

## Department of Energy

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(b) DOE must state any expenditure prohibitions or limitations specific to a particular category of special projects in the annual SEP special projects solicitation/guidance.

[64 FR 46114, Aug. 24, 1999]

### **PART 429—CERTIFICATION, COMPLIANCE, AND ENFORCEMENT FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT**

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APPENDIX B TO SUBPART C OF PART 429—SAMPLING PLAN FOR ENFORCEMENT TESTING

## § 429.1

OF COVERED COMMERCIAL EQUIPMENT AND CERTAIN LOW-VOLUME COVERED PRODUCTS  
APPENDIX C TO SUBPART C OF PART 429—SAMPLING PLAN FOR ENFORCEMENT TESTING OF DISTRIBUTION TRANSFORMERS

AUTHORITY: 42 U.S.C. 6291–6317.

SOURCE: 76 FR 12451, Mar. 7, 2011, unless otherwise noted.

### Subpart A—General Provisions

#### § 429.1 Purpose and scope.

This part sets forth the procedures to be followed for certification, determination and enforcement of compliance of covered products and covered equipment with the applicable conservation standards set forth in parts 430 and 431 of this subchapter. This part does not cover motors or electric motors as defined in § 431.12, and all references to “covered equipment” in this part exclude such motors.

#### § 429.2 Definitions.

(a) The definitions found in §§ 430.2, 431.2, 431.62, 431.72, 431.82, 431.92, 431.102, 431.132, 431.152, 431.172, 431.192, 431.202, 431.222, 431.242, 431.262, 431.292, 431.302, 431.322, and 431.442 apply for purposes of this part.

(b) The following definitions apply for the purposes of this part. Any words or terms defined in this section or elsewhere in this part shall be defined as provided in sections 321 and 340 of the Energy Policy Conservation Act, as amended, hereinafter referred to as “the Act.”

*Energy conservation standard* means any standards meeting the definitions of that term in 42 U.S.C. 6291(6) and 42 U.S.C. 6311(18) as well as any other water conservation standards and design requirements found in this part or parts 430 or 431.

*Engineered-to-order* means a basic model of commercial water heating equipment, commercial packaged boiler, commercial heating, ventilation, and air conditioning (HVAC) equipment, or commercial refrigeration equipment that is: Not listed in any catalogs or marketing literature and designed and built to specific customer requirements. A unit of an engineered-to-order basic model is not offered as a set of options (e.g., configure-to-order, menu-system).

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*Manufacturer’s model number* means the identifier used by a manufacturer to uniquely identify the group of identical or essentially identical covered products or covered equipment to which a particular unit belongs. The manufacturer’s model number typically appears on the product nameplates, in product catalogs and in other product advertising literature.

[76 FR 12451, Mar. 7, 2011, as amended at 79 FR 25499, May 5, 2014]

#### § 429.4 Materials incorporated by reference.

(a) General. We incorporate by reference the following standards into part 429. The material listed has been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Any subsequent amendment to a standard by the standard-setting organization will not affect the DOE regulations unless and until amended by DOE. Material is incorporated as it exists on the date of the approval and a notice of any change in the material will be published in the FEDERAL REGISTER. All approved material is available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). Also, this material is available for inspection at U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, 6th Floor, 950 L’Enfant Plaza, SW., Washington, DC 20024, (202) 586–2945, or go to: [http://www1.eere.energy.gov/buildings/appliance\\_standards/](http://www1.eere.energy.gov/buildings/appliance_standards/). Standards can be obtained from the sources below.

(b) AHAM. Association of Home Appliance Manufacturers, 1111 19th Street, NW., Suite 402, Washington, DC 20036, 202–872–5955, or go to <http://www.aham.org>.

(1) ANSI/AHAM DW–1–1992, American National Standard, Household Electric Dishwashers, approved February 6, 1992, IBR approved for § 429.19.

(2) ANSI/AHAM DW–1–2010, *Household Electric Dishwashers*, (ANSI approved

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September 18, 2010), IBR approved for § 429.19.

(c) *ISO*. International Organization for Standardization, ch. de la Voie-Creuse CP 56 CH-1211 Geneva 20 Switzerland, telephone + 41 22 749 01 11, or go to <http://www.iso.org/iso>.

(1) International Organization for Standardization (ISO)/International Electrotechnical Commission, (“ISO/IEC 17025:2005(E)”), “General requirements for the competence of testing and calibration laboratories”, Second edition, May 15, 2005, IBR approved for § 429.110.

(2) [Reserved]

[76 FR 12451, Mar. 7, 2011, as amended at 77 FR 65977, Oct. 31, 2012]

EFFECTIVE DATE NOTE: At 80 FR 79668, Dec. 23, 2015, § 429.4 was amended by redesignating paragraph (c) as (d) and adding paragraph (c), effective Jan. 22, 2016. For the convenience of the user, the added text is set forth as follows:

**§ 429.4 Materials incorporated by reference.**

\* \* \* \* \*

(c) *AHRI*. Air-Conditioning, Heating, and Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, (703) 524-8800, or go to: <http://www.ahrinet.org>.

(1) ANSI/AHRI Standard 340/360-2007, (“AHRI-340/360-2007”), 2007 Standard for Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment, with Addenda 1 and 2, ANSI approved October 27, 2011, IBR approved for § 429.43.

(2) [Reserved]

\* \* \* \* \*

**§ 429.5 Imported products.**

(a) Any person importing any covered product or covered equipment into the United States shall comply with the provisions of this part, and parts 430 and 431, and is subject to the remedies of this part.

(b) Any covered product or covered equipment offered for importation in violation of this part, or part 430 or 431, shall be refused admission into the customs territory of the United States under rules issued by the U.S. Customs and Border Protection (CBP) and subject to further remedies as provided by law, except that CBP may, by such rules, authorize the importation of

such covered product or covered equipment upon such terms and conditions (including the furnishing of a bond) as may appear to CBP appropriate to ensure that such covered product or covered equipment will not violate this part, or part 430 or 431, or will be exported or abandoned to the United States.

**§ 429.6 Exported products.**

This part, and parts 430 and 431, shall not apply to any covered product or covered equipment if:

(a) Such covered product or covered equipment is manufactured, sold, or held for sale for export from the United States or is imported for export;

(b) Such covered product or covered equipment or any container in which it is enclosed, when distributed in commerce, bears a stamp or label stating “NOT FOR SALE FOR USE IN THE UNITED STATES”; and

(c) Such product is, in fact, not distributed in commerce for use in the United States.

**§ 429.7 Confidentiality.**

(a) The following records are not exempt from public disclosure: Product or equipment type; product or equipment class; private labeler name; brand name; applicable model number(s) unless that information meets the criteria specified in paragraph (b) of this section; energy or water ratings submitted by manufacturers to DOE pursuant to § 429.12(b)(13); whether the certification was based on a test procedure waiver and the date of such waiver; and whether the certification was based on exception relief from the Office of Hearing and Appeals and the date of such relief.

(b) An individual, manufacturer model number is public information unless:

(1) The individual, manufacturer model number is a unique model number of a commercial packaged boiler, commercial water heating equipment, commercial HVAC equipment or commercial refrigeration equipment that was developed for an individual customer,

(2) The individual, manufacturer model number is not displayed on product literature, and

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(3) Disclosure of the individual, manufacturer model number would reveal confidential business information as described at § 1004.11 of this title—in which case, under these limited circumstances, a manufacturer may identify the individual manufacturer model number as a private model number on a certification report submitted pursuant to § 429.12(b)(6).

(c) Pursuant to the provisions of 10 CFR 1004.11(e), any person submitting information or data which the person believes to be confidential and exempt by law from public disclosure should—at the time of submission—submit:

(1) One complete copy, and one copy from which the information believed to be confidential has been deleted.

(2) A request for confidentiality containing the submitter's views on the reasons for withholding the information from disclosure, including:

(i) A description of the items sought to be withheld from public disclosure,

(ii) Whether and why such items are customarily treated as confidential within the industry,

(iii) Whether the information is generally known by or available from other sources,

(iv) Whether the information has previously been made available to others without obligation concerning its confidentiality,

(v) An explanation of the competitive injury to the submitting person which would result from public disclosure,

(vi) A date upon which such information might lose its confidential nature due to the passage of time, and

(vii) Why disclosure of the information would be contrary to the public interest.

(d) In accordance with the procedures established in 10 CFR 1004.11(e), DOE shall make its own determination with regard to any claim that information submitted be exempt from public disclosure.

[76 FR 12451, Mar. 7, 2011, as amended at 79 FR 25499, May 5, 2014; 80 FR 151, Jan. 5, 2015]

## § 429.8 Subpoena.

For purposes of carrying out parts 429, 430, and 431, the General Counsel (or delegatee), may sign and issue subpoenas for the attendance and testimony of witnesses and the production

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of relevant books, records, papers, and other documents, and administer oaths. Witnesses summoned under the provisions of this section shall be paid the same fees and mileage as are paid to witnesses in the courts of the United States. In case of contumacy by, or refusal to obey a subpoena served, upon any persons subject to parts 429, 430, or 431, the General Counsel (or delegatee) may seek an order from the District Court of the United States for any District in which such person is found or resides or transacts business requiring such person to appear and give testimony, or to appear and produce documents. Failure to obey such order is punishable by such court as contempt thereof.

## Subpart B—Certification

### § 429.10 Purpose and scope.

This subpart sets forth the procedures for manufacturers to certify that their covered products and covered equipment comply with the applicable energy conservation standards.

### § 429.11 General sampling requirements for selecting units to be tested.

(a) When testing of covered products or covered equipment is required to comply with section 323(c) of the Act, or to comply with rules prescribed under sections 324, 325, or 342, 344, 345 or 346 of the Act, a sample comprised of production units (or units representative of production units) of the basic model being tested shall be selected at random and tested, and shall meet the criteria found in §§ 429.14 through 429.54 of this subpart. Components of similar design may be substituted without additional testing if the substitution does not affect energy or water consumption. Any represented values of measures of energy efficiency, water efficiency, energy consumption, or water consumption for all individual models represented by a given basic model must be the same.

(b) Unless otherwise specified, the minimum number of units tested shall be no less than two (except where a different minimum limit is specified in §§ 429.14 through 429.54 of this subpart); and

**§ 429.12 General requirements applicable to certification reports.**

(a) *Certification.* Each manufacturer, before distributing in commerce any basic model of a covered product or covered equipment subject to an applicable energy conservation standard set forth in parts 430 or 431, and annually thereafter on or before the dates provided in paragraph (d) of this section, shall submit a certification report to DOE certifying that each basic model meets the applicable energy conservation standard(s). The certification report(s) must be submitted to DOE in accordance with the submission procedures of paragraph (h) of this section.

(b) *Certification report.* A certification report shall include a compliance statement (see paragraph (c) of this section), and for each basic model, the information listed in this paragraph (b).

(1) Product or equipment type;

(2) Product or equipment class (as denoted in the provisions of part 430 or 431 of this chapter containing the applicable energy conservation standard);

(3) Manufacturer's name and address;

(4) Private labeler's name(s) and address(es) (if applicable);

(5) Brand name;

(6) For each brand, the basic model number and the manufacturer's individual model number(s) in that basic model with the following exceptions: For external power supplies that are certified based on design families, the design family model number and the individual manufacturer's model numbers covered by that design family must be submitted for each brand. For walk-in coolers, the basic model number for each brand must be submitted. For distribution transformers, the basic model number or kVA grouping model number (depending on the certification method) for each brand must be submitted. For commercial HVAC, WH, and refrigeration equipment, an individual manufacturer model number may be identified as a "private model number" if it meets the requirements of § 429.7(b).

(7) Whether the submission is for a new model, a discontinued model, a correction to a previously submitted model, data on a carryover model, or a model that has been found in violation

of a voluntary industry certification program;

(8) The test sample size (i.e., number of units tested for each basic model). Manufacturers must enter "0" if an AEDM was used in lieu of testing;

(9) The certifying party's U.S. Customs and Border Protection (CBP) importer identification numbers assigned by CBP pursuant to 19 CFR 24.5, if applicable;

(10) Whether certification is based upon any waiver of test procedure requirements under § 430.27 or § 431.401 of this chapter and the date(s) of such waiver(s);

(11) Whether certification is based upon any exception relief from an applicable energy conservation standard and the date such relief was issued by DOE's Office of Hearings and Appeals;

(12) If the test sample size is listed as "0" to indicate the certification is based upon the use of an alternate way of determining measures of energy conservation, identify the method used for determining measures of energy conservation (such as "AEDM," "ARM," or linear interpolation) and the approval date, if applicable, of any such alternate rating, testing, or efficiency determination method. Manufacturers of commercial packaged boilers, commercial water heating equipment, commercial refrigeration equipment and commercial HVAC equipment, must provide the manufacturer's designation (name or other identifier) of the AEDM used; and

(13) Product specific information listed in §§ 429.14 through 429.58 of this chapter.

(c) *Compliance statement.* The compliance statement required by paragraph (b) of this section shall include the date, the name of the company official signing the statement, and his or her signature, title, address, telephone number, and facsimile number and shall certify that:

(1) The basic model(s) complies with the applicable energy conservation standard(s);

(2) All required testing has been conducted in conformance with the applicable test requirements prescribed in parts 429, 430 and 431, as appropriate, or in accordance with the terms of an applicable test procedure waiver;

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(3) All information reported in the certification report is true, accurate, and complete; and

(4) The manufacturer is aware of the penalties associated with violations of the Act, the regulations thereunder, and 18 U.S.C. 1001 which prohibits

knowingly making false statements to the Federal Government.

(d) *Annual filing.* All data required by paragraphs (a) through (c) shall be submitted to DOE annually, on or before the following dates:

Product category	Deadline for data submission
Fluorescent lamp ballasts, Medium base compact fluorescent lamps, Incandescent reflector lamps, General service fluorescent lamps, General service incandescent lamps, Intermediate base incandescent lamps, Candelabra base incandescent lamps, Residential ceiling fans, Residential ceiling fan light kits, Residential showerheads, Residential faucets, Residential water closets, and Residential urinals.	Mar. 1.
Residential water heater, Residential furnaces, Residential boilers, Residential pool heaters, Commercial water heaters, Commercial hot water supply boilers, Commercial unfired hot water storage tanks, Commercial packaged boilers, Commercial warm air furnaces, Commercial unit heaters and Residential furnace fans.	May 1
Residential dishwashers, Commercial prerinse spray valves, Illuminated exit signs, Traffic signal modules, Pedestrian modules, and Distribution transformers.	June 1.
Room air conditioners, Residential central air conditioners, Residential central heat pumps, Small duct high velocity system, Space constrained products, Commercial package air-conditioning and heating equipment, Packaged terminal air conditioners, Packaged terminal heat pumps, and Single package vertical units.	July 1.
Residential refrigerators, Residential refrigerators-freezers, Residential freezers, Commercial refrigerator, freezer, and refrigerator-freezer, Automatic commercial automatic ice makers, Refrigerated bottled or canned beverage vending machine, Walk-in coolers, and Walk-in freezers.	Aug. 1.
Torchieres, Residential dehumidifiers, Metal halide lamp fixtures, and External power supplies ..... Residential clothes washers, Residential clothes dryers, Residential direct heating equipment, Residential cooking products, and Commercial clothes washers.	Sept. 1. Oct. 1.

