



Santa Clara Fire Department Refrigeration Systems



PURPOSE

The intent of this guideline is to provide the requirements for refrigeration systems so their installation, upgrade, retrofit, and modification plans comply with all applicable codes and standards.

SCOPE

The Santa Clara Fire Department (SCFD) has established the following requirements for the submittal of all refrigeration systems being installed within its jurisdiction. These guidelines apply to all existing refrigeration systems and 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 by the 2013 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. Plans not conforming to these minimum requirements will be returned as incomplete.

CODES & STANDARDS FOR SYSTEM REQUIREMENTS:

- 2013 California Fire Code (CFC), Chapter 6, Section 606
- 2013 California Mechanical Code (CMC),

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 escape-impairing symptoms or irreversible health effects. This level is established by the National Institute of Occupational Safety and Health (NIOSH). If the 2013 California Mechanical Code (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 (e.g. ammonia is a Class B-2 while R-404A and R-507A are Class A-1).

Toxicity Classification based on the 2013 CMC shows Class A as refrigerants with a low degree of toxicity and Class B as refrigerants with higher toxicity.

Flammability Classification based on the 2013 CMC shows Class 1 indicated low flammability, Class 2 indicates moderate flammability, and Class 3 indicates high flammability.

SUBMITTAL REQUIREMENTS

1. GENERAL REQUIREMENTS

- A. Submit a completed SCFD Permit Application, which can be obtained at the Fire Marshal's Office which is located at 1675 Lincoln Street, Santa Clara or on the City of Santa Clara website at www.santaclaraca.gov.
- B. Submit appropriate fees: Please reference SCFD Plan Check Fees Document
- C. Submit three sets of legible, scaled plans with ONE set of current and complete technical data sheets. These plans shall contain the following information and items:
 - i. Scope of work for the project.
 - ii. Design details
 - iii. Specifications of the systems
 - iv. Complete address of the project, including the tract and lot numbers.
 - v. Name and phone number of the project coordinator, facility owner, and system designer. Evidence of the designer's qualifications is to be provided upon request by the SCFD.

2. PLANS

- A. Access – Refrigeration systems shall be accessible to the fire department at all times as required by the fire code official. SCFD recommends an approved Knox key box.
- B. Emergency Fire Control Box – Are no longer required by the CFC or the CMC. Existing refrigeration systems are expected to maintain and test their emergency fire control box. Removing or altering the emergency control box shall be approved by SCFD. 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 the refrigeration engineer's emergency 24-hour 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 (2013 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.
- D. Ammonia refrigerant – Systems containing ammonia refrigerant shall discharge vapor to the atmosphere only through approved treatment, flaring, or diffusion systems (2013 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 SCFD that this connection and use of the drain is acceptable by the local sanitation authority.
- E. Refrigeration Machinery Room – When required by 2013 CMC machinery rooms (sometimes referred to as compressor or engine rooms) shall conform to specific sections. 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

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, no ventilation

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 valves at oil drain points
- Flow direction and identification signs on piping
- Emergency pressure control system (systems built after 2007)
- Automatic crossover valves (systems built after 2007)

I. Detection and Alarm Systems: Alarm signaling devices shall sound at 15 dB above ambient noise. Alarms shall be activated in the space when the refrigerant vapor PEL is exceeded. Detection and alarm systems shall be powered and supervised as required for fire alarm systems in 2013 NFPA 72.

J. Testing of Equipment – Installation acceptance tests must be witnessed and approved by a SCFD inspector.

3. NOTIFICATION OF DISCHARGES

The SCFD 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 Cal OES at (800) 852-7550. 2013 CFC 606.14

4. LEAK DETECTION AND ALARMS

Additional information in meeting the refrigerant alarm and detection requirements of the 2013 California Fire Code and the 2013 California Mechanical Code:

- Most Machinery Rooms require refrigerant alarm and detection systems
- Some walk-in freezers and coolers require refrigerant alarm and detection systems if refrigerant quantities exceed 2013 CMC Table 11A amounts
- Refrigerant alarm and detection systems shall provide supervisory trouble and supervisory detection signals to an off-premises central monitoring station. It is preferred that refrigerant alarm and detection systems be connected to a Security panel or local fire alarm/sprinkler monitoring system, or directly to a refrigeration engineer under contract to respond in 30 minutes.
- Refrigerant alarm and detection signals shall not activate fire alarm/sprinkler monitoring alarm devices. Only the blue-colored horn/strobes of the refrigerant alarm and detection system shall be activated by a refrigerant detection.
- SCFD may require refrigeration trouble and/or detection signals as alarm signals (and dispatch first responders) if unusually hazardous conditions may result from a significant refrigerant leak

SCHEDULING INSPECTIONS

1. Inspection appointments can only be made by the permit applicant or listed contractor.
2. It is the responsibility of the permit applicant or listed contractor to have a representative on the job site during the inspection with a set of approved plans. Failure to do so will result in the cancellation of the inspection and a re-inspection fee will be assessed.
3. Call (408) 615-4970 at least one business day prior to the desired date of the inspection. Inspections are assigned on a first come first served basis. The inspection request line is open Monday through Friday between 8:00 a.m. and 5:00 p.m.

SMART PERMIT INFORMATION SYSTEM

The City of Santa Clara offers you the opportunity to check the status of you fire permits on-line. To access the Smart Permit Information System please log onto the system at:

http://smartpermit.santaclaraca.gov/tm_bin/tmw_cmd.pl?tmw_cmd=StatusQueryForm&tmw_query=PublicCase

You can search the system using your Case Number (Permit number; fir2014-00001), Project Name, Applicant Name or the address of the project.

REFRIGERANT DISCLOSURE FORM

Date: _____

Business Name (where system is located): _____

Complete Business Address: _____

Business Phone: () _____

Refrigerant Contractor or Engineering Firm: _____

Contractor Phone: () _____

Instructions:

- Column #1 Identify each refrigerant system included in this submittal
- Column #2 List the chemical name of the refrigerant, the refrigerant number, or the CMC Factor
- 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, obtain a permit directly from the Fire Department.
- 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 1102.2
- Column #6 Calculate by using column #4 divided by column #5 divided by 1000. If this value exceeds the CMC value for the specific refrigerant type, then obtain a permit directly from the Fire Department, including a refrigerant alarm and detection system plan.
- Column #7 Does the quantity of refrigerant exceeds the amount specified in CMC Table 1102.2? If yes, contact the Fire Department for requirements.

Provide Information in Table Format

| Identify Each System | Refrigerant Chemical Name Or Number | Safety Group | Quantity of Refrigerant (Pounds) | Volume of Smallest Occupied Space Open to System (Cubic feet) | Pounds of Refrigerant per 1,000 Cubic Feet of Enclosed Space | Does Column #6 Quantity Exceed CMC Table 11A? |
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Completed by (Print and sign)

Date Completed