APPROVED BY THE CALIFORNIA BUILDING STANDARDS COMMISSION   
AUGUST 1, 2023

# FINAL EXPRESS TERMS FOR PROPOSED BUILDING STANDARDS OF THE OFFICE OF THE STATE FIRE MARSHAL REGARDING THE 2022 CALIFORNIA MECHANICAL CODE, CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 4 (SFM 05/22)

The State agency shall draft the regulations in plain, straightforward language, avoiding technical terms as much as possible and using a coherent and easily readable style. The agency shall draft the regulation in plain English. A notation shall follow the express terms of each regulation listing the specific statutes authorizing the adoption and listing specific statutes being implemented, interpreted, or made specific (Government Code Section 11346.2(a)(1)).

If using assistive technology, please adjust your settings to recognize underline, strikeout, italic and ellipsis.

## LEGEND for EXPRESS TERMS (Based on model codes - Parts 2, 2.5, 3, 4, 5, 9, 10)

* Model Code language appears upright
* Existing California amendments appear in *italic*
* Amended model code or new California amendments appear *underlined & italic*
* Repealed model code language appears ~~upright and in strikeout~~
* Repealed California amendments appear in *~~italic and strikeout~~*
* Ellipses (...) indicate existing text remains unchanged

## FINAL EXPRESS TERMS

### ITEM 1 Chapter 1 SCOPE AND ADMINISTRATION, Division I, California Administration

#### ITEM 1-1 Section 1.11.1 SFM-Office of the State Fire Marshal

[The SFM is proposing to amend the definition of Specified State-Occupied.]

***Any State Institution or Other State-Owned or Specified State-Occupied Building.***

***Specified State-Occupied Buildings.*** *Any building, structure or area that meets any of the following criteria:*

1. *A building where the state has contracted into a build-to-suit lease.*
2. *A courthouse holding facility or trial court with a detention area.*
3. *A building used by the Department of Corrections and Rehabilitation (CDCR) as a community correctional reentry center.*
4. *100 percent state occupied.*
5. *State-occupied areas in a state-leased building that is a high-rise and is 75 percent of the net area floor space or more occupied by state entities.*
6. *State-occupied areas in a building that contains 5,000 square feet (465 m2) or more space of state-leased Group H or Group L occupancy.*
7. *A state-leased building with facilities with the primary purpose of housing state records and/or state artifacts of historical significance.*
8. *Properties leased by California State University (CSU).*
9. *State institutions and their real property.*
10. *CAL FIRE occupied areas in leased buildings.*
11. *State-leased facilities where the governing body’s fire protection services rely on an all-volunteer fire department.*

***Authority cited —*** *Health and Safety Code Sections 13108, 13145, 13146, 16022.5 and 17921.*

***Reference —*** *Health and Safety Code Sections 13108, 13143, 13145, 13146, 16022.5 and 17921.*

**Notation:**

Authority: Health and Safety Code Sections 1250, 1502, 1568.02, 1569.72 - 1569.78, 1597.44 - 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13145, 13146, 13211, 16022.5, 17921, 18928, 18949.2, 25500 through 25545; Government Code Sections 51176, 51177, 51178 and 51179, 51189; Education Code Section 17074.50; Public Resources Code Sections 4201 through 4204.

Reference(s): Health and Safety Code Sections 13108, 13108.5, 13113, 13113.5, 13114, 13132, 13132.7, 13133, 13135, 13143, 13143.1, 13143.2, 13143.6, 13143.9, 13145, 13146, 13210, 13211, 16022.5, 17921.

### ITEM 2Chapter 2 DEFINITIONS

#### ITEM 2-1 Section 202.0 -R- Refrigerant, Refrigerant Concentration Limit (RCL), Refrigerant Safety Classifications, Flammability Classification

[The SFM proposes to adopt text from the 2024 Uniform Mechanical Code and print as an amendment to the 2022 California Mechanical Code.]

**220.0 – R –**

**…**

***Refrigerant.*** *A chemical compound intended to be used for heat transfer in a refrigerating system.*

***Refrigerant Concentration Limit (RCL). (SFM)*** *The refrigerant concentration limit, in air, determined in accordance with this code and intended to reduce the risks of acute toxicity, asphyxiation, and flammability hazards in normally occupied, enclosed spaces. [ASHRAE 34:3.1]*

…

**Refrigerant Safety Classifications.** Made up of a letter (A or B), that indicates the toxicity class, followed by a number (1, *2L*, 2, or 3), that indicates the flammability class.

...

**Flammability Classification.** Refrigerants shall be classified for flammability in accordance with one of the following:

**Class 1.** …

**Class 2.** …

***Class 2L.*** *Refrigerants having a lower flammability limit (LFL) of more than 0.00625 pound per cubic foot (lb/ft3) (0.10012 kg/m3) at 140°F (60°C), 14.7 psia (101 kPa), a heat of combustion of less than 8169 British thermal units per pound (Btu/lb) (1.8988 E+07 J/kg), and a maximum burning velocity of 3.9 inches per second (10 cm/s) where tested at 73.4°F (23°C) and 14.7 psia (101 kPa) in dry air.*

**Class 3.** …

…

**Notation:**

Authority: Health and Safety Code Sections 1250, 1502, 1568.02, 1569.72 - 1569.78, 1597.44 - 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13145, 13146, 13211, 16022.5, 17921, 18928, 18949.2, 25500 through 25545; Government Code Sections 51176, 51177, 51178 and 51179, 51189; Education Code Section 17074.50; Public Resources Code Sections 4201 through 4204.

Reference(s): Health and Safety Code Sections 13108, 13108.5, 13113, 13113.5, 13114, 13132, 13132.7, 13133, 13135, 13143, 13143.1, 13143.2, 13143.6, 13143.9, 13145, 13146, 13210, 13211, 16022.5, 17921.

### ITEM 3 Chapter 3 GENERAL REGULATIONS, Sections 307.3, 307.4

[The SFM proposes to adopt text from the 2024 Uniform Mechanical Code and print as an amendment to the 2022 California Mechanical Code.]

#### ITEM 3-1 Section 307.3 Heat Pump and Electic Cooling Appliances

[Propose to modify section to require labeling for refrigerant designation on heat pump/cooling appliances.]

**307.0 Labeling.**

**…**

**307.3 Heat Pump and Electric Cooling Appliances.** Heat pumps and electric cooling appliances shall bear a permanent and legible factory-applied nameplate on which shall appear:

(1) The name or trademark of the manufacturer.

(2) The model number or equivalent.

(3) The serial number.

(4) The amount *of refrigerant*. ~~and type of~~

*(5) The* refrigerant *designation*.

(~~5~~*6*) The factory test pressures, or pressures applied.

(~~6~~*7*) The electrical rating in volts, amperes, and, for other than single phase, the number of phases.

(~~7~~*8*) The output rating in Btu/h (kW).

(~~8~~*9*) The electrical rating in volts, amperes, or watts of each field replaceable electrical component.

(~~9~~*10*) The symbol of an approved agency certifying compliance of the equipment with recognized standards.

(~~10~~*11*) Required clearances from combustible surfaces on which or adjacent to which it is permitted to be mounted.

An appliance shall be accompanied by clear and complete installation instructions, including required clearances from combustible other than mounting or adjacent surfaces, and temperature rating of field-installed wiring connections exceeding 140°F (60°C).

#### ITEM 3-2 Section 307.4 Absorption Units

[Propose to modify section to require labeling for refrigerant designation on absorption units.]

**307.4 Absorption Units.** Absorption units shall bear a permanent and legible factory-applied nameplate on which shall appear:

(1) The name or trademark of the manufacturer.

(2) The model number or equivalent.

(3) The serial number.

(4) The amount *of refrigerant.* ~~and type of~~

(5) *The* refrigerant *designation*.

(~~5~~*6*) Hourly rating in Btu/h (kW).

(~~6~~*7*) The type of fuel approved for use with the unit.

(~~7~~*8*) Cooling capacity Btu/h (kW).

(~~8~~*9*) Required clearances from combustible surfaces on which or adjacent to which it is permitted to be mounted.

(~~9~~*~~10~~*) The symbol of an approved agency certifying compliance of the equipment with recognized standards.

