

# 1.6 Common Requirements

*Appendix material, which appears in shaded boxes at the bottom of the page, is advisory only.*

## 1 General Considerations

### 1.1 Applicability

Except as modified elsewhere in this document, the provisions of this chapter shall apply to all health care facility projects.

## 2 Building Systems

### 2.1 Plumbing

#### 2.1.1 General

Unless otherwise specified herein, all plumbing systems shall be designed and installed in accordance with the International Plumbing Code.

#### 2.1.2 Plumbing and Other Piping Systems

**2.1.2.1** Hot water systems. The following standards shall apply to hot water systems:

- \* (1) Capacity. The water-heating system shall have sufficient supply capacity at the temperatures and amounts indicated in the applicable table. Storage of water at higher temperatures shall be permitted.
- (2) Hot water distribution systems serving patient/resident care areas shall be under constant recirculation to provide continuous hot water

at each hot water outlet. Non-recirculated fixture branch piping shall not exceed 25 feet (7.62 meters) in length.

- (3) Dead-end piping (risers with no flow, branches with no fixture) shall not be installed. In renovation projects, dead-end piping shall be removed. Empty risers, mains, and branches installed for future use shall be permitted.

- \* (4) Provisions shall be included in the domestic hot water system to limit the amount of Legionella bacteria and opportunistic waterborne pathogens.

#### 2.1.2.2 Condensate drains

- (1) Condensate drains for cooling coils shall be a type that may be cleaned as needed without disassembly. (Unless specifically required by local authorities, traps are not required for condensate drains.)
- (2) An air gap shall be provided where condensate drains empty into building drains.
- (3) Heater elements shall be provided for condensate lines in freezers or other areas where freezing may be a problem.

#### 2.1.3 Plumbing Fixtures

The following standards shall apply to plumbing fixtures:

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**A2.1.2.1 (1)** Water temperature is measured at the point of use or inlet to the equipment.

**A2.1.2.1 (4)** There are several ways to treat domestic water systems to kill Legionella and opportunistic waterborne pathogens. Complete removal of these organisms is not feasible, but methods to reduce the amount include hyperchlorination (free chlorine, chlorine dioxide, monochloramine), elevated hot water temperature, ozone injection, silver/copper ions, and ultraviolet light. Each of these options has advantages and disadvantages. While

increasing the hot water supply temperature to 140°F (60°C) is typically considered the easiest option, the risk of scalding, especially to youth and the elderly, is significant. Additional consideration should be given to domestic water used in bone marrow transplant units. See CDC and ASHRAE Guideline 12, “Minimizing the Risk of Legionellosis Associated with Building Water Systems,” for additional information. Another reference on this topic is “Legionella Control in Health Care Facilities,” available from the American Society of Plumbing Engineers.

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### 2.1.3.1 General

- (1) Materials. The material used for plumbing fixtures shall be nonabsorptive and acid-resistant.
- (2) Clearances. Water spouts used in lavatories and sinks shall have clearances adequate to avoid contaminating utensils and the contents of carafes, etc.

**2.1.3.2 Hand-washing stations.** General hand-washing stations used by medical and nursing staff, patients, and food handlers shall be trimmed with valves that can be operated without hands. Single-lever or wrist blade devices shall be permitted. Blade handles used for this purpose shall not exceed 4-1/2 inches (11.43 centimeters) in length.

**2.1.3.3 Showers and tubs.** Showers and tubs shall have nonslip walking surfaces.

**2.1.3.4 Ice machines.** Copper tubing shall be provided for supply connections to ice machines.

## 2.2 Heating, Ventilating, and Air-Conditioning (HVAC) Systems

### 2.2.1 Thermal Insulation and Acoustical Provisions

**2.2.1.1 General.** Insulation shall be provided within the building to conserve energy, protect personnel, prevent vapor condensation, and reduce noise.

- (1) Vapor barrier. Insulation on cold surfaces shall include an exterior vapor barrier. (Material that will not absorb or transmit moisture will not require a separate vapor barrier.)
- (2) Flame-spread rating. Insulation, including finishes and adhesives on the exterior surfaces of ducts, piping, and equipment, shall have a flame-spread rating of 25 or less and a smoke-developed rating of 50 or less as determined by an independent testing laboratory in accordance with NFPA 255.
- (3) Renovation. Existing accessible insulation within areas of facilities to be modernized shall be inspected, repaired, and/or replaced, as appropriate.

### 2.2.1.2 Duct linings

- (1) If duct lining is used, it shall be coated and sealed and shall meet ASTM C1071.
- (2) These linings (including coatings, adhesives, and exterior surface insulation on pipes and ducts in spaces used as air supply plenums) shall have a flame-spread rating of 25 or less and a smoke-developed rating of 50 or less, as determined by an independent testing laboratory in accordance with NFPA 255.
- (3) Duct linings exposed to air movement shall not be used in ducts serving operating rooms, delivery rooms, LDR rooms, nurseries, protective environment rooms, and critical care units. This requirement shall not apply to mixing boxes and sound attenuators that have special coverings over such lining.
- (4) Duct lining shall not be installed within 15 feet (4.57 meters) downstream of humidifiers.
- (5) Renovation. If existing lined ductwork is reworked in a renovation project, the liner seams and punctures shall be resealed.

