P8.13 SAFETY DEVICES—HOT WATER**

**P8.13.1 Pressure Relief Valves.** Pressure relief valves shall be installed for all equipment used for heating or storage of hot water. The rate of discharge of such valve shall limit the pressure rise for any given heat input to 10 per cent of the pressure at which the valve is set to open.

**P8.13.2 Temperature Relief Valves.** Temperature relief valves shall be installed for all equipment used for heating or storage of hot water. Each valve shall be rated as to its B.T.U. capacity. At 210°F. it shall be capable of discharging sufficient hot water to prevent any further rise in temperature.

**P8.13.3 Approvals.** Combination pressure and temperature relief valves or separate pressure and temperature relief valves which have been tested and approved by, or meet the specification requirement of, the American Gas Association or the National Board of Casualty and Surety Underwriters, shall be considered acceptable.

**P8.13.4 Vacuum Relief.** Copper tanks shall be provided with vacuum relief valves.

**P8.13.5 Relief Valve Location.** Temperature relief valves shall be placed directly above the tanks served, and in no case more than 3 inches away from such tank. Pressure relief valves may be located adjacent to the equipment they serve. There shall be no check valve or shut-off valve between a relief valve and the heater or tank for which it is installed.

**P8.13.6 Relief Outlet Wastes.** Relief outlets of pressure, temperature or other type relief valve shall not be connected as a direct waste to the drainage system.

**P8.13.7 Size of Relief Outlet Waste.** Relief outlet waste shall be equal to or greater than the cross-sectional area of the valve discharge outlet.

#### **P8.14 MISCELLANEOUS**

**P8.14.1 Drain Cocks.** All storage tanks shall be equipped with adequate drain cocks.

**P8.14.2 Line Valves.** Valves in the water supply distribution system, except those immediately controlling one fixture supply, when fully opened shall have a cross-sectional area of the smallest orifice or opening through which the water flows at least equal to the cross-sectional area of the nominal size of the pipe in which the valve is installed.

### **SECTION P9—DRAINAGE SYSTEM**

#### **P9.1 MATERIALS**

**P9.1.1 Pipe and Fittings.** Pipe and fittings for the various systems of drainage and for each type of piping shall comply with standards as given in Section P3.

**P9.1.2 Above Ground Piping Within Buildings.** Soil and waste piping for drainage system within a building shall be of cast-iron, galvanized wrought iron, galvanized open-hearth iron, galvanized steel, brass, copper, lead, or plastic (DWV).

**P9.1.3 Underground Piping Within Buildings.** Drains within buildings, when underground, shall be of cast-iron soil pipe. For buildings under four stories in height, the pipe may be service weight. For buildings four stories or more in height, the pipe shall be of extra-heavy weight.

The following materials may be used underground when approved as safe by the administrative authority: Galvanized steel or galvanized ferrous-alloys, lead, copper pipe, copper tubing, or plastic (DWV). Where threaded joints are approved for use underground, they shall be coated and wrapped after installation.

**P9.1.4 Fittings.** Fittings on the drainage system shall conform to the type of piping used. Fittings on screwed pipe shall be of the recessed drainage type. (See P2.5.)

#### **P9.2 BUILDING SEWER**

**P9.2.1 Separate Trenches.** The building sewer, when installed in a separate trench from the water service pipe, shall be of cast-iron sewer pipe, vitrified-clay sewer pipe, concrete sewer pipe, bituminized-fibre sewer pipe, asbestos-cement sewer pipe, or plastic sewer pipe. The joints shall be water-tight and rootproof.

**P9.2.2 One Trench.** The building sewer, when installed in the same trench with the water service pipe, shall be constructed of durable materials which are corrosion-resistant and shall be so installed as to remain water tight and be rootproof. The building sewer shall be tested with a 10-foot head of water or equivalent and found to be tight.

**P9.2.3 Sewer in Filled Ground.** A building sewer or building drain installed in filled or unstable ground shall be of cast-iron pipe, except that nonmetallic drains may be laid upon an approved concrete pad if installed in accordance with Paragraph P11.3.6.

**P9.2.4 Sanitary and Storm Sewers.** Where separate systems of sanitary drainage and storm drainage are installed in the same property,

the sanitary and storm building sewers or drains may be laid side by side in one trench.

**P9.2.5 Old House Sewers and Drains.** Old house sewers and house drains may be used in connection with new buildings or new plumbing and drainage work only when they are found to conform in all respects to the requirements governing new house sewers, and the administrative authority shall notify the owner to make the changes necessary to conform to this Code.

### **P9.3 DRAINAGE PIPE INSTALLATION**

**P9.3.1 Horizontal Drainage Piping.** Horizontal drainage piping shall be installed at a uniform slope, but at slopes not less than permitted in Paragraphs P9.3.2, P9.3.3 and P9.3.4.

**P9.3.2 Small Piping.** Horizontal drainage piping of 3-inch diameter and less shall be installed with a fall of not less than  $\frac{1}{4}$  inch per foot.

**P9.3.3 Large Piping.** Horizontal drainage piping of larger than 3-inch diameter shall be installed with a fall of not less than  $\frac{1}{8}$  inch per foot.

**P9.3.4 Minimum Velocity.** Where conditions do not permit building drains and sewers to be laid with a fall as great as specified, then a lesser slope may be permitted provided the computed velocity will be not less than 2 feet per second when flowing full.

### **P9.4 FIXTURE UNITS**

**P9.4.1 Values for Fixtures.** Fixture unit values as given in Table P9.4.1 designate the relative load weight of different kinds of fixtures which shall be employed in estimating the total load carried by a soil or waste pipe, and shall be used in connection with tables of sizes for soil waste and drain pipes in which the permissible load is given in terms of fixture units.

**TABLE P9.4.1 Fixture Units Per Fixture or Group**

|                                                                                   | <b>Fixture-Unit<br/>Value as Load<br/>Factor</b>  | <b>Minimum<br/>Size of<br/>Trap (inches)</b> |
|-----------------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------|
| 1 bathroom group consisting of water closet, lavatory and bathtub or shower stall | Tank water closet 6<br>Flush valve water closet 8 |                                              |
| Bathtub <sup>1</sup> (with or without overhead shower) -----                      | 2                                                 | 1½                                           |
| Bathtub <sup>1</sup> -----                                                        | 3                                                 | 2                                            |
| Bidet -----                                                                       | 3                                                 | Nominal 1½                                   |
| Combination sink-and-tray -----                                                   | 3                                                 | 1½                                           |
| Combination sink-and-tray with food disposal unit -----                           | 4                                                 | Separate traps 1½                            |
| Dental unit or cuspidor -----                                                     | 1                                                 | 1¼                                           |
| Dental lavatory -----                                                             | 1                                                 | 1¼                                           |
| Drinking fountain -----                                                           | ½                                                 | 1                                            |
| Dishwasher, <sup>2</sup> domestic -----                                           | 2                                                 | 1½                                           |
| Floor drains <sup>3</sup> -----                                                   | 1                                                 | 2                                            |
| Kitchen sink, domestic -----                                                      | 2                                                 | 1½                                           |
| Kitchen sink with food disposal unit -----                                        | 3                                                 | 1½                                           |
| Lavatory <sup>4</sup> -----                                                       | 1                                                 | Small P. O. 1¼                               |
| Lavatory <sup>4</sup> -----                                                       | 2                                                 | Large P. O. 1½                               |
| Lavatory, barber, beauty parlor -----                                             | 2                                                 | 1½                                           |
| Lavatory, surgeon's -----                                                         | 2                                                 | 1½                                           |
| Laundry tray (1 or 2 compartments) -----                                          | 2                                                 | 1½                                           |
| Shower stall, domestic -----                                                      | 2                                                 | 2                                            |
| Showers (group) per head <sup>5</sup> -----                                       | 3                                                 |                                              |
| Sinks:                                                                            |                                                   |                                              |
| Surgeon's -----                                                                   | 3                                                 | 1½                                           |
| Flushing rim (with valve) -----                                                   | 8                                                 | 3                                            |
| Service (trap standard) -----                                                     | 3                                                 | 2                                            |

**TABLE P9.4.1 Fixture Units Per Fixture or Group—(Cont'd)**

|                                                                             | Fixture-Unit<br>Value as Load<br>Factor | Minimum<br>Size of<br>Trap (inches) |
|-----------------------------------------------------------------------------|-----------------------------------------|-------------------------------------|
| Service (P trap) -----                                                      | 2                                       | 2                                   |
| Pot, scullery, etc. <sup>2</sup> -----                                      | 4                                       | 1½                                  |
| Urinal, pedestal, syphon jet, blowout -----                                 | 8                                       | Nominal 3                           |
| Urinal, wall lip -----                                                      | 4                                       | 1½                                  |
| Urinal stall, washout -----                                                 | 4                                       | 2                                   |
| Urinal trough <sup>2</sup> (each 2-foot section) -----                      | 2                                       | 1½                                  |
| Wash sink <sup>2</sup> (circular or multiple),<br>each set of faucets ----- | 2                                       | Nominal 1½                          |
| Water closet, tank-operated -----                                           | 4                                       | Nominal 3                           |
| Water closet, valve-operated -----                                          | 8                                       | 3                                   |

<sup>1</sup>A shower head over a bathtub does not increase the fixture value.

<sup>2</sup>See Paragraphs P9.4.2 and P9.4.3 for method of computing unit value of fixtures not listed in Table P9.4.1 or for rating of devices with intermittent flows.

<sup>3</sup>Size of floor drain shall be determined by the area of surface water to be drained.

<sup>4</sup>Lavatories with 1¼ inch or 1½ inch trap have the same load value; larger P.O. plugs have greater flow rate.

P9.4.2 Fixtures not listed in Table P9.4.1 shall be estimated in accordance with Table P9.4.2.

**TABLE P9.4.2**

| Fixture Drain<br>or Trap Size | Fixture-Unit<br>Value |
|-------------------------------|-----------------------|
| 1¼ inches and smaller -----   | 1                     |
| 1½ inches -----               | 2                     |
| 2 inches -----                | 3                     |
| 2½ inches -----               | 4                     |
| 3 inches -----                | 5                     |
| 4 inches -----                | 6                     |

P9.4.3 **Values for Continuous Flow.** For a continuous or semi-continuous flow into a drainage system such as from a pump, sump ejectors, air conditioning equipment or similar device, two fixture units shall be allowed for each gallon per minute flow.

## P9.5 DETERMINATION OF SIZES FOR THE DRAINAGE SYSTEM

P9.5.1 **Maximum Fixture-Unit Load.** The maximum number of fixture units which may be connected to a given size of building sewer, building drain, horizontal branch, or vertical soil or waste stack is given in Tables P9.5.2 and P9.5.3.

**TABLE P9.5.2 Building Drains and Sewers**

| Diameter of<br>pipe (inches) | Maximum number of fixture units, which<br>may be connected to any portion <sup>1</sup> of the<br>building drain or the building sewer |                 |                 |                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|-----------------|
|                              | Fall per foot                                                                                                                         |                 |                 |                 |
|                              | 1/16-inch                                                                                                                             | ¼-inch          | ½-inch          | ¾-inch          |
| 2 -----                      | ---                                                                                                                                   | ---             | 21              | 26              |
| 2½ -----                     | ---                                                                                                                                   | ---             | 24              | 31              |
| 3 -----                      | ---                                                                                                                                   | 20 <sup>2</sup> | 27 <sup>2</sup> | 36 <sup>2</sup> |
| 4 -----                      | ---                                                                                                                                   | 180             | 216             | 250             |
| 5 -----                      | ---                                                                                                                                   | 390             | 480             | 575             |
| 6 -----                      | ---                                                                                                                                   | 700             | 840             | 1,000           |
| 8 -----                      | 1,400                                                                                                                                 | 1,600           | 1,920           | 2,300           |
| 10 -----                     | 2,500                                                                                                                                 | 2,900           | 3,500           | 4,200           |
| 12 -----                     | 3,900                                                                                                                                 | 4,600           | 5,600           | 6,700           |

<sup>1</sup>Includes branches of the building drain.

<sup>2</sup>Not over 2 water closets.

**TABLE P9.5.3 Horizontal Fixture Branches and Stacks**

| Diameter of pipe (inches) | Maximum number of fixture units which may be connected to |                                               |                               |                                                |
|---------------------------|-----------------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------------|
|                           | Any horizontal <sup>1</sup> fixture branch                | 1 stack of 3 stories in height or 3 intervals | More than 3 stories in height |                                                |
|                           |                                                           |                                               | Total for stack               | Total at <sup>1</sup> story or branch interval |
| 1¼                        | 1                                                         | 2                                             | 2                             | 1                                              |
| 1½                        | 3                                                         | 4                                             | 8                             | 2                                              |
| 2                         | 6                                                         | 10                                            | 24                            | 6                                              |
| 2½                        | 12                                                        | 20                                            | 42                            | 9                                              |
| 3                         | 20 <sup>2</sup>                                           | 30 <sup>3</sup>                               | 60 <sup>3</sup>               | 16 <sup>2</sup>                                |
| 4                         | 160                                                       | 240                                           | 500                           | 90                                             |
| 5                         | 360                                                       | 540                                           | 1,100                         | 200                                            |
| 6                         | 620                                                       | 960                                           | 1,900                         | 350                                            |
| 8                         | 1,400                                                     | 2,200                                         | 3,600                         | 600                                            |
| 10                        | 2,500                                                     | 3,800                                         | 5,600                         | 1,000                                          |
| 12                        | 3,900                                                     | 6,000                                         | 8,400                         | 1,500                                          |

<sup>1</sup> Does not include branches of the building drain.

