

**Moreno Valley Fire Department
Fire Prevention Bureau**

Refrigeration Systems



Approved and Authorized By:

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Refrigeration Systems

PURPOSE

The intent of this guideline is to clarify certain requirements for refrigeration systems regulated by Chapter 6 of the 2007 California Fire Code (CFC). Not all refrigeration system requirements will be identified in these guidelines. Note that the 2007 CFC Section 606.1 references the 2007 CMC, but the 2007 CMC is based on the prior Uniform Codes which used a different design approach than the 2007 CFC. The primary difference is the 2007 CFC uses an Emergency Pressure Control system in lieu of the Emergency Control Box concept (i.e. Manual Dump Station). This guideline provides direction relative to these conflicts.

SCOPE

This guideline is applicable to existing refrigeration systems as well as new systems where the amount of refrigerant in a single system exceeds 220 pounds of Group A1 or 30 pounds of any other Group. Existing systems will be regulated by the Code in effect at the time of construction or major upgrade, while new installations are regulated to the 2007 CFC. When an existing refrigeration system is upgraded or modified, the Fire Code Official will determine how the application of the two codes shall be applied.

The following definitions are provided to assist in the use of this guideline:

Immediately Dangerous to Life and Health (IDLH) – a concentration of airborne contaminants normally expressed in parts per million (ppm) or milligrams per cubic meter, which represents the maximum level from which one could escape within 30 minutes without any escape-impairing symptoms or irreversible health effects. This level is established by the National Institute of Occupational Safety and Health (NIOSH). If Table 11-1 in the CMC does not have adequate data for IDLH, the refrigerant manufacturer or the Fire Code Official shall make a determination.

Lower Flammability Limit (LFL) – the minimum concentration of vapor in air at which propagation of flame will occur in the presence of an ignition source. LFL is sometimes referred to as LEL (Lower Explosive Limit).

Permissible Exposure Limit (PEL) – the maximum permitted eight-hour time-weighted average concentration of an airborne contaminant.

Classification

Refrigerants are classified into groups according to toxicity and flammability, *example: ammonia is a Class B-2 while R-404A and R-507A are Class A-1.*

Toxicity Classification based on Table 11-1 2007 CMC shows Class A as refrigerants with a low degree of toxicity and Class B are refrigerants with higher toxicity.

Flammability Classification based on Table 11-12007 CMC shows Class 1 indicates low flammability, Class 2 indicates moderate flammability, and Class 3 indicates high flammability.

SUBMITTAL REQUIREMENTS

1. Permits and Plans

A permit is required to install or operate a mechanical refrigeration unit or system. A system shall be subject to review by both the Moreno Valley Fire Prevention Division (MVFD) and the Building & Safety Division. Installation, upgrade, retrofit, and modification plans of refrigeration systems shall be submitted for review to the MVFD prior to installation. The plans shall include the scope of work, design details, specifications of the system, and demonstrate full compliance with applicable codes and industry standards/guidelines (such as IIAR). Plans need to specify if CFC or CMC designs are proposed, any combined use of these codes and/or standards are subject to approval by MVFD.

- A. Access – Refrigeration systems shall be accessible to the fire department at all times as required by the fire code official (2007 CFC 606.5). MVFD recommends an approved Knox key box.
- B. Emergency Control Box – Are no longer required by the 2007 CFC or the 2007 CMC. Existing refrigeration systems are expected to maintain and test their emergency control box. Removing or altering the emergency control box shall be approved by MVFD. The control box for existing ammonia refrigeration systems shall be in accordance with the Code in effect at the time of construction or major upgrade, and contain a compressor shut down switch, clear emergency instructions, and emergency 24 hr telephone contacts.
- C. Toxic or highly toxic refrigerants. Systems containing refrigerants which are toxic or highly toxic shall discharge vapor to atmosphere only through an approved treatment or flare system (2007 CFC 606.12.2). Some refrigerants, such as ammonia, are subject to additional state and/or federal programs when the total facility-wide quantity exceeds 500 pounds (for CalARP) or 10,000 pounds (for Federal RMP). Contact the Riverside County Office of Environmental Health to determine the applicability of these additional requirements.
- D. Ammonia refrigerant. Systems containing ammonia refrigerant shall discharge vapor to the atmosphere only through approved treatment, flaring, or diffusion systems (2007 CFC 606.12.3). If another method of safe emergency discharge is currently in use such as a sanitary drain system, the business owner shall be required to show MVFD that this connection and use of the drain is acceptable by the applicable sanitation authority.