### 2.2.2 HVAC Air Distribution

#### 2.2.2.1 HVAC ductwork

- (1) General
  - (a) Air-handling duct systems shall be designed with accessibility for duct cleaning and shall meet the requirements of NFPA 90A.
  - (b) When smoke partitions are required, heating, ventilating, and air conditioning zones shall be coordinated with compartmentation insofar as practical to minimize the need to penetrate fire and smoke partitions.
- \*(2) Duct humidifiers
  - (a) If duct humidifiers are located upstream of the final filters, they shall be at least 15 feet (4.57 meters) upstream of the final filters.

- (b) Ductwork with duct-mounted humidifiers shall have a means of water removal.
  - (c) An adjustable high-limit humidistat shall be located downstream of the humidifier to reduce the potential for condensation inside the duct.
  - (d) Humidifiers shall be connected to airflow proving switches that prevent humidification unless the required volume of airflow is present or high-limit humidistats are provided.
  - (e) All duct takeoffs shall be sufficiently downstream of the humidifier to ensure complete moisture absorption.
  - (f) Steam humidifiers shall be used. Reservoir-type water spray or evaporative pan humidifiers shall not be used.
- (3) Fire and smoke dampers
- (a) Fire and smoke dampers shall be constructed, located, and installed in accordance with the requirements of NFPA 101, 90A, and the specific damper's listing requirements.
  - (b) Fans, dampers, and detectors shall be interconnected so that damper activation will not damage ducts.
  - (c) Maintenance access shall be provided at all dampers.
  - (d) All damper locations shall be shown on design drawings.
  - (e) Dampers shall be activated in accordance with NFPA 90A. Installation of switching systems for restarting fans shall be permitted for fire department use in venting smoke after a fire has been controlled. Provisions to avoid possible damage to the system due to closed dampers shall be permitted.
- (4) Construction requirements. Ducts that penetrate construction intended to protect against x-ray, magnetic, RFI, or other radiation shall not impair the effectiveness of the protection.

### 2.2.3 Steam and Hot Water Systems

#### 2.2.3.1 Boilers

- (1) Capacity. Boilers shall have the capacity, based upon the net ratings published by the Hydronics Institute or another acceptable national standard, to supply the normal heating, hot water, and steam requirements of all systems and equipment. Their number and arrangement shall accommodate facility needs despite the breakdown or routine maintenance of any one boiler. The capacity of the remaining boiler(s) (reserve capacity) shall be sufficient to provide hot water service for clinical, dietary, and patient or resident use; steam for sterilization and dietary purposes; and space heating for operating, delivery and birthing, labor, recovery, nurseries, and intensive care.
- (2) Space heating requirements. Reserve capacity for facility space heating is not required in geographic areas where a design dry-bulb temperature of 25°F (-4°C) or more represents not less than 99 percent of the total hours in any one heating month as noted in the *ASHRAE Handbook—Fundamentals*, under the “Table for Climatic Conditions for the United States.”

**2.2.3.2 Boiler accessories.** These, including feed pumps, heat-circulating pumps, condensate return pumps, fuel oil pumps, and waste heat boilers, shall be connected and installed to provide both normal and standby service.

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**A2.2.2.1 (2)** One way to achieve basic humidification may be by a steam-jacketed manifold-type humidifier with a condensate separator that delivers high-quality steam. Additional booster humidification (if required) should be provided by steam-jacketed humidifiers for each individually controlled area. Steam to be used for humidification may be generated in a separate steam generator. The steam generator feedwater may be supplied either from soft or reverse osmosis water. Provisions should be made for periodic cleaning.

## 1.6 COMMON REQUIREMENTS

### 2.3 Electrical Systems

#### 2.3.1 Lighting

##### \*2.3.1.1 General

- (1) Recommended lighting levels for health care facilities developed by the Illuminating Engineering Society of North America (IES) shall be considered. Refer to the IES publication RP-29, *Lighting for Hospitals and Health Care Facilities*.
- (2) As required by the functional program, special needs of the elderly shall be incorporated into the lighting design. Excessive contrast in lighting levels that makes effective sight adaptation difficult shall be minimized. Refer to IES publication RP-28, *Lighting and the Visual Environment for Senior Living*.
- (3) Approaches to buildings and parking lots, and all occupied spaces within buildings, shall have fixtures that can be illuminated as necessary.

**2.3.1.2** Emergency lighting. Light intensity of required emergency lighting shall generally comply with the IES recommendations.

**2.3.1.3** Exit signs. Egress and exit lighting shall comply with NFPA 101.

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**A2.3.1.1** Light intensity for staff and patient needs should generally comply with health care guidelines set forth in the IES publications referenced in Section 1.6-2.3.1.1. Consideration should be given to controlling intensity and/or wavelength to prevent harm to the patient's eyes (i.e., retina damage to premature infants and cataracts due to ultraviolet light).

Many procedures are available to satisfy lighting requirements, but the design should consider light quality as well as quantity for effectiveness and efficiency. While light levels in the IES publications are referenced herein, those publications include other useful guidance and recommendations which the designer is encouraged to follow.