

shall designate the standard input rating, and the water heater need only be tested with heating elements at the designated standard input ratings. The first-hour ratings for units having power input rating less than the designated standard input rating shall be assigned a first-hour rating equivalent to the first draw of the first-hour rating for the electric water heater with the standard input rating. For units having power inputs greater than the designated standard input rating, the first-hour rating shall be equivalent to that measured for the water heater with the standard input rating.

7.2.2 *Energy Factor*. The energy factor for identical electric storage-type water heaters, with the exception of heating element wattage, may use the energy factor obtained during testing of the water heater with the designated standard input rating.

[63 FR 26008, May 11, 1998; 63 FR 38738, July 20, 1998, as amended at 66 FR 4497, Jan. 17, 2001]

APPENDIX F TO SUBPART B OF PART 430—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF ROOM AIR CONDITIONERS

NOTE: Manufacturers are not required to use the test procedures and calculations that refer to standby mode and off mode energy consumption, (specifically, sections 2.2, 3.2, 4.2, and 5.3 of this appendix F) until the compliance date of any amended energy conservation standards for room air conditioners at 10 CFR 430.32(b).

1. *Definitions.*

1.1 “Active mode” means a mode in which the room air conditioner is connected to a mains power source, has been activated and is performing the main function of cooling or heating the conditioned space, or circulating air through activation of its fan or blower, with or without energizing active air-cleaning components or devices such as ultraviolet (UV) radiation, electrostatic filters, ozone generators, or other air-cleaning devices.

1.2 “ANSI/AHAM RAC-1” means the test standard published jointly by the American National Standards Institute and the Association of Home Appliance Manufacturers, titled “Room Air Conditioners,” Standard RAC-1-2008 (incorporated by reference; see § 430.3).

1.3 “ANSI/ASHRAE 16” means the test standard published jointly by the American National Standards Institute and the American Society of Heating, Refrigerating, and Air-Conditioning Engineers titled “Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners,” Standard 16-1983 (RA 2009) (incorporated by reference; see § 430.3).

1.4 “IEC 62301” means the test standard published by the International Electrotechnical Commission, (“IEC”), titled “Household electrical appliances—Measurement of standby power,” Publication 62301 (first edition June 2005), (incorporated by reference; see § 430.3).

1.5 “Inactive mode” means a standby mode that facilitates the activation of active mode by remote switch (including remote control) or internal sensor or which provides continuous status display.

1.6 “Off mode” means a mode in which a room air conditioner is connected to a mains power source and is not providing any active or standby mode function and where the mode may persist for an indefinite time. An indicator that only shows the user that the product is in the off position is included within the classification of an off mode.

1.7 “Standby mode” means any product modes where the where the energy using product is connected to a mains power source and offers one or more of the following user oriented or protective functions which may persist for an indefinite time:

(a) To facilitate the activation of other modes (including activation or deactivation of active mode) by remote switch (including remote control), internal sensor, or timer.

(b) Continuous functions, including information or status displays (including clocks) or sensor-based functions. A timer is a continuous clock function (which may or may not be associated with a display) that provides regular scheduled tasks (*e.g.*, switching) and that operates on a continuous basis.

2. *Test methods.*

2.1 *Cooling*. The test method for testing room air conditioners in cooling mode shall consist of application of the methods and conditions in ANSI/AHAM RAC-1 sections 4, 5, 6.1, and 6.5 (incorporated by reference; see § 430.3), and in ANSI/ASHRAE 16 (incorporated by reference; see § 430.3).

2.2 *Standby and off modes*. The method for testing room air conditioners in standby and off modes shall consist of application of the methods and conditions in IEC 62301 (incorporated by reference; see § 430.3), as modified by the requirements of this standard. The testing may be conducted in test facilities used for testing cooling performance. If testing is not conducted in such a facility, the test facility shall comply with IEC 62301 section 4.2.

3. *Test conditions.*

3.1 *Cooling mode*. Establish the test conditions described in sections 4 and 5 of ANSI/AHAM RAC-1 (incorporated by reference; see § 430.3) and in accordance with ANSI/ASHRAE 16 (incorporated by reference; see § 430.3).

3.2 *Standby and off modes*.

3.2.1 *Test room conditions*. Maintain the indoor test conditions as required by section 4.2 of IEC 62301 (incorporated by reference;

see § 430.3). If the standby and off mode testing is conducted in a facility that is also used for testing cooling performance, maintain the outdoor test conditions either as required by section 4.2 of IEC 62301 or as described in section 3.1. If the unit is equipped with an outdoor air ventilation damper, close this damper during testing.

