



STATE OF WASHINGTON  
**STATE BUILDING CODE COUNCIL**

May 2018  
Log No. \_\_\_\_\_

**1. State Building Code to be Amended:**

- |   |   |
|---|---|
| <input type="checkbox"/> International Building Code          | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code   | <input type="checkbox"/> International Fuel Gas Code              |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code           |
| <input type="checkbox"/> International Residential Code       | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code     |
| <input type="checkbox"/> International Fire Code              | <input type="checkbox"/> Wildland Urban Interface Code            |
| <input type="checkbox"/> Uniform Plumbing Code                |   |

For the Washington State Energy Code, please see specialized [energy code forms](#)

**Section(s):** [2021 IMC Sections 501.3.1, 1104.3, 1105.7, 1102.5, 1109.3.2, 1110.2](#)

**Title:** [Chapter 11 and ASHRAE 15](#)

**2. Proponent Name (Specific local government, organization or individual):**

**Proponent:** [Eric Vander Mey, PE](#)

**Title:** [Principal](#)

**Date:** [11/12/2024](#)

**3. Designated Contact Person:**

**Name:** [Eric Vander Mey](#)

**Company:** [Delta E Consulting](#)

**Cell:** [\(206\) 321-1677](#)

**E-Mail:** [eriev@deltaconsulting.com](mailto:eriev@deltaconsulting.com)

**4. Proposed Code Amendment.** Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code, additional pages may be attached.

Clearly state if the proposal modifies an existing amendment or if a new amendment is needed. If the proposal modifies an **existing amendment**, show the modifications to the existing amendment by underlining all added language and striking through all deleted language. If a new amendment is needed, show the modifications to the **model code** by underlining all added language and striking through all deleted language.

**Code(s)**      **2021 International Mechanical Code (IMC)**  
**Section(s)**   **501.3.1, 1104.3, 1105.7, 1102.5, 1109.3.2, 1109.4.2, 1110.2**

Enforceable code language must be used.  
Amend section to read as follows:

Base language in black text is from 2021 WSMC  
See revisions proposed below with track changes in blue text

501.3.1: Location of exhaust outlets.

The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

8. For specific systems see the following sections:

8.1 Clothes dryer exhaust, Section 504.4.

8.2 Kitchen hoods and other kitchen exhaust equipment, Sections 506.3.13, 506.4 and 506.5.

8.3 Dust stock and refuse conveying systems, Section 511.2.

8.4 Subslab soil exhaust systems, Section 512.4.

8.5 Smoke control systems, Section 513.10.3.

8.6 Refrigerant discharge for relief devices, Section 1105.7.

8.7 Machinery room discharge, Section 1105.6.1.

8.8 Natural ventilation and mechanical exhaust discharge for A2L and B2L refrigerant piping shafts, Sections 1105.7 and 1109.3.2.

8.9 Mechanical exhaust discharge for A2, B2, A3, and B3 refrigerant piping shafts, Sections 1105.7 and 1109.3.2.

**Commented [EV1]:** Add pointers to chapter 11 sections to correlate to ASHRAE 15-2022.

1104.3: Refrigerant restrictions.

Refrigerant applications, maximum quantities and use shall be restricted in accordance with Sections 1104.3.1 through 1104.3.4.

1104.3.1 Air-conditioning for human comfort.

~~In other than industrial occupancies where the quantity in a single independent circuit does not exceed the amount in Table 1103.1, Group B1, B2 and B3 refrigerants shall not be used in high probability systems for air conditioning for human comfort.~~

High-probability systems used for human comfort shall use Group A1 or A2L refrigerant.

**Commented [EV2]:** Match language in 2024 IMC for 1104.3.1

Exceptions:

1. Equipment listed for and used in residential occupancies containing a maximum of 6.6 pounds (3 kg) of refrigerant.

2. Equipment listed for and used in commercial occupancies containing a maximum of 22 pounds (10 kg) of refrigerant.

3. Industrial occupancies.

1104.3.2 Nonindustrial occupancies. ~~A2, A3, B2 and B3 refrigerants.~~

~~Group A2 and B2 refrigerants shall not be used in high-probability systems where the quantity of refrigerant in any independent refrigerant circuit exceeds the amount shown in Table 1104.3.2. Group A3 and B3 refrigerants shall not be used except where approved.~~

~~Exception: This section does not apply to laboratories where the floor area per occupant is not less than 100 square feet (9.3 m<sup>2</sup>).~~

Group A2 and B2 refrigerants shall not be used in high-probability systems. Group A3 and B3 refrigerants shall not be used except where approved.

Exceptions: This section does not apply to:

1. Laboratories where the floor area per occupant is not less than 100 square feet (9.3 m<sup>2</sup>).
2. Listed self-contained systems having a maximum of 0.331 pounds (150 g) of Group A3 refrigerant.
3. Industrial occupancies.
4. Equipment listed for and used in residential occupancies containing a maximum of 6.6 pounds (3 kg) of Group A2 or B2 refrigerant.
5. Equipment listed for and used in commercial occupancies containing a maximum of 22 pounds (10 kg) of Group A2 or B2 refrigerant.

**Commented [EV3]:** Revise section 1104.3.2 to match 2024 IMC changes

Remove Table 1104.3.2 to match 2024 IMC provisions:

**TABLE 1104.3.2 MAXIMUM PERMISSIBLE QUANTITIES OF REFRIGERANTS**

TYPE OF REFRIGERATION SYSTEM	MAXIMUM POUNDS FOR VARIOUS OCCUPANCIES			
	Institutional	Public assembly	Residential	All other occupancies
<b>Sealed absorption system</b>				
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	6.6
<b>Unit systems</b>				
In other than exit access	0	0	6.6	6.6

For SI: 1 pound = 0.454 kg.

1104.3.3: All occupancies.

The total of all Group A2, B2, A3 and B3 refrigerants shall not exceed 1,100 pounds (499 kg) except where approved.

1104.3.4: Protection from refrigerant decomposition.

Where any device having an open flame or surface temperature greater than 800°F (427C) is used in a room containing more than 6.6 pounds (3 kg) of refrigerant in a single independent circuit, a hood and exhaust system shall be provided in accordance with Section 509.

Such exhaust system shall exhaust combustion products to the outdoors.

Exception: A hood and exhaust system shall not be required where any of the following apply:

1. The refrigerant is R-718 (water) or R-744 (carbon dioxide).
2. The combustion air is ducted from the outdoors in a manner that prevents leaked refrigerant from being combusted.
3. A refrigerant detector is used to stop the combustion in the event of a refrigerant leak (see Sections 1105.3 and 1105.5).

1104.3.5: Corridors and Lobbies:

Refrigerating systems in a public corridor or lobby shall comply with ASHRAE 15 Section 7.5.1.2.