<sup>2</sup> Not over 2 water closets.

<sup>3</sup> Not over 6 water closets.

**P9.5.4 Minimum Size of Soil and Waste Stacks.** No soil or waste stack shall be smaller than the largest horizontal branch connected thereto, except that a 4x3 W.C. connection shall not be considered a reduction in pipe size.

**P9.5.4.1 Minimum Size of Stack-Vent or Vent Stack.** Any structure on which a building drain is installed shall have at least one stack-vent or vent stack carried full size through the roof not less than 3 inches in diameter or the size of the building drain, whichever is the lesser.

**P9.5.5 Future Fixtures.** When provision is made for the future installation of fixtures, those provided for shall be considered in determining the required sizes of the drain pipes. Construction to provide for such future installation shall be terminated with a plugged fitting or fittings, at the stack, and shall be vented as required in Section P10.

**P9.5.6 Underground Drainage Piping.** No portion of the drainage system installed underground or below the basement or cellar floor shall be less than 2 inches in diameter.

**P9.5.7 Offsets.** In case an offset in a soil or waste stack is made at an angle greater than 45 degrees and the load on the stack at the point above the offset is greater than ½ the allowable load on the total stack (given in Table P9.5.3) the diameter of the stack below and including the offset shall be sized as for a building drain.

**P9.5.8 Connections at Offset Prohibited.** No horizontal branch shall connect within the offset, and the branch which ordinarily connects to the stack on the floor immediately above the offset shall connect to the stack below the offset.

#### **P9.6 SUMPS AND EJECTORS**

**P9.6.1 Building Drains Below Sewer.** Building drains which can not be discharged to the sewer by gravity flow shall be discharged into a tightly covered and vented sump from which the liquid shall be lifted and discharged into the building gravity drainage system by automatic pumping equipment.

**P9.6.2 Storage Period.** The storage of drainage in a sump or ejector shall not exceed a period of 12 hours.

**P9.6.3 Design.** Sump and pumping equipment shall be so designed as to discharge all contents accumulated in the sump during the cycle of emptying operation.

**P9.6.4 Venting.** The system of drainage piping below the sewer level shall be installed and vented, in a manner similar to that of the gravity system.

**P9.6.5 Duplex Equipment.** Sumps receiving the discharge of more than six (6) water closets shall be provided with duplex pumping equipment.

**P9.6.6 Vent Sizes.** Building sump vents shall be sized in accordance with Table P10.17.8, but shall in no case be sized less than 1½ inches.

**P9.6.7 Separate Vents.** Vents from pneumatic ejectors or similar equipment shall be carried separately to the open air as a vent terminal.

**P9.6.8 Connections.** No direct connection of a steam exhaust, blow-off, or drip pipe shall be made with the building drainage system. Waste water when discharged into the building drainage system shall be at a temperature not higher than 140°F. When higher temperature exists, proper cooling methods shall be provided.

#### **P9.7 FLOOR DRAINS**

**P9.7.1 Accessibility.** Floor drains shall connect into a trap so constructed that it can be readily cleaned and of a size to serve efficiently the purpose for which it is intended. The drain inlet shall be so located that it is, at all times, in full view.

**P9.7.2 Size.** Floor drain traps and drains, installed below a basement floor or underground, shall be not less than 2 inches in diameter.

**P9.7.3 Bell Traps.** Bell traps are prohibited.

#### **P9.8 FROST PROTECTION**

**P9.8.1** No soil or waste pipes shall be installed or permitted outside a building, or concealed in outside walls, or in any place where they may be subjected to freezing temperatures, unless adequate provision is made to protect them from frost.

### **SECTION P10—VENTS AND VENTING**

#### **P10.1 MATERIALS**

**P10.1.1 Vents.** Pipe, tubing, and fittings for the vent piping system shall comply with the provisions in Section P3.

**P10.1.2 Specific Type.** Standards given in Table P3.5 apply to the specific materials approved for use and as indicated in the various paragraphs in this chapter as they apply to the venting system.

**P10.1.3 Piping.** Vent piping shall be of cast-iron, galvanized wrought iron, galvanized steel, ferrous-alloys, lead, brass, copper pipe, copper tubing, or plastic.

**P10.1.4 Underground.** Vent piping placed underground shall be cast-iron soil pipe, copper tube of a minimum wall thickness equal to that established for copper water tube, Type L, ABS or PVC plastic pipe (DWV); provided that other materials may be used for underground vents when approved and installed as directed by the administrative authority. Where threaded joints are approved for use underground, they shall be coated and wrapped after installation and test.

**P10.1.5 Fittings.** Fittings shall conform to the type of pipe used in the vent system as required by Paragraphs P10.1.2 and P10.1.3.

**P10.1.6 Acid System.** Vent piping on acid-waste systems shall conform to that required for acid-waste pipe, except as may be approved by the administrative authority.

**P10.1.7 Other Materials.** Nothing in this section shall be deemed to preclude the use of other materials of equal or better quality when approved by the administrative authority.

#### **P10.2 PROTECTION OF TRAP SEALS**

**P10.2.1 Individual Vents.** The seal of every fixture trap in a plumbing system shall be protected by a properly installed individual vent except as otherwise provided in this Section.

**P10.2.2 Stack Vents.** Every soil or waste stack shall be extended vertically as a stack vent to at least 6 inches above the flood level rim of the highest fixture, then to the open air; or the stack vent and vent

stack shall be joined within the building at least 6 inches above the flood level rim of the highest fixture with a single extension from the point of joining to the open air.

**P10.2.3 Vent Stacks.** A vent stack or main vent shall be installed with a soil or waste stack whenever back vents, relief vents or other branch vents are required in two or more branch intervals. The vent stack shall terminate independently in the open air outside the building or shall be connected with the stack vent as prescribed in Paragraph P10.2.2 and shall connect with the soil or waste stack through, at, or below the lowest horizontal waste branch; or with the building drain.

**P10.2.4 Location of Vent Terminal.** Vent terminal from a drainage system shall not be directly beneath any door, window or other ventilating opening of the building or an adjacent building, nor shall any such vent terminal be within 12 feet horizontally of such an opening unless it is at least 3 feet above the top of such opening.

**P10.2.5 Extension Through Roof.** Extensions of vent pipes through a roof shall be terminated at least 6 inches above it and shall be properly flashed. In sections of the country subjected to snow accumulation vent extensions shall be high enough to clear any possible accumulation of snow. Where the roof is to be used for any purpose other than weather protection, the extensions shall be run at least 7 feet above the roof.

**P10.2.7 Deleted**

**P10.2.6 Extensions Through Wall.** Vent terminals extending through a wall shall be at least 12 feet horizontally from any adjacent lot line. They shall be effectively screened, and shall meet requirements as prescribed in Paragraph P10.2.4.

**P10.2.8 Flashings.** Each vent terminal shall be made water-tight with the roof by proper flashing.

**P10.2.9 Flag Poling.** Vent terminals shall not be used for the purpose of flag poling, TV aerials, or similar purposes, except when the piping has been anchored to the construction and approved as safe by the administrative authority.

**P10.2.10 Frost Closure.** Where there is possibility of frost closure, the vent extension through the roof shall be at least 3 inches in diameter. When it is found necessary to increase the size of the vent terminal, the change in diameter shall be made inside the building.

### **P10.3 FIXTURE VENTS**

**P10.3.1 Distance of Trap from Vent.** Each fixture trap shall have a protecting vent so located that the slope and the developed length in the fixture drain from the trap weir to the vent fitting are within the requirements set forth in Table P10.3.1.

**TABLE P10.3.1 Distance of Trap from Vent**

| Permissible Length in Feet        |       |                          |
|-----------------------------------|-------|--------------------------|
| Size of Fixture Drain (in inches) |       | Sanitary Tee<br>¾" Slope |
| 1                                 | ----- | 2'-0"                    |
| 1¼                                | ----- | 4'-0"                    |
| 1½                                | ----- | 4'-6"                    |
| 2                                 | ----- | 5'-0"                    |
| 3                                 | ----- | 6'-0"                    |
| 4                                 | ----- | 10'-0"                   |

**P10.3.2 Vent Pipe Level.** The vent pipe opening from a soil or waste pipe, except for water closets and similar fixtures shall not be below the dip of the trap.

**P10.3.3 Crown Vent Prohibited.** No back vent shall be installed within 2 pipe diameters of the trap weir.

**P10.3.4 Vent Prohibited.** Wet venting or stack venting of fixtures shall be prohibited except as permitted in Paragraphs P10.5 and P10.6.

**P10.4 COMMON VENT**

**P10.4.1** An individual vent or stack vent installed vertically, may be used as a common vent for two fixture traps when both fixture drains connect with a vertical drain or stack at the same level and the connections, slope and length are within the limits of Paragraph P10.3.

**P10.4.2** A common vent may be used for two fixtures set on the same floor level but connecting at different levels in the stack, provided the vertical drain is one pipe diameter larger than the upper fixture drain but in no case smaller than the lower fixture drain, whichever is the larger, and that both drains conform to Table P10.3.1.

**P10.5 WET VENTING**

**P10.5.1 Single Bathroom Groups.** A single bathroom group of fixtures may be installed with the drain from a back-vented lavatory, kitchen sink, or combination fixture serving as a wet vent for a bathtub or shower stall and for the water closet, provided that:

(a) Not more than one fixture unit is drained into a 1½-inch-diameter wet vent or not more than four fixture units drain into a 2-inch-diameter wet vent.

(b) The horizontal branch connects to the stack at the same level as the water-closet drain or below the water-closet drain when installed on the top floor. It may also connect to the water-closet bend.

**P10.5.2 Double Bath.** Bathroom groups back-to-back on top floor consisting of two lavatories and two bathtubs or shower stalls may be installed on the same horizontal branch with a common vent for the lavatories and with no back vent for the bathtubs or shower stalls and for the water closets, provided the wet vent is 2 inches in diameter, and the length of the fixture drain conforms to Table P10.3.1.

**P10.5.3 Multistory Bathroom Groups.** On the lower floors of a multistory building, the waste pipe from one or two lavatories may be used as a wet vent for one or two bathtubs or showers provided that:

(a) The wet vent and its extension to the vent stack is 2 inches in diameter.

(b) Each water closet below the top floor is individually back vented.

(c) The vent stack is sized as given in Table P10.5.3.

**TABLE P10.5.3 Size of Vent Stacks**

| Number of Wet Vented Fixtures      | Diameter of vent stacks (inches) |
|------------------------------------|----------------------------------|
| 1 or 2 bathtubs or showers -----   | 2                                |
| 3 to 5 bathtubs or showers -----   | 2½                               |
| 6 to 9 bathtubs or showers -----   | 3                                |
| 10 to 16 bathtubs or showers ----- | 4                                |

**P10.5.4 Exception.** In multistory bathroom groups, wet vented in accordance with Paragraph P10.5.3, the water closets below the top floor need not be individually vented if the 2-inch waste connects directly into the water closet bend at a 45° angle to the horizontal portion of the bend in the direction of flow.

**P10.6 STACK VENTING**

**P10.6.1** Every bathroom or toilet room group shall have a stack-vent as per P9.5.4.1 or P10.17, whichever is applicable.

**P10.6.2 One-Bathroom Group.** Where the water closet and bathtub (or shower) wastes enter the stack at the same level, it shall be considered adequately vented when all fixtures are installed within the limits given in Paragraphs P10.3.1 and P10.6.3.

**P10.6.3 Limits of Fixture Units** above stack vented water closets



and bath or shower shall not be exceeded by more than 4 fixture units for stack vented group.

**P10.6.4 One-Bathroom Group.** Except as indicated in Paragraph P10.6.5, a group of fixtures, consisting of one bathroom group and a kitchen sink or combination fixture, may be installed without individual fixture vents, in a one-story building or on the top floor of a building, provided each fixture drain connects independently to the stack and the water closet and bathtub or shower-stall drain enters the stack at the same level and in accordance with the requirements in Table P10.3.1.

**P10.6.5 Overtaxed Sewers.** When a sink or combination fixture connects to the stack-vented bathroom group, and when the street sewer is sufficiently overloaded to cause frequent submersion of the building sewer, a relief vent or back-vented fixture shall be connected to the stack below the stack-vented water closet or bathtub.

#### **P10.7 INDIVIDUAL FIXTURE REVENTING**

**P10.7.1 Horizontal Branches.** One sink and one lavatory, or three lavatories within 8 feet developed length of a main-vented line may be installed on a 2-inch horizontal waste branch without reventing, provided the branch is not less than 2 inches in diameter throughout its length, and provided the wastes are connected into the side of the branch and the branch leads to its stack connection with a pitch of not more than  $\frac{1}{4}$ -inch per foot.

**P10.7.2 Where Required.** When fixtures other than water closets discharge downstream from a water closet, each fixture connecting downstream shall be individually vented.

**P10.7.3 Limits of Fixture Units Above Bathtubs and Water Closets.** A fixture or combination of fixtures whose total discharge rating is not more than three fixture units may discharge into a stack not less than 3 inches in diameter without reventing, provided such fixture connections are made above the connection to the highest water closet, or bathtub sanitary tee, the fixture-unit rating of the stack is not otherwise exceeded, and their waste piping is installed as otherwise required in Paragraph P10.7.1.

