

previous step. Round the final minimum energy factor value to two decimal places as follows:

(i) A fractional number at or above the midpoint between two consecutive decimal places shall be rounded up to the higher of the two decimal places; or

(ii) A fractional number below the midpoint between two consecutive decimal places shall be rounded down to the lower of the two decimal places.

4. *Test Measurement:* Measure the energy factor for dehumidifiers, expressed in liters per kilowatt hour (L/kWh) and product capacity in pints per day (pints/day), in accordance with the test requirements specified in section 4, “Test Criteria,” of EPA’s “ENERGY STAR Program Requirements for Dehumidifiers,” effective January 1, 2001 (Incorporated by reference, see § 430.22).

[71 FR 71366, Dec. 8, 2006]

APPENDIX Y TO SUBPART B OF PART 430—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF BATTERY CHARGERS

1. *Scope:* This appendix covers the test requirements used to measure battery charger energy consumption.

2. *Definitions:* The following definitions are for the purposes of understanding terminology associated with the test method for measuring battery charger energy consumption.¹

a. *Accumulated nonactive energy* is the sum of the energy, in watt-hours, consumed by the battery charger in battery-maintenance mode and standby mode over time periods defined in the test procedure.

b. *Active mode* is the condition in which the battery is receiving the main charge, equalizing cells, and performing other one-time or limited-time functions necessary for bringing the battery to the fully charged state.

c. *Battery or battery pack* is an assembly of one or more rechargeable cells intended to provide electrical energy to a consumer product, and may be in one of the following forms: (a) detachable battery: a battery that is contained in a separate enclosure from the consumer product and is intended to be removed or disconnected from the consumer product for recharging; or (b) integral battery: a battery that is contained within the consumer product and is not removed from the consumer product for charging purposes.

d. *Battery energy* is the energy, in watt-hours, delivered by the battery under the specified discharge conditions in the test procedure.

¹For clarity on any other terminology used in the test method, please refer to IEEE Standard 1515–2000.

e. *Battery maintenance mode or maintenance mode* is the mode of operation when the battery charger is connected to the main electricity supply and the battery is fully charged, but is still connected to the charger.

f. *Cradle* is an electrical interface between an integral battery product and the rest of the battery charger designed to hold the product between uses.

g. *Energy ratio or nonactive energy ratio* means the ratio of the accumulated nonactive energy divided by the battery energy.

h. *Manual on-off switch* is a switch activated by the user to control power reaching the device. This term does not apply to any mechanical, optical, or electronic switches that automatically disconnect mains power from the device when a battery is removed from a cradle or charging base or, for products with non-detachable batteries, that control power to the product itself.

i. *Multi-port charger* means a battery charger that is capable of simultaneously charging two or more batteries. These chargers also may have multi-voltage capability, allowing two or more batteries of different voltages to charge simultaneously.

j. *Multi-voltage a la carte charger* means a separate battery charger that is individually packaged without batteries, and is able to charge a variety of batteries of different nominal voltages.

k. *Off mode* is the condition, applicable only to units with manual on-off switches, in which the battery charger is (1) connected to the main electricity supply; (2) is not connected to the battery; and (3) all manual on-off switches are turned off.

l. *Standby mode (also no-battery mode)* means the condition in which (1) the battery charger is connected to the main electricity supply; (2) the battery is not connected to the charger; and (3) for battery chargers with manual on-off switches, all such switches are turned on.

3. *Test Apparatus and General Instructions:* The test apparatus, standard testing conditions, and instructions for testing battery chargers shall conform to the requirements specified in section 4, “Standard Testing Conditions,” of the EPA’s “Test Methodology for Determining the Energy Performance of Battery Charging Systems,” December 2005 Incorporated by reference, see § 430.22). The test voltage specified in section 4.1.1, “Voltage,” shall be 115 volts, 60 Hz. The battery charger should be tested using the full test methodology, which has a test duration of 48 hours. In section 4.3.1, “Precision Requirements,” append this sentence to the end: “The test equipment must be capable of accounting for crest factor and frequency spectrum in its measurement of the UUT input current.”

