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See comments in attached file

Editorial Public Comments by:

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Editorial Public Comments based on WAC 173-443 CR-102 proposed rule filed on 7/13/2023:

**Comment 1: Clarify definitions in regards to Potable Air-to-Water Heat Pumps or Reverse Cycle Chillers**

Recommend adding the following sentence at the end of the "air conditioning equipment" and "chiller" definitions to clarify that potable or service hot water heating equipment that utilizes the refrigeration cycle is not an air conditioning equipment:

"Air conditioning equipment does not include potable or service hot water heating equipment such as reverse cycle chillers, air-to-water heat pumps, and water-to-water heat pumps."

"Air conditioning" means the process of treating air to meet the requirements of a conditioning space by controlling its temperature, humidity, cleanliness, or distribution. "Air conditioning" includes the use of chillers, except for purposes of applying a maximum GWP threshold for new air conditioning equipment under WAC 173-443-040, and the use of heat pumps.

"Air conditioning equipment" or "air conditioning system" means the piece(s) of stationary equipment used to provide air conditioning. "Air conditioning equipment" or "air conditioning system" includes, but is not limited to, room air conditioners and residential and other dehumidifiers; ducted central air conditioners and heat pumps; nonducted air conditioners (both mini and multisplit); packaged roof top units; water source and ground source heat pumps; and remote condensing units used for comfort cooling. "Air conditioning equipment" or "air conditioning system" does not include mobile air conditioning systems, including those used in motor vehicles, rail and trains, aircraft, watercraft, recreational vehicles, recreational trailers, and campers.

"Chiller" means a water or heat transfer fluid chilling equipment package custom built in place or a factory-made and prefabricated assembly of one or more compressors, condensers and evaporators, with interconnections and accessories including controls, designed for the purpose of cooling or heating water or a heat transfer fluid. A chiller is a machine specifically designed to make use of a vapor compression cycle or absorption refrigeration cycle to transfer heat from a cold water or heat transfer fluid circulating system to the air, a heat transfer fluid, or other heat exchange media. Chillers can be water-cooled, air-cooled, or evaporatively cooled. Chillers include, but are not limited to, rotary chillers, centrifugal chillers, and positive displacement chillers, including reciprocating, scroll, and screw chillers. A chiller used for air conditioning purposes is considered air conditioning equipment except for purposes of applying a GWP threshold under WAC 173-443-040, Table 2. A chiller used for refrigeration in a retail food facility is considered an indirect type of "supermarket system." A chiller used for industrial process refrigeration is considered a type of "other refrigeration" application.

**Comment 2: No Exception for Existing Permits for Heating Chillers**

Recommend adding exemption to the following end-use categories for projects that have building or mechanical permits before the effective date of this chapter. This would allow exemptions for heating chillers similar to the Table 3 HVAC equipment.

Based on the Table 1 changes this is recommended for the following end-use categories:

- Centrifugal chillers – heating and heating and cooling (new)
- Positive displacement chillers – heating and heating and cooling (new)

There are many projects that have or will have permits (building or mechanical) by the end of 2023 that will need to revise the air-to-water heat pump chillers selections to meet the 1/1/2025 prohibited substances requirements of Table 1.

This means that this projects will have to revise the existing permits. They also may need to select other manufacturers as the basis of design manufacturer that is planned may not have equipment redesigned and listed for the alternate refrigerants. This could have space coordination changes and other significant late changes for permitted equipment that is in the process of being procured.

**TABLE 1. Prohibited Substances for New Products and Equipment**

<b>End-Use Category: Air Conditioning</b>		
<b>End-Use</b>	<b>Prohibited Substances</b>	<b>Effective Date</b>
<u>Centrifugal chillers - Cooling only (New)</u>	<u>FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC-245fa, R-125/134a/600a (28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-423A, R-424A, R-434A, R-438A, R-507A, RS-44 (2003 composition), THR-03</u>	<u>January 1, 2024</u>
<u>Positive displacement chillers - Cooling only (New)</u>	<u>FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/134a/600a (28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-424A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 composition), SP34E, THR-03</u>	<u>January 1, 2024</u>
<u>Centrifugal chillers - Heating and heating and cooling (New)</u>	<u>FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC-245fa, R-125/134a/600a (28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-423A, R-424A, R-434A, R-438A, R-507A, RS-44 (2003 composition), THR-03</u>	<u>January 1, 2025</u>
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**Comment 3: 4-pipe heat recovery chillers is considered cooling only or cooling and heating**

Recommend clarifying if a 4-pipe heat recovery chillers is considered cooling only or cooling and heating. Is a 4-pipe heat recovery chiller that controls to only the leaving chilled water temperature on the evaporator side of the chiller and that rejects heat on the condenser side to a hot water loop (instead of a condenser water loop) but does not actively control to a leaving water temperature on the condenser side a cooling only chiller or a heating and cooling chiller?

