



R E-MAKING ORDER
(RCW 34.05.360)

CR-103 (4/25/96)

Agency: State Building Code Council

- Permanent Rule**
 Emergency Rule
 Expedited Repeal

(1) Date of adoption: November 13, 1996

(2) Purpose: To provide regulations relating to the discharge of ammonia refrigerant in cold storage warehouses in response to Governor Lowry's direction to "take appropriate action immediately" to resolve this issue.

(3) Citation of existing rules affected by this order:

- Repealed:**
Amended: WAC 51-32 (Uniform Mechanical Code) and WAC 51-34 (Uniform Fire Code)
Suspended:

(4) Statutory authority for adoption: RCW 19.27.074
Other authority:

PERMANENT RULE ONLY

Adopted under notice filed as WSR ~~96-15-083~~ ⁹⁶⁻²⁰⁻¹⁰¹ on October 1, 1996 (date).

Describe any changes other than editing from proposed to adopted version:

In order to make the Mechanical and Fire Codes consistent, the scope of changes has been expanded in the Fire Code from just ammonia refrigeration to include refrigeration systems in general.

EMERGENCY RULE ONLY

Under RCW 34.05.350 the agency for good cause finds:

- (a) That immediate adoption, amendment, or repeal of a rule is necessary for the preservation of the public health, safety, or general welfare, and that observing the time requirements of notice and opportunity to comment upon adoption of a permanent rule would be contrary to the public interest.
 (b) That state or federal law or federal rule or a federal deadline for state receipt of federal funds requires immediate adoption of a rule.

Reasons for this finding:

EXPEDITED REPEAL ONLY

Under Preproposal Statement of Inquiry filed as WSR _____ on _____ (date).

(5.3) Any other findings required by other provisions of law as precondition to adoption or effectiveness of rule?

- Yes No If Yes, explain:

(6) Effective date of rule:

Permanent Rules
or Expedited Repeal

Emergency Rules

- 31 days after filing
 Other (specify) 7/1/97 *
 Immediately
 Later (specify) _____

*(If less than 31 days after filing, specific finding in 5.3 under RCW 34.05.380(3) is required)

NAME (TYPE OR PRINT)

James R. Beaver

SIGNATURE

TITLE

Chair

DATE

12/19/96

CODE REVISER USE ONLY

CODE REVISOR'S OFFICE
 STATE OF WASHINGTON
 PULLMAN

DEC 1 1996

TIME: 11:29
 WSR: 97-01-135

**Note: If any category is left blank, it will be calculated as zero.
No descriptive text.**

**Count by whole WAC sections only, from the WAC number through the history note.
A section may be counted in more than one category.**

The number of sections adopted in order to comply with:

Federal statute:	New _____	Amended _____	Repealed _____
Federal rules or standards:	New _____	Amended _____	Repealed _____
Recently enacted state statutes:	New _____	Amended _____	Repealed _____

The number of sections adopted at the request of a nongovernmental entity:

New _____ Amended _____ Repealed _____

The number of sections adopted on the agency's own initiative:

New _____ Amended _____ Repealed _____

The number of sections adopted in order to clarify, streamline, or reform agency procedures:

New _____ Amended _____ Repealed _____

The number of sections adopted using:

Negotiated rule making:	New <u>33</u>	Amended _____	Repealed _____
Pilot rule making:	New _____	Amended _____	Repealed _____
Other alternative rule making:	New _____	Amended _____	Repealed _____

NEW SECTION

WAC 51-32-1100 Refrigeration.

NEW SECTION

WAC 51-32-1101 General.

1101.1 Scope. This chapter shall govern the design, installation, construction and repair of refrigeration systems that vaporize and liquefy a fluid during the refrigerating cycle. Refrigerant piping design and installation, including pressure vessels and pressure relief devices, shall conform to this code. Permanently installed refrigerant storage systems and other components shall be considered as part of the refrigeration system to which they are attached.

1101.2 Factory-built equipment. Listed and labeled self-contained, factory-built equipment shall be tested in accordance with UL 207, 303, 412, 465, 471 or 1995.

1101.3 Protection. Any portion of a refrigeration system that is subject to physical damage shall be protected in an approved manner.

1101.4 Water connection. Water supply and discharge connections associated with refrigeration systems shall be made in accordance with this code and the plumbing code.

1101.5 Gas connection. Gas fuel devices and equipment used with refrigeration systems shall be installed in accordance with this code.

1101.6 General. Refrigeration systems shall comply with the requirements of this code and, except as modified by this code, ASHRAE 15-1994. Ammonia-refrigerating systems shall comply with this code and, except as modified by this code, ASHRAE 15-1994 and IIAR 2-1992.

NEW SECTION

WAC 51-32-1102 System requirements.

1102.1 General. The system classification, allowable refrigerants, the maximum quantity, enclosure requirements, location limitations and field pressure test requirements, shall be determined as follows:

1. Determine the refrigeration system's classification in accordance with Section 1103.
2. Determine the refrigerant classification in accordance with Table 1104.1.
3. Determine the maximum allowable quantity of refrigerant in accordance with Table 1104.2(1), based on type of refrigerant, system classification and occupancy.
4. Determine the system enclosure requirements in accordance with Table 1104.2(1).
5. Refrigeration equipment location and installation shall be subject to the limitations of Chapter 3.
6. Nonfactory-tested, field-erected equipment shall be pressure tested in accordance with Section 1108.

1102.2 Refrigerants. Refrigerants not identified in Table 1104.1 shall be approved before use. Refrigerants (including refrigerant blends) with different designations in ASHRAE 34-1992, with addenda through 1995, shall not be mixed in a system.

1102.2.1 New refrigerants. Refrigerants used in new equipment shall be of a type and purity level specified or approved by the equipment manufacturer.

1102.2.2 Recovered refrigerants. Refrigerants that are recovered from refrigeration and air-conditioning systems shall not be reused in other than the system from which they were recovered and in other systems of the same owner. Recovered refrigerants shall be filtered and dried before reuse. Recovered refrigerants that show clear signs of contamination shall not be reused unless reclaimed in accordance with Section 1102.2.3.

1102.2.3 Reclaimed refrigerants. Used refrigerants shall not be reused in a different owner's equipment unless reclaimed and found to meet the purity requirements of ARI 700-1993. Contaminated refrigerants shall not be used in the same owner's equipment or in a different owner's equipment unless reclaimed and found to meet the purity requirements of ARI 700-1993.

NEW SECTION

WAC 51-32-1103 Refrigeration system classification.

1103.1 General. For the purposes of applying Tables 1104.1, 1104.2(1), and 1104.2(2), refrigeration systems shall be classified as a high-probability or low-probability system based on the potential hazard resulting from a leakage of refrigerant into an occupancy-classified area other than the machinery room.