**Notation:**

Authority: Health and Safety Code Sections 1250, 1502, 1568.02, 1569.72 - 1569.78, 1597.44 - 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13145, 13146, 13211, 16022.5, 17921, 18928, 18949.2, 25500 through 25545; Government Code Sections 51176, 51177, 51178 and 51179, 51189; Education Code Section 17074.50; Public Resources Code Sections 4201 through 4204.

Reference(s): Health and Safety Code Sections 13108, 13108.5, 13113, 13113.5, 13114, 13132, 13132.7, 13133, 13135, 13143, 13143.1, 13143.2, 13143.6, 13143.9, 13145, 13146, 13210, 13211, 16022.5, 17921.

### ITEM 4 Chapter 6 DUCT SYSTEMS, Section 609.1

[Amend section 609.1 to provide additional guidance for the location of smoke detection. Relocating part of the requirements for Duct smoke detectors to its own section 609.1.1.]

#### ITEM 4-1 Section 609.1 Air-Moving systems and smoke detectors.

[Propose to modify to add additional guidance regarding the location of smoke detection required for shutdown of supply-air systems.]

**609.1 Air-Moving Systems and Smoke Detectors.** Air-moving systems supplying air in excess of 2000 cubic feet per minute (ft3/min) (0.9439 m3/s) to enclosed spaces within buildings shall be equipped with an automatic shutoff. Automatic shutoff shall be accomplished by interrupting the power source of the air-moving equipment upon detection of smoke in the main supply-air duct *downstream of both the fan and filters* served by such equipment. ~~Duct smoke detectors shall comply with UL 268A~~*~~, shall be labeled by an approved agency, approved, and listed by California State Fire Marshal,~~* ~~and shall be installed in accordance with the manufacturer’s installation instructions. Such devices shall be compatible with the operating velocities, pressures, temperatures, and humidity’s of the system. Where fire-detection or alarm systems are provided for the building, the smoke detectors shall be supervised by such systems in an approved manner and~~ *~~installed in accordance with NFPA 72 and the California Building and Fire Codes.~~*

**Exceptions:**

~~(1) Where the space supplied by the air-moving equipment is served by a total coverage smoke-detection system in accordance with~~ *~~the California Fire Code~~*~~, interconnection to such system shall be permitted to be used to accomplish the required shutoff.~~

*(1) Where all portions of the building served by air-moving equipment returning air in excess of 2,000 cubic feet per minute (ft3/min) (0.9439 m3/s) are protected by a total coverage smoke-detection system in accordance with NFPA 72 and the California Fire Code, interconnection to such system shall be permitted to be used to accomplish the required return-air system shutoff.*

(Exceptions 2, 3, 4, 5 remain unchanged)

#### ITEM 4-2 Section 609.1.1 Duct smoke detectors.

[Proposes to relocate existing language from the charging paragraph of CMC Section 609.1 to add new Section 609.1.1.]

***609.1.1 Duct Smoke Detectors.*** *Duct smoke detectors shall comply with UL 268A, shall be labeled by an approved agency, approved~~,~~* [The comma is removed during August 1, 2023, meeting by the Commission and agreed to by the Agency. See Amended Justification attached.] *and listed by California State Fire Marshal, and shall be installed in accordance with the manufacturer’s installation instructions. Such devices shall be compatible with the operating velocities, pressures, temperatures, and humidity’s of the system. Where fire-detection or alarm systems are provided for the building, the smoke detectors shall be supervised by such systems in an approved manner and installed in accordance with NFPA 72 and the California Building and Fire Codes.*

*High-rise buildings having occupied floors located more than 75 feet above the lowest level of building access shall be provided with duct smoke detection in accordance with section 609.1 and the California Fire Code, Section 907.2.13.1.*

#### ITEM 4-3 Section 609.2 Air-moving systems and smoke detectors in Group I-2 occupanicies.

[Add new section 609.2 which aligns with the nationally recognized standards for healthcare facilities.]

***609.2 Air-Moving Systems and Smoke Detectors in Group I-2 occupancies.***

*In Group I-2 occupancies, air-moving systems returning air in excess of 2,000 cubic feet per minute (ft3/min) (0.9439 m3/s) from enclosed spaces within buildings shall be equipped with an automatic shutoff. Automatic shutoff shall be accomplished by interrupting the power source of the air-moving equipment upon detection of smoke in the return air duct or plenum upstream of any filters, exhaust air connections, outside air connections, or decontamination equipment and appliances.*

*Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access shall be provided with duct smoke detection in accordance with this section and the California Fire Code, Section 907.2.13.1.*

**Notation:**

Authority: Health and Safety Code Sections 1250, 1502, 1568.02, 1569.72 -1569.78, 1597.44 - 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13145, 13146, 13211, 16022.5, 17921, 18928, 18949.2, 25500 through 25545; Government Code Sections 51176, 51177, 51178 and 51179, 51189; Education Code Section 17074.50; Public Resources Code Sections 4201 through 4204.

Reference(s): Health and Safety Code Sections 13108, 13108.5, 13113, 13113.5, 13114, 13132, 13132.7, 13133, 13135, 13143, 13143.1, 13143.2, 13143.6, 13143.9, 13145, 13146, 13210, 13211, 16022.5, 17921.

### ITEM 5 Chapter 11 REFRIGERATION, Sections 1103.1.1, Table 1103.1.1, Table 1104.1, 1104.2, 1104.5, 1104.6, 1104.6.1, 1104.6.2, 1104.6.2.1, 1104.6.2.2, 1104.6.2.3, 1104.6.2.4, 1104.6.3, 1104.6.4, 1104.6.5, 1104.6.6, 1104.7, 1104.8, 1104.8.1, 1104.8.2, 1104.8.3, 1104.8.4, 1104.9, 1106.2.2, 1106.2.3, 1106.2.4, 1106.2.5, 1106.2.6, 1106.2.7, 1106.2.8, 1106.2.9, 1106.2.9.1, 1106.2.5.2, Table 1106.2.5.2, 1106.4, 1106.11, 1106.11.1, 1106.11.2, 1106.11.3, 1106.11.4, 1106.11.5, 1106.11.6, 1106.11.6.1, 1106.11.6.2, 1106.11.7, 1106.11.8, 1106.11.9, 1106.11.10, 1106.11.10.1, 1106.11.10.2, Table 1106.11.10.2, 1106.11.10.3, 1106.11.10.4, 1106.11.11, 1106.11.11.1, Table 1106.11.11.2, 1106.11.11.2, 1106.11.11.3, 1106.11.11.4, Figure 1106.11.11.4(1), Figure 1106.11.11.4(2), 1107.1.7.1, 1107.1.7.3, 1112.11.1, 1115.5

[The SFM proposes to adopt text from the 2024 Uniform Mechanical Code and print as an amendment to the 2022 California Mechanical Code.]

#### ITEM 5-1 Section 1103.1.1 Safety group.

[Propose to modify and provide pointer to new table.]

**1103.0 Classification.**

**…**

**1103.1.1 Safety Group.** Table 1102.3 classifies refrigerants by toxicity and flammability and assigns safety groups using combinations of toxicity class and flammability class. For the purposes of this chapter, the refrigerant Groups A1, A2L, A2, A3, B1, B2L, B2, and B3 shall be considered to be individual and distinct safety groups, *as shown in Table 1103.1.1*. Each refrigerant is assigned into not more than one group.

#### ITEM 5-2 Table 1103.1.1 Refrigerant Safety Group Classifications

[Propose to adopt new table with refrigerant safety group classifications.]

***TABLE 1103.1.1***

***REFRIGERANT SAFETY GROUP CLASSIFICATIONS***

|  |  |  |
| --- | --- | --- |
| ***Higher Flammability*** | ***A3*** | ***B3*** |
| ***Flammable*** | ***A2*** | ***B2*** |
| ***Lower Flammability*** | ***A2L*** | ***B2L*** |
| ***No Flame Propagation*** | ***A1*** | ***B1*** |
|  | ***Lower Toxicity*** | ***Higher Toxicity*** |

#### ITEM 5-3 Table 1104.1 Permissible Refrigeration Systems

[Propose to modify table to add A2L for permissible refrigeration systems.]

