

Department of Energy

§ 431.96

(7) [Reserved]

(c) *ASHRAE*. American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1791 Tullie Circle, NE., Atlanta, Georgia 30329, (404) 636-8400, or go to: <http://www.ashrae.org>.

(1) ANSI/ASHRAE Standard 16-1983 (RA 2014), (“ANSI/ASHRAE 16”), “Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners,” ASHRAE reaffirmed July 3, 2014, IBR approved for § 431.96.

(2) ANSI/ASHRAE Standard 37-2009, (“ANSI/ASHRAE 37”), “Methods of Testing for Rating Electrically Driven Unitary Air-Conditioning and Heat Pump Equipment,” ASHRAE approved June 24, 2009, IBR approved for § 431.96 and appendix A of this subpart.

(3) ANSI/ASHRAE Standard 58-1986 (RA 2014), (“ANSI/ASHRAE 58”), “Method of Testing for Rating Room Air-Conditioner and Packaged Terminal Air-Conditioner Heating Capacity,” ASHRAE reaffirmed July 3, 2014, IBR approved for § 431.96.

(4) ASHRAE Standard 127-2007, “*Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners*,” approved on June 28, 2007, (ASHRAE 127-2007), IBR approved for § 431.96.

(d) *ISO*. International Organization for Standardization, 1, ch. De la Voie-Creuse, Case Postale 56, CH-1211 Geneva 20, Switzerland, + 41 22 749 01 11 or go to: <http://www.iso.ch/>.

(1) ISO Standard 13256-1, “*Water-source heat pumps—Testing and rating for performance—Part 1: Water-to-air and brine-to-air heat pumps*,” approved 1998, IBR approved for § 431.96.

(2) [Reserved]

[77 FR 28989, May 16, 2012, as amended at 80 FR 37148, June 30, 2015; 80 FR 79669, Dec. 23, 2015]

**§ 431.96 Uniform test method for the measurement of energy efficiency of commercial air conditioners and heat pumps.**

(a) *Scope*. This section contains test procedures for measuring, pursuant to EPCA, the energy efficiency of any small, large, or very large commercial package air-conditioning and heating equipment, packaged terminal air conditioners and packaged terminal heat pumps, computer room air conditioners, variable refrigerant flow systems, and single package vertical air conditioners and single package vertical heat pumps.

(b) *Testing and calculations*. (1) Determine the energy efficiency of each type of covered equipment by conducting the test procedure(s) listed in Table 1 of this section along with any additional testing provisions set forth in paragraphs (c) through (g) of this section and appendix A to this subpart, that apply to the energy efficiency descriptor for that equipment, category, and cooling capacity. The omitted sections of the test procedures listed in Table 1 of this section must not be used.

(2) After June 24, 2016, any representations made with respect to the energy use or efficiency of packaged terminal air conditioners and heat pumps (PTACs and PTHPs) must be made in accordance with the results of testing pursuant to this section. Manufacturers conducting tests of PTACs and PTHPs after July 30, 2015 and prior to June 24, 2016, must conduct such test in accordance with either table 1 to this section or § 431.96 as it appeared at 10 CFR part 431, subpart F, in the 10 CFR parts 200 to 499 edition revised as of January 1, 2014. Any representations made with respect to the energy use or efficiency of such packaged terminal air conditioners and heat pumps must be in accordance with whichever version is selected.

