



## **EXCERPT FROM THE 2007 SUPPLEMENT**

### **INTERNATIONAL MECHANICAL CODE**

This document is posted for use in developing code changes for the 2007/2008 Code Development Cycle. Code changes are due August 20, 2007.

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## PREFACE

This document includes excerpts from the 2007 Supplement to the 2006 edition of the *International Mechanical Code*<sup>®</sup>. It contains changes submitted in the 2006/2007 Code Development Cycle which were approved by the membership of the International Code Council.

The excerpts from this supplement are organized by code and include all approved changes. Each section is identified, followed by the applicable code change number and the revised/added/deleted text. Editorial revisions approved by the ICC Code Correlation Committee are indicated by "CCC".



# INTERNATIONAL MECHANICAL CODE

## 2007 SUPPLEMENT

*Chapter 1 Change chapter heading and add Part I to read as shown (Sections 101 and 102 to be included in Part I): (G221-06/07 Part VI)*

### CHAPTER 1

#### SCOPE AND ADMINISTRATION

##### Part 1 – Scope and Application

*Section 102.1 Change to read as shown: (M1-06/07)*

**102.1 General.** Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

*Section 102.8 Change to read as shown: (M1-06/07)*

**102.8 Referenced codes and standards.** The codes and standards referenced herein shall be those that are listed in Chapter 15 and such codes and standards shall be considered as part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and the referenced standards, the provisions of this code shall apply.

**Exception:** Where enforcement of a code provision would violate the conditions of the listing of the equipment or appliance, the conditions of the listing and the manufacturer's installation instructions shall apply.

*Section 102.10 Add new section to read as shown: (M1-06/07)*

**102.10 Other laws.** The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

*Section 102.11 Add new section to read as shown: (M1-06/07)*

**102.11 Application of references.** Reference to chapter section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

*Part 2 Add Part 2 to read as shown (Sections 103 to the end of Chapter 1 to be included in Part 2): (G221-06/07 Part VI)*

##### Part 2 – Administration and Enforcement

*Section 103.2 Change to read as shown: (M3-06/07)*

**103.2 Appointment.** The code official shall be appointed by the chief appointing authority of the jurisdiction.

*Section 103.3 Change to read as shown: (M3-06/07)*

**103.3 Deputies.** In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the code official shall have the authority to appoint a deputy code official, other related technical officers, inspectors and other employees. Such employees shall have powers as delegated by the code official.

*Section 103.4 Change to read as shown: (M3-06/07)*

**103.4 Liability.** The code official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered liable personally, and is hereby

relieved from personal liability for any damage accruing to persons or property as a result of an act or by reason of an act or omission in the discharge of official duties.

Any suit instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code.

***Section 104.1 Change to read as shown: (M4-06/07)***

**104.1 General.** The code official is hereby authorized and directed to enforce the provisions of this code. The code official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

***Section 104.2 "Rule making authority" Delete without substitution: (M4-06/07)***

(Renumber subsequent sections)

***Section 104.3 Change to read as shown: (M4-06/07)***

**104.3 Applications and permits.** The code official shall receive applications, review construction documents and issue permits for the installation and alteration of mechanical systems, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

***Section 104.8 Change to read as shown: (M4-06/07)***

**104.8 Department records.** The code official shall keep official records of applications received, permits and certificates issued, fees collected, reports of inspections, and notices and orders issued. Such records shall be retained in the official records for the period required for retention of public records.

***Section 105.1 Change to read as shown: (M5-06/07)***

**105.1 Modifications.** Whenever there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases upon application of the owner or owner's representative, provided that the code official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the mechanical inspection department.

***Section 105.2.1 Add new section to read as shown: (M5-06/07)***

**105.2.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

***Section 105.4 Add new section to read as shown: (M5-06/07)***

**105.4 Approved materials and equipment.** Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

***Section 107.1 Add new section to read as shown: (M7-06/07)***

**107.1 General.** The code official is authorized to conduct such inspections as are deemed necessary to determine compliance with the provisions of this code. Construction or work for which a permit is required shall be subject to inspection by the code official, and such construction or work shall remain accessible and exposed for inspection purposes until approved. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid.

***Section 107.1 "Required inspections and testing" Relocated to Section 107.2: (M7-06/07)***

**Section 107.1.1 “Approved inspection agencies” Relocated to Section 107.2.4: (M7-06/07)**

**Section 107.2 “Required inspections and testing” Relocated from Section 107.1 with no change to current text: (M7-06/07)**

**Sections 107.2.1, 107.2.2, 107.2.3 Add new sections to read as shown: (M7-06/07)**

**107.2.1 Other inspections.** In addition to the inspections specified above, the code official is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced.

**107.2.2 Inspection requests.** It shall be the duty of the holder of the permit or their duly authorized agent to notify the code official when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for inspections of such work that are required by this code.

**107.2.3 Approval required.** Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the code official. The code official, upon notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or his or her agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected and such portion shall not be covered or concealed until authorized by the code official.

**Section 107.2.4 Relocated from Section 107.1.1 and changed to read as shown: (M7-06/07)**

**107.2.4 Approved inspection agencies.** The code official is authorized to accept reports of approved agencies, provided that such agencies satisfy the requirements as to qualifications and reliability.

**Section 107.3 “Approval” Relocated to Section 107.4: (M7-06/07)**

**Section 107.4 Relocated from Section 107.3 with no change to current text: (M7-06/07)**

**Section 107.4.1 Add new section as shown: (M7-06/07)**

**107.4.1 Revocation.** The code official is authorized to, in writing, suspend or revoke a notice of approval issued under the provisions of this code wherever the notice is issued in error, on the basis of incorrect information supplied, or where it is determined that the building or structure, premise or portion thereof is in violation of any ordinance or regulation or any of the provisions of this code.

**Section 107.4 “Temporary connection” Relocated to Section 107.5: (M7-06/07)**

**Section 107.5 Relocated from Section 107.4 with no change to current text: (M7-06/07)**

**Section 107.6 Add new section to read as shown: (M7-06/07)**

**107.6 Connection of service utilities.** No person shall make connections from a utility, source of energy, fuel, or power to any building or system that is regulated by this code for which a permit is required, until authorized by the code official.

**Section 110 Add new section to read as shown: (M10-06/07)**

## SECTION 110 TEMPORARY EQUIPMENT, SYSTEMS AND USES

**110.1 General.** The code official is authorized to issue a permit for temporary equipment, systems and uses. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The code official is authorized to grant extensions for demonstrated cause.

**110.2 Conformance.** Temporary equipment, systems and uses shall conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary requirements of this code as necessary to ensure the public health, safety and general welfare.

**110.3 Temporary utilities.** The code official is authorized to give permission to temporarily supply utilities before an installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in the code.

**110.4 Termination of approval.** The code official is authorized to terminate such permit for temporary equipment, systems or uses and to order the temporary equipment, systems or uses to be discontinued.

## CHAPTER 2 DEFINITIONS

**Section 202 Add new definition of “AIR DISPERSION SYSTEM” to read as shown: (M98-06/07)**

**AIR DISPERSION SYSTEM.** Any diffuser system designed to, both, convey air within a room, space or area and diffuse air into that space while operating under positive pressure. Systems are commonly constructed of, but not limited to, fabric or plastic film.

**Section 202 Add new definition of “BREATHING ZONE” to read as shown: (M44-06/07)**

**BREATHING ZONE.** The region within an occupied space between planes 3 and 72 inches (75 and 1800 mm) above the floor and more than 2 feet (600 mm) from the walls of the space or from fixed air-conditioning equipment.

**Section 202 Add new definition of “CEILING RADIATION DAMPER” to read as shown: (M11-06/07)**

**CEILING RADIATION DAMPER.** A listed device installed in a ceiling membrane of a fire-resistance-rated floor/ceiling or roof/ceiling assembly to limit automatically the radiative heat transfer through an air inlet/outlet opening.

**Section 202 Add new definition of COMBINATION FIRE/SMOKE DAMPER” to read as shown: (M11-06/07)**

**COMBINATION FIRE/SMOKE DAMPER.** A listed device installed in ducts and air transfer openings designed to close automatically upon the detection of heat and resist the passage of flame and smoke. The device is installed to operate automatically and be controlled by a smoke detection system.

**Section 202 Delete definition of “CONFINED SPACES”: (M108-06/07 Part I)**

**Section 202 Add new definition of “FIRE DAMPER” to read as shown: (M11-06/07)**

**FIRE DAMPER.** A listed device installed in ducts and air transfer openings designed to close automatically upon detection of heat and to restrict the passage of flame. Fire dampers are classified for use in either static systems that will automatically shut down in the event of a fire, or in dynamic systems that continue to operate during a fire. A dynamic fire damper is tested and rated for closure under elevated temperature airflow.

**Section 202 Change definition of “LIGHT-DUTY COOKING APPLIANCE” to read as shown: (M13-06/07)**

**LIGHT-DUTY COOKING APPLIANCE.** Light-duty cooking appliances include gas and electric ovens (including standard, bake, roasting, revolving, retherm, convection, combination convection/steamer, conveyor, deck or deck-style pizza, and pastry), electric and gas steam-jacketed kettles, electric and gas pasta cookers, electric and gas compartment steamers (both pressure and atmospheric) and electric and gas cheesemelters.

**Section 202 Change definition of “MECHANICAL JOINT” to read as shown: (M14-06/07)**

**MECHANICAL JOINT.** A connection between pipes, fittings, or pipes and fittings, which is neither screwed, caulked, threaded, soldered, solvent cemented, brazed nor welded. Also, a joint in which compression is applied along the centerline of the pieces being joined. Some joints are part of a coupling, fitting or adapter. These joints include both the press-type and push-fit joining systems.

**Section 202 Change definition of “MEDIUM-DUTY COOKING APPLIANCE” to read as shown: (M13-06/07)**

**MEDIUM-DUTY COOKING APPLIANCE.** Medium-duty cooking appliances include electric discrete element ranges(with or without oven), electric and gas hot-top ranges, electric and gas griddles, electric and gas double-sided griddles, electric and gas fryers (including open deep fat fryers, donut fryers, kettle fryers, and pressure fryers), electric and gas conveyor pizza ovens, electric and gas tilting skillets (braising pans) and electric and gas rotisseries.

**Section 202 Add new definition of “NET OCCUPIABLE FLOOR AREA” to read as shown: (M44-06/07)**

**NET OCCUPIABLE FLOOR AREA.** The floor area of an occupiable space defined by the inside surfaces of its walls but excluding shafts, column enclosures and other permanently enclosed, inaccessible and unoccupiable areas. Obstructions in the space such as furnishings, display or storage racks and other obstructions, whether temporary or permanent, shall not be deducted from the space area.