(e) *New model filing.* (1) In addition to the annual filing schedule in paragraph (d) of this section, any new basic models must be certified pursuant to paragraph (a) of this section before distribution in commerce. A modification to a model that increases the model's energy or water consumption or decreases its efficiency resulting in re-rating must be certified as a new basic model pursuant to paragraph (a) of this section.

(2) For general service fluorescent lamps or incandescent reflector lamps: Prior to or concurrent with the distribution of a new basic model each manufacturer shall submit an initial certification report listing the basic model number, lamp wattage, and date of first manufacture (*i.e.*, production date) for that basic model. The certification report must also state how the manufacturer determined that the lamp meets or exceeds the energy conservation standards, including a description of any testing or analysis the manufacturer performed. Manufacturers of general service fluorescent lamps and incandescent reflector lamps shall submit the certification report required by paragraph (b) of this section

within one year after the first date of new model manufacture.

(3) For distribution transformers, the manufacturer shall submit all information required in paragraphs (b) and (c) of this section for the new basic model, unless the manufacturer has previously submitted to the Department a certification report for a basic model of distribution transformer that is in the same kVA grouping as the new basic model.

(f) *Discontinued model filing.* When production of a basic model has ceased and it is no longer being sold or offered for sale by the manufacturer or private labeler, the manufacturer shall report this discontinued status to DOE as part of the next annual certification report following such cessation. For each basic model, the report shall include the information specified in paragraphs (b)(1) through (b)(7) of this section.

(g) *Third party submitters.* A manufacturer may elect to use a third party to submit the certification report to DOE (for example, a trade association, independent test lab, or other authorized representative, including a private labeler acting as a third party submitter on behalf of a manufacturer); however, the manufacturer is responsible for

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submission of the certification report to DOE. DOE may refuse to accept certification reports from third party submitters who have failed to submit reports in accordance with the rules of this part. The third party submitter must complete the compliance statement as part of the certification report. Each manufacturer using a third party submitter must have an authorization form on file with DOE. The authorization form includes a compliance statement, specifies the third party authorized to submit certification reports on the manufacturer's behalf and provides the contact information and signature of a company official.

(h) *Method of submission.* Reports required by this section must be submitted to DOE electronically at <http://www.regulations.doe.gov/ccms> (CCMS). A manufacturer or third party submitter can find product-specific templates for each covered product or covered equipment with certification requirements online at <https://www.regulations.doe.gov/ccms/templates.html>. Manufacturers and third party submitters must submit a registration form, signed by an officer of the company, in order to obtain access to CCMS.

(i) *Compliance dates.* For any product subject to an applicable energy conservation standard for which the compliance date has not yet occurred, a certification report must be submitted not later than the compliance date for the applicable energy conservation standard. The covered products enumerated below are subject to the stated compliance dates for initial certification:

(1) Commercial warm air furnaces, packaged terminal air conditioners, and packaged terminal heat pumps, July 1, 2014;

(2) Commercial gas-fired and oil-fired instantaneous water heaters less than 10 gallons and commercial gas-fired and oil-fired hot water supply boilers less than 10 gallons, October 1, 2014;

(3) All other types of covered commercial water heaters except those specified in paragraph (i)(2) of this section, commercial packaged boilers with input capacities less than or equal to 2.5 million Btu/h, and self-contained commercial refrigeration equipment

with solid or transparent doors, December 31, 2014;

(4) Variable refrigerant flow air conditioners and heat pumps, March 31, 2015;

(5) Small, large, or very large air-cooled, water-cooled, evaporatively-cooled, and water-source commercial air conditioning and heating equipment, single package vertical units, computer room air conditioners, commercial packaged boilers with input capacities greater than 2.5 million Btu/h, and all other types of commercial refrigeration equipment except those specified in paragraph (i)(3) of this section, July 1, 2015.

[76 FR 12451, Mar. 7, 2011; 76 FR 24762, May 2, 2011, as amended at 76 FR 38292, June 30, 2011; 76 FR 65365, Oct. 21, 2011; 77 FR 76830, Dec. 31, 2012; 78 FR 79593, Dec. 31, 2013; 79 FR 25500, May 5, 2014; 79 FR 38208, July 3, 2014]

### § 429.13 Testing requirements.

(a) The determination that a basic model complies with an applicable energy conservation standard shall be determined from the values derived pursuant to the applicable testing and sampling requirements set forth in parts 429, 430 and 431. The determination that a basic model complies with the applicable design standard shall be based upon the incorporation of specific design requirements in parts 430 and 431 or as specified in section 325 and 342 of the Act.

(b) Where DOE has determined a particular entity is in noncompliance with an applicable standard or certification requirement, DOE may impose additional testing requirements as a remedial measure.

### § 429.14 Residential refrigerators, refrigerator-freezers and freezers.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to residential refrigerators, refrigerator-freezers and freezers; and

(2) For each basic model of residential refrigerators, refrigerator-freezers, and freezers, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of estimated annual operating cost, energy

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consumption, or other measure of energy consumption of a basic model for which consumers would favor lower

values shall be greater than or equal to the higher of:  
(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;  
or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the energy factor or other measure of energy consumption of a basic model for which

consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;  
or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).



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(3) The value of total refrigerated volume of a basic model reported in accordance with paragraph (b)(2) of this section shall be the mean of the total refrigerated volumes measured for each tested unit of the basic model or the total refrigerated volume of the basic model as calculated in accordance with § 429.72(c).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to residential refrigerators, refrigerator-freezers and freezers; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The annual energy use in kilowatt hours per year (kWh/yr); the total refrigerated volume in cubic feet (ft³); and the adjusted total volume in cubic feet (ft³).

(3) Pursuant to § 429.12(b)(13), a certification report shall include the following additional product-specific information: whether the basic model has variable defrost control (in which case, manufacturers must also report the values, if any, of CT<sub>L</sub> and CT<sub>M</sub> (For an example, see section 5.2.1.3 in appendix A to subpart B of 10 CFR part 430) used in the calculation of energy consumption), whether the basic model has variable anti-sweat heater control (in

which case, manufacturers must also report the values of heater Watts at the ten humidity levels (5%, 15%, 25%, 35%, 45%, 55%, 65%, 75%, 85%, and 95%) used to calculate the variable anti-sweat heater "Correction Factor"), and whether testing has been conducted with modifications to the standard temperature sensor locations specified by the figures referenced in section 5.1 of appendices A1, B1, A, and B to subpart B of 10 CFR part 430.

[76 FR 12451, Mar. 7, 2011; 76 FR 24762, May 2, 2011, as amended at 79 FR 22348, Apr. 21, 2014]

§ 429.15 Room air conditioners.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to room air conditioners; and

(2) For each basic model of room air conditioners, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of estimated annual operating cost, energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; or,

(B) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

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and

(ii) Any represented value of the energy efficiency ratio or other measure of energy consumption of a basic model

for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

or,

(B) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to room air conditioners; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/W-h)), cooling capacity in British thermal units per hour (Btu/h), and the electrical power input in watts (W).

[76 FR 12451, Mar. 7, 2011; 76 FR 24763, May 2, 2011]

**§ 429.16 Central air conditioners and heat pumps.**

(a) *Sampling plan for selection of units for testing.* (1) The general requirements of § 429.11 are applicable to central air conditioners and heat pumps; and

(2)(i) For central air conditioners and heat pumps, each single-package sys-

tem and each condensing unit (outdoor unit) of a split-system, when combined with a selected evaporator coil (indoor unit) or a set of selected indoor units, must have a sample of sufficient size tested in accordance with the applicable provisions of this subpart. The represented values for any model of a single-package system, any model of a tested split-system combination, any model of a tested mini-split system combination, or any model of a tested multi-split system combination must be assigned such that—

(A) Any represented value of annual operating cost, energy consumption or other measure of energy consumption of the central air conditioner or heat pump for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The upper 90 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.90} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.90}$  is the t statistic for a 90% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(B) Any represented value of the energy efficiency or other measure of energy consumption of the central air

conditioner or heat pump for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The lower 90 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.90} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.90}$  is the t statistic for a 90% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(C) For heat pumps, all units of the sample population must be tested in both the cooling and heating modes and the results used for determining the heat pump's certified Seasonal En-

ergy Efficiency Ratio (SEER) and Heating Seasonal Performance Factor (HSPF) ratings in accordance with paragraph (a)(2)(i)(B) of this section.

(ii) For split-system air conditioners and heat pumps, the condenser-evaporator coil combination selected for tests pursuant to paragraph (a)(2)(i) of this section shall include the evaporator coil that is likely to have the largest volume of retail sales with the particular model of condensing unit. For mini-split condensing units that are designed to always be installed with more than one indoor unit, a “tested combination” as defined in 10 CFR 430.2 shall be used for tests pursuant to paragraph (a)(2)(i) of this section. For multi-split systems, each model of condensing unit shall be tested with two different sets of indoor units. For one set, a “tested combination” composed entirely of non-ducted indoor units shall be used. For the second set, a “tested combination” composed entirely of ducted indoor units shall be used. However, for any split-system air conditioner having a single-speed compressor, the condenser-evaporator coil combination selected for tests pursuant to paragraph (a)(2)(i) of this section shall include the indoor *coil-only* unit that is likely to have the largest volume of retail sales with the particular model of outdoor unit. This *coil-only* requirement does not apply to split-system air conditioners that are only sold and installed with *blower-coil* indoor units, specifically mini-splits, multi-splits, and through-the-wall units. This *coil-only* requirement does not apply to any split-system heat pumps. For every other split-system combination that includes the same model of condensing unit but a different model of evaporator coil and for every other mini-split and multi-split system that includes the same model of condensing unit but a different set of evaporator coils, whether the evaporator coil(s) is manufactured by the same manufacturer or by a component manufacturer, either—

(A) A sample of sufficient size, comprised of production units or representing production units, must be tested as complete systems with the resulting ratings for the outdoor unit-indoor unit(s) combination obtained in accordance with paragraphs (a)(2)(i)(A) and (a)(2)(i)(B) of this section; or

(B) The representative values of the measures of energy efficiency must be assigned as follows:

(1) Using an alternative rating method (ARM) that has been approved by DOE in accordance with the provisions of § 429.70(e)(1) and (2); or

(2) For multi-split systems composed entirely of non-ducted indoor units, set equal to the system tested in accordance with paragraph (a)(2)(i) of this section whose tested combination was entirely non-ducted indoor units; or

(3) For multi-split systems composed entirely of ducted indoor units, set equal to the system tested in accordance with paragraph (a)(2)(i) of this section when the tested combination was entirely ducted indoor units; or

(4) For multi-split systems having a mix of non-ducted and ducted indoor units, set equal to the mean of the values for the two systems—one having the tested combination of all non-ducted units and the second having the tested combination of all ducted indoor units—tested in accordance with paragraph (a)(2)(i) of this section.

(iii) Whenever the representative values of the measures of energy consumption, as determined by the provisions of paragraph (a)(2)(ii)(B) of this section, do not agree within 5 percent of the energy consumption as determined by actual testing, the values determined by actual testing must be used to comply with section 323(c) of the Act or to comply with rules under section 324 of the Act.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to central air conditioners and heat pumps; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information:

(i) Residential central air conditioners: The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/W-h)), the cooling capacity in British thermal units per hour (Btu/h), and the manufacturer and individual manufacturer’s model numbers of the indoor and outdoor unit. For central air conditioners whose seasonal energy efficiency ratio is based on an installation that includes a particular model of ducted air mover (*e.g.*,

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furnace, air handler, blower kit), the manufacturer's model number of this ducted air mover must be included among the model numbers listed on the certification report.

(ii) Residential central air conditioning heat pumps: The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/W-h)), the cooling capacity in British thermal units per hour (Btu/h), the heating seasonal performance factor (HSPF in British thermal units per Watt-hour (Btu/W-h)), and the manufacturer and individual model numbers of the indoor and outdoor unit. For central air conditioning heat pumps whose seasonal energy efficiency ratio and heating seasonal performance factor are based on an installation that includes a particular model of ducted air mover (e.g., furnace, air handler, blower kit), the model number of this ducted air mover must be included among the model numbers listed on the certification report.

(iii) Small duct, high velocity air conditioners: The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/W-h)) and the cooling capacity in British thermal units per hour (Btu/h).

(iv) Small duct, high velocity heat pumps: The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/W-h)), the heating seasonal performance factor (HSPF in British thermal units per Watt-hour (Btu/W-h)), and the cooling capacity in British thermal units per hour (Btu/h).

(v) Space constrained air conditioners: The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/W-h)) and the cool-

ing capacity in British thermal units per hour (Btu/h).

(v) Space constrained heat pumps: The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/W-h)), the coefficient of performance, and the cooling capacity in British thermal units per hour (Btu/h).

(c) *Alternative methods for determining efficiency or energy use* for central air conditioners and heat pumps can be found in § 429.70 of this subpart.

[76 FR 12451, Mar. 7, 2011; 76 FR 24763, May 2, 2011]

§ 429.17 Residential water heaters.

(a) *Determination of represented value.* Manufacturers must determine the represented value, which includes the certified rating, for each basic model of residential water heater either by testing, in conjunction with the applicable sampling provisions, or by applying an alternative efficiency determination method (AEDM) approved for use by DOE.

(1) *Units to be tested.* (i) If the represented value is determined through testing, the general requirements of § 429.11 are applicable; and

(ii) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of estimated annual operating cost, energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{th}$  sample;

Or,

(2) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.95}$  is the  $t$  statistic for a 95% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A).

and

(B) Any represented value of the energy factor or other measure of energy consumption of a basic model for which

consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.95}$  is the  $t$  statistic for a 95% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A).

(C) Any represented value of the rated storage volume must be equal to the mean of the measured storage volumes of all the units within the sample.

(D) Any represented value of first-hour rating or maximum gallons per minute (GPM) must be equal to the mean of the measured first-hour ratings or measured maximum GPM ratings, respectively, of all the units within the sample.

(2) *Alternative efficiency determination methods.* In lieu of testing, represented values for a basic model must be determined through the application of an AEDM pursuant to the requirements of § 429.70.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to residential water heaters; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The uniform energy factor (UEF, rounded to the nearest 0.01), rated storage volume in gallons (gal), first-hour rating or maximum gallons per minute (GPM), and recovery efficiency (percent).