1103.2 High-probability systems. Direct systems and indirect open-spray systems shall be classified as high-probability systems.

EXCEPTION: An indirect open-spray system shall not be required to be classified as a high-probability system if the pressure of the secondary coolant is at all times (operating and standby) greater than the pressure of the refrigerant.

1103.3 Low-probability systems. Double-indirect open-spray systems, indirect closed systems and indirect-vented closed systems shall be classified as low-probability systems, provided that all refrigerant-containing piping and fittings are isolated when the quantities in Table 1104.1 are exceeded.

NEW SECTION

WAC 51-32-1104 Refrigerant classification and system requirements.

1104.1 Refrigerant classification. Refrigerants shall be classified in accordance with ASHRAE 34-1992, with addenda through 1995, as listed in Table 1104.1.

TABLE 1104.1
REFRIGERANT^a CLASSIFICATION, AMOUNT^{b,c,e} AND TLV-TWA^f

REFRIGERANT DESCRIPTION			AMOUNT OF REFRIGERANT PER OCCUPIED SPACE			TLV ^f TWA ppm
Refrigerant Classification	Name or Blend	Chemical Formula	Lb per 1,000 ft ^{3a}	ppm	g/m ^{3c}	
Group A1						
R-11	Trichlorofluoromethane	CCl ₃ F	1.6	4,000	250	C1,000
R-12	Dichlorodifluoromethane	CCl ₂ F ₂	12	40,000	200	1,000
R-13	Chlorotrifluoromethane	CClF ₃	18	67,000	290	1,000
R-13B1	Bromotrifluoromethane	CBrF ₃	22	57,000	350	1,000
R-14	Tetrafluoromethane (Carbon Tetrafluoride)	CF ₄	15	67,000	240	1,000
R-22	Chlorodifluoromethane	CHClF ₂	9.4	42,000	150	1,000
R-113	1,1,2-trichloro-1, 2, 2-trifluoroethane	CCl ₂ CClF ₂	1.9	4,000	31	1,000
R-114	1,2-dichloro-1, 1, 2, 2-tetrafluoroethane	RCClF ₂ CClF ₂	9.4	21,000	150	1,000
R-115	Chloropentafluoroethane	CClF ₂ CF ₃	27	67,000	430	1,000
R-134a	1,1,1,2-Tetrafluoroethane	CH ₂ FCF ₃	16	60,000	250	1,000
R-C318	Octafluorocyclobutane	-CF ₂ -CF ₂ -CF ₂ -CF ₂ -	35	67,000	550	1,000
R-400	R-12/R-114	CCL ₂ F ₂ /CCl ₂ FCClF ₂	Note d	Note d	Note d	1,000
R-500	R-12/152a(73.8/26.2)	CCL ₂ F ₂ /CH ₃ CHF ₂	12	47,000	200	1,000
R-502	R-22/115(48.8/51.2)	CHClF ₂ /CClF ₂ CF ₃	19	65,000	300	1,000
R-503	R-23/13(40.1/59.9)	CHF ₃ /CClF ₃	15	67,000	240	1,000
R-744	Carbon Dioxide	CO ₂	5.7	50,000	91	5,000
Group A2						
R-142b	1-chloro-1, 1 -Difluoroethane	CH ₃ CClF ₂	3.7	14,000	60	1,000
R-152a	1, 1-Difluoroethane	CH ₃ CHF ₂	1.2	7,000	20	1,000
Group A3^g						
R-170	Ethane	CH ₃ CH ₃	0.50	6,400	8.0	1,000
R-290	Propane	CH ₃ CH ₂ CH ₃	0.50	4,400	8.0	1,000
R-600	Butane	CH ₃ CH ₂ CH ₂ CH ₃	0.51	3,400	8.2	800
R-600a	2-Methyl propane (Isobutane)	CH(CH ₃) ₂ -CH ₃	0.51	3,400	8.2	800
R-1150	Ethene (Ethylene)	CH ₂ =CH ₂	0.38	5,200	6.0	1,000
R-1270	Propene (Propylene)	CH ₃ CH=CH ₂	037	3,400	5.0	1,000
Group B1						
R-123	2, 2-Dichloro-1, 1, 1-Trifluorethane	CHCl ₂ CF ₃	0.4	1,000	6.3	30
R-764	Sulfur Dioxide	SO ₂	0.016	100	0.26	2
Group B2						
R-40	Chloromethane (methyl chloride)	CH ₃ Cl	1.3	10,000	21.0	C50
R-611	Methyl Formate	HCOOCH ₃	0.78	5,000	12.0	100
R-717	Ammonia	NH ₃	0.022	500	0.35	25
Group B3^g	—	—	—	—	—	—

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m³.

^a Other refrigerants shall be approved.

^b To be used only in conjunction with footnotes from Table 1104.2(1).

^c To correct for height, *H* (feet), above sea level, multiply these values by (1 - 2.42 × 10⁻⁶*H*). To correct for height, *h* (km), above sea level, multiply these values by (1 - 7.94 × 10⁻²*h*). Do not adjust volume percent or TLV-TWA (ppm) for altitude.

^d The quantity of each component shall comply with the limits set in Table 1104.1 for the pure compound and the total volume percent of all components shall not exceed 6.7 volume percent.

^e The basis of the table amounts is given as follows:

Group A1 Eighty percent of the cardiac sensitization level for R-11, R-12, R-13B1, R-22, R-113, R-114, R-134a, R-500 and R-502. One-hundred percent of the IDLH for R-744. Others are limited by levels where oxygen deprivation begins to occur.

Group A2, A3 Approximately 20 percent of LFL.

Group B1 One hundred percent of IDLH for R-764, and 100 percent of the measure consistent with the IDLH for R-123.

Group B2, B3 One hundred percent of IDLH or 20 percent of LFL, whichever is lower.

^f TLV-TWA or measure consistent therewith to be used with Section 1104. The values shown for R-11 and R-40 are TLV-C (TLV-ceiling) values not to be exceeded.

^g Group A3 and B3 refrigerants as listed in Table 1104.1 shall not be used in a refrigerating system in excess of 1,000 pounds, unless approved by the code official.

1104.2 System requirements. The maximum allowable refrigerant quantities shall be in accordance with Table 1104.2(1). To use Table 1104.2(1), determine the occupancy class, refrigerant group in accordance with Table 1104.1 and type of system in accordance with Section 1103, and then locate the notes that apply.

