ADDENDA

ANSI/ASHRAE/IES Addendum ay to
ANSI/ASHRAE/IES Standard 90.1-2019

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on July 20, 2022; by the ASHRAE Board of Directors on August 15, 2022; by the Illuminating Engineering Society on September 8, 2022; and by the American National Standards Institute on September 9, 2022.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (https://www.ashrae.org/continuous-maintenance).

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FOREWORD

Standard 90.1-2019 Tables 6.8.1-8 and 6.8.1-9 address the minimum efficiency requirements for variable refrigerant flow (VRF) air conditioners and heat pumps, respectively. Presently, these minimum efficiency requirements are based on the following energy efficiency metrics:

- *For cooling:*
  - *SEER (for air-cooled systems with cooling capacity <65,000 Btu/h) (SEER2 after 1/1/23)*
  - *EER and IEER (for systems with cooling capacity ≥65,000 Btu/h)*
- *For heating:*
  - *HSPF (for air-cooled systems with cooling capacity <65,000 Btu/h) (HSPF2 after 1/1/23)*
  - *COP_H at varying rating conditions (for systems with cooling capacity ≥65,000 Btu/h)*

In 2018, the U.S. Department of Energy (DOE) Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) VRF Working Group (WG) began negotiation meetings to revise the test procedure (TP) and energy conservation standards (ECS) for VRF equipment. This WG comprised representatives from the following stakeholder groups: energy/environment advocates, utilities, VRF original equipment manufacturers (OEMs), consumer advocates/users, and regulatory authorities. A full list of WG participation is available on the DOE ASRAC website[1]. The TP term sheet was approved on October 1, 2019. The ECS term sheet was approved November 15, 2019.

Significant modifications were made to the TP for VRF equipment via the ASRAC negotiation process, and a TP term sheet was approved on October 1, 2019[2]. Subsequently, AHRI published the final TP, AHRI Standard 1230, Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment*, on May 18, 2021[3]. Several test procedure revisions were made such that VRF system ratings in accordance with AHRI Standard 1230-2021 are not equivalent to the system ratings in accordance with preceding versions of AHRI Standard 1230. A notable revision incorporated with AHRI Standard 1230-2021 is the setting of a new sensible heat ratio (SHR) requirement at the 100% and 75% cooling test load conditions (see Section 6.3.3.2). The new SHR requirement limits the sensible cooling capacity relative to the total cooling capacity at both 100% and 75% cooling test loads. As a result, the indoor airflow and corresponding net cooling capacity used to calculate the system's EER at 100% and 75% cooling load points will decrease.*

The ECS for VRF were also negotiated by the ASRAC VRF WG, and the final term sheet was approved on November 5, 2019.[4]

Per the term sheets, the energy efficiency metric used to determine the energy conservation standards is recommended to move from EER (at 100% cooling load point) to IEER. Further, the IEER and COP_H ECS recommended in the term sheet are the same numbers as the current minimum efficiency requirement levels in ASHRAE/IES Standard 90.1-2019; however, given the increased stringency in the test procedure (AHRI 1230-2021), these same numbers represent a 12% increase in efficiency[5]. The term sheets also recommend a proposed effective date to DOE of January 1, 2024, for both the TP and ECS, in line with the term sheet.

To address the outcome of these DOE ASRAC VRF WG negotiations in Standard 90.1, Addendum ay makes the following changes:

a. Updates the test procedure reference under Tables 6.8.1-8 and 6.8.1-9 to AHRI Standard 1230-2021 with an effective date of January 1, 2024.

b. Adds a note under Tables 6.8.1-8 and 6.8.1-9 clarifying the difference between a VRF heat-pump system and a VRF heat-pump system with heat recovery modules.