[76 FR 12451, Mar. 7, 2011; 76 FR 24764, May 2, 2011, as amended at 79 FR 40565, July 11, 2014]

**§ 429.18 Residential furnaces.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of

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§ 429.11 are applicable to residential furnaces; and

(2) (i) For each basic model of furnaces, other than basic models of those sectional cast-iron boilers (which may be aggregated into groups having identical intermediate sections and combustion chambers) a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of estimated annual operating cost, energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(B) Any represented value of the annual fuel utilization efficiency or other measure of energy consumption of a

basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(ii) For the lowest capacity basic model of a group of basic models of those sectional cast-iron boilers having identical intermediate sections and combustion chambers, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of estimated annual operating cost, energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(B) Any represented value of the fuel utilization efficiency or other measure of energy consumption of a basic model

for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;



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Or,

(2) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(iii) For the highest capacity basic model of a group of basic models of those sectional cast-iron boilers having identical intermediate sections and combustion chambers, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of estimated annual operating cost, energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(B) Any represented value of the fuel utilization efficiency or other measure of energy consumption of a basic model

for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(iv) For each basic model or capacity other than the highest or lowest of the group of basic models of sectional cast-iron boilers having identical intermediate sections and combustion chambers, represented values of measures of energy consumption shall be determined by either—

(A) A linear interpolation of data obtained for the smallest and largest capacity units of the family, or

(B) Testing a sample of sufficient size to ensure that:

(1) Any represented value of estimated annual operating cost, energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$

sample;

Or,

(ii) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(2) Any represented value of the energy factor or other measure of energy consumption of a basic model for which

consumers would favor higher values shall be less than or equal to the lower of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(ii) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(v) Whenever measures of energy consumption determined by linear interpolation do not agree with measures of energy consumption determined by actual testing, the values determined by testing must be used for certification.

(vi) In calculating the measures of energy consumption for each unit test-

ed, use the design heating requirement corresponding to the mean of the capacities of the units of the sample.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to residential furnaces; and

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(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information:

(i) Residential furnaces and boilers: The annual fuel utilization efficiency (AFUE) in percent (%) and the input capacity in British thermal units per hour (Btu/h).

(ii) For cast-iron sectional boilers: The type of ignition system for gas-fired steam and hot water boilers.

(3) Pursuant to § 429.12(b)(13), a certification report shall include the following additional product-specific information: For cast-iron sectional boilers: a declaration of whether certification is based on linear interpolation or testing. For hot water boilers, a declaration that the manufacturer has in-

corporated the applicable design requirements.

[76 FR 12451, Mar. 7, 2011; 76 FR 24765, May 2, 2011, as amended at 76 FR 38292, June 30, 2011]

§ 429.19 Dishwashers.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to dishwashers; and

(2) For each basic model of dishwashers, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of estimated annual operating cost, energy or water consumption or other measure of energy or water consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0,975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0,975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the energy or water factor or other measure of energy or water consumption of a

basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.975}$  is the  $t$  statistic for a 97.5% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to dishwashers; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The estimated annual energy use in kilowatt hours per year (kWh/yr) and the water consumption in gallons per cycle.

(3) Pursuant to § 429.12(b)(13), a certification report shall include the following additional product-specific information when using appendix C or appendix C1: the capacity in number of place settings as specified in ANSI/AHAM DW-1-1992 when using appendix C (incorporated by reference, see § 429.4) and ANSI/AHAM DW-1-2010 when using appendix C1 (incorporated by reference, see § 429.4), presence of a soil sensor (if yes, the number of cycles required to reach calibration), and the water inlet temperature used for testing in degrees Fahrenheit (°F). When using appendix C1, additionally: the cycle selected for energy testing and whether that cycle is soil-sensing, the options selected for the energy test, and presence of a built-in water softening system (if yes,

the energy use in kilowatt-hours and the water use in gallons required for each regeneration of the water softening system, the number of regeneration cycles per year, and data and calculations used to derive these values).

[76 FR 12451, Mar. 7, 2011; 76 FR 24766, May 2, 2011, as amended at 77 FR 31962, May 30, 2012; 77 FR 65977, Oct. 31, 2012]

#### § 429.20 Residential clothes washers.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to residential clothes washers; and

(2) For each basic model of residential clothes washers, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of the water factor, integrated water factor, the estimated annual operating cost, the energy or water consumption, or other measure of energy or water consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the modified energy factor, integrated modified energy factor, or other measure of energy or water consumption of

a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(3) The capacity of a basic model reported in accordance with paragraph (b)(2) of this section shall be the mean of the measured clothes container ca-

capacity, C, of all tested units of the basic model.

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(4) The remaining moisture content (RMC) of a basic model reported in accordance with paragraph (b)(2) of this section shall be the mean of the final RMC value measured for all tested units of the basic model.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to residential clothes washers; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information:

(i) For residential clothes washers tested in accordance with Appendix J1: The modified energy factor (MEF) in cubic feet per kilowatt hour per cycle (cu ft/kWh/cycle), the capacity in cubic feet (cu ft), the corrected remaining moisture content (RMC) expressed as a percentage, and, for standard-size residential clothes washers, a water factor (WF) in gallons per cycle per cubic foot (gal/cycle/cu ft).

(ii) For residential clothes washers tested in accordance with Appendix J2: The integrated modified energy factor (IMEF) in cu ft/kWh/cycle, the integrated water factor (IWF) in gal/cycle/cu ft, the capacity in cu ft, the corrected remaining moisture content (RMC) expressed as a percentage, and the type of loading (top-loading or front-loading).

(3) Pursuant to § 429.12(b)(13), a certification report must include the fol-

lowing additional product-specific information: A list of all cycle selections comprising the complete energy test cycle for each basic model.

(c) *Reported values.* Values reported pursuant to this subsection must be rounded as follows: MEF and IMEF to the nearest 0.01 cu ft/kWh/cycle, WF and IWF to the nearest 0.1 gal/cycle/cu ft, RMC to the nearest 0.1 percentage point, and clothes container capacity to the nearest 0.1 cu ft.

[76 FR 12451, Mar. 7, 2011; 76 FR 24767, May 2, 2011, as amended at 77 FR 13936, Mar. 7, 2012; 77 FR 32379, May 31, 2012; 80 FR 46760, Aug. 5, 2015]

§ 429.21 Residential clothes dryers.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to clothes dryers; and

(2) For each basic model of clothes dryers a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of estimated annual operating cost, energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

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and

(ii) Any represented value of the energy factor, combined energy factor, or other measure of energy consumption

of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(3) The capacity of a basic model reported in accordance with paragraph (b)(2) of this section shall be the mean of the capacities measured for each tested unit of the basic model.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to clothes dryers; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: When using appendix D, the energy factor in pounds per kilowatt hours (lb/kWh), the capacity in cubic feet (cu ft), the voltage in volts (V) (for electric dryers only), an indication if the dryer has automatic termination controls, and the hourly British thermal unit (Btu) rating of the burner (for gas dryers only); when using appendix D1, the combined energy factor in pounds per kilowatt hours (lb/kWh), the capacity in cubic feet (cu ft), the voltage in volts (V) (for electric dryers only), an indication if the dryer has automatic termination controls, and the hourly Btu rating of the burner (for gas dryers only); when using appendix D2, the combined energy factor in pounds per kilowatt hours (lb/kWh),

the capacity in cubic feet (cu ft), the voltage in volts (V) (for electric dryers only), an indication if the dryer has automatic termination controls, the hourly Btu rating of the burner (for gas dryers only), and a list of the cycle setting selections for the energy test cycle as recorded in section 3.4.7 of appendix D2 to Subpart B of Part 430.

[76 FR 12451, Mar. 7, 2011; 76 FR 24767, May 2, 2011, as amended at 78 FR 49644, Aug. 14, 2013]

§ 429.22 **Direct heating equipment.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to direct heating equipment; and

(2) (i) For each basic model of direct heating equipment (not including furnaces) a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of estimated annual operating cost, energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:



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(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(B) Any represented value of the fuel utilization efficiency or other measure of energy consumption of a basic model

for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(2) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(ii) In calculating the measures of energy consumption for each unit tested, use the design heating requirement

corresponding to the mean of the capacities of the units of the sample.

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(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to direct heating equipment; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: Direct heating equipment, the annual fuel utilization efficiency (AFUE) in percent (%), the mean input capacity in British thermal units per hour (Btu/h), and the mean output capacity in British thermal units per hour (Btu/h).

[76 FR 12451, Mar. 7, 2011; 76 FR 24768, May 2, 2011, as amended at 76 FR 38292, June 30, 2011]

**§ 429.23 Conventional cooking tops, conventional ovens, microwave ovens.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of

§ 429.11 are applicable to conventional cooking tops, conventional ovens and microwave ovens; and

(2) For each basic model of conventional cooking tops, conventional ovens and microwave ovens a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of estimated annual operating cost, energy consumption, standby mode power consumption, off mode power consumption, or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the energy factor, integrated energy factor, or other measure of energy consumption

of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

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Or,

(B) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to conventional cooking tops, conventional ovens and microwave ovens; and (2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: For conventional cooking tops and conventional ovens: the type of pilot light and a declaration that the manufacturer has incorporated the applicable design requirements. For microwave ovens, the average standby power in watts.

[76 FR 12451, Mar. 7, 2011; 76 FR 24769, May 2, 2011, as amended at 77 FR 65977, Oct. 31, 2012; 78 FR 4025, Jan. 18, 2013; 78 FR 36368, June 17, 2013]

**§ 429.24 Pool heaters.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to pool heaters; and

(2) For each basic model of pool heater a sample of sufficient size shall be randomly selected and tested to ensure that any represented value of the thermal efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

(i) The mean of the sample, where:  
Or,

(ii) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

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$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.975}$  is the  $t$  statistic for a 97.5% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to pool heaters; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The thermal efficiency in percent (%) and the input capacity in British thermal units per hour (Btu/h).

[76 FR 12451, Mar. 7, 2011; 76 FR 24769, May 2, 2011]

§ 429.25 **Television sets.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to televisions; and

(2) For each basic model of television, samples shall be randomly selected and tested to ensure that—

(i) Any represented value of power consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) For on mode power consumption, the upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

and  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.95}$  is the

$t$ -statistic for a 95% one-tailed confidence interval with  $n-1$  degrees of freedom (from appendix A of this subpart).

And

(C) For standby mode power consumption and power consumption measurements in modes other than on mode, the upper 90 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{0.90} \left( \frac{s}{\sqrt{n}} \right)$$

and  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.90}$  is the  $t$ -statistic for a 90% one-tailed confidence interval with  $n-1$  degrees of freedom (from appendix A of this subpart).

(ii) Any represented annual energy consumption of a basic model shall be determined by applying the AEC calculation in section 8.2 of Appendix H to subpart B of 10 CFR Part 430 to the represented values of power consumption as calculated pursuant to paragraph (a)(2)(i) of this section.

(iii) *Rounding requirements.* The represented value of power consumption and the represented annual energy consumption shall be rounded as follows:

(A) For power consumption in the on, standby, and off modes, the represented value shall be rounded according to the accuracy requirements specified in section 3.3.3 of Appendix H to subpart B of 10 CFR Part 430.

(B) For annual energy consumption, the represented value shall be rounded according to the rounding requirements specified in section 8.3 of Appendix H to subpart B of 10 CFR Part 430.

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(b) [Reserved]

[78 FR 63840, Oct. 25, 2013]

§ 429.26 Fluorescent lamp ballasts.

(a) Sampling plan for selection of units for testing. (1) The requirements of § 429.11 are applicable to fluorescent lamp ballasts; and

(2) For each basic model of fluorescent lamp ballasts, a sample of sufficient size, not less than four, shall be randomly selected and tested to ensure that—

(i) Any represented value of estimated annual energy operating costs, energy consumption, or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{th}$  sample;

Or,

(B) The upper 99 percent confidence limit (UCL) of the true mean divided by 1.01, where:

$$UCL = \bar{x} + t_{0.99} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.99}$  is the t statistic for a 99% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the ballast efficacy factor or other measure of the energy consumption of a basic

model for which consumers would favor a higher value shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{th}$  sample;

Or,

(B) The lower 99 percent confidence limit (LCL) of the true mean divided by 0.99, where:

$$LCL = \bar{x} - t_{.99} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.99}$  is the t statistic for a 99% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to fluorescent lamp ballasts; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The ballast efficacy factor, the ballast power factor, the number of lamps operated by the ballast, and the type of lamps operated by the ballast.

[76 FR 12451, Mar. 7, 2011; 76 FR 24769, May 2, 2011]

**§ 429.27 General service fluorescent lamps, general service incandescent lamps, and incandescent reflector lamps.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to general service fluorescent lamps, general service incandescent lamps and incandescent reflector lamps; and

(2)(i) For each basic model of general service fluorescent lamp and incandescent reflector lamp, samples of production lamps shall be obtained from a 12-month period, tested, and the results averaged. A minimum sample of 21 lamps shall be tested. The manufacturer shall randomly select a minimum of three lamps from each month of production for a minimum of 7 out of the 12-month period. In the instance where production occurs during fewer than 7 of such 12 months, the manufacturer shall randomly select 3 or more lamps from each month of production, where the number of lamps selected for each month shall be distributed as evenly as practicable among the months of production to attain a minimum sample of 21 lamps. Any represented value of lamp efficacy of a basic model shall be based on the sample and shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by .97, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(ii) For each basic model of general service fluorescent lamp and general service incandescent lamp, the color rendering index (CRI) shall be measured from the same lamps selected for the lumen output and watts input measurements in paragraphs (a)(2)(i) and (a)(2)(iii) of this section, *i.e.*, the

manufacturer shall measure all lamps for lumens, watts input, and CRI. The CRI shall be represented as the average of a minimum sample of 21 lamps and shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by .97, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(iii) For each basic model of general service incandescent lamp, for measurements of rated wattage and rated lumen output, samples of production lamps shall be obtained from a 12-month period, tested, and the results averaged. A minimum sample of 21 lamps shall be tested. The manufacturer shall randomly select a minimum of three lamps from each month of production for a minimum of 7 out of the 12-month period. In the instance where production occurs during fewer than 7

of such 12 months, the manufacturer shall randomly select 3 or more lamps from each month of production, where the number of lamps selected for each month shall be distributed as evenly as practicable among the months of production to attain a minimum sample of 21 lamps. Any represented value of rated wattage of a basic model shall be based on the sample and shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.03, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

and  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A to this subpart).

(iv) For each basic model of general service incandescent lamp, for measurements of rated lifetime, a minimum sample of 21 lamps shall be tested. The manufacturer shall randomly select a minimum of three lamps from each month of production for a minimum of 7 out of the 12-month period. In the instance where production occurs during fewer than 7 of such 12 months, the manufacturer shall randomly select three or more lamps from each month of production, where the number of lamps selected for each month shall be distributed as evenly as practicable among the months of production to attain a minimum sample of 21 lamps. The lifetime shall be represented as the length of operating time between first use and failure of 50 percent of the sample size, in accordance with test procedures described in section 4.2 of Appendix R to subpart B of part 430 of this chapter. Compliance will be determined by the percentage of sample size that meets the minimum rated lifetime.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to general service fluorescent lamps, general service incandescent lamps and incandescent reflector lamps; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information:

(i) General service fluorescent lamps: the testing laboratory's National Voluntary Laboratory Accreditation Program (NVLAP) identification number or other NVLAP-approved accreditation identification, production dates of the units tested, the 12-month average lamp efficacy in lumens per watt (lm/W), lamp wattage (W), correlated color temperature in Kelvin (K), and the 12-month average Color Rendering Index (CRI).