#### **P10.8 CIRCUIT AND LOOP VENTING**

**P10.8.1 Battery Venting.** A branch soil or waste pipe to which two but not more than eight water closets (except blow-out type), pedestal urinals, trap standard to floor, shower stalls, or floor drains are connected in battery, shall be vented by a circuit or loop vent which shall take off in front of the last fixture connection. In addition, lower-floor branches serving more than three water closets shall be provided with a relief vent taken off in front of the first fixture connection. When lavatories or similar fixtures discharge above such branches, each vertical branch shall be provided with a continuous vent.

**P10.8.2 Dual Relief Vents.** Two horizontal branches serving a total of not more than 8 water closets (as indicated in Paragraph P10.8.1) in the same branch interval shall have a dual relief vent. Where the vents are joined, the point of joining shall be at least 6 inches above the flood-level rim of the highest fixture connected to either branch. When other fixtures discharge above such branch, each branch shall be provided with a relief vent taken off in front of the first fixture connection.

**P10.8.3 Vent Connections.** When the circuit loop or relief vent connection is taken off the horizontal branch, the vent connection must be taken off not more than 60° from a vertical line from the top of the horizontal branch.

**P10.9 FIXTURES BACK-TO-BACK IN BATTERY.** When fixtures are connected to one horizontal branch through a double wye or a sanitary cross in a vertical position, a common vent for each two fixtures back-to-back or double connection shall be provided. The common vent shall be installed in a vertical position as a continuation of the double connection.

**P10.10 SUMP VENTS. Size of Vent.** All pumps, ejectors (except

pneumatic ejectors), and receiving tanks used for receiving sewage or other wastes, shall be provided with a vent of a size in accordance with Table P10.17.8.

**P10.11 PNEUMATIC EJECTORS.** Relief vents from a pneumatic ejector shall not be connected to a fixture-branch vent but shall be carried separately to a main vent or stack-vent or to the open air above roof.

#### **P10.12 VENTING OFFSETS**

**P10.12.1 Venting Required.** Offsets in soil or waste stacks at an angle greater than 45° from the vertical, serving fixtures below and on two or more floors above the offset, shall be vented as provided in either Paragraph P10.12.2 or P10.12.3.

**P10.12.2 Offset Vent Connection.** Such offsets shall be provided with a vent equal in diameter to the vent stack or soil stack, and connected to the stack through a "Y" below the offset and above the next lower branch interval. The upper end of the vent shall connect to the vent stack, not less than 3 feet above the floor level.

**P10.12.3 Separate Venting.** Such offsets may be vented as two separate soil or waste stacks, namely the stack section below the offset and the stack section above the offset.

#### **P10.13 RELIEF VENTS**

**P10.13.1 Stacks of More than Ten Branch Intervals.** All soil and waste stacks in buildings having more than 10 branch intervals, shall be provided with a relief vent at each tenth interval installed, counting to begin at the top floor. The size of the relief vent shall be equal to the size of the vent stack to which it connects. The lower end of the relief vent shall connect to the soil or waste stack through a "Y" below the horizontal branch serving that floor and the upper end shall connect to the vent stack through a "Y" not less than 3 feet above the floor level.

**P10.14 MAIN VENTS TO CONNECT AT BASE.** All main vents or vent stacks shall connect full size at their base to the building drain or to the main soil or waste pipe, at or below the lowest fixture branch. All vent pipes shall extend undiminished in size above the roof, or shall be reconnected with main soil or waste vent.

#### **P10.15 VENT HEADERS**

**P10.15.1 Connection of Vents.** Stack vents and vent stacks may be connected into a common vent header at the top of the stacks and then extended to the open air at one point. This header shall be sized in accordance with the requirements of Table P10.17.8, the number of units being the sum of all units on all stacks connected thereto, and the developed length being the longest vent length from the intersection at the base of the most distant stack to the vent header terminal in the open air as a direct extension of one stack.

#### **P10.16 VENT PIPE GRADES AND CONNECTIONS**

**P10.16.1 Grades.** All vent and branch-vent pipes shall be free from drops or sags and be so graded and connected as to drip back to the soil or waste pipe or vent stack by gravity.

**P10.16.2 Connections to Soil or Waste Pipe.** Where vent pipes connect to a horizontal soil or waste pipe, the vent shall be taken off above the center line of the soil pipe, and the vent pipe shall rise vertically, or at an angle not more than 60° to the vertical to a point at least 6 inches above the flood-level rim of the fixture it is venting before offsetting horizontally or before connecting to the branch vent.

**P10.16.3 Connection to Vent Stack.** A connection between a vent pipe and a vent stack shall be at least 6 inches above the flood-level rim of the highest fixture served by the vent. Horizontal vent pipes forming branch vents, relief vents, circuit vents, or loop vents shall be at least 6 inches above the flood-level rim of the highest fixture served.

#### **P10.17 SIZE AND LENGTH OF VENTS**

**P10.17.1 Length of Vent Stacks.** The length of vent stack or main vent shall be its developed length from the lowest connection of the vent system with the soil stack, waste stack or building drain either to

the vent stack terminal, if it terminates separately in the open air, or to the connection of the vent stack with the stack vent, plus the developed length, of the stack vent from the connection to the terminal in the open air, if the two vents are connected together with a single extension to the open air.

**P10.17.2 Length of Branch Vent.** The length of a branch vent shall be the developed length from its connection with the vent stack or stack vent to the fixture drain or horizontal soil or waste branch served by the branch vent.

**P10.17.3 Length of Stack Vent.** The length of a stack vent shall be the developed length from the highest horizontal or fixture branch connected to the stack, to the terminal of the stack vent in the open air.

**P10.17.4 Size of Stack Vent.** The diameter of a stack vent shall not be less than the diameter of the soil or waste stack.

**P10.17.5 Size of Vent Stack.** A vent stack or main vent shall have a diameter of at least one-half the diameter of the soil or waste stack, but in no case less than 1½ inches, and depending on its developed length and the number of fixture units installed on the soil or waste stack shall be in accordance with Table P10.7.8.

**P10.17.6 Size of Individual Vent.** The diameter of an individual vent shall be not less than 1¼ inches nor less than one-half the diameter of the drain to which it is connected.

**P10.17.7 Size of Relief Vent.** The diameter of a relief vent shall be not less than one-half the diameter of the soil or waste branch.

**P10.17.8 Size of Vent Piping.** The size of vent piping shall be determined from its length and the total of fixture units connected thereto, as provided in Table P10.17.8. 20 per cent of the total length may be installed in a horizontal position.

**TABLE P10.17.8 Size and Length of Vents**

| Size of<br>Soil or<br>Waste<br>Stack<br>(Inches) | Fixture<br>units<br>con-<br>nected | Diameter of Vent Required (Inches) |     |     |     |     |      |      |      |   |
|--------------------------------------------------|------------------------------------|------------------------------------|-----|-----|-----|-----|------|------|------|---|
|                                                  |                                    | 1¼                                 | 1½  | 2   | 2½  | 3   | 4    | 5    | 6    | 8 |
|                                                  |                                    | Maximum Length of Vent (Feet)      |     |     |     |     |      |      |      |   |
| 1¼                                               | 2                                  | 30                                 | --- | --- | --- | --- | ---  | ---  | ---  |   |
| 1½                                               | 8                                  | 50                                 | 150 | --- | --- | --- | ---  | ---  | ---  |   |
| 1½                                               | 10                                 | 30                                 | 100 | --- | --- | --- | ---  | ---  | ---  |   |
| 2                                                | 12                                 | 30                                 | 75  | 200 | --- | --- | ---  | ---  | ---  |   |
| 2                                                | 20                                 | 26                                 | 50  | 150 | --- | --- | ---  | ---  | ---  |   |
| 2½                                               | 42                                 | ---                                | 30  | 100 | 300 | --- | ---  | ---  | ---  |   |
| 3                                                | 10                                 | ---                                | 30  | 100 | 200 | 600 | ---  | ---  | ---  |   |
| 3                                                | 30                                 | ---                                | --- | 60  | 200 | 500 | ---  | ---  | ---  |   |
| 3                                                | 60                                 | ---                                | --- | 50  | 80  | 400 | ---  | ---  | ---  |   |
| 4                                                | 100                                | ---                                | --- | 35  | 100 | 260 | 1000 | ---  | ---  |   |
| 4                                                | 200                                | ---                                | --- | 30  | 90  | 250 | 900  | ---  | ---  |   |
| 4                                                | 500                                | ---                                | --- | 20  | 70  | 180 | 700  | ---  | ---  |   |
| 5                                                | 200                                | ---                                | --- | --- | 35  | 80  | 350  | 1000 | ---  |   |
| 5                                                | 500                                | ---                                | --- | --- | 30  | 70  | 300  | 900  | ---  |   |
| 5                                                | 1100                               | ---                                | --- | --- | 20  | 50  | 200  | 700  | ---  |   |
| 6                                                | 350                                | ---                                | --- | --- | 25  | 50  | 200  | 400  | 1300 |   |
| 6                                                | 620                                | ---                                | --- | --- | 15  | 30  | 125  | 300  | 1100 |   |
| 6                                                | 960                                | ---                                | --- | --- | --- | 24  | 100  | 250  | 1000 |   |
| 6                                                | 1900                               | ---                                | --- | --- | --- | 20  | 70   | 200  | 700  |   |
| 8                                                | 600                                | ---                                | --- | --- | --- | --- | 50   | 150  | 500  |   |
| 8                                                | 1400                               | ---                                | --- | --- | --- | --- | 40   | 100  | 400  |   |
| 8                                                | 2200                               | ---                                | --- | --- | --- | --- | 30   | 80   | 350  |   |
| 8                                                | 3600                               | ---                                | --- | --- | --- | --- | 25   | 60   | 250  |   |
| 10                                               | 1000                               | ---                                | --- | --- | --- | --- | ---  | 75   | 125  |   |
| 10                                               | 2500                               | ---                                | --- | --- | --- | --- | ---  | 50   | 100  |   |
| 10                                               | 3800                               | ---                                | --- | --- | --- | --- | ---  | 30   | 80   |   |
| 10                                               | 5600                               | ---                                | --- | --- | --- | --- | ---  | 25   | 60   |   |

## SECTION P11—HANGERS AND SUPPORTS

### P11.1 STRAINS AND STRESSES

P11.1.1 **General.** Piping in a plumbing system shall be installed without undue strains and stresses, and provision shall be made for expansion, contraction, and structural settlement.

### P11.2 VERTICAL PIPING

P11.2.1 **Attachment.** Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.

P11.2.2 **Cast-Iron Soil Pipe.** Cast-iron soil pipe shall be supported at not less than every story height and at its base.

P11.2.3 **Screwed Pipe.** Screwed pipe (SPS) shall be supported at not less than every other story height.

P11.2.4 **Copper Tubing.** Copper tubing shall be supported at each story for piping 1½ inches and over, and at not more than 4-foot intervals for 1½ inches and smaller.

P11.2.5 **Lead Pipe.** Lead pipe shall be supported at intervals not exceeding 4 feet.

P11.2.6 **Plastic Pipe.** Plastic pipe when installed vertically shall be supported at intervals of not more than six (6) feet; except in building in which the distance from floor to ceiling does not exceed eight (8) feet supports at each floor will be acceptable.

### P11.3 HORIZONTAL PIPING

P11.3.1 **Supports.** Horizontal piping shall be supported at sufficiently close intervals to keep it in alignment and prevent sagging.

P11.3.2 **Cast-Iron Soil Pipe.** Cast-iron soil pipe shall be supported at not more than 5-foot intervals.

P11.3.3 **Screwed Pipe.** Screwed pipe (SPS) shall be supported at approximately 12-foot intervals.

P11.3.4 **Copper Tubing.** Copper tubing shall be supported at approximately 6-foot intervals for piping 1½ inches and smaller, and at 10-foot intervals for piping 2 inches and larger.

P11.3.5 **Lead Pipe.** Lead pipe in excess of 5 feet in length shall be supported by straps or otherwise for its entire length.

P11.3.6 **In Ground.** Piping in the ground shall be laid on a firm bed for its entire length, except where support is otherwise provided and which is adequate in the judgment of the administrative authority.

P11.3.7 **Plastic Pipe.** Plastic pipe when installed horizontally shall be supported at intervals of not more than five (5) feet, at ends of branches, and at all points of change of direction. Support trap arms in excess of three (3) feet as close as possible to the trap.

### P11.4 HANGERS AND ANCHORS

P11.4.1 **Material.** Hangers and anchors shall be of metal of sufficient strength to maintain their proportional share of the pipe alignments and prevent rattling.

P11.4.2 **Attachment.** Hangers and anchors shall be securely attached to the building construction.

### P11.5 STRAINS AND STRESSES

P11.5.1 **Installation of Pipe.** Piping in a plumbing system shall be so installed as to prevent undue strains and stresses.

P11.5.2 **Expansion and Contraction.** Provision shall be made for expansion and contraction of piping and for structural settlement which may affect the piping.

P11.5.3 **Piping in Concrete.** Piping in concrete or masonry walls or footings shall be placed or installed in chases or recesses which will permit access to the piping for repair or replacement.

### P11.6 BASE OF STACKS

P11.6.1 **Supports.** Bases of cast-iron soil stacks shall be supported on concrete, brick laid in cement mortar, metal brackets attached to the building construction, or by other methods approved by the administrative authority.