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- E. Refrigeration Machinery Rooms – When required by 2007 CMC 1107.1 machinery rooms shall conform to sections 1107, 1108, and 1109. Roof mounted systems and/or equipment not sufficiently enclosed to contain refrigerant vapors need not comply with this section.
- F. The following is a summary of significant machinery room safety features:
- Vapor leak detectors to have blue visual strobes in/out of primary exits
 - Vapor leak detectors to have local audible horns in/out of primary exits
 - Normal ventilation
 - Emergency purge ventilation
 - Automatic shutdown device
 - Emergency shutdown device
 - Exit door 36” width, swing outward, panic hardware, illuminated sign
 - Automatic fire sprinklers and/or fire rated construction (see CBC Sec 508.2)
- G. The following is a partial summary of refrigerated space/cold area safety features:
- Vapor leak detectors to have blue visual strobes in/out of primary exits
 - Vapor leak detectors to have local audible horns in/out of primary exits
 - Vapor tight design
- H. The following is a partial summary of refrigeration system safety features:
- Compressor isolation stop valves
 - Liquid receiver vessel isolation stop valves
 - Liquid condensers isolation stop valves
 - Spring return (“deadman”) valves at oil drain points
 - Flow direction and identification signs on piping
 - Emergency pressure control system (2007 CFC only)
 - Automatic crossover valves (2007 CFC only)
- I. Power and Supervision. Detection and alarm systems for new installations shall be powered and supervised as required for fire alarm systems in the Fire Code (2007 CMC 1121.2)
- J. Testing of Equipment –Installation acceptance tests must be witnessed and approved by an MVFD inspector or, when required by MVFD, an approved third party inspector paid for by the project owner.

2. Notification of Discharges

The MVFD shall be notified immediately upon discharge of refrigerant, whether automatic or manual. Refrigerant shall not be discharged except in an emergency. Releases or threatened releases must also be reported to the Office of Emergency Services (OES) at 800-852-7550 and Riverside County Office of Environmental Health. 2007 CFC 606.14

NOTE: Please complete the attached refrigerant disclosure form and include it as part of the plan submittal package.

REFRIGERANT DISCLOSURE

Moreno Valley Fire Department – Fire Prevention Division

Note: This information is to be completed by the designing engineer or contractor

Date: _____ MVFD FP# (if applicable): _____

Business Name (Where system is located): _____

Complete Business Address: _____ Phone: (____) _____

Refrigerant Contractor or Engineering Firm: _____ Phone: (____) _____

Instructions:

Column #1 Identify each refrigerant system included in this submittal.

Column #2 List the chemical name of the refrigerant used and the refrigerant number.

Column #3 Identify the refrigerant safety group. Refrigerant safety groups are defined in the California Mechanical Code (CMC).

Column #4 Identify the total amount of refrigerant in each system (in pounds). If the amount in any single system is greater than 220 pounds of Group A1 refrigerants or 30 pounds of any other Group, submit a refrigeration plan to the MVFD.

Column #5 Does the refrigeration system have components located so that the leakage of refrigerant could enter a space occupied by any person? If yes, identify the volume of the smallest space occupied (in cubic feet). CMC Table 11-1

Column #6 Does the quantity of refrigerant exceed the amount specified in CMC Table 11-1? If yes, contact the Building & Safety Division for instructions and compliance requirements.

PROVIDE INFORMATION IN TABLE FORMAT

Identify Each System	Refrigerant Chemical Name and Refrigerant Number	Safety Group	Quantity of Refrigerant (Pounds)	Volume of Smallest Occupied Space Open to System (Cubic Feet)	Does Refrigerant Quantity Exceed CMC Table 11A? (Y/N)

Completed by (Print name and sign)

Date Completed