TABLE 1 TO § 431.96—TEST PROCEDURES FOR COMMERCIAL AIR CONDITIONERS AND HEAT PUMPS

Equipment type	Category	Cooling capacity	Energy efficiency descriptor	Use tests, conditions, and procedures <sup>1</sup> in	Additional test procedure provisions as indicated in the listed paragraphs of this section
Small Commercial Package Air-Conditioning and Heating Equipment.	Air-Cooled, 3-Phase, AC and HP.	<65,000 Btu/h ...	SEER and HSPF	AHRI 210/240–2008 (omit section 6.5).	Paragraphs (c) and (e).
	Air-Cooled AC and HP.	≥65,000 Btu/h and <135,000 Btu/h.	EER, IEER, and COP.	Appendix A to this subpart.	None.
	Water-Cooled and Evaporatively-Cooled AC.	<65,000 Btu/h ...	EER .....	AHRI 210/240–2008 (omit section 6.5).	Paragraphs (c) and (e).
	Water-Source HP ....	≥65,000 Btu/h and <135,000 Btu/h.	EER .....	AHRI 340/360–2007 (omit section 6.3).	Paragraphs (c) and (e).
Large Commercial Package Air-Conditioning and Heating Equipment.	Water-Cooled and Evaporatively-Cooled AC.	<135,000 Btu/h	EER and COP ....	ISO Standard 13256–1 (1998). Appendix A to this subpart.	Paragraph (e).
	Air-Cooled AC and HP.	≥135,000 Btu/h and <240,000 Btu/h.	EER, IEER and COP.	AHRI 340/360–2007 (omit section 6.3).	None.
Very Large Commercial Package Air-Conditioning and Heating Equipment.	Water-Cooled and Evaporatively-Cooled AC.	≥240,000 Btu/h and <760,000 Btu/h.	EER .....	AHRI 340/360–2007 (omit section 6.3).	Paragraphs (c) and (e).
	Air-Cooled AC and HP.	≥240,000 Btu/h and <760,000 Btu/h.	EER, IEER and COP.	Appendix A to this subpart.	None.
Packaged Terminal Air Conditioners and Heat Pumps.	Water-Cooled and Evaporatively-Cooled AC.	≥240,000 Btu/h and <760,000 Btu/h.	EER .....	AHRI 340/360–2007 (omit section 6.3).	Paragraphs (c) and (e).
Computer Room Air Conditioners.	AC and HP .....	<760,000 Btu/h	EER and COP ....	Paragraph (g) of this section.	Paragraphs (c), (e), and (g).
	AC .....	<65,000 Btu/h ...	SCOP .....	ASHRAE 127–2007 (omit section 5.11).	Paragraphs (c) and (e).
Variable Refrigerant Flow Multi-split Systems.	AC .....	≥65,000 Btu/h and <760,000 Btu/h.	SCOP .....	ASHRAE 127–2007 (omit section 5.11).	Paragraphs (c) and (e).
	AC .....	<65,000 Btu/h (3-phase).	SEER .....	AHRI 1230–2010 (omit sections 5.1.2 and 6.6).	Paragraphs (c), (d), (e), and (f).
Variable Refrigerant Flow Multi-split Systems, Air-cooled.	HP .....	≥65,000 Btu/h and <760,000 Btu/h.	EER .....	AHRI 1230–2010 (omit sections 5.1.2 and 6.6).	Paragraphs (c), (d), (e), and (f).
	HP .....	<65,000 Btu/h (3-phase).	SEER and HSPF	AHRI 1230–2010 (omit sections 5.1.2 and 6.6).	Paragraphs (c), (d), (e), and (f).
Variable Refrigerant Flow Multi-split Systems, Water-source.	HP .....	≥65,000 Btu/h and <760,000 Btu/h.	EER and COP ....	AHRI 1230–2010 (omit sections 5.1.2 and 6.6).	Paragraphs (c), (d), (e), and (f).
	HP .....	<760,000 Btu/h	EER and COP ....	AHRI 1230–2010 (omit sections 5.1.2 and 6.6).	Paragraphs (c), (d), (e), and (f).
Single Package Vertical Air Conditioners and Single Package Vertical Heat Pumps.	AC and HP .....	<760,000 Btu/h	EER and COP ....	AHRI 390–2003 (omit section 6.4).	Paragraphs (c) and (e).

<sup>1</sup> Incorporated by reference; see § 431.95.

(c) *Optional break-in period for tests conducted using AHRI 210/240–2008, AHRI 390–2003, AHRI 1230–2010, and ASHRAE 127–2007.* Manufacturers may optionally

specify a “break-in” period, not to exceed 20 hours, to operate the equipment under test prior to conducting the test method specified by AHRI 210/240–2008,

AHRI 390–2003, AHRI 1230–2010, or ASHRAE 127–2007 (incorporated by reference; see § 431.95). A manufacturer who elects to use an optional compressor break-in period in its certification testing should record this information (including the duration) in the test data underlying the certified ratings that is required to be maintained under 10 CFR 429.71.