(ii) Incandescent reflector lamps: The laboratory's NVLAP identification number or other NVLAP-approved accreditation identification, production dates of the units tested, the 12-month average lamp efficacy in lumens per watt (lm/W), and lamp wattage (W).

(iii) General service incandescent lamps: The testing laboratory's National Voluntary Laboratory Accreditation Program (NVLAP) identification number or other NVLAP-approved accreditation identification, production dates of the units tested, the 12-month average maximum rate wattage in watts (W), the 12-month average minimum rated lifetime (hours), and the 12-month average Color Rendering Index (CRI).

(c) *Test data.* Manufacturers must include the production date codes and the accompanying decoding scheme corresponding to all of the units tested for a given basic model in the detailed test records maintained under § 429.71.

[76 FR 12451, Mar. 7, 2011; 76 FR 24770, May 2, 2011, as amended at 76 FR 38292, June 30, 2011; 77 FR 4215, Jan. 27, 2012]



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**§ 429.28 Faucets.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to faucets; and

(2) For each basic model of faucet, a sample of sufficient size shall be ran-

domly selected and tested to ensure that any represented value of water consumption of a basic model for which consumers favor lower values shall be no less than the higher of the higher of:

- (i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

- (ii) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to faucets; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: For non-metering faucets, the maximum water use in gallons per minute (gpm) rounded to the nearest 0.1 gallon; for metering faucets, the maximum water use in gallons per cycle (gal/cycle) rounded to the nearest 0.01 gallon; and for all faucet types, the flow water pressure in pounds per square inch (psi).

[76 FR 12451, Mar. 7, 2011; 76 FR 24771, May 2, 2011, as amended at 78 FR 62985, Oct. 23, 2013]

**§ 429.29 Showerheads.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to showerheads; and

(2) For each basic model of a showerhead, a sample of sufficient size shall be randomly selected and tested to ensure that any represented value of water consumption of a basic model for which consumers favor lower values shall be greater than or equal to the higher of:

- (i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

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(ii) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to showerheads; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The maximum water use in gallons per minute (gpm) rounded to the nearest 0.1 gallon, the maximum flow water pressure in pounds per square inch (psi), and a declaration that the showerhead meets the requirements of § 430.32(p) pertaining to mechanical retention of the flow-restricting insert, if applicable.

[76 FR 12451, Mar. 7, 2011; 76 FR 24771, May 2, 2011, as amended at 78 FR 62985, Oct. 23, 2013]

§ 429.30 Water closets.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to water closets; and

(2) For each basic model of water closet, a sample of sufficient size shall be randomly selected and tested to ensure that any represented value of water consumption of a basic model for which consumers favor lower values shall be greater than or equal to the higher of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(ii) The upper 90 percent confidence limit (UCL) of the true mean divided by 1.1, where:

$$UCL = \bar{x} + t_{.90} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.90}$  is the t statistic for a 90% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

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(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to water closets; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The maximum water use in gallons per flush (gpf), rounded to the nearest 0.01 gallon. For dual-flush water closets, the maximum water use to be reported is the flush volume observed when tested in the full-flush mode.

[76 FR 12451, Mar. 7, 2011; 76 FR 24771, May 2, 2011, as amended at 78 FR 62986, Oct. 23, 2013]

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(ii) The upper 90 percent confidence limit (UCL) of the true mean divided by 1.1, where:

$$UCL = \bar{x} + t_{.90} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.90}$  is the t statistic for a 90% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to urinals; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The maximum water use in gallons per flush (gpf), rounded to the nearest 0.01 gallon, and for trough-type urinals, the maximum flow rate in gallons per minute (gpm), rounded to the nearest 0.01 gallon, and the length of the trough in inches (in).

[76 FR 12451, Mar. 7, 2011; 76 FR 24771, May 2, 2011, as amended at 78 FR 62986, Oct. 23, 2013]

**§ 429.31 Urinals.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to urinals; and

(2) For each basic model of urinal, a sample of sufficient size shall be randomly selected and tested to ensure that any represented value of water consumption of a basic model for which consumers favor lower values shall be greater than or equal to the higher of:

(i) The mean of the sample, where:

**§ 429.32 Ceiling fans.**

(a) *Sampling plan for selection of units for testing.* The requirements of § 429.11 are applicable to ceiling fans.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to ceiling fans; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The number of speeds within the ceiling fan controls and a declaration that the manufacturer has incorporated the applicable design requirements.

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**§ 429.33 Ceiling fan light kits.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to ceiling fan light kits; and

(2) For each basic model of ceiling fan light kit with sockets for medium screw base lamps or pin-based fluorescent lamps selected for testing, a sam-

ple of sufficient size shall be randomly selected and tested to ensure that—

(i) Any value of estimated energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.1, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-

1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the efficacy or other measure of energy consumption of a basic model for which

consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.9, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.95}$  is the  $t$  statistic for a 95% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to ceiling fan light kits; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information:

(i) Ceiling fan light kits with sockets for medium screw base lamps: the rated wattage in watts (W) and the system's efficacy in lumens per watt (lm/W).

(ii) Ceiling fan light kits with pin-based sockets for fluorescent lamps: the rated wattage in watts (W), the system's efficacy in lumens per watt (lm/W), and the length of the lamp in inches (in).

(iii) Ceiling fan light kits with any other socket type: the rated wattage in watts (W) and the number of individual sockets.

(3) Pursuant to § 429.12(b)(13), a certification report shall include the following additional product-specific information: Ceiling fan light kits with any other socket type: a declaration that the basic model meets the applicable design requirement and the features that have been incorporated into the ceiling fan light kit to meet the applicable design requirement (*e.g.*, circuit breaker, fuse, ballast).

[76 FR 12451, Mar. 7, 2011; 76 FR 24772, May 2, 2011]

EFFECTIVE DATE NOTE: At 80 FR 80225, Dec. 24, 2015, § 429.3 was amended by revising paragraph (a) and adding paragraph (c), effective Jan. 25, 2016. For the convenience of the user, the added and revised text is set forth as follows:

**§ 429.33 Ceiling fan light kits.**

(a) *Determination of represented value.* Manufacturers must determine represented values, which includes certified ratings, for each basic model of ceiling fan light kit in

accordance with following sampling provisions.

(1) The requirements of § 429.11 are applicable to ceiling fan light kits, and

(2) For each basic model of ceiling fan light kit, the following sample size requirements are applicable to demonstrate compliance with the January 1, 2007 energy conservation standards:

(i) For ceiling fan light kits with medium screw base sockets that are packaged with compact fluorescent lamps, determine the represented values of each basic model of lamp packaged with the ceiling fan light kit in accordance with § 429.35.

(ii) [Reserved]

(iii) For ceiling fan light kits with pin-based sockets that are packaged with fluorescent lamps, determine the represented values of each basic model of lamp packaged with the ceiling fan light kit in accordance with the sampling requirements in § 429.35.

(iv) For ceiling fan light kits with medium screw base sockets that are packaged with incandescent lamps, determine the represented values of each basic model of lamp packaged with the ceiling fan light kit in accordance with § 429.27.

(v) For ceiling fan light kits with sockets or packaged with lamps other than those described in paragraphs (a)(2)(i), (ii), (iii), or (iv) of this section, each unit must comply with the applicable design standard in § 430.32(s)(4) of this chapter.

(3) For ceiling fan light kits required to comply with amended energy conservation standards, if established:

(i) Determine the represented values of each basic model of lamp packaged with each basic model of ceiling fan light kit, in accordance with the specified section:

(A) For compact fluorescent lamps, § 429.35;  
(B) For general service fluorescent lamps, § 429.27;

(C) For incandescent lamps, § 429.27;

(D) [Reserved]

(E) For other fluorescent lamps (not compact fluorescent lamps or general service fluorescent lamps), § 429.35; and

(F) [Reserved]

(ii) Determine the represented value of each basic model of integrated SSL circuitry

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that is incorporated into each basic model of ceiling fan light kit by randomly selecting a sample of sufficient size and testing to ensure that any represented value of the en-

ergy efficiency of the integrated SSL circuitry basic model is less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from appendix A to subpart B).

meet the applicable design requirement (e.g., circuit breaker, fuse, ballast).

**§ 429.35 Bare or covered (no reflector) medium base compact fluorescent lamps.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to bare or covered (no reflector) medium base compact fluorescent lamps; and

(2) For each basic model of bare or covered (no reflector) medium base compact fluorescent lamp

(i) No less than five units per basic model must be used when testing for the efficacy, 1,000-hour lumen maintenance, and the lumen maintenance. Each unit must be tested in the base-up position unless the product is labeled restricted by the manufacturer, in which case the unit should be tested in the manufacturer specified position. Any represented value of efficacy, 1,000-hour lumen maintenance, and lumen maintenance shall be based on a sample randomly selected and tested to ensure that the represented value is less than or equal to the lower of:

(A) The mean of the sample, where:

\* \* \* \* \*

(c) *Rounding requirements.* Any represented value of initial lamp efficacy of CFLKs as described in paragraph (a)(3)(i)(E); system efficacy of CFLKs as described in paragraph (a)(2)(iii); luminaire efficacy of CFLKs as described in paragraph (a)(3)(ii) of this section must be expressed in lumens per watt and rounded to the nearest tenth of a lumen per watt.

**§ 429.34 Torchieres.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to torchieres; and

(2) Reserved

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to torchieres; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following additional product-specific information: A declaration that the basic model meets the applicable design requirement and the features that have been incorporated into the torchiere to

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;  
Or,

(B) The lower 97.5 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(ii) No less than 6 unique units (*i.e.*, units that have not previously been tested) per basic model must be used when testing for the rapid cycle stress. Each unit can be tested in the base up or base down position as stated by the manufacturer.

(iii) No less than 10 units per basic model must be used when testing for the average rated lamp life. Half the sample should be tested in the base up position and half of the sample should be tested in the base down position, unless specific use or position appears on the packaging of that particular unit.

(b) *Certification reports.* (1) The requirements of §429.12 are applicable to bare or covered medium base compact fluorescent lamps; and

(2) Pursuant to §429.12(b)(13), a certification report shall include the following public product-specific information: The testing laboratory's NVLAP identification number or other NVLAP-approved accreditation identification, the minimum initial efficacy

in lumens per watt (lm/W), the lumen maintenance at 1,000 hours in percent (%), the lumen maintenance at 40 percent of rated life in percent (%), the rapid cycle stress test in number of units passed, and the lamp life in hours (h).

[76 FR 12451, Mar. 7, 2011; 76 FR 24772, May 2, 2011, as amended at 76 FR 38292, June 30, 2011]

**§ 429.36 Dehumidifiers.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of §429.11 are applicable to dehumidifiers; and

(2) For each basic model of dehumidifier selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

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Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the energy factor, integrated energy factor, or other measure of energy consump-

tion of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(3) The capacity of a basic model is the mean of the measured capacities for each tested unit of the basic model. Round the mean capacity value to two decimal places.

(4) For whole-home dehumidifiers, the case volume of a basic model is the mean of the measured case volumes for each tested unit of the basic model. Round the mean case volume value to one decimal place.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to dehumidifiers; and

(2) Pursuant to § 429.12(b)(13), a certification report must include the following public product-specific information: The energy factor in liters per kilowatt hour (liters/kWh), capacity in pints per day, and for whole-home dehumidifiers, case volume in cubic feet.

[76 FR 12451, Mar. 7, 2011; 76 FR 24773, May 2, 2011, as amended at 77 FR 65977, Oct. 31, 2012; 80 FR 45824, July 31, 2015]



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**§ 429.37 External power supplies.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to external power supplies; and

(2) For each basic model of external power supply selected for testing, a sample of sufficient size shall be ran-

domly selected and tested to ensure that—

(i) Any represented value of the estimated energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 97.5 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the estimated energy consumption of a basic

model for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 97.5 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to external power supplies except that required information may be reported on the basis of a basic model or a design family. If certifying using a design family, for § 429.12(b)(6), report the individual manufacturer’s model numbers covered by the design family.

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information:

(i) External power supplies: The average active mode efficiency as a percentage (%), no-load mode power consumption in watts (W), nameplate output power in watts (W), and, if missing from the nameplate, the output current in amperes (A) of the basic model or the output current in amperes (A) of the highest- and lowest-voltage models within the external power supply design family.

(ii) Switch-selectable single-voltage external power supplies: The average active mode efficiency as a percentage (%) value, no-load mode power consumption in watts (W) using the lowest and highest selectable output voltages, nameplate output power in watts (W), and, if missing from the nameplate, the output current in amperes (A).

(iii) Adaptive single-voltage external power supplies: The average active-mode efficiency as a percentage (%) at the highest and lowest nameplate output voltages, no-load mode power consumption in watts (W), nameplate output power in watts (W) at the highest and lowest nameplate output voltages, and, if missing from the nameplate, the output current in amperes (A) at the

highest and lowest nameplate output voltages.

(iv) External power supplies that are exempt from no-load mode requirements under § 430.32(w)(1)(iii) of this chapter: A statement that the product is designed to be connected to a security or life safety alarm or surveillance system component, the average active-mode efficiency as a percentage (%), the nameplate output power in watts (W), and if missing from the nameplate, the certification report must also include the output current in amperes (A) of the basic model or the output current in amperes (A) of the highest- and lowest-voltage models within the external power supply design family.

[76 FR 12451, Mar. 7, 2011; 76 FR 24773, May 2, 2011, as amended at 76 FR 57899, Sept. 19, 2011; 80 FR 51440, Aug. 25, 2015]

**§ 429.38 Non-class A external power supplies. [Reserved]**

**§ 429.39 Battery chargers.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to battery chargers; and

(2) For each basic model of battery charger selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of the estimated non-active energy ratio or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 97.5 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the estimated non-active energy ratio or other measure of energy consumption of a

basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 97.5 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A of this part).

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(b) *Certification reports.* [Reserved]

[76 FR 12451, Mar. 7, 2011; 76 FR 24774, May 2, 2011]

§ 429.40 Candelabra base incandescent lamps and intermediate base incandescent lamps.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to candelabra base incandescent lamps; and

(2) For each basic model of candelabra base incandescent lamp and intermediate base incandescent lamp, a minimum sample of 21 lamps shall be randomly selected and tested. Any represented value of lamp wattage of a basic model shall be based on the sample and shall be less than or equal to the lower of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{th}$  sample;

Or,

(ii) The lower 97.5 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of

samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1

degrees of freedom (from Appendix A of this part).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to candelabra base and intermediate base incandescent lamps; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information:

(i) Candelabra base incandescent lamp: The rated wattage in watts (W).