1. www.energy.gov/eere/buildings/appliance-standards-and-rulemaking-federal-advisory-committee#Variable%20Refrigerant%20Flow%20Multi-Split%20Air%20Conditioners%20and%20Heat%20Pumps%20Working%20Group
2. www.regulations.gov/document/EERE-2018-BT-STD-0003-0044
3. www.ahrinet.org/App_Content/ahri/files/STANDARDS/AHRI/AHRI_Standard_1230-2021.pdf
4. www.regulations.gov/document/EERE-2018-BT-STD-0003-0055
5. *Variable Refrigerant Flow (VRF) Multi-Split Air Conditioners and Heat Pumps: Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) Working Group Meeting 9*. Washington, DC: DOE.

c. Adds a note under Tables 6.8.1-8 and 6.8.1-9 clarifying the outdoor-indoor combination used for ratings per AHRI Standard 1230.

d. Deletes dated/expired IEER and COP_H efficiency levels for certain VRF system types.

e. Deletes air-cooled, single-phase VRF multisplit air conditioners and heat pumps with cooling capacity less than 65,000 Btu/h in Tables 6.8.1-8 and 6.8.1-9. These are considered residential central air conditioners and heat pumps and are regulated under the energy conservation program for consumer products (10 CFR Part 430, Subpart B, Appendices M and M1 and 10 CFR Part 430, Subpart C).

Economic Analysis

DOE estimates the average annual per-unit energy consumption is approximately 9100 kWh [6]. Nationally, VRF consume an estimated 0.04% of all national annual building energy use for an estimated total of 0.01 quads of primary energy consumption in 2016 [7]. DOE also estimates that approximately 28,000 VRF multisplit systems are shipped annually in the United States [8]. This efficiency improvement will remove a significant percentage of products from the market by increasing IEER and EER levels and by requiring retesting of all products to comply with the new test procedure. DOE is completing a cost-effectiveness study of this measure proposal for the forthcoming rulemaking; it is expected to be within ASHRAE's scalar limit of 12 years for a product with a 15 year life, so the change is cost effective.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum ay to Standard 90.1-2019

6. DOE VRF FAQ: https://www.energy.gov/sites/prod/files/2019/07/f64/vrf-ecs-rfi-noda-faq.pdf
7. *Ibid.*
8. *Ibid.*

Modify Tables 6.8.1-8 and 6.8.1-9 (I-P).

Table 6.8.1-8 Electrically Operated Variable-Refrigerant-Flow Air Conditioners—Minimum *Efficiency* Requirements

Equipment Type[a]	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air conditioners, air-cooled	<65,000 Btu/h three-phase for applications in the US and single- and three-phase for applications outside the US	All	*VRF* multisplit *system*	13.0 *SEER* Before 1/1/23 SEER2 = 13.4 On or after 1/1/23	AHRI 1230-2014 with Addendum 1 (before 1/1/2023) AHRI 210/240-2023 (on or after 1/1/2023)
	≥65,000 Btu/h and <135,000 Btu/h	*Electric resistance* (or none)	*VRF* multisplit *system*	11.2 *EER* 15.5 *IEER* Before 1/1/2024 10.5 *EER* 15.5 *IEER* On or after 1/1/24	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
	≥135,000 Btu/h and <240,000 Btu/h	*Electric resistance* (or none)	*VRF* multisplit *system*	11.0 *EER* 14.9 *IEER* Before 1/1/2024 10.3 *EER* 14.9 *IEER* On or after 1/1/24	
	≥240,000 Btu/h	*Electric resistance* (or none)	*VRF* multisplit *system*	10.0 *EER* 13.9 *IEER* Before 1/1/2024 9.5 *EER* 13.9 *IEER* On or after 1/1/24	

a. *VRF* outdoor units can be combined with innumerable indoor unit combinations, which will vary by application, building type, building size, operating conditions, and comfort level goals. Selection of indoor units tested during the test is considered to be representative of commonly sold applications and is detailed in AHRI Standard 1230.

Informative Note: For single-phase *VRF* air conditioners, air-cooled ~~*systems*~~ less than 65,000 Btu/h see Informative Appendix F, Table F-1 for the U.S. Department of Energy minimum.