1104.2.1 Occupancy classification. Locations of refrigerating systems are described by occupancy classifications that consider the ability of people to respond to potential exposure to refrigerant. Where equipment, other than piping, is located outside a building and within 20 feet (6096 mm) of any building opening, such equipment shall be governed by the occupancy classification of the building. Occupancy classifications shall be defined as follows:

1. Institutional occupancy is that portion of premises from which, because they are disabled, debilitated or confined, occupants cannot readily leave without the assistance of others. Institutional occupancies include, among others, hospitals, nursing homes, asylums and spaces containing locked cells.
2. Public assembly occupancy is that portion of premises where large numbers of people congregate and from which occupants cannot quickly vacate the space. Public assembly occupancies include, among others, auditoriums, ballrooms, classrooms, passenger depots, restaurants and theaters.
3. Residential occupancy is that portion of premises that provides the occupants with complete independent living facilities, including permanent provisions for living, sleeping, eating, cooking and sanitation. Residential occupancies include, among others, dormitories, hotels, multi-unit apartments and private residences.
4. Commercial occupancy is that portion of premises where people transact business, receive personal service or purchase food and other goods. Commercial occupancies include, among others, office and professional buildings, markets (but not large mercantile occupancies) and work or storage areas that do not qualify as industrial occupancies.
5. Large mercantile occupancy is that portion of premises where more than 100 persons congregate on levels above or below street level to purchase personal merchandise.
6. Industrial occupancy is that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.
7. Mixed occupancy occurs when two or more occupancies are located within the same building. When each occupancy is isolated from the rest of the building by tight walls, floors and ceilings and by self-closing doors, the requirements for each occupancy shall apply to its portion of the building. When the various occupancies

are not so isolated, the occupancy having the most stringent requirements shall be the governing occupancy.

1104.3 Volume calculations. Volume calculations shall be in accordance with Sections 1104.3.1 through 1104.3.3.

1104.3.1 Unventilated spaces. Where the refrigerant-containing parts of a system are located in one or more unventilated spaces, the volume of the smallest, enclosed occupied space, other than a machinery room, shall be used to determine the permissible quantity of refrigerant in the system. Where a building consists of several stories of unpartitioned space, such as a mezzanine or an atrium, the story having the smallest occupied space shall be deemed to be the enclosed space.

1104.3.2 Ventilated spaces. Where an evaporator or condenser is located in an air duct system, the volume of the smallest occupied space or unpartitioned building story, served by the duct shall be used to determine the maximum allowable quantity of refrigerant in the system.

EXCEPTION: If airflow to any enclosed space cannot be reduced below one-quarter of its maximum, the entire space served by the air duct system shall be used to determine the maximum allowable quantity of refrigerant in the system.

1104.3.3 Plenums. Where the space above a suspended ceiling is continuous and part of the supply or return air plenum system, this space shall be included in calculating the volume of the enclosed space.

NEW SECTION

WAC 51-32-1105 Machinery room, general requirements.

1105.1 General. Where required by Table 1104.2(1), a machinery room shall be provided to enclose refrigeration systems located indoors. Access to the machinery room shall be restricted to authorized personnel. For rooms where occupational exposure could occur, see WAC 296-62-07515 and 296-62-3112.

1105.2 Dimensions. A machinery room shall be dimensioned so as to provide clearances required by Chapter 3. There shall be clear head room of not less than 7 feet 3 inches (2210 mm) below equipment located over passageways.

1105.3 Doors. Each machinery room shall have self-closing, weather-stripped doors opening in the direction of egress travel. Doors and door openings shall comply with the requirements of the building code.

1105.4 Openings. Openings to other parts of the building that permit passage of escaping refrigerant to other parts of the building are prohibited. Ducts and air handlers in the machinery room that operate at a lower pressure than the room shall be sealed to prevent any refrigerant leakage from entering the airstream.

EXCEPTIONS:

1. Egress doors serving the machinery room.
2. Access doors and panels in air ducts and air-handling units, provided that such openings are gasketed and tight fitting.

TABLE 1104.2(1)

SYSTEM APPLICATION REQUIREMENTS

(Letters in the table under "Occupancy" refer to footnotes.)

Where more than one footnote exists, each footnote is a limitation on the other.)

(For system and refrigerant classifications see Section 1103 and Table 1104.1.)

REFRIGERANT GROUP	SYSTEM CLASSIFICATION	OCCUPANCY ^d		
		Institutional	Public assembly, residential, commercial and large mercantile	Industrial
A1	High	a	b	c
	Low	d	d	d
A2	High	e	e	c, f, h
	Low	g	g	g
A3	High	i	i	c, f, h
	Low	i	i	g
B1	High	a, f	b, f	c
	Low	d	d	d
B2	High	e, f	e, f	c, f, h
	Low	g	g	g
B3	High	i	i	c, f, h
	Low	i	i	g

For SI: 1 square foot = 0.0929 m², 1 pound = 0.454 kg.

^a The refrigerant amount is limited to 50 percent of those listed in Table 1104.1, except Footnote b applies in kitchens, laboratories and mortuaries. If any portion of a refrigerant system containing more than 1 pound of refrigerant (except R-744) is in a room with a flame-sustaining device, this device shall be provided with a hood to exhaust combustion products to the outside air. Otherwise Footnotes e and f shall be followed.

^b The refrigerant amount shall be limited as listed in Table 1104.1.

^c The refrigerant amount shall be unlimited when all of the following are satisfied:

1. The area containing machinery is separated from the areas of the building not containing machinery by tight construction with tight-fitting doors;
2. Egress from the room is directly outdoors;
3. The number of persons in a machinery-containing space on any floor above the first floor (ground level or deck level) is equal to or less than one person per 100 square feet of floor area or, if the number exceeds one person per 100 square feet, the machinery-containing space shall be provided with the required number of doors opening directly into approved building exits; and
4. Detectors are located in areas where refrigerant vapor from a leak will concentrate so as to provide warning at levels not exceeding the TLV-TWA quantities given in Table 1104.1. Otherwise, the footnotes for other occupancies shall apply.

Exception: For ammonia, see Section 1106.8.

^d When the quantity of refrigerant in the largest system exceeds the amounts in Table 1104.1, all refrigerant-containing parts, except piping and those parts outside the building, shall be installed in a machinery room meeting the general requirements of Section 1105.

^e Refrigerant amounts and types of systems shall be limited as shown in Table 1104.2(2).

^f Applications involving air conditioning for human comfort are prohibited.

^g When the quantity of refrigerant in the largest system exceeds the amounts in Table 1104.1, all refrigerant-containing parts, except piping and those parts outside the building, shall be installed in a special requirements machinery room in accordance with Section 1106 with limitations on refrigerant quantities as follows:

550 pounds — Institutional

No limit except Footnote h — Public Assembly

No limit except Footnote h — Residential

No limit except Footnote h — All other occupancies

No limit except Footnote h — Industrial

Otherwise, Footnote e applies to the amount of Group A2, A3, B2 or B3 refrigerant in the system.