**1104.0 Requirements for Refrigerant and Refrigeration System Use.**

**…**

**TABLE 1104.1**

**PERMISSIBLE REFRIGERATION SYSTEMS1**

| **OCCUPANCY GROUP3** | **HIGH-PROBABILITY**  **SYSTEM** | **LOW PROBABILITY**  **SYSTEM** | **MACHINERY ROOM** |
| --- | --- | --- | --- |
| **A-1** | Group A1 *or A2L4* only | **Any** | **Any** |
| **A-2** | Group A1 *or A2L4* only | **Any** | **Any** |
|  |  |  |  |
| **A-3** | Group A1 *or A2L4* only | **Any** | **Any** |
| **A-4** | Group A1 *or A2L4* only | **Any** | **Any** |
| **B** | Group A12 *or A2L 2,4* only | **Any** | **Any** |
| **E** | Group A1 *or A2L4* only | **Any** | **Any** |
| **F-1** | Group A12 *or A2L 2,4* only | **Any** | **Any** |
| **F-2** | **Any 2** | **Any** | **Any** |
| **H-1** | **Any** | **Any** | **Any** |
| **H-2** | **Any** | **Any** | **Any** |
| **H-3** | **Any** | **Any** | **Any** |
| **H-4** | Group A1 *or A2L4* only | **Any** | **Any** |
| **H-5** | Group A1 *or A2L4* only | **Any** | **Any** |
| **I-1** | **None** | **Any** | **Any** |
| **I-2** | Group A1 *or A2L4* only | **Any** | **Any** |
| ***[OSHPD 1, 1R, 2, 3, 4 & 5] I-2.1*** | *Group A1 only* | ***Any*** | ***Any*** |
| **I-3** | **None** | **Any** | **Any** |
| **I-4** | Group A1 *or A2L4* only | **Any** | **Any** |
| **M** | Group A12 *or A2L 2,4* only | **Any** | **Any** |
| **R-1** | Group A1 *or A2L4* only | **Any** | **Any** |
| **R-2** | Group A1 *or A2L4* only | **Any** | **Any** |
| **R-3** | Group A1 *or A2L4* only | **Any** | **Any** |
| **R-4** | Group A1 *or A2L4* only | **Any** | **Any** |
| **S-1** | Group A12 *or A2L 2,4* only | **Any** | **Any** |
| **S-2** | **Any2** | **Any** | **Any** |
| **U** | **Any** | **Any** | **Any** |

**Notes:**

1 See Section 1104.0.

2 A refrigerant shall be permitted to be used within a high-probability system where the room or space is in accordance with Section 1104.4.

3 Occupancy classifications are defined in the building code.

*4 See Section 1104.6 for requirements applicable to A2L equipment.*

…

#### ITEM 5-4 Table 1104.2 Refrigent concentartion limit (RCL)

[Propose to modify to add new referenced section number.]

**1104.2 Refrigerant Concentration Limit *(RCL)*.** The concentration of refrigerant in a complete discharge of an independent circuit of high-probability systems shall not exceed the amounts shown in Table 1102.3, except as provided in Section 1104.3*,* ~~and~~ Section 1104.4 *and Section 1104.6*. The volume of occupied space shall be determined in accordance with Section 1104.2.1 through Section 1104.2.3.

**Exceptions:**

(1) Listed equipment *in locations other than public corridors and lobbies* containing not more than 6.6 pounds (2.99 kg) of refrigerant, regardless of the refrigerant safety classification, provided the equipment is installed in accordance with the listing and with the manufacturer’s installation instructions.

(2) Listed equipment for use in laboratories with more than 100 square feet (9.29 m2) of space per person, regardless of the refrigerant safety classification, provided that the equipment is installed in accordance with the listing and the manufacturer’s installation instructions. [ASHRAE 15:7.2]

#### ITEM 5-5 Section 1104.5 Flammable Refrigerants.

[Propose to modify section with new text based on flammability requirements in additional sections.]

**1104.5 Flammable Refrigerants.** The total of Group A2, B2, A3, and B3 refrigerants, other than Group A2L and B2L refrigerants shall not exceed 1100 pounds (498.9 kg) without approval by the Authority Having Jurisdiction. Institutional Occupancies shall comply with Section 1104.3. *Machinery rooms required in accordance with Section 1106.0 based on flammability shall be constructed and maintained in accordance with Section 1106.2.1 through Section 1106.2.6 and Section 1106.11 for Group A2L and B2L refrigerants.*

#### ITEM 5-6 Section 1104.6 Group A2L Refrigerants for Human Comfort.

[Propose to adopt new section regarding A2L refrigerants for human comfort.]

***1104.6 Group A2L Refrigerants for Human Comfort.*** *High-probability systems using Group A2L refrigerants for human comfort applications shall comply with this section. [ASHRAE 15:7.6]*

#### ITEM 5-7 Section 1104.6.1 Refrigerant concentration limits.

[Propose to adopt new section on refrigerant concentration limits.]

***1104.6.1 Refrigerant Concentration Limits.*** *Occupied spaces shall comply with the releasable charge limitations of the equipment listing and ASHRAE 15. Unoccupied spaces with refrigerant containing equipment, not including continuous piping or tubing, shall comply with the releasable charge limitations of the equipment listing or Section 1104.6.4. [ASHRAE 15:7.6.1-7.6.1.2]*

#### ITEM 5-8 Section 1104.6.1 Refrigerant concentration limits.

[Propose to adopt new section for listing and install requirements.]

***1104.6.2 Listing and Installation Requirements.*** *Refrigeration systems shall be listed and shall be installed in accordance with listing, the manufacturer’s instructions, and any markings on the equipment restricting the installation. [ASHRAE 15:7.6.2]*

#### ITEM 5-9 Section 1104.6.2.1 Nameplate.

[Propose to adopt new section re: nameplate which requires symbol indicate flammable refrigerant.]

***1104.6.2.1 Nameplate.*** *The nameplate required by Section 1115.5 shall include a symbol indicating that a flammable refrigerant is used, as specified by the product listing. [ASHRAE 15:7.6.2.1]*

#### ITEM 5-10 Section 1104.6.2.2 Labeling.

[Propose to adopt new section re: labeling indicate flammable refrigerant being used.]

***1104.6.2.2 Labeling.*** *A label indicating a flammable refrigerant is used shall be placed adjacent to service ports and other locations where service involving components containing refrigerant is performed, as specified by the product listing. [ASHRAE 15:7.6.2.2]*

#### ITEM 5-11 Section 1104.6.2.3 Refrigerant Detection Systems.

[Propose to adopt new section re: refrigerant detection systems.]

***1104.6.2.3 Refrigerant Detection Systems.*** *Refrigerant detection systems shall be in accordance with the listing and ASHRAE 15.*

#### ITEM 5-12 Section 1104.6.2.4 Refrigerant Concentration Above Limit.

[Propose to adopt new section re: refrigerant concentration maximum value limits.]

***1104.6.2.4 Refrigerant Concentration Above Limit.*** *When the refrigerant detection system senses**a refrigerant exceeding its setpoint, the following**actions shall be taken:*

1. *The supply air fan of the equipment shall activate with a minimum airflow rate specified by the manufacturer.*
2. *Turn off the compressor and all other electrical devices, excluding the control power transformers, control systems, and the supply air fan. The supply air fan shall continue to operate for at least five minutes after the refrigerant detection system has sensed a drop in the refrigerant concentration below the value specified in Section 1104.6.6(b).*
   * 1. ***Exception:*** *The compressor operation shall not be turned off when the compressor operation reduces the leak rate or the total amount of released refrigerant to the indoor space.*
3. *Any device that controls airflow located within the product or in ductwork that supplies air to the occupied space shall be fully open. Any device that controls airflow shall be listed.*
4. *Mitigation action required by the equipment listing shall be initiated [ASHRAE 15:7.6.2.4]*

#### ITEM 5-13 Section 1104.6.3 Ignition Sources Located in Ductwork.

[Propose to adopt new section re: ignition sources in ductwork.]

***1104.6.3 Ignition Sources Located in Ductwork.*** *Open-flame-producing devices shall not be permanently installed in the ductwork that serves the space. Unclassified electrical devices shall not be located within the ductwork that serves the space. Devices containing hot surfaces exceeding 1290°F (700°C) shall not be located in the ductwork that serves the space unless there is a minimum airflow of 200 ft/min (1.0 m/s) across the heating device(s) and there is proof of airflow before the heating device(s) is energized. [ASHRAE 15:7.6.3-7.6.3.3]*

#### ITEM 5-14 Section 1104.6.4 Mechanical Ventilation.

[Propose to adopt new section re: Mechanical ventilation.]