(ii) Intermediate base incandescent lamp: The rated wattage in watts (W).

[76 FR 12451, Mar. 7, 2011; 76 FR 24774, May 2, 2011]

§ 429.41 Commercial warm air furnaces.

(a) *Determination of represented value.* Manufacturers must determine the represented value, which includes the cer-

tified rating, for each basic model of commercial warm air furnace either by testing, in conjunction with the applicable sampling provisions, or by applying an AEDM.

(1) *Units to be tested.* (i) If the represented value is determined through testing, the general requirements of § 429.11 are applicable; and

(ii) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:  
(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; Or,

(2) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A to subpart B of part 429). And,

(B) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; Or,

(2) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A to subpart B of part 429).

(2) *Alternative efficiency determination methods.* In lieu of testing, a represented value of efficiency or consumption for a basic model of commercial warm air furnace must be determined through the application of an AEDM pursuant to the requirements of § 429.70 and the provisions of this section, where:

(i) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the output of the AEDM and less than or equal to the Federal standard for that basic model; and

(ii) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the output of the AEDM and greater than or

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equal to the Federal standard for that basic model.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to commercial warm air furnaces; and

(2) Pursuant to § 429.12(b)(13), a certification report must include the following public, equipment-specific information: The thermal efficiency in percent (%), and the maximum rated input capacity in British thermal units per hour (Btu/h).

(3) Pursuant to § 429.12(b)(13), a certification report must include the following additional equipment-specific information:

(i) Whether the basic model is engineered-to-order; and

(ii) For any basic model rated with an AEDM, whether the manufacturer elects the witness test option for verification testing. (See § 429.70(c)(5)(iii) for options). However, the manufacturer may not select more than 10% of AEDM-rated basic models.

(4) Pursuant to § 429.12(b)(13), a certification report may include supplemental testing instructions in PDF format. If necessary to run a valid test, the equipment-specific, supplemental information must include any additional testing and testing set up instructions (e.g., specific operational or control codes or settings), which would be necessary to operate the basic model under the required conditions specified

by the relevant test procedure. A manufacturer may also include with a certification report other supplementary items in PDF format (e.g., manuals) for DOE consideration in performing testing under subpart C of this part.

[79 FR 25500, May 5, 2014, as amended at 80 FR 151, Jan. 5, 2015]

§ 429.42 Commercial refrigerators, freezers, and refrigerator-freezers.

(a) *Determination of represented value.* Manufacturers must determine the represented value, which includes the certified rating, for each basic model of commercial refrigerator, freezer, or refrigerator-freezer either by testing, in conjunction with the applicable sampling provisions, or by applying an AEDM.

(1) *Units to be tested.* (i) If the represented value for a given basic model is determined through testing, the general requirements of § 429.11 are applicable; and

(ii) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

And  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; or,

(2) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval

with n-1 degrees of freedom (from Appendix A to subpart B of part 429); And,

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(B) Any represented value of the energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher

values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

And,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; or,

(2) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A to subpart B of part 429).

(2) *Alternative efficiency determination methods.* In lieu of testing, a represented value of efficiency or consumption for a basic model of commercial refrigerator, freezer or refrigerator-freezer must be determined through the application of an AEDM pursuant to the requirements of § 429.70 and the provisions of this section, where:

(i) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the output of the AEDM and less than or equal to the Federal standard for that basic model; and

(ii) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the output of the AEDM and greater than or equal to the Federal standard for that basic model.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to commercial refrigerators, freezers, and refrigerator-freezers; and

(2) Pursuant to § 429.12(b)(13), a certification report must include the following public, equipment-specific information:

(i) The daily energy consumption in kilowatt hours per day (kWh/day);

(ii) The rating temperature (e.g. lowest product application temperature, if applicable) in degrees Fahrenheit ( °F); and

(iii) The chilled or frozen compartment volume in cubic feet (ft<sup>3</sup>), the adjusted volume in cubic feet (ft<sup>3</sup>), or the total display area (TDA) in feet squared (ft<sup>2</sup>) (as appropriate for the equipment class).

(3) Pursuant to § 429.12(b)(13), a certification report must include the following additional, equipment-specific information:

(i) Whether the basic model is engineered-to-order; and

(ii) For any basic model rated with an AEDM, whether the manufacturer elects the witness test option for verification testing. (See § 429.70(c)(5)(iii) for options). However, the manufacturer may not select more than 10% of AEDM-rated basic models.

(4) Pursuant to § 429.12(b)(13), a certification report must include supplemental information submitted in PDF format. The equipment-specific, supplemental information must include any additional testing and testing set

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up instructions (*e.g.*, charging instructions) for the basic model; identification of all special features that were included in rating the basic model; and all other information (*e.g.*, any specific settings or controls) necessary to operate the basic model under the required conditions specified by the relevant test procedure. A manufacturer may also include with a certification report other supplementary items in PDF format (*e.g.*, manuals) for DOE to consider when performing testing under subpart C of this part.

[76 FR 12451, Mar. 7, 2011; 76 FR 24775, May 2, 2011, as amended at 76 FR 38292, June 30, 2011; 78 FR 79593, Dec. 31, 2013; 79 FR 22307, Apr. 21, 2014; 79 FR 25501, May 5, 2014; 80 FR 151, Jan. 5, 2015]

**§ 429.43 Commercial heating, ventilating, air conditioning (HVAC) equipment.**

(a) *Determination of represented value.* Manufacturers must determine the rep-

resented value, which includes the certified rating, for each basic model of commercial HVAC equipment either by testing, in conjunction with the applicable sampling provisions, or by applying an AEDM.

(1) *Units to be tested.* (i) If the represented value is determined through testing, the general requirements of § 429.11 are applicable; and

(ii) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

And,  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; or,

(2) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.95}$  is the  $t$  statistic for a 95% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A to subpart B of part 429). And,

(B) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$



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And,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{th}$  sample; or,

(2) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A to subpart B of part 429).

cooled with a cooling capacity less than 65,000 Btu/h): The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(iii) For packaged terminal air conditioners and packaged terminal heat pumps, the represented value of cooling capacity shall be the average of the capacities measured for the sample selected as described in (a)(1)(ii) of this section, rounded to the nearest 100 Btu/h.

(ii) Commercial package heating equipment (except commercial package heating equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h): The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the coefficient of performance (COP), the rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(2) *Alternative efficiency determination methods.* In lieu of testing, a represented value of efficiency or consumption for a basic model of commercial HVAC equipment must be determined through the application of an AEDM pursuant to the requirements of § 429.70 and the provisions of this section, where:

(iii) Commercial package air conditioning equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h (3-Phase): The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/Wh)), and the rated cooling capacity in British thermal units per hour (Btu/h).

(i) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the output of the AEDM and less than or equal to the Federal standard for that basic model; and

(iv) Commercial package heating equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h (3-Phase): The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/Wh)), the heating seasonal performance factor (HSPF in British thermal units per Watt-hour (Btu/Wh)), and the rated cooling capacity in British thermal units per hour (Btu/h).

(ii) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the output of the AEDM and greater than or equal to the Federal standard for that basic model.

(v) Packaged terminal air conditioners: The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the rated cooling capacity in British thermal units per hour (Btu/h), the wall sleeve dimensions in inches (in), and the duration of the break-in period (hours).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to commercial HVAC equipment; and

(2) Pursuant to § 429.12(b)(13), a certification report must include the following public equipment-specific information:

(i) Commercial package air-conditioning equipment (except commercial package air conditioning that are air-

(vi) Packaged terminal heat pumps: The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/W-h)), the coefficient of performance (COP), the rated cooling capacity in British thermal units per hour (Btu/h), the wall sleeve dimensions in inches (in), and the duration of the break-in period (hours).

(vii) Single package vertical air conditioners: The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)) and the rated cooling capacity in British thermal units per hour (Btu/h).

(viii) Single package vertical heat pumps: The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the coefficient of performance (COP), and the rated cooling capacity in British thermal units per hour (Btu/h).

(ix) Variable refrigerant flow multi-split air conditioners with rated cooling capacity less than 65,000 Btu/h (3-Phase): The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/Wh)) and rated cooling capacity in British thermal units per hour (Btu/h).

(x) Variable refrigerant flow multi-split heat pumps with rated cooling capacity less than 65,000 Btu/h (3-Phase): The seasonal energy efficiency ratio (SEER in British thermal units per Watt-hour (Btu/Wh)), the heating seasonal performance factor (HSPF in British thermal units per Watt-hour (Btu/Wh)), and rated cooling capacity in British thermal units per hour (Btu/h).

(xi) Variable refrigerant flow multi-split air conditioners with rated cooling capacity greater than or equal to 65,000 Btu/h: The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(xii) Variable refrigerant flow multi-split heat pumps with rated cooling capacity greater than or equal to 65,000 Btu/h: The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the coefficient of performance (COP), rated cooling capacity in British thermal units per

hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(xiii) Water source variable refrigerant flow heat pumps (all rated cooling capacities): The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the coefficient of performance (COP), rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(xiv) Computer room air-conditioners: The net sensible cooling capacity in British thermal units per hour (Btu/h), the net cooling capacity in British thermal units per hour (Btu/h), the configuration (upflow/downflow), economizer presence (yes or no), condenser medium (air, water, or glycol-cooled), sensible coefficient of performance (SCOP), and rated airflow in standard cubic feet per minute (SCFM).

(xv) Water source heat pumps (other than variable refrigerant flow): The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the coefficient of performance (COP), the rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(3) Pursuant to § 429.12(b)(13), a certification report must include the following additional equipment-specific information:

(i) Whether the basic model is engineered-to-order; and

(ii) For any basic model rated with an AEDM, whether the manufacturer elects the witness test option for verification testing. (See § 429.70(c)(5)(iii) for options). However, the manufacturer may not select more than 10% of AEDM-rated basic models.

(4) Pursuant to § 429.12(b)(13), a certification report must include supplemental information submitted in PDF format. The equipment-specific, supplemental information must include any additional testing and testing set up instructions (e.g., charging instructions) for the basic model; identification of all special features that were included in rating the basic model; and all other information (e.g., operational codes or component settings) necessary

to operate the basic model under the required conditions specified by the relevant test procedure. A manufacturer may also include with a certification report other supplementary items in PDF format (*e.g.*, manuals) for DOE consideration in performing testing under subpart C of this part. The equipment-specific, supplemental information must include at least the following:

(i) Commercial package air-conditioning equipment (except commercial package air conditioning equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h): The nominal cooling capacity in British thermal units per hour (Btu/h); rated airflow in standard cubic feet per minute (SCFM) for each fan coil; water flow rate in gallons per minute (gpm) for water cooled units only; rated static pressure in inches of water; refrigeration charging instructions (*e.g.*, refrigerant charge, superheat and/or subcooling temperatures); frequency or control set points for variable speed components (*e.g.*, compressors, VFDs); required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions, if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model.

(ii) Commercial package heating equipment (except commercial package heating equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h): The nominal cooling capacity in British thermal units per hour (Btu/h); rated heating capacity in British thermal units per hour (Btu/h); rated airflow in standard cubic feet per minute (SCFM) for each fan coil; water flow rate in gallons per minute (gpm) for water cooled units only; rated static pressure in inches of water; refrig-

eration charging instructions (*e.g.*, refrigerant charge, superheat and/or subcooling temperatures); frequency or control set points for variable speed components (*e.g.*, compressors, VFDs); required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions, if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model.

(iii) Commercial package air conditioning equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h (3-phase): The nominal cooling capacity in British thermal units per hour (Btu/h); rated airflow in standard cubic feet per minute (SCFM) for each fan coil; rated static pressure in inches of water; refrigeration charging instructions (*e.g.*, refrigerant charge, superheat and/or subcooling temperatures); frequency or control set points for variable speed components (*e.g.*, compressors, VFDs); required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions, if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model.

(iv) Commercial package heating equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h

(3-phase): The nominal cooling capacity in British thermal units per hour (Btu/h); rated heating capacity in British thermal units per hour (Btu/h); rated airflow in standard cubic feet per minute (SCFM) for each fan coil; rated static pressure in inches of water; refrigeration charging instructions (e.g., refrigerant charge, superheat and/or subcooling temperatures); frequency or control set points for variable speed components (e.g., compressors, VFDs); required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions, if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model.

(v) Variable refrigerant flow multi-split air conditioners with cooling capacity less than 65,000 Btu/h (3-phase): The nominal cooling capacity in British thermal units per hour (Btu/h); outdoor unit(s) and indoor units identified in the tested combination; components needed for heat recovery, if applicable; rated airflow in standard cubic feet per minute (SCFM) for each indoor unit; water flow rate in gallons per minute (gpm) for water-cooled units only; rated static pressure in inches of water; compressor frequency set points; required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions, if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to

determine the certified rating; and which, if any, special features were included in rating the basic model. Additionally, upon DOE request, the manufacturer must provide a layout of the system set-up for testing including charging instructions consistent with the installation manual.

(vi) Variable refrigerant flow multi-split heat pumps with cooling capacity less than 65,000 Btu/h (3-phase): The nominal cooling capacity in British thermal units per hour (Btu/h); rated heating capacity in British thermal units per hour (Btu/h); outdoor unit(s) and indoor units identified in the tested combination; components needed for heat recovery, if applicable; rated airflow in standard cubic feet per minute (SCFM) for each indoor unit; water flow rate in gallons per minute (gpm) for water-cooled units only; rated static pressure in inches of water; compressor frequency set points; required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions, if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model. Additionally, upon DOE request, the manufacturer must provide a layout of the system set-up for testing including charging instructions consistent with the installation manual.

(vii) Variable refrigerant flow multi-split air conditioners with cooling capacity greater than or equal to 65,000 Btu/h: The nominal cooling capacity in British thermal units per hour (Btu/h); outdoor unit(s) and indoor units identified in the tested combination; components needed for heat recovery, if applicable; rated airflow in standard cubic feet per minute (SCFM) for each indoor unit; water flow rate in gallons per minute (gpm) for water-cooled

units only; rated static pressure in inches of water; compressor frequency set points; required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model. Additionally, upon DOE request, the manufacturer must provide a layout of the system set-up for testing including charging instructions consistent with the installation manual.

(viii) Variable refrigerant flow multi-split heat pumps with cooling capacity greater than or equal to 65,000 Btu/h: The nominal cooling capacity in British thermal units per hour (Btu/h); rated heating capacity in British thermal units per hour (Btu/h); outdoor unit(s) and indoor units identified in the tested combination; components needed for heat recovery, if applicable; rated airflow in standard cubic feet per minute (SCFM) for each indoor unit; water flow rate in gallons per minute (gpm) for water-cooled units only; rated static pressure in inches of water; compressor frequency set points; required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model. Addi-

tionally, upon DOE request, the manufacturer must provide a layout of the system set-up for testing including charging instructions consistent with the installation manual.