^h When the quantity of refrigerant exceeds Table 1104.1 amounts, all refrigerant-containing parts, except piping, low-side components, condensers, and parts outside the building, shall be installed in a machinery room meeting the general requirements in Section 1105. For refrigerants of Groups A2, A3, B2 and B3:

1. The machinery room shall also meet the special requirements of Section 1106.
2. Except for ammonia, amounts in excess of 1,100 pounds shall be approved by the code official.

ⁱ Use of these refrigerants is prohibited, except in laboratories in commercial occupancies. Only unit systems containing not more than 6.6 pounds of Group A3 or B3 refrigerant shall be used unless the laboratory is occupied by less than one person per 100 square feet of floor area, in which case the requirements of industrial occupancies shall apply.

TABLE 1104.2(2)
MAXIMUM PERMISSIBLE QUANTITIES OF REFRIGERANTS
 [For Use With Footnote e of Table 1104.2(1)]

TYPE OF REFRIGERATION SYSTEM	MAXIMUM POUNDS FOR VARIOUS OCCUPANCIES			
	Institutional	Assembly	Residential	All other occupancies
Sealed Absorption System				
In exit access	0	0	3.3	3.3
In adjacent outdoor locations	0	0	22	22
In other than exit access	0	6.6	6.6	22
Unit Systems				
In other than exit access	0	0	6.6	22

For SI: 1 pound = 0.454 kg.

1105.5 Refrigerant vapor detector. Machinery rooms shall contain a refrigerant vapor 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 vapor from a leak will concentrate. The alarm shall be actuated at a value not greater than the corresponding TLV-TWA values shown in Table 1104.1. Detectors and alarms shall be placed in approved locations. Detection and alarm systems shall be powered and supervised, monitored and annunciated, and installed and maintained as required by Article 6313.2 of the Uniform Fire Code.

EXCEPTION: Detectors are not required for ammonia systems complying with Section 1106.8.

1105.6 Tests. Periodic tests of the detector, alarm and mechanical ventilating system shall be performed in accordance with manufacturer's specifications and as required by the code official.

1105.7 Fuel-burning equipment. Open flames that use combustion air from the machinery room shall not be installed in a machinery room.

- EXCEPTIONS:
1. Matches, lighters, halide leak detectors and similar devices.
 2. Where the refrigerant is carbon dioxide or water.
 3. Fuel-burning equipment shall not be prohibited in the same machinery room with refrigerant-containing equipment where combustion air is ducted from outside the machinery room and sealed in such a manner as to prevent any refrigerant leakage from entering the combustion chamber, or where a refrigerant vapor detector is employed to automatically shut off the combustion process in the event of refrigerant leakage.

1105.8 Sign. A sign shall be posted on the machinery room door prohibiting access of unauthorized personnel.

1105.9 Ventilation. Machinery rooms shall be mechanically ventilated to the outdoors. Mechanical ventilation shall be capable of exhausting the minimum quantity of air both at the normal operating and emergency conditions. Multiple fans or multispeed fans shall be allowed in order to produce the emergency ventilation rate and to obtain a reduced airflow for normal ventilation. Fans providing refrigeration machinery room temperature control or automatic response to refrigerant vapor are allowed to be automatically controlled to provide intermittent ventilation as conditions require.

EXCEPTION: Where a refrigerating system is located outdoors more than 20 feet (6096 mm) from any building opening and is enclosed by a penthouse, lean-to or other open structure, natural or mechanical ventilation shall be provided. Location of the openings shall be based on the relative density of the refrigerant to air. The free-aperture cross section for the ventilation of the machinery room shall be not less than:

$$F = \sqrt{G}$$

For SI: $F = 0.138 \sqrt{G}$

where:

F = the free opening area in square feet (m^2).

G = the mass of refrigerant in pounds (kg) in the largest system, any part of which is located in the machinery room.

1105.9.1 Discharge location. The discharge of the air shall be to the outdoors in accordance with Chapter 5. Exhaust from mechanical ventilation systems shall be discharged not less than 20 feet (6096 mm) from a property line or openings into buildings.

1105.9.2 Supply air. Provisions shall be made for supply air to replace that being exhausted. Openings for supply air shall be located to avoid intake of exhaust air. Air supply and exhaust ducts to the machinery room shall serve no other area, shall be constructed in accordance with Chapter 5 and shall be covered with corrosion-resistant screen of not less than 1/4-inch (6.4 mm) mesh. The supply air shall be taken from directly outside the building. Intakes shall be fitted with backdraft dampers or similar approved flow control means to prevent reverse flow.

1105.9.3 Quantity--normal ventilation. During occupied conditions the mechanical ventilation system shall exhaust the larger of the following:

1. Not less than 0.5 cfm per square foot (0.0025 $m^3/s \cdot m^2$) of machinery room area or 20 cfm (0.009 m^3/s) per person; or
2. A volume required to maintain a maximum temperature rise of 18°F. (-7.8°C.) based on all of the heat-producing machinery in the room.

1105.9.4 Quantity--emergency conditions. Upon actuation of the refrigerant detector required in Section 1105.5, the mechanical ventilation system shall exhaust air from the machinery room in the following quantity:

$$Q = 100 \times \sqrt{G}$$

For SI: $Q = 0.07 \times \sqrt{G}$

where:

Q = the airflow in cubic feet per minute (m^3/s).

G = the design mass of refrigerant in pounds (kg) in the largest system, any part of which is located in the machinery room.

1105.10 Termination of relief devices. In the equipment room, pressure relief devices, fusible plugs and purge systems shall terminate outside of the structure at a location not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

NEW SECTION

WAC 51-32-1106 Machinery room, special requirements.

1106.1 General. Where required by Table 1104.2(1), the machinery room shall meet the requirements of this section in addition to the requirements of Section 1105.

1106.2 Elevated temperature. There shall not be an open flame-producing device or continuously operating hot surface over 800°F. (427°C.) permanently installed in the room.

1106.3 Construction requirements. The machinery room shall be separated from other occupied space with smoke-tight, 1-hour fire-resistance-rated construction.

1106.4 Opening protectives. Opening protection between the machinery room and other occupied spaces shall be approved, self-closing, tight-fitting fire doors with a minimum fire-resistance-rating of 3/4 hour.

1106.5 Pipe penetrations. All pipe penetrations of the interior walls, ceiling or floor of machinery rooms shall be sealed vapor tight and protected in accordance with the building code.

1106.6 Exterior openings. Openings in exterior walls of machinery rooms shall not be located under any exit, stairway or exit discharge.

1106.7 Egress. Exits shall comply with Uniform Building Code Section 1020-Special Hazards.

Each machinery room shall be provided with a minimum of one exit door that opens directly to the outside.

EXCEPTION: Self-closing, tight-fitting doors opening into a vestibule leading directly outside.