***1104.6.4*** ***Mechanical Ventilation.*** *When the releasable charge of the refrigeration system exceeds the refrigerant concentration limit specified in Section 1104.6.1, the refrigerant charge and ventilation air flow shall be in accordance with the equipment listing and ASHRAE 15.*

#### ITEM 5-15 Section 1104.6.5 Compressors and Pressure Vessels Located Indoors.

[Propose to adopt new section re: Compressors and Pressure Vessels Located Indoors.]

***1104.6.5*** ***Compressors and Pressure Vessels Located Indoors.*** *For refrigeration compressors and pressure vessels located in an indoor space that is accessible only during service and maintenance, the refrigerant charge shall be in accordance with the equipment listing and ASHRAE 15.*

#### ITEM 5-16 Section 1104.6.5 Sensors.

[Propose to adopt new section re: refrigerant sensors.]

***1104.6.6 Refrigerant Sensors.*** *Refrigerant sensors required by Section 1106.2.6 shall meet the following requirements:*

1. *Refrigerant sensors shall be evaluated by the testing laboratory as part of the equipment listing.*
2. *Refrigerant sensors shall be located such that refrigerant will be detected if the refrigerating system is operating or not operating.* 
   1. *For refrigerating systems that are connected to the occupied space through ductwork, refrigerant sensors shall be located within the listed equipment.*
   2. *For refrigerating systems that are directly connected to the occupied space without ductwork, the refrigerant sensor shall be located in the equipment in accordance with the equipment listing. Additional remote refrigerant sensors shall be permitted within the occupied space when included as part of the equipment mitigation system according to manufacturer’s instructions. [ASHRAE 15:7.6.5]*

#### ITEM 5-17 Section ~~1104.6~~ 1104.7 Applications for Human Comfort and for Nonindustrial Occupancies.

[Propose to amend to add a section number to reference A2L and remove existing exceptions.]

**~~1104.6~~ *1104.7* Applications for Human Comfort and for Nonindustrial Occupancies.** In nonindustrial occupancies, Group A2, ~~A2L,~~ A3, B1, B2L, B2, and B3 refrigerants shall not be used in high-probability systems for human comfort. *Use of Group A2L refrigerants used in high-probability systems for human comfort shall be in accordance with Section 1104.6.*

***~~Exceptions:~~***

1. *~~Listed equipment, units having a factory-sealed refrigerating system, containing no more than 2.2 lbs. (1kg) of A2L refrigerant installed in accordance with the listing and the manufacturer’s installation instructions.~~*
2. *~~Listed equipment for non-residential applications, having a factory-sealed refrigerating system and containing no more than 4 lbs. (1.8 kg) of A2L refrigerant installed in accordance with the listing and the manufacturer’s installation instructions.~~*

(Renumbering of remaining sections)

#### ITEM 5-18 Sections ~~1104.7~~ 1104.8, ~~1104.7.1~~ *1104.8.1*, ~~1104.7.2~~ *1104.8.2*, ~~1104.7.3~~ *1104.8.3*, ~~1104.7.4~~ *1104.8.4*, ~~1104.8~~ *1104.9,* 1105.12.1

[Propose to renumber sections and amend in accordance with the published 2024 Uniform Mechanical Code.]

**~~1104.7~~ *1104.8* Refrigerant Type and Purity. …**

**~~1104.7.1~~ *1104.8.1* Recovered Refrigerants. …**

**~~1104.7.2~~ *1104.8.2* Recycled Refrigerants. …**

**~~1104.7.3~~ *1104.8.3* Reclaimed Refrigerants. …**

**~~1104.7.4~~ *1104.8.4* Mixing.**Refrigerants~~, including refrigerant blends,~~ with different *refrigerant* designations~~as in accordance with Table 1102.3 shall not be mixed in a system~~ *shall only be mixed in a system in accordance with the following:*

1. *The addition of a second refrigerant is allowed by the equipment manufacturer and is in accordance with the manufacturer’s instructions.*
2. *The resulting mixture does not change the refrigerant safety group. [ASHRAE 15:7.5.1.7]*

**~~1104.8~~ *1104.9* Changing Refrigerants.** ~~A change in the type of refrigerant in a system shall not be made without notifying the Authority Having Jurisdiction, the user, and due observance of safety requirements. The refrigerant being considered shall be evaluated for suitability.~~*Changes of refrigerant in an existing system to a refrigerant with a different refrigerant designation shall only be allowed where in accordance with Section 1104.9.1 through Section 1104.9.4.* [ASHRAE 15:5.3]

***1104.9.1 Approval.*** *The change of refrigerant shall be approved by the owner. [ASHRAE 15:5.3.1]*

***1104.9.2 Procedures.*** *The change of refrigerant shall be in accordance with one of the following:*

*(1) Written instructions of the original equipment manufacturer.*

*(2) An evaluation of the system by a registered design professional or by an approved nationally recognized testing laboratory that validates safety and suitability of the replacement refrigerant.*

*(3) Approval of the Authority Having Jurisdiction. [ASHRAE 15:5.3.2]*

***1104.9.3 Replacement Refrigerant of Same Classification.*** *Where the replacement refrigerant is classified**into the same safety group, requirements that were**applicable to the existing system shall continue to apply.**[ASHRAE 15:5.3.3]*

***1104.9.4 Replacement Refrigerant of Different Classification.*** *Where the replacement refrigerant is**classified into a different safety group, the system shall**comply with the requirements of this chapter for a new**installation, and the change of refrigerant shall require**Authority Having Jurisdiction approval. [ASHRAE**15:5.3.4]*

…

**1105.12.1 ~~Quantity~~ *Storing Refrigerant*….**

#### ITEM 5-19 Section 1106.2.2 Openings.

[Propose to modify referenced section number.]

**1106.2.2 Openings.** Each refrigeration machinery room shall have a tight-fitting door or doors opening outward, self-closing where they open into the building and adequate in number to ensure freedom for persons to escape in an emergency. With the exception of access doors and panels in air ducts and air-handling units in accordance with Section ~~1106.6~~ *1106.2.3*, there shall be no openings that will permit passage of escaping refrigerant to other parts of the building. [ASHRAE 15: 8.11.2]

#### ITEM 5-20 Section ~~1106.6~~ *1106.2.3* Airflow.

[Propose to modify referenced ASHRAE number.]

**~~1106.6~~ *1106.2.3* Airflow.** There shall be no airflow to or from an occupied space through a machinery room unless the air is ducted and sealed in such a manner as to prevent ~~a~~ *any* refrigerant leakage from entering the airstream. Access doors and panels in ductwork and air-handling units shall be gasketed and tight fitting. [ASHRAE 15:8.11.~~7~~*.3*]

#### ITEM 5-21 Section ~~1106.11~~ *1106.2.4* Restricted Access.

[Propose to modify referenced ASHRAE number.]

**~~1106.11~~ *1106.2.4* Restricted Access.** Access to the refrigeration machinery room shall be restricted to authorized personnel. Doors shall be clearly marked, or permanent signs shall be posted at each entrance to indicate this restriction. [ASHRAE 15:8.11.~~8~~*4*]

#### ITEM 5-22 Section ~~1106.2.2.1~~ *1106.2.5* Detectors and Alarms.

[Propose to modify the referenced section numbers & modify the exception to add referenced section number for A2L and B2l refrigerant detectors.]

**~~1106.2.2.1~~ *1106.2.5* Detectors and Alarms.** Each refrigeration machinery room shall contain one or more refrigerant detectors in accordance with Section ~~1106.2.2.2~~ *1106.2.6*, located in areas where refrigerant from a leak will concentrate, that actuate an alarm and mechanical ventilation in accordance with Section ~~1106.2.2.2~~ *1106.2.7* at a set point not more than the corresponding Occupational Exposure Limit, OEL, in accordance with Table 1102.3, a set point determined in accordance with the OEL as defined in Chapter 2 shall be approved by the Authority Having Jurisdiction. The alarm shall annunciate visual and audible alarms inside the refrigeration machinery room and outside each entrance to the refrigeration machinery room. The alarms required in this section shall be of the manual reset type with the reset located inside the refrigeration machinery room. Alarms set at other levels, such as IDLH, and automatic reset alarms shall be permitted in addition to those required in accordance with this section. The meaning of each alarm shall be clearly marked by signage near the annunciator.