(ix) Water source variable refrigerant flow heat pumps: The nominal cooling capacity in British thermal units per hour (Btu/h); rated heating capacity in British thermal units per hour (Btu/h); rated airflow in standard cubic feet per minute (SCFM) for each indoor unit; water flow rate in gallons per minute (gpm); rated static pressure in inches of water; refrigeration charging instructions (e.g., refrigerant charge, superheat and/or subcooling temperatures); frequency set points for variable speed components (e.g., compressors, VFDs), including the required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model. Additionally, upon DOE request, the manufacturer must provide a layout of the system set-up for testing including charging instructions consistent with the installation manual.

(x) Water source heat pumps: The nominal cooling capacity in British thermal units per hour (Btu/h); rated heating capacity in British thermal units per hour (Btu/h); rated airflow in standard cubic feet per minute (SCFM) for each indoor unit; water flow rate in gallons per minute (gpm); rated static pressure in inches of water; refrigerant charging instructions, (e.g., refrigerant charge, superheat and/or subcooling temperatures); frequency set points for variable speed components (e.g., compressors, VFDs), including the required dip switch/control settings for step or variable components; a statement

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whether the model will operate at test conditions without manufacturer programming; any additional testing instructions if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model.

(xi) Single package vertical air conditioners: Any additional testing instructions, if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model.

(xii) Single package vertical heat pumps: Any additional testing instructions, if applicable; if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating; and which, if any, special features were included in rating the basic model.

(xiii) Computer room air-conditioners: Any additional testing instructions, if applicable; and which, if any, special features were included in rating the basic model.

(xiv) Package terminal air conditioners and package terminal heat pumps: Any additional testing instructions, if applicable.

(c) Alternative methods for determining efficiency or energy use for

commercial HVAC equipment can be found in § 429.70 of this subpart.

[76 FR 12451, Mar. 7, 2011; 76 FR 24775, May 2, 2011, as amended at 78 FR 79594, Dec. 31, 2013; 79 FR 25501, May 5, 2014; 80 FR 151, Jan. 5, 2015; 80 FR 37147, June 30, 2015]

EFFECTIVE DATE NOTE: At 80 FR 79668, Dec. 23, 2015, § 429.43 was amended by adding paragraph (a)(1)(iv) and revising paragraphs (a)(2), (b)(2)(i) and (ii), and (b)(4)(i) and (ii), effective Jan. 22, 2016. For the convenience of the user, the added and revised text is set forth as follows:

§ 429.43 Commercial heating, ventilating, air conditioning (HVAC) equipment.

(a) \* \* \*

(1) \* \* \*

(iv) For air-cooled commercial package air-conditioning and heating equipment, the represented value of cooling capacity must be a self-declared value corresponding to the nearest appropriate Btu/h multiple according to Table 4 of ANSI/AHRI 340/360–2007 (incorporated by reference; see § 429.4) that is no less than 95 percent of the mean of the capacities measured for the units in the sample selected as described in paragraph (a)(1)(ii) of this section.

(2) *Alternative efficiency determination methods.* (i) In lieu of testing, a represented value of efficiency or consumption for a basic model of commercial HVAC equipment must be determined through the application of an AEDM pursuant to the requirements of § 429.70 and the provisions of this section, where:

(A) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the output of the AEDM and less than or equal to the Federal standard for that basic model; and

(B) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the output of the AEDM and greater than or equal to the Federal standard for that basic model.

(i) For air-cooled commercial package air-conditioning and heating equipment, the represented value of cooling capacity must be the cooling capacity output simulated by the AEDM as described in paragraph (a)(2) of this section.

(b) \* \* \*

(2) \* \* \*

(i) Commercial package air-conditioning equipment (except commercial package air conditioning equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h):

(A) When certifying compliance with an EER standard: the energy efficiency ratio

(EER in British thermal units per Watt-hour (Btu/Wh)), the rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(B) When certifying compliance with an IEER standard: the integrated energy efficiency ratio (IEER in British thermal units per Watt-hour (Btu/Wh)), the rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(ii) Commercial package heating equipment (except commercial package heating equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h):

(A) When certifying compliance with an EER standard: the energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the coefficient of performance (COP), the rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

(B) When certifying compliance an IEER standard: the integrated energy efficiency ratio (IEER in British thermal units per Watt-hour (Btu/Wh)), the coefficient of performance (COP), the rated cooling capacity in British thermal units per hour (Btu/h), and the type(s) of heating used by the basic model (e.g., electric, gas, hydronic, none).

\* \* \* \* \*

(4) \* \* \*

(i) Commercial package air-conditioning equipment (except commercial package air conditioning equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h): rated indoor airflow in standard cubic feet per minute (SCFM) for each fan coil; water flow rate in gallons per minute (gpm) for water-cooled units only; rated external static pressure in inches of water; frequency or control set points for variable speed components (e.g., compressors, VFDs); required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions, if applicable; and if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating. When certifying compliance with an IEER standard, rated indoor airflow in SCFM for each part-load point used in the IEER calculation and any special instructions required to obtain operation at each part-load point, such as fre-

quency or control set points for variable speed components (e.g., compressors, VFDs), dip switch/control settings for step or variable components, or any additional applicable testing instructions, are also required.

(ii) Commercial package heating equipment (except commercial package heating equipment that is air-cooled with a cooling capacity less than 65,000 Btu/h): The rated heating capacity in British thermal units per hour (Btu/h); rated indoor airflow in standard cubic feet per minute (SCFM) for each fan coil (in cooling mode); rated airflow in SCFM for each fan coil in heating mode if the unit is designed to operate with different airflow rates for cooling and heating mode; water flow rate in gallons per minute (gpm) for water cooled units only; rated external static pressure in inches of water; frequency or control set points for variable speed components (e.g., compressors, VFDs); required dip switch/control settings for step or variable components; a statement whether the model will operate at test conditions without manufacturer programming; any additional testing instructions, if applicable; and if a variety of motors/drive kits are offered for sale as options in the basic model to account for varying installation requirements, the model number and specifications of the motor (to include efficiency, horsepower, open/closed, and number of poles) and the drive kit, including settings, associated with that specific motor that were used to determine the certified rating. When certifying compliance with an IEER standard, rated indoor airflow in SCFM for each part-load point used in the IEER calculation and any special instructions required to obtain operation at each part-load point, such as frequency or control set points for variable speed components (e.g., compressors, VFDs), dip switch/control settings for step or variable components, or any additional applicable testing instructions, are also required.

\* \* \* \* \*

**§ 429.44 Commercial water heating equipment.**

(a) For residential-duty commercial water heaters, all represented values must be determined in accordance with § 429.17.

(b) *Determination of Represented Value for All Types of Commercial Water Heaters Except Residential-Duty Commercial Water Heaters.* Manufacturers must determine the represented value, which includes the certified rating, for each basic model of commercial water heating equipment except residential-duty commercial water heaters, either by

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testing, in conjunction with the applicable sampling provisions, or by applying an AEDM as set forth in § 429.70.

(c) *Certification reports.* (1) The requirements of § 429.12 are applicable to commercial WH equipment; and

(2) Pursuant to § 429.12(b)(13), a certification report must include the following public equipment-specific information:

(i) Commercial electric storage water heaters: The maximum standby loss in percent per hour (%/hr) and the measured storage volume in gallons (gal).

(ii) Commercial gas-fired and oil-fired storage water heaters: The thermal efficiency in percent (%), the maximum standby loss in British thermal units per hour (Btu/h), the rated storage volume in gallons (gal), and the nameplate input rate in British thermal units per hour (Btu/h).

(iii) Commercial water heaters and hot water supply boilers with storage capacity greater than 140 gallons: The thermal efficiency in percent (%), whether the storage volume is greater than 140 gallons (Yes/No); whether the tank surface area is insulated with at least R-12.5 (Yes/No); whether a standing pilot light is used (Yes/No); for gas or oil-fired water heaters, whether the basic model has a fire damper or fan assisted combustion (Yes/No); and, if applicable, pursuant to 10 CFR 431.110, the maximum standby loss in British thermal units per hour (Btu/h) and measured storage volume in gallons (gal).

(iv) Commercial gas-fired and oil-fired instantaneous water heaters greater than or equal to 10 gallons and gas-fired and oil-fired hot water supply boilers greater than or equal to 10 gallons: The thermal efficiency in percent (%), the maximum standby loss in British thermal units per hour (Btu/h), the rated storage volume in gallons (gal), and the nameplate input rate in Btu/h.

(v) Commercial gas-fired and oil-fired instantaneous water heaters less than 10 gallons and gas-fired and oil-fired hot water supply boilers less than 10 gallons: The thermal efficiency in percent (%) and the rated storage volume in gallons (g).

(vi) Commercial unfired hot water storage tanks: The thermal insulation

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(i.e., R-value) and stored volume in gallons (gal).

(3) Pursuant to § 429.12(b)(13), a certification report must include the following additional, equipment-specific information:

(i) Whether the basic model is engineered-to-order; and

(ii) For any basic model rated with an AEDM, whether the manufacturer elects the witness test option for verification testing. (See § 429.70(c)(5)(iii) for options). However, the manufacturer may not select more than 10% of AEDM-rated basic models to be eligible for witness testing.

(4) Pursuant to § 429.12(b)(13), a certification report may include supplemental testing instructions in PDF format. If necessary to run a valid test, the equipment-specific, supplemental information must include any additional testing and testing set up instructions (e.g., whether a bypass loop was used for testing) for the basic model and all other information (e.g., operational codes or overrides for the control settings) necessary to operate the basic model under the required conditions specified by the relevant test procedure. A manufacturer may also include with a certification report other supplementary items in PDF format (e.g., manuals) for DOE consideration in performing testing under subpart C of this part.

(d) Alternative methods for determining efficiency or energy use for commercial WH equipment can be found in § 429.70 of this subpart.

[76 FR 12451, Mar. 7, 2011; 76 FR 24776, May 2, 2011, as amended at 78 FR 79594, Dec. 31, 2013; 79 FR 25504, May 5, 2014; 80 FR 151, Jan. 5, 2015; 79 FR 40565, July 11, 2014]

### § 429.45 Automatic commercial ice makers.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to automatic commercial ice makers; and

(2) For each basic model of automatic commercial ice maker selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of maximum energy use or other measure of energy consumption of a basic model



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for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the energy efficiency or other measure of energy consumption of a basic model for

which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

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(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to automatic commercial ice makers; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The maximum energy use in kilowatt hours per 100 pounds of ice (kWh/100 lbs ice), the maximum condenser water use in gallons per 100 pounds of ice (gal/100 lbs ice), the harvest rate in pounds of ice per 24 hours (lbs ice/24 hours), the type of cooling, and the equipment type.

[76 FR 12451, Mar. 7, 2011; 76 FR 24776, May 2, 2011]

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 97½ percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the modified energy factor or other measure of energy or water consumption of

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**§ 429.46 Commercial clothes washers.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to commercial clothes washers; and

(2) For each basic model of commercial clothes washers, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of the water factor or other measure of energy or water consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

a basic model for which consumers would favor higher values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 97½ percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.975} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.975}$  is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of §429.12 are applicable to commercial clothes washers; and

(2) Pursuant to §429.12(b)(13), a certification report shall include the following public product-specific information:

(i) If testing was conducted using Appendix J1 to subpart B of part 430 of this chapter: The modified energy factor (MEF) in cubic feet per kilowatt hour per cycle (cu ft/kWh/cycle); and the water factor (WF) in gallons per cubic feet per cycle (gal/cu ft/cycle);

(ii) If testing was conducted using Appendix J2 to subpart B of part 430 of this chapter: The modified energy factor (MEF<sub>12</sub>) in cu ft/kWh/cycle and the integrated water factor (IWF) in gal/cu ft/cycle.

[76 FR 12451, Mar. 7, 2011; 76 FR 24777, May 2, 2011, as amended at 79 FR 71630, Dec. 3, 2014]

**§ 429.47 Distribution transformers.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of

§429.11 are applicable to distribution transformers; and

(2) For each basic model of distribution transformer, efficiency must be determined either by testing, in accordance with §431.193 and the provisions of this section, or by application of an AEDM that meets the requirements of §429.70 and the provisions of this section.

(i) For each basic model selected for testing:

(A) If the manufacturer produces five or fewer units of a basic model over 6 months, each unit must be tested. A manufacturer may not use a basic model with a sample size of fewer than five units to substantiate an AEDM pursuant to §429.70.

(B) If the manufacturer produces more than five units over 6 months, a sample of at least five units must be selected and tested.

(ii) Any represented value of efficiency of a basic model must satisfy the condition:

$$RE \leq \frac{100}{1 + \left( \frac{100 - \bar{x}}{\bar{x}} \right) \left( \frac{\sqrt{n}}{\sqrt{n} + .08} \right)}$$

where  $\bar{x}$  is the average efficiency of the sample.

(b) *Certification reports.* (1) The requirements of §429.12 are applicable to distribution transformers except that required information in paragraph (b) of this section may be reported by kVA grouping instead of by basic model and

paragraph (b)(6) of this section does not apply; and

(2) Pursuant to §429.12(b)(13), a certification report shall include the following public product-specific information: For the most and least efficient

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basic models within each “kVA grouping” for which part 431 prescribes an efficiency standard, the kVA rating, the insulation type (*i.e.*, low-voltage dry-type, medium-voltage dry-type or liquid-immersed), the number of phases (*i.e.*, single-phase or three-phase), and the basic impulse insulation level (BIL) group rating (for medium-voltage dry-types).

(c) *Alternative methods for determining efficiency or energy use* for distribution transformers can be found in § 429.70 of this subpart.

(d) *Kilovolt ampere (kVA) grouping.* As used in this section, a “kVA grouping” is a group of basic models which all have the same kVA rating, have the same insulation type (*i.e.*, low-voltage dry-type, medium-voltage dry-type or liquid-immersed), have the same number of phases (*i.e.*, single-phase or

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three-phase), and, for medium-voltage dry-types, have the same BIL group rating (*i.e.*, 20–45 kV BIL, 46–95 kV BIL or greater than or equal to 96 kV BIL).

**§ 429.48 Illuminated exit signs.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to illuminated exit signs; and

(2) For each basic model of illuminated exit sign selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of input power demand or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of

samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-

1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the energy efficiency or other measure of energy consumption of a basic model for

which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of §429.12 are applicable to illuminated exit signs; and

(2) Pursuant to §429.12(b)(13), a certification report shall include the following public product-specific information: The input power demand in watts (W) and the number of faces.