Table 6.8.1-9 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum Efficiency Requirements

Equipment Type[a]	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air-cooled (cooling mode)	<65,000 Btu/h three-phase for applications in the US and single- and three-phase for applications outside the US	All	*VRF* multisplit *system*	13.0 *SEER* Before 1/1/2023 SEER2 = 13.4 On or after 1/1/2023	AHRI 1230-2014 with Addendum 1 (before 1/1/2023) AHRI 210/240-2023 (on or after 1/1/2023)
	≥65,000 Btu/h and <135,000 Btu/h	Electric resistance (or none)		11.0 *EER* 14.6 *IEER* Before 1/1/2024 10.3 *EER* 14.6 *IEER* On or after 1/1/24	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
			VRF multisplit *system* with heat recovery	10.8 *EER* 14.4 *IEER* Before 1/1/2024 10.1 *EER* 14.4 *IEER* On or after 1/1/24	
	≥135,000 Btu/h and <240,000 Btu/h		*VRF* multisplit *system*	10.6 *EER* 13.9 *IEER* Before 1/1/2024 9.9 *EER* 13.9 *IEER* On or after 1/1/24	
			VRF multisplit *system* with heat recovery	10.4 *EER* 13.7 *IEER* Before 1/1/2024 9.7 *EER* 13.7 *IEER* On or after 1/1/24	
	≥240,000 Btu/h		*VRF* multisplit *system*	9.5 *EER* 12.7 *IEER* Before 1/1/2024 9.1 *EER* 12.7 *IEER* On or after 1/1/24	
			VRF multisplit *system* with heat recovery	9.3 *EER* 12.5 *IEER* Before 1/1/2024 8.9 *EER* 12.5 *IEER* On or after 1/1/24	

a. *VRF* outdoor units can be combined with innumerable indoor unit combinations, which will vary by application, building type, building size, operating conditions, and comfort level goals. Selection of indoor units tested during the test is considered to be representative of commonly sold applications and is detailed in AHRI Standard 1230.

Informative Note: For single-phase *VRF* multisplit *system* less than 65,000 Btu/h, see Informative Appendix F, Table F-1 for the U.S. Department of Energy minimum.

Table 6.8.1-9 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum Efficiency Requirements

Equipment Type[a]	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF water source (cooling mode)	<65,000 Btu/h	All	*VRF* multisplit *systems* 86°F entering water	12.0 *EER* 16.0 *IEER*	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
			VRF multisplit *systems* with heat recovery 86°F entering water	11.8 *EER* 15.8 *IEER*	
	≥65,000 Btu/h and <135,000 Btu/h		*VRF* multisplit *system* 86°F entering water	12.0 *EER* 16.0 *IEER*	
			VRF multisplit *system* with heat recovery 86°F entering water	11.8 *EER* 15.8 *IEER*	
	≥135,000 Btu/h and <240,000 Btu/h		*VRF* multisplit *system* 86°F entering water	10.0 *EER* 14.0 *IEER*	
			VRF multisplit *system* with heat recovery 86°F entering water	9.8 *EER* 13.8 *IEER*	
	≥240,000 Btu/h		*VRF* multisplit *system* 86°F entering water	10.0 *EER* 12.0 *IEER*	
			VRF multisplit *system* with heat recovery 86°F entering water	9.8 *EER* 11.8 *IEER*	
VRF groundwater source (cooling mode)	<135,000 Btu/h	All	*VRF* multisplit *system* 59°F entering water	16.2 *EER*	AHRI 1230- 2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
			VRF multisplit *system* with heat recovery 59°F entering water	16.0 *EER*	
	≥135,000 Btu/h		*VRF* multisplit *system* 59°F entering water	13.8 *EER*	
			VRF multisplit *system* with heat recovery 59°F entering water	13.6 *EER*	
VRF ground source (cooling mode)	<135,000 Btu/h	All	*VRF* multisplit *system* 77°F entering water	13.4 *EER*	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI Standard 1230-2021 (on or after 1/1/2024)
			VRF multisplit *system* with heat recovery 77°F entering water	13.2 *EER*	
	≥135,000 Btu/h		*VRF* multisplit *system* 77°F entering water	11.0 *EER*	
			VRF multisplit *system* with heat recovery 77°F entering water	10.8 *EER*	

a. *VRF* outdoor units can be combined with innumerable indoor unit combinations, which will vary by application, building type, building size, operating conditions, and comfort level goals. Selection of indoor units tested during the test is considered to be representative of commonly sold applications and is detailed in AHRI Standard 1230.