**P11.6.2 Piping Material.** Other piping material shall be so anchored as to take the load off the stack at the base.

## **SECTION P12—STORM DRAINS**

### **P12.1 GENERAL**

**P12.1.1 Drainage Required.** Roof and paved areas, yards, courts and courtyards shall be drained into a storm-sewer system, or into a combined sewer system where such systems are available.

**P12.1.2 Prohibited Drainage.** Storm water shall not be drained into sewers intended for sewage only.

**P12.1.3 Traps.** Leaders and storm drains, when connected to a combined sewer or storm sewer shall be trapped. When the sewage and storm water drainage are combined within the building, one trap on the main storm drain of the building may serve.

**P12.1.4 Expansion Joints.** Expansion joints or sleeves shall be provided where warranted by temperature variations or physical conditions.

**P12.1.5 Subsoil drain.** Where subsoil drains are placed under the cellar or basement floor, or are used to surround the outer walls of a building, they shall be made of open-jointed or horizontally split or perforated clay tile, or perforated bituminized-fiber pipe or perforated asbestos-cement pipe, or perforated plastic pipe, not less than 4 inches in diameter. When the building is subject to backwater, the subsoil drain shall be protected by an accessibly located backwater valve. Subsoil drains may discharge into a properly trapped area drain or sump. Such sumps do not require vents.

**P12.1.6 Building Subdrains.** Building subdrains located below the public drainage level shall discharge into a sump or receiving tank, the contents of which shall be automatically lifted and discharged into the drainage system as required for building sumps.

### **P12.2 MATERIALS**

**P12.2.1 Inside Leaders, Conductors or Downspouts.** Leaders, conductors, or downspouts placed within a building or run in a vent or pipe shaft shall be of centrifugally spun cast-iron, brass, copper, copper tube (KLM or DWV), lead, galvanized wrought iron or plastic (DWV).

**P12.2.2 Outside Leaders.** When outside leaders are of sheet metal and connected to a building storm drain or storm sewer, they shall be connected to a cast-iron drain extending above the finish grade, or the sheet-metal leader shall be protected against injury.

**P12.2.3 Underground Storm Drains.** Building storm drains underground, inside the building, shall be of cast-iron soil pipe.

**P12.2.4 Deleted**

**P12.2.5 Building Storm Sewers.** Building storm sewers from a point 5 feet beyond the footings or bearing walls shall be of centrifugally spun cast iron, brass, copper, copper tube (KLM or DWV), plastic (DWV), vitrified clay, concrete, bituminized-fiber or asbestos-cement.

### **P12.3 TRAPS**

**P12.3.1 Main Traps.** Individual storm water traps shall be installed on the storm water drain branch serving each conductor, or a single trap shall be installed in the main storm drain just before its connection to the combined building sewer, main drain, or public sewer.

**P12.3.2 Material.** Storm water traps, when required, shall be of cast-iron, galvanized ferrous alloys, brass, copper (K & L), lead, or plastic (DWV).

**P12.3.3** No traps shall be required for storm water drains which are connected to a sewer carrying storm water exclusively.

**P12.3.4 Conductor traps** shall be so located that an accessible cleanout may be installed on the building side of the trap.

### **P12.4 ROOF DRAINS**

**P12.4.1 Material.** Roof drains shall be of cast-iron, copper, lead, or other acceptable corrosion-resisting material.

**P12.4.2 Strainers.** All roof areas, except those draining to hanging gutters, shall be equipped with roof drains having strainers extending not less than 4 inches above the surface of the roof immediately adjacent to the roof drain. Strainers shall have an available inlet area, above roof level, of not less than  $1\frac{1}{2}$  times the area of the conductor or leader to which the drain is connected.

**P12.4.3 Flat Decks.** Roof drain strainers for use on sun decks, parking decks, and similar areas, normally serviced and maintained may be of the flat surface type, level with the deck, and shall have an available inlet area not less than two times the area of the conductor or leader to which the drain is connected.

**P12.4.4 Roof Drain Flashings.** The connection between roofs and roof drains which pass through the roof and into the interior of the building shall be made watertight by the use of proper flashing material.

#### **P12.5 SIZE OF LEADERS AND STORM DRAINS**

**P12.5.1 Vertical Leaders.** The size of the vertical leader or a leader having a slope of  $\frac{1}{2}$ -inch or greater shall be based upon the maximum projected roof area as given in Table P12.5.1.

**TABLE P12.5.1 Size of Vertical Leaders**

| <b>Nominal Leader Size,<br/>Equivalent Diameter,<br/>in Inches</b> | <b>Maximum Projected<br/>Roof Area*<br/>in Square Feet</b> |
|--------------------------------------------------------------------|------------------------------------------------------------|
| 2                                                                  | 525                                                        |
| 2½                                                                 | 945                                                        |
| 3                                                                  | 1,600                                                      |
| 4                                                                  | 3,340                                                      |
| 5                                                                  | 6,290                                                      |
| 6                                                                  | 9,825                                                      |
| 8                                                                  | 21,100                                                     |

**P12.5.2 Storm Drains.** The minimum size of a building storm sewer, building drain or any of its branches, having a slope of  $\frac{1}{2}$  inch or less per foot, shall be based upon the maximum roof area to be handled according to Table P12.5.2.

**TABLE P12.5.2 Maximum Projected Roof Area for Drains at Various Slopes**

| <b>Diameter<br/>of Pipe</b> | <b><math>\frac{1}{8}</math> Inch Fall<br/>per Foot</b> | <b><math>\frac{1}{4}</math> Inch Fall<br/>per Foot</b> | <b><math>\frac{1}{2}</math> Inch Fall<br/>per Foot</b> |
|-----------------------------|--------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|
| <b>Inches</b>               | <b>Square Feet*</b>                                    | <b>Square Feet</b>                                     | <b>Square Feet</b>                                     |
| 2                           | ---                                                    | 370                                                    | 525                                                    |
| 3                           | 597                                                    | 843                                                    | 1,195                                                  |
| 4                           | 1,368                                                  | 1,925                                                  | 2,730                                                  |
| 5                           | 2,425                                                  | 3,430                                                  | 4,850                                                  |
| 6                           | 3,880                                                  | 5,480                                                  | 7,770                                                  |
| 8                           | 8,350                                                  | 11,850                                                 | 16,700                                                 |
| 10                          | 15,000                                                 | 21,200                                                 | 30,000                                                 |
| 12                          | 24,200                                                 | 34,200                                                 | 48,400                                                 |
| 15                          | 43,200                                                 | 61,000                                                 | 86,500                                                 |

\*Tables P12.5.1 and P12.5.2 are based upon a maximum rate of rainfall of  $5\frac{1}{2}$  inches per hour. This is believed to be a reasonable rate for all parts of Louisiana. If a lesser or greater rainfall intensity is assumed, the figures given in the tables for roof area must be adjusted proportionally by multiplying the figure given for the roof area by  $5\frac{1}{2}$  and dividing the product by the assumed hourly rainfall rate.

**P12.5.3 Roof Gutters.** The size of semicircular gutters shall be based on the maximum projected roof area, according to Table P12.5.3.

**TABLE P12.5.3 Size of Gutters.**

| Diameter of gutter <sup>1</sup> | Maximum projected roof area for gutters of various slopes |          |          |          |
|---------------------------------|-----------------------------------------------------------|----------|----------|----------|
|                                 | 1/16 inch                                                 | 1/8 inch | 1/4 inch | 1/2 inch |
| Inches                          | Sq. ft.                                                   | Sq. ft.  | Sq. ft.  | Sq. ft.  |
| 3 -----                         | 170                                                       | 240      | 340      | 480      |
| 4 -----                         | 360                                                       | 510      | 720      | 1,020    |
| 5 -----                         | 625                                                       | 880      | 1,250    | 1,770    |
| 6 -----                         | 960                                                       | 1,360    | 1,920    | 2,770    |
| 7 -----                         | 1,380                                                     | 1,950    | 2,760    | 3,900    |
| 8 -----                         | 1,990                                                     | 2,800    | 3,980    | 5,600    |
| 10 -----                        | 3,600                                                     | 5,100    | 7,200    | 10,000   |

<sup>1</sup>Gutters other than semicircular may be used provided they have an equivalent cross-sectional area.

## **P12.6 CONDUCTORS AND CONNECTIONS**

**P12.6.1** Conductor pipes shall not be used as soil, waste, or vent pipes; nor shall soil, waste, or vent pipes be used as conductors.

**P12.6.2** Rain water conductors installed along alley-ways, drive-ways, or other locations where they may be exposed to damage, shall be protected by metal guards, recessed into the wall, or constructed from ferrous-alloy pipe.

**P12.6.3 Combining Storm with Sanitary Drainage.** The sanitary and storm-drainage system of a building shall be entirely separate; except that where a combined sewer is available, the building storm-drain may be connected in the same horizontal plane through a single Y fitting to the combined drain or sewer at least 10 feet downstream from any branch to the building drain or from any soil stack.

**P12.6.4 Double Connections of Storm Drains.** Where the sanitary and storm drains are connected on both sides of the combined sewer, single Y's shall be used; and the requirements of Paragraph P12.6.3 relative to the location of connections shall also apply.

**P12.6.5** Floor drains connected to a storm drain shall be trapped; and where necessary shall be provided with back-water valves.

## **P12.7 SIZE OF COMBINED DRAINS AND SEWERS**

**P12.7.1 Size to Combining Point.** The size of the building drains and the building storm drains up to the point of combining into one system shall be as required for separate storm and sewage systems.

**P12.7.2 Roof Area Equivalents for Fixture Units.** To determine the size of a combined drain or sewer, the connected fixture units shall be first converted to square feet or roof area, as follows:

(a) When the total fixture-unit load on the combined drain is less than 256 fixture-units, the equivalent drainage area in horizontal projection shall be taken as 1,000 square feet.

(b) When the total fixture-unit load exceeds 256 fixture-units, each fixture-unit shall be considered the equivalent of 3.9 square feet of drainage area.

(c) If the rainfall to be provided for is more or less than 4 inches per hour, the 1,000-square-foot equivalent in Paragraph (a) and the 3.9 square feet in Paragraph (b) shall be adjusted by multiplying by 4 and dividing by the rainfall in inches per hour to be provided for.

**P12.7.3 Values for Continuous Flow.** Where there is a continuous or semi-continuous discharge into the building storm drain or the building storm sewer as from a pump, air conditioning plant or similar de-

vice, then each gallon per minute of such discharge shall be computed as being equivalent to 24 square feet of roof area, based upon a 4-inch rainfall.

## **SECTION P13—INSPECTION, TESTS AND MAINTENANCE**

**P13.1 PLUMBING PLANS.** All plans and specifications required to be submitted shall be examined for acceptability under the provisions of this Code.

### **P13.2 INSPECTIONS**

**P13.2.1 New Work.** All new plumbing work, and such portions of existing systems as may be affected by new work or any changes, shall be inspected to ensure compliance with all the requirements of this Code and to assure that the installation and construction of the plumbing system is in accordance with the approved plans.

**P13.2.2 Notification.** It shall be the duty of the plumber to give advance notice to the proper administrative authority when plumbing work is ready for test or inspection.

**P13.2.3 Responsibility.** It shall be the duty of the holder of a permit to make sure that the work will stand the test prescribed before giving the notification.

**P13.2.4 Re-testing.** If the proper administrative authority finds that the work will not pass the test, the plumber shall be required to make the necessary corrections, and the work shall then be resubmitted for test or inspection.

**P13.2.5 Test.** Tests shall be conducted in the presence of the administrative authority or of his duly appointed representative.

**P13.2.6 Material and Labor for Tests.** The equipment, material, power and labor necessary for the inspection and test shall be furnished by the plumber.

**P13.2.7 Requirements.** No drainage or plumbing system or part thereof shall be covered until it has been inspected, tested, and accepted as prescribed in this Code.

**P13.2.8 Uncovering.** If any building or drainage or plumbing system or part thereof which is installed, altered, or repaired, is covered before being inspected, tested, and approved, as prescribed in this code it shall be uncovered for inspection after notice to uncover the work has been issued to the responsible party by the administrative authority.

**P13.2.9 Violations.** Notices of violations shall be written and mailed or delivered by the administrative authority to the person responsible at the time the inspection was made.

**P13.3 TESTS OF DRAINAGE AND VENT SYSTEMS.** All the piping of the plumbing system shall be tested with water or air. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submitted to a final test. The proper administrative authority may require the removal of any clean-outs to ascertain if the pressure has reached all parts of the system.

### **P13.4 METHOD OF TESTING DRAINAGE AND VENT SYSTEM**

**P13.4.1 Water Test.** The water test shall be applied to the drainage system in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest opening of the section under test, and each section shall be filled with water; but no section shall be tested with less than a 10-foot head of water. In testing successive sections, at least the upper 10 feet of the next preceding section shall be tested, so that no joint of pipe in the building (except the uppermost 10 feet of the system) shall have been submitted to a test of less than a 10-foot head of water. The



water shall be kept in the system, or in the portion under test, for at least 15 minutes before inspection starts; and the system shall be tight at all points.

**P13.4.2 Air Test.** The air test shall be made by attaching an air compressor or testing apparatus to any suitable opening and, after closing all other inlets and outlets to the system, forcing air into the system until there is a uniform gage pressure of 5 pounds per square inch, or sufficient to balance a column of mercury 10 inches in height. This pressure shall be held without the introduction of additional air for a period of at least 15 minutes.

