2010 Refrigeration Machinery Rooms Equipment Reminder List

Applicable Codes and Standards

CBC 2010, CMC 2010, CFC 2010
ASHRAE 15 - 2007

9/21/2011
OFFICE ONLY

CHK.	N/A			
		I. SCOPE		
☐	☐	**1.**	Refrigeration systems, equipment and devices, including the replacement of parts, alterations and substitution of a different refrigerant shall conform to the requirements of CMC Ch. 11 and CFC Section 606.	**CMC 1101.0**
☐	☐	**2.**	Refrigerants are regulated under the provisions CFC Section 606 and CMC Chapter 11; refrigerant quantities are not regulated by CFC Chapter 27 or CBC Chapter 3,4.	**CFC 606** **CMC 1101.0**
☐	☐	**3.**	Refrigeration systems shall comply with ASHRAE 15, except as modified by the CMC.	**CMC 1102.0**
CHK.	**N/A**		**II. CLASSIFICATION OF REFRIGERANTS/SYSTEMS**	
☐	☐	**1.**	The refrigerant used shall be of a type listed in Table 11-1 or as classified with ASHRAE 34-2007 as approved.	**CMC 1102.1**
☐	☐	**2.**	Refrigeration systems shall be classified as a High-Probability or Low-Probability System according to the degree of probability that a leakage of refrigerant could enter a normally occupied area.	**CMC 1104**
☐	☐	**3.**	When a refrigeration system is located in a refrigeration machinery room, the classification of the refrigeration system is not required.	**CMC 1104**
CHK.	**N/A**		**III. LOCATION OF REFRIGERATION SYSTEMS**	
☐	☐	**1.**	The refrigerant quantity of a high-probability system shall not exceed the amount of Table 11-1 based on the volume of the smallest, enclosed space which the system is located in, serves, or passes through.	**CMC 1105.2**
☐	☐	**2.**	Table 11-1 amounts shall be reduced by 50% for institutions, except kitchens, labs, mortuaries.	**CMC Table 11-1**
☐	☐	**3.**	Refrigeration systems or portions thereof shall not be located within a required exit enclosure.	**CMC 1106.8**
☐	☐	**4.**	Refrigeration compressors >5 horsepower rating shall be located at least 10 feet from an exit opening in a Group A, B, E, F, I, R Div. 1, S Occupancy unless separated by a one-hour fire-resistive occupancy separation.	**CMC 1106.8**
☐	☐	**5.**	Refrigerant piping shall not be located within a required exit.	**CMC 1106.8**
☐	☐	**6.**	Equipment, other than piping, located outside a building and within 20' of any building opening shall be governed by the occupancy classification of the building.	**ASHRAE 15, 4.2**
CHK.	**N/A**		**IV. REFRIGERATION MACHINERY ROOMS**	
☐	☐	**1.**	Refrigeration systems shall be provided with a refrigeration machinery room (or located outdoors) when any of the following conditions exist: **a.** The quantity of refrigerant in a single system exceeds Table 11-1 amounts. **b.** Direct-fired and indirect- fired absorption equipment, except lithium bromide systems using water as the refrigerant. **c.** An A1 system having an aggregate compressor horsepower of 100 or more. **d.** The system contains other than a Group A1 refrigerant. (see exceptions)	**CMC 1107.1** **ASHRAE 15, 7.4**
CHK.	**N/A**		**V. REFRIGERATION MACHINERY ROOM CONSTRUCTION**	
☐	☐	**1.**	Refrigeration machinery rooms shall be separated from other portions of the building per CBC Table 508.4 as an F-1 Occupancy when apart of a central plant.	**CBC 508.4**
☐	☐	**2.**	An isolated chiller room can be classified as an incidental accessory occupancy and be separated by CBC Table 508.2.5.	**CBC 508.2.5**
☐	☐	**3.**	Penetrations into machinery rooms shall be sealed to inhibit the passage of refrigerant vapor.	**CMC 1107.5**
☐	☐	**4.**	Doors communicating with the building shall be approved, self-closing, tight fitting doors.	**ASHRAE 15, 8.11**
☐	☐	**5.**	The machinery room shall have a door that opens to the outside or through a vestibule with self-closing, tight fitting doors for A-2, B-2, A-3 and B-3 refrigerants.	**ASHRAE 15, 8.12**
☐	☐	**6.**	Walls, floor and ceiling shall be tight and of noncombustible constructionfor A-2, B-2, A-3 and B-3 refrigerants.	**ASHRAE 15, 8.12**
☐	☐	**7.**	Exterior openings shall not be located under and exterior stairfor A-2, B-2, A-3 and B-3 refrigerants.	**ASHRAE 15, 8.12**