**Section 202 Add new definition of “OCCUPIABLE SPACE” to read as shown: (M44-06/07)**

**OCCUPIABLE SPACE.** An enclosed space intended for human activities, excluding those spaces intended primarily for other purposes, such as storage rooms and equipment rooms, that are only intended to be occupied occasionally and for short periods of time.

**Section 202 Add new definition of “PUSH-FIT JOINTS” to read as shown: (M16-06/07)**

**PUSH-FIT JOINTS.** A type of mechanical joint consisting of elastomeric seals and corrosion-resistant tube grippers. Such joints are permanent or removable depending on the design.

**Section 202 Add new definition of “SMOKE DAMPER” to read as shown: (M11-06/07)**

**SMOKE DAMPER.** A listed device installed in ducts and air transfer openings designed to resist the passage of smoke. The device is installed to operate automatically, controlled by a smoke detection system, and where required, is capable of being positioned from a fire command center.

**Section 202 Delete definition of “UNCONFINED SPACE”: (M108-06/07, Part I)****Section 202 Delete definition of “UNUSUALLY TIGHT CONSTRUCTION”: (M108-06/07, Part I)****Section 202 Add new definition of “ZONE” to read as shown: (M44-06/07)**

**ZONE.** One occupiable space or several occupiable spaces with similar occupancy classification (see Table 403.3), occupant density, zone air distribution effectiveness and zone primary airflow rate per unit area.

## CHAPTER 3 GENERAL REGULATIONS

**Section 303.5 Change to read as shown: (M18-06/07 Part I)**

**303.5 Indoor locations.** Fuel-fired furnaces, water heaters and boilers installed in closets and alcoves shall be listed for such installation. For purposes of this section, a closet or alcove shall be defined as a room or space having a volume less than 12 times the total volume of fuel-fired appliances other than boilers and less than 16 times the total volume of boilers. Room volume shall be computed using the gross floor area and the actual ceiling height up to a maximum computation height of 8 feet (2438 mm).

**Section 304.5 Change to read as shown: (FG20-06/07 Part II)**

**304.5 Public garages.** Appliances located in public garages, motor fueling dispensing facilities, repair garages or other areas frequented by motor vehicles, shall be installed a minimum of 8 feet (2438 mm) above the floor. Where motor vehicles are capable of passing under an appliance, the appliance shall be installed at the clearances required by the appliance manufacturer and not less than 1 foot higher than the tallest vehicle garage door opening.

**Exception:** The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and installed in accordance with Section 304.3 and NFPA 30A.

**Table 305.4 Change table by adding rows to read as shown: (M19-06/07)****TABLE 305.4  
PIPE SUPPORT SPACING<sup>a</sup>**

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Polypropylene (PP) pipe or tubing 1 inch or smaller	2 2/3 (32 inches)	10 <sup>c</sup>
Polypropylene (PP) pipe or tubing, 1 ¼ inches or larger	4	10 <sup>c</sup>

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

- See Section 301.15.
- The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.
- Mid-story guide.

**Section 306.1 Change to read as shown: (M21-06/07)**

**306.1 Access for maintenance and replacement.** Appliances shall be accessible for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, venting systems or any other piping or ducts not connected to the appliance being inspected, serviced, repaired or replaced. A level working space at least 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an appliance.

**Section 306.5 Change to read as shown: (M29-06/07, M30-06/07)**

**306.5 Equipment and appliances on roofs or elevated structures.** Where equipment and appliances requiring access are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

- The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).
- Ladders shall have rung spacing not to exceed 14 inches (356 mm) on center.
- Ladders shall have a toe spacing not less than 6 inches (152 mm) deep.
- There shall be a minimum of 18 inches (457 mm) between rails.
- Rungs shall have a minimum 0.75-inch (19 mm) diameter and be capable of withstanding a 300-pound (136.1 kg) load.
- Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds (488.2 kg/m<sup>2</sup>) per square foot. Landing dimensions shall be not less than 18 inches and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
- Ladders shall be protected against corrosion by approved means.

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

**Exception:** This section shall not apply to Group R-3 occupancies.

**Section 306.5.1 Change to read as shown: (M31-06/07)**

**306.5.1 Sloped roofs.** Where appliances, equipment, fans or other components that require service are installed on a roof having a slope of three units vertical in 12 units horizontal (25-percent slope) or greater and having an edge more than 30 inches (762 mm) above grade at such edge, a level platform shall be provided on each side of the appliance or equipment to which access is required for service, repair or maintenance. The platform shall be not less than 30 inches (762 mm) in any dimension and shall be provided with guards. The guards shall extend not less than 42 inches (1067 mm) above the platform, shall be constructed so as to prevent the passage of a 21-

inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *International Building Code*. Access shall not require walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Where access involves obstructions greater than 30 inches in height, such obstructions shall be provided with ladders installed in accordance with Section 306.5 or stairs installed in accordance with the requirements specified in the *International Building Code* in the path of travel to and from appliances, fans or equipment requiring service.

**Section 307.2.1 Change to read as shown: (M33-06/07 Part I)**

**307.2.1 Condensate disposal.** Condensate from all cooling coils and evaporators shall be conveyed from the drain pan outlet to an approved place of disposal. Such piping shall maintain a minimum horizontal slope in the direction of discharge of not less than one-eighth unit vertical in 12 units horizontal (1-percent slope). Condensate shall not discharge into a street, alley or other areas so as to cause a nuisance.

**Section 307.2.2 Change to read as shown: (M34-06/07, M35-06/07 Part I)**

**307.2.2 Drain pipe materials and sizes.** Components of the condensate disposal system shall be cast iron, galvanized steel, copper, cross-linked polyethylene, polybutylene, polyethylene, ABS, CPVC or PVC pipe or tubing. All components shall be selected for the pressure and temperature rating of the installation. Joints and connections shall be made in accordance with the applicable provisions of Chapter 7 of the *International Plumbing Code* relative to the material type. Condensate waste and drain line size shall be not less than 3/4-inch (19 mm) internal diameter and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with Table 307.2.2.

**Table 307.2.2 Add new table to read as shown: (M34-06/07)**

**TABLE 307.2.2  
CONDENSATE DRAIN SIZING**

<b>EQUIPMENT CAPACITY</b>	<b>MINIMUM CONDENSATE PIPE DIAMETER</b>
Up to 20 tons (70.3 kw) of refrigeration	¾ inch (19 mm)
Over 20 tons (70.3 kw) to 40 tons (141 kw) of refrigeration	1 inch (25 mm)
Over 40 tons (141 kw) to 90 tons (317 kw) of refrigeration	1 1/4 inch (32 mm)
Over 90 tons (317 kw) to 125 tons (440 kw) of refrigeration	1 1/2 inch (38 mm)
Over 125 tons (440 kw) to 250 tons (879 kw) of refrigeration	2 inch (51 mm)

**Section 307.2.3.1 Change to read as shown: (M39-06/07 Part I)**

**307.2.3.1 Water-level monitoring devices.** On down-flow units and all other coils that do not have a secondary drain or provisions to install a secondary or auxiliary drain pan, a water-level monitoring device shall be installed inside the primary drain pan. This device shall shut off the equipment served in the event that the primary drain becomes restricted. Devices installed in the drain line shall not be permitted.

**Section 307.2.3.2 Add new section to read as shown: (M40-06/07 Part I)**

**307.2.3.2 Appliance, equipment and insulation in pans.** Where appliances, equipment or insulation are subject to water damage when auxiliary drain pans fill, that portion of the appliance, equipment and insulation shall be installed above the rim of the pan. Supports located inside of the pan to support the appliance or equipment shall be water-resistant and approved.

## **CHAPTER 4 VENTILATION**

**Section 401.1 Change to read as shown: (M42-06/07)**

**401.1 Scope.** This chapter shall govern the ventilation of spaces within a building intended to be occupied. Mechanical exhaust systems, including exhaust systems serving clothes dryers and cooking appliances; hazardous exhaust systems; dust, stock and refuse conveyor systems; subslab soil exhaust systems; smoke control systems; energy recovery ventilation systems; and other systems specified in Section 502 shall comply with Chapter 5.

**Section 401.4.1 Change to read as shown: (M43-06/07)**

**401.4.1 Intake openings.** Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Where a source of contaminant is located within 10 feet (3048 mm) horizontally of an intake opening, such opening shall be located a minimum of 2 feet (610 mm) below the contaminant source.

Environmental air exhausted from a residential dwelling shall not be considered to be a hazardous or noxious contaminant.

**Section 403.1 Change to read as shown: (M44-06/07)**

**403.1 Ventilation system.** Mechanical ventilation shall be provided by a method of supply air and return or exhaust air. The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing negative or positive pressure. The system to convey ventilation air shall be designed and installed in accordance with Chapter 6.

**Section 403.2 Change to read as shown: (M44-06/07)**

**403.2 Outdoor air required.** The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space.

**Exception:** Where the registered design professional demonstrates that an engineered ventilation system will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

**Section 403.2.1 Change to read as shown: (M44-06/07)**

**403.2.1 Recirculation of air.** The outdoor air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling to another or to dissimilar occupancies.
2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces where 10 percent or more of the resulting supply airstream consists of air recirculated from these spaces.
3. Where mechanical exhaust is required by Note b in Table 403.3, recirculation of air from such spaces shall be prohibited. All air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.
4. Where mechanical exhaust is required by Note h in Table 403.3, mechanical exhaust is required and recirculation is prohibited where 10 percent or more of the resulting supply airstream consists of air recirculated from these spaces.

**Section 403.2.2 Change to read as shown: (M44-06/07)**

**403.2.2 Transfer air.** Except where recirculation from such spaces is prohibited by Table 403.3, air transferred from occupiable spaces is not prohibited from serving as makeup air for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and exhaust air shall be sufficient to provide the flow rates as specified in Section 403.3. The required outdoor airflow rates specified in Table 403.3 shall be introduced directly into such spaces or into the occupied spaces from which air is transferred or a combination of both.

**Section 403.3 Change to read as shown: (M44-06/07)**

**403.3 Outdoor airflow rate.** Ventilation systems shall be designed to have the capacity to supply the minimum outdoor airflow rate determined in accordance with this section. The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3. Ventilation rates for occupancies not represented in Table 403.3 shall be those for a listed occupancy classification that is most similar in terms of occupant density, activities and building

construction; or shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code.