4. *Test Measurement:*

(a) Inactive Mode Energy Consumption Measurement. The measurement of the battery charger energy ratio shall conform to the requirements specified in section 5, "Determining BCS Energy Ratio," of the EPA's "Test Methodology for Determining the Energy Performance of Battery Charging Systems, December 2005" (Incorporated by reference, see §430.22).

(b) Active Mode Energy Consumption Measurement. [Reserved]

(c)(1) Standby Mode Energy Consumption Measurement. Conduct a measurement of standby power consumption while the battery charger is connected to the power source. Disconnect the battery from the charger and record the power (*i.e.*, watts) consumed as the time series integral of the power consumed over a 1-hour test period, divided by the period of measurement. If the battery charger has manual on-off switches, all must be turned on for the duration of the standby mode test.

(2) Standby mode may also apply to products with integral batteries. If the product uses a cradle and/or adapter for power conversion and charging, then "disconnecting the battery from the charger" will require disconnection of the end-use product, which contains the batteries. The other enclosures of the battery charging system will remain connected to the main electricity supply, and standby mode power consumption will equal that of the cradle and/or adapter alone.

(3) If the product also contains integrated power conversion and charging circuitry and is powered through a detachable AC power cord, then only the cord will remain connected to mains, and standby mode power consumption will equal that of the AC power cord (*i.e.*, zero watts).

(4) Finally, if the product contains integrated power conversion and charging circuitry but is powered through a non-detachable AC power cord or plug blades, then no part of the system will remain connected to mains, and standby mode measurement is not applicable.

(d)(1) Off Mode Energy Consumption Measurement. If the battery charger has manual on-off switches, record a measurement of off mode energy consumption while the battery charger is connected to the power source. Remove the battery from the charger and record the power (*i.e.*, watts) consumed as the time series integral of the power consumed over a 1-hour test period, divided by the period of measurement, with all manual on-off switches turned off. If the battery charger does not have manual on-off switches, record that the off mode measurement is not applicable to this product.

(2) Off mode may also apply to products with integral batteries. If the product uses a cradle and/or adapter for power conversion and charging, then "disconnecting the battery from the charger" will require dis-

connection of the end-use product, which contains the batteries. The other enclosures of the battery charging system will remain connected to the main electricity supply, and off mode power consumption will equal that of the cradle and/or adapter alone.

(3) If the product also contains integrated power conversion and charging circuitry and is powered through a detachable AC power cord, then only the cord will remain connected to mains, and off mode power consumption will equal that of the AC power cord (*i.e.*, zero watts).

(4) Finally, if the product contains integrated power conversion and charging circuitry but is powered through a non-detachable AC power cord or plug blades, then no part of the system will remain connected to mains, and off mode measurement is not applicable.

[71 FR 71366, Dec. 8, 2006, as amended at 74 FR 13334, Mar. 27, 2009]

APPENDIX Z TO SUBPART B OF PART 430—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF EXTERNAL POWER SUPPLIES

1. *Scope*: This appendix covers the test requirements used to measure energy consumption of external power supplies.

2. *Definitions*: The following definitions are for the purposes of understanding terminology associated with the test method for measuring external power supply energy consumption. For clarity on any other terminology used in the test method, please refer to IEC Standard 60050 or IEEE Standard 100. (Reference for guidance only, see §430.4.)

a. *Active mode* means the mode of operation when the external power supply is connected to the main electricity supply and the output is (or "all outputs are" for a multiple-voltage external power supply) connected to a load (or "loads" for a multiple-voltage external power supply).

b. *Active mode efficiency* is the ratio, expressed as a percentage, of the total real output power produced by a power supply to the real input power required to produce it. (Reference for guidance only, see IEEE Standard 1515-2000, 4.3.1.1, §430.4.)

c. *Active power (also real power) (P)* means the root-mean-square (RMS) value of the instantaneous power taken over one period. (Reference for guidance only, see IEEE Standard 1515-2000, §430.4.)

d. *Ambient temperature* means the temperature of the ambient air immediately surrounding the unit under test.

e. *Apparent power (S)* is the product of RMS voltage and RMS current (VA).

f. *Instantaneous power* means the product of the instantaneous voltage and instantaneous