**Exception:** Refrigerant detectors are not required where only systems using R-718 (water) are located in the refrigeration machinery room. *For Group A2L and B2L, refrigerant detectors shall comply with Section 1106.11.*

#### ITEM 5-23 Section ~~1106.2.2.2~~ *1106.2.6* Refrigerant Detectors.

[Propose to modify referenced section numbers.]

**~~1106.2.2.2~~ *1106.2.6* Refrigerant Detectors.** Refrigerant detectors required in accordance with Section ~~1106.2.2.1~~ *1106.2.5* or Section 1107.1.7 shall meet all of the following conditions:

1. The refrigerant detector shall perform automatic self-testing of sensors. Where a failure is detected, a trouble signal shall be activated.
2. The refrigerant detector shall have one or more set points to activate responses in accordance with Section ~~1106.2.2.1~~ *1106.2.5* or Section 1107.1.7.
3. The refrigerant detector as installed, including any sampling tubes, shall activate responses within a time not to exceed 30 seconds after exposure to refrigerant concentration exceeding the set point value specified in Section ~~1106.2.2.1~~ *1106.2.5* or Section 1107.1.7.

#### ITEM 5-24 Section~~s 1106.2.3~~ *1106.2.7,* ~~1106.2.4~~ *1106.2.8*

[Propose to renumber sections.**]**

**~~1106.2.3~~ *1106.2.7* Mechanical Ventilation. …**

**~~1106.2.4~~ *1106.2.8* Ventilation. …**

#### ITEM 5-25 Section ~~1106.2.5~~ *1106.2.9* Emergency Ventilation-Required Airflow.

[Propose to renumber section.**]**

**~~1106.2.5~~  *1106.2.9* Emergency Ventilation-Required Airflow.** An emergency ventilation system shall be required to exhaust an accumulation of refrigerant due to leaks or a rupture of the system. The emergency ventilation required shall be capable of removing air from the machinery room in not less than the airflow quantity in Section ~~1106.2.5.1 or Section 1106.2.5.2~~ *1106.2.9.1*. Where multiple refrigerants are present, then the highest airflow quantity shall apply.

#### ITEM 5-26 Section ~~1106.2.5.1~~ *1106.2.9.1* Ventilation - A1, A2, A3, B1, ~~B2L~~, B2 and B3 ~~r~~Refrigerants.

[Modify Section Title number and remove B2L from list of refrigerants for ventilation.]

**~~1106.2.5.1~~ *1106.2.9.1* Ventilation - A1, A2, A3, B1, ~~B2L~~, B2 and B3 ~~r~~Refrigerants.** The emergency ventilation for A1, A2, A3, B1, ~~B2L,~~ B2 and B3 refrigerants shall have the capacity to provide mechanical exhaust at a rate as determined in accordance with Equation ~~1106.2.5.1~~ *1106.2.9.1*. …

#### ITEM 5-27 Section 1106.2.5.2 Ventilation - Group A2L Refrigerants.

[Repeal section “Ventilation – Group A2L Refrigerants.”]

**~~1106.2.5.2 Ventilation - Group A2L Refrigerants.~~** ~~The emergency ventilation for A2L refrigerants shall have the capacity to provide mechanical exhaust at a rate determined in accordance with Table 1106.2.5.2:~~

#### ITEM 5-28 Table 1106.2.5.2

[Repeal Table “Required Airflow for Group A2L Refrigerants.”]

**~~TABLE 1106.2.5.2~~**

**~~REQUIRED AIRFLOW FOR GROUP A2L REFRIGERANTS~~**

|  |  |
| --- | --- |
| **~~REFRIGERANT~~** | **~~MINIMUM AIRFLOW~~**  **~~(CFM)~~** |
| ~~R-32~~ | ~~32 500~~ |
| ~~R-143a~~ | ~~28 600~~ |
| ~~R-444A~~ | ~~13 700~~ |
| ~~R-444B~~ | ~~22 400~~ |
| ~~R-445A~~ | ~~16 400~~ |
| ~~R-446A~~ | ~~50 500~~ |
| ~~R-447A~~ | ~~50 200~~ |
| ~~R-447B~~ | ~~29 600~~ |
| ~~R-451A~~ | ~~14 900~~ |
| ~~R-451B~~ | ~~14 900~~ |
| ~~R-452B~~ | ~~31 500~~ |
| ~~R-454A~~ | ~~4290~~ |
| ~~R-454B~~ | ~~6650~~ |
| ~~R-454C~~ | ~~32 800~~ |
| ~~R-455A~~ | ~~4770~~ |
| ~~R-457A~~ | ~~31 400~~ |
| ~~R-1234yf~~ | ~~16 500~~ |
| ~~R-1234zeE~~ | ~~12 600~~ |

*~~For~~* ~~SI units: 1 cubic foot per minute = 0.00047 m3/s~~

~~\* The values were tabulated from the following equation:~~

*~~QA2L~~* ~~= [(P~~*~~·V·A~~*~~)/(~~*~~LFL~~*~~·0.50)] (Equation 1106.2.5.2)~~

*~~Where~~*~~:~~

*~~P~~* ~~= Refrigerant density, pounds per cubic feet (kg/m3).~~

*~~V~~* ~~= Refrigerant velocity equal to the refrigerant acoustic velocity (speed of sound), feet per second (m/s).~~

*~~A~~* ~~= Cross-section flow area of refrigerant leak, square feet (m2), A = 0.00136 ft2 (0.000126 m2).~~

*~~LFL~~* ~~= Lower Flammability Limit, or ETFL60 where no LFL exist, published value in accordance with ASHRAE 34.~~

*~~QA2L~~* ~~= Minimum required air flow rate, conversion to other units of measures is permitted, cubic feet per second (m3/s).~~

~~For exact ventilation rates and for refrigerants not listed, the ventilation rate shall be calculated using this equation.~~

…

#### ITEM 5-29 Section 1106.4 Natural Ventilation, Sections 1106.7

[Propose to modify existing section with minor modifications. Renumber sections 1106.7-1106.12]

**1106.4 Natural Ventilation.** ~~Where~~ *When* a refrigerating system is located outdoors more than 20 feet (6096 mm) from building~~s~~ openings and is enclosed by a penthouse, lean-to, or other open structure, natural or mechanical ventilation shall be provided. The requirements for such natural ventilation shall be in accordance with the following:

1. The free-aperture cross section for the ventilation of a machinery room shall be not less than as determined in accordance with Equation 1106.4.

*F* = √*G* (Equation 1106.4)

Where:

*F* = The free opening area, square feet.

*G* = The mass of refrigerant in the largest system, any part of which is located in the machinery room, pounds.

For SI units: 1 cubic foot per minute = 0.00047 m3/s, 1 pound = 0.453 kg

1. ~~The~~ ~~l~~Locations of the gravity ventilation openings shall be based on the relative density of the refrigerant to air. [ASHRAE 15:~~8.11.5(a), (b)~~*8.14*]

…

**~~1106.7~~ *1106.6* Ventilation Intake. …**

**~~1106.8~~ *1106.7* Maximum Temperature. …**

**~~1106.9~~ *1106.8* Refrigerant Parts in Air Duct. …**

**~~1106.10~~ *1106.9* Dimensions. …**

**~~1106.12~~ *1106.10* Exits. …**

#### ITEM 5-30 Section 1106.11 Machinery Room, A2L and B2L.

[Propose to adopt new section re: Machinery Room, A2L & B2L.]

***1106.11 Machinery Room, A2L and B2L.*** *When required by Section 1106.1, machinery rooms shall comply with Section 1106.11.1 through Section 1106.11.6. [ASHRAE 15:8.13]*

#### ITEM 5-31 Section 1106.11.1 Flame-Producing Device.

[Propose to adopt new section re: Flame-Producing Device.]

***1106.11.1 Flame-Producing Device.*** *There shall be no flame-producing device or hot surface over 1290°F (70 °C) in the room, other than that used for maintenance or repair, unless installed in accordance with Section 1106.5. [ASHRAE 15:8.13.1]*

#### ITEM 5-32 Section 1106.11.2 Communicating Spaces

[Propose to adopt new section re: Communicating Spaces.]

***1106.11.2 Communicating Spaces.*** *Doors communicating with the building shall be approved, self-closing, tight-fitting fire doors. [ASHRAE 15:8.13.2]*

#### ITEM 5-33 Section 1106.11.3 Noncombustible Construction.

[Propose to adopt new section re: Noncombustible Construction.]