**P13.4.3 Final Inspection.** A final inspection of the completed drainage and vent systems shall be made.

#### **P13.5 BUILDING SEWER**

**P13.5.1 Inspection Required.** Building sewers shall be subject to a final inspection.

#### **P13.6 TEST OF WATER SUPPLY SYSTEM**

**P13.6.1** Upon completion of a section or of the entire water supply system it shall be tested and proved tight under a water pressure not less than the working pressure under which it is to be used. The water used for the tests shall be obtained from the normal source of supply.

**P13.7 TEST OF INTERIOR LEADERS OR DOWNSPOUTS.** Leaders or downspouts and branches within a building shall be tested by water or air as per Paragraph P13.4.1 or P13.4.2.

**P13.8 CERTIFICATE OF APPROVAL.** Upon the satisfactory completion and final inspection of the plumbing system, a certificate of approval shall be issued by the administrative authority to the plumber to be delivered to the owner.

**P13.9 DEFECTIVE PLUMBING.** Wherever there is reason to believe that the plumbing system of any building has become defective, it shall be subjected to test or inspection; and any defects found shall be corrected as required in writing by the administrative authority.

**P13.10 INSPECTION AND TEST NOT REQUIRED.** No tests or inspection shall be required where a plumbing system or part thereof is set up for exhibition purposes and is not used for toilet purposes and is not directly connected to a water supply or sewerage system.

### **SECTION P14—AIR GAPS AND BACKFLOW PREVENTERS**

#### **P14.1 GENERAL**

**P14.1.1** Backflow connections shall not be permitted between the piping system carrying a potable water supply and any piping system or plumbing equipment carrying non-potable water or water-borne waste.

#### **P14.2 AIR GAPS**

**P14.2.1** The "air gap" in a water supply system is the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank or plumbing fixture and the flood-level rim of the receptacle. (See Figure 1 and Figure 2.)

**P14.2.2** The minimum required air gap shall be measured vertically from the end of the faucet, spout or supply pipe to the flood-level rim of the fixture or vessel. (See A, Figure 1 and Figure 2.)

**P14.2.3** The water inlet to certain fixtures, such as water closet flush tanks and tanks or vats, may be difficult to protect with air gaps and therefore require special consideration. (See Paragraphs P14.2.5, P14.2.6, P14.2.7, P14.2.8 and P14.2.9.)

**P14.2.4** The minimum required air gap shall be twice the diameter of the effective opening, but in no case less than given in Table P14.2.4.

**TABLE P14.2.4 Minimum Air Gaps for Generally Used Plumbing Fixtures**

| Fixture                                                                                                       | Minimum Air Gap                 |                             |
|---------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------|
|                                                                                                               | When not affected by near wall* | When affected by near wall† |
| Lavatories with effective openings not greater than ½ in. diameter -----                                      | 1.0                             | 1.50                        |
| Sink, laundry, trays, and gooseneck bath faucets with effective openings not greater than ¾ in. diameter ---- | 1.5                             | 2.25                        |
| Overrim bath fillers with effective openings not greater than 1 in. diameter -----                            | 2.0                             | 3.00                        |
| Effective openings greater than 1 in. diameter -----                                                          | 2 X effective opening           | 3 X effective opening       |

\*Side walls, ribs, or similar obstructions do not affect the air gaps when spaced from inside edge of spout opening a distance greater than three times the diameter of the effective opening for a single wall, or a distance greater than four times the diameter of the effective opening for two intersecting walls. See Figure 2.

†Vertical walls, ribs, or similar obstructions extending from the water surface to or above the horizontal plane of the spout opening require greater air gaps when spaced closer to the nearest inside edge of the spout opening than specified in \* above. The effect of three or more such vertical walls or ribs has not been determined. In such cases, the air gap shall be measured from the top of the wall.

P14.2.5 Where it is not practical to provide a minimum required air gap above the flood-level rim (top-edge) of a tank or vat, an arrangement similar to that shown in Figure 3 may be provided.

P14.2.6 The overflow pipe or channel shall be so arranged as to allow overflow water a free discharge to the atmosphere under all conditions, the overflow piping to be provided with an adequate break in the piping as close to the tank as possible; and the area of the free opening shall be at least equal to that of the overflow pipe. (See Figure 3.) The tank and overflow piping must be protected against freezing.

P14.2.7 When water enters the tank at the maximum rate with all inlets open and all outlets closed, the size and capacity of the overflow pipe or channel shall be sufficient to keep the water level from rising to more than half of the minimum required air gap as shown in Table P14.2.4, said distance to be measured above the top of the overflow.

P14.2.8 The minimum air gap, as measured from the lowest point of any supply outlet to the top of the overflow opening, shall be 1½ times the minimum air gap as required by Table P14.2.4. (See Figure 3.)

P14.2.9 If, however, a tank or vat cannot be provided with an adequate air gap as required, a backflow (back-siphonage) preventer is required.

#### P14.3 DRINKING FOUNTAIN STANDARDS—ASA Z42-1942

P14.3.1 **Material.** The fountain should be constructed of impervious material, such as vitreous china, porcelain, enameled cast-iron, other metals, or stoneware.

P14.3.2 **Installation.** The jet of the fountain should issue from a nozzle of nonoxidizing, impervious material set at an angle from the vertical such as to prevent the return of water in the jet to the orifice or orifices whence the jet issues. The nozzle and every other opening in the water pipe or conductor leading to the nozzle should be above the edge of the bowl, so that such nozzle or opening can not be flooded in case a drain from the bowl of the fountain becomes clogged.

**Minimum Elevation.** All drinking fountain nozzles, including those which may at times extend through a water surface and with an orifice diameter not greater than 7/16 (0.440) inch or 0.150 sq. in. area, shall be placed so that the lower edge of the nozzle orifice is at an elevation

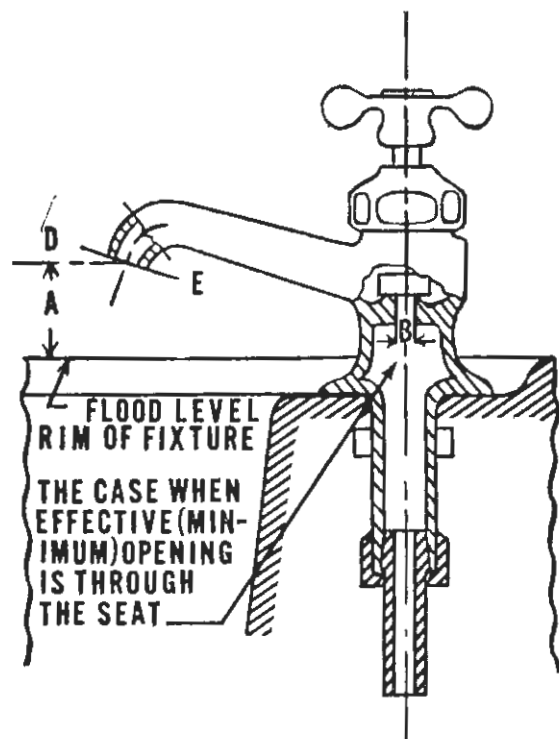


FIGURE 1. AIR GAP AND EFFECTIVE OPENING

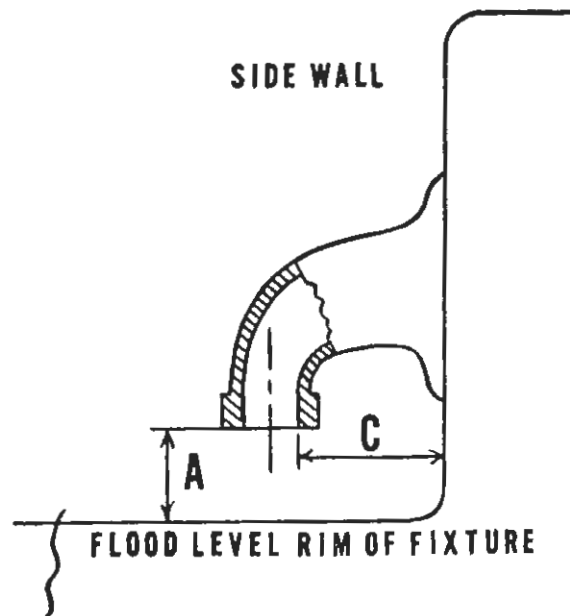


FIGURE 2. NEAR WALL INFLUENCE ON AIR GAP

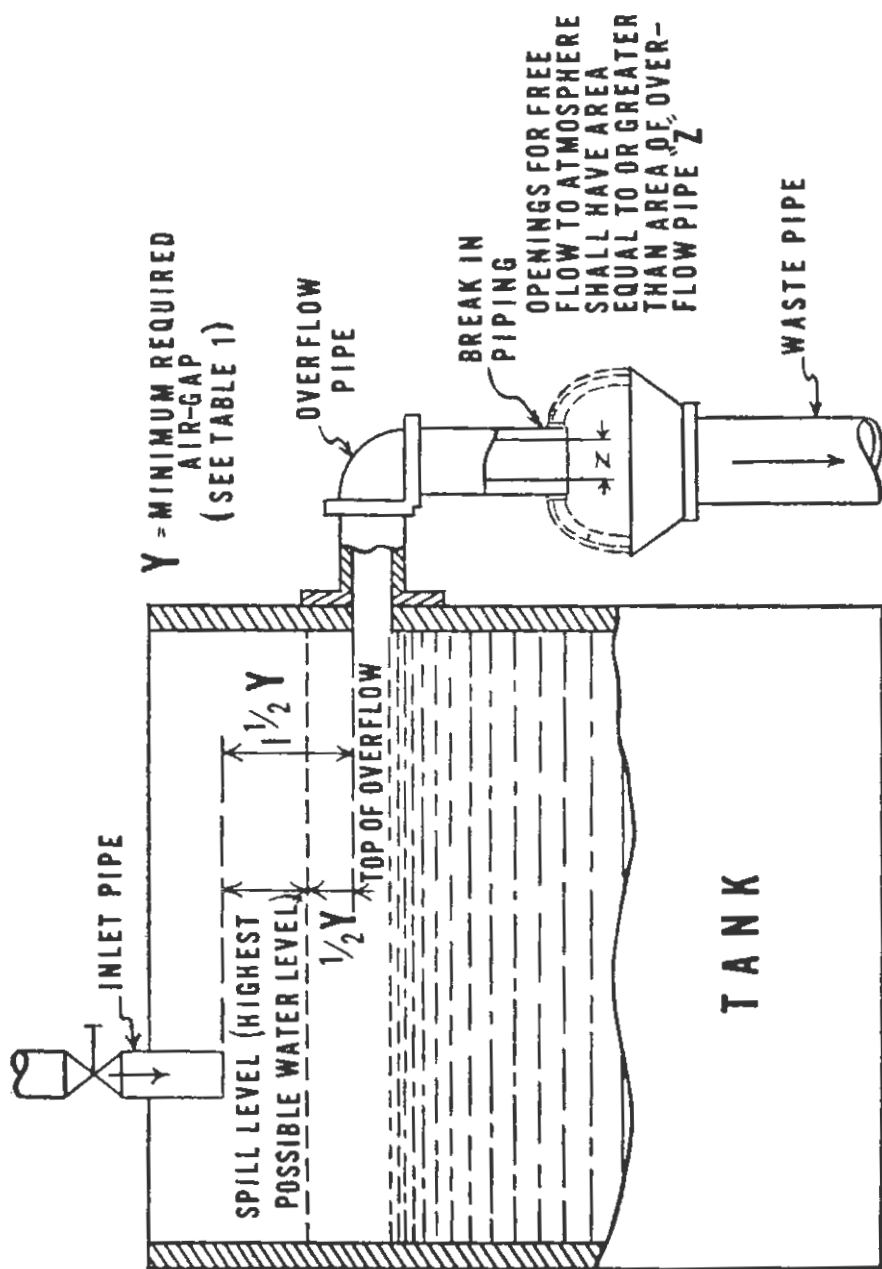


FIGURE 3. AIR GAP IN OPEN TANK WITH OVERFLOW

not less than  $\frac{3}{4}$  inch above the flood-level rim of the receptacle.

The  $\frac{3}{4}$  inch elevation shall also apply to nozzles with more than one orifice, provided the sum of the area of all orifices shall not exceed the area of a circle  $\frac{7}{16}$  inch in diameter.

**P14.3.3 Protection.** The end of the nozzle should be protected by non-oxidizing guards to prevent the mouth and nose of the user from coming into contact with the nozzle. Guards should be so designed that the possibility or transmission of infection by touching the guards is reduced to a minimum.

**P14.3.4 Spattering.** The inclined jet of water issuing from the nozzle should not touch the guard, and thereby cause spattering.

**P14.3.5 Cleansing.** The bowl of the fountain should be so designed and proportioned as to be free from corners which would be difficult to clean or which would collect dirt.

**P14.3.6 Splashing.** The bowl of the fountain should be so proportioned as to prevent unnecessary splashing at a point where the jet falls into the bowl.

**P14.3.7 Traps.** The drain from the fountain should not have a direct physical connection with a waste pipe, unless the drain is trapped.

**P14.3.8 Flow Regulator.** The water supply pipe should be provided with an adjustable valve fitted with a loose key or an automatic valve permitting the regulation of the rate of flow of water to the fountain so that the valve manipulated by the users of the fountain will merely turn the water on or off.