With the exception of smoking lounges, the ventilation rates in Table 403.3 are based on the absence of smoking in occupiable spaces. Where smoking is anticipated in a space other than a smoking lounge, the ventilation system serving the space shall be designed to provide ventilation over and above that required by Table 403.3 in accordance with accepted engineering practice.

**Exception:** The occupant load is not required to be determined, based on the estimated maximum occupant load rate indicated in Table 403.3 where approved statistical data document the accuracy of an alternate anticipated occupant density.

**Section 403.3.1 “System operation” Relocated to Section 403.5: (M44-06/07)**

**Section 403.3.1 Add new section to read as shown: (M44-06/07)**

**403.3.1 Zone outdoor airflow.** The minimum outdoor airflow required to be supplied to each zone shall be determined as a function of occupancy classification and space air distribution effectiveness in accordance with Sections 403.3.1.1 through 403.3.1.3.

**Sections 403.3.1.1, 403.3.1.2, Table 403.3.1.2, Section 403.3.1.3 Add new sections and new table to read as shown: (M44-06/07)**

**403.3.1.1 Breathing zone outdoor airflow.** The outdoor airflow rate required in the breathing zone ( $V_{bz}$ ) of the occupiable space or spaces in a zone shall be determined in accordance with Equation 4-1.

$$V_{bz} = R_p P_z + R_a A_z \quad \text{(Equation 4-1)}$$

where:

$A_z$  = zone floor area: the net occupiable floor area of the space or spaces in the zone.

$P_z$  = zone population: the number of people in the space or spaces in the zone.

$R_p$  = people outdoor air rate: the outdoor airflow rate required per person from Table 403.3

$R_a$  = area outdoor air rate: the outdoor airflow rate required per unit area from Table 403.3

**403.3.1.2 Zone air distribution effectiveness.** The zone air distribution effectiveness ( $E_z$ ) shall be determined using Table 403.3.1.2.

**TABLE 403.3.1.2  
ZONE AIR DISTRIBUTION EFFECTIVENESS<sup>a,b,c,d,e</sup>**

Air Distribution Configuration	$E_z$
Ceiling or floor supply of cool air	1.0 <sup>f</sup>
Ceiling or floor supply of warm air and floor return	1.0
Ceiling supply of warm air and ceiling return	0.8 <sup>g</sup>
Floor supply of warm air and ceiling return	0.7
Makeup air drawn in on the opposite side of the room from the exhaust and/or return	0.8
Makeup air drawn in near to the exhaust and/or return location	0.5

For SI: 1 foot = 304.8 mm, 1 foot per minute = 0.00506 m/s, °C = [(°F) – 32]/1.8.

- a. “Cool air” is air cooler than space temperature.
- b. “Warm air” is air warmer than space temperature.
- c. “Ceiling” includes any point above the breathing zone.
- d. “Floor” includes any point below the breathing zone.
- e. “Makeup air” is air supplied or transferred to a zone to replace air removed from the zone by exhaust or return systems.
- f. Zone air distribution effectiveness of 1.2 shall be permitted for systems with a floor supply of cool air and ceiling return, provided that low-velocity displacement ventilation achieves unidirectional flow and thermal stratification.

- g. Zone air distribution effectiveness of 1.0 shall be permitted for systems with a ceiling supply of warm air, provided that supply air temperature is less than 15° F above space temperature and provided that the 150 foot-per-minute supply air jet reaches to within 4.5 feet of floor level.

**403.3.1.3 Zone outdoor airflow.** The zone outdoor airflow rate ( $V_{oz}$ ), shall be determined in accordance with Equation 4-2.

$$V_{oz} = V_{bz}/E_z \quad \text{(Equation 4-2)}$$

**Section 403.3.2 Change to read as shown: (M44-06/07)**

**403.3.2 System outdoor airflow.** The outdoor air required to be supplied by each ventilation system shall be determined in accordance with Sections 403.3.2.1 through 403.2.3 as a function of system type and zone outdoor airflow rates.

**Sections 403.3.2.1, 403.3.2.2, 403.3.2.3, 403.3.2.3.1, 403.3.2.3.2, Table 403.3.2.3.2, Sections 403.3.2.3.3, 403.3.2.3.4 Add new sections and table to read as shown: (M44-06/07)**

**403.3.2.1 Single zone systems.** Where one air handler supplies a mixture of outdoor air and recirculated return air to only one zone, the system outdoor air intake flow rate ( $V_{ot}$ ) shall be determined in accordance with Equation 4-3.

$$V_{ot} = V_{oz} \quad \text{(Equation 4-3)}$$

**403.3.2.2 100-percent outdoor air systems.** Where one air handler supplies only outdoor air to one or more zones, the system outdoor air intake flow rate ( $V_{ot}$ ) shall be determined using Equation 4-4.

$$V_{ot} = \sum_{all\ zones} V_{oz} \quad \text{(Equation 4-4)}$$

**403.3.2.3 Multiple zone recirculating systems.** Where one air handler supplies a mixture of outdoor air and recirculated return air to more than one zone, the system outdoor air intake flow rate ( $V_{ot}$ ) shall be determined in accordance with Sections 403.3.2.3.1 through 403.3.2.3.5.

**403.3.2.3.1 Primary Outdoor Air Fraction.** The primary outdoor air fraction ( $Z_p$ ) shall be determined for each zone in accordance with Equation 4-5.

$$Z_p = V_{oz}/V_{pz} \quad \text{(Equation 4-5)}$$

where:

$V_{pz}$  = Primary airflow: The airflow rate supplied to the zone from the air-handling unit at which the outdoor air intake is located. It includes outdoor intake air and recirculated air from that air-handling unit but does not include air transferred or air recirculated to the zone by other means. For design purposes,  $V_{pz}$  shall be the zone design primary airflow rate, except for zones with variable air volume supply and  $V_{pz}$  shall be the lowest expected primary airflow rate to the zone when it is fully occupied.

**403.3.2.3.2 System ventilation efficiency.** The system ventilation efficiency ( $E_v$ ) shall be determined using Table 403.3.2.3.2 or Appendix A of ASHRAE 62.1.

**TABLE 403.3.2.3.2  
SYSTEM VENTILATION EFFICIENCY**

<i>Max (Z<sub>p</sub>)</i>	<i>E<sub>v</sub></i>
0.15	1.0
0.25	0.9
0.35	0.8
0.45	0.7
0.55	0.6
0.65	0.5
0.75	0.4
> 0.75	0.3

- a. *Max (Z<sub>p</sub>)* is the largest value of *Z<sub>p</sub>* calculated using Equation 4-5 among all the zones served by the system.  
b. Interpolating between table values shall be permitted.

**403.3.2.3.3 Uncorrected outdoor air intake.** The uncorrected outdoor air intake flow rate (*V<sub>ou</sub>*) shall be determined in accordance with Equation 4-7.

$$V_{ou} = D \sum_{all\ zones} R_p P_z + \sum_{all\ zones} R_a A_z \quad \text{(Equation 4-7)}$$

where:

*D* = Occupant diversity: the ratio of the *system population* to the sum of the zone populations, determined in accordance with Equation 4-8.

$$D = P_s / \sum_{all\ zones} P_z \quad \text{(Equation 4-8)}$$

where:

*P<sub>s</sub>* = System population: The total number of occupants in the area served by the system. For design purposes, *P<sub>s</sub>* shall be the maximum number of occupants expected to be concurrently in all zones served by the system.

**403.3.2.3.4 Outdoor air intake flow rate.** The outdoor air intake flow rate (*V<sub>ot</sub>*) shall be determined in accordance with Equation 4-9.

$$V_{ot} = V_{ou} / E_v \quad \text{(Equation 4-9)}$$

**Section 403.3.3 “Variable air volume system control” Relocated to Section 403.6: (M44-06/07)**

**Section 403.3.4 “Balancing” Relocated to Section 403.7: (M44-06/07)**

Table 403.3 Change table to read as shown: (M44-06/07, M48-06/07)

**TABLE 403.3  
MINIMUM VENTILATION RATES**

OCCUPANCY CLASSIFICATION	People Outdoor Airflow Rate in Breathing Zone Cfm/person	Area Outdoor Airflow Rate In Breathing Zone Ra cfm/ft <sup>2a</sup>	Default Occupant Density #/1000 ft <sup>2a</sup>	Exhaust Airflow Rate Cfm/ft <sup>2a</sup>
<b>Correctional facilities</b>				
Cells				
without plumbing fixtures	5	0.12	25	-
with plumbing fixtures <sup>9</sup>	5	0.12	25	1.0
Dining halls (See Food and Beverage Service)	-	-	-	-
Guard stations	5	0.06	15	-
Day room	5	0.06	30	-
Booking/waiting	7.5	0.06	50	-
<b>Dry Cleaners, laundries</b>				
Coin-operated dry cleaner	15	-	20	-
Coin-operated laundries	7.5	0.06	20	-
Commercial dry cleaner	30	-	30	-
Commercial laundry	25	-	10	-
Storage, pick up	7.5	.12	30	-
<b>Education</b>				
Auditoriums	5	0.06	150	-
Corridors (See Public Spaces)	-	-	-	-
Media center	10	0.12	25	-
Sports locker rooms <sup>9</sup>	-	-	-	0.5
Music/theater/dance	10	0.06	35	-
Smoking lounges <sup>b</sup>	60	-	70	-
Daycare (through age 4)	10	0.18	25	-
Classrooms (ages 5-8)	10	0.12	25	-
Classrooms (age 9 plus)	10	0.12	35	-
Lecture classroom	7.5	0.06	65	-
Lecture hall (fixed seats)	7.5	0.06	150	-
Art classroom <sup>9</sup>	10	0.18	20	0.7
Science laboratories <sup>9</sup>	10	0.18	25	1.0
Wood/metal shops <sup>9</sup>	10	0.18	20	0.5
Computer lab	10	0.12	25	-
Multi-use assembly	7.5	0.06	100	-
Locker/dressing rooms <sup>9</sup>	-	-	-	0.25
<b>Food and beverage service</b>				
Bars, cocktail lounges	7.5	0.18	100	-
Cafeteria, fast food	7.5	0.18	100	-
Dining rooms	7.5	0.18	70	-
Kitchens (cooking) <sup>b</sup>	-	-	-	0.7
<b>Hospitals, nursing and convalescent homes</b>				
Autopsy rooms <sup>b</sup>				0.5
Medical procedure rooms	15	-	20	-
Operating rooms	30	-	20	-
Patient rooms	25	-	10	-
Physical therapy	15	-	20	-
Recovery and ICU	15	-	20	-
<b>Hotels, motels, resorts and dormitories</b>				
Multi-purpose assembly	5	0.06	120	-
Bathrooms/Toilet – private <sup>9</sup>	-	-	-	25/50 <sup>f</sup>
Bedroom/living room	5	0.06	10	-
Conference/meeting	5	0.06	50	-
Dormitory sleeping areas	5	0.06	20	-
Gambling casinos	7.5	0.18	120	-
Lobbies/pre-function	7.5	0.06	30	-
<b>Offices</b>				
Conference rooms	5	0.06	50	-
Office spaces	5	0.06	5	-
Reception areas	5	0.06	30	-
Telephone/data entry	5	0.06	60	--
Main entry lobbies	5	0.06	10	--