***1106.11.3 Noncombustible Construction.*** *Walls, floor, and ceiling shall be tight and of noncombustible construction. Walls, floor, and ceiling separating the refrigerating machinery room from other occupied spaces shall be of at least one-hour fire-resistive construction. [ASHRAE 15:8.13.3]*

#### ITEM 5-34 Section 1106.11.4 Exterior Openings.

[Propose to adopt new section re: Exterior Openings.]

***1106.11.4 Exterior Openings.*** *Exterior openings, if present, shall not be under any fire escape or any open stairway. [ASHRAE 15:8.13.4]*

#### ITEM 5-35 Section 1106.11.5 Pipe Penetrations.

[Propose to adopt new section re: Pipe Penetrations.]

***1106.11.5 Pipe Penetrations.*** *All pipes piercing the interior walls, ceiling, or floor of such rooms shall be tightly sealed to the walls, ceiling, or floor through which they pass. [ASHRAE 15:8.13.5]*

#### ITEM 5-36 Section 1106.11.6 Machinery Room Designation.

[Propose to adopt new section re: Machinery Room Designation.]

***1106.11.6 Machinery Room Designation.*** *When any refrigerant of Groups A2, A3, B2, or B3 are used, the machinery room shall be designated as Class I, Division 2 hazardous (classified) electrical location in accordance with the California Electrical Code. When the only flammable refrigerants used are from Group A2L or B2L, the machinery room shall comply with both Section 1106.11.6.1 for ventilation and Section 1106.11.6.2 for refrigerant detection, or shall be designated as Class I, Division 2 hazardous (classified) electrical location in accordance with the California Electrical Code. [ASHRAE 15:8.13.6]*

#### ITEM 5-37 Section 1106.11.6.1 Mechanical Ventilation.

[Propose to adopt new section re: Mechanical Ventilation.]

***1106.11.6.1 Mechanical Ventilation.*** *The machinery room shall have a mechanical ventilation system in accordance with Section 1106.11.11. The mechanical ventilation system shall:*

1. *Run continuously, and failure of the mechanical ventilation system actuates an alarm, or*
2. *Be activated by one or more refrigerant detectors, conforming to requirements of Section 1106.11.8. [ASHRAE 15:8.13.6.1]*

#### ITEM 5-38 Section 1106.11.6.2 Detection System.

[Propose to adopt new section re: Detection System.]

***1106.11.6.2 Detection System.*** *Detection of refrigerant concentration that exceeds 25 percent of the LFL or the upper detection limit of the refrigerant detector, whichever is lower, shall automatically de-energize the following equipment in the machinery room:*

1. *Refrigerant compressors*
2. *Refrigerant pumps*
3. *Normally closed automatic refrigerant valves*
4. *Other unclassified electrical sources of ignition with apparent power rating greater than 1 kVA, where the apparent power is the product of the circuit voltage and current rating. [ASHRAE 15:8.13.6.2]*

#### ITEM 5-39 Section 1106.11.7 Mechanical Equipment Control.

[Propose to adopt new section re: Mechanical Equipment Control.]

***1106.11.7 Mechanical Equipment Control.*** *Remote control of the mechanical equipment in the refrigerating machinery room shall be provided immediately outside the machinery room door solely for the purpose of shutting down the equipment in an emergency. Ventilation fans shall be on a separate electrical circuit and have a control switch located immediately outside the machinery room door. [ASHRAE 15:8.13.7]*

#### ITEM 5-40 Section 1106.11.8 Refrigerant Detectors.

[Propose to adopt new section re: Refrigerant Detectors.]

***1106.11.8 Refrigerant Detectors.*** *Each refrigerating machinery room in accordance with Section 1106.11 shall contain one or more refrigerant detectors in accordance with Section 1106.11.9. The detector(s) sensing element shall be located in areas where refrigerant from a leak will concentrate, with one or more set points that activate responses in accordance with Section 1106.11.10 for alarms and Section 1106.11.11 for mechanical ventilation. Multiport-type devices shall be prohibited. [ASHRAE 15:8.13.8]*

#### ITEM 5-41 Section 1106.11.9 Refrigerant Detectors Requirements.

[Propose to adopt new section re: Refrigerant Detector Requirements.]

***1106.11.9 Refrigerant Detector Requirements.*** *Refrigerant detectors required by Section 1106.11 shall meet all of the following conditions:*

1. *A refrigerant detector shall be capable of detecting each of the specific refrigerant designations in the machinery room.*
2. *The refrigerant detector shall activate responses within a time not to exceed a limit specified in Section 1106.11.10 and Section 1106.11.11 after exposure to refrigerant concentration exceeding a limit value specified in Section 1106.11.10 and Section 1106.11.11.*
3. *The refrigerant detector shall have a set point not greater than the applicable Occupational Exposure Limit (OEL) value in accordance with Table 1102.3. The applicable OEL value shall be the lowest OEL value for any refrigerant designation in the machinery room. For refrigerants that do not have an OEL value in Table 1102.3, use a value determined in accordance with the OEL as defined by ASHRAE 34 where approved by the Authority Having Jurisdiction.*
4. *The refrigerant detector shall have a set point not more than the applicable Refrigerant Concentration Limit (RCL) value in accordance with Table 1102.3. The applicable RCL value shall be the lowest RCL value for any refrigerant designation in the machinery room. For refrigerants that do not have a RCL value in Table 1102.3, use a value determined in accordance with the RCL as defined by ASHRAE 34 where approved by the Authority Having Jurisdiction.*
5. *The refrigerant detector shall provide a means for automatic self-testing and shall be in accordance with Section 1106.11.10.4. The refrigerant detector shall be tested during installation and annually thereafter in accordance with the fire code, or at an interval not exceeding the manufacturer’s installation instructions, whichever is less. Testing shall verify compliance with the alarm set points and response times per Section 1106.11.10 and Section 1106.11.11. [ASHRAE 15:8.13.9]*

#### ITEM 5-42 Section 1106.11.10 Alarms.

[Propose to adopt new section re: Alarms.]

***1106.11.10 Alarms.*** *Alarms required by Section 1106.11.8 shall comply with Section 1106.11.10.1 through Section 1106.11.10.4.*

#### ITEM 5-43 Section 1106.11.10.1 Visual and Audio.

[Propose to adopt new section re: Visual and Audio.]

***1106.11.10.1 Visual and Audio.*** *The alarm shall have visual and audible annunciation inside the refrigerating machinery room and outside each entrance to the refrigerating machinery room. [ASHRAE 15:8.13.10.1]*

#### ITEM 5-44 Section 1106.11.10.2 Detector Activation.

[Propose to adopt new section re: Detector Activation.]

***1106.11.10.2 Detector Activation.*** *The refrigerant detector set points shall activate an alarm in accordance with the type of reset in Table 1106.11.10.2. Manual reset type alarms shall have the reset located inside the refrigerating machinery room. [ASHRAE 15:8.13.10.2]*

#### ITEM 5-45 Table 1106.11.10.2 Refrigerant detector set points, response times, alarms, and ventilation levels [ASHRAE 15: Table 8-1]

[Propose to adopt new table re: Refrigerant Detector Set Points, Response Times, Alarms and Ventilation levels.]

***TABLE 1106.11.10.2***

***REFRIGERANT DETECTOR SET POINTS, RESPONSE TIMES, ALARMS, AND VENTILATION LEVELS***

***[ASHRAE 15: TABLE 8-1]***

| ***LIMIT VALUE*** | ***RESPONSE***  ***TIME (seconds)*** | ***ALARM TYPE*** | ***ALARM***  ***RESET TYPE*** | ***VENTILATION***  ***RATE*** | ***VENTILATION***  ***RESET TYPE*** |
| --- | --- | --- | --- | --- | --- |
| *Set point ≤ OEL* | *≤ 300* | *Trouble Alarm* | *Automatic* | *Level 1* | *Automatic* |
| *Set point ≤ RCL* | *≤ 15* | *Emergency Alarm* | *Manual* | *Level 2* | *Manual* |

#### ITEM 5-46 Section 1106.11.10.3 Alarm Levels.

[Propose to adopt new section re: Alarm Levels]

***1106.11.10.3 Alarm Levels.*** *Alarms set at levels other than Table 1106.11.10.2 (such as IDLH) and automatic reset alarms are permitted in addition to those required by Section 1106.11.10. The meaning of each alarm shall be clearly marked by signage near the annunciators. [ASHRAE 15:8.13.10.3]*

#### ITEM 5-47 Section 1106.11.10.4 Emergency

[Propose to adopt new section re: Emergency.]