Recommend clarifying this it may be considered a cooling only device as there is no control of the leaving water temperature on the condenser side. There is only heat recovery of the heat on the condenser side that is uncontrolled. As there is a difference of a year for the effective date whether the heat recovery chiller it is important to be clear on how these cooling only controlled heat recovery chillers will be classified in Table 1.

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<b>End-Use</b>	<b>Prohibited Substances</b>	<b>Effective Date</b>
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<u>Positive displacement chillers - Cooling only (New)</u>	<u>FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/134a/600a (28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-424A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 composition), SP34E, THR-03</u>	<u>January 1, 2024</u>
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<u>Positive displacement chillers - Heating and heating and cooling (New)</u>	<u>FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/134a/600a (28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-424A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 composition), SP34E, THR-03</u>	<u>January 1, 2025</u>

**Comment 4: Table 3 Exemptions**

Recommend changing the wording wording of the exemptions for the Table 3 equipment as follows:

“Facilities with new air conditioning equipment with a building permit or mechanical permit issued before the effective date of this chapter.”

By adding the words mechanical permit this will allow projects that have a mechanical permit issued but do not have a building permit yet issued to utilizing the mechanical permit that is likely under the 2018 International Mechanical Code to install the equipment with a refrigerant with a GWP greater than 750.

For VRF systems that have to have the HVAC system installed and filled with refrigerant by the effective date in Table 3 if the project does not get the building permit in time but does get the mechanical permit this would allow the project to not have to redesign the system. The redesign for VRF systems requires the 2021 International Mechanical Code and most jurisdictions do not typically allow for mixing of code provisions between cycles. This may require the whole project to be repermited under the 2021 codes which would be a substantial cost and substantial rework.

Also, it may be clearer to the public to just indicate a date (like January 31, 2024) instead of saying “effective date of this chapter” as the chapter may be revised in the future and some folks are confusing this date with the effective dates in Table 3 (for example: VRF is effective January 1, 2026).

**TABLE 3. Exemptions for New Stationary Air Conditioning Equipment**

<b><u>End-Use</u></b>	<b><u>Prohibited Substances</u></b>	<b><u>Exemptions</u></b>
<u>Room air conditioners and residential dehumidifiers</u>	<u>Refrigerants with a GWP of 750 or more</u>	<u>Facilities with new air conditioning equipment with a building permit issued before the effective date of this chapter.</u>
<u>Variable refrigerant flow (VRF) or volume system</u>	<u>Refrigerants with a GWP of 750 or more</u>	<u>Facilities with new air conditioning equipment with a building permit issued before the effective date of this chapter.</u>
<u>Other types of air conditioning equipment used in residential and nonresidential applications</u>	<u>Refrigerants with a GWP of 750 or more</u>	<u>Facilities with new air conditioning equipment with a building permit issued before the effective date of this chapter.</u>

**Comment 5: Do SPVHP's fall into the PTHP effective date of 1/1/2024?**

SPVHPs (or VTHPs) are covered under a different AHRI standard in the Washington State Energy Code than PTHP's but have a similar wall sleeve installation but are larger than PTHP's and vertical. SPVHP's may serve a single room or could be ducted to serve more than one room depending on how they are installed.

- PTHP under AHRI 310/380
- SPVHP under AHRI 390

Are SPVHP's (VTHP's) part of the room air conditioners or other HVAC end-use category?

(3) Table 3 in this section lists prohibited substances in new air conditioning equipment, as defined in WAC 173-443-030, and the effective date of the prohibition, unless an exemption is provided for in WAC 173-443-050.

**TABLE 3. Prohibited Substances for New Air Conditioning Equipment**

<u>End-Use</u>	<u>Criteria</u>	<u>Prohibited Substances</u>	<u>Effective Date</u>
<u>Room air conditioners and residential dehumidifiers</u>	<u>New air conditioning equipment</u>	<u>Refrigerants with a GWP of 750 or more</u>	<u>January 1, 2024</u>
<u>Other types of air conditioning equipment used in residential and nonresidential applications</u>	<u>New air conditioning equipment</u>	<u>Refrigerants with a GWP of 750 or more</u>	<u>January 1, 2028</u>
<u>Variable refrigerant flow (VRF) or volume system</u>	<u>New air conditioning equipment</u>	<u>Refrigerants with a GWP of 750 or more</u>	<u>January 1, 2026</u>

"Packaged terminal air conditioner" or "PTAC" means a wall sleeve and a separate unencased combination of heating and cooling assemblies specified by the builder and intended for mounting through a wall. "Packaged terminal air conditioner" includes a prime source of refrigeration, separable outdoor louvers, forced ventilation, and heating availability by builder's choice of energy.

"Packaged terminal heat pump" or "PTHP" means a packaged terminal air conditioner that utilizes reverse cycle refrigeration as its prime heat source and can have supplementary heating availability by builder's choice of energy.

"Room air conditioner" includes window units, wall units, packaged terminal air conditioners (PTACs), packaged terminal heat pumps (PTHPs), and portable air conditioners.