1106.8 Ammonia room ventilation. Ventilation equipment in ammonia machinery rooms shall be operated continuously.

EXCEPTIONS: 1. Machinery rooms equipped with a refrigerant vapor detector that will automatically start the ventilation system and actuate an alarm at a detection level not to exceed 1,000 ppm; or
2. Machinery rooms conforming to the Class 1, Division 2, hazardous location classification requirements of NFPA 70.

1106.9 Flammable refrigerants. Where refrigerants of Groups A2, A3, B2 and B3 are used, the machinery room shall conform to the Class 1, Division 2, hazardous location classification requirements of NFPA 70.

EXCEPTION: Ammonia machinery rooms.

1106.10 Remote controls. Remote control of the mechanical equipment located in the machinery room shall be provided at an approved location immediately outside the machinery room and adjacent to its principal entrance.

1106.10.1 Refrigeration system. A clearly identified switch of the break-glass-type shall provide off-only control of all electrically energized equipment in the machinery room, other than refrigerant leak detectors and machinery room ventilation.

1106.10.2 Ventilation system. Mechanical ventilation systems shall have switches to control power to each fan. The switches shall be key operated or within a locked glass-covered enclosure at an approved location adjacent to and outside of the principal entrance to the machinery room. Necessary keys shall be located in a single approved location. Switches controlling fans providing

intermittent or emergency ventilation shall be of the three-position, automatic/on/off type. Switches shall be labeled identifying both function and specific fan controlled. Two-colored and labeled indicator lamps responding to the differential pressure created by the air flow shall be provided for each switch. One lamp shall indicate flow, the other shall indicate no flow.

1106.10.3 Emergency control box. An emergency control box shall be provided as required by IIAR 2-1992 Section 5.4. Emergency control boxes shall be designed and constructed to the standards of IIAR 2-1992 Appendix A except as modified by Uniform Fire Code Article 6307.

NEW SECTION

WAC 51-32-1107 Refrigerant piping.

1107.1 General. All refrigerant piping shall be installed, tested and placed in operation in accordance with this chapter.

1107.2 Pipe enclosures. Rigid or flexible metal enclosures or pipe ducts shall be provided for soft, annealed copper tubing and used for refrigerant piping erected on the premises and containing other than Group A1 or B1 refrigerants. Enclosures shall not be required for connections between condensing units and the nearest riser box(es), provided such connections do not exceed 6 feet (1829 mm) in length.

1107.3 Condensation. All refrigerating piping and fittings, brine piping and fittings that, during normal operation, will reach a surface temperature below the dew point of the surrounding air, and are located in spaces or areas where condensation will cause a safety hazard to the building occupants, structure, electrical equipment or any other equipment, shall be protected in an approved manner to prevent such damage.

1107.4 Materials for refrigerant pipe and tubing. Piping materials shall be as set forth in Sections 1107.4.1 through 1107.4.5.

1107.4.1 Steel pipe. Carbon steel pipe with a wall thickness not less than Schedule 80 shall be used for Group A2, A3, B2 or B3 refrigerant liquid lines for sizes 1 1/2 inches (38 mm) and smaller. Carbon steel pipe with a wall thickness not less than Schedule 40 shall be used for Group A1 or B1 refrigerant liquid lines 6 inches (152 mm) and smaller, Group A2, A3, B2 or B3 refrigerant liquid lines sizes 2 inches (51 mm) through 6 inches (152 mm), and all refrigerant suction and discharge lines 6 inches (152 mm) and smaller. Type F steel pipe shall not be used for refrigerant lines having an operating temperature less than -20°F. (-29°C.).

1107.4.2 Copper and brass pipe. Standard iron-pipe size, copper and red brass (not less than 80 percent copper) pipe shall conform to ASTM B 42 and ASTM B 43.

1107.4.3 Copper tube. Copper tube used for refrigerant piping erected on the premises shall be seamless copper tube of Type ACR (hard or annealed) complying with ASTM B 280. Where approved, copper tube for refrigerant piping erected on the premises shall be seamless copper tube of Type K, L or M (drawn or annealed) in accordance with ASTM B 88. Annealed temper copper tube shall not be used in sizes larger than a 2-inch (51 mm) nominal size. Mechanical joints shall not be used on annealed temper copper tube in sizes larger than 7/8-inch (22 mm) OD size.

1107.4.4 Copper tube joints. Copper tubing joints used in refrigerating systems containing Group A2, A3, B2 or B3 refrigerants shall be brazed. Soldered joints shall not be used in such refrigerating systems.

1107.4.5 Aluminum tube. Type 3003-0 aluminum tubing with high-pressure fittings shall not be used with methyl chloride and other refrigerants known to attack aluminum.

1107.5 Joints and refrigerant-containing parts in air ducts. Joints and all refrigerant-containing parts of a refrigerating system located in an air duct of an air-conditioning system carrying conditioned air to and from humanly occupied space shall be constructed to withstand, without leakage, a pressure of 150 percent of the higher of the design pressure or pressure relief device setting.

1107.6 Exposure of refrigerant pipe joints. Refrigerant pipe joints erected on the premises shall be exposed for visual inspection prior to being covered or enclosed.

1107.7 Stop valves. All systems containing more than 6.6 pounds (3 kg) of a refrigerant in systems using positive-displacement compressors, shall have stop valves installed as follows:

1. At the inlet of each compressor, compressor unit or condensing unit.
2. At the discharge outlet of each compressor, compressor unit or condensing unit and of each liquid receiver.

EXCEPTIONS:

1. Systems that have a refrigerant pumpout function capable of storing the entire refrigerant charge in a receiver or heat exchanger.
2. Systems that are equipped with provisions for pumpout of the refrigerant using either portable or permanently installed recovery equipment.
3. Self-contained systems.

1107.7.1 Liquid receivers. All systems containing 100 pounds (45 kg) or more of a refrigerant, other than systems utilizing nonpositive displacement compressors, shall have stop valves, in addition to those required by Section 1107.7, on each inlet of each liquid receiver. Stop valves shall not be required on the inlet of a receiver in a condensing unit, nor on the inlet of a receiver which is an integral part of the condenser.

1107.7.2 Copper tubing. Stop valves used with soft annealed copper tubing or hard-drawn copper tubing 7/8-inch (22 mm) OD standard size or smaller shall be securely mounted, independent of tubing fastenings or supports.

1107.7.3 Identification. Stop valves shall be identified where their intended purpose is not obvious. Numbers shall not be used to label the valves, unless a key to the numbers is located near the valves.

NEW SECTION

WAC 51-32-1108 Field test.

1108.1 General. Every refrigerant-containing part of every system that is erected on the premises, except compressors, condensers, vessels, evaporators, safety devices, pressure gauges and control mechanisms that are listed and factory tested, shall be tested and proved tight after complete installation, and before operation. Tests shall include both the high- and low-pressure sides of each system at not less than the lower of the design pressures or the setting of the pressure-relief device(s). The design pressures for testing shall be those listed on the condensing unit, compressor or compressor unit nameplate, as required by ASHRAE 15-1994.

