

## CHAPTER 8

# INDOOR ENVIRONMENTAL QUALITY AND COMFORT

### SECTION 801 GENERAL

**801.1 Scope and intent.** The provisions of this chapter are intended to provide an interior environment that is conducive to the health and well-being of *building* occupants.

**801.2 Indoor air quality management plan required.** RESERVED.

### SECTION 802 BUILDING CONSTRUCTION FEATURES

**802.1 Scope.** To facilitate the energy efficient operation of the *building*, the *building* and its systems shall comply with the requirements of Sections 802.2 through 802.5.

**802.2 Air handling system access.** The arrangement and location of air handling system components including, but not limited to, ducts, air handler units, fans, coils and condensate pans shall allow access for cleaning and *repair* of the air handling surfaces of such components. Access ports shall be installed in the air handling system to permit such cleaning and repairs. Piping, conduits and other *building* components shall not be located so as to obstruct the required access ports.

**802.3 Durability of air handling surfaces.** Surfaces exposed to airflow within air handling systems shall be constructed of materials that are resistant to deterioration and will not break away, crack, peel, flake off or show evidence of delamination or continued erosion when tested in accordance with the erosion test in UL 181.

**802.4 Air handling system filters.** Filter racks shall be designed to prevent airflow from bypassing filters. Access doors and panels provided for filter replacement shall be fitted with flexible seals to provide an effective seal between the doors and panels and the mating filter rack surfaces. Special tools shall not be required for opening access doors and panels. Filter access panels and doors shall not be obstructed.

**802.5 Airstream surfaces.** Materials exposed to airflow within ducts, within air plenums or on top of suspended ceilings shall not break away, crack, peel, flake off or show evidence of delamination or continued erosion when tested in accordance with the erosion test in UL 181.

### SECTION 803 HVAC SYSTEMS

**803.1 Construction phase requirements.** RESERVED.

**803.1.1 Duct openings.** RESERVED.

**803.1.2 Indoor air quality during construction.** RESERVED.

**803.1.2.1 Ventilation.** RESERVED.

**803.1.2.2 Protection of HVAC system openings.** RESERVED.

**803.1.2.3 Return air filters.** RESERVED.

**803.1.3 Construction phase ductless system or filter.** RESERVED.

**803.2 Thermal environmental conditions for human occupancy.** RESERVED.

**803.3 Environmental tobacco smoke control.** RESERVED.

**803.4 Isolation of pollutant sources.** RESERVED.

**803.4.1 Print, copy and janitorial rooms and garages.** RESERVED.

**803.5 Filters.** Filters for air conditioning systems shall be rated at MERV 11 or higher and system equipment shall be designed to be compatible. The air handling system design shall account for pressure drop across the filter.

### SECTION 804 SPECIFIC INDOOR AIR QUALITY AND POLLUTANT CONTROL MEASURES

**804.1 Fireplaces and appliances.** RESERVED.

**804.1.1 Installation.** RESERVED.

**804.1.2 Venting.** *Fireplaces* and fuel-burning appliances shall be vented to the outdoors and shall be provided with combustion air in accordance with the *Mechanical Code*.

**804.1.3 Gas fireplaces.** Vented decorative gas appliances and vented gas fireplace heaters shall be direct-vented and listed in accordance with ANSI Z21.50/CSA 2.22 and ANSI Z21.88/CSA 2.33, respectively.

**804.1.4 Fireplaces.** Wood-burning *fireplaces* shall be provided with combustion air directly from the outdoors and shall be provided with a means to tightly close off the chimney flue and combustion air outlets when the *fireplace* is not in use.

**804.1.5 Wood-fired appliances.** Wood stoves and wood *fireplace* inserts shall be *listed* in accordance with UL 1482 and shall be certified in accordance with the requirements of the EPA Standards of Performance for New Residential Wood Heaters, 40 CFR Part 60 subpart AAA.

**804.1.6 Biomass appliances.** Biomass fireplaces, stoves and inserts shall be *listed* in accordance with ASTM E 1509. Biomass boilers and furnaces shall be *listed* in accordance with CSA B366.1-2009 or UL 391.