**Commented [EV4]:** Add new section to provide reference to ASHRAE 15 requirements

1105.7: Termination of relief devices and refrigerant piping shaft ventilation discharge air outlets.

Pressure relief devices, fusible plugs and purge systems located within the machinery room and refrigerant piping shaft natural and mechanical ventilation discharge air shall terminate outside of the ~~structure-building~~ and comply with all of the following:

**Commented [EV5]:** Revise to match ASHRAE 15-2022 language

1. The point of vent discharge shall be at a location not less than 15 feet (4572 mm) above the adjoining grade level.
2. ~~and~~The point of vent discharge shall be not less than 20 feet (6096 mm) from any window, ventilation opening or exit.
3. For heavier-than-air refrigerants, the point of vent discharge shall be located not less than 20 ft (6.1 m) horizontally from below-grade walkways, entrances, pits, or ramps if a release of the entire system charge into such a space would yield a concentration of refrigerant in excess of the refrigerant concentration limit (RCL). The direct discharge of a relief vent into enclosed outdoor spaces, such as a courtyard with walls on all sides, shall not be permitted if a release of the entire system charge into such a space would yield a concentration of refrigerant in excess of the Refrigerant Concentration Level (RCL). The volume for the refrigerant concentration calculation shall be determined using the gross area of the space and a height of 8.2 ft (2.5 m), regardless of the actual height of the enclosed space.
4. The termination point of a vent discharge line shall be made in a manner that prevents discharged refrigerant from spraying directly onto personnel that might be in the vicinity.
5. The termination point of vent discharge lines shall be made in a manner that prevents foreign material or debris from entering the discharge outlet.
6. Relief vent lines that terminate vertically upward and are subject to moisture entry shall be provided with a drip pocket having a minimum of 24 in. (0.6 m) in length and having the size of the vent discharge pipe. The drip pocket shall be installed to extend below the first change in vent pipe direction and shall be fitted with a valve or drain plug to permit removal of accumulated moisture.

1109.2.2: Refrigerant pipe enclosure.

Refrigerant piping shall be protected by locating it within the building elements or within protective enclosures.

Exception: Piping protection within the building elements or protective enclosure shall not be required in any of the following locations:

1. Where installed without ready access or located more than 7 feet 3 inches (2210 mm) above the finished floor.
2. Where located within 6 feet (1829 mm) of the refrigerant unit or appliance.
3. Where located in a machinery room complying with Section 1105.

4. Outside the building:

- 4.1. Where protected from damage from the weather, including but not limited to hail, ice and snow loads.
- 4.2. Where protected from damage within the expected foot or traffic path.
- 4.3. Where installed underground not less than 8 inches (200 mm) below finished grade and protected against corrosion.

1109.2.5: Refrigerant pipe shafts.

Refrigerant piping that penetrates two or more floor/ceiling assemblies shall be enclosed in a fire-resistance-rated shaft enclosure. The fire-resistance-rated shaft enclosure shall comply with Section 713 of the International Building Code. Refrigerant pipe shafts that are naturally or mechanically ventilated shall be

[constructed as exterior building envelope walls with thermal insulation and air barrier construction required by the Washington State Energy Code.](#)

Exceptions:

1. [Refrigeration](#) systems using R-718 refrigerant (water).
2. Piping in a direct [refrigeration](#) system [using Group A1 refrigerant](#) where the refrigerant quantity does not exceed the limits of Table 1103.1 for the smallest occupied space through which the piping passes.
3. Piping located on the exterior of the building where vented to the outdoors. [Natural ventilation openings shall be distributed vertically along the enclosure to prevent containment of refrigerant piping leaks and be located a minimum of 3 feet \(914 mm\) from operable openings into the building. Mechanical ventilation of exterior enclosures to comply with Section 1109.3.2.](#)

**Commented [EV6]:** Revise to match ASHRAE 15-2022 language. This is provided in a separate code change proposal based on 2027 IMC code change proposal and is provided here for reference.

1109.3.2: Shaft ventilation.

Refrigerant pipe shafts with systems using Group A2L or B2L refrigerant shall be naturally or mechanically ventilated. The shaft [natural ventilation discharge outlet and mechanical ventilation discharge](#) exhaust outlet shall comply with Sections 501.3.1 and 1105.7. Naturally ventilated shafts shall have a pipe, duct or conduit not less than 4 inches (102 mm) in diameter that connects to the lowest point of the shaft and extends to the outdoors. The pipe, duct or conduit shall be level or pitched downward to the outdoors. [A makeup air opening shall be provided at the top of the shaft.](#) Mechanically ventilated shafts shall have a minimum airflow velocity in accordance with Table 1109.3.2. The mechanical ventilation shall be continuously operated or activated by a refrigerant detector. [Makeup air shall be provided at the inlet to the shaft for mechanically ventilated shafts.](#) Systems utilizing a refrigerant detector shall activate the mechanical ventilation at a maximum refrigerant concentration of 25 percent of the lower flammable limit of the refrigerant. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate.

**Commented [EV7]:** Clarify this applies to natural and mechanical ventilation outlets.

**Commented [EV8]:** Add requirement from ASHRAE 15-2022.

**Commented [EV9]:** Add requirement from ASHRAE 15-2022.

Exceptions:

1. The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors.
- 1-2. [For refrigeration systems complying with ASHRAE 15.2 used in residential occupancies serving only a single dwelling unit or sleeping unit, shaft ventilation shall not be required where the pipe or tube is continuous without fittings in the shaft.](#)

**Commented [EV10]:** This is provided in a separate code change proposal based on 2027 IMC code change proposal and is included here for reference.

1109.4 Installation requirements for Group A2, A3, B2 or B3 refrigerant.

Piping systems using Group A2, A3, B2 or B3 refrigerant shall comply with the requirements of Sections 1109.4.1 and 1109.4.2.

1109.4.1 Piping material.

Piping material for Group A2, A3, B2 or B3 refrigerant located inside the building, except for machinery rooms, shall be copper pipe, brass pipe or steel pipe. Pipe joints located in areas other than the machinery room shall be welded. Self-contained listed and labeled equipment or appliances shall have piping material based on the listing requirements.

1109.4.2 Shaft ventilation.

~~Refrigerant pipe shafts with systems using Group A2, A3, B2 or B3 refrigerant shall be continuously mechanically ventilated. Refrigerant pipe shafts with one or more systems using any Group A2, A3, B2 or B3 refrigerant shall be continuously mechanically ventilated and shall include a refrigerant detector.~~ The shaft ventilation exhaust outlet shall comply with Sections 501.3.1 and 1105.7. Mechanically ventilated shafts shall have a minimum airflow velocity as specified in Table 1109.3.2. [Makeup air shall be provided at the inlet to the shaft for mechanically ventilated shafts.](#) The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors.