- EXCEPTIONS:
1. Gas bulk storage tanks that are not permanently connected to a refrigeration system.
 2. Systems erected on the premises with copper tubing not exceeding 5/8-inch (16 mm) OD, with wall thickness as required by ASHRAE 15-1994, shall be tested in accordance with Section 1108.1, or by means of refrigerant charged into the system at the saturated vapor pressure of the refrigerant at 70°F. (21°C.) or higher.
 3. Limited-charge systems equipped with a pressure relief device, erected on the premises, shall be tested at a pressure not less than one and one-half times the pressure setting of the relief device. If the equipment has been tested by the manufacturer at one and one-half times the design pressure, the test after erection on the premises shall be conducted at the design pressure.
 4. Where a compressor is used as a booster to obtain an intermediate pressure and discharges into the suction side of another compressor, the booster compressor shall be considered a part of the low side, provided that it is protected by a pressure relief device.
 5. In field-testing systems using centrifugal or other nonpositive displacement compressors, the entire system shall be considered as the low-side pressure for field test purposes.

1108.2 Test gases. Tests shall be performed with an inert dried gas including, but not limited to, nitrogen or carbon dioxide. Oxygen, air, toxic or combustible gases, and mixtures containing such gases, shall not be used.

1108.3 Test apparatus. The means used to build up the test pressure shall have either a pressure-limiting device or a pressure-reducing device and a gauge on the outlet side.

1108.4 Declaration. A certificate of test shall be provided for all systems containing 55 pounds (25 kg) or more of refrigerant. The certificate shall give the name of the refrigerant and the field test pressure applied to the high side and the low side of the system. The certification of test shall be signed by the installer and shall be made part of the public record.

ARTICLE 63--REFRIGERATION

NEW SECTION

WAC 51-34-6301 Scope.

6301.1 This article shall govern the design, installation, construction and repair of refrigeration systems that vaporize and liquify a fluid during the refrigerating cycle. Refrigerant piping design and installation, including pressure vessels and pressure relief devices, shall conform to this code. Permanently installed refrigerant storage systems and other components shall be considered as part of the refrigeration system to which they are attached.

6301.2 Refrigeration unit and system installations having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (13.6 kg) of any other group refrigerant shall be in accordance with Article 63 and the Mechanical Code. See the Mechanical Code for refrigerant group descriptions. See also Sections 8001.1.2 and 8002.

EXCEPTION: The chief is authorized to exempt temporary or portable installations.

6301.3 Refrigeration systems shall comply with the requirements of this code and, except as modified by this code, ASHRAE 15 - 1994. Ammonia refrigerating systems shall comply with this code and, except as modified by this code, ASHRAE 15 - 1994 and IIAR 2 - 1992.

NEW SECTION

WAC 51-34-6302 Classification.

Refrigerants shall be classified into groups in accordance with the Mechanical Code. See Appendix VI-F.

NEW SECTION

WAC 51-34-6303 Definitions.

For definitions of IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH), LOWER FLAMMABILITY LIMIT (LFL), PERMISSIBLE EXPOSURE LIMIT (PEL)

and REFRIGERANT, See Article 2. For refrigerant groups, see Appendix VI-F.

NEW SECTION

WAC 51-34-6304 Permits and plans.

For a permit to install or operate a refrigeration system, see Section 105, Permit r.2. When required by the chief, applications for permits shall also be in accordance with Section 8001.3.

Plans and specifications for devices and systems required by Article 63 shall be submitted to the fire department for review and approval prior to installation.

NEW SECTION

WAC 51-34-6305 Installation and maintenance.

Refrigeration systems shall be installed and maintained in a safe manner which will minimize the life, health, and fire hazard of the installation. Installation shall be in accordance with the Mechanical Code. Also see Sections 6313.2.4 and 6320.2.

Refrigeration systems shall be safely maintained in an operable condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris, or leaks.

NEW SECTION

WAC 51-34-6306 Access.

Refrigeration systems shall be accessible to the fire department at all times as required by the chief. See also Sections 6310.2 and 6315.3.

NEW SECTION

WAC 51-34-6307 Emergency control box.

6307.1 Location. When required by Article 63 or the Mechanical Code, control boxes shall be located outside of the building adjacent to a street or at an approved accessible location. All

portions of the control box shall be 6 feet (1829 mm) or less above the adjoining grade.

6307.2 Valve Operational Procedure. Valves and switches shall be adequately identified as to the sequential procedure to be followed in the event of an emergency.

6307.3 Control Boxes. Control boxes shall be of iron or steel not less than 0.055 inch (1.4 mm) (16 gage) thickness and provided with a hinged cover and lock.

6307.4 Identification. Control boxes shall be provided with a permanent label on the outside cover reading FIRE DEPARTMENT - EMERGENCY CONTROL BOX and including the name of the refrigerant in the system. Hazard identification in accordance with U.F.C. Standard 79-3 shall be posted inside and outside of the control box.

NEW SECTION

WAC 51-34-6308 Treatment and flaring systems for discharge.

6308.1 General.

6308.1.1 Applicability. Refrigeration systems which are designed to discharge refrigerant vapor to atmosphere shall be provided with an approved treatment or flaring system when required by Section 6308.1. Also see Section 6314.1.

- EXCEPTIONS:
1. Ammonia systems complying with Section 6309.
 2. Ammonia absorption systems serving a single dwelling unit.

6308.1.2 Toxic and Highly Toxic Refrigerants. Systems containing refrigerants which are toxic or highly toxic shall discharge vapor to atmosphere only through an approved treatment system. Treatment systems shall be in accordance with Sections 8003.3.1.3.5.1, 8003.3.1.3.5.2 and 8003.3.1.3.5.3.

6308.1.3 Flammable Refrigerants. Systems containing refrigerants which are flammable shall discharge vapor to the atmosphere only through an approved treatment or flaring system. Flaring systems shall be in accordance with Section 6308.2.

6308.2 Flaring System Design Requirements. 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.

NEW SECTION

WAC 51-34-6309 Ammonia discharge.

Ammonia refrigeration systems shall be designed and installed in accordance with ASHRAE 15 - 1994 Section 9.7.8.2, Ammonia Discharge.

EXCEPTION: An emergency discharge is not required for ammonia-water absorption unit systems installed outdoors provided that the discharge is shielded and dispersed.

NEW SECTION

WAC 51-34-6310 Refrigeration machinery rooms.

6310.1 When Required. Where required by UMC Table 1104.2(1), a machinery room shall be provided to enclose refrigeration systems located indoors. Access to the machinery room shall be restricted to authorized personnel. For rooms where occupational exposure could occur, see WAC 296-62-07515 and 296-62-3112.