OCCUPANCY CLASSIFICATION	People Outdoor Airflow Rate in Breathing Zone Cfm/person	Area Outdoor Airflow Rate In Breathing Zone Ra cfm/ft <sup>2a</sup>	Default Occupant Density #/1000 ft <sup>2a</sup>	Exhaust Airflow Rate Cfm/ft <sup>2a</sup>
<b>Private dwellings, single and Multiple</b>				
Garages, common for multiple units <sup>b</sup>	-	-	-	0.75
Garages, separate for each dwelling <sup>b</sup>	-	-	-	100 cfm per car
Kitchens <sup>b</sup>	-	-	-	25/100 <sup>f</sup>
Living areas <sup>c</sup>	0.35 ACH but not less than 15 cfm/person	-	Based upon number of bedrooms. first bedroom 2; each additional bedroom: 1	-
Toilet rooms and bathrooms <sup>g</sup>	-	-	-	20/50 <sup>f</sup>
<b>Public spaces</b>				
Corridors	-	0.06	-	-
Elevator car	-	-	-	1.0
Shower room (per shower head) <sup>g</sup>	-	-	-	50/20 <sup>f</sup>
Smoking lounges <sup>b</sup>	60	-	70	-
Toilet rooms – public <sup>g</sup>	-	-	-	50/70 <sup>e</sup>
Places of religious worship	5	0.06	120	-
Courtrooms	5	0.06	70	-
Legislative chambers	5	0.06	50	-
Libraries	5	0.12	10	-
Museums (children's)	7.5	0.12	40	-
Museums/galleries	7.5	0.06	40	-
<b>Retail stores, sales floors and Showroom floors</b>				
Sales (except as below)	7.5	0.12	15	-
Dressing rooms	-	-	-	0.25
Mall common areas	7.5	0.06	40	-
Shipping and receiving	-	0.12	-	-
Smoking lounges <sup>b</sup>	60	-	70	-
Storage rooms	-	0.12	-	-
Warehouses (See Storage)	-	-	-	-
<b>Specialty shops</b>				
Automotive motor-fuel dispensing stations <sup>b</sup>	-	-	-	1.5
Barber	7.5	0.06	25	0.5
Beauty and nail salons <sup>b,i</sup>	20	0.12	25	0.6
Embalming room <sup>b</sup>	-	-	-	2.0
Pet shops (animal areas) <sup>b</sup>	7.5	0.18	10	0.9
Supermarkets	7.5	0.06	8	-
<b>Sports and amusement</b>				
Disco/dance floors	20	0.06	100	-
Bowling alleys (seating areas)	10	0.12	40	-
Game arcades	7.5	0.18	20	-
Ice arenas without combustion engines	-	0.30	-	0.5
Gym, stadium, arena (play area)	-	0.30	-	-
Spectator areas	7.5	0.06	150	-
Swimming pools (pool and deck area)	-	0.48	-	-
Health club/aerobics room	20	0.06	40	-
Health club/weight room	20	0.06	10	-
<b>Storage</b>				
Repair garages, enclosed parking garages <sup>b,d</sup>	-	-	-	0.75
Warehouses	-	0.06	-	-
<b>Theaters</b>				
Auditoriums (See Education)	-	-	-	-
Lobbies	5	0.06	150	-
Stages, studios	10	0.06	70	-
Ticket booths	5	0.06	60	-
<b>Transportation</b>				
Platforms	7.5	0.06	100	-
Transportation waiting	7.5	0.06	100	-
<b>Workrooms</b>				
Bank vaults/safe deposit	5	0.06	5	-
Darkrooms	-	-	-	1.0
Copy, printing rooms	5	0.06	4	0.5
Meat processing <sup>c</sup>	15	-	10	-
Pharmacy (prep. area)	5	0.18	10	-
Photo studios	5	0.12	10	-
Computer (without printing)	5	0.06	4	-

For SI: 1 cubic foot per minute = 0.0004719 m<sup>3</sup>/s, 1 ton = 908 kg,  
1 cubic foot per minute per square foot = 0.00508 m<sup>3</sup>/(s m<sup>2</sup>),  
C = [(F) -32]/1.8, 1 square foot = 0.0929 m<sup>2</sup>.

- a. Based upon net occupiable floor area
- b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited (see Section 403.2.1, Item 3).
- c. Spaces unheated or maintained below 50° F are not covered by these requirements unless the occupancy is continuous.
- d. Ventilation systems in enclosed parking garages shall comply with Section 404.
- e. Rates are per water closet or urinal. The higher rate shall be provided where periods of heavy use are expected to occur, such as, toilets in theaters, schools, and sports facilities. The lower rate shall be permitted where periods of heavy use are not expected.
- f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted where the exhaust system is designed to operate continuously during normal hours of use.
- g. Mechanical exhaust is required and recirculation is prohibited except that recirculation shall be permitted where the resulting supply airstream consists of not more than 10 percent air recirculated from these spaces (see Section 403.2.1, Items 2 and 4).
- h. For nail salons, the required exhaust shall include ventilation tables or other systems that capture the contaminants and odors at their source and are capable of exhausting a minimum of 50 cfm per station.

**Section 403.4 Add new section to read as shown: (M44-06/07)**

**403.4 Exhaust Ventilation.** Exhaust airflow rate shall be provided in accordance with the requirements in Table 403.3. Exhaust makeup air shall be permitted to be any combination of outdoor air, recirculated air and transfer air, except as limited in accordance with Section 403.2.

**Section 403.5 Relocated from Section 403.3.1 with no change to current text: (M44-06/07)**

**Section 403.6 Relocated from 403.3.3 and changed to read as shown: (M44-06/07)**

**403.6 Variable air volume system control.** Variable air volume air distribution systems, other than those designed to supply only 100-percent outdoor air, shall be provided with controls to regulate the flow of outdoor air. Such control system shall be designed to maintain the flow rate of outdoor air at a rate of not less than that required by Section 403.3 over the entire range of supply air operating rates.

**Section 403.7 Relocated from Section 403.3.4 and changed to read as shown: (M44-06/07)**

**403.7 Balancing.** The ventilation air distribution system shall be provided with means to adjust the system to achieve at least the minimum ventilation airflow rate as required by Sections 403.3 and 403.4. Ventilation systems shall be balanced by an approved method. Such balancing shall verify that the ventilation system is capable of supplying and exhausting the airflow rates required by Sections 403.3 and 403.4.

**Section 404.2 Change to read as shown: (M44-06/07)**

**404.2 Minimum ventilation.** Automatic operation of the system shall not reduce the ventilation airflow rate below 0.05 cfm per square foot (0.00025 m<sup>3</sup>/s · m<sup>2</sup>) of the floor area and the system shall be capable of producing a ventilation airflow rate of 0.75 cfm per square foot (0.0076m<sup>3</sup>/s · m<sup>2</sup>) of floor area.

## CHAPTER 5 EXHAUST SYSTEMS

**Section 501.1 Change to read as shown: (M42-06/07)**

**501.1 Scope.** This chapter shall govern the design, construction and installation of mechanical exhaust systems, including exhaust systems serving clothes dryers and cooking appliances; hazardous exhaust systems; dust, stock and refuse conveyor systems, subslab soil exhaust systems; smoke control systems; energy recovery ventilation systems; and other systems specified in Section 502.

**Section 501.2.1 Change to read as shown: (M42-06/07, M53-06/07)**

**501.2.1 Location of exhaust outlets.** The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings which are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. Environmental air duct exhaust terminations shall comply with Section 401.4.

**Exception:** Exhaust from bathrooms and kitchens in residential dwellings complying with Section 401.4.1.

4. For specific systems see the following sections:
  - 4.1. Clothes dryer exhaust, Section 504.4
  - 4.2. Kitchen hoods and other kitchen exhaust equipment, Sections 506.3.12, 506.4 and 506.5
  - 4.3. Dust, stock and refuse conveying systems, Section 511.2
  - 4.4. Subslab soil exhaust systems, Section 512.4, and
  - 4.5. Smoke control systems, Section 513.10.3

**Section 501.3 Change to read as shown: (M54-06/07)**

**501.3 Pressure equalization.** Mechanical exhaust systems shall be sized to remove the quantity of air required by this chapter to be exhausted. The system shall operate when air is required to be exhausted. Where mechanical exhaust is required in a room or space in other than occupancies in R-3 and dwelling units in R-2, such space shall be maintained with a neutral or negative pressure. If a greater quantity of air is supplied by a mechanical ventilating supply system than is removed by a mechanical exhaust for a room, adequate means shall be provided for the natural or mechanical exhaust of the excess air supplied. If only a mechanical exhaust system is installed for a room or if a greater quantity of air is removed by a mechanical exhaust system than is supplied by a mechanical ventilating supply system for a room, adequate make-up air consisting of supply air, transfer air or outdoor air shall be provided to satisfy the deficiency. The calculated building infiltration rate shall not be utilized to satisfy the requirements of this section.

**Section 504.2 Change to read as shown: (M57-06/07)**

**504.2 Exhaust penetrations.** Where a clothes dryer exhaust duct penetrates a wall or ceiling membrane, the annular space shall be sealed with noncombustible material, approved fire caulking, or a noncombustible dryer exhaust duct wall receptacle. Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, draftstopping or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless such duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating is maintained in accordance with *the international Building Code*. Fire dampers, combination fire/smoke dampers and any similar devices that will obstruct the exhaust flow, shall be prohibited in clothes dryer exhaust ducts.

**Section 504.5 Change to read as shown: (M58-06/07)**

**504.5 Makeup air.** Installations exhausting more than 200 cfm (0.09m<sup>3</sup>/s) shall be provided with makeup air. Where a closet is designed for the installation of a clothes dryer, an opening having an area of not less than 100 square inches (0.0645 m<sup>2</sup>) shall be provided in the closet enclosure or makeup air shall be provided by other approved means.