**P14.3.9 Height.** The height of the fountain at the drinking level should be such as to be most convenient to persons using the fountain. The provision of several step-like elevations to the floor at fountains will permit children of various ages to utilize the fountain.

**P14.3.10 Flow.** The waste opening and pipe should be of sufficient size to carry off the water promptly. The opening should be provided with a strainer.

#### **P14.4 VACUUM BREAKERS OR BACKFLOW PREVENTERS**

**P14.4.1 Required.** Backflow preventers shall be installed with any supply fixture, the outlet end of which may at times be submerged, such as hose and spray, direct flushing valves, aspirators and under-rim water supply connections to a plumbing fixture or receptacle in which the surface of the water in the fixture or receptacle is exposed at all times to atmospheric pressure. The type of preventer referred to will not protect against flow when water is discharged through it into a space which is higher than atmospheric pressures.

**P14.4.2** Backflow preventers shall be installed between the control valve and the fixture so that it will not be subjected to water pressure, except the back pressure incidental to water flowing to the fixture.

**P14.4.3** Backflow preventers shall not be installed on the inlet side of the control valve.

**P14.4.4 Effective Opening.** The effective opening is the minimum cross-sectional area at the point of water supply discharge, measured or expressed in terms of (1) the diameter of a circle or (2) if the opening is not circular, the diameter of a circle of equivalent cross-sectional area. (See Figure 1, point B. In some cases it may be at point X.)

**P14.4.5 Materials.** Backflow preventers shall be made of corrosion-resistant material, of design and proportions which will not deteriorate or deform under reasonable service conditions.

**P14.4.6 Tests and Performance.** Backflow preventers shall have been tested and approved to meet tests and performances as required for Backflow Preventers A.S.A. A40.6-1943.

### **SECTION P15—SIZING THE WATER SUPPLY SYSTEM**

#### **General**

Proper design of the water distribution system in a building is necessary in order that the various fixtures may function properly. The

amount of either hot or cold water used in any building is variable, depending on the type of structure, usage, occupancy, and time of day. It is necessary to provide piping, water heating, and storage facilities of sufficient capacity to meet the peak demand without wasteful excess in either piping or equivalent cost.

For additional information on this subject the reader is referred to Water Supply Piping for Plumbing Systems, by F. M. Dawson and A. A. Kalinske—Technical Bulletin No. 3 of the National Association of Master Plumbers; Water-Distributing Systems for Buildings, by Roy B. Hunter; Report BMS79 of the National Bureau of Standards, and Plumbing Manual, Report BMS66 also published by the National Bureau of Standards.

This section gives a suggested procedure for sizing the water supply system prepared by F. M. Dawson.

#### **P15.1 PRELIMINARY INFORMATION**

**P15.1.1 Available Pressure.** Obtain the necessary information regarding the minimum daily service pressure in the area where the building is to be located.

**P15.1.2 Piping Material.** Obtain all available local information regarding the use of different kinds of pipe with respect both to durability and to decrease in capacity with length of service in the particular water supply.

#### **P15.2 ESTIMATE OF DEMAND LOAD AND PIPE CAPACITY**

**P15.2.1 Rate of Flow.** One of the important items which must be determined before any part of the water piping system can be sized is the probable rate of flow in any particular reach of piping. The rate of flow in the service line, risers, and main branches, however, will rarely be equal to the sum of the rates of flow of all connected fixtures. In fact, the probability of every fixture in a large group being used at the same time is so remote that it would be very poor engineering to design the piping large enough to take care of such simultaneous flow.

**P15.2.2 Simultaneous Use.** The demand load in building water supply systems can not be determined exactly and is not readily standardized. The two main problems to be considered are (1) the satisfactory supply of water for a given fixture and (2) the number of fixtures which may be assumed to be in use at the same time.

**P15.2.3 Daily Demand.** The minimum flow which will be satisfactory to the consumer depends greatly upon the consumer, his standard of living, his professional needs, size of family, garden requirements, and similar factors. Depending upon those factors, per capita water consumption for domestic use usually varies between 20 and 80 gallons per day.

**P15.2.4 Type of Building.** Experience indicates that the type of dwelling has considerable influence upon the water consumption.

**P15.2.5 Apartment Buildings.** In apartment houses the per capita daily water consumption is generally higher than in single family houses. This is due to the central metering system which is not conducive to the saving of water and to the long hot-water lines which result in high heat losses, thus in the wasting of water. In designing water supply systems for apartment houses, a daily per capita water consumption of 50 gallons may be considered a safe design figure.

**P15.2.6 Dwelling.** Although a considerable number of housing projects have been developed across the Nation, conclusive water consumption data have not been gathered as yet. Nevertheless, it seems that the daily per capita water consumption in housing projects falls in between the consumption in apartment houses and single dwellings at the same geographical location. In general, a daily per capita water consumption of 40 gallons can be used as a safe design figure for housing projects.

#### **P15.3 FLOW AND PRESSURE REQUIRED**

**P15.3.1** Table P15.3.2 gives the rate of flow desirable for many common types of fixtures, and the average pressure necessary to give this rate of flow. The pressure necessarily varies with fixture design;

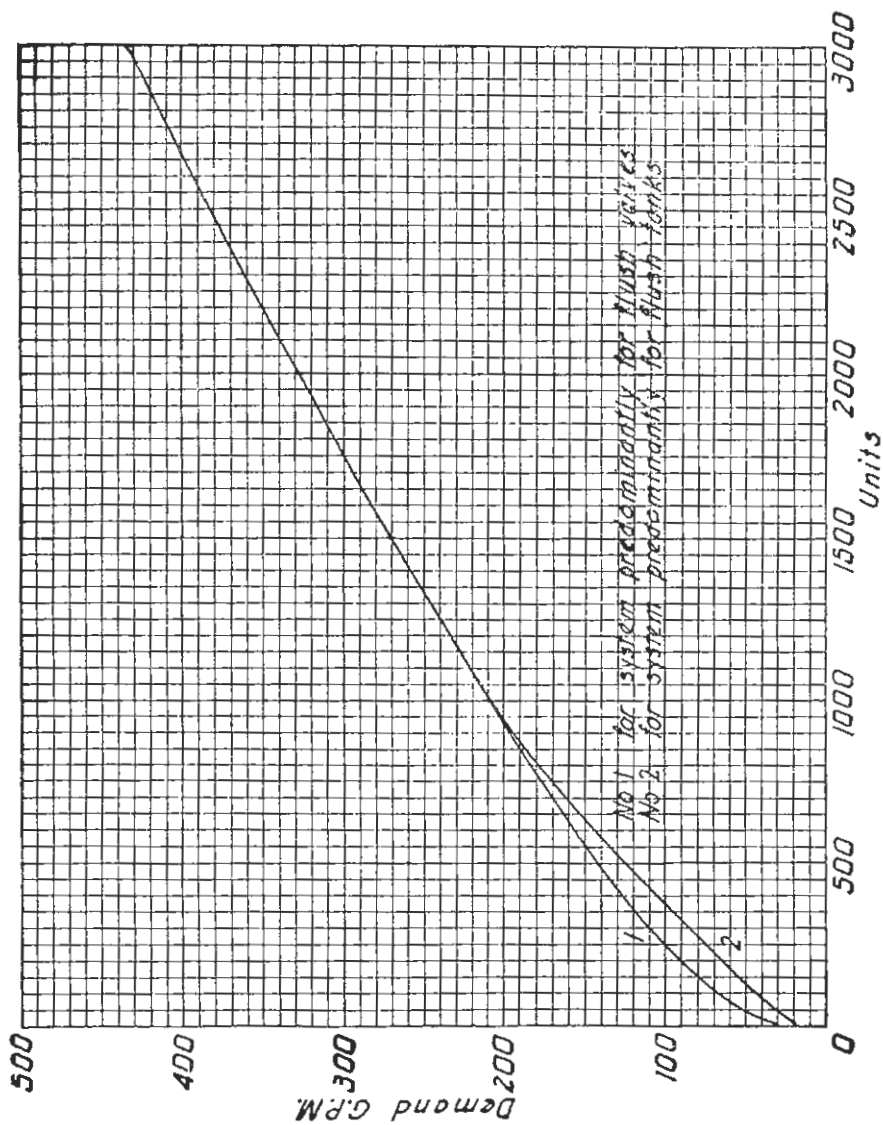


CHART P1. ESTIMATE CURVES FOR DEMAND LOAD

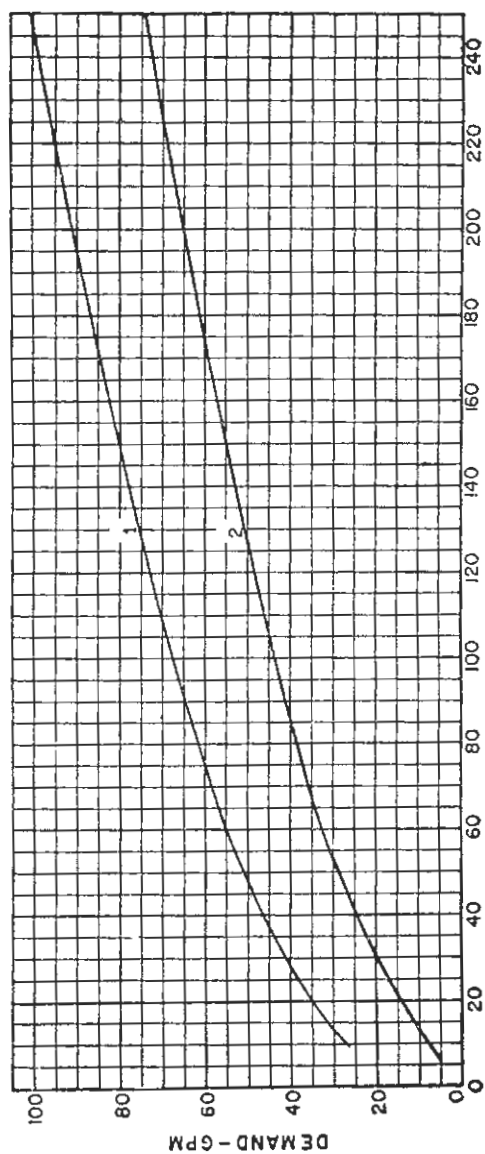


CHART P2. ENLARGED SCALE DEMAND LOAD



with some, a much greater pressure is necessary to give the same rate of flow than with others.

**TABLE P15.3.2 Rate of Flow and Required Pressure During Flow for Different Fixtures**

| Fixture                                     | Flow Pressure <sup>1</sup><br>P.s.i. | Flow Rate<br>G.p.m.   |
|---------------------------------------------|--------------------------------------|-----------------------|
| Ordinary basin faucet -----                 | 8                                    | 3.0                   |
| Self-closing basin faucet -----             | 12                                   | 2.5                   |
| Sink faucet, $\frac{3}{8}$ -inch -----      | 10                                   | 4.5                   |
| Sink faucet, $\frac{1}{2}$ -inch -----      | 5                                    | 4.5                   |
| Bathtub faucet -----                        | 5                                    | 6.0                   |
| Laundry tub cock, $\frac{1}{2}$ -inch ----- | 5                                    | 5.0                   |
| Shower -----                                | 12                                   | 5.0                   |
| Ball cock for closet -----                  | 15                                   | 3.0                   |
| Flush valve for closet -----                | 10 to 20                             | 15 to 40 <sup>2</sup> |
| Flush valve for urinal -----                | 15                                   | 15.0                  |
| Garden hose, 50 feet and sill cock -----    | 15                                   | 15.0                  |

<sup>1</sup>Flow pressure is the pressure in the pipe at the entrance to the particular fixture considered.

<sup>2</sup>Wider range due to variation in design and type of flush-valve closets.

P15.3.3 In estimating the load, the rate of flow is frequently computed in fixture units.

P15.3.4 Table P15.3.5 gives the demand weight in terms of fixture units for different plumbing fixtures under several conditions of service.

**TABLE P15.3.5 Demand Weight of Fixtures in Fixture Units<sup>1</sup>**

| Fixture or Group <sup>2</sup> | Occupancy                 | Type of Supply Control       | Fixture Weight in Units <sup>3</sup> |
|-------------------------------|---------------------------|------------------------------|--------------------------------------|
| Water closet -----            | Public -----              | Flush valve -----            | 10                                   |
| Water closet -----            | " -----                   | Flush tank -----             | 5                                    |
| Pedestal urinal -----         | " -----                   | Flush valve -----            | 10                                   |
| Stall or wall urinal -----    | " -----                   | Flush valve -----            | 5                                    |
| Stall or wall urinal -----    | " -----                   | Flush tank -----             | 3                                    |
| Lavatory -----                | " -----                   | Faucet -----                 | 2                                    |
| Bathtub -----                 | " -----                   | Faucet -----                 | 4                                    |
| Shower head -----             | " -----                   | Mixing valve -----           | 4                                    |
| Service sink -----            | Office, etc. -----        | Faucet -----                 | 3                                    |
| Kitchen sink -----            | Hotel or restaurant ----- | Faucet -----                 | 4                                    |
| Water closet -----            | Private -----             | Flush valve -----            | 6                                    |
| Water closet -----            | " -----                   | Flush tank -----             | 3                                    |
| Lavatory -----                | " -----                   | Faucet -----                 | 1                                    |
| Bathtub -----                 | " -----                   | Faucet -----                 | 2                                    |
| Shower head -----             | " -----                   | Mixing valve -----           | 2                                    |
| Bathroom group -----          | " -----                   | Flush valve for closet ----- | 8                                    |
| Bathroom group -----          | " -----                   | Flush tank for closet -----  | 6                                    |
| Separate shower -----         | " -----                   | Mixing valve -----           | 2                                    |
| Kitchen sink -----            | " -----                   | Faucet -----                 | 2                                    |
| Laundry trays (1 to 3) -----  | " -----                   | Faucet -----                 | 3                                    |
| Combination fixture -----     | " -----                   | Faucet -----                 | 3                                    |

<sup>1</sup>For supply outlets likely to impose continuous demands, estimate continuous supply separately and add to total demand for fixtures.

