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REFRIGERATION EQUIPMENT

General. An operational permit is required to operate a mechanical refrigeration unit or system regulated by Minnesota State Fire Code (MSFC) Chapter 6. Refrigeration systems shall be installed in accordance with the Mechanical Code.

Refrigerants. The use and purity and classification of new, recovered, and reclaimed refrigerants shall be in accordance with the Mechanical Code.

Changing Refrigerant Types. A change in the type of refrigerant in a refrigeration system shall be in accordance with the Mechanical Code.

Access. Refrigeration systems having refrigerant circuit containing more than 220 pounds of Group A1 or 30 pounds of any other group refrigerant shall be accessible to the fire department at all times as required by the code official.

Testing of equipment. Refrigeration equipment and systems having a refrigerant circuit containing more than 220 pounds of Group A1 or 30 pounds of any other group refrigerant shall be subject to periodic testing in accordance with MSFC Section 606.6 A written record of required testing shall be maintained on the premises. Tests of emergency devices or systems required by this chapter shall be conducted by persons trained and qualified in refrigeration systems.

Periodic testing. The following emergency devices or systems shall be periodically tested in accordance with the manufacturer's instructions and as required by the code official.

1. Treatment and flaring systems.
2. Valves and appurtenances necessary to the operation of emergency refrigeration control boxes.
3. Fans and associated equipment intended to operate emergency ventilation systems.
4. Detection and alarm systems.

Emergency signs. 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 *International Mechanical Code* for the classification of refrigerants listed therein.

Refrigerant detector. Machinery rooms shall contain a refrigerant detector with an audible and visual alarm. The detector, or a 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 *International Mechanical Code* for the refrigerant classification. Detectors and alarms shall be placed in approved locations.

Electrical equipment. Where refrigerants of Groups A2, A3, B2 and B3, as defined in the *International Mechanical Code*, are used, refrigeration machinery rooms shall conform to the Class I, Division 2 hazardous location classification requirements of the ICC *Electrical Code*.

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

Remote controls. Remote control of mechanical equipment located in the machinery room shall be provided at an approved location immediately outside the machinery room adjacent to its principal entrance.

Refrigeration system. A clearly identified switch of the break-glass type shall provide off-only control of electrically energized equipment and appliances in the machinery room, other than refrigerant leak detectors and machinery room ventilation.

Ventilation system. A clearly identified switch of the break-glass type shall provide on-only control of the machinery room ventilation fans.

Emergency control box. Emergency control boxes shall be provided for refrigeration systems required to be equipped with a treatment system, flaring system or ammonia diffusion system.

Location. Emergency control boxes shall be located outside of the building at an approved accessible location. All portions of the emergency control box shall be 6 feet or less above the adjoining grade.

Construction. Emergency control boxes shall be of iron or steel not less than 0.055 inch in thickness and provided with a hinged cover and lock.

Operational procedure. Valves and switches shall be identified in an approved manner as to the sequential procedure to be followed in the event of an emergency.

Identification. Emergency control boxes shall be provided with a permanent label on the outside cover reading: FIRE DEPARTMENT USE ONLY—REFRIGERANT CONTROL BOX, and including the name of the refrigerant in the system. Hazard identification in accordance with NFPA 704 shall be posted inside and outside of the control box.

Instructions. Written instructions and information shall be provided and located in the emergency control box designating the following information:

1. Instructions for suspending operation of the system in the event of an emergency.
2. The name, address and emergency telephone numbers to obtain emergency service.
3. The location and operation of emergency discharge systems.

Storage, use and handling. 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 MSFC Chapters 27, 30, 32 and 34.

Exception: This provision shall not apply to spare parts, tools, and incidental materials necessary for the safe and proper operation and maintenance of the system.

Refrigerant discharge. Refrigeration systems containing more than 6.6 pounds of flammable, toxic or highly toxic refrigerants shall be provided with an approved discharge system as required by MSFC Sections 606.12.1, 606.12.2 and 606.12.3.

Flammable refrigerants. Systems containing flammable refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with MSFC Section 606.12.1 or a flaring system in accordance with Section 606.12.5.

Toxic and highly toxic refrigerants. Systems containing toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with MSFC Section 606.12.2 or a flaring system in accordance with Section 606.12.5.

Ammonia refrigerant. Systems containing ammonia refrigerant shall discharge vapor to the atmosphere through a flaring system in accordance with Section 606.12.3, through an approved ammonia diffusion system in accordance with MSFC Section 606.12.6, or by other approved means.

Exception: Ammonia/water absorption systems containing less than 22 pounds of ammonia and for which the ammonia circuit is located entirely outdoors.

Treatment systems. 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 MSFC Chapter 37.

Flaring systems. 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.

Ammonia diffusion systems. 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 (10 058 mm) below the maximum liquid level. The tank shall contain the volume of water and ammonia without overflowing.

Discharge location for refrigeration machinery room ventilation. Exhaust from mechanical ventilation systems serving refrigeration machinery rooms 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 of flammable, toxic or highly toxic refrigerants to those values or lower.

Notification of discharges. The fire department shall be notified immediately upon the automatic or manual discharge of refrigerant from systems having a refrigerant circuit containing more than 220 pounds of Group A1 or 30 pounds of any other group refrigerant. Refrigerant shall not be discharged except in an emergency.

Exception: Notification is not required for any of the following conditions: 1. Refrigeration systems operating at pressures below atmospheric and incorporating automatic purge systems. 2. Incidental operation of automatic pressure relief valves resulting in minor release of refrigerant charge. 3. Incidental minor releases associated with service operations after system pump-down has been accomplished.

Records. A written record shall be kept of refrigerant quantities brought into and removed from the premises. Such records shall be available to the code official.