[76 FR 12451, Mar. 7, 2011; 76 FR 24778, May 2, 2011]

**§ 429.49 Traffic signal modules and pedestrian modules.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of

§429.11 are applicable to traffic signal modules and pedestrian modules; and

(2) For each basic model of traffic signal module or pedestrian module selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of estimated maximum and nominal wattage or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the energy efficiency or other measure of energy consumption of a basic model for

which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to traffic signal modules and pedestrian modules; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The maximum wattage at 74 degrees Celsius (°C) in watts (W), the nominal wattage at 25 degrees Celsius (°C) in watts (W), and the signal type.

[76 FR 12451, Mar. 7, 2011; 76 FR 24778, May 2, 2011]

**§ 429.50 Commercial unit heaters.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to commercial unit heaters; and

(2) [Reserved]

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to commercial unit heaters; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The type of ignition system and a declaration that the manufacturer has incorporated the applicable design requirements.

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**§ 429.51 Commercial pre-rinse spray valves.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to commercial pre-rinse spray valves; and

(2) For each basic model of commercial pre-rinse spray valves selected for testing, a sample of sufficient size shall

be randomly selected and tested to ensure that—

(i) Any represented value of water consumption or other measure of water consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the water efficiency or other measure of water consumption of a basic model for

which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of §429.12 are applicable to commercial pre-rinse spray valves; and (2) Pursuant to §429.12(b)(13), a certification report shall include the following public product-specific information: The maximum flow rate in gallons per minute (gpm), rounded to the nearest 0.1 gallon.

[76 FR 12451, Mar. 7, 2011; 76 FR 24779, May 2, 2011, as amended at 78 FR 62986, Oct. 23, 2013]

EFFECTIVE DATE NOTE: At 80 FR 81453, Dec. 30, 2015, §429.51 was amended by revising

paragraph (a), effective Jan. 29, 2016. For the convenience of the user, the revised text is set forth as follows:

**§ 429.51 Commercial pre-rinse spray valves.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of §429.11 apply to commercial prerinse spray valves; and

(2) For each basic model of commercial prerinse spray valve, a sample of sufficient size must be randomly selected and tested to ensure that any represented value of flow rate must be greater than or equal to the higher of:

- (i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; Or,

- (ii) The upper 95-percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

and,  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95-percent two-tailed confidence interval with n-1 degrees of freedom (from Appendix A of this subpart).

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**§ 429.52 Refrigerated bottled or canned beverage vending machines.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of

§429.11 are applicable to refrigerated bottled or canned beverage vending machine; and

(2) For each basic model of refrigerated bottled or canned beverage vending machine selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

- (i) Any represented value of energy consumption or other measure of energy consumption of a basic model for which consumers would favor lower



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values shall be greater than or equal to the higher of: (A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{th}$  sample;

Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

and

(ii) Any represented value of the energy efficiency or other measure of energy consumption of a basic model for

which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{th}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% two-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

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(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to refrigerated bottled or canned beverage vending machine; and

(2) Pursuant to § 429.12(b)(13), a certification report must include the following additional public, equipment-specific information:

(i) When using appendix A of subpart Q of part 431 of this chapter, the daily energy consumption in kilowatt hours per day (kWh/day), the refrigerated volume (V) in cubic feet (ft<sup>3</sup>), whether testing was conducted with payment mechanism in place and operational, and, if applicable, the lowest application product temperature in degrees Fahrenheit (°F), if applicable.

(ii) When using appendix B of subpart Q of part 431 of this chapter, the daily energy consumption in kilowatt hours per day (kWh/day), the refrigerated volume (V) in cubic feet (ft<sup>3</sup>), whether testing was conducted with payment mechanism in place and operational, whether testing was conducted using an accessory low power mode, whether rating was based on the presence of a refrigeration low power mode, and, if applicable, the lowest application prod-

uct temperature in degrees Fahrenheit (°F).

[76 FR 12451, Mar. 7, 2011; 76 FR 24779, May 2, 2011, as amended at 76 FR 38292, June 30, 2011; 80 FR 45792, July 31, 2015]

**§ 429.53 Walk-in coolers and walk-in freezers.**

(a) *Determination of represented value—(1) Refrigeration equipment:* Manufacturers must determine the represented value, which includes the certified rating, for each basic model of walk-in cooler or freezer refrigeration equipment, either by testing, in conjunction with the applicable sampling provisions, or by applying an AEDM satisfying the criteria provided at § 429.70(f)(1).

(i) *Units to be tested.* (A) If the represented value for a given basic model is determined through testing, the general requirements of § 429.11 apply; and

(B) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(1) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; or,

(ii) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n–1 degrees of

freedom (from Appendix A to subpart B). And,

(2) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which

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consumers would favor higher values shall be less than or equal to the lower of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

And,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; or,

(ii) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A to subpart B).

(ii) *Alternative efficiency determination methods.* In lieu of testing, a represented value of efficiency or consumption for a basic model of a walk-in cooler or freezer refrigeration system must be determined through the application of an AEDM pursuant to the requirements of § 429.70 and the provisions of this section, where:

(A) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the output of the AEDM and less than or equal to the Federal standard for that basic model; and

(B) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the output of the AEDM and greater than or equal to the Federal standard for that basic model.

(iii) If the represented value of a refrigeration system was determined using the unit cooler testing provisions

at 10 CFR 431.304(c)(12), that represented value may be used for all refrigeration systems containing that unit cooler irrespective of whether such equipment is sold separately or as part of a matched refrigeration system. However, for any representations of matched-system efficiency that exceed the refrigeration system rating as determined by the unit cooler testing provisions at 10 CFR 431.304(c)(12) and for which a manufacturer wishes to make representations of the more-efficient rating, then the matched refrigeration system must be tested separately in accordance with the DOE test procedure for matched systems and applicable sampling plan.

(2) *WICF components other than those specified in (a)(1) of this section—(i) Units to be tested.*

(A) The general requirements of § 429.11 apply; and

(B) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(1) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; or,

(ii) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A to subpart B). And,

(2) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

And,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; or,

(ii) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A to subpart B).

(b) *Certification reports.* (1) The requirements of §429.12 are applicable to manufacturers of the components of walk-in coolers and freezers (WICFs) listed in paragraph (b)(2) of this section, and;

(2) Pursuant to §429.12(b)(13), a certification report shall include the following public product-specific information:

(i) For WICF doors: The door type, R-value of the door insulation, and a declaration that the manufacturer has incorporated the applicable design requirements. In addition, for those WICFs with transparent reach-in doors and windows: The glass type of the doors and windows (e.g., double-pane with heat reflective treatment, triple-pane glass with gas fill), and the power

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draw of the antisweat heater in watts per square foot of door opening.

(ii) For WICF panels: The R-value of the insulation (except for glazed portions of the doors or structural members).

(iii) For WICF refrigeration systems: The motor's purpose (i.e., evaporator fan motor or condenser fan motor), the horsepower, and a declaration that the manufacturer has incorporated the applicable design requirements.

[79 FR 27409, May 13, 2014]

**§ 429.54 Metal halide lamp ballasts and fixtures.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample;

Or,

(B) The lower 99-percent confidence limit (LCL) of the true mean divided by 0.99.

$$LCL = \bar{x} - t_{.99} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.99}$  is the t statistic for a 99% two-tailed confidence interval with n-1 degrees of freedom (from appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to metal halide lamp ballasts; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The minimum ballast efficiency in percent (%), the lamp wattage in watts (W), and the type of ballast (e.g., pulse-start, magnetic probe-start, and non-pulse start electronic).

[76 FR 12451, Mar. 7, 2011; 76 FR 24780, May 2, 2011; 76 FR 46202, Aug. 2, 2011]

§ 429.11 are applicable to metal halide lamp ballasts; and

(2) For each basic model of metal halide lamp ballast selected for testing, a sample of sufficient size, not less than four, shall be selected at random and tested to ensure that:

(i) Any represented value of estimated energy efficiency calculated as the measured output power to the lamp divided by the measured input power to the ballast ( $P_{out}/P_{in}$ ), of a basic model is less than or equal to the lower of:

(A) The mean of the sample, where:

**§ 429.58 Furnace fans.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to furnace fans; and

(2) For each basic model of furnace fan within the scope of appendix AA of subpart B of part 430, a sample of sufficient size shall be randomly selected and tested to ensure that any represented value of fan energy rating (FER), rounded to the nearest integer, shall be greater than or equal to the higher of:

(i) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

And,  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the measured value for the  $i^{\text{th}}$  sample; Or,

(ii) The upper 90 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.90} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.90}$  is the t statistic for a 90% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A).

resistance kit with which it is equipped for certification testing.

[79 FR 520, Jan. 3, 2014, as amended at 79 FR 38208, July 3, 2014]

**§ 429.60 Commercial packaged boilers.**

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to residential furnace fans; and

(a) *Determination of represented value.* Manufacturers must determine the represented value, which includes the certified rating, for each basic model of commercial packaged boilers either by testing, in conjunction with the applicable sampling provisions, or by applying an AEDM.

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information: The fan energy rating (FER) in watts per thousand cubic feet per minute (W/1000 cfm); the calculated maximum airflow at the reference system external static pressure (ESP) in cubic feet per minute (cfm); the control system configuration for achieving the heating and constant-circulation airflow-control settings required for determining FER as specified in the furnace fan test procedure (10 CFR part 430, subpart B, appendix AA); the measured steady-state gas, oil, or electric heat input rate ( $Q_{IN}$ ) in the heating setting required for determining FER; and for modular blowers, the manufacturer and model number of the electric heat

(1) *Units to be tested.* (i) If the represented value is determined through testing, the general requirements of § 429.11 are applicable; and

(ii) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; Or,

(2) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.95}$  is the  $t$  statistic for a 95% one-tailed confidence interval with  $n - 1$  degrees of freedom (from Appendix A to subpart B of part 429). And,

(B) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the  $i^{\text{th}}$  sample; Or,

(2) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.95}$  is the  $t$  statistic for a 95% one-tailed confidence interval with  $n - 1$  degrees of freedom (from Appendix A to subpart B of part 429).

(2) *Alternative efficiency determination methods.* In lieu of testing, a represented value of efficiency or consumption for a basic model of commercial packaged boiler must be determined through the application of an AEDM pursuant to the requirements of § 429.70 and the provisions of this section, where:

(i) Any represented value of energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the output of the AEDM and less than or equal to the Federal standard for that basic model; and

(ii) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values

shall be less than or equal to the output of the AEDM and greater than or equal to the Federal standard for that basic model.

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to commercial packaged boilers; and

(2) Pursuant to § 429.12(b)(13), a certification report must include the following public equipment-specific information: The combustion efficiency in percent (%) or the thermal efficiency in percent (%), as required in § 431.87 of this chapter; and the maximum rated input capacity in British thermal units per hour (Btu/h).

(3) Pursuant to § 429.12(b)(13), a certification report must include the following additional equipment-specific information:

(i) Whether the basic model is engineered-to-order; and

(ii) For any basic model rated with an AEDM, whether the manufacturer elects the witness test option for verification testing. (See § 429.70(c)(5)(iii) for options). However,

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the manufacturer may not select more than 10% of AEDM-rated basic models to be eligible for witness testing.

(4) Pursuant to § 429.12(b)(13), a certification report may include supplemental testing instructions in PDF format. If necessary to run a valid test, the equipment-specific, supplemental information must include any additional testing and testing set up instructions (*e.g.*, specific operational or control codes or settings), which would be necessary to operate the basic model under the required conditions specified by the relevant test procedure. A manufacturer may also include with a certification report other supplementary items in PDF format (*e.g.*, manuals) for DOE consideration in performing testing under subpart C of this part.

(c) Alternative methods for determining efficiency or energy use for commercial packaged boilers can be found in § 429.70.

[79 FR 25504, May 5, 2014, as amended at 80 FR 151, Jan. 5, 2015]

### **§ 429.70 Alternative methods for determining energy efficiency and energy use.**

(a) *General applicability of an AEDM.* A manufacturer of covered products or covered equipment explicitly authorized to use an AEDM in §§ 429.14 through 429.54 may not distribute any basic model of such equipment in commerce unless the manufacturer has determined the energy efficiency of the basic model, either from testing the basic model in conjunction with DOE's certification sampling plans and statistics or from applying an alternative method for determining energy efficiency or energy use (AEDM) to the basic model, in accordance with the requirements of this section. In instances where a manufacturer has tested a basic model, the manufacturer may not knowingly use an AEDM to overrate the efficiency (or underrate the consumption) of the model.

(b) *Testing.* Testing for each covered product or covered equipment must be done in accordance with the sampling plan provisions established in § 429.11 and the testing procedures in parts 430 and 431 of this chapter.

(c) *Alternative efficiency determination method (AEDM) for commercial HVAC*

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(includes commercial warm air furnaces and commercial packaged boilers), WH, and refrigeration equipment—(1) *Criteria an AEDM must satisfy.* A manufacturer may not apply an AEDM to a basic model to determine its efficiency pursuant to this section unless:

(i) The AEDM is derived from a mathematical model that estimates the energy efficiency or energy consumption characteristics of the basic model as measured by the applicable DOE test procedure;

(ii) The AEDM is based on engineering or statistical analysis, computer simulation or modeling, or other analytic evaluation of performance data; and

(iii) The manufacturer has validated the AEDM, in accordance with paragraph (c)(2) of this section with basic models that meet the current Federal energy conservation standards.

(2) *Validation of an AEDM.* Before using an AEDM, the manufacturer must validate the AEDM's accuracy and reliability as follows:

(i) The manufacturer must select at least the minimum number of basic models for each validation class specified in paragraph (c)(2)(iv) of this section to which the particular AEDM applies. Using the AEDM, calculate the energy use or efficiency for each of the selected basic models. Test a single unit of each selected basic model in accordance with paragraph (c)(2)(iii) of this section. Compare the results from the single unit test and the AEDM energy use or efficiency output according to paragraph (c)(2)(ii) of this section. The manufacturer is responsible for ensuring the accuracy and reliability of the AEDM.

(ii) *Individual model tolerances.* (A) For those covered products with an energy-efficiency metric, the predicted efficiency for each model calculated by applying the AEDM may not be more than five percent greater than the efficiency determined from the corresponding test of the model.

(B) For those covered products with an energy-consumption metric, the predicted energy consumption for each model, calculated by applying the AEDM, may not be more than five percent less than the energy consumption



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determined from the corresponding test of the model.

(C) For all covered products, the predicted energy efficiency or consumption for each model calculated by applying the AEDM must meet or exceed the applicable federal energy conservation performance standard.

(iii) *Additional test unit requirements.*

(A) Each AEDM must be supported by test data obtained from physical tests of current models; and

(B) Test results used to validate the AEDM must meet or exceed current, applicable Federal standards as specified in part 431 of this chapter; and

(C) Each test must have been performed in accordance with the DOE test procedure specified in parts 430 or 431 of this chapter or test procedure waiver for which compliance is required at the time the basic model is distributed in commerce.

