



# REFRIGERATION EQUIPMENT FIRE INSTALLATION PERMIT – SUBMITTAL CHECKLIST



Building Permit # \_\_\_\_\_ Fire Permit # \_\_\_\_\_

Project Name/Tenant: \_\_\_\_\_

Site Address: \_\_\_\_\_ Bldg/Unit/Suite: \_\_\_\_\_

Applicant: \_\_\_\_\_ Phone: \_\_\_\_\_

An IFC Fire Installation Permit is required to install a mechanical refrigeration unit or system having a refrigerant circuit containing more than 220 pounds of Group A1 or 30 pounds of any other group of refrigerant.

The following information is required at time of application for the Fire Installation Permit:

### Permitting Requirements:

- Completed Fire Installation Permit Application & Submittal Checklist
- Submit (2) sets of plans for review by the Redmond Fire Prevention Division
- A separate Mechanical Permit is required through the Building Division

### Plans:

The following is a list of information required on all plan submittals for review of a place of assembly. The plan shall be drawn to 1/8" scale minimum. The applicant is required to submit all of this information so an accurate and timely review may be done:

### General Requirements:

- Specify the type(s) and quantity(ies) of refrigerant in each circuit of the refrigerant system.
- All components containing refrigerant shall be located **either outdoors or in a machinery room** where the quantity of refrigerant in an independent circuit of a system exceeds the amounts in Table 1103.1 of the 2006 UMC. For refrigerant blends not listed in Table 1103.1, the same requirement shall apply when the amount for any blend component exceeds that indicated in Table 1103.1 for that component. (UMC 1104.2)
  - The amounts shown in Table 1103.1 shall be reduced by 50 percent for all areas of institutional occupancies except kitchens, laboratories, and mortuaries. The total of all Group A2, B2, A3 and B3 refrigerants shall not exceed 550 pounds in occupied areas or machinery rooms (UMC 1104.2.1)
- Flammable and combustible materials shall not be stored in machinery rooms for refrigeration systems having a refrigerant circuit containing more than 220 pounds of Group A1 or 30 pounds of any other group refrigerant. Storage, use, or handling of extra refrigerant or refrigerant oils shall be as required by IFC Chapters 50, 53, 55, and 57. (IFC 606.11)

### Machinery Rooms:

- Machinery rooms shall be constructed and maintained in accordance with UMC Section 1105 for Group A1 and B1 refrigerants and in accordance with Sections 1105 and 1106 or Group A2, B2, A3 and B3 refrigerants. (UMC 1104.2)
- Machinery rooms are not required for listed equipment and appliances containing not more than 6.6 pounds of refrigerant, regardless of the refrigerant's safety classification, where installed in accordance with the equipment's or appliance's listing and manufacturer's installation instruction. (UMC 1104.2, Exception #1)

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~ Fire Prevention (425)406-0865 ~

- ❑ Machinery rooms are not required for industrial occupancies and refrigerated rooms for manufacturing, food and beverage preparation, meat cutting, other processes and storage where all of the following conditions are met (UMC 1104.2.2):
  1. The space containing the machinery is separated from other occupancies by tight construction with tight-fitting doors.
  2. Access is restricted to authorized personnel.
  3. The floor area per occupant is not less than 100 s.f. where machinery is located on floor levels with exits more than 6.6 feet above the ground. Where provided with egress directly to the outdoors or into approved building exits, the minimum floor area shall not apply.
  4. Refrigerant detectors are installed as required for machinery rooms in accordance with Section 1105.3.
  5. Surfaces having temperatures exceeding 800 degrees F and open flames are not present where any Group A2, B2, A3 or B3 refrigerant is used.
  6. All electrical equipment and appliances conform to Class 1, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
  7. All refrigerant-containing parts in systems exceeding 100 hp drive power, except evaporators used for refrigeration or dehumidification; condensers used for heating; control and pressure relief valves for either; and connecting piping, shall be located either outdoors or in a machinery room.
- ❑ Refrigerant machinery rooms located in an unsprinklered building shall be separated from the remainder of the building by a 1-hour fire barrier constructed in accordance with IBC Section 706 or a horizontal assembly constructed in accordance with IBC Section 711, or both. Door shall be self- or automatic closing upon detection of smoke. (IBC Table 509)
- ❑ Refrigerant machinery rooms larger than 1,000 s.f. containing a refrigerant evaporator and maintained at a temperature below 68 degrees F shall have not less than two exits or exit access doorways. Exit access doorways shall be determined as specified in IBC Section 1017.1. All portions of the machinery room shall be within 150 feet of an exit or exit access doorway where such rooms are not protected by an approved automatic sprinkler systems. Egress is allowed through adjoining refrigerated rooms or spaces. (IBC 1006.2.2.3)
- ❑ Where refrigerants of Groups A2, A3, B2 and B3 are used, refrigeration machinery rooms shall conform to the Class I, Division 2 hazardous location classification requirements of the ICC Electrical Code. (IFC 606.16)

**Exception:** Ammonia machinery rooms that are provided with ventilation in accordance with Section 1106.3 of the IMC.

**Refrigerant Detection/Remote Controls:**

- ❑ Machinery rooms shall contain a refrigerant detector with an audible and visual alarm. The detector, or sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The alarm shall be actuated at a value not greater than the corresponding TLV-TWA values shown in the IMC for the refrigerant classification. Detectors and alarms shall be placed in approved locations. (IFC 606.8)
- ❑ Remote control of the mechanical equipment and appliances located in the machinery room shall be provided at an approved location immediately outside the machinery room and adjacent to its principal entrance. (IFC 606.9)