6310.2 Dimensions. A machinery room shall be dimensioned so as to provide clearances required by UMC Chapter 3. There shall be clear head room of not less than 7 feet 3 inches (2210 mm).

6310.3 Exits. Exits shall comply with Uniform Building Code Section 1020 - Special Hazards.

Each machinery room shall be provided with a minimum of one exit door that opens directly to the outside.

EXCEPTION: Self-closing, tight-fitting doors opening into a vestibule leading directly outside.

6310.4 Refrigerant-vapor Alarms. Machinery rooms shall contain a refrigerant vapor 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 vapor from a leak will concentrate. The alarm shall be actuated at a value not greater than the corresponding TLV - TWA values shown in UMC Table 1104.1. Detectors and alarms shall be placed in approved locations.

EXCEPTION: Detectors are not required for ammonia systems complying with UMC Section 1106.8.

6310.5 Separation. Refrigeration machinery rooms shall be separated from other portions of the building as required in the special hazards provisions of the Building Code. Penetrations shall be sealed to inhibit the passage of refrigerant vapor.

6310.6 Combustion Air and Return Air. Combustion air or return air shall not be taken from or through a refrigeration machinery room.

EXCEPTIONS: 1. Refrigeration machinery rooms used exclusively for direct-fired absorption equipment.
2. Direct-vented combustion equipment.

6310.7 Special Requirements. Open flames that use combustion air from the machinery room shall not be installed in a machinery room.

EXCEPTIONS: 1. Matches, lighters, halide leak detectors and similar devices.
2. Where the refrigerant is carbon dioxide or water.
3. Fuel burning equipment shall not be prohibited in the same machinery room with refrigerant - containing equipment where combustion air is ducted from outside the machinery room and sealed in such a manner as to prevent any refrigerant

leakage from entering the combustion chamber, or where a refrigerant vapor detector is employed to automatically shut off the combustion process in the event of refrigerant leakage.

NEW SECTION

WAC 51-34-6311 Refrigeration machinery room ventilation.

6311.1 General. Machinery rooms shall be mechanically ventilated to the outdoors. Mechanical ventilation shall be capable of exhausting the minimum quantity of air both at the normal operating and emergency conditions. Multiple fans or multispeed fans shall be allowed in order to produce the emergency ventilation rate to obtain a reduced airflow for normal ventilation.

EXCEPTION: Where a refrigerating system is located outdoors more than 20 feet (6096 mm) from any building opening and is enclosed by a penthouse, lean - to or other structure, natural or mechanical ventilation shall be provided in accordance with UMC Section 1105.9.

6311.2 Distribution of Ventilation. Provisions shall be made for supply air to replace that being exhausted. Openings for supply air shall be located to avoid intake of exhaust air. Air supply and exhaust ducts to the machinery room shall comply with the provisions of UMC Section 1105.9.

6311.3 Intermittent Control of Ventilation Systems. Fans providing refrigeration machinery room temperature control or automatic response to refrigerant vapor are allowed to be automatically controlled to provide intermittent ventilation as conditions require.

6311.4 Emergency Control of Ventilation Systems. Fans providing emergency purge ventilation for refrigerant escape shall have a clearly identified switch of the break-glass type providing on-only control immediately adjacent to and outside of each refrigerant machinery room exit. Purge fans shall also respond automatically to the refrigerant concentration detection system set to activate the ventilation system at values not greater than the corresponding TLV - TWA values shown in UMC Table 1104.1. Ventilation equipment in ammonia machinery rooms equipped with a refrigerant vapor detector that will automatically start the ventilation system and actuate an alarm may be set at detection levels which exceed those in UMC Table 1104.1 but such detection level setting shall not exceed 1,000 ppm. An emergency purge control shall be provided with a manual reset only.

6311.5 Central Control of Ventilation Systems. Mechanical ventilation systems shall have switches to control power to each fan. The switches shall be key operated or within a locked glass-covered enclosure at an approved location adjacent to and outside of the principal entrance to the machinery room. Necessary keys shall be located in a single approved location. Switches controlling fans providing continuous ventilation shall be of the two-position, on/off type. Switches controlling fans providing intermittent or emergency ventilation shall be of the three-position, automatic/on/off type. Switches shall be labeled identifying both function and specific fan controlled. Two-colored and labeled indicator lamps responding to the differential pressure

created by air flow shall be provided for each switch. One lamp shall indicate flow, the other shall indicate no flow.

6311.6 Ventilation Discharge. Exhaust from mechanical ventilation systems shall be discharged 20 feet (6096 mm) or more from a property line or openings into buildings. Also see Section 6308.

6311.7 Fans. Fans and associated equipment intended to operate the emergency purge of other than Group A1 or Group B1 refrigerants shall meet the requirements for a Class I, Division 1 hazardous location as specified in the Electrical Code.

EXCEPTION: Ammonia machinery rooms.

6311.8 Ventilation Intake. Makeup-air intakes to replace the exhaust air shall be provided to the refrigeration machinery room directly from outside the building. Intakes shall be located as required by the Mechanical Code and fitted with backdraft dampers or similar approved flow-control means to prevent reverse flow. Distribution of makeup air shall be arranged to provide thorough mixing within the refrigeration machinery room to prevent short circuiting of the makeup air directly to the exhaust.

6311.9 Ventilation Rate. Ventilation rate shall be in accordance with the Building and Mechanical Codes.

NEW SECTION

WAC 51-34-6312 Refrigerated process and storage areas.

Refrigerant quantities in evaporators and piping within rooms or spaces used exclusively for processing or storage of materials under refrigerated conditions shall not be limited provided that exiting is provided in accordance with the Building Code for special hazards and:

1. The refrigerated room or space is equipped with a refrigerant vapor-detection and alarm system complying with Section 6313, and
2. The refrigerated room or space is sealed from all other portions of the building by vaportight construction and tightfitting, gasketed doors.

EXCEPTION: Adjoining refrigerated rooms need not be separated by vaportight construction.

NEW SECTION

WAC 51-34-6313 Detection and alarm systems.

6313.1 General. When required by this article, approved refrigerant vapor-detection devices shall be connected to alarm systems utilizing listed fire alarm signaling devices capable of generating a sound level of at least 15dB above the operating ambient sound pressure level of the space in which they are

installed and providing an approved, distinctive audible and visual alarm. See Sections 6314.1 and 8003.1.15.

6313.2 Detection Thresholds.

6313.2.1 Alarm. Refrigerant vapor alarms shall be activated at a value not greater than the corresponding TLV - TWA values shown in UMC Table 1104.1.

EXCEPTION: Alarms in ammonia machinery rooms may be activated by a detector setting not to exceed 1,000 ppm when the activation of the detector will automatically start the ventilation system.

6313.2.2 Power and Supervision. Detection and alarm systems shall be powered and supervised as required for fire alarm systems in accordance with U.F.C. Standard 10-2.