**Commented [EV11]:** Use code language from 2024 IMC Section 1109.3.2 for section 1109.4.2 that is removed in 2024 IMC.

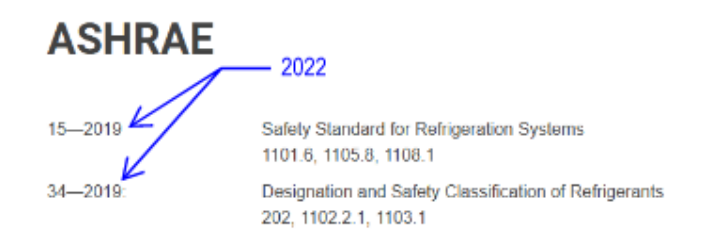
**Commented [EV12]:** Add requirement from ASHRAE 15-2022.

1110.2: Exposure of refrigerant piping system.

Refrigerant pipe and joints installed in the field shall be exposed for visual inspection and testing prior to being covered or enclosed.

Exception: Factory-insulated refrigerant piping line-sets are exempt from exposing the piping material for visual inspection.

#### Chapter 15 Referenced Standards



**5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.**

Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Clarify IMC requirements to correlate to latest ASHRAE 15-2022 requirements.

**6. Specify what criteria this proposal meets.** You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

**7. Is there an economic impact:**  Yes  No

If no, state reason:

Clarifies IMC requirements to correlate to ASHRAE 15 a referenced standard in IMC Chapter 11 that is already required to be complied with.

Cost savings based on every project will not have to use alternate means and methods code alternate request with the Authority Having Jurisdiction to utilize the latest ASHRAE 15-2022 and ASHRAE 34-2022 requirements.

As the 2021 IMC requires compliance with both IMC Chapter 11 and ASHRAE 15.

If yes, provide economic impact, costs and benefits as noted below in items a – f.

Soft cost engineering and AHJ savings of a minimum of \$2,500 per applicable project.  
Construction cost savings will be much greater depending on the project and the pathway selected.

a. **Life Cycle Cost.** Use the OFM Life Cycle Cost [Analysis tool](#) to estimate the life cycle cost of the proposal using one or more typical examples. Reference these [Instructions](#); use these [Inputs](#). Webinars on the tool can be found [Here](#) and [Here](#). If the tool is used, submit a copy of the excel file with your proposal submission. If preferred, you may submit an alternate life cycle cost analysis.

b. **Construction Cost.** Provide your best estimate of the construction cost (or cost savings) of your code change proposal.

For residential projects, also provide construction cost of savings of \$200 to \$2000/(per dwelling unit or sleeping unit) for not having to install the rated, vented shaft system for mini-split units and not having construct shaft to meet exterior envelope requirements for thermal insulation and air barrier per energy code requirements.

Show calculations here, and list sources for costs/savings, or attach backup data pages

Costs savings will vary based on number of dwelling units or sleeping units served by each rated but unvented refrigerant piping shaft. The more units each rated shaft serves the lower the cost savings per unit.

c. **Code Enforcement.** List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

[Resolves conflict between ASHRAE 15-2022 and 2021/2024 IMC.](#)

[Does not require design professional to submit code alternate for AHJ review and approval saving engineering and code official costs.](#)

d. **Small Business Impact.** Describe economic impacts to small businesses:

[No impact as this provides cost savings and aligns with ASHRAE 15-2022 simplifying code compliance.](#)

e. **Housing Affordability.** Describe economic impacts on housing affordability:

f. **Other.** Describe other qualitative cost and benefits to owners, to occupants, to the public, to the environment, and to other stakeholders that have not yet been discussed:

[Allows for more cost effective transition to A2L and other refrigerants to meet Washington State Department of Ecology and US EPA requirements.](#)

Please send your completed proposal to: [sbcc@des.wa.gov](mailto:sbcc@des.wa.gov)

**All questions must be answered to be considered complete. Incomplete proposals will not be accepted.**



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**1. State Building Code to be Amended:**

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| <input type="checkbox"/> International Building Code          | <input checked="" type="checkbox"/> International Mechanical Code |
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| <input type="checkbox"/> International Residential Code       | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code     |
| <input type="checkbox"/> International Fire Code              | <input type="checkbox"/> Wildland Urban Interface Code            |
| <input type="checkbox"/> Uniform Plumbing Code                |   |
- For the Washington State Energy Code, please see specialized [energy code forms](#)

**Section(s):** 2021 IMC Chapter 2 & Sections 1101.1.1, 1103.1, 1103.2 1104.2, 1104.3, 1106.3, 1106.4

**Title:** Chapter 11 and ASHRAE 15

**2. Proponent Name (Specific local government, organization or individual):**

**Proponent:** Eric Vander Mey, PE  
**Title:** Principal  
**Date:** 11/12/2024

**3. Designated Contact Person:**

**Name:** Eric Vander Mey  
**Company:** Delta E Consulting  
  
**Cell:** (206) 321-1677  
**E-Mail:** [ericv@deltaconsulting.com](mailto:ericv@deltaconsulting.com)



**4. Proposed Code Amendment.** Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code, additional pages may be attached.

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**Code(s)**      **2021 International Mechanical Code (IMC)**  
**Section(s)**   **Chapter 2, 1101.1.1, 1103.1, 1103.2, 1104.2, 1104.3, 1106.3, 1106.4**

Enforceable code language must be used.  
Amend section to read as follows:

Base language in black text is from 2021 WSMC  
See revisions proposed below with track changes in blue text

#### Chapter 2: Definitions

**MACHINERY ROOM.** ~~An enclosed space that is required by Chapter 11 to contain refrigeration equipment and to comply with Sections 1105 and 1106.~~

A designated space meeting the requirements of Sections 1105 and 1106 that contains one or more refrigerating systems or portions thereof.

**Commented [EV1]:** Update to align with 2027 IMC Code Change Proposal M12-24.

**EFFECTIVE DISPERSAL VOLUME.** ~~The volume of a space or connected spaces in which leaked refrigerant will disperse.~~

**Commented [EV2]:** Add new definitions of 2027 IMC Code Change Proposal M9-24 to align with ASHRAE 15.

**EFFECTIVE DISPERSAL VOLUME CHARGE (EDVC).** ~~The maximum refrigerant charge permitted for an effective dispersal volume.~~

#### 1101.1.1 Refrigerants other than ammonia.

~~Refrigerant piping design and installation for systems containing a refrigerant other than ammonia, including pressure vessels and pressure relief devices, shall comply with this chapter and ASHRAE 15.~~

Refrigeration systems using a refrigerant other than ammonia shall comply with this chapter, ASHRAE 15 and the International Fire Code. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with IAR CO2 or be part of listed and labeled equipment.

