ADDENDA

ANSI/ASHRAE/IES Addendum bs to
ANSI/ASHRAE/IES Standard 90.1-2013

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on August 24, 2016; by the ASHRAE Tech Council on August 29, 2016; by the IES Board of Directors on September 26, 2016; and by the American National Standards Institute on August 30, 2016.

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FOREWORD

In 2014, ASHRAE approved addendum n to Standard 90.1-2013 which amended the part load integrated energy efficiency ratios (IEER) for variable refrigerant flow (VRF) air-cooled air conditioners and heat pumps greater than 65,000 Btu/h. However, energy efficiency standards for water source VRF products were left unchanged.

This addendum establishes for the first time minimum IEER values for water source VRF products above 65,000 Btu/h. The proposal also updates the COPs. In addition, two new product size categories were added to distinguish products between 135,000 and 240,000 Btu/h and products from products above 240,000 Btu/h. The new IEERs and COPs will become effective on January 1, 2018.

[Note: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes.]

Addendum bs to 90.1-2013

Revise Table 6.8.1-10 as follows (I-P).

TABLE 6.8.1-10 Electrically Operated Variable-Refrigerant-Flow Air-to-Air and Applied Heat Pumps—Minimum Efficiency Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air cooled (cooling mode)	<65,000 Btu/h	All	VRF multisplit system	13.0 SEER	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	Electric resistance (or none)	VRF multisplit system	11.0 EER 12.3 IEER	
	≥65,000 Btu/h and <135,000 Btu/h	Electric resistance (or none)	VRF multisplit system with heat recovery	10.8 EER 12.1 IEER	
	≥135,000 Btu/h and <240,000 Btu/h	Electric resistance (or none)	VRF multisplit system	10.6 EER 11.8 IEER	
	≥135,000 Btu/h and <240,000 Btu/h	Electric resistance (or none)	VRF multisplit system with heat recovery	10.4 EER 11.6 IEER	
	≥240,000 Btu/h	Electric resistance (or none)	VRF multisplit system	9.5 EER 10.6 IEER	
	≥240,000 Btu/h	Electric resistance (or none)	VRF multisplit system with heat recovery	9.3 EER 10.4 IEER	
VRF water source	<65,000 Btu/h	All	VRF multisplit systems	12.0 EER	AHRI 1230

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(cooling mode)			86°F entering water	16.0 IEER (as of 1/1/2018)	
	<65,000 Btu/h	All	VRF multisplit systems with heat recovery 86°F entering water	11.8 EER 15.8 IEER (as of 1/1/2018)	
	≥65,000 Btu/h and <135,000 Btu/h	All	VRF multisplit system 86°F entering water	12.0 EER 16.0 IEER (as of 1/1/2018)	
	≥65,000 Btu/h and <135,000 Btu/h	All	VRF multisplit system with heat recovery 86°F entering water	11.8 EER 15.8 IEER (as of 1/1/2018)	
	≥135,000 Btu/h and <240,000 Btu/h	All	VRF multisplit system 86°F entering water	10.0 EER 14.0 IEER (as of 1/1/2018)	
	≥135,000 Btu/h and <240,000 Btu/h	All	VRF multisplit system with heat recovery 86°F entering water	9.8 EER 13.8 IEER (as of 1/1/2018)	
	≥240,000 Btu/h	All	VRF multisplit system 86°F entering water	10.0 EER 12.0 IEER (as of 1/1/2018)	
	≥240,000 Btu/h	All	VRF multisplit system with heat recovery 86°F entering water	9.8 EER 11.8 IEER (as of 1/1/2018)	
VRF groundwater source (cooling mode)	<135,000 Btu/h	All	VRF multisplit system 59°F entering water	16.2 EER	AHRI 1230
	<135,000 Btu/h	All	VRF multisplit system with heat recovery 59°F entering water	16.0 EER	
	≥135,000 Btu/h	All	VRF multisplit system 59°F entering water	13.8 EER	
	≥135,000 Btu/h	All	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
	<135,000 Btu/h	All	VRF multisplit system with heat recovery 77°F entering water	13.2 EER	
	≥135,000 Btu/h	All	VRF multisplit system 77°F entering water	11.0 EER	
	≥135,000 Btu/h	All	VRF multisplit system with heat recovery 77°F entering water	10.8 EER	
VRF air cooled (heating mode)	<65,000 Btu/h (cooling capacity)	—	VRF multisplit system	7.7 HSPF	AHRI 1230
	≥65,000 Btu/h and	—	VRF multisplit system		

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	<135,000 Btu/h		47°F db/43°F wb outdoor air	3.3 COP_H	
			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)	—	VRF multisplit system 68°F entering water	4.2 COP_H (before 1/1/2018) 4.3 COP_H (as of 1/1/2018)	AHRI 1230
	≥ 65,000 Btu/h and <135,000 Btu/h (cooling capacity)	—	VRF multisplit system 68°F entering water	4.2 COP_H (before 1/1/2018) 4.3 COP_H (as of 1/1/2018)	
	≥135,000 Btu/h and <240,000 Btu/h (cooling capacity)	—	VRF multisplit system 68°F entering water	3.9 COP_H (before 1/1/2018) 4.0 COP_H (as of 1/1/2018)	
	≥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)	—	VRF multisplit system 50°F entering water	3.6 COP_H	AHRI 1230
	≥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)	—	VRF multisplit system 32°F entering water	3.1 COP_H	AHRI 1230
	≥135,000 Btu/h (cooling capacity)	—	VRF multisplit system 32°F entering water	2.8 COP_H	

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Modify Table 6.8.1-10 as follows (SI).