***1106.11.10.4 Emergency.*** *In the event of a failure during a refrigerant detector self-test in accordance with Section 1106.11.9(5), a trouble alarm signal shall be transmitted to an approved monitored location. [ASHRAE 15:8.13.10.4]*

#### ITEM 5-48 Section 1106.11.11 Mechanical Ventilation

[Propose to adopt new section re: Mechanical Ventilation.]

***1106.11.11 Mechanical Ventilation.*** *Machinery rooms, in accordance with Section 1106.11, shall be vented to the outdoors, using mechanical ventilation in accordance with Section 1106.11.11.1, Section 1106.11.11.2, and Section 1106.11.11.3. [ASHRAE 15:8.13.11]*

#### ITEM 5-49 Section 1106.11.11.1 Mechanical Ventilation Requirements.

[Propose to adopt new section re: Mechanical Ventilation Requirements.]

***1106.11.11.1 Mechanical Ventilation Requirements.*** *Mechanical ventilation referred to in Section 1106.11.11 shall be in accordance with all of the following:*

1. *Include one or more power-driven fans capable of exhausting air from the machinery room; multispeed fans shall be permitted.*
2. *Electric motors driving fans shall not be placed inside ducts; fan rotating elements shall be nonferrous or non-sparking, or the casing shall consist of or be lined with such material.*
3. *Include provision to supply make-up air to replace that being exhausted; ducts for supply to and exhaust from the machinery room shall serve no other area; the makeup air supply locations shall be positioned relative to the exhaust air locations to avoid short circuiting.*
4. *Inlets to the exhaust ducts shall be located in an area where refrigerant from a leak will concentrate, in consideration of the location of the replacement supply air paths, refrigerating machines, and the density of the refrigerant relative to air.*
5. *Inlets to exhaust ducts shall be within 1 foot (0.3 m) of the lowest point of the machinery room for refrigerants that are heavier than air and shall be within 1 foot (0.3 m) of the highest point for refrigerants that are lighter than air.*
6. *The discharge of the exhaust air shall be to the outdoors in such a manner as not to cause a nuisance or danger. [ASHRAE 15:8.13.11.1]*

#### ITEM 5-50 Table 1106.11.11.2 Level 1 ventilation rate for class 2L refrigerants [ASHRAE 15: Table 8-2]

[Propose to adopt new Table re: Level 1 Ventilation Rate for Class 2L Refrigerants.]

***TABLE 1106.11.11.2***

***LEVEL 1 VENTILATION RATE FOR CLASS 2L REFRIGERANTS***

***[ASHRAE 15: Table 8-2]***

| ***STATUS*** | ***AIRFLOW*** |
| --- | --- |
| *Operated when occupied and operated*  *when activated in accordance with*  *Section 1106.11.9(3) and Table*  *1106.11.10.2* | *The greater of the following:*  *(1) 0.5 ft3/min per ft3 (2.54 L/s per m3) of machinery room area, or*  *(2) 20 ft3/min (9.44 L/s) per person* |
| *Operable when occupied* | *With or without mechanical cooling of the machinery room, the greater of:*  *(1) The airflow rate required to not exceed a temperature rise of 18°F (10°C) above inlet air temperature or*  *(2) The airflow rate required to not exceed a maximum air temperature of*  *122°F (50°C) in the machinery room.* |

#### ITEM 5-51 Section 1106.11.11.2 Level 1 Ventilation Rate.

[Propose to adopt new section re: Level 1 Ventilation Rate.]

***1106.11.11.2 Level 1 Ventilation Rate.*** *The refrigerating machinery room mechanical ventilation in Section 1106.11.11.1 shall exhaust at an airflow rate not less than shown in Table 1106.11.11.2. [ASHRAE 15:8.13.11.2]*

#### ITEM 5-52 Section 1106.11.11.3 Level 2 Ventilation.

[Propose to adopt new section re: Level 2 Ventilation.]

***1106.11.11.3 Level 2 Ventilation.*** *A part of the refrigerating machinery room mechanical ventilation referred to in Section 1106.11.11.1 shall exhaust an accumulation of refrigerant due to leaks or a rupture of a refrigerating system, or portion thereof, in the machinery room. The refrigerant detectors required in accordance with Section 1106.11.8 shall activate ventilation at a set point and response time in accordance with Table 1106.11.10.2, at an airflow rate not less than the value determined in accordance with Section 1106.11.11.4.*

*When multiple refrigerant designations are in the machinery room, evaluate the required airflow according to each refrigerating system, and the highest airflow quantity shall apply.*

*Ventilation reset shall be in accordance with the type of reset in Table 1106.11.10.2. Manual-type ventilation reset shall have the reset located inside the refrigerating machinery room. [ASHRAE 15:8.13.11.3]*

#### ITEM 5-53 Section 1106.11.11.4 Level 2 Ventilation Rate.

[Propose to adopt new section re: Level 2 Ventilation Rate.]

***1106.11.11.4 Level 2 Ventilation Rate.*** *When required by Section 1106.11.11.3, the total airflow for Level 2 ventilation shall be not less than the airflow rate determined by Figure 1106.11.11.4. [ASHRAE 15:8.13.11.4]*

#### ITEM 5-54 Figure 1106.11.11.4 (1) LEVEL 2 VENTILATION RATE FOR CLASS 2L REFRIGERANTS [ASHRAE 15: FIGURE 8-1]

[Propose to adopt new figure for Level 2 Ventilation Rate for Class 2L Refrigerants.]

FIGURE 1106.13.11.4(1)
LEVEL 2 VENTILATION RATE FOR CLASS 2L REFRIGERANTS
[ASHRAE 15: FIGURE 8-1]

Chart (a)


![FIGURE 1106.13.11.4(1)
LEVEL 2 VENTILATION RATE FOR CLASS 2L REFRIGERANTS
[ASHRAE 15: FIGURE 8-1]

Chart (b)]()

***FIGURE 1106.11.11.4(1)***

***LEVEL 2 VENTILATION RATE FOR CLASS 2L REFRIGERANTS***

***[ASHRAE 15: FIGURE 8-1]***

#### ITEM 5-55 Figure 1106.11.11.4 (2) LEVEL 2 VENTILATION RATE FOR CLASS 2L REFRIGERANTS (SI) [ASHRAE 15: FIGURE 8-2]

[Propose to adopt new figure for Level 2 Ventilation Rate for Class 2L Refrigerants (SI)]

*FIGURE 1106.13.11.4(2)
LEVEL 2 VENTILATION RATE FOR CLASS 2L REFRIGERANTS (SI)
[ASHRAE 15: FIGURE 8-2]
*

***FIGURE 1106.11.11.4(2)***

***LEVEL 2 VENTILATION RATE FOR CLASS 2L REFRIGERANTS (SI)***

***[ASHRAE 15: FIGURE 8-2]***

…

#### ITEM 5-56 Section 1107.1.7.1 Mechanical Ventilation.

[Propose to modify referenced section numbers.]

**1107.1.7.1 Mechanical Ventilation.** The mechanical ventilation system in the machinery room is run continuously in accordance with Section ~~1106.2.5~~ *1106.11.6.1* and failure of the mechanical ventilation system actuates an alarm, or the mechanical ventilation system in the machinery room is activated by one or more refrigerant detectors, in accordance with the requirements of Section ~~1106.2.2.1 and Section 1106.2.2.2~~ *1106.11.11*.

#### ITEM 5-57 Sections 1107.1.7.2, 1107.1.7.3, 1107.1.9, 1108.3, 1108.4

[Propose to modify referenced section numbers.]

**1107.1.7.2 Refrigeration Detectors.** For the refrigerant detection required in Section ~~1106.2.2.1~~ *1106.2.5*, …

**1107.1.7.3 Machinery Rooms.** The machinery room shall comply with Section ~~1107.1.8~~ *1106.11*.

…

**1107.1.9 Refrigeration Systems.** As part of the mechanical ventilation system in accordance with Section ~~1106.2.4~~ *1106.2.8*, …

…

**1108.3 Emergency Shutoff.** … in accordance with Section ~~1106.2.2.1~~ *1106.2.5*.

**1108.4 Installation, Maintenance, and Testing.** … Section ~~1106.2.2.1~~ *1106.2.5* …

#### ITEM 5-58 Section 1112.11.1 Discharging Location Interior to Building.

[Propose to modify to add in A2L & B2L refrigerants.]