**Commented [EV3]:** Revise to use the 2024 IMC language and then amend that with 2027 IMC proposed language.

**Commented [EV4]:** Update to align with 2027 IMC Code Change Proposal M63-24.

1103.1 Refrigerant classification. Refrigerants shall be classified in accordance with ASHRAE 34 as listed in Table 1103.1. Refrigerants without a refrigerant number designation or without a safety group classification in the referenced edition of ASHRAE Standard 34 shall be classified in accordance with the criteria in ASHRAE Standard 34 as a single-compound refrigerant blend of two or more compounds. Such safety classifications not assigned by ASHRAE Standard 34 shall be submitted for approval to the code official. Compliance with the requirements of this code is contingent upon use of approved safety classifications where not assigned by the referenced edition of ASHRAE Standard 34.

**Commented [EV5]:** Update to align with 2027 IMC Code Change Proposal M64-24.

1104.2 Machinery room. Except as provided in Sections 1104.2.1 and 1104.2.2, all components containing the refrigerant shall be located either outdoors or in a machinery room where the quantity of refrigerant in an independent circuit of a refrigeration system exceeds both of the following:

1. T the amounts shown in Table 1103.1, and
2. The effective dispersal volume charge as calculated in accordance with ASHRAE 15.

For refrigerant blends not listed in Table 1103.1, the same requirement shall apply where the amount for any blend component exceeds that indicated in Table 1103.1 for each that component. ~~This~~ These requirements shall also apply where the combined amount of the blend components exceeds a limit of 69,100 parts per million (ppm) by volume. Machinery rooms required by this section and containing only Group A1 or B1 refrigerants shall be constructed and maintained in accordance with Section 1105. ~~for Group A1 and B1 refrigerants and in accordance with Sections 1105 and 1106 for Group A2, B2, A3 and B3 refrigerants. Machinery rooms required by this section and containing any Group A2, B2, A3, or B3 flammable refrigerants shall be constructed and maintained in accordance with Sections 1105 and 1106. Machinery rooms required by this section, containing any Group A2L or B2L flammable refrigerants and containing no Group A2, B2, A3, or B3 flammable refrigerants, shall be constructed and maintained in accordance with Section 1105 and Section 1106.4.1 through 1106.4.3.~~

Exceptions:

1. Machinery rooms are not required for listed equipment and appliances containing not more than 6.6 pounds (3 kg) of refrigerant, regardless of the refrigerant's safety classification, where installed in accordance with the equipment's or appliance's listing and the equipment or appliance manufacturer's installation instructions.
2. Piping in compliance with Section 1107 is allowed in other locations to connect components installed in a machinery room with those installed outdoors.

1104.3: Refrigerant restrictions.

Refrigerant applications, maximum quantities and use shall be restricted in accordance with Sections 1104.3.1 through 1104.3.4.

1104.3.1: Air conditioning for human comfort ~~High-probability air conditioners, heat pumps, and dehumidifiers.~~ High-probability systems used for human comfort ~~air conditioners, heat pumps, and dehumidifiers~~ shall use Group A1 or A2L refrigerant.

Exceptions:

1. Equipment listed for and used in residential occupancies containing a maximum of 6.6 pounds (3 kg) of refrigerant.
2. Equipment listed for and used in commercial occupancies containing a maximum of 22 pounds (10 kg) of refrigerant.
3. Industrial occupancies.

1104.3.2: Group A2, A3, B2 and B3 refrigerants.

Group A2 and B2 refrigerants shall not be used in high-probability systems. Group A3 and B3 refrigerants shall not be used except where approved.

Exceptions: ~~This section does not apply to:~~

1. Laboratories where the floor area per occupant is not less than 100 square feet (9.3 m<sup>2</sup>).
2. Listed self-contained systems having a maximum of 0.331 pounds (150 g) of Group A3 refrigerant.
3. Industrial occupancies.

**Commented [EV6]:** Make revisions per 2027 IMC Code Change Proposal M9-24.

**Commented [EV7]:** Update to align with 2027 IMC Code Change Proposal M66-24 and ASHRAE 15 language.

**Commented [EV8R7]:** See Misc ASHRAE 15 corrections for changes from 2021 IMC to 2024 IMC.

**Commented [EV9]:** See Misc ASHRAE 15 corrections for changes from 2021 IMC to 2024 IMC.

4. Equipment listed for and used in residential occupancies containing a maximum of 6.6 pounds (3 kg) of Group A2 or B2 refrigerant.
5. Equipment listed for and used in commercial occupancies containing a maximum of 22 pounds (10 kg) of Group A2 or B2 refrigerant.

6. [Self-contained equipment using Groups A3 and B3 refrigerants that are listed to UL 60335-2-89 and installed in accordance with the listing, the manufacturer's installation instructions, and ASHRAE 15.](#)

7. [Self-contained equipment using Groups A3 and B3 refrigerants that are listed to UL 60335-2-40 and installed in accordance with the listing, the manufacturer's installation instructions, and ASHRAE 15.](#)

**Commented [EV10]:** Update to align with 2027 IMC Code Change Proposal M67-24.

**Commented [EV11]:** Update to align with 2027 IMC Code Change Proposal M67-24.

1104.3.3: All occupancies.

The total of all Group A2, B2, A3 and B3 refrigerants shall not exceed 1,100 pounds (499 kg) except where approved.

1104.3.4: Protection from refrigerant decomposition.

Where any device having an open flame or surface temperature greater than 800°F (427C) is used in a room containing more than 6.6 pounds (3 kg) of refrigerant in a single independent circuit, a hood and exhaust system shall be provided in accordance with Section 509.

Such exhaust system shall exhaust combustion products to the outdoors.

Exception: A hood and exhaust system shall not be required where any of the following apply:

1. The refrigerant is R-718 (water) or R-744 (carbon dioxide).
2. The combustion air is ducted from the outdoors in a manner that prevents leaked refrigerant from being combusted.
3. A refrigerant detector is used to stop the combustion in the event of a refrigerant leak (see Sections 1105.3 and 1105.5).

1106.3 [Class 2 and 3](#) refrigerants. Where [any flammable](#) refrigerants of Groups A2, A3, B2 and B3 are used, the machinery room shall conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70.

**Commented [EV12]:** Make revisions per 2027 IMC Code Change Proposal M9-24.

Incorporate revisions below from 2024 IMC to 2021 WSMC:

2021 WSMC language for reference:

#### **1106.4 Special requirements for Group A2L refrigerant machinery rooms.**

*Machinery rooms with systems containing Group A2L refrigerants that do not conform to the Class I, Division 2, hazardous location electrical requirements of NFPA 70, as permitted by the exception to Section 1106.3, shall comply with Sections 1106.4.1 through 1106.4.3.*

**Exception:** *Machinery rooms conforming to the Class I, Division 2, hazardous location classification requirements of NFPA 70 are not required to comply with Sections 1106.4.1 and 1106.4.2.*

##### **[F] 1106.4.1 Ventilation system activation.**

Ventilation shall be activated by the refrigerant detection system in the machinery room. Refrigerant detection systems shall be in accordance with Section 608.9 of the *International Fire Code* and all of the following:

1. The detectors shall activate at or below a refrigerant concentration of 25 percent of the LFL.
2. Upon activation, the detection system shall activate the emergency ventilation system required by Section 1106.4.2.
3. The detection, signaling and control circuits shall be supervised.