<sup>2</sup>For fixtures not listed, weights may be assumed by comparing the fixture to a listed one using water in similar quantities and at similar rates.

<sup>3</sup>The given weights are for total demand. For fixtures with both hot and cold water supplies, the weights for maximum separate demands may be taken as three-fourths the listed demand for supply.

P15.3.6 Chart P1 gives the estimated demand in gallons per minute corresponding to any total number of fixture units. Chart P2 shows an enlargement of Chart P1 for a range up to 250 fixture units.

P15.3.7 The estimated demand load for fixtures used intermittently on any supply pipe will be obtained by multiplying the number of each kind of fixture supplied through that pipe by its weight from Table P15.3.5, adding the products, and then referring to the appropriate curve of Charts P1 or P2 to find the demand corresponding to the total fixture units. In using this method it should be noted that the demand for fixture or supply outlets other than those listed in the table of fixture units is not yet included in the estimate. The demands for outlets (such as hose connections, air-conditioning apparatus, etc.) which are likely to impose continuous demand during times of heavy use of the weighted fixtures, should be estimated separately and added to the demand for fixtures used intermittently, in order to estimate the total demand.

#### P15.4 SIZING COLD WATER SUPPLY PIPING

P15.4.1 **Pressure Loss.** As water flows through a pipe, the pressure continually decreases along the pipe, due to loss of energy from friction. The problem is then one of ascertaining the minimum pressure in the street main, and the minimum pressure required for the operation of the topmost fixture. (A pressure of 15 p.s.i. is ample for flush valves, but reference should be made to the manufacturers' requirements. A minimum of 8 p.s.i. should be allowed for other fixtures.) The pressure differential thus obtained will be available for overcoming pressure losses in the distribution system and in overcoming the difference in elevation between the water main and the highest fixture.

P15.4.2 **Pressure Loss by Elevation.** The pressure loss, in pounds per square inch, caused by the difference in elevation between the street main and the highest fixture, may be obtained by multiplying the difference in elevation in feet by the conversion factor 0.43.

P15.4.3 **Water Flow.** When water flows through a pipe, friction occurs as the result of the sliding of water particles past one another. If the pipe wall is rough, the roughness projections cause additional friction, owing to the development of increased turbulence in the flowing water. As the water flows along a smooth pipe, the pressure decreases as a result of a dissipation of energy arising from the internal friction set up by the viscosity of the water. This loss in energy is shown by the loss of pressure. The pressure loss is proportioned to the length of straight uniform pipes, and varies greatly with flow velocity, pipe diameter, and roughness of pipe.

#### P15.5 PIPE CLASSIFICATION

P15.5.1 On the basis of inside surface conditions, pipes may be classified as smooth, fairly rough, and rough, as follows:

P15.5.2 **Smooth Pipe.** The inside pipe surface shows no perceptible roughness. Pipes made of copper, brass or lead usually may be classified as smooth.

P15.5.3 **Fairly Rough.** All ordinary pipes, such as wrought iron, galvanized iron, steel and cast iron, after a few years of usage, may be called fairly rough.

P15.5.4 **Rough.** Pipes which have deteriorated fairly rapidly for some 10 or 15 years after being laid are classified as rough.

#### P15.6 FLOW CHARTS

P15.6.1 Charts P3, P4 and P5 give the pipe friction losses corresponding to these three types of pipes for various nominal diameters. Example 1: A 2½-inch fairly rough pipe supplies 100 g.p.m. of water. Find the friction loss in head if the pipe length is 200 feet. **Solution:** Enter Chart P4 at 100 g.p.m. and move along this line until it intersects the 2½-inch diameter line. From this intersection point, move vertically down and read 4.5 p.s.i. friction loss per 100 feet of pipe length. Then the total friction loss will be  $2 \times 4.5 = 9$  p.s.i.

#### P15.7 FITTINGS, VALVES, AND METERS

P15.7.1 The pressure losses in the distributing system will consist of the pressure losses in the piping itself, plus the pressure losses in

the pipe fittings, valves, and the water meter. Estimated pressure losses for disk-type meters for various rates of flow are given in Chart P6.

P15.7.2 Flow limits for disk-type meters, which may be regarded as the limits of recommended ranges in capacities, are given in Table P15.7.3. For information on other types of meters, the manufacturer should be consulted.

#### P15.7.3

**TABLE P15.7.3 Performance Requirements of Water Meters<sup>1</sup>**

| Pipe size<br>(inches) | Normal test-<br>flow limits<br>G.p.m. | Minimum<br>test low<br>Hours |
|-----------------------|---------------------------------------|------------------------------|
| $\frac{5}{8}$         | 1 to 20                               | $\frac{1}{4}$                |
| $\frac{3}{4}$         | 2 to 34                               | $\frac{1}{2}$                |
| 1                     | 3 to 53                               | $\frac{3}{4}$                |
| $1\frac{1}{2}$        | 5 to 100                              | $1\frac{1}{2}$               |
| 2                     | 8 to 160                              | 2                            |
| 3                     | 16 to 315                             | 4                            |
| 4                     | 28 to 500                             | 7                            |
| 6                     | 48 to 1,000                           | 12                           |

<sup>1</sup> American Water Works Association Standards.

P15.7.4 **Registration.** The registration on the meter dial shall indicate the quantity recorded to be not less than 98 per cent nor more than 102 per cent of the water actually passed through the meter while it is being tested at rates of flow within the specified limits (see Table P15.7.3) under normal test-flow limits. There shall be not less than 90 per cent of the actual flow recorded when a test is made at the rate of flow set forth under minimum test flow.

P15.7.5 The loss pressure through any fitting or valve can be expressed in pounds per square inch for any given rate of flow. Experience has shown, however, that the simplest method of expressing losses in fittings and valves is to use the concept of an equivalent length of straight pipe. It has been found, for example, that a 1-inch, 90° elbow introduces a loss which is equivalent to 2.2 feet of straight 1-inch pipe. Therefore, for each 1-inch, 90° elbow, 2.2 feet of 1-inch pipe are added to the total length of 1-inch pipe.

P15.7.6 Estimated pressure losses for pipe fittings and valves in terms of equivalent pipe lengths are shown in Table P15.7.7.

#### P15.7.7

**TABLE P15.7.7 Allowance in Equivalent Length of Pipe for Friction Loss in Valves and Threaded Fittings**

| Equivalent length of pipe for various fittings |                        |                        |                    |                                          |                    |                     |                     |
|------------------------------------------------|------------------------|------------------------|--------------------|------------------------------------------|--------------------|---------------------|---------------------|
| Diameter of fitting<br>(inches)                | 90° standard L<br>Feet | 45° standard L<br>Feet | 90° side T<br>Feet | Coupling or<br>straight run of T<br>Feet | Gate Valve<br>Feet | Globe Valve<br>Feet | Angle Valve<br>Feet |
| $\frac{3}{8}$                                  | 1                      | 0.6                    | 1.5                | 0.2                                      | 0.2                | 8                   | 4                   |
| $\frac{1}{2}$                                  | 2                      | 1.2                    | 3                  | .6                                       | .4                 | 15                  | 8                   |
| $\frac{3}{4}$                                  | 2.5                    | 1.5                    | 4                  | .8                                       | .5                 | 20                  | 12                  |
| 1                                              | 3                      | 1.8                    | 5                  | .9                                       | .6                 | 25                  | 15                  |
| $1\frac{1}{4}$                                 | 4                      | 2.4                    | 6                  | 1.2                                      | .8                 | 35                  | 18                  |
| $1\frac{1}{2}$                                 | 5                      | 3.0                    | 7                  | 1.5                                      | 1.0                | 45                  | 22                  |
| 2                                              | 7                      | 4.0                    | 10                 | 2.0                                      | 1.3                | 55                  | 28                  |
| $2\frac{1}{2}$                                 | 8                      | 5.0                    | 12                 | 2.5                                      | 1.6                | 65                  | 34                  |
| 3                                              | 10                     | 6.0                    | 15                 | 3.0                                      | 2.0                | 80                  | 40                  |
| $3\frac{1}{2}$                                 | 12                     | 7.0                    | 18                 | 3.6                                      | 2.4                | 100                 | 50                  |
| 4                                              | 14                     | 8.0                    | 21                 | 4.0                                      | 2.7                | 125                 | 55                  |
| 5                                              | 17                     | 10.0                   | 25                 | 5.0                                      | 3.3                | 140                 | 70                  |
| 6                                              | 20                     | 12.0                   | 30                 | 6.0                                      | 4.0                | 165                 | 80                  |

