RULE-MAKING ORDER
EMERGENCY RULE ONLY

CR-103E (December 2017)
(Implements RCW 34.05.350 and 34.05.360)

CODE REVISER USE ONLY

OFFICE OF THE CODE REVISER
STATE OF WASHINGTON
FILED

DATE: February 13, 2025
TIME: 11:53 AM

WSR 25-05-051

Agency: Washington State Building Code Council

Effective date of rule:

Emergency Rules

☒ Immediately upon filing.

☐ Later (specify) _____

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

☐ Yes ☒ No If Yes, explain:

Purpose: Amending WAC 51-52, the adoption of the 2021 International Mechanical Code with Washington State Amendments, to clarify requirements for A2L refrigerants. The changes coordinate the adopted code with the most recent ASHRAE 15, ASHRAE 15.2, ASHRAE 34, and UL 60335-2-40 standards. The majority of the changes are in Chapter 11, with updates to the referenced standards in Chapter 15 and coordinating changes to the definitions and the location of exhaust outlets.

Citation of rules affected by this order:

New: WAC 51-52-1103, -1104, -1109, and -1110
Repealed:
Amended: WAC 51-52-0202, -0501, -1101, -1105, -1106, -1107, and -1500
Suspended:

Statutory authority for adoption: RCW 19.27.031. 19.27.074

Other authority: RCW 19.27

EMERGENCY RULE

Under RCW 34.05.350 the agency for good cause finds:

☒ 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.

☐ 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: The changes proposed help coordinate with the hydrofluorocarbon rules adopted by Ecology that went into effect January 1, 2024, and provides clearer guidance on the use of A2L refrigerants. These changes will help ensure a safe and consistent application of the latest safety standards for A2L and other refrigerants that are now the only option available for some HVAC equipment. The rules will eliminate the need for owners, developers, architects, contractors and other engineers from pursuing the more costly route of code compliance through the use of alternate means and methods to use the necessary standards for the safe use of these refrigerants. On January 24, 2025, the State Building Code Council voted that an emergency basis exists, pursuant to RCW 19.27.032(1)(c)(iii), based on the cost and complexity of meeting both the mechanical code requirements and the refrigeration standards for the refrigerants with lower global warming potential required by chapter 173-443 WAC.

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	4	Amended	7	Repealed	____

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

	New	4	Amended	7	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	4	Amended	7	Repealed	____

The number of sections adopted using:

Negotiated rule making:	New	____	Amended	____	Repealed	____
Pilot rule making:	New	____	Amended	____	Repealed	____
Other alternative rule making:	New	____	Amended	____	Repealed	____

Date Adopted: January 24, 2025	**Signature:** 
Name: Todd Beyreuther	
Title: Council Chair	

AMENDATORY SECTION (Amending WSR 23-02-055, 23-12-106, and 23-20-025, filed 1/3/23, 6/7/23, and 9/25/23, effective 3/15/24)

WAC 51-52-0202 Section 202—General definitions.

BALANCED WHOLE HOUSE VENTILATION. Any combination of concurrently operating residential dwelling or sleeping unit mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent or 5 cfm, whichever is greater, of the total mechanical supply airflow rate.

NOT BALANCED WHOLE HOUSE VENTILATION. A whole house ventilation system serving a dwelling or sleeping unit that is not considered balanced in accordance with the definition in this code for *balanced whole house ventilation system*. Only other than Group R-2 dwelling and sleeping units are allowed in accordance with Section 403.4.4.1 to have *not balanced whole house ventilation systems*.

DISTRIBUTED WHOLE HOUSE VENTILATION. A whole house ventilation system shall be considered distributed when it supplies outdoor air directly (not transfer air) to each dwelling or sleeping unit habitable space, (living room, den, office, *interior adjacent room*, interior adjoining spaces or bedroom), and exhausts air from all kitchens and bathrooms directly outside.

NOT DISTRIBUTED WHOLE HOUSE VENTILATION. A whole house ventilation system shall be considered not distributed when either the supply system or the exhaust system is not distributed. Supply systems are not distributed when a habitable space is supplied with outdoor air to ventilate an *interior adjacent room* or an *interior adjoining space*. Exhaust systems are not distributed when all bathrooms and kitchens are not exhausted by the whole house ventilation system. If either the supply system or the exhaust system is not distributed, then the ventilation quality adjustment system coefficient adjustment is required in accordance with Section C403.4.3.

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.

ENCLOSED KITCHEN. A kitchen whose permanent openings to interior adjacent spaces do not exceed a total of 60 square feet (6 m^2).

INTERIOR ADJACENT ROOM. An enclosed room without exterior windows or openings to the outdoors located within a dwelling or sleeping unit that does not have interior unobstructed openings required for an *interior adjoining space*.

INTERIOR ADJOINING SPACE. A room or space without openings to the outdoors that is naturally ventilated from another habitable space by unobstructed fixed openings size in accordance with Section 402.3.