#### 1106.4.2 Emergency ventilation system.

An emergency ventilation system shall be provided at the minimum exhaust rate specified in ASHRAE 15 or Table 1106.4.2. Shutdown of the emergency ventilation system shall be by manual means.

**TABLE 1106.4.2 MINIMUM EXHAUST RATES**

REFRIGERANT	Q(m/sec)	Q(cfm)
R32	15.4	32,600
R143A	13.6	28,700
R444A	6.46	13,700
R444B	10.6	22,400
R445A	7.83	16,600
R446A	23.9	50,700
R447A	23.8	50,400
R451A	7.04	15,000
R451B	7.05	15,000
R1234yf	7.80	16,600
R1234ze(E)	5.92	12,600

#### 1106.4.3 Emergency ventilation system discharge.

The emergency ventilation system point of discharge to the atmosphere shall be located outside of the structure at 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.

#### 2024 IMC language

1106.4 Group A2L and B2L refrigerants. Machinery rooms ~~for containing any~~ Group A2L ~~and~~ or B2L refrigerants ~~and containing no refrigerants of Group A2, A3, B2, or B3~~ shall comply with Sections 1106.4.1 through 1106.4.3.

**Commented [EV13]:** Make revisions per 2027 IMC Code Change Proposal M9-24.

#### 1106.4.1: Elevated temperatures. P

Open flame-producing devices or continuously operating hot surfaces over 1290°F (700°C) shall not be permanently installed in the room.

#### 1106.4.2: Refrigerant detector. P

In addition to the requirements of Section 1105.3, refrigerant detectors shall signal an alarm and activate the ventilation system in accordance with the response time specified in Table 1106.4.2.

**Table 1106.4.2 Group A2L and B2L detector activation**

ACTIVATION LEVEL	MAXIMUM RESPONSE TIME (seconds)	ASHRAE 15 VENTILATION (seconds)	ALARM RESET	ALARM TYPE
Less than or equal to the OEL in Table 1103.1	300	1	Automatic	Trouble
Less than or equal to the refrigerant concentration level in Table 1103.1	15	2	Manual	Emergency

#### 1106.4.3: Mechanical ventilation. P

The machinery room shall have a mechanical ventilation system complying with ASHRAE 15.

5. **Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.** Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Clarify IMC requirements to correlate to latest ASHRAE 15-2022 requirements.

6. **Specify what criteria this proposal meets.** You may select more than one.
- The amendment is needed to address a critical life/safety need.
  - The amendment clarifies the intent or application of the code.
  - The amendment is needed to address a specific state policy or statute.
  - The amendment is needed for consistency with state or federal regulations.
  - The amendment is needed to address a unique character of the state.
  - The amendment corrects errors and omissions.

7. **Is there an economic impact:**  Yes  No

If no, state reason:

Clarifies IMC requirements to correlate to ASHRAE 15 a referenced standard in IMC Chapter 11 that is required to be complied with.

Cost savings based on every project will not have to use alternate means and methods code alternate request with the Authority Having Jurisdiction to utilize the latest ASHRAE 15-2022 and ASHRAE 34-2022 requirements.

As the 2021 IMC requires compliance with both IMC Chapter 11 and ASHRAE 15.

If yes, provide economic impact, costs and benefits as noted below in items a – f.

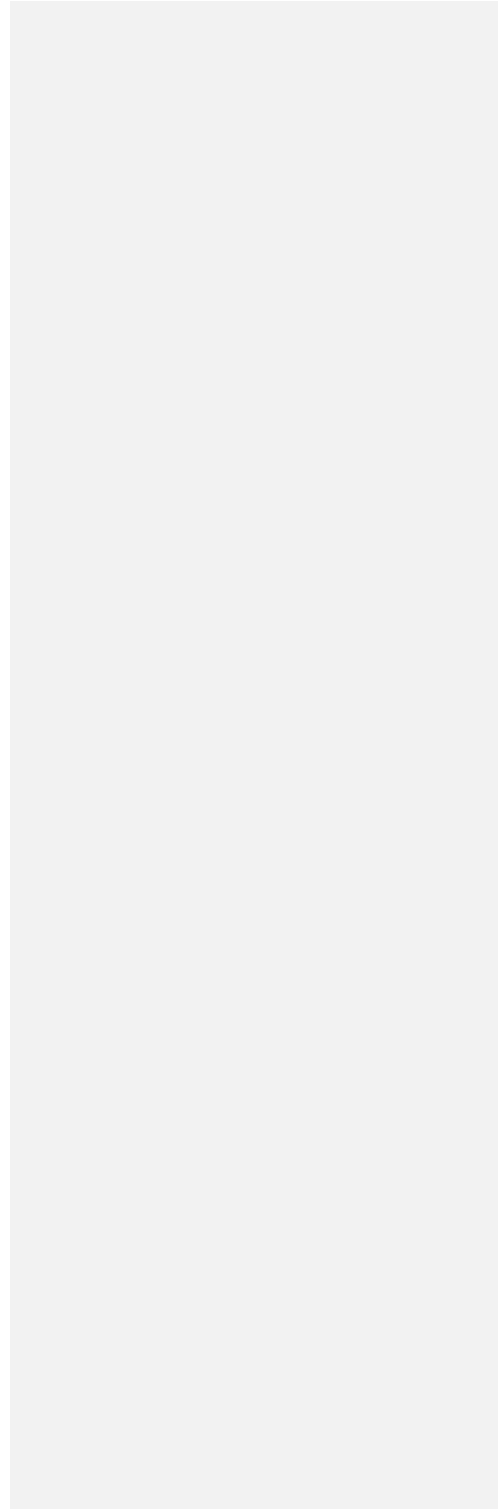
Soft cost engineering and AHJ savings of a minimum of \$2,500 per applicable project.  
Construction cost savings will be much greater depending on the project and the pathway selected.