3.2.2 *Power supply.* Maintain power supply conditions specified in section 4.3 of IEC 62301 (incorporated by reference; see § 430.3). Use room air conditioner nameplate voltage and frequency as the basis for power supply conditions. Maintain power supply voltage waveform according to the requirements of section 4.4 of IEC 62301.

3.2.3 *Watt meter.* The watt meter used to measure standby mode and off mode power consumption of the room air conditioner shall have the resolution specified in section 4, paragraph 4.5 of IEC 62301 (incorporated by reference; see § 430.3). The watt meter shall also be able to record a “true” average power specified in section 5, paragraph 5.3.2(a) of IEC 62301.

4. Measurements.

4.1 *Cooling mode.* Measure the quantities delineated in section 5 of ANSI/AHAM RAC-1 (incorporated by reference; see § 430.3).

4.2 *Standby and off modes.* Establish the testing conditions set forth in section 3.2. Prior to the initiation of the test measurements, the room air conditioner shall also be installed in accordance with section 5, paragraph 5.2 of IEC 62301 (incorporated by reference; see § 430.3). For room air conditioners that drop from a higher power state to a lower power state as discussed in section 5, paragraph 5.1, note 1 of IEC 62301, allow sufficient time for the room air conditioner to reach the lower power state before proceeding with the test measurement. Follow the test procedure specified in section 5, paragraph 5.3 of IEC 62301 for testing in each possible mode as described in 4.2.1 and 4.2.2, except allow the product to stabilize for 5 to 10 minutes and use an energy use measurement period of 5 minutes. For units in which power varies over a cycle, as described in section 5, paragraph 5.3.2 of IEC 62301, use the average power approach in paragraph 5.3.2(a).

4.2.1 If a room air conditioner has an inactive mode, as defined in 1.5, measure and record the average inactive mode power of the room air conditioner, P_{IA} , in watts.

4.2.2 If a room air conditioner has an off mode, as defined in 1.6, measure and record the average off mode power of the room air conditioner, P_{OFF} , in watts.

5. Calculations.

5.1 Calculate the cooling capacity (expressed in Btu/hr) as required in section 6.1 of ANSI/AHAM RAC-1 (incorporated by reference; see § 430.3) and in accordance with ANSI/ASHRAE 16 (incorporated by reference; see § 430.3).

5.2 Determine the electrical power input (expressed in watts) as required by section 6.5 of ANSI/AHAM RAC-1 (incorporated by reference; see § 430.3) and in accordance with ANSI/ASHRAE 16 (incorporated by reference; see § 430.3).

5.3 *Standby mode and off mode annual energy consumption.* Calculate the standby mode and off mode annual energy consumption for room air conditioners, E_{TSO} , expressed in kilowatt-hours per year, according to the following:

$$E_{TSO} = [(P_{IA} \times S_{IA}) + (P_{OFF} \times S_{OFF})] \times K$$

Where:

P_{IA} = room air conditioner inactive mode power, in watts, as measured in section 4.2.1

P_{OFF} = room air conditioner off mode power, in watts, as measured in section 4.2.2.

If the room air conditioner has both inactive mode and off mode, S_{IA} and S_{OFF} both equal $5,115 \div 2 = 2,557.5$, where 5,115 is the total inactive and off mode annual hours;

If the room air conditioner has an inactive mode but no off mode, the inactive mode annual hours, S_{IA} , is equal to 5,115 and the off mode annual hours, S_{OFF} , is equal to 0;

If the room air conditioner has an off mode but no inactive mode, S_{IA} is equal to 0 and S_{OFF} is equal to S_{TOT} ;

$K = 0.001$ kWh/Wh conversion factor for watt-hours to kilowatt-hours.

[76 FR 1035, Jan. 6, 2011]

APPENDIX G TO SUBPART B OF PART 430—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF UNVENTED HOME HEATING EQUIPMENT

1. Testing conditions.

1.1 Installation.

1.1.1 *Electric heater.* Install heater according to manufacturer's instructions. Heaters shall be connected to an electrical supply circuit of nameplate voltage with a wattmeter installed in the circuit. The wattmeter shall have a maximum error not greater than one percent.

1.1.2 *Unvented gas heater.* Install heater according to manufacturer's instructions. Heaters shall be connected to a gas supply line with a gas displacement meter installed between the supply line and the heater according to manufacturer's specifications. The gas displacement meter shall have a maximum error not greater than one percent. Gas heaters with electrical auxiliaries shall be connected to an electrical supply circuit of nameplate voltage with a wattmeter installed in the circuit. The wattmeter shall have a maximum error not greater than one percent.