LOCAL EXHAUST. An exhaust system that uses one or more fans to exhaust air from a specific room or rooms within a residential dwelling or sleeping unit.

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

PERMANENT CONSTRUCTION. Construction that, if removed, would disturb the structural integrity of the building or the fire-resistance rating of a building assembly.

RELIEF AIR. Exhausted return air from a system that provides ventilation for human usage.

REPLACEMENT AIR. Outdoor air that is used to replace air removed from a building through an exhaust system. Replacement air may be derived from one or more of the following: Makeup air, supply air, transfer air, and infiltration. However, the ultimate source of all replacement air is outdoor air. When replacement air exceeds exhaust, the result is exfiltration.

WHOLE HOUSE VENTILATION SYSTEM. A mechanical ventilation system, including fans, controls, and ducts, which replaces, by direct means, air from the habitable rooms with *outdoor air*.

VENTILATION ZONE. Any indoor area that requires ventilation and comprises one or more spaces with the same occupancy category (see Table 403.3.1.1), occupant density, zone air distribution effectiveness (see Section 403.3.1.1.1.2), and design zone primary airflow per unit area.

AMENDATORY SECTION (Amending WSR 23-23-105, filed 11/15/23, effective 3/16/24)

WAC 51-52-0501 Section 501—General.

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:

1. **For ducts conveying explosive or flammable vapors, fumes or dusts:** 30 feet (9144 mm) from the property line; 10 feet (3048 mm) from operable openings into the building; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into the building which are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.

2. **For other product-conveying outlets:** 10 feet (3048 mm) from property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into the building; 10 feet (3048 mm) above adjoining grade.

3. **For environmental air exhaust other than enclosed parking garage and transformer vault exhaust:** 3 feet (914 mm) from property lines, 3 feet (914 mm) from operable openings into buildings for all occupancies other that Group U, and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Separation is not required between intake air openings and living space *exhaust air* openings of an individual *dwelling unit* or *sleeping unit* where an approved factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the manufacturer's instructions.

EXCEPTIONS:
1. The separation between an air intake and exhaust outlet on a single listed package HVAC unit.
2. Exhaust from environmental air systems other than garages may be discharged into an open parking garage.
3. Except for Group I occupancies, where ventilation system design circumstances require building HVAC air to be relieved, such as during economizer operation, such air may be relieved into an open or enclosed parking garage within the same building.

4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment.

5. For enclosed parking garage exhaust system outlets and transformer vault exhaust system outlets: 10 feet (3048 mm) from property lines which separate one lot from another; 10 feet (3048 mm) from operable openings into buildings; 3 feet (914 mm) horizontally from, 10 feet above, or 10 feet below adjoining finished walkways.

6. For transformer vault exhaust system outlets, subject to the requirements of NFPA 70 Section 450.45: Ten feet (3048 mm) from fire escapes, required means of egress at the exterior of the building, elements of exit discharge, exterior combustible materials, and openings that are not protected in accordance with Section 705.8 of the *International Building Code*; 10 feet (3048 mm) from property lines which separate one lot from another; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above walkways.

7. For elevator machinery rooms in enclosed or open parking garages: Exhaust outlets may discharge air directly into the parking garage.

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 <u>for relief devices</u>, Section 1105.7.

8.7. Machinery room discharge, Section 1105.6.1.

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

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

501.4 Pressure equalization. Mechanical exhaust systems shall be sized to remove the quantity of air required by this chapter to be exhausted. The system shall operate when air is required to be exhausted. Where mechanical exhaust is required in a room or space, such space shall be maintained with a neutral or negative pressure. If a greater quantity of air is supplied by a mechanical ventilating supply system than is removed by a mechanical exhaust for a room, adequate means shall be provided for the natural or mechanical exhaust of the excess air supplied. If only a mechanical exhaust system is installed for a room or if a greater quantity of air is removed by a mechanical exhaust system than is supplied by a mechanical ventilating supply system for a room, adequate makeup air consisting of supply air, transfer air or outdoor air shall be provided to satisfy the deficiency. The calculated building infiltration rate shall not be used to satisfy the requirements of this section.

EXCEPTION: Intermittent kitchen exhaust, intermittent domestic dryer exhaust, and intermittent local exhaust systems in R-3 occupancies and dwelling units in R-2 occupancies are excluded from the pressure equalization requirement unless required by Section 504 or Section 505.

AMENDATORY SECTION (Amending WSR 23-02-055, 23-12-106, and 23-20-025, filed 1/3/23, 6/7/23, and 9/25/23, effective 3/15/24)

WAC 51-52-1101 ((~~Reserved.~~)) General.

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. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with IIAR CO2 or be part of *listed* and *labeled equipment*.

NEW SECTION

WAC 51-52-1103 Section 1103—Refrigeration system classification.