TABLE 6.8.1-10 Electrically Operated Variable-Refrigerant-Flow Air-to-Air and Applied Heat Pumps—Minimum Efficiency Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air cooled (cooling mode)	<19 kW	All	VRF multisplit system	3.81 $SCOP_C$	AHRI 1230
	≥19 kW and <40 kW	Electric resistance (or none)	VRF multisplit system	3.22 COP_C 3.60 ICOP	
	≥19 kW and <40 kW	Electric resistance (or none)	VRF multisplit system with heat recovery	3.16 COP_C 3.55 ICOP	
	≥40 kW and <70 kW	Electric resistance (or none)	VRF multisplit system	3.11 COP_C 3.46 ICOP	
	≥40 kW and <70 kW	Electric resistance (or none)	VRF multisplit system with heat recovery	3.05 COP_C 3.40 ICOP	
	≥70 kW	Electric resistance (or none)	VRF multisplit system	2.78 COP_C 3.11 ICOP	
	≥70 kW	Electric resistance (or none)	VRF multisplit system with heat recovery	2.72 COP_C 3.05 ICOP	
VRF water source (cooling mode)	<19 kW	All	VRF multisplit systems 30°C entering water	3.52 COP_C 4.69 ICOP (as of 1/1/2018)	AHRI 1230
	<19 kW	All	VRF multisplit systems with heat recovery 30°C entering water	3.46 COP_C 4.63 ICOP (as of 1/1/2018)	
	≥19 kW and <40 kW	All	VRF multisplit system 30°C entering water	3.52 COP_C 4.69 ICOP (as of 1/1/2018)	
	≥19 kW and <40 kW	All	VRF multisplit system with heat recovery 30°C entering water	3.46 COP_C 4.63 ICOP (as of 1/1/2018)	
	≤40 kW and <70 kW	All	VRF multisplit system 30°C entering water	2.93 COP_C 4.10 ICOP (as of 1/1/2018)	
	≤40 kW and <70 kW	All	VRF multisplit system with heat recovery 30°C entering water	2.87 COP_C 4.04 ICOP (as of 1/1/2018)	
	≥70 kW	All	VRF multisplit system 30°C entering water	2.93 COP_C (before 1/1/2018) 3.52 $ICOP_H$ (as of 1/1/2018)	
	≥70 kW	All	VRF multisplit system with heat recover 30°C entering water	2.87 COP_C (before 1/1/2018) 3.46 $ICOP_H$ (as of 1/1/2018)	
VRF groundwater source (cooling mode)	<40 kW	All	VRF multisplit system 15°C entering water	4.75 COP_C	AHRI 1230
	<40 kW	All	VRF multisplit system with heat recovery 15°C entering water	4.69 COP_C	
	≥40 kW		VRF multisplit system	4.04 COP_C	

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		All	15°C entering water		
	≥40 kW	All	VRF multisplit system with heat recovery 15°C entering water	3.98 COP_C	
VRF ground source (cooling mode)	<40 kW	All	VRF multisplit system 25°C entering water	3.93 COP_C	AHRI 1230
	<40 kW	All	VRF multisplit system with heat recovery 25°C entering water	3.87 COP_C	
	≥40 kW	All	VRF multisplit system 25°C entering water	3.22 COP_C	
	≥40 kW	All	VRF multisplit system with heat recovery 25°C entering water	3.16 COP_C	
VRF air cooled (heating mode)	<19 kW (cooling capacity)	—	VRF multisplit system	2.25 $SCOP_H$	AHRI 1230
	≥19 kW and <40 kW	—	VRF multisplit system 8.3°C db/6.1°C wb outdoor air	3.3 COP_H	
			-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	4.2 COP_H (before 1/1/2018) 4.3 COP_H (as of 1/1/2018)	AHRI 1230
	≥19 kW and <40 kW (cooling capacity)	—	VRF multisplit system 20°C entering water	4.2 COP_H (before 1/1/2018) 4.3 COP_H (as of 1/1/2018)	
	≥40 kW and <70 kW (cooling capacity)	—	VRF multisplit system 20°C entering water	3.9 COP_H (before 1/1/2018) 4.0 COP_H (as of 1/1/2018)	
	≥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
	≥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
	≥40 kW (cooling capacity)	—	VRF multisplit system 0°C entering water	2.8 COP_H	

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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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