**1112.11.1 Discharging Location Interior to Building.** Pressure-relief devices, including fusible plugs, serving refrigeration systems shall be permitted to discharge to the interior of a building where in accordance with *all of* the following:

1. The system contains less than 110 pounds (49.9 kg) of a Group A1 *or A2L* refrigerant.
2. The system contains less than 6.6 pounds (2.99 kg) of a Group A2, B1, ~~or~~ B2 *or B2L* refrigerant.
3. The system is ~~not required~~ to be installed in a machinery room in accordance with Section 1106.0.

#### ITEM 5-59 Section 1115.5 Nameplate.

[Propose to adopt new section re: Nameplate.]

***1115.5 Nameplate.*** *Each self-contained system and each separate condensing unit, compressor, or compressor unit sold for field assembly in a refrigerating system shall carry a nameplate marked with the manufacturer’s name, nationally registered trademark or trade name, identification number, design pressures, and refrigerant for which it is designed. The refrigerant shall be designated by the refrigerant number (“R-” number) as shown in Table 1102.3. [ASHRAE 15:9.15]*

*Heat pumps and electric cooling appliances shall bear a factory-applied nameplate in accordance with Section 307.3.*

**Notation:**

Authority: Health and Safety Code Sections 1250, 1502, 1568.02, 1569.72 - 1569.78, 1597.44 - 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13145, 13146, 13211, 16022.5, 17921, 18928, 18949.2, 25500 through 25545; Government Code Sections 51176, 51177, 51178 and 51179, 51189; Education Code Section 17074.50; Public Resources Code Sections 4201 through 4204.

Reference(s): Health and Safety Code Sections 13108, 13108.5, 13113, 13113.5, 13114, 13132, 13132.7, 13133, 13135, 13143, 13143.1, 13143.2, 13143.6, 13143.9, 13145, 13146, 13210, 13211, 16022.5, 17921.

### ITEM 6 Chapter 13 FUEL GAS PIPING

[The SFM proposes that fuel oil piping systems be installed in accordance with NFPA 37]

#### ITEM 6-1 Section 1301.1 Applicability.

[Propose to modify section which identifies that the installation of fuel oil piping systems connected to combustion engines and gas turbines is also a concern.]

**1301.1 Applicability.** The regulations of this chapter shall govern the installation of fuel gas piping in or in connection with a building, structure or within the property lines of premises up to 5 pounds-force per square inch (psi) (34 kPa) for natural gas and 10 psi (69 kPa) for undiluted propane, other than service pipe. Fuel oil piping systems *connected to oil-burning equipment* shall be installed in accordance with NFPA 31. *Fuel oil piping systems connected to internal combustion engines and gas turbines shall be installed in accordance with NFPA 37.*

**Notation:**

Authority: Health and Safety Code Sections 1250, 1502, 1568.02, 1569.72 - 1569.78, 1597.44 - 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13145, 13146, 13211, 16022.5, 17921, 18928, 18949.2, 25500 through 25545; Government Code Sections 51176, 51177, 51178 and 51179, 51189; Education Code Section 17074.50; Public Resources Code Sections 4201 through 4204.

Reference(s): Health and Safety Code Sections 13108, 13108.5, 13113, 13113.5, 13114, 13132, 13132.7, 13133, 13135, 13143, 13143.1, 13143.2, 13143.6, 13143.9, 13145, 13146, 13210, 13211, 16022.5, 17921.

### ITEM 7 Chapter 16 STATIONARY POWER PLANTS, Section 1602.0, 1602.1, 1602.1.1, 1602.2

[The SFM proposed amendment adds liquid fueled engines and gas turbines to the subject matter of Section 1602.0]

#### ITEM 7-1 Section 1602.0 Stationary ~~gas~~ engines, ~~and~~ generators *and gas turbines*.

[Propose to modify section title to add gas turbines.]

**1602.0 Stationary ~~Gas~~ Engines, ~~and~~ Generators *and Gas Turbines*.**

#### ITEM 7-2 Section 1602.1 ~~General~~ *Gas Engines*.

[Propose to modify title and include stationary gas engines.]

**1602.1 ~~General~~ *Gas Engines*.** The installation of *stationary* gas engines shall conform to NFPA 37. [NFPA 54:10.23]

#### ITEM 7-3 1602.~~2.~~*1.1* Connection to the Gas Supply Piping.

[Propose to renumber section.]

**1602.~~2.~~*1.1* Connection to the Gas Supply Piping.** Stationary gas engines shall not be rigidly connected to the gas supply piping. [NFPA 54:10.23.1]

#### ITEM 7-4 1602.2 Liquid-Fueled Engines and Gas Turbines.

[Propose to adopt new section re: Liquid-Fueled Engines and Gas Turbines.]

***1602.2 Liquid-Fueled Engines and Gas Turbines.*** *In accordance with California Building Code Section 442.1, the installation of liquid-fueled stationary internal combustion engines and gas turbines shall conform to NFPA 37.*

**Notation:**

Authority: Health and Safety Code Sections 1250, 1502, 1568.02, 1569.72 - 1569.78, 1597.44 - 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13145, 13146, 13211, 16022.5, 17921, 18928, 18949.2, 25500 through 25545; Government Code Sections 51176, 51177, 51178 and 51179, 51189; Education Code Section 17074.50; Public Resources Code Sections 4201 through 4204.

Reference(s): Health and Safety Code Sections 13108, 13108.5, 13113, 13113.5, 13114, 13132, 13132.7, 13133, 13135, 13143, 13143.1, 13143.2, 13143.6, 13143.9, 13145, 13146, 13210, 13211, 16022.5, 17921.

### ITEM 8 Chapter 17 REFERENCE STANDARDS

[Adopt the latest edition of ASHRAE 15 and 34 (2022)]

#### ITEM 8-1 ASHRAE 15

[Propose to modify ASHRAE 15 Standard to the 2022 edition.]

ASHRAE 15-~~2016~~ *2022* Safety Standard for Refrigeration Systems

#### ITEM 8-2 ASHRAE 34

[Propose to modify ASHRAE 34 Standard to the 2022 edition.]

ASHRAE 34-~~2016~~ *2022* Designation and Safety Classification of Refrigerants

#### ITEM 8-3 NFPA 37

[Amend the 2018 edition of NFPA 37 reference sections.]

| **STANDARD NUMBER** | **STANDARD TITLE** | **APPLICATION** | **REFERENCED SECTION** |
| --- | --- | --- | --- |
| NFPA 37- 2018 | Installation and Use of Stationary Combustion Engines and Gas Turbines | Generators*, Fuel oil piping systems* | *1301.1*, 1602.1, *1602.2*, 1602.3 |

#### ITEM 8-4 NFPA 409

[Propose to modify NFPA 409 Standard to the 2022 edition.]

NFPA 409-~~2016~~ *2022* Aircraft Hangars

#### ITEM 8-5 UL 60335-2-40

[Propose to modify to the UL 60335-2-40 Standard to the 2022 4th edition.]

UL 60335-2-40-~~2017~~*, 4th Edition 2022*

Household and Similar Electrical Appliances – Safety –Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

#### ITEM 8-6 UL 60335-2-89

[Propose to modify UL 60335-2-89 Standard to the 2021 edition.]

UL 60335-2-89 ~~2017~~ *2021* Household and Similar Electrical Appliances – Safety – Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor.

**Notation:**

Authority: Health and Safety Code Sections 1250, 1502, 1568.02, 1569.72 - 1569.78, 1597.44 - 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13145, 13146, 13211, 16022.5, 17921, 18928, 18949.2, 25500 through 25545; Government Code Sections 51176, 51177, 51178 and 51179, 51189; Education Code Section 17074.50; Public Resources Code Sections 4201 through 4204.

Reference(s): Health and Safety Code Sections 13108, 13108.5, 13113, 13113.5, 13114, 13132, 13132.7, 13133, 13135, 13143, 13143.1, 13143.2, 13143.6, 13143.9, 13145, 13146, 13210, 13211, 16022.5, 17921.