**Section 504.6.1 Change exception to read as shown: (M62-06/07 Part I)**

**504.6.1 Maximum length.** The maximum length of a clothes dryer exhaust duct shall not exceed 25 feet (7620 mm) from the dryer location to the outlet terminal. The maximum length of the duct shall be reduced 2 1/2 feet (762 mm) for each 45 degree (0.79 rad) bend and 5 feet (1524 mm) for each 90 degree (1.6 rad) bend. The maximum length of the exhaust duct does not include the transition duct.

**Exception:** Where the make and model of the clothes dryer to be installed is known and the manufacturer's installation instructions for such dryer are provided to the code official, the maximum length of the exhaust duct, including any transition duct, shall be permitted to be in accordance with the dryer manufacturer's installation instructions. Where exhaust ducts are installed in concealed locations, the developed length of the exhaust duct system shall be indicated by permanent labels or tags installed in an observable location.

**Section 505.1 Change exception 2 to read as shown: (M64-06/07 Part I)**

**505.1 Domestic systems.** Where domestic range hoods and domestic appliances equipped with downdraft exhaust are located within dwelling units, such hoods and appliances shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls and shall be air tight and equipped with a backdraft damper.

**Exceptions:**

1. Where installed in accordance with the manufacturer's installation instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.
2. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
  - 2.1. The duct shall be installed under a concrete slab poured on grade.
  - 2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
  - 2.3. The PVC duct shall extend not greater than 1 inch (25 mm) above the indoor concrete floor surface.
  - 2.4. The PVC duct shall extend not greater than 1 inch (25 mm) above grade outside of the building.
  - 2.5. The PVC ducts shall be solvent cemented.

**Section 505.2 Add new section to read as shown: (M65-06/07 Part I)**

**505.2 Makeup air required.** Exhaust hood systems capable of exhausting in excess of 400 cfm (0.19 m<sup>3</sup>/s) shall be provided with make-up air at a rate approximately equal to the exhaust air rate. Such make-up air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

**Section 506.3.1.1 Change to read as shown: (M66-06/07)**

**506.3.1.1 Grease duct materials.** Grease ducts serving Type I hoods shall be constructed of steel not less than 0.055 inch (1.4 mm) (No. 16 Gage) in thickness or stainless steel not less than 0.044 inch (1.1 mm) (No. 18 Gage) in thickness.

**Exception:** Factory-built commercial kitchen grease ducts listed and labeled in accordance with UL 1978 and installed in accordance with Section 304.1.

**Section 506.3.2.5 Change to read as shown: (M68-06/07)**

**506.3.2.5 Grease duct test.** Prior to the use or concealment of any portion of a grease duct system, a leakage test shall be performed in the presence of the code official. Ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the duct work from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary equipment and perform the grease duct leakage test. A light test or an approved equivalent test method shall be performed to determine that all welded and brazed joints are liquid tight.

A light test shall be performed by passing a lamp having a power rating of not less than 100 watts through the entire section of duct work to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. A test shall be performed for the entire duct system, including the hood-to-duct connection. The duct work shall be permitted to be tested in sections, provided that every joint is tested.

**Exception:** Subject to the approval of the code official, the leakage test need not be performed in the presence of the code official provided that an approved agency submits a report of the results of the test.

**Section 506.3.6 Change to read as shown: (M66-06/07)**

**506.3.6 Grease duct clearances.** Grease duct systems and exhaust equipment serving a Type I hood shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 3 inches (76 mm).

**Exception:** Factory-built commercial kitchen grease ducts listed and labeled in accordance with UL 1978 and listed and labeled exhaust equipment installed in accordance with Section 304.1.

**Section 506.3.8 Change to read as shown: (M69-06/07)**

**506.3.8 Grease duct cleanouts and other openings.** Grease duct systems shall not have openings therein other than those required for proper operation and maintenance of the system. Any portion of such system having sections not provided with access from the duct entry or discharge shall be provided with cleanout openings. Cleanout openings shall be equipped with tight-fitting doors constructed of steel having a thickness not less than that required for the duct. Doors shall be equipped with a substantial method of latching, sufficient to hold the door tightly closed. Door assemblies, including any frames and gasketing, shall be approved for the purpose, and shall not have fasteners that penetrate the duct. Listed and labeled access door assemblies shall be installed in accordance with the terms of the listing.

**Section 506.3.10 Change exceptions to read as shown: (M74-06/07; FS8-06/07 Part II)**

**506.3.10 Grease duct enclosure.** A grease duct serving a Type I hood that penetrates a ceiling, wall or floor shall be enclosed from the point of penetration to the out let terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. Ducts shall be enclosed in accordance with the *International Building Code* requirements for shaft construction. The duct enclosure shall be sealed around the duct at the point of penetration and vented to the out side of the building through the use of weather-protected openings. Clearance from the duct to the interior surface of enclosures of combustible construction shall be not less than 18 inches (457 mm). Clearance from the duct to the interior surface of enclosures of noncombustible construction or gypsum wall board attached to noncombustible structures shall be not less than 6 inches (152 mm). The duct enclosure shall serve a single grease exhaust duct system and shall not contain any other ducts, piping, wiring or systems.

**Exceptions:**

1. The shaft enclosure provisions of this section shall not be required where a duct penetration is protected with a through-penetration firestop system tested and listed in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. The duct shall be covered with a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose, in accordance with ASTM E2336. Such system shall be installed in accordance with the listing and the manufacturer's installation instructions. Exposed ductwrap systems shall be protected where subject to physical damage.
2. The shaft enclosure provisions of this section shall not be required where a duct penetration is protected with a through-penetration firestop system tested in accordance with ASTM E 814 or UL 1479, having an "F" and "T" rating equal to the fire resistance rating of the assembly being penetrated and where a listed and labeled prefabricated duct system, listed for such purposes in accordance with UL 2221, is utilized. Such system shall be installed in accordance with the listing and the manufacturer's installation instructions.
3. A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

**Section 506.3.12.3 Change to read as shown: (M75-06/07)**

**506.3.12.3 Termination location.** Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from parts of the same or contiguous buildings, adjacent buildings and adjacent property lines and shall be located not less than 10 feet (3048 mm) above the adjoining grade level. Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from or not less than 2 feet (607 mm) above air intake openings into any building. Exhaust outlet terminations shall not be directed towards nor impinge on any structure.

**Exception:** Exhaust outlets shall terminate not less than 5 feet (1524 mm) from parts of the same or contiguous building, an adjacent building, adjacent property line and air intake openings into a building where air from the exhaust outlet discharges away from such locations.

**Section 506.4.3 Add new section to read as shown: (M76-06/07)**

**506.4.3 Type II terminations.** Exhaust outlets serving Type II hoods shall terminate in accordance with the hood manufacturer's installation instructions and shall comply with all of the following:

1. Exhaust outlets shall terminate not less than 3 feet (914 mm) in any direction from openings into the building.
2. Outlets shall terminate not less than 10 feet (3048 mm) from property lines.
3. Outlets shall terminate not less than 10 feet (3048 mm) above grade.
4. Outlets shall terminate not less than 30 inches (762 mm) above the roof surface.
5. Outlets shall terminate not less than 30 inches (762 mm) from exterior vertical walls

**Section 507.2.2 Add exception 5 to read as shown: (M77-06/07)**

**507.2.2. Type II hoods.** Type II hoods shall be installed where cooking or dishwashing appliances produce heat, steam, or products of combustion and do not produce grease or smoke, such as steamers, kettles, pasta cookers and dishwashing machines.

**Exceptions:**

1. Under-counter-type commercial dishwashing machines.
2. A Type II hood is not required for dishwashers and potwashers that are provided with heat and water vapor exhaust systems that are supplied by the appliance manufacturer and are installed in accordance with the manufacturer's instructions.
3. A single light-duty electric convection, bread, retherm or microwave oven. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.
4. A Type II hood is not required for the following electrically heated appliances: toasters, steam tables, popcorn poppers, hot dog cookers, coffee makers, rice cookers, egg cookers, holding/warming ovens. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.
5. Any appliance having an engineered exhaust system incorporated as part of the appliance's design.

**Section 507.9 Change exception to read as shown: (M79-06/07)**

**507.9 Clearances for Type I hood.** A Type I hood shall be installed with a clearance to combustibles of not less than 18 inches (457 mm).

**Exception:** Clearance shall not be required from gypsum wallboard or 1/2-inch or thicker cementitious wallboard attached to noncombustible structures provided that a smooth, cleanable, nonabsorbent and noncombustible material is installed between the hood and the gypsum or cementitious wallboard over an area extending not less than 18 inches (457 mm) in all directions from the hood.

**Section 508.1 Add exception to read as shown: (M81-06/07)**

**508.1 Makeup air.** Makeup air shall be supplied during the operation of commercial kitchen exhaust systems that are provided for commercial cooking appliances. The amount of makeup air supplied shall be approximately equal to the amount of exhaust air. The makeup air shall not reduce the effectiveness of the exhaust system. Makeup air shall be provided by gravity or mechanical means or both. For mechanical makeup air systems, the makeup air system shall be automatically controlled to start and operate simultaneously with the exhaust system. Makeup air intake opening locations shall comply with Sections 401.4 and 401.4.1.

**Section 508.2 Change to read as shown: (M83-06/07)**

**508.2 Compensating hoods.** Manufacturers of compensating hoods shall provide a label indicating minimum exhaust flow and/or maximum makeup airflow that provides capture and containment of the exhaust effluent.

**Exception:** Compensating hoods with makeup air supplied only from front face discharge and side face discharge openings shall not be required to be labeled with the maximum makeup airflow.

**Section 510.4 Change to read as shown: (M84-06/07)**

**510.4 Independent system.** Hazardous exhaust systems shall be independent of other types of exhaust systems. Incompatible materials, as defined in the *International Fire Code*, shall not be exhausted through the same hazardous exhaust system. Hazardous exhaust systems shall not share common shafts with other duct systems, except where such systems are hazardous exhaust systems originating in the same fire area.

**Exception:** The provision of this section shall not apply to laboratory exhaust systems where all of the following conditions apply:

1. All of the hazardous exhaust ductwork and other laboratory exhaust within both the occupied space and the shafts are under negative pressure while in operation.
2. The hazardous exhaust ductwork manifolded together within the occupied space must originate within the same fire area.
3. Each control branch has a flow regulating device.
4. Perchloric acid hoods and connected exhaust shall be prohibited from manifolding.
5. Radioisotope hoods are equipped with filtration and/or carbon beds where required by the registered design professional.
6. Biological safety cabinets are filtered.
7. Provision is made for continuous maintenance of negative static pressure in the ductwork.