- a. **Life Cycle Cost.** Use the OFM Life Cycle Cost [Analysis tool](#) to estimate the life cycle cost of the proposal using one or more typical examples. Reference these [Instructions](#); use these [Inputs](#). Webinars on the tool can be found [Here](#) and [Here](#)). If the tool is used, submit a copy of the excel file with your proposal submission. If preferred, you may submit an alternate life cycle cost analysis.
- b. **Construction Cost.** Provide your best estimate of the construction cost (or cost savings) of your code change proposal.  
Show calculations here, and list sources for costs/savings, or attach backup data pages
- c. **Code Enforcement.** List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:  
[Resolves conflict between ASHRAE 15-2022 and 2021/2024 IMC.](#)  
[Does not require design professional to submit code alternate for AHJ review and approval saving engineering and code official costs.](#)
- d. **Small Business Impact.** Describe economic impacts to small businesses:  
[No impact as this provides cost savings and aligns with ASHRAE 15-2022 simplifying code compliance.](#)

- e. **Housing Affordability.** Describe economic impacts on housing affordability:
- f. **Other.** Describe other qualitative cost and benefits to owners, to occupants, to the public, to the environment, and to other stakeholders that have not yet been discussed:  
[Allows for more cost effective transition to A2L and other refrigerants to meet Washington State Department of Ecology and US EPA requirements.](#)

Please send your completed proposal to: [sbcc@des.wa.gov](mailto:sbcc@des.wa.gov)

**All questions must be answered to be considered complete. Incomplete proposals will not be accepted.**



# M12-24

IMC®: SECTION 202

**Proponents:** Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

## 2024 International Mechanical Code

**Revise as follows:**

**MACHINERY ROOM.** ~~An enclosed space that is required by Chapter 11 to contain refrigeration *equipment* and to comply with Sections 1105 and 1106.~~

A designated space meeting the requirements of Sections 1105 and 1106 that contains one or more refrigerating systems or portions thereof.

**Reason:** The proposed change creates better language for a definition to avoid creating what looks like a requirement (to be enclosed), as that is better to do in the main text of Chapter 11.

**Cost Impact:** The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

**Justification for no cost impact:**

Editorial only. We consider it editorial because the original takes information from 1105 and 1106 and includes it in the definition. We are not saying this information no longer applies, but that it's not appropriate for a definition. In other words, the definition should not say when a space is to be enclosed; that should be determined between 1105 and 1106.

"Enclosed space" is now a designated space that meets 1105 and 1106 (same compliance is expected as before).

"Contain refrigerant equipment" means to contain one or more refrigerating systems or portions thereof (same meaning but probably less possibility for gaming).

# M63-24

IMC®: 1101.1.1

**Proponents:** Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

## 2024 International Mechanical Code

### Revise as follows:

**1101.1.1 Refrigerants other than ammonia.** *Refrigeration systems* using a refrigerant other than ammonia shall comply with this chapter, ASHRAE 15 and the *International Fire Code*. *Refrigeration systems* containing carbon dioxide as the refrigerant shall also comply with IAR CO2 or be part of listed and labeled equipment.

**Reason:** The scope of IAR CO2 specifically excludes “Listed equipment or systems.” There are many listed refrigeration systems using carbon dioxide as the refrigerant. Field erected systems may also be evaluated by NRTLs to existing industry safety standards, such as UL 60335-2-40, UL 60335-2-89, and UL 471.

**Cost Impact:** The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

### Justification for no cost impact:

This change is only meant to address an inconsistency in order to maintain the intent of the scope.



# M65-24

IMC®: 1103.1

**Proponents:** Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

## 2024 International Mechanical Code

**Revise as follows:**

**1103.1 Refrigerant classification.** Refrigerants shall be classified in accordance with ASHRAE 34 as listed in Table 1103.1. Refrigerants without a refrigerant number designation or without a safety group classification in the referenced edition of ASHRAE Standard 34 shall be classified in accordance with the criteria in ASHRAE Standard 34 as a single-compound refrigerant blend of two or more compounds. Such safety classifications not assigned by ASHRAE Standard 34 shall be submitted for approval to the code official. Compliance with the requirements of this code is contingent upon use of approved safety classifications where not assigned by the referenced edition of ASHRAE Standard 34.

**Reason:** This change accounts for the fact that new refrigerants will be approved during continuous maintenance of ASHRAE 34 that cannot all be reflected in the latest edition of the IMC due to timing. It offers flexibility to use approved refrigerants even though they are not yet specified in the IMC.

**Cost Impact:** The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

**Justification for no cost impact:**

This proposal will provide more choice to the user and, thus, direct costs could ultimately be lower. In general, this change is not expected to have a bearing on cost.

**Staff Analysis:** The standard referenced within the new code text is in the current edition of the IMC.

# M9-24

IMC®: SECTION 202 (New), 1104.2, 1106.3, 1106.4

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

## 2024 International Mechanical Code

Add new definition as follows:

**EFFECTIVE DISPERSAL VOLUME.** The volume of a space or connected spaces in which leaked refrigerant will disperse.

**EFFECTIVE DISPERSAL VOLUME CHARGE (EDVC).** The maximum refrigerant charge permitted for an effective dispersal volume.

Revise as follows:

**1104.2 Machinery room.** Except as provided in Sections 1104.2.1 and 1104.2.2, all components containing the refrigerant shall be located either outdoors or in a *machinery room* where the quantity of refrigerant in an independent circuit of a *refrigeration system* exceeds both of the following:

1. The amounts shown in Table 1103.1, and
2. The effective dispersal volume charge as calculated in accordance with ASHRAE 15.

For refrigerant blends not listed in Table 1103.1, the same requirement shall apply ~~where the amount for any blend component exceeds that indicated in Table 1103.1 for each that component. This~~ These requirements shall also apply where the combined amount of the blend components exceeds a limit of 69,100 parts per million (ppm) by volume. Machinery rooms required by this section and containing only Group A1 or B1 refrigerants shall be constructed and maintained in accordance with Section 1105, for Group A1 and B1 refrigerants and in accordance with Sections 1105 and 1106 for Group A2, B2, A3 and B3 refrigerants. Machinery rooms required by this section and containing any Group A2, B2, A3, or B3 flammable refrigerants shall be constructed and maintained in accordance with Sections 1105 and 1106. Machinery rooms required by this section, containing any Group A2L or B2L flammable refrigerants and containing no Group A2, B2, A3, or B3 flammable refrigerants, shall be constructed and maintained in accordance with Section 1105 and Section 1106.4.1 through 1106.4.3.

Exceptions:

1. *Machinery rooms* are not required for *listed equipment* and *appliances* containing not more than 6.6 pounds (3 kg) of refrigerant, regardless of the refrigerant's safety classification, where installed in accordance with the *equipment's* or *appliance's* listing and the *equipment* or *appliance* manufacturer's installation instructions.
2. Piping in compliance with Section 1107 is allowed in other locations to connect components installed in a *machinery room* with those installed outdoors.

**1106.3 Class 2 and 3 refrigerants.** Where any flammable refrigerants of Groups A2, A3, B2 and B3 are used, the *machinery room* shall conform to the Class I, Division 2, *hazardous location* classification requirements of NFPA 70.

**1106.4 Group A2L and B2L refrigerants.** Machinery rooms for containing any Group A2L and/or B2L refrigerants and containing no refrigerants of Group A2, A3, B2, or B3 shall comply with Sections 1106.4.1 through 1106.4.3.