**TABLE C403.3.2(4)**  
**ELECTRICALLY OPERATED PACKAGED TERMINAL AIR CONDITIONERS,**  
**PACKAGED TERMINAL HEAT PUMPS, SINGLE-PACKAGE VERTICAL AIR CONDITIONERS,**  
**SINGLE-PACKAGE VERTICAL HEAT PUMPS, ROOM AIR CONDITIONERS AND**  
**ROOM AIR-CONDITIONER HEAT PUMPS—MINIMUM EFFICIENCY REQUIREMENTS<sup>e</sup>**

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure <sup>a</sup>
PTAC (cooling mode) Standard size	< 7,000 Btu/h	95°F db/75°F wb outdoor air <sup>c</sup>	11.9 EER	AHRI 310/380
	≥ 7,000 Btu/h and ≤ 15,000 Btu/h		14.0 - (0.300 × Cap/1000) EER <sup>d</sup>	
	> 15,000 Btu/h		9.5 EER	
PTAC (cooling mode) Nonstandard size <sup>a</sup>	< 7,000 Btu/h	95°F db/75°F wb outdoor air <sup>c</sup>	9.4 EER	AHRI 310/380
	≥ 7,000 Btu/h and ≤ 15,000 Btu/h		10.9 - (0.213 × Cap/1000) EER <sup>d</sup>	
	> 15,000 Btu/h		7.7 EER	
PTHP (cooling mode) Standard size	< 7,000 Btu/h	95°F db/75°F wb outdoor air <sup>c</sup>	11.9 EER	AHRI 310/380
	≥ 7,000 Btu/h and ≤ 15,000 Btu/h		14.0 - (0.300 × Cap/1000) EER <sup>d</sup>	
	> 15,000 Btu/h		9.5 EER	
PTHP (cooling mode) Nonstandard size <sup>b</sup>	< 7,000 Btu/h	95°F db/75°F wb outdoor air <sup>c</sup>	9.3 EER	AHRI 310/380
	≥ 7,000 Btu/h and ≤ 15,000 Btu/h		10.8 - (0.213 × Cap/1000) EER <sup>d</sup>	
	> 15,000 Btu/h		7.6 EER	
PTHP (heating mode) Standard size	< 7,000 Btu/h	47°F db/43°F wb outdoor air	3.3 COP <sub>H</sub>	AHRI 310/380
	≥ 7,000 Btu/h and ≤ 15,000 Btu/h		3.7 - (0.052 × Cap/1000) COP <sub>H</sub> <sup>d</sup>	
	> 15,000 Btu/h		2.90 COP <sub>H</sub>	
PTHP (heating mode) Nonstandard size <sup>b</sup>	< 7,000 Btu/h	47°F db/43°F wb outdoor air	2.7 COP <sub>H</sub>	AHRI 310/380
	≥ 7,000 Btu/h and ≤ 15,000 Btu/h		2.9 - (0.026 × Cap/1000) COP <sub>H</sub> <sup>d</sup>	
	> 15,000 Btu/h		2.5 COP <sub>H</sub>	
SPVAC (cooling mode)	< 65,000 Btu/h	95°F db/75°F wb outdoor air <sup>c</sup>	11.0 EER	AHRI 390
	≥ 65,000 Btu/h and < 135,000 Btu/h		10.0 EER	
	≥ 135,000 Btu/h and < 240,000 Btu/h		10.0 EER	
SPVHP (cooling mode)	< 65,000 Btu/h	95°F db/75°F wb outdoor air <sup>c</sup>	11.0 EER	AHRI 390
	≥ 65,000 Btu/h and < 135,000 Btu/h		10.0 EER	
	≥ 135,000 Btu/h and < 240,000 Btu/h		10.0 EER	
SPVHP (heating mode)	< 65,000 Btu/h	47°F db/43°F wb outdoor air	3.3 COP	AHRI 390
	≥ 65,000 Btu/h and < 135,000 Btu/h		3.0 COP	
	≥ 135,000 Btu/h and < 240,000 Btu/h		3.0 COP	

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### Comment 6: Clarify definitions of the word “System”

The word system is not defined but is used throughout the standard. Does the 2021 IMC definition apply for how the word system is utilized in regard to calculating a system and its associated refrigerant volume?

Recommend adding a definition for system. Could refer to Chapter 11 of the IMC for how systems are classified.

2021 IMC Section 1102 discusses how a refrigeration system is classified.

## CHAPTER 11 REFRIGERATION

### SECTION 1102 SYSTEM REQUIREMENTS

Premium Code Insights :  Key Changes

#### 1102.1 General.

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

1. Determine the refrigeration system's classification, in accordance with Section 1103.3.
2. Determine the refrigerant classification in accordance with Section 1103.1.
3. Determine the maximum allowable quantity of refrigerant in accordance with Section 1104, based on type of refrigerant, system classification and *occupancy*.
4. Determine the system enclosure requirements in accordance with Section 1104.
5. Refrigeration *equipment* and *appliance* location and installation shall be subject to the limitations of Chapter 3.
6. Nonfactory-tested, field-erected *equipment* and *appliances* shall be pressure tested in accordance with Section 1108.