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VI. REFRIGERATION MACHINERY ROOM CONTENTS

CHK.	N/A			
☐	☐	1.	Refrigeration machinery rooms shall house all refrigerant-containing portions of the system other than the piping and evaporators permitted by CMC Section 1105.3, discharge piping required by CMC Chapter 11, and cooling towers regulated by CMC Chapter 11, Part II and their essential piping.	**CMC 1107.1**
☐	☐	2.	Open flames or devices having an exposed surface exceeding 800F are prohibited in refrigeration machinery rooms.	**CMC 1107.7**
☐	☐	3.	Combustion air or return air shall not be taken from or through a refrigeration machinery room.	**CMC 1107.6**
☐	☐	4.	Equipment, piping, ducts, vents or similar devices which are not essential for the refrigeration process, maintenance of the equipment or for the illumination, ventilation or fire protection of the room shall not be placed in or pass through a refrigeration machinery room including flammable and combustinble materials.	**CMC 1109.1** **CFC 606.11**

VII. REFRIGERATION MACHINERY ROOM ACCESS AND EGRESS

CHK.	N/A			
☐	☐	1.	Refrigeration machinery rooms shall be of such dimensions that all system parts are readily accessible with adequate space for maintenance and operations.	**CMC 1107.2**
☐	☐	2.	An unobstructed walking space at least 3 feet in width and 6 feet 8 inches in height shall be maintained throughout allowing free access to at least two sides of all moving machinery and approaching each stop valve.	**CMC 1107.2**
☐	☐	3.	Access to refrigeration machinery rooms shall be restricted to authorized personnel and posted with a permanent sign.	**CMC 1107.2**
☐	☐	4.	Refrigeration systems having more than 220lbs A1 or 30lbs other group refrigerant shall be accessible to the fire department at all times.	**CFC 606.5**
☐	☐	5.	Refrigeration machinery rooms >1,000 sq. ft. shall have access to not less than 2 exits.	**CBC 1015.4**
☐	☐	6.	The exits shall be separated by a minimum distance equal to 1/2 the maximum horizontal dimension of the room.	**CBC 1015.4**
☐	☐	7.	When 2 exits are required, one such exit may be by a fixed ladder or alternating tread device.	**CBC 1015.4**
☐	☐	8.	All portions of machinery rooms must be within 150 ft. travel of an exit or exit access door and doors shall swing in direction of egress travel.	**CBC 1015.4**
☐	☐	9.	Doors shall be tight-fitting and self-closing.	**CBC 1015.4**

VIII. REFRIGERANT VAPOR DETECTION AND ALARMS

CHK.	N/A			
☐	☐	1.	Machinery rooms shall have approved refrigerant-vapor detectors.	**CFC 606.8, 908.6**
☐	☐	2.	Refrigerant-vapor detectors or sampling tube shall be located in an area where refrigerant from a leak will concentrate and will activate visual and audible alarms.	**CFC 606.8** **CMC 1107.4**
☐	☐	3.	The alarm shall be actuated at a value not greater than the corresponding TLV-TWA values shown in the CMC for the refrigerant classification.	**CFC 606.8**
☐	☐	4.	The alarm shall be of the manual reset type with the reset location inside the refrigeration machinery room. Additional alarms may be automatic reset. Meaning of alarm shall be clearly marked.	**ASHRAE 15, 8.11.2.1**
☐	☐	5.	Approved refrigerant-vapor detection and alarm systems shall utilize alarm signaling devices of at least 15 dba above the operating ambient noise level of the space installed and shall provide an approved, distinctive visual alarm which shall actuivate when the OEL is exceeded.	**CMC 1121.1**
☐	☐	6.	The alarm shall annunciate visual and audible alarms inside the refrigeration machinery room and outside each entrance to the refrigeration machinery room.	**ASHRAE 15, 8.11.2.1**
☐	☐	7.	Detectors and alarms shall be placed in approved locations.	**CFC 606.8**
☐	☐	8.	The detector shall transmit to an approved location.	**CFC 606.8**
☐	☐	9.	Refrigerant vapor-detectors shall activate fans providing emergency purge ventilation.	**CMC 1108.5**
☐	☐	10	Refrigerant vapor-detectors shall activate the emergency shutoff of electrically energized equipment and devices within the refrigeration machinery room.	**CMC 1109.4**
☐	☐	11	Detection and alarm systems shall be powered and supervised as required for fire alarm systems in the CFC.	**CMC 1121.2**
☐	☐	12.	Detection and Alarm systems shall be annunciated for all refrigerants at an approved location as required for fire alarm systems in the CFC.	**CMC 1121.3**
☐	☐	13.	Detection and alarm systems shall be installed, maintained, and tested in accordance with the CFC and with the equipment manufacturer's specifications.	**CMC 1121.4**
☐	☐	14.	An emergency alarm-initiating device shall be located outside each interior exit or exit-access door.	**CFC 2704.9**