Contaminated air shall not be recirculated to occupiable areas. Air containing explosive or flammable vapors, fumes or dusts; flammable, highly toxic or toxic gases; or radioactive material shall be considered to be contaminated.

**Section 510.8 Change to read as shown: (M85-06/07)**

**510.8 Duct construction.** Ducts utilized to convey hazardous exhaust shall be constructed of approved G90 galvanized sheet steel, with a minimum nominal thickness as specified in Table 510.8. Nonmetallic ducts utilized in systems exhausting nonflammable corrosive fumes or vapors shall be listed and labeled.

Nonmetallic duct shall have a flame spread index of 25 or less and a smoke-developed index of 50 or less, when tested in accordance with ASTM E 84 or UL 723. Ducts shall be approved for installation in such an exhaust system. Where the products being exhausted are detrimental to the duct material, the ducts shall be constructed of alternative materials that are compatible with the exhaust.

**Section 513.11 Change to read as shown: (FS37-06/07 Part IV)**

**[F] 513.11 Power systems.** The smoke control system shall be supplied with two sources of power. Primary power shall be the normal building power systems. Secondary power shall be from an approved standby source complying with the *International Code Council Electrical Code Administrative Provisions*. The standby power source and its transfer switches shall be in a room separate from the normal power transformers and switch gear and ventilated directly to and from the exterior. The room shall be enclosed with not less than 1-hour fire-resistance-rated fire barriers constructed in accordance with Section 706 of the *International Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *International Building Code*, or both. Power distribution from the two sources shall be by independent routes. Transfer to full standby power shall be automatic and within 60seconds of failure of the primary power. The systems shall comply with the *International Code Council Electrical Code Administrative Provisions*.

## CHAPTER 6 DUCT SYSTEMS

**Section 602.2.1 Add exception 5to read as shown: (M89-06/07)**

**602.2.1 Materials within plenums.** Except as required by Sections 602.2.1.1 through 602.2.1.5, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84.

**Exceptions:**

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, approved gypsum board assemblies or within materials listed and labeled for such application.

**Section 603.4.1 Add new section to read as shown: (M91-06/07 Part I)**

**603.4.1 Minimum fasteners.** Round metallic ducts shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint.

**Exception:** Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion so as to prevent a hinge effect.

**Section 603.8.1 Change to read as shown: (M92-06/07)**

**603.8.1 Slope.** Ducts shall have a minimum slope of 1/8-inch per foot to allow drainage to a point provided with access.

**Section 603.9 Change to read as shown: (M95-06/07 Part I)**

**603.9 Joints, seams and connections.** All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC *Duct Construction Standards—Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards*. All joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants, or tapes. Tapes and mastics used to seal ductwork listed and labeled in accordance with UL 181A shall be marked “181A-P” for pressure-sensitive tape, “181 A-M” for mastic or “181 A-H” for heat-sensitive tape. Tapes and mastics used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked “181B-FX” for pressure-sensitive tape or “181B-M” for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Unlisted duct tape is not permitted as a sealant on any metal ducts.

**Section 603.17.3 Add new section to read as shown: (M98-06/07)**

**603.17.3 Air dispersion systems.** Air dispersion systems shall be exposed in the space that is being conditioned by the system and shall be operated under positive pressure. Air dispersion systems shall not pass through fire-resistance-rated assemblies. Air dispersion systems shall be listed and labeled.

**Section 604.7 Change to read as shown: (M100-06/07 Part II)**

**[EC] 604.7 Identification.** External duct insulation, except spray polyurethane foam, and factory-insulated flexible duct shall be legibly printed or identified at intervals not greater than 36 inches (914 mm) with the name of the manufacturer, the thermal resistance *R*-value at the specified installed thickness and the flame spread and smoke-developed indexes of the composite materials. All duct insulation product *R*-values shall be based on insulation only, excluding air films, vapor retarders or other duct components, and shall be based on tested *C*-values at 75°F (24°C) mean temperature at the installed thickness, in accordance with recognized industry procedures. The installed thickness of duct insulation used to determine its *R*-values shall be determined as follows:

1. For duct board, duct liner and factory-made rigid ducts not normally subjected to compression, the nominal insulation thickness shall be used.
2. For duct wrap, the installed thickness shall be assumed to be 75 percent (25-percent compression) of nominal thickness.
3. For factory-made flexible air ducts, the installed thickness shall be determined by dividing the difference between the actual outside diameter and nominal inside diameter by two.
4. For spray polyurethane foam, the aged *R*-value per inch, measured in accordance with recognized industry standards, shall be provided to the customer in writing at the time of foam application.

**Section 606.4.1 Change to read as shown: (F120-06/07 Part II)**

**606.4.1 Supervision.** The duct smoke detectors shall be connected to a fire alarm system where a fire alarm system is required by Section 907.2 of the *International Fire Code*. The actuation of a duct smoke detector shall activate a visible and audible supervisory signal at a constantly attended location.

**Exceptions:**

1. The supervisory signal at a constantly attended location is not required where the duct smoke detector activates the building's alarm-indicating appliances.
2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and an audible signal in an approved location. Duct smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble.

**Section 607.1.1 Change to read as shown: (FS46-06/07)**

**[B] 607.1.1 Ducts that penetrate fire resistance rated assemblies without dampers.** Ducts that penetrate fire-resistance-rated assemblies and are not required by this section to have dampers shall comply with the requirements of Sections 712.2 through 712.3.4 of the *International Building Code*. Ducts that penetrate horizontal assemblies not required to be contained within a shaft and not required by this section to have dampers shall comply with the requirements of Sections 712.4 through 712.4.4 of the *International Building Code*.

**Section 607.1.1.1 Add new section to read as shown: (FS46-06/07)**

**[B] 607.1.1.1 Ducts that penetrate nonfire-resistance-rated assemblies.** The space around a duct penetrating a nonfire-resistance-rated floor assembly shall comply with Section 716.6.3 of the *International Building Code*.

**Section 607.3.2.1 Change exception to read as shown: (FS130-06/07)**

**[B] 607.3.2.1 Smoke damper actuation methods.** The smoke damper shall close upon actuation of a listed smoke detector or detectors installed in accordance with Section 607 of this code and Sections 907.10 and 907.11 of the *International Building Code* and one of the following methods, as applicable:

1. Where a damper is installed within a duct, a smoke detector shall be installed in the duct within 5 feet (1524 mm) of the damper with no air outlets or inlets between the detector and the damper. The detector shall be listed for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.
2. Where a damper is installed above smoke barrier doors in a smoke barrier, a spot-type detector listed for releasing service shall be installed on either side of the smoke barrier door opening.
3. Where a damper is installed within an air transfer opening in a wall, a spot-type detector listed for releasing service shall be installed within 5 feet (1524 mm) horizontally of the damper.
4. Where a damper is installed in a corridor wall or ceiling, the damper shall be permitted to be controlled by a smoke detection system installed in the corridor.
5. Where a total-coverage smoke detector system is provided within areas served by an HVAC system, dampers shall be permitted to be controlled by the smoke detection system.

**Section 607.5 Change to read as shown: (FS140-06/07)**

**[B] 607.5 Where required.** Fire dampers, smoke dampers, combination fire/smoke dampers and ceiling radiation dampers shall be provided at the locations prescribed in Sections 607.5.1 through 607.5.7. Where an assembly is required to have both fire dampers and smoke dampers, combination fire/smoke dampers or a fire damper and smoke damper shall be required.

**Section 607.5.2 Change to read as shown: (FS10-06/07 Part I)**

**[B] 607.5.2 Fire barriers.** Ducts and air transfer openings that penetrate fire barriers shall be protected with listed fire dampers installed in accordance with their listing. Ducts and air transfer openings shall not penetrate exit enclosures and exit passageways except as permitted by Sections 1020.1.2 and 1021.5, respectively, of the *International Building Code*.

**Exception:** Fire dampers are not required at penetrations of fire barriers where any of the following apply:

1. Penetrations are tested in accordance with ASTM E 119 or UL 263 as part of the fire-resistance-rated assembly.
2. Ducts are used as part of an approved smoke control system in accordance with Section 513 and where the fire damper would interfere with the operation of the smoke control system.
3. Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, are in areas of other than Group H and are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the *International Building Code*. For the purposes of this exception, a ducted HVAC system shall be a duct system for the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage [0.0217 inch (0.55 mm)] thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

**Section 607.5.3 Change to read as shown: (FS43-06/07)**

**[B] 607.5.3 Fire partitions.** Ducts and air transfer openings that penetrate fire partitions shall be protected with listed fire dampers installed in accordance with their listing.

**Exception:** In occupancies other than Group H, fire dampers are not required where any of the following apply:

1. The partitions are tenant separation or corridor walls in buildings equipped throughout with an automatic sprinkler system in accordance with section 903.3.1.1 or 903.3.1.2 of the *International Building Code* and the duct is protected as a through penetration in accordance with Section 712 of the *International Building Code*.
2. The partitions are tenant partitions in covered mall buildings where the walls are not required by provisions elsewhere in the *International Building Code* to extend to the underside of the floor or roof sheathing, slab or deck above.
3. The duct system is constructed of approved materials in accordance with Section 603 and the duct penetrating the wall complies with all of the following requirements:
  - 3.1. The duct shall not exceed 100 square inches (0.06 m<sup>2</sup>).
  - 3.2. The duct shall be constructed of steel a minimum of 0.0217-inch (0.55 mm) in thickness.
  - 3.3. The duct shall not have openings that communicate the corridor with adjacent spaces or rooms.
  - 3.4. The duct shall be installed above a ceiling.
  - 3.5. The duct shall not terminate at a wall register in the fire-resistance-rated wall.
  - 3.6. A minimum 12-inch-long (305 mm) by 0.060-inch-thick (1.52 mm) steel sleeve shall be centered in each duct opening. The sleeve shall be secured to both sides of the wall and all four sides of the sleeve with minimum 1 1/2-inch by 1 1/2-inch by 0.060-inch (38 mm by 38 mm by 1.52 mm) steel retaining angles. The retaining angles shall be secured to the sleeve and the wall with No. 10 (M5) screws. The annular space between the steel sleeve and the wall opening shall be filled with rock (mineral) wool batting on all sides.

**Section 607.5.5 Change to read as shown: (FS10-06/07 Part I, FS135-06/07)**

**[B] 607.5.5 Shaft enclosures.** Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with listed fire and smoke dampers installed in accordance with their listing.