(d) *Refrigerant line length corrections for tests conducted using AHRI 1230–2010.* For test setups where it is physically impossible for the laboratory to use the required line length listed in Table 3 of the AHRI 1230–2010 (incorporated by reference, see § 431.95), then the actual refrigerant line length used by the laboratory may exceed the required length and the following correction factors are applied:

Piping length beyond minimum, X (ft)	Piping length beyond minimum, Y (m)	Cooling capacity correction %
0>X ≤20	0>Y ≤6.1	1
20>X ≤40	6.1>Y ≤12.2	2
40>X ≤60	12.2>Y ≤18.3	3
60>X ≤80	18.3>Y ≤24.4	4
80>X ≤100	24.4>Y ≤30.5	5
100 >X ≤120	30.5>Y ≤36.6	6

(e) *Additional provisions for equipment set-up.* The only additional specifications that may be used in setting up the basic model for test are those set forth in the installation and operation manual shipped with the unit. Each unit should be set up for test in accordance with the manufacturer installation and operation manuals. Paragraphs (e)(1) through (3) of this section provide specifications for addressing key information typically found in the installation and operation manuals.

(1) If a manufacturer specifies a range of superheat, sub-cooling, and/or refrigerant pressure in its installation and operation manual for a given basic model, any value(s) within that range may be used to determine refrigerant charge or mass of refrigerant, unless the manufacturer clearly specifies a rating value in its installation and operation manual, in which case the specified rating value shall be used.

(2) The air flow rate used for testing must be that set forth in the installation and operation manuals being shipped to the commercial customer with the basic model and clearly identified

as that used to generate the DOE performance ratings. If a rated air flow value for testing is not clearly identified, a value of 400 standard cubic feet per minute (scfm) per ton shall be used.

(3) For VRF systems, the test set-up and the fixed compressor speeds (*i.e.*, the maximum, minimum, and any intermediate speeds used for testing) should be recorded and maintained as part of the test data underlying the certified ratings that is required to be maintained under 10 CFR 429.71.

(f) *Manufacturer involvement in assessment or enforcement testing for variable refrigerant flow systems.* A manufacturer’s representative will be allowed to witness assessment and/or enforcement testing for VRF systems. The manufacturer’s representative will be allowed to inspect and discuss set-up only with a DOE representative and adjust only the modulating components during testing in the presence of a DOE representative that are necessary to achieve steady-state operation. Only previously documented specifications for set-up as specified under paragraphs (d) and (e) of this section will be used.

(g) *Test Procedures for Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps—(1) Cooling mode testing.* The test method for testing packaged terminal air conditioners and packaged terminal heat pumps in cooling mode shall consist of application of the methods and conditions in AHRI 310/380–2014 sections 3, 4.1, 4.2, 4.3, and 4.4 (incorporated by reference; see § 431.95), and in ANSI/ASHRAE 16 (incorporated by reference; see § 431.95) or ANSI/ASHRAE 37 (incorporated by reference; see § 431.95), except that instruments used for measuring electricity input shall be accurate to within ±0.5 percent of the quantity measured. Where definitions provided in AHRI 310/380–2014, ANSI/ASHRAE 16, and/or ANSI/ASHRAE 37 conflict with the definitions provided in 10 CFR 431.92, the 10 CFR 431.92 definitions shall be used. Where AHRI 310/380–2014 makes reference to ANSI/ASHRAE 16, it is interpreted as reference to ANSI/ASHRAE 16–1983 (RA 2014).

(2) *Heating mode testing.* The test method for testing packaged terminal heat pumps in heating mode shall consist of application of the methods and

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conditions in AHRI 310/380–2014 sections 3, 4.1, 4.2 (except the section 4.2.1.2(b) reference to ANSI/ASHRAE 37), 4.3, and 4.4 (incorporated by reference; see § 431.95), and in ANSI/ASHRAE 58 (incorporated by reference; see § 431.95). Where definitions provided in AHRI 310/380–2014 or ANSI/ASHRAE 58 conflict with the definitions provided in 10 CFR 431.92, the 10 CFR 431.92 definitions shall be used. Where AHRI 310/380–2014 makes reference to ANSI/ASHRAE 58, it is interpreted as reference to ANSI/ASHRAE 58–1986 (RA 2014).