**Reason:** This proposal harmonizes with Addendum q to ASHRAE 15-2019. The latest published language of ASHRAE 15-2022 was used as the basis for this update. The revisions clarify which requirements apply in cases where a machinery room contains refrigerants from multiple safety groups. The revisions also refer to ASHRAE 15 for EDVC calculations, with the updated requirements for refrigerant charge quantity limits, for determination of when a machinery room is required.

**Cost Impact:** The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

**Justification for no cost impact:**



STATE OF WASHINGTON  
**STATE BUILDING CODE COUNCIL**

May 2018  
Log No. \_\_\_\_\_

**1. State Building Code to be Amended:**

- |   |   |
|---|---|
| <input type="checkbox"/> International Building Code          | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code   | <input type="checkbox"/> International Fuel Gas Code              |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code           |
| <input type="checkbox"/> International Residential Code       | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code     |
| <input type="checkbox"/> International Fire Code              | <input type="checkbox"/> Wildland Urban Interface Code            |
| <input type="checkbox"/> Uniform Plumbing Code                |   |

For the Washington State Energy Code, please see specialized [energy code forms](#)

**Section(s):** 2021 IMC Sections 1101.1.1, 1107.4, 1109.2.7, 1109.3.2, and Chapter 15

**Title:** Chapter 11 Refrigeration – Addition of ASHRAE 15.2

**2. Proponent Name (Specific local government, organization or individual):**

**Proponent:** Eric Vander Mey, PE  
**Title:** Principal  
**Date:** 11/12/2024

**3. Designated Contact Person:**

**Name:** Eric Vander Mey  
**Title:** Delta E Consulting  
  
**Cell:** (206) 321-1677  
**E-Mail:** ericv@deltaeconsulting.com

**4. Proposed Code Amendment.** Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code, additional pages may be attached.

Clearly state if the proposal modifies an existing amendment or if a new amendment is needed. If the proposal modifies an **existing amendment**, show the modifications to the existing amendment by underlining all added language and striking through all deleted language. If a new amendment is needed, show the modifications to the **model code** by underlining all added language and striking through all deleted language.

**Code(s)**        **2021 International Mechanical Code (IMC)**  
**Section(s)**    **1101.1.1, 1107.4, 1109.2.7, 1109.3.2, and Chapter 15**

Enforceable code language must be used.  
Amend section to read as follows:

Base language in black text is from 2021 WSMC  
See revisions proposed below with track changes in blue text

1101.1.1 Refrigerants other than ammonia.

~~Refrigerant piping design and installation for systems containing a refrigerant other than ammonia, including pressure vessels and pressure relief devices, shall comply with this chapter and ASHRAE 15.~~

Refrigeration systems using a refrigerant other than ammonia shall comply with this chapter, the International Fire Code, and either ASHRAE 15 or ASHRAE 15.2, as applicable and the International Fire Code.

Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with IAR CO2 .

1107.4: Piping materials standards.

Refrigerant pipe shall conform to one or more of the standards listed in Table 1107.4. For refrigeration systems complying with ASHRAE 15.2 used in residential occupancies serving only a single dwelling or sleeping unit, refrigerant piping and tubing shall be limited to aluminum, copper, and copper alloy. The exterior of the pipe shall be protected from corrosion and degradation.

1107.5: Pipe fittings.

Refrigerant pipe fittings shall be approved for installation with the piping materials to be installed, and shall conform to one of more of the standards listed in Table 1107.5 or shall be listed and labeled as complying with UL 207. For refrigeration systems complying with ASHRAE 15.2 used in residential occupancies serving only a single dwelling unit or sleeping unit, refrigerant fittings shall be limited to aluminum, copper, copper alloys, stainless steel, and steel.

1109.2.7: Pipe identification.

Refrigerant pipe located in areas other than the room or space where the refrigerating equipment is located shall be identified. The pipe identification shall be located at intervals not exceeding 20 feet (6096 mm) on the refrigerant piping or pipe insulation. The minimum height of lettering of the identification label shall be 1/2 inch (12.7 mm). The identification shall indicate the refrigerant designation and safety group classification of refrigerant used in the piping system. For Group A2L and B2L refrigerants, the identification shall also include the following statement: "WARNING-Risk of Fire. Flammable Refrigerant." For Group A2, A3, B2 and B3 refrigerants, the identification shall also include the following statement: "DANGER-Risk of Fire or Explosion.

Flammable Refrigerant." For any Group B refrigerant, the identification shall also include the following statement: "DANGER-Toxic Refrigerant."

[Exception: For refrigeration systems complying with ASHRAE 15.2 used in residential occupancies serving only a single dwelling unit or sleeping unit pipe identification shall not be required.](#)

### 1109.3.2: Shaft ventilation.

Refrigerant pipe shafts with systems using Group A2L or B2L refrigerant shall be naturally or mechanically ventilated. Refrigerant pipe shafts with one or more systems using any Group A2, A3, B2 or B3 refrigerant shall be continuously mechanically ventilated and shall include a refrigerant detector. The shaft ventilation exhaust outlet shall comply with Section 501.3.1. Naturally ventilated shafts shall have a pipe, duct or conduit not less than 4 inches (102 mm) in diameter that connects to the lowest point of the shaft and extends to the outdoors. The pipe, duct or conduit shall be level or pitched downward to the outdoors. Mechanically ventilated shafts shall have a minimum airflow velocity in accordance with Table 1109.3.2. The mechanical ventilation shall be continuously operated or activated by a refrigerant detector. Systems utilizing a refrigerant detector shall activate the mechanical ventilation at a maximum refrigerant concentration of 25 percent of the lower flammable limit of the refrigerant. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors.

[Exception: For refrigeration systems complying with ASHRAE 15.2 used in residential occupancies serving only a single dwelling unit or sleeping unit, shaft ventilation shall not be required where the pipe or tube is continuous without fittings in the shaft.](#)

## Chapter 15 Referenced Standards

### ASHRAE

#### [15.2-2022 Safety Standard for Refrigeration Systems in Residential Applications](#)

- 5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.** Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Align 2024 WSMC with 2027 IMC code change proposal. See attached code change proposal for details. Allows ASHRAE 15.2 to be utilized for refrigeration systems service single dwelling or sleeping units where applicable. Allowing flexibility for code compliance and cost savings.](#)

- 6. Specify what criteria this proposal meets.** You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact:  Yes  No

If no, state reason:

If yes, provide economic impact, costs and benefits as noted below in items a – f.

- a. **Life Cycle Cost.** Use the OFM Life Cycle Cost [Analysis tool](#) to estimate the life cycle cost of the proposal using one or more typical examples. Reference these [Instructions](#); use these [Inputs](#). Webinars on the tool can be found [Here](#) and [Here](#)). If the tool is used, submit a copy of the excel file with your proposal submission. If preferred, you may submit an alternate life cycle cost analysis.

Life cycle cost analysis not required as this is an alternate means of compliance that can be selected.