IX. REFRIGERATION ROOM VENTILATION

CHK.	N/A			
☐	☐	**1.**	Refrigeration machinery rooms shall be provided with a continuous source of outside air for ventilation and removal of rejected heat.	**CMC 1108.1**
☐	☐	**2.**	Exhaust inlets or permanent openings shall be arranged to provide ventilation throughout the entire machinery room.	**CMC 1108.3**
☐	☐	**3.**	Fans providing machinery room temperature control or automatic purge of refrigerant-vapor are allowed to be automatically controlled to provide intermittent ventilation as conditions require.	**CMC 1108.4**
☐	☐	**4.**	Emergency purge fans shall have a break-glass type on-only control switch immediately adjacent to and outside each refrigeration machinery room means of egress.	**CMC 1108.5** **CFC 606.9.2**
☐	☐	**5.**	Mechanical ventilation systems shall have switches to control power to each fan.	**CMC 1108.6**
☐	☐	**6.**	Fan switches shall be key activated or within a locked glass-covered enclosure located adjacent to and outside of the principal entrance to the machinery room.	**CMC 1108.6**
☐	☐	**7.**	Exhaust from mechanical ventilation systems shall discharge not less than 20 feet from a property line or a building opening.	**CMC 1108.7**
☐	☐	**8.**	Exhausts capable of discharges exceeding 25% of the LFL or 50% of the IDLH shall be provided with an approved treatment system.	**CMC 1108.7**
☐	☐	**9.**	Emergency purge fans and their associated equipment provided for the exhausting of other than Group A1 and Group B1 refrigerants shall meet the requirements of Class I, Division 1 hazardous locations.	**CMC 1108.8**
☐	☐	**10.**	Makeup-air intakes to replace exhaust air shall provide air directly from the outside of the building.	**CMC 1108.9**
☐	☐	**11.**	Intakes shall be fitted with backdraft dampers or similar flow-control means to prevent reverse flow.	**CMC 1108.9**
☐	☐	**12.**	Distribution of makeup-air shall be arranged to provide thorough mixing within the room to prevent short circuiting of makeup-air directly to exhaust.	**CMC 1108.9**
☐	☐	**13.**	Exhaust from ventilation systems serving flammable, toxic or highly toxic refrigerants capable of exceeding 25% of the LFL or 50% of the IDLH shall be equipped with an approved treatment system.	**CFC 606.13**

X. EMERGENCY CONTROL

CHK.	N/A			
☐	☐	**1.**	Regardless of the refrigerant group or the type of electrical installation provided, an emergency break-glass type off-only control switch shall be provided immediately adjacent and outside each machinery room means of egress.	**CMC 1109.4** **CFC 606.9.1**
☐	☐	**2.**	The emergency control switch shall shutoff electrically energized equipment and devices located within the machinery room. Emergency shutoff shall be automatically activated when the concentration of refrigerant vapor exceeds 25% of the LFL.	**CMC 1109.4**
☐	☐	**3.**	Refrigeration machinery rooms are not required to be classified as a hazardous location for electrical equipment.	**CMC 1109.2**
☐	☐	**4.**	Where refrigerants of A2, A3,B2 and B3 are used, the machinery room shall conform to the Class I, Division 2 hazardous location requirement of the CEC.	**CFC 606.16**
☐	☐	**5.**	Refrigeration systems containing more than 6.6lbs of flammable, toxic or highly toxic refrigerant or ammonia shall be provided with an automatic crossover valve and automatic emergency stop.	**CFC 606.10**