**804.2 Radon mitigation.** RESERVED.

**804.2.1 Subfloor preparation.** RESERVED.

**804.2.2 Soil-gas-retarder.** RESERVED.

**804.2.3 Entry routes.** RESERVED.

- 804.2.3.1 Floor openings. RESERVED.
- 804.2.3.2 Concrete joints. RESERVED.
- 804.2.3.3 Condensate drains. RESERVED.
- 804.2.3.4 Sumps. RESERVED.
- 804.2.3.5 Foundation walls. RESERVED.
- 804.2.3.6 Dampproofing. RESERVED.
- 804.2.3.7 Air handling units. RESERVED.
- 804.2.3.8 Ducts. RESERVED.
- 804.2.3.9 Crawl space floors. RESERVED.
- 804.2.3.10 Crawl space access. RESERVED.
- 804.2.4 Passive submembrane depressurization system. RESERVED.
  - 804.2.4.1 Ventilation. RESERVED.
  - 804.2.4.2 Soil-gas-retarder. RESERVED.
  - 804.2.4.3 Vent pipe. RESERVED.
- 804.2.5 Passive subslab depressurization system. RESERVED.
  - 804.2.5.1 Vent pipe. RESERVED.
  - 804.2.5.2 Multiple vent pipes. RESERVED.
- 804.2.6 Vent pipe drainage. RESERVED.
- 804.2.7 Vent pipe accessibility. RESERVED.
- 804.2.8 Vent pipe identification. RESERVED.
- 804.2.9 Combination foundations. RESERVED.
- 804.2.10 Power source. RESERVED.
- 804.3 Building flush out. RESERVED.
- 804.4 Building entrances. RESERVED.
  - 804.4.1 Scraper surface. RESERVED.
  - 804.4.2 Absorption surface. RESERVED.
  - 804.4.3 Finishing surface. RESERVED.

**SECTION 805  
ASBESTOS USE PREVENTION**

- 805.1 Scope. RESERVED.

**SECTION 806  
MATERIAL EMISSIONS  
AND POLLUTANT CONTROL**

- 806.1 Emissions from glued wood products. RESERVED.
- 806.2 Adhesives and sealants. RESERVED.
  - 806.2.1 Single-ply roof membrane adhesives. RESERVED.
- 806.3 Architectural paints and coatings. RESERVED.
- 806.4 Flooring. RESERVED.
- 806.5 Acoustical ceiling tiles and wall systems. RESERVED.
- 806.6 Insulation. RESERVED.

**SECTION 807  
ACOUSTICS**

- 807.1 Sound transmission. RESERVED.
- 807.2 Exterior sound transmission. RESERVED.
- 807.3 Interior sound transmission. RESERVED.
- 807.4 Mechanical and emergency generator equipment and systems. RESERVED.
  - 807.4.1 Separating assemblies. RESERVED.
  - 807.4.2 Mechanical and emergency generator equipment outside of buildings. RESERVED.
  - 807.4.3 HVAC background sound. RESERVED.
- 807.5 Special inspections for sound transmission. RESERVED.
  - 807.5.1 Testing for mechanical and emergency generator equipment outside of buildings. RESERVED.
  - 807.5.2 Testing for building system background noise. RESERVED.

**SECTION 808  
DAYLIGHTING**

**808.1 General.** The fenestration in building roofs and walls shall be placed in accordance with Sections 808.1 through 808.3 when chosen by a building owner as a project elective. Interior spaces shall be planned to benefit from the exposure to natural light offered by the fenestration in accordance with this section.

**808.2 Applicability.** Daylighting of *building* spaces in accordance with Section 808.3 for buildings containing Group A-3, B, E, F, M or S occupancies.

**Exception:** Daylighting is not required in the following rooms and spaces:

1. A Group A3 occupancy where the specific use of the room or space is for other than reading areas in libraries, waiting areas in transportation terminals, exhibition halls, gymnasiums and indoor athletic areas.
2. A Group B occupancy where the specific use of the room or space is for other than educational facilities for students above the 12th grade, laboratories for testing and research, post offices, print shops, offices and training and skill development not within a school or academic program.
3. Those portions of Group M or S occupancies located directly underneath a higher floor.
4. *Building* spaces where darkness is required for the primary use of the space including, but not limited to, light sensitive material handling and darkrooms.
5. *Building* spaces that are required to be cooled below 50°F (10°C).
6. Unconditioned *buildings* that are equipped with exterior doors that when opened provide equivalent daylighting.