- b. **Construction Cost.** Provide your best estimate of the construction cost (or cost savings) of your code change proposal.

For residential projects, also provide construction cost of savings of \$200 to \$2000/(per dwelling unit or sleeping unit) for not having to installed the shaft natural or mechanical venting system and not having construct shaft to meet exterior envelope requirements for thermal insulation and air barrier per energy code requirements.

Show calculations here, and list sources for costs/savings, or attach backup data pages

Costs savings will vary based on number of dwelling units or sleeping units served by each rated but unvented refrigerant piping shaft. The more units each rated shaft serves the lower the cost savings per unit.

- c. **Code Enforcement.** List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Will require AHJ's to understand the provisions of ASHRAE 15.2 which will likely be required for 2027 IMC and are allowed per SBCC opinion for 2021 WSMC projects.

Does not require design professional to submit code alternate for AHJ review and approval saving engineering and code official costs.

- d. **Small Business Impact.** Describe economic impacts to small businesses:

No impact as this is an optional path that does not have to be selected.

- e. **Housing Affordability.** Describe economic impacts on housing affordability:

Lowers the cost of construction for dwelling and sleeping units. See Item b above.

- f. **Other.** Describe other qualitative cost and benefits to owners, to occupants, to the public, to the environment, and to other stakeholders that have not yet been discussed:

Allows for more cost effective transition to A2L and other refrigerants to meet Washington State Department of Ecology and US EPA requirements.

Please send your completed proposal to: [sbcc@des.wa.gov](mailto:sbcc@des.wa.gov)

**All questions must be answered to be considered complete. Incomplete proposals will not be accepted.**

# M62-24

IMC®: CHAPTER 11, SECTION 1101, 1101.1, 1101.1.1, 1107.4, 1107.5, 1109.2.7, 1109.3.2, ASHRAE Chapter 15 (New)

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

## 2024 International Mechanical Code

### CHAPTER 11 REFRIGERATION

#### SECTION 1101 GENERAL

**1101.1 Scope.** This chapter shall govern the design, installation, construction and repair of *refrigeration systems*. Permanently installed refrigerant storage systems and other components shall be considered as part of the *refrigeration system* to which they are attached.

#### Revise as follows:

**1101.1.1 Refrigerants other than ammonia.** *Refrigeration systems* using a refrigerant other than ammonia shall comply with this chapter, the International Fire Code, and either ASHRAE 15 or ASHRAE 15.2, as applicable and ~~the International Fire Code.~~ *Refrigeration systems* containing carbon dioxide as the refrigerant shall also comply with IAR CO2 .

**1107.4 Piping materials standards.** Refrigerant pipe shall conform to one or more of the standards *listed* in Table 1107.4. For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit, refrigerant piping and tubing shall be limited to aluminum, copper, and copper alloy. The exterior of the pipe shall be protected from corrosion and degradation.

**1107.5 Pipe fittings.** Refrigerant pipe fittings shall be *approved* for installation with the piping materials to be installed, and shall conform to one of more of the standards listed in Table 1107.5 or shall be *listed and labeled* as complying with UL 207. For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit, refrigerant fittings shall be limited to aluminum, copper, copper alloys, stainless steel, and steel.

**1109.2.7 Pipe identification.** Refrigerant pipe located in areas other than the room or space where the refrigerating *equipment* is located shall be identified. The pipe identification shall be located at intervals not exceeding 20 feet (6096 mm) on the refrigerant piping or pipe insulation. The minimum height of lettering of the identification label shall be  $\frac{1}{2}$  inch (12.7 mm). The identification shall indicate the *refrigerant designation* and safety group classification of refrigerant used in the piping system. For Group A2L and B2L refrigerants, the identification shall also include the following statement: "WARNING—Risk of Fire. Flammable Refrigerant." For Group A2, A3, B2 and B3 refrigerants, the identification shall also include the following statement: "DANGER—Risk of Fire or Explosion. Flammable Refrigerant." For any Group B refrigerant, the identification shall also include the following statement: "DANGER—Toxic Refrigerant."

**Exception:** For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit pipe identification shall not be required.

**1109.3.2 Shaft ventilation.** Refrigerant pipe shafts with systems using Group A2L or B2L refrigerant shall be naturally or mechanically ventilated. Refrigerant pipe shafts with one or more systems using any Group A2, A3, B2 or B3 refrigerant shall be continuously mechanically ventilated and shall include a refrigerant detector. The shaft ventilation exhaust outlet shall comply with Section 501.3.1. Naturally ventilated shafts shall have a pipe, duct or conduit not less than 4 inches (102 mm) in diameter that connects to the lowest point of the shaft and extends to the outdoors. The pipe, duct or conduit shall be level or pitched downward to the outdoors. Mechanically ventilated shafts shall have a minimum airflow velocity in accordance with Table 1109.3.2. The mechanical ventilation shall be continuously operated or activated by a refrigerant detector. Systems utilizing a refrigerant detector shall activate the mechanical ventilation at a maximum refrigerant concentration of 25 percent of the lower flammable limit of the refrigerant. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The shaft shall not

be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors. For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit, shaft ventilation shall not be required where the pipe or tube is continuous without fittings in the shaft.

**Add new standard(s) as follows:**

## **ASHRAE**

ASHRAE  
180 Technology Parkway  
Peachtree Corners, GA 30092

15.2-2022

Safety Standard for Refrigeration Systems in Residential Applications

**Reason:** This code change proposal adds the reference to ASHRAE 15.2, the installation standard for residential air conditioning systems used for a single dwelling or sleeping unit. This addition addresses a gap created in the Code when ASHRAE 15 split its scope between standards 15 and 15.2. As some systems covered by the scope of ASHRAE 15.2 are also covered by the IMC, its inclusion within the IMC is necessary. With the separation between ASHRAE 15 and ASHRAE 15.2, there were certain changes that impact the refrigerant piping requirements. For residential systems, the piping material is limited to aluminum, copper, and copper alloy pipe or tube. The fitting requirements are similar material requirements with the addition of stainless steel and steel.

Pipe identification is not required for piping system regulated by ASHRAE 15.2. The reason for this is that the refrigerant piping is obvious not needing to be individually identified. Whereas in commercial buildings there are often multiple piping systems where the type of piping system is not obvious.

For shaft ventilation, there is an allowance in residential systems to eliminate the ventilation of the shaft when the piping system is continuous without fittings in the shaft. This provision was added to the end of the section.

**Cost Impact:** The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

### **Justification for no cost impact:**

The inclusion of ASHRAE 15.2 into the IMC is editorial in nature, and as such will not impact the cost of construction. Changes to piping for ASHRAE 15.2 may actually reduce the cost of construction, by not requiring shaft ventilation when no joints are present in the shaft.

**Staff Analysis:** A review of the standard proposed for inclusion in the code, ASHREA 15.2 Safety Standard for Refrigeration Systems in Residential Applications, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.