**Exceptions:**

1. Fire dampers are not required at penetrations of shafts where:
  - 1.1. Steel exhaust subducts extend at least 22 inches (559 mm) vertically in exhaust shafts provided that there is a continuous airflow upward to the outdoors;
  - 1.2. Penetrations are tested in accordance with ASTM E 119 or UL 263 as part of the fire-resistance-rated assembly;
  - 1.3. Ducts are used as part of an approved smoke control system in accordance with Section 909 of the *International Building Code*, and where the fire damper will interfere with the operation of the smoke control system; or
  - 1.4. The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction
2. In Group B and R occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Building Code*, smoke dampers are not required at

penetrations of shafts where kitchen, clothes dryer, bathroom and toilet room exhaust openings with steel exhaust subducts, having a wall thickness of at least 0.019 inch (0.48 mm), extend at least 22 inches (559 mm) vertically and the exhaust fan at the upper terminus is powered continuously in accordance with the provisions of Section 909.11 of the *International Building Code*, and maintains airflow upward to the outdoors.

3. Smoke dampers are not required at penetration of exhaust or supply shafts in parking garages that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.
4. Smoke dampers are not required at penetrations of shafts where ducts are used as part of an approved mechanical smoke control system designed in accordance with Section 909 of the *International Building Code* and where the smoke damper will interfere with the operation of the smoke control system.
5. Fire dampers and combination fire/smoke dampers are not required in kitchen and clothes dryer exhaust systems installed in accordance with this code.

**Section 607.5.6 Add new section to read as shown: (FS139-06/07)**

**[B] 607.5.6 Exterior walls.** Ducts and air transfer openings in fire-resistance rated exterior walls required to have protected openings in accordance with Section 704.14 of the *International Building Code* shall be protected with listed fire dampers installed in accordance with their listing.

**Section 607.5.7 Add new section to read as shown: (FS140-06/07)**

**[B] 607.5.7 Smoke partitions.** A listed smoke damper designed to resist the passage of smoke shall be provided at each point that an air transfer opening penetrates a smoke partition. Smoke dampers and smoke damper actuation methods shall comply with Section 607.3.2.1.

**Exception:** Where the installation of a smoke damper will interfere with the operation of a required smoke control system in accordance with Section 513, approved alternate protection shall be utilized.

**Section 607.6.1 Change to read as shown: (FS10-06/07 Part I)**

**[B] 607.6.1 Through penetrations.** In occupancies other than groups I-2 and I-3, a duct constructed of approved materials in accordance with Section 603 that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided that a listed fire damper is installed at the floor line or the duct is protected in accordance with Section 712.4 of the *International Building Code*. For air transfer openings, see Exception 7 to Section 707.2 of the *International Building Code*.

**Exception:** A duct is permitted to penetrate three floors or less without a fire damper at each floor provided it meets all of the following requirements.

1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel not less than 0.019 inch (0.48 mm) (26 gage) in thickness.
2. The duct shall open into only one dwelling unit or sleeping unit and the duct system shall be continuous from the unit to the exterior of the building.
3. The duct shall not exceed 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches (0.065 m<sup>2</sup>) for any 100 square feet (9.3 m<sup>2</sup>) of the floor area.
4. The annular space around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.
5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a listed ceiling radiation damper installed in accordance with Section 607.6.2.

**Section 607.6.2.1 Change to read as shown: (FS10-06/07 Part I, FS143-06/07)**

**[B] 607.6.2.1 Ceiling radiation dampers.** Ceiling radiation dampers shall be tested either in accordance with UL 555C or as part of a fire-resistance rated floor-ceiling or roof/ceiling assembly in accordance with ASTM E 119 or UL 263. Ceiling radiation dampers shall be installed in accordance with the details listed in the fire-resistance rated assembly and the manufacturer's installation instructions and the listing. Ceiling radiation dampers are not required where either of the following apply:

1. Tests in accordance with ASTM E119 or UL 263 have shown that ceiling radiation dampers are not necessary in order to maintain the fire-resistance rating of the assembly.
2. Where exhaust duct penetrations are protected in accordance with Section 712.4.1.2 of the *International Building Code* and the exhaust ducts are located within the cavity of a wall, and do not pass through another dwelling unit or tenant space.

## CHAPTER 7 COMBUSTION AIR

### **Section 701.1 Change to read as shown: (M108-06/07 Part I)**

**701.1 Scope.** Solid-fuel-burning appliances shall be provided with combustion air in accordance with the appliance manufacturer's installation instructions. Oil-fired appliances shall be provided with combustion air in accordance with NFPA 31. The methods of providing combustion air in this chapter do not apply to fireplaces, fireplace stoves and direct-vent appliances. The requirements for combustion and dilution air for gas-fired appliances shall be in accordance with the *International Fuel Gas Code*.

### **Sections 701.2 through 710.1 Delete without substitution: (M108-06/07 Part I)**

## CHAPTER 8 CHIMNEYS AND VENTS

### **Section 801.18.4 Change exception to read as shown: (M109-06/07)**

**801.18.4 Clearances.** Chimneys and vents shall have air-space clearance to combustibles in accordance with the *International Building Code* and the chimney or vent manufacturer's installation instructions.

**Exception:** Masonry chimneys without the required air-space clearances shall be permitted to be used if lined or relined with a chimney lining system listed for use in chimneys with reduced clearances in accordance with UL 1777. The chimney clearance shall be not less than permitted by the terms of the chimney liner listing and the manufacturer's instructions.

### **Section 801.18.4.1 Add new section to read as shown: (M109-06/07)**

**801.18.4.1 Fireblocking.** Noncombustible fireblocking shall be provided in accordance with the *International Building Code*.

### **Section 801.20 Change to read as shown: (M110-06/07)**

**801.20 Plastic vent joints.** Plastic pipe and fittings used to vent appliances shall be installed in accordance with the appliance manufacturer's installation instructions.

## CHAPTER 9 SPECIFIC APPLIANCES, FIREPLACES AND SOLID FUEL-BURNING EQUIPMENT

### **Section 914.2 Change to read as shown: (M113-06/07)**

**914.2 Installation.** Sauna heaters shall be listed and labeled in accordance with UL 875 and shall be installed in accordance with their listing and the manufacturer's installation instructions.

### **Section 915.1 Change to read as shown: (M114-06/07)**

**915.1 General.** The installation of liquid-fueled stationary internal combustion engines and gas turbines, including exhaust, fuel storage and piping, shall meet the requirements of NFPA 37. Stationary engine generator assemblies shall meet the requirements of UL 2200.

**Section 917.1 Change to read as shown: (M115-06/07)**

**917.1 Cooking appliances.** Cooking appliances that are designed for permanent installation, including ranges, ovens, stoves, broilers, grills, fryers, griddles and barbecues, shall be listed, labeled and installed in accordance with the manufacturer's installation instructions. Commercial electric cooking appliances shall be listed and labeled in accordance with UL 197. Household electric ranges shall be listed and labeled in accordance with UL 858. Microwave cooking appliances shall be listed and labeled in accordance with UL 923. Oil-burning stoves shall be listed and labeled in accordance with UL 896. Solid fuel-fired ovens shall be listed and labeled in accordance with UL 2162.

## CHAPTER 11 REFRIGERATION

**[F] Table 1103.1 Change table to read as shown: (M118-06/07)**

**[F] TABLE 1103.1  
REFRIGERANT CLASSIFICATION, AMOUNT AND TLV-TWA**

Refrigerant	Chemical Formula	Chemical Name or Blend	Hazard Categories	Refrigerant Classification	Degrees of Hazard	Pounds per 1000 cubic feet	ppm	g/m <sup>3</sup>	TLV-TWA (ppm)
R-717	NH <sub>3</sub>	Ammonia	CG,C,F,OH H	B2	3-3-0 <sup>d</sup>	0.014	320	0.22	25
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	CG,F,OHH	A2					
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	CG,F,OHH	A2					
R-420A	zeotrope	R-134a/142b (88.0/12.0)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-421A	zeotrope	R-125/134a (58.0/42.0)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-421B	zeotrope	R-125/134a (85.0/15.0)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-423A	zeotrope	R-134a/227ea (52.5/47.5)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-424A	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	CG,OHH	A1	2-0-0 <sup>e</sup>				
R-425A	zeotrope	R-32/134a/227e (18.5/69.5/12.0)	CG,OHH	A1	2-0-0 <sup>e</sup>				

(Portions of table not shown remain unchanged)

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m<sup>3</sup>.

- a. CG = Compressed gas; C = Corrosive; F = Flammable; OHH = Other Health Hazard.
- b. Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.
- c. Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.
- d. For installations that are entirely outdoors, use 3-1-0.
- e. Class I ozone depleting substance; prohibited for new installations.
- f. PEL or consistent occupational exposure limit on a time-weighted average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

## CHAPTER 12 HYDRONIC PIPING

**Table 1202.4** Change table to add rows as shown: (M121-06/07, M122-06/07))

**TABLE 1202.4  
HYDRONIC PIPE**

MATERIAL	STANDARD (see Chapter 15)
Ductile iron pipe	AWWA C151/A21.51; AWWA C115/A21.15
Polypropylene (PP) plastic pipe	ASTM F 2389

(Portions of table not shown remain unchanged)

**Table 1202.5** Change to read as shown: (M122-06/07, M123-06/07)

**TABLE 1202.5  
HYDRONIC PIPE FITTINGS**

MATERIAL	STANDARD (see Chapter 15)
Ductile iron and gray iron	AWWA C110/A21.10
Ductile iron	AWWA C153/A21.53
Plastic	ASTM D 2466; ASTM D 2467; ASTM D 2468; ASTM F 438; ASTM F 439; ASTM F 877; ASTM F 2389

(Portions of table not shown remain unchanged)

**Section 1203.8.2** Add new section to read as shown: (M124-06/07)

**1203.8.2 Push-fit joints.** Push-fit joints shall be installed in accordance with the manufacturer's instructions.

**Sections 1203.16, 1203.16.1, 1203.16.2** Add new sections to read as shown: (M125-06/07)

**1203.16 Polypropylene (PP) plastic.** Joints between PP plastic pipe and fittings shall comply with Sections 1203.16.1 and 1203.16.2.

**1203.16.1 Heat-fusion joints.** Heat-fusion joints for polypropylene (PP) pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings, electrofusion polypropylene fittings or by butt fusion. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F 2389.

**1203.16.2 Mechanical and compression sleeve joints.** Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's instructions.