Informative Note: For single-phase *VRF* multisplit *system* less than 65,000 Btu/h, see Informative Appendix F, Table F-1 for the U.S. Department of Energy minimum.

Table 6.8.1-9 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum Efficiency Requirements

Equipment Type[a]	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air-cooled (heating mode)	<65,000 Btu/h (cooling capacity) three-phase applications in the US and single and three-phase for applications outside the US	All	*VRF* multisplit *system*	7.7 *HSPF* Before 1/1/2023 On or after 1/1/2023 HSPF2 = 7.5	AHRI 1230-2014 with Addendum 1 (before 1/1/2023) AHRI 210/240-2023 (on or after 1/1/2023)
	≥65,000 Btu/h and <135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 47°F db/43°F wb *outdoor air*	3.3 COP_H	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI Standard 1230-2021 (on or after 1/1/2024)
			17°F db/15°F wb *outdoor air*	2.25 COP_H	
	≥135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 47°F db/43°F wb *outdoor air*	3.2 COP_H	
			17°F db/15°F wb *outdoor air*	2.05 COP_H	
VRF water source (heating mode)	<65,000 Btu/h (cooling capacity)	All	*VRF* multisplit *system* 68°F entering water	4.3 COP_H	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
	≥65,000 Btu/h and <135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 68°F entering water	4.3 COP_H	
	≥135,000 Btu/h and <240,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 68°F entering water	4.0 COP_H	
	≥240,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 68°F entering water	3.9 COP_H	
VRF groundwater source heating mode)	<135,000 Btu/h (cooling capacity)	All	*VRF* multisplit *system* 50°F entering water	3.6 COP_H	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
	≥135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 50°F entering water	3.3 COP_H	
VRF ground source (heating mode)	<135,000 Btu/h (cooling capacity)	All	*VRF* multisplit *system* 32°F entering water	3.1 COP_H	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
	≥135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 32°F entering water	2.8 COP_H	

a. *VRF* outdoor units can be combined with innumerable indoor unit combinations, which will vary by application, building type, building size, operating conditions, and comfort level goals. Selection of indoor units tested during the test is considered to be representative of commonly sold applications and is detailed in AHRI Standard 1230.

Informative Note: For single-phase *VRF* multisplit *system* less than 65,000 Btu/h, see Informative Appendix F, Table F-1 for the U.S. Department of Energy minimum.

Modify Tables 6.8.1-8 and 6.8.1-9 (SI).

Table 6.8.1-8 Electrically Operated Variable-Refrigerant-Flow Air Conditioners—Minimum *Efficiency* Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air conditioners, air-cooled[a]	<19 *kW* three-phase for applications in the US and single- and three-phase for applications outside the US	All	*VRF* multisplit system	3.81 $SCOP_C$ Before 1/1/23 On or after 1/1/2023 $SCOP2_C$ = 4.19	AHRI 1230-2014 with Addendum 1 (before 1/1/2023) AHRI 210/240-2023 (on or after 1/1/2023)
	≥19 *kW* and <40 *kW*	Electric resistance (or none)	*VRF* multisplit system	3.28 COP_C 4.54 *ICOP* Before 1/1/2024 3.08 COP_C 4.54 *ICOP* On or after 1/1/24	AHRI 1230- 2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
	≥40 *kW* and <70 *kW*	Electric resistance (or none)	*VRF* multisplit system	3.22 COP_C 4.37 *ICOP* Before 1/1/2024 3.02 COP_C 4.37 *ICOP* On or after 1/1/24	
	≥70 *kW*	Electric resistance (or none)	*VRF* multisplit system	2.93 COP_C 4.07 *ICOP* Before 1/1/2024 2.78 COP_C 4.07 *ICOP* On or after 1/1/24	

a. *VRF* outdoor units can be combined with innumerable indoor unit combinations, which will vary by application, building type, building size, operating conditions, and comfort level goals. Selection of indoor units tested during the test is considered to be representative of commonly sold applications and is detailed in AHRI Standard 1230.