7. Alteration, repair, movement or change of occupancy of existing buildings.

**808.3 Daylighting of building spaces.** Not less than 50 percent of the total floor area in *regularly occupied spaces* shall be located within a *daylit area* that complies with either Section 808.3.1 or 808.3.2. Buildings required to have more than 25,000 square feet (2322 m<sup>2</sup>) of *daylit area* shall comply with Section 808.3.2.

**Exception:**

Where *exterior walls* or *roofs* are *obstructed*, the required *daylit area* shall be modified in accordance with Equation 8-1.

$$\text{Required } \textit{daylit area} \geq 50\% \times \text{TDP} \quad \text{(Equation 8-1)}$$

The total daylight potential (TDP) is a weighted average of the individual daylight potentials for each floor:

$$\text{TDP} = \Sigma(\text{DP}_1 \div \text{FA}_1/\text{TF}) + (\text{DP}_2 \div \text{FA}_2/\text{TF}) + \dots$$

$$\text{DP}_1 = 1 - [(\text{OW}_1/\text{TW}_1) \div (\text{OR}_1/\text{TR}_1)].$$

*OW*<sub>1,2,...</sub> = The length of *obstructed exterior wall* for each floor.

*TW*<sub>1,2,...</sub> = The total length of exterior wall for each floor.

*OR*<sub>1,2,...</sub> = The *obstructed roof area* immediately above each floor.

*TR*<sub>1,2,...</sub> = The total roof area immediately above each floor.

*FA*<sub>1,2,...</sub> = The floor area of each floor.

*TF* = The total floor area of all floors.

**808.3.1 Daylight prescriptive requirements.** Each *sidelighting daylight zone* that complies with Section 808.3.1.1 shall be considered to be a *daylit area*. Each *toplighting daylight zone* that complies with Section 808.3.1.2 shall be considered to be a *daylit area*.

**808.3.1.1 Sidelighting.** The *sidelighting daylight zone* shall include *fenestration* that complies with Table 606.1.1(2). *Fenestration* shall not be located in an *obstructed wall*.

**808.3.1.2 Toplighting.** The *toplighting daylight zone* shall include *fenestration* that complies with Table 606.1.1(2). *Fenestration* shall not be located in an *obstructed roof*.

**808.3.2 Daylight performance requirements.** All areas having a daylight saturation of not less than 60 percent shall be considered to be *daylit areas*. Daylight analysis shall be conducted in accordance with Section 808.3.2.1.

**808.3.2.1 Daylight simulation.** A climate-based analysis shall comply with the following:

1. Provide data on an hourly basis for a typical meteorological year, excluding hours between and including the last hour before sunset and the first hour after sunrise every day.

2. Address the effects of exterior shading devices, shade trees complying with all of the requirements of Section 404.2.3, *buildings, structures* and geological formations. Include the effects of movable exterior fenestration shading devices. The configuration of manually controlled exterior fenestration shading devices shall be adjusted on the spring and fall equinoxes only. The configuration of automatically controlled exterior fenestration shading devices and fenestration with automatically controlled variable transmittance shall be adjusted to accurately represent the control system operation.
3. Exclude the effects of interior furniture systems, shelving and stacks.
4. Use the actual reflectance characteristics of all materials.
5. Include the effects of blinds, shades and other movable interior fenestration shading devices. The configuration of *manually* controlled fenestration shading devices shall be adjusted on the spring and fall equinoxes only. The configuration of automatically controlled fenestration shading devices and fenestration with automatically controlled variable transmittance shall be adjusted to accurately represent the control system operation.
6. Calculation points shall be spaced not more than 39 inches (991 mm) by 39 inches (991 mm) and 30 inches (762 mm) above the floor. The calculation grid shall start within 39 inches (991 mm) of each wall or partition.
7. Where details about the window framing, mullions, wall thickness and well depth cannot be included in the model, the visible transmittance of all fenestration shall be reduced by 20 percent.

**SECTION 809  
PROJECT ELECTIVES  
RESERVED**