**Section 1206.1.1 "Prohibited tee applications"** Delete without substitution: (M126-06/07)

**Section 1206.2** Add exception to read as shown: (M129-06/07 Part I)

**1206.2 System drain down.** Hydronic piping systems shall be designed and installed to permit the system to be drained. Where the system drains to the plumbing drainage system, the installation shall conform to the requirements of the *International Plumbing Code*.

**Exception:** The buried portions of systems embedded underground or under floors.

**Sections 1209.5, 1209.5.1, 1209.5.2, 1209.5.3, 1209.5.4** Add new sections to read as shown: (M130-06/07 Part I)

**1209.5 Thermal barrier required.** Radiant floor heating systems shall be provided with a thermal barrier in accordance with Sections 1209.5.1, through 1209.5.4.

**Exception:** Insulation shall not be required in engineered systems where it can be demonstrated that the insulation will decrease the efficiency or have a negative effect on the installation.

**1209.5.1 Slab on grade installation.** Radiant piping utilized in slab on grade applications shall be provided with insulating materials installed beneath the piping having a minimum *R*-value of 5.

**1209.5.2 Suspended floor installation.** In suspended floor applications, insulation shall be installed in the joist bay cavity serving the heating space above and shall consist of materials having a minimum *R*-value of 11.

**1209.5.3 Thermal break required.** A thermal break shall be provided consisting of asphalt expansion joint materials or similar insulating materials at a point where a heated slab meets a foundation wall or other conductive slab.

**1209.5.4 Thermal barrier material marking.** Insulating materials utilized in thermal barriers shall be installed such that the manufacturer's *R*-value mark is readily observable upon inspection.

## CHAPTER 15 REFERENCED STANDARDS

**Change, delete or add the following referenced standards to read as shown: (M46-06/07, M85-06/07, M113-06/07, M114-06/07, M115-06/07, M121-06/07, M122-06/07, M123-06/07, M132-06/07 (STANDARDS NOT SHOWN REMAIN UNCHANGED))**

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**ASHRAE** American Society of Heating, Refrigerating and  
Air-Conditioning Engineers, Inc.  
1791 Tullie Circle NE  
Atlanta, GA 30329-2305

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Standard reference number	Title	Referenced In code section number
15—2004 ASHRAE	Safety Standard for Refrigeration Systems. . . . .	1101.6, 1105.8, 1108.1
—2005	ASHRAE Fundamentals Handbook. . . . .	312.1, 603.2

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**ASSE** American Society of Sanitary Engineering  
901 Canterbury Road, Suite A  
Westlake, OH 44145

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Standard reference number	Title	Referenced In code section number
1017—2003	Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems . . . . .	1002.2.2

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**ASTM** ASTM  
100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959

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Standard reference number	Title	Referenced In code section number
A 53/A 53M—05	Specification for Pipe, Steel, Black and Hot Dipped Zinc-coated Welded and Seamless. . . . .	403.4.2
A 106/A106M—04b	Specification for Seamless Carbon Steel Pipe for High-temperature Service . . . . .	Table 1202.4, Table 1302.3
A 420/A 420M—05	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-temperature Service . . . . .	Table 1202.5
B 32—04	Specification for Solder Metal . . . . .	1203.3.3

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C 411—05 Test Method for Hot-surface Performance of High-temperature Thermal Insulation . . . . .604.3  
D 56—05 Test Method for Flash Point by Tag Closed Tester . . . . . 202  
D 1527—99  
(2005) Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe,  
Schedules 40 and 80 . . . . . Table 1202.4  
D 1693—05 Test Method for Environmental Stress-cracking of Ethylene Plastics . . . . .Table 1202.4  
D 1785—05 Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe,  
Schedules 40, 80 and 120. . . . .Table 1202.4  
D 2235—04 Specifications for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS)  
Plastic Pipe and Fittings. . . . .1203.3.4  
D 2241—05 Specification for Poly (Vinyl Chloride)(PVC) Pressure-rated Pipe  
(SDR-Series) . . . . . Table 1202.4  
D 2282—99  
(2005) Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR) . . . . .Table 1202.4  
D 2466—05 Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe Fittings,  
Schedule 40. . . . .Table 1202.5  
D 2467—05 Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe Fittings,  
Schedule 80. . . . . Table 1202.5  
D 2513—05 Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings . . . . .Table 1202.4,  
1203.15.3  
D 2564—04 Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC)  
Plastic Piping Systems . . . . . 1203.3.4  
D 2683—04 Specification for Socket-type Polyethylene Fittings for Outside Diameter-controlled  
Polyethylene Pipe and Tubing. . . . . Table 1202.4, 1203.15.1  
D 2846/D 2846M—99e01  
Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot  
and Cold Water Distribution Systems . . . . . Table 1202.4, 1203.3.4  
D 3278—96  
(2004)e01 Test Methods for Flash Point of Liquids by Small Scale Closed-cup Apparatus. . . . . 202  
E 84—05e01 Test Method for Surface Burning Characteristics of Building Materials . . . . .202, 510.8,  
602.2.1, 602.2.1.5, 604.3, 1204.1  
E 119—05a Test Method for Fire Tests of Building Construction and Materials . . . . . 607.5.2, 607.6.2  
E 136—04 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C . . . . . 202  
E 2231-02e01 Standard Practice For Specimen Preparation and Mounting of Pipe and Duct  
Insulation Materials to Assess Surface Burning Characteristics. . . . .604.3, 1204.1  
F 439—05 Specification for Socket Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic  
Pipe Fittings, Schedule 80 . . . . .Table 1202.5  
F 442/F 442M  
—99(2005) Specification for Chlorinated Poly (Vinyl Chloride) (CPVC)  
Plastic Pipe (SDR-PR). . . . .Table 1202.4  
F 876—05 Specification for Crosslinked Polyethylene (PEX) Tubing. . . . . Table 1202.4  
F 877—05 Specification for Crosslinked Polyethylene (PEX) Plastic Hot and Cold Water  
Distribution Systems. . . . . Table 1202.4, Table 1202.5  
F 1281—05 Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene  
(PEX-AL-PEX) Pressure Pipe . . . . . Table 1202.4  
F 1476—01 Specification for Performance of Gasketed Mechanical Couplings for Use in  
Piping Applications . . . . . 1203.3.7  
F2389—04 Specification for Pressure-Rated Polypropylene Piping Systems. . . . . Table 1202.4, Table 1202.5

**AWWA** American Water Work Association  
6666 West Quincy Avenue  
Denver, CO 80235

Standard reference number	Title	Referenced In code section number
C110/A21.10-03	Standard for Ductile-Iron & Gray Iron Fittings, 2 inches Through 48 inches for Water . . . . .	Table 1202.5
C115/A21.15-99	Standard for Flanged Ductile-iron Pipe with Ductile-iron or Grey-iron Threaded Flanges . . . . .	Table 1202.5

C153/A21.53-00	Standard for Ductile-Iron Compact Fittings for Water Service . . . . .	Table 1202.5
C151/A21.51-02	Standard for Ductile-iron Pipe, Centrifugally Cast for Water. . . . .	Table 1202.5

**NFPA** National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02269-9101

Standard reference number	Title	Referenced In code section number
91—04	Exhaust Systems for Air Conveying of Vapors, Gases, Mists and Noncombustible Particulate Solids . . . . .	502.9.5.1, 502.17
211—06	Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances . . . . .	.806.1

**SMACNA** Sheet Metal and Air Conditioning Contractors National Association, Inc.  
4021 Lafayette Center Drive  
Chantilly, VA 20151-1209

Standard reference number	Title	Referenced In code section number
SMACNA/ANSI (2005)	HVAC Duct Construction Standards—Metal and Flexible . . . . .	603.4, 603.9

**UL** Underwriters Laboratories, Inc.  
333 Pfingsten Road  
Northbrook, IL 60062-2096

Standard reference number	Title	Referenced In code section number
103—01	Factory-built Chimneys, Residential Type and Building Heating Appliance—with Revisions through December 2005 . . . . .	805.2
174—04	Household Electric Storage Tank Water Heaters—with Revisions through November 2005. . . . .	1002.1
181—05	Factory-made Air Ducts and Air Connectors . . . . .	512.2, 603.5, 603.6.1, 603.6.2, 604.13
181A—2005	Closure Systems for Use with Rigid Air Ducts and Air Connectors . . . . .	.603.9
181B—2005	Closure Systems for Use with Flexible Air Ducts and Air Connectors. . . . .	.603.9
207—01	Refrigerant-containing Components and Accessories, Nonelectrical – with Revisions through November 2004 . . . . .	1101.2
268—96	Smoke Detectors for Fire Prevention Signaling Systems—with Revisions through October 2003 . . . . .	.606.1
268A—98	Smoke Detectors for Duct Applications—with Revisions through April 2003. . . . .	.606.1
412—04	Refrigeration Unit Coolers . . . . .	1101.2
471—2006	Commercial Refrigerators and Freezers—with Revisions through February 2006 . . . . .	1101.2
641—95	Type L Low-temperature Venting Systems—with Revisions through August 2005. . . . .	802.1
723—03	Standard for Test for Surface Burning Characteristics of Building Materials with Revisions through May 2005. . . . .	.510.8
726—95	Oil-fired Boiler Assemblies—with Revisions through February 2006 . . . . .	.916.1, 1004.1
731—95	Oil-fired Unit Heaters—with Revisions through February 2006. . . . .	.920.1
732—95	Oil-fired Storage Tank Water Heaters—with Revisions through February 2005 . . . . .	1002.1
834—04	Heating, Water Supply and Power Boilers Electric. . . . .	1004.1
858—05	Household Electric Ranges. . . . .	.917.1
867—00	Electrostatic Air Cleaners—with Revisions through February 2004. . . . .	.605.2
875—04	Electric Dry Bath Heater . . . . .	914.2
900—94	Air Filter Units . . . . .	.605.2
923—02	Microwave Cooking Appliances with Revisions through February 2006 . . . . .	914.2
1240—2005	Electric Commercial Clothes. . . . .	.913.1

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1820—2004 Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics . . . . .602.2.1.3  
1887—2004 Fire Tests of Plastic Sprinkler Pipe for Visible Flame  
and Smoke Characteristics. . . . .602.2.1.2  
1995—2005 Heating and Cooling Equipment. . . . . 911.1, 918.1, 918.3, 1101.2  
2158—97 Electric Clothes Dryer—with Revisions through May 2004. . . . . 913.1  
2200—04 Stationary Engine Generator Assemblies . . . . .915.1

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