Informative Note*:* For single-phase *VRF* air conditioners, air-cooled *systems* less than 19 *kW*, see Informative Appendix F, Table F-1 for the U.S. Department of Energy minimum.

Table 6.8.1-9 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum *Efficiency* Requirements

Equipment Type[a]	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air-cooled (cooling mode)	<19 *kW* three-phase for applications in the US and single- and three- phase for applications outside the US	All	*VRF* multisplit *system*	3.81 $SCOP_C$ Before 1/1/2023 On or after 1/1/2023 $SCOP_C$ = 4.19	AHRI 1230-2014 with Addendum 1 (before 1/1/2023) AHRI 210/240-2023 (on or after 1/1/2023)
	≥19 *kW* and <40 *kW*	Electric resistance (or none)	*VRF* multisplit *system*	3.22 COP_C 4.28 $ICOP_C$ Before 1/1/2024 3.02 COP_C 4.28 *ICOP* On or after 1/1/24	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
			VRF multisplit *system* with heat recovery	3.16 COP_C 4.22 $ICOP_C$ Before 1/1/2024 2.96 COP_C 4.22 *ICOP* On or after 1/1/24	
	≥40 *kW* and <70 *kW*		*VRF* multisplit *system*	3.11 COP_C 4.07 $ICOP_C$ Before 1/1/2024 2.90 COP_C 4.07 *ICOP* On or after 1/1/24	
			VRF multisplit *system* with heat recovery	3.05 COP_C 4.01 $ICOP_C$ Before 1/1/2024 2.84 COP_C 4.01 *ICOP* On or after 1/1/24	
	≥70 *kW*		*VRF* multisplit *system*	2.78 COP_C 3.72 $ICOP_C$ Before 1/1/2024 2.66 COP_C 3.72 *ICOP* On or after 1/1/24	
			VRF multisplit *system* with heat recovery	2.73 COP_C 3.66 $ICOP_C$ Before 1/1/2024 2.71 COP_C 3.66 *ICOP* On or after 1/1/24	

a. *VRF* outdoor units can be combined with innumerable indoor unit combinations, which will vary by application, building type, building size, operating conditions, and comfort level goals. Selection of indoor units tested during the test is considered to be representative of commonly sold applications and is detailed in AHRI Standard 1230.

Informative Note: For single-phase air-cooled *VRF* multisplit *system* less than 19 *kW*, see Informative Appendix F, Table F-1 for the U.S. Department of Energy minimum.

Table 6.8.1-9 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum *Efficiency* Requirements

Equipment Type[a]	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF water source (cooling mode)	<19 *kW*	All	*VRF* multisplit *systems* 30°C entering water	3.52 COP_C 4.69 $ICOP_C$	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
			VRF multisplit *systems* with heat recovery 30°C entering water	3.46 COP_C 4.63 $ICOP_C$	
	≥19 *kW* and <40 *kW*		*VRF* multisplit *system* 30°C entering water	3.52 COP_C 4.69 $ICOP_C$	
			VRF multisplit *system* with heat recovery 30°C entering water	3.46 COP_C 4.63 $ICOP_C$	
	≥40 *kW* and <70 *kW*		*VRF* multisplit *system* 30°C entering water	2.93 COP_C 4.10 $ICOP_C$	
			VRF multisplit *system* with heat recovery 30°C entering water	2.87 COP_C 3.52 $ICOP_C$	
	≥70 *kW*		*VRF* multisplit *system* 30°C entering water	2.93 COP_C 3.52 $ICOP_H$	
			VRF multisplit *system* with heat recovery 30°C entering water	2.87 COP_C 3.46 $ICOP_H$	
VRF groundwater source (cooling mode)	<40 *kW*	All	*VRF* multisplit *system* 15°C entering water	4.75 COP_C	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
			VRF multisplit *system* with heat recovery 15°C entering water	4.69 COP_C	
	≥40 *kW*		*VRF* multisplit *system* 15°C entering water	4.04 COP_C	
			VRF multisplit *system* with heat recovery 15°C entering water	3.99 COP_C	
VRF ground source (cooling mode)	<40 *kW*	All	*VRF* multisplit *system* 25°C entering water	3.93 COP_C	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI 1230-2021 (on or after 1/1/2024)
			VRF multisplit *system* with heat recovery 25°C entering water	3.87 COP_C	
	≥40 *kW*		*VRF* multisplit *system* 25°C entering water	3.22 COP_C	
			VRF multisplit *system* with heat recovery 25°C entering water	3.16 COP_C	