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 34 shall be classified in accordance with the criteria in ASHRAE 34 as a single-compound refrigerant blend of two or more compounds. Such safety classifications not assigned by ASHRAE 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 34.

NEW SECTION

WAC 51-52-1104 Section 1104—Refrigeration system application requirements.

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 for that component. 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. *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 and 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 Sections 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.

1104.3.1 High-probability air conditioners, heat pumps, and dehumidifiers. High-probability 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:
1. Laboratories where the floor area per occupant is not less than 100 square feet (9.3 m^2).
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.
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.

TABLE 1104.3.2

MAXIMUM PERMISSIBLE QUANTITIES OF REFRIGERANTS

This table is not adopted.

1104.3.5 Corridors and lobbies. Refrigerating systems in a public corridor or lobby shall comply with ASHRAE 15 Section 7.5.1.2.

AMENDATORY SECTION (Amending WSR 23-02-055, 23-12-106, and 23-20-025, filed 1/3/23, 6/7/23, and 9/25/23, effective 3/15/24)

WAC 51-52-1105 ((~~Reserved.~~)) Section 1105—Machinery room, general 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 *building* and comply with all of the following:

1. The point of vent discharge shall be at a location not less than 15 feet (4572 mm) above the adjoining grade level.

2. 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 feet (6096 mm) 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 (RLC). 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 RLC. The volume for the refrigerant concentration calculation shall be determined using the gross area of the space and a height of 8.2 feet (2500 mm), 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 inches (610 mm) 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.

AMENDATORY SECTION (Amending WSR 23-23-105, filed 11/15/23, effective 3/16/24)

WAC 51-52-1106 Section 1106—Machinery room, special requirements.

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* containing any Group A2L 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.

1106.4.1 Elevated temperatures. 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 ((~~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.~~)) **Refrigerant detector.** 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
((~~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~~

~~Refrigerant~~	~~Q(m/sec)~~	~~Q(cfm)~~
~~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~~))

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

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-1107 Section 1107—((~~Reserved~~)) Piping material.

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 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 or 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.

NEW SECTION

WAC 51-52-1109 Section 1109—Refrigerant pipe installation.

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 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.

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 the 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. 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.

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.
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.

1109.4.2 Shaft ventilation. 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.

NEW SECTION

WAC 51-52-1110 Section 1110—Refrigerant piping system test.

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.

AMENDATORY SECTION (Amending WSR 23-02-055, 23-12-106, and 23-20-025, filed 1/3/23, 6/7/23, and 9/25/23, effective 3/15/24)

WAC 51-52-1500 Chapter 15—Referenced standards. The following referenced standards are amended or added to Chapter 15.

AHAM
Association of Home Appliance Manufacturers
1111 19th St. N.W., #402
Washington D.C. 20036

AHAM-Certified Range Hood Directory. 403.4.7.3.1

HRH-2 Household Range Hoods 403.4.7.3.1

ANCE

UL/CSA/ANCE 60335-2-40—((~~2019~~)) 2022 Household and Similar Electrical Appliances - Safety - Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers 1101.2

ASHRAE

15-2022 Safety Standard for Refrigeration Systems. 1101.6, 1104.3.5, 1105.8, 1106.4.2, 1108.1

15.2-2022 Safety Standard for Refrigeration Systems in Residential Applications. 1101.1.1, 1107.4, 1107.5, 1109.2.7, 1109.3.2

34-2022 Designation and Safety Classification of Refrigerants. . . . 202, 1102.2.1, 1103.1

62.2-2019 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. 401.4, 403.4, 403.4.7.3.3, 403.4.11

ASTM

E3087—18: Standard Test Method for Measuring Capture Efficiency of Domestic Range Hoods. . . . . 403.4.7.3.2, Table 403.4.7.3.2

CSA

UL/CSA/ANCE 60335-2-40—((~~2019~~)) 2022 Household and Similar Electrical Appliances - Safety - Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers. 1101.2

HVI address:
Home Ventilating Institute
1740 Dell Range Blvd., Suite H, PMB 450
Cheyenne, WY 82009

HVI Publication 911 Certified Home Ventilating Product Directory. 403.4.7.3.4

HVI 915-2020 Procedure for Loudness Testing of Residential Fan Products. 403.4.6.1, 403.4.6.2, 403.4.7.2

HVI 916-2020 Air Flow Test Procedure. 403.4.6.1, 403.4.6.2, 403.4.7.2

HVI 920-2020 Product Performance Certification Procedure Including Verification and Challenge. 403.4.6.1, 403.4.6.2, 403.4.7.2

NFPA

110-22 Standard for Emergency and Standby Power Systems. 915.3, 915.3.1, 915.3.2

111-22 Standard on Stored Electrical Energy Emergency and Standby Power Systems. 915.3, 915.4

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864-2014 Control Units and Accessories for Fire Alarm Systems with revisions through October 2018. . . . . 606.2.2

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