- ❑ A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide off-only control of refrigerant compressors, refrigerant pumps and normally closed automatic refrigerant valves located in the machinery room. Additionally, this equipment shall automatically shut off when the refrigerant vapor concentration in the machinery room exceeds the vapor detector's upper limit or 25 percent of the LEL, whichever is lower. (IFC 606.9.1)
- ❑ A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide for on-only control of the machinery room ventilation fans. (IFC 606.9.2)

**Emergency pressure Controls:**

- ❑ Refrigeration systems containing more than 6.6 pounds of flammable, toxic or highly toxic refrigerant or ammonia shall be provided with an emergency pressure control system in accordance with Sections 606.10.1 and 606.10.2. (IFC 606.10)
- ❑ Each high- and intermediate-pressure zone in a refrigerant system shall be provided with a single automatic valve providing a cross-over connection to a lower pressure zone. (IFC 606.10.1)
  - ❑ Automatic crossover valves shall be arranged to automatically relieve excess system pressure to a lower pressure zone if the pressure in a high- or intermediate-pressure zone rises to within 90 percent of the set point for emergency pressure-relief devices. (IFC 606.10.1.1)
  - ❑ When required by the fire code official, automatic crossover valves shall be capable of manual operation. (IFC 606.10.1.2)
  - ❑ Refrigeration system zones that are connected to a higher pressure zone by an automatic crossover valve shall be designed to safely contain the maximum pressure that can be achieved by interconnection of the two zones. (IFC 606.10.1.3)
- ❑ An automatic emergency stop feature shall be provided in accordance with the following:
  - ❑ Operation of an automatic crossover valve shall cause all compressors on the affected system to immediately stop. Dedicated pressure-sensing devices located immediately adjacent to crossover valves shall be permitted as a means for determining operation of a valve. To ensure that the automatic crossover valve system provides a redundant means of stopping compressors in an overpressure condition, high-pressure cutout sensors associated with compressors shall not be used as a basis for determining operation of a crossover valve. (IFC 606.10.2.1)
  - ❑ The lowest pressure zone in a refrigeration system shall be provided with a dedicated means of determining a rise in system pressure to within 90 percent of the set point for emergency pressure-relief devices. Activation of the overpressure sensing device shall cause all compressors on the affected system to immediately stop. (IFC 606.10.2.2)

**Termination of Relief Devices:**

- ❑ Pressure relief devices, fusible plugs and purge systems for refrigeration systems discharging to the atmosphere from refrigerant systems containing flammable, toxic, or highly toxic refrigerants or ammonia shall comply with IFC Sections 606.12.3 through 606.12.5. (IFC 606.12)
- ❑ Systems containing more than 6.6 pounds of flammable refrigerants having a density equal to or greater than the density of air shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Section 606.12.6 or a flaring system in accordance with Section 606.12.7.

Systems containing more than 6.6 pounds of flammable refrigerants having a density less than the density of air shall be permitted to discharge vapor to the atmosphere provided that the point

of discharge is located outside of the structure at not less than 15 feet above the adjoining grade level and not less than 20 feet from any window, ventilation opening or exit. (IFC 606.12.3)

- ❑ Systems containing more than 6.6 pounds of toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment systems in accordance with Section 606.12.6 or a flaring system in accordance with Section 606.12.7. (IFC 606.12.4)
- ❑ Systems containing more than 6.6 pounds of ammonia refrigerant shall discharge vapor to the atmosphere in accordance with one of the following methods:
  1. Directly to atmosphere where the fire code official determines, on review of an engineering analysis prepared in accordance with Section 104.7.2 that a fire, health or environmental hazard would not result from atmospheric discharge of ammonia.
  2. Through an approved treatment system in accordance with Section 606.12.6.
  3. Through a flaring system in accordance with Section 606.12.8.
  4. Through an approved ammonia diffusion system in accordance with Section 606.12.8
  5. By other approved means.

❑ **Exception:**

1. Ammonia/water absorption systems containing less than 22 pounds of ammonia and for which the ammonia circuit is located entirely outdoors. (IFC 606.12.5)
- ❑ Treatment systems shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50 percent of the IDLH at the point of exhaust. Treatment systems shall be in accordance with Chapter 60. (IFC 606.12.6)
  - ❑ Flaring systems for incineration of flammable refrigerants shall be designed to incinerate the entire discharge. The products of refrigerant incineration shall not pose health or environmental hazards. Incineration shall be automatic upon initiation of discharge, shall be designed to prevent blowback and shall not expose structures or materials to threat of fire. Standby fuel, such as LP gas, and standby power shall have the capacity to operate for one and one-half the required time for complete incineration of refrigerant in the system. Standby electrical power, where required to complete the incineration process, shall be in accordance with Section 604.(IFC 606.12.7)
  - ❑ Ammonia diffusion systems shall include a tank containing 1 gallon of water for each pound of ammonia that will be released in 1 hour from the largest relief device connected to the discharge pipe. The water shall be prevented from freezing. The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but no lower than 33 feet below the maximum liquid level. The tank shall contain the volume of water and ammonia without overflowing. (IFC 606.12.8)

**Ventilation Discharge:**

- ❑ Exhaust from mechanical ventilation systems serving refrigeration machinery rooms containing flammable, toxic or highly toxic refrigerants, other than ammonia capable of exceeding 25 percent of the LFL or 50 percent of the IDLH shall be equipped with approved treatment systems to reduce the discharge concentrations to those values or lower. (IFC 606.13)

**Signage:**

- ❑ Refrigeration units or systems having a refrigerant circuit containing more than 220 pounds of Group A1 or 30 pounds of any other group refrigerant shall be provided with approved emergency signs, charts, and labels in accordance with NFPA 704. Hazard signs shall be in accordance with the IMC for the classification of refrigerant listed therein. (IFC 606.7)