6313.2.3 Monitoring and Annunciation. Detection and alarm systems shall be remotely annunciated at an approved constantly attended location as required for fire alarm systems in accordance with Article 10.

6313.2.4 Installation and Maintenance. Detection and alarm systems shall be installed and maintained as required for fire alarm systems in accordance with Article 10 and U.F.C. Standards 10-2 and 10-4. Also see Section 6320.1.

NEW SECTION

WAC 51-34-6314 Refrigeration machinery room equipment and controls.

6314.1 General. Equipment, piping, ducts, vents or similar devices which are not essential for the refrigeration process, maintenance of the equipment, or illumination, ventilation, or fire protection of the room shall not be placed in or pass through a refrigeration machinery room.

Equipment essential to the refrigeration process often includes, but is not always limited to, the following: refrigeration compressors; condensing units; pumps, associated piping and automatic control valves for refrigerant, condenser water, and brine or chilled water; refrigeration control devices and panels; machinery room ventilation equipment; cooling towers or portions thereof; refrigerant receivers and accumulators; refrigerant vapor-detection and alarm systems; machinery room fire sprinkler system exclusive of shutoff valves; machinery room lighting and service receptacles; and motor control centers and electrical panels for machinery room systems.

6314.2 Electrical. Electrical equipment and installations shall comply with the Electrical Code. The refrigeration machinery room shall not be required to be classified as a hazardous location for electrical equipment except as provided in the Mechanical Code and Article 63.

6314.3 Storage. Storage of materials in a refrigeration machinery room shall be in accordance with other applicable articles of this code.

6314.4 Emergency Control. A clearly identified switch of the break-glass type providing off-only control of electrically energized equipment and devices within the refrigeration machinery room shall be provided immediately adjacent to and outside of each refrigeration machinery room exit.

NEW SECTION

WAC 51-34-6315 Refrigerant control valves.

6315.1 Location. Stop valves shall be installed in the refrigerant piping of a refrigeration system at the following locations:

1. At the inlet and outlet of a positive-displacement-type compressor, compressor unit or condensing unit,
2. At the refrigerant outlet from a liquid receiver, and
3. At the refrigerant inlet of a pressure vessel containing liquid refrigerant and having an internal gross volume exceeding 3 cubic feet (85 L).

- EXCEPTIONS:
1. Systems with nonpositive-displacement compressors.
 2. Systems having a pump-out receiver for storage of the charge.
 3. Systems containing less than 110 pounds (50 kg) of Group A1 refrigerant.
 4. Self-contained systems do not require a stop valve at the inlet of the receiver.

6315.2 Support. Stop valves installed in copper refrigerant lines of 7/8 inch (22 mm) or less outside diameter shall be securely supported independently of the tubing or piping.

6315.3 Access. Stop valves required by Section 6315 shall be readily accessible from the refrigeration machinery room floor or a level platform.

6315.4 Identification. Stop valves shall be identified by tagging in accordance with Section 6319. A valve chart shall be mounted under glass at an approved location near the principal entrance to a refrigeration machinery room.

6315.5 Piping Identification. Piping shall be identified in accordance with Section 6319. The type of refrigerant, function and pressure shall be indicated.

NEW SECTION

WAC 51-34-6316 Protection from mechanical damage.

Refrigeration systems and portions thereof shall not be located in an elevator shaft, dumbwaiter shaft, or a shaft having moving objects therein, nor in a location where they will be subject to mechanical damage. Equipment subject to vehicular damage shall be protected in accordance with Section 8001.9.3.

NEW SECTION

WAC 51-34-6317 Electrical.

6317.1 General. Electrically energized components of refrigeration systems shall conform to the Electrical Code. See also Section 6314.2.

6317.2 Secondary Source. When treatment, detection or alarm systems are required, such systems shall be connected to a secondary source of power to automatically supply electrical power in the event of loss of power from the primary source. See Electrical Code.

NEW SECTION

WAC 51-34-6318 Instructions.

The person in charge of premises on which a refrigeration unit or system is installed shall provide an approved card located in the emergency control box designating:

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 name, address, and telephone number of the fire department with instructions to notify the fire department in the event of an emergency,
4. 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, and,
5. The location and operation of emergency discharge systems when such systems are required by Article 63.

NEW SECTION

WAC 51-34-6319 Emergency signs and labels.

Refrigeration units or systems shall be provided with approved emergency signs, charts, and labels in accordance with the Mechanical Code, U.F.C. Standard 79-3, and the Mechanical Code (see U.M.C. Standard 11-2). See also Appendix VI-F.

NEW SECTION

WAC 51-34-6320 Testing of equipment.

6320.1 Acceptance Testing. The following emergency devices or systems shall be tested to demonstrate their safety and effectiveness upon completion or alteration:

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

Fire alarm systems shall be tested in accordance with U.F.C. Standards 10-2 and 10-4.

6320.2 Periodic Testing. The following emergency devices or systems shall be tested in accordance with the manufacturer's instructions and as required by the chief:

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 purge ventilation systems, and
 4. Detection and alarm systems. See Section 6313.2.4.
- Also see Section 6305.

6320.3 Records. A written record of required testing shall be maintained on the premises.

6320.4 Frequency of Testing. Unless otherwise required by the chief, testing frequency shall be in accordance with Section 6320.2.

6320.5 Personnel Qualifications. Tests of emergency devices or systems required by Article 63 shall be conducted by approved persons.

NEW SECTION

WAC 51-34-6321 Notification of discharges.

The fire department shall be notified immediately upon discharge of refrigerant, whether automatic or manual. Refrigerant shall not be discharged except in an emergency. Notification shall comply with Section 8001.5.2.2.

- EXCEPTIONS:
1. Refrigeration systems operating at pressures below atmospheric and incorporating automatic purge cycles.
 2. Incidental operation of automatic pressure-relief valves resulting in minor release of the refrigerant charge.
 3. Incidental minor releases associated with service operations after system pump down has been accomplished.

NEW SECTION

WAC 51-34-6322 Storage, handling and use.

Flammable and combustible materials shall not be stored in machinery rooms. Storage, use, and handling of extra refrigerant or refrigerant oils shall be as required by other articles of this code. See Articles 74, 75, 79, and 80 for storage, use, and handling other than within refrigeration systems.

EXCEPTION: Spare parts, tools, and incidental materials necessary for the safe and proper operation and maintenance of the system.

NEW SECTION

WAC 51-34-6323 Changing of refrigerant type.

Refrigerant types shall not be changed without prior notification and approval of the chief.

NEW SECTION

WAC 51-34-6324 Records.

The person in charge of the premises on which a refrigeration unit or system subject to these regulations is installed or maintained shall keep a written record of refrigerant quantities brought onto and removed from the premises. Such records shall be available to the fire department.