XI. Control Valves

CHK.	N/A			
☐	☐	**1.**	Stop valves shall be installed in refrigerant piping at the following locations:	**CMC 1112.1**
			a. At inlet and outlet of a positive-displacement-type compressor, compressor unit or condensing unit.	**CMC 1112.1.1**
			b. At refrigerant outlet from a liquid receiver.	**CMC 1112.1.2**
			c. At the refrigerant inlet of a pressure vessel containing liquid refrigerant with a volume of greater than 3 cubic feet.	**CMC 1112.1.3**
			Ex. 1. Systems with non-positive-displacement compressors **2.** Systems having a pump-out receiver for storage of the charge **3.** Systems containing less than 110 lbs. of Group A1 refrigerant **4.** Self-contained systems do not require a stop valve at the inlet of the receiver	
☐	☐	**2.**	Stop valves shall be readily accessible from the refrigeration floor or platform.	**CMC 1112.3**

XII. EMERGENCY SIGNS AND LABELS

CHK.	N/A		
☐	☐	**1.** Stop valves shall be identified by tagging in accordance with ASME A 13.1-2007	**CMC 1112.4**
☐	☐	**2.** A valve chart shall be mounted under glass at a location near the principal entrance to the machinery room.	**CMC 1112.4**
☐	☐	**3.** Piping shall be identified with the type of refrigerant, function and pressure.	**CMC 1111.8**
☐	☐	**4.** Refrigeration units or systems with over 220lbs A1 or other over 30lbs shall be provided with a approved emergency signs, charts and labels in accordance with NFPA 704. Hazard signs shall be in accordance with the CMC for the classification of refrigerants listed therein.	**CFC 606.7**
☐	☐	**5.** Each refrigerating systems shall have a sign indicating: **a.** the name and address of the installer **b.** the refrigerant number and amount of refrigerant **c.** the lubricant identity and amount **d.** the field test pressure applied	**ASHRAE 15, 11.2.1**
☐	☐	**6.** A schematic drawing or panel giving directions for the operation of the system is required for systems containg over 55 lbs and shall be in a location convient to operators of the equipment.	**ASHRAE 15, 11.7**
☐	☐	**7.** Emergency shutdown procedures, including precautions to be observed during breakdown or leak, shall be displayed on a conspicous card located near as possible to the refrigerant compressor: **a.** instructions for shutting down the system in case of emergency **b.** the name, address, and day and night telephone numbers for obtaining service **c.** the names, addresses, and telephone numbers of all corporate, local, state, and federal agencies to be contacted as required in the event of a reportable incident.	**ASHRAE 15, 11.7**

XIII. PROTECTION OF PIPING AND EQUIPMENT

CHK.	N/A		
☐	☐	**1.** Refrigeration systems and portions thereof shall not be located in an elevator shaft, dumbwaiter shaft or a shaft containing moving objects nor in a location where they will be subject to mechanical damage.	**CMC 1106.5**
☐	☐	**2.** Refrigeration systems or portions thereof shall not be located in an exit enclosure.	**CMC 1106.8**
☐	☐	**3.** Refrigeration compressors exceeding 5 hp shall be located at least 10 ft from an exit opening in a Group A, B, E, F, I, R-1, or S occupancy unless separated by a 1hr separation	**CMC 1106.8**
☐	☐	**4.** Equipment subject to vehicular damage shall be protected in accordance with CFC Section 312.	**CFC 312**

IX. Pressure-Relief Devices

☐	☐	**1.** Refrigeration systems shall be protected by a pressure relief device or other means to safely relieve pressure due to fire or abnormal conditions.	**CMC 1114.1**
☐	☐	**2.** Pressure relif devices, fusible plugs and purge systems for refrigeration systems containing >6.6lbs of flammable, toxic or highly toxic refrigerants shall be provided with an approved discharge system as required by CFC 606.12.1-3.	**CFC 606.12**

NOTE

Compliance with all items on this list does not necessarily assure compliance with all provisions of the applicable codes and standards. This check list should be used only by persons with a comprehensive knowledge of the applicable codes and standards. This list is for OSHPD personnel only and shall not be distributed to the public.

OSHPD Policy Intent Notices and Code Application Notices.
http://www.oshpd.ca.gov/FDD/Regulations/pinscans.html
OSHPD Project Review Status
http://www.oshpd.ca.gov/FDD/Project_Tracking/index.asp
OSHPD Public Use Forms
http://www.oshpd.ca.gov/FDD/Forms/index.html