a. *VRF* outdoor units can be combined with innumerable indoor unit combinations, which will vary by application, building type, building size, operating conditions, and comfort level goals. Selection of indoor units tested during the test is considered to be representative of commonly sold applications and is detailed in AHRI Standard 1230.

Informative Note: For single-phase air-cooled *VRF* multisplit *system* less than 19 *kW*, see Informative Appendix F, Table F-1 for the U.S. Department of Energy minimum.

Table 6.8.1-9 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum *Efficiency* Requirements

Equipment Type[a]	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air-cooled (heating mode)	<19 *kW* (cooling capacity) three-phase for applications in the U.S. and single- and three-phase for applications outside the U.S.		*VRF* multisplit *system*	2.25 $SCOP_H$ Before 1/1/23 On or after 1/1/2023 $SCOPH$ = 2.20	AHRI 1230-2014 with Addendum 1 (before 1/1/2023) AHRI 210/240-2023 (on or after 1/1/2023)
	≥19 *kW* and <40 *kW* (cooling capacity)		*VRF* multisplit *system* 8.3°C db/6.1°C wb *outdoor air*	3.3 COP_H	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI Standard 1230-2021 (on or after 1/1/2024)
			–8.3°C db/–9.4°C wb outdoor air	2.25 COP_H	
	≥40 *kW* (cooling capacity)		*VRF* multisplit *system* 8.3°C db/6.1°C wb *outdoor air*	3.2 COP_H	
			–8.3°C db/–9.4°C wb outdoor air	2.05 COP_H	
VRF water source (heating mode)	<19 *kW* (cooling capacity)		*VRF* multisplit *system* 20°C entering water	4.3 COP_H	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI Standard 1230-2021 (on or after 1/1/2024)
	≥19 *kW* and <40 *kW* (cooling capacity)		*VRF* multisplit *system* 20°C entering water	4.3 COP_H	
	≥40 *kW* and <70 *kW* (cooling capacity)		*VRF* multisplit *system* 20°C entering water	4.0 COP_H	
	≥70 *kW* (cooling capacity)		*VRF* multisplit *system* 20°C entering water	3.9 COP_H	
VRF groundwater source (heating mode)	<40 *kW* (cooling capacity)		*VRF* multisplit *system* 10°C entering water	3.6 COP_H	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI Standard 1230-2021 (on or after 1/1/2024)
	≥40 *kW* (cooling capacity)		*VRF* multisplit *system* 10°C entering water	3.3 COP_H	
VRF ground source (heating mode)	<40 *kW* (cooling capacity)		*VRF* multisplit *system* 0°C entering water	3.1 COP_H	AHRI 1230-2014 with Addendum 1 (before 1/1/2024) AHRI Standard 1230-2021 (on or after 1/1/2024)
	≥40 *kW* (cooling capacity)		*VRF* multisplit *system* 0°C entering water	2.8 COP_H	

a. *VRF* outdoor units can be combined with innumerable indoor unit combinations, which will vary by application, building type, building size, operating conditions, and comfort level goals. Selection of indoor units tested during the test is considered to be representative of commonly sold applications and is detailed in AHRI Standard 1230.

Informative Note: For single-phase air-cooled *VRF* multisplit *system* less than 19 *kW*, see Informative Appendix F, Table F-1 for the U.S. Department of Energy minimum.

Modify Section 12 as shown (I-P and SI).

Reference	Title
[. . .]	
ANSI/AHRI 1230-2021	Performance Rating of Variable Refrigerant Flow (VRF) Multi-split Air-Conditioning and Heat Pump Equipment
[. . .]	

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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About ASHRAE

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

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