(3) *Wall sleeves.* For packaged terminal air conditioners and packaged terminal heat pumps, the unit must be installed in a wall sleeve with a 14 inch depth if available. If a 14 inch deep wall sleeve is not available, use the available wall sleeve option closest to 14 inches in depth. The area(s) between the wall sleeve and the insulated partition between the indoor and outdoor rooms must be sealed to eliminate all air leakage through this area.

(4) *Optional pre-filling of the condensate drain pan.* For packaged terminal air conditioners and packaged terminal heat pumps, test facilities may add water to the condensate drain pan of the equipment under test (until the water drains out due to overflow devices or until the pan is full) prior to conducting the test method specified by AHRI 310/380–2014 (incorporated by reference, see § 431.95). No specific level of water mineral content or water temperature is required for the water added to the condensate drain pan.

(5) *Filter selection.* For packaged terminal air conditioners and packaged terminal heat pumps, the indoor filter used during testing shall be the standard or default filter option shipped with the model. If a particular model is shipped without a filter, the unit must be tested with a MERV–1 filter sized appropriately for the filter slot.

[77 FR 28989, May 16, 2012; 80 FR 11857, Mar. 5, 2015, as amended at 80 FR 37148, June 30, 2015; 80 FR 79669, Dec. 23, 2015]

ENERGY EFFICIENCY STANDARDS

§ 431.97 Energy efficiency standards and their compliance dates.

(a) All basic models of commercial package air-conditioning and heating equipment must be tested for performance using the applicable DOE test procedure in § 431.96, be compliant with the applicable standards set forth in paragraphs (b) through (f) of this section, and be certified to the Department under 10 CFR part 429.

(b) Each commercial air conditioner or heat pump (not including single package vertical air conditioners and single package vertical heat pumps, packaged terminal air conditioners and packaged terminal heat pumps, computer room air conditioners, and variable refrigerant flow systems) manufactured starting on the compliance date listed in the corresponding table must meet the applicable minimum energy efficiency standard level(s) set forth in Tables 1 through 6 of this section.

TABLE 1 TO § 431.97—MINIMUM COOLING EFFICIENCY STANDARDS FOR AIR CONDITIONING AND HEATING EQUIPMENT

[Not including single package vertical air conditioners and single package vertical heat pumps, packaged terminal air conditioners and packaged terminal heat pumps, computer room air conditioners, variable refrigerant flow multi-split air conditioners and heat pumps, and double-duct air-cooled commercial package air conditioning and heating equipment]

Equipment type	Cooling capacity	Sub-category	Heating type	Efficiency level	Compliance date: Equipment manufactured starting on . . .
Small Commercial Package Air Conditioning and Heating Equipment (Air-Cooled, 3-Phase, Split-System).	<65,000 Btu/h . . . . .	AC	All . . . . .	SEER = 13	June 16, 2008.
		HP AC	All . . . . . All . . . . .	SEER = 13 SEER = 13	June 16, 2008. <sup>1</sup> June 16, 2008. <sup>1</sup>
Small Commercial Package Air Conditioning and Heating Equipment (Air-Cooled, 3-Phase, Single-Package).	<65,000 Btu/h . . . . .	HP AC	All . . . . . No Heating or Electric Resistance Heating.	SEER = 13 EER = 11.2	June 16, 2008. <sup>1</sup> January 1, 2010. <sup>2</sup>
Small Commercial Package Air Conditioning and Heating Equipment (Air-Cooled).	≥65,000 Btu/h and <135,000 Btu/h.	HP AC	All . . . . . No Heating or Electric Resistance Heating.	SEER = 13 EER = 11.2	June 16, 2008. <sup>1</sup> January 1, 2010. <sup>2</sup>