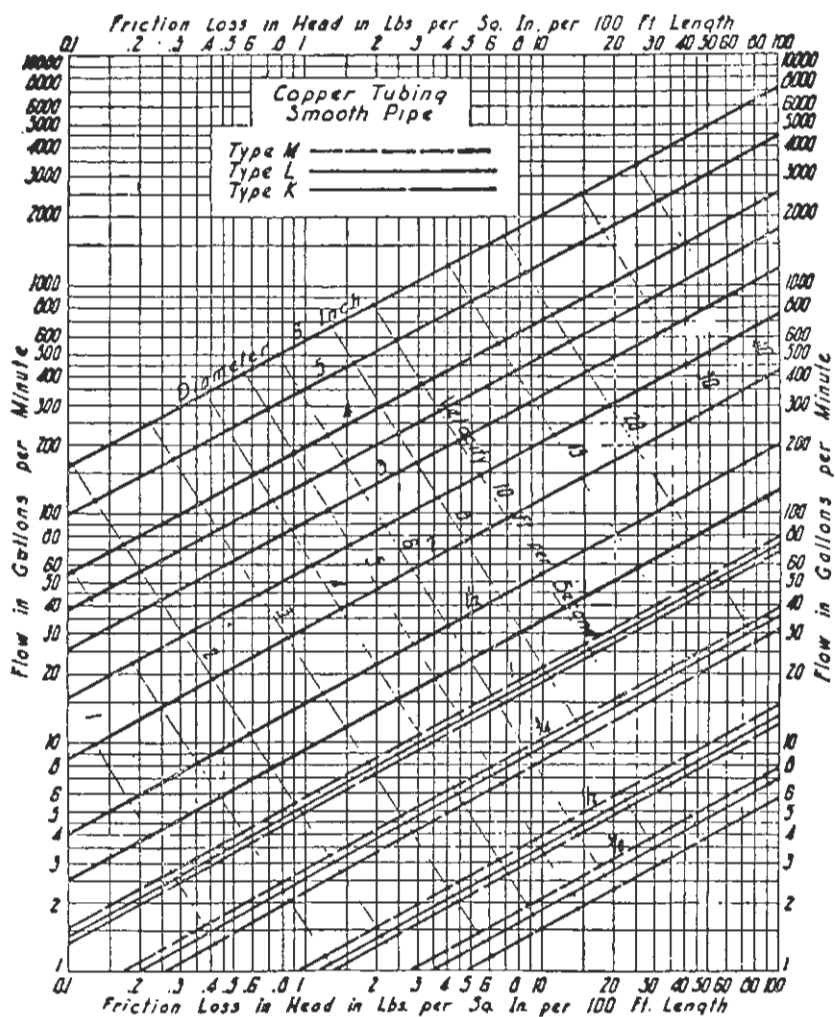


CHART P3

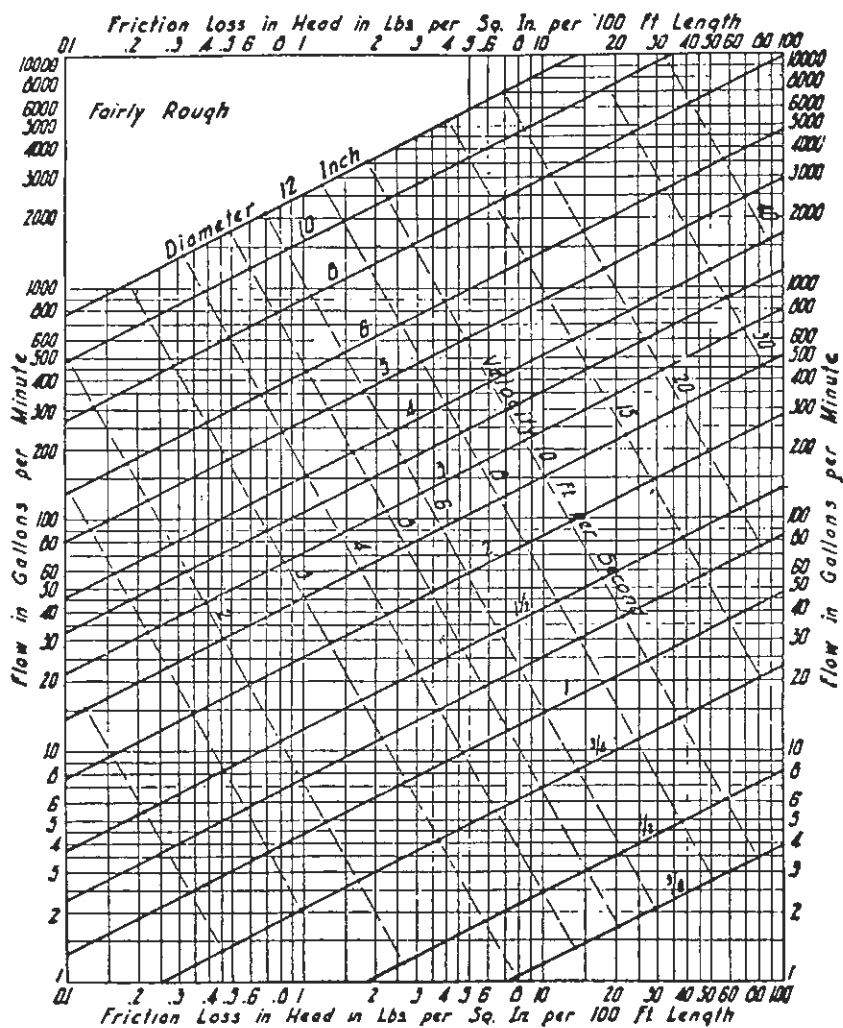


CHART P4



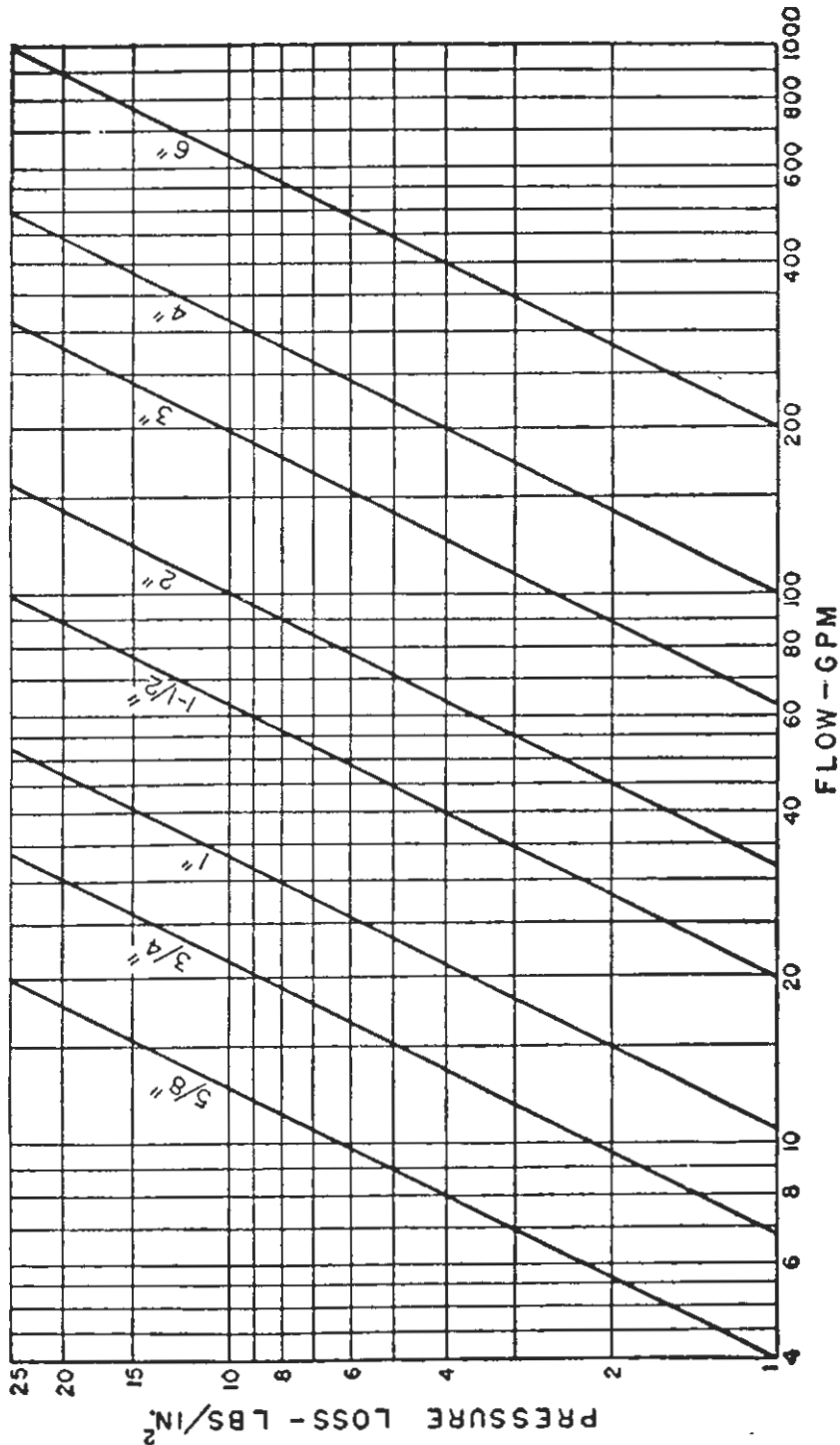


CHART P6—PRESSURE LOSSES IN DISK-TYPE WATER METERS

P15.7.8 Table P15.7.9 lists the equivalent lengths for various special types of apparatus and fittings. The friction loss in water meters varies considerably with the design, even in meters of the same nominal size. The values given in Table P15.7.9 are ample for the well-known meters now on the market.

P15.7.9

**TABLE P15.7.9 Equivalent Lengths of Iron Pipe to Give Same Loss as Special Fittings or Apparatus**

| Fitting or apparatus                      | Nominal diameter of pipe |        |        |         |
|-------------------------------------------|--------------------------|--------|--------|---------|
|                                           | ½-inch                   | ¾-inch | 1-inch | 1¼-inch |
| 30-gallon vertical hot water tank, Feet   |                          | Feet   | Feet   | Feet    |
| ¾-inch pipe -----                         | 4                        | 17     | 56     | ----    |
| 30-gallon horizontal hot water tank, Feet |                          |        |        |         |
| ¾-inch pipe -----                         | 1.2                      | 5      | 16     | ----    |
| Water meters (no valves included):        |                          |        |        |         |
| ¾-inch with ½-inch connections..          | 6.7                      | 28     | 90     | ----    |
| ¾-inch with ¾-inch connections..          | 4.8                      | 20     | 64     | ----    |
| ¾-inch with ¾-inch connections..          | 3.4                      | 14     | 45     | ----    |
| 1-inch with 1-inch connections....        | --                       | 9      | 30     | 115     |
| 1¼-inch with 1-inch connections..         | --                       | 4.4    | 14     | 54      |
| Water softener -----                      | --                       | 50-200 | --     | ----    |

**Example 2:** Assume a minimum street main pressure of 55 p.s.i.; a height of topmost fixture above street main of 50 feet; a developed pipe length from water main to highest fixture of 100 feet; a total load on the system of 50 fixture units; and that the water closets are flush-valve operated. Find the required size of the supply main.

**Solution:** From Chart P2 the estimated peak demand is found to be 51 g.p.m. From Table P15.7.3 it is evident that several sizes of meters would adequately measure this flow. For a trial computation choose the 1½-inch meter. From Chart P6 the pressure drop through a 1½-inch disk-type meter for a flow of 51 g.p.m. is found to be 6.5 p.s.i.

Then the pressure drop available for overcoming friction in pipes and fittings is  $55 (15 + 50 \times 0.43 + 6.5) + 12$  p.s.i.

At this point it is necessary to make some estimate of the equivalent pipe length of the fittings on the direct line from the street main to the highest fixture. The exact equivalent length of the various fittings can not now be determined since the pipe sizes of the building main, riser, and branch leading to the highest fixture are not known as yet, but a first approximation is necessary in order to make a tentative selection of pipe sizes. If the computed pipe sizes differ from those used in determining the equivalent length of pipe fittings, a recalculation will be necessary, using the computed pipe sizes for the fittings. For the purposes of this example assume that the total equivalent length of the pipe fitting is 50 feet. Then the permissible pressure loss per 100 feet of equivalent pipe is  $12 \times 100 / (100 + 50) + 8$  p.s.i.

Assuming that the corrosive and caking properties of the water are such that Chart P4 for fairly rough pipe is applicable, a 2-inch building main will be adequate.

The sizing of the branches of the building main, the risers, and fixture branches follow the principles outlined. For example, assume that one of the branches of the building main carries the cold water supply for three water closets, two bathtubs, and three lavatories. Using the permissible loss of 8 p.s.i. per 100 feet, the size of branch determined from Table P15.3.5, and Charts P1 and P4, is found to be 1½-inches. Items entering the computation of pipe size are given in Table P15.7.10.



**TABLE P15.7.10 Computation of Branch Size in Example 2**

| Number and kind of fixtures | Fixture units (from Table P15.3.5 and Footnote 3) | Demand (from Chart P2) | Pipe Sizes (from Chart P4) Inches |
|-----------------------------|---------------------------------------------------|------------------------|-----------------------------------|
| 3 flush valves -----        | $3 \times 6 = 18$                                 | 33                     |                                   |
| 2 bathtubs -----            | $\frac{3}{4}(2 \times 2) = 3$                     | 3                      | 1½                                |
| 3 lavatories -----          | $\frac{3}{4}(3 \times 1) = 2.25$                  | 2                      |                                   |
| Total -----                 | 23.25                                             | 38                     | 1½                                |

### P15.8 UP-FEED AND DOWN-FEED SYSTEMS

P15.8.1 The principles involved in sizing either up-feed or down-feed systems are the same. The principal difference in procedure is that in the down-feed system the difference in elevation between the house tank and the fixtures provides the pressure required to overcome pipe friction.

P15.8.2 The water demand for hose bibbs or other large-demand fixtures taken off the building main is frequently the cause of inadequate water supply to the upper floor of a building. This condition may be prevented by sizing the distribution system so that the pressure drops from the street main to all fixtures are the same. It is good practice to maintain the building main of ample size (not less than 1-inch where possible) until all branches of hose bibbs have been connected. Where the street main pressure is excessive and a pressure reducing valve is used to prevent water hammer or excessive pressure at the fixtures, it is frequently desirable to connect hose bibbs ahead of the reducing valve.

P15.8.3 The recommended procedure in sizing piping systems may be outlined as follows:

(1) Draw a sketch of the main lines, risers, and branches indicating the fixtures served. Indicate the rate of flow of each fixture.

(2) Using Table P15.3.5, compute the demand weights of the fixtures in fixture units.

(3) Determine the total demand in fixture units and, using Chart P1 or P2, find the expected demand in gallons per minute.

(4) Determine the equivalent length of pipe in the main lines, risers, and branches. Since the sizes of the pipes are not known, the exact equivalent length for various fittings, etc., can not be made. Add up the equivalent lengths, starting at the street main and proceeding along the service line, main line in the building, and up the riser to the top fixture of the group served.

(5) Determine the average minimum pressure in the street main and the minimum pressure required for the operation of the topmost fixture. This latter pressure should be 8 to 15 p.s.i.

(6) Calculate the approximate value of the average pressure drop per 100 feet of pipe in the equivalent length determined in Item 4. Do this according to the following rule:

$$p = \frac{100}{L} (P - 0.43H - 10) -$$

where  $p$  = average pressure loss per 100 feet of equivalent length of pipe in p.s.i.

$P$  = pressure in street main in p.s.i.

$H$  = height of highest fixture above street main, in feet

$L$  = equivalent length determined in Item 4

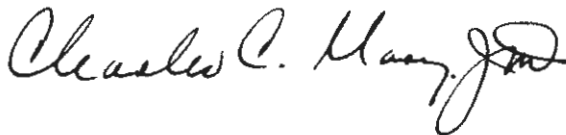
If the system is of the down-feed supply from a gravity tank, the height of water in the tank converted to pounds per square inch by multiplying by 0.43 replaces the street main pressure, and the term  $0.43H$  in the equation in Item 6 is added instead of subtracted in calculating the term  $p$ . In this case  $H$  will be the vertical distance of the fixture below the bottom of the tank.

(7) From the expected rate of flow determined in Item 3 and the value of  $P$  calculated in Item 6, choose the size of pipe, from Charts P3, P4 or P5.



### CERTIFICATE

The foregoing is a true and correct copy of Chapter X-A of the Sanitary Code, State of Louisiana, consisting of 69 pages, as adopted and promulgated in accordance with law, and amended through Dec. 31, 1973.

A handwritten signature in cursive script, reading "Charles C. Mary, Jr.", with a stylized flourish at the end.

CHARLES C. MARY, JR., M.D.  
Commissioner and  
State Health Officer



## Plumbing

- Air gaps and backflow preventers,
  - Sec. P14
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  - drinking fountain standards, P14.3
  - general, P14.1
  - vacuum breakers or backflow preventers, P8.4.1, P14.4
- Backfill, trenching and excavation, P2.8
- Backflow preventers, P8.4.1, P8.4.2,
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- Back siphonage, P8.4.1
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- Bathtubs, *See* Plumbing fixtures, Sec. P6
- Booster pump,
  - control of, P8.7.5, P8.7.7
- Building sewer, P8.3.1-2, P9.2
- Cleanouts and pipe cleanouts, Sec. P5
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  - concealment, P5.8.4
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- Condensers and sumps, P7.3
- Conductors and connectors, P12.6
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