(iv) *Validation classes.*

Validation class	Minimum number of distinct models that must be tested per AEDM
Air-Cooled, Split and Packaged Air Conditioners (ACs) and Heat Pumps (HPs) less than 65,000 Btu/h Cooling Capacity (3-Phase).	2 Basic Models.
(A) Commercial HVAC validation classes	
Air-Cooled, Split and Packaged ACs and HPs greater than or equal to 65,000 Btu/h Cooling Capacity and Less than 760,000 Btu/h Cooling Capacity.	2 Basic Models.
Water-Cooled, Split and Packaged ACs and HPs, All Cooling Capacities .....	2 Basic Models.
Evaporatively-Cooled, Split and Packaged ACs and HPs, All Capacities .....	2 Basic Models.
Water-Source HPs, All Capacities .....	2 Basic Models.
Single Package Vertical ACs and HPs .....	2 Basic Models.
Packaged Terminal ACs and HPs .....	2 Basic Models.
Air-Cooled, Variable Refrigerant Flow ACs and HPs .....	2 Basic Models.
Water-Cooled, Variable Refrigerant Flow ACs and HPs .....	2 Basic Models.
Computer Room Air Conditioners, Air Cooled .....	2 Basic Models.
Computer Room Air Conditioners, Water-Cooled .....	2 Basic Models.
(B) Commercial water heater validation classes	
Gas-fired Water Heaters and Hot Water Supply Boilers Less than 10 Gallons .....	2 Basic Models.
Gas-fired Water Heaters and Hot Water Supply Boilers Greater than or Equal to 10 Gallons .....	2 Basic Models.
Oil-fired Water Heaters and Hot Water Supply Boilers Less than 10 Gallons .....	2 Basic Models.
Oil-fired Water Heaters and Hot Water Supply Boilers Greater than or Equal to 10 Gallons .....	2 Basic Models.
Electric Water Heaters .....	2 Basic Models.
Heat Pump Water Heaters .....	2 Basic Models.
Unfired Hot Water Storage Tanks .....	2 Basic Models.
(C) Commercial packaged boilers validation classes	
Gas-fired, Hot Water Only Commercial Packaged Boilers .....	2 Basic Models.
Gas-fired, Steam Only Commercial Packaged Boilers .....	2 Basic Models.
Gas-fired Hot Water/Steam Commercial Packaged Boilers .....	2 Basic Models.
Oil-fired, Hot Water Only Commercial Packaged Boilers .....	2 Basic Models.
Oil-fired, Steam Only Commercial Packaged Boilers .....	2 Basic Models.
Oil-fired Hot Water/Steam Commercial Packaged Boilers .....	2 Basic Models.
(D) Commercial furnace validation classes	
Gas-fired Furnaces .....	2 Basic Models.
Oil-fired Furnaces .....	2 Basic Models.
(E) Commercial refrigeration equipment validation classes	
Self-Contained Open Refrigerators .....	2 Basic Models.
Self-Contained Open Freezers .....	2 Basic Models.
Remote Condensing Open Refrigerators .....	2 Basic Models.
Remote Condensing Open Freezers .....	2 Basic Models.
Self-Contained Closed Refrigerators .....	2 Basic Models.
Self-Contained Closed Freezers .....	2 Basic Models.
Remote Condensing Closed Refrigerators .....	2 Basic Models.
Remote Condensing Closed Freezers .....	2 Basic Models.

<sup>1</sup>The minimum number of tests indicated above must be comprised of a transparent model, a solid model, a vertical model, a semi-vertical model, a horizontal model, and a service-over-the counter model, as applicable based on the equipment offering. However, manufacturers do not need to include all types of these models if it will increase the minimum number of tests that need to be conducted.

(3) *AEDM records retention requirements.* If a manufacturer has used an AEDM to determine representative values pursuant to this section, the manufacturer must have available upon request for inspection by the Department records showing:

(i) The AEDM, including the mathematical model, the engineering or statistical analysis, and/or computer simulation or modeling that is the basis of the AEDM;

(ii) Product information, complete test data, AEDM calculations, and the statistical comparisons from the units tested that were used to validate the AEDM pursuant to paragraph (c)(2) of this section; and

(iii) Product information and AEDM calculations for each basic model to which the AEDM has been applied.

(4) *Additional AEDM requirements.* If requested by the Department and at DOE's discretion, the manufacturer must perform at least one of the following:

(i) Conduct simulations before representatives of the Department to predict the performance of particular basic models of the product to which the AEDM was applied;

(ii) Provide analyses of previous simulations conducted by the manufacturer; or

(iii) Conduct certification testing of basic models selected by the Department.

(5) *AEDM verification testing.* DOE may use the test data for a given individual model generated pursuant to § 429.104 to verify the certified rating determined by an AEDM as long as the following process is followed:

(i) *Selection of units.* DOE will obtain units for test from retail, where available. If units cannot be obtained from retail, DOE will request that a unit be provided by the manufacturer;

(ii) *Lab requirements.* DOE will conduct testing at an independent, third-party testing facility of its choosing. In cases where no third-party laboratory is capable of testing the equipment, it may be tested at a manufacturer's facility upon DOE's request.

(iii) *Manufacturer participation.* (A) Except when testing variable refrigerant flow systems (which are governed by the rules found at § 431.96(f)), testing

will be completed without a manufacturer representative on-site. In limited instances further described in paragraph (c)(5)(iii)(B) of this section, a manufacturer and DOE representative may be present to witness the test set-up.

(B) A manufacturer's representative may request to be on-site to witness the test set-up if:

(1) The installation manual for the basic model specifically requires it to be started only by a factory-trained installer; or

(2) The manufacturer has elected, as part of the certification of that basic model, to have the opportunity to witness the test set-up. A manufacturer may elect to witness the test set-up for the initial verification test for no more than 10 percent of the manufacturer's basic models submitted for certification and rated with an AEDM per validation class specified in section (c)(2)(iv) of this paragraph. The 10-percent limit applies to all of the eligible basic models submitted for certification by a given manufacturer no matter how many AEDMs a manufacturer has used to develop its ratings. The 10-percent limit is determined by first calculating 10 percent of the total number of basic models rated with an AEDM per validation class, and then truncating the resulting product. Manufacturers who have submitted fewer than 10 basic models rated with an AEDM for certification may elect to have the opportunity to witness the test set-up of one basic model. A manufacturer must identify the basic models it wishes to witness as part of its certification report(s) prior to the basic model being selected for verification testing.

(3) In those instances in which a manufacturer has not provided the required information as specified in § 429.12(b)(13) for a given basic model that has been rated and certified as compliant with the applicable standards, a manufacturer is precluded from witnessing the testing set up for that basic model.

(C) A DOE representative will be present for the test set-up in all cases where a manufacturer representative requests to be on-site for the test set-up. The manufacturer's representative

cannot communicate with a lab representative outside of the DOE representative's presence.

(D) If DOE has obtained through retail channels a unit for test that meets either of the conditions in paragraph (c)(5)(iii)(B) of this section, DOE will notify the manufacturer that the basic model was selected for testing and that the manufacturer may have a representative present for the test set-up. If the manufacturer does not respond within five calendar days of receipt of that notification, the manufacturer waives the option to be present for test set-up, and DOE will proceed with the test set-up without a manufacturer's representative present.

(E) If DOE has obtained directly from the manufacturer a unit for test that meets either of the conditions in paragraph (c)(5)(iii)(B) of this section, DOE will notify the manufacturer of the option to be present for the test set-up at the time the unit is purchased. DOE will specify the date (not less than five calendar days) by which the manufacturer must notify DOE whether a manufacturer's representative will be present. If the manufacturer does not notify DOE by the date specified, the manufacturer waives the option to be present for the test set-up, and DOE will proceed with the test set-up without a manufacturer's representative present.

(F) DOE will review the certification submissions from the manufacturer that were on file as of the date DOE purchased a basic model (under paragraph (c)(5)(iii)(D) of this section) or the date DOE notifies the manufacturer that the basic model has been selected for testing (under paragraph (c)(5)(iii)(E) of this section) to determine if the manufacturer has indicated that it intends to witness the test set-up of the selected basic model. DOE will also verify that the manufacturer has not exceeded the allowable limit of witness testing selections as specified in paragraph (c)(5)(iii)(B)(2) of this section. If DOE discovers that the manufacturer exceeded the limits specified in paragraph (c)(5)(iii)(B)(2), DOE will notify the manufacturer of this fact and deny its request to be present for the test set-up of the selected basic model. The manufacturer must update

its certification submission to ensure it has not exceeded the allowable limit of witness testing selections as specified in paragraph (c)(5)(iii)(B)(2) to be present at set-up for future selections. At this time DOE will also review the supplemental PDF submission(s) for the selected basic model to determine that all necessary information has been provided to the Department.

(G) If DOE determines, pursuant to paragraph (c)(5)(ii) of this section, that the model should be tested at the manufacturer's facility, a DOE representative will be present on site to observe the test set-up and testing with the manufacturer's representative. All testing will be conducted at DOE's direction, which may include DOE-contracted personnel from a third-party lab, as well as the manufacturer's technicians.

(H) As further explained in paragraph (c)(5)(v)(B) of this section, if a manufacturer's representative is present for the initial test set-up for any reason, the manufacturer forfeits any opportunity to request a retest of the basic model. Furthermore, if the manufacturer requests to be on-site for test set-up pursuant to paragraph (c)(5)(iii)(B) of this section but is not present on site, the manufacturer forfeits any opportunity to request a retest of the basic model.

(iv) *Testing.* At no time during verification testing may the lab and the manufacturer communicate without DOE authorization. All verification testing will be conducted in accordance with the applicable DOE test procedure, as well as each of the following to the extent that they apply:

(A) Any active test procedure waivers that have been granted for the basic model;

(B) Any test procedure guidance that has been issued by DOE;

(C) The installation and operations manual that is shipped with the unit;

(D) Any additional information that was provided by the manufacturer at the time of certification (prior to DOE obtaining the unit for test); and

(E) If during test set-up or testing, the lab indicates to DOE that it needs additional information regarding a given basic model in order to test in accordance with the applicable DOE

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test procedure, DOE may organize a meeting between DOE, the manufacturer and the lab to provide such information.

(v) *Failure to meet certified rating.* If a model tests worse than its certified rating by an amount exceeding the tolerance prescribed in paragraph (c)(5)(vi) of this section, DOE will notify the manufacturer. DOE will provide the manufacturer with all documentation related to the test set up, test conditions, and test results for the unit. Within the timeframe allotted by DOE, the manufacturer may then:

(A) Present all claims regarding testing validity; and

(B) If the manufacturer was not on site for the initial test set-up, request

a retest of the previously tested unit with manufacturer and DOE representatives on-site for the test set-up. DOE will not conduct the retest using a different unit of the same basic model unless DOE and the manufacturer determine it is necessary based on the test results, claims presented, and DOE regulations.

(vi) *Tolerances.* (A) For consumption metrics, the result from a DOE verification test must be less than or equal to the certified rating  $\times$  (1 + the applicable tolerance).

(B) For efficiency metrics, the result from a DOE verification test must be greater than or equal to the certified rating  $\times$  (1 - the applicable tolerance).

Equipment	Metric	Applicable tolerance
Commercial Packaged Boilers .....	Combustion Efficiency .....	5% (0.05)
	Thermal Efficiency .....	5% (0.05)
Commercial Water Heaters or Hot Water Supply Boilers .....	Thermal Efficiency .....	5% (0.05)
	Standby Loss .....	10% (0.1)
Unfired Storage Tanks .....	R-Value .....	10% (0.1)
Air-Cooled, Split and Packaged ACs and HPs less than 65,000 Btu/h Cooling Capacity (3-Phase) .....	Seasonal Energy-Efficiency Ratio .....	5% (0.05)
	Heating Season Performance Factor .....	5% (0.05)
Air-Cooled, Split and Packaged ACs and HPs greater than or equal to 65,000 Btu/h Cooling Capacity and Less than 760,000 Btu/h Cooling Capacity.	Energy Efficiency Ratio .....	10% (0.1)
	Energy Efficiency Ratio .....	5% (0.05)
	Coefficient of Performance .....	5% (0.05)
	Integrated Energy Efficiency Ratio .....	10% (0.1)
Water-Cooled, Split and Packaged ACs and HPs, All Cooling Capacities	Energy Efficiency Ratio .....	5% (0.05)
	Coefficient of Performance .....	5% (0.05)
	Integrated Energy Efficiency Ratio .....	10% (0.1)
	Energy Efficiency Ratio .....	5% (0.05)
Evaporatively-Cooled, Split and Packaged ACs and HPs, All Capacities	Coefficient of Performance .....	5% (0.05)
	Integrated Energy Efficiency Ratio .....	10% (0.1)
	Energy Efficiency Ratio .....	5% (0.05)
Water-Source HPs, All Capacities .....	Energy Efficiency Ratio .....	5% (0.05)
	Coefficient of Performance .....	5% (0.05)
	Integrated Energy Efficiency Ratio .....	10% (0.1)
Single Package Vertical ACs and HPs .....	Energy Efficiency Ratio .....	5% (0.05)
	Coefficient of Performance .....	5% (0.05)
Packaged Terminal ACs and HPs .....	Energy Efficiency Ratio .....	5% (0.05)
	Coefficient of Performance .....	5% (0.05)
Variable Refrigerant Flow ACs and HPs .....	Energy Efficiency Ratio .....	5% (0.05)
	Coefficient of Performance .....	5% (0.05)
	Integrated Energy Efficiency Ratio .....	10% (0.1)
Computer Room Air Conditioners .....	Sensible Coefficient of Performance .....	5% (0.05)
Commercial Warm-Air Furnaces .....	Thermal Efficiency .....	5% (0.05)
Commercial Refrigeration Equipment .....	Daily Energy Consumption .....	5% (0.05)

(vii) *Invalid rating.* If, following discussions with the manufacturer and a retest where applicable, DOE determines that the verification testing was conducted appropriately in accordance with the DOE test procedure, DOE will issue a determination that the rating for the model is invalid. The manufacturer must elect, within 15 days, one of the following to be completed in a time

frame specified by DOE, which is never to exceed 180 days:

(A) Re-rate and re-certify the model based on DOE's test data alone; or

(B) Discontinue the model through the certification process; or

(C) Conduct additional testing and re-rate and re-certify the basic model based on all test data collected, including DOE's test data.

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(viii) *AEDM use.* (A) If DOE has determined that a manufacturer made invalid ratings on two or more models rated using the same AEDM within a 24 month period, the manufacturer must take the action listed in the table corresponding to the number of invalid certified ratings. The twenty-four month period begins with a DOE determination that a rating is invalid

through the process outlined above. Additional invalid ratings apply for the purposes of determining the appropriate consequences if the subsequent determination(s) is based on selection of a unit for testing within the twenty-four month period (i.e., subsequent determinations need not be made within 24 months).

Number of invalid certified ratings from the same AEDM <sup>2</sup> within a rolling 24 month period <sup>3</sup>	Required manufacturer actions
2 .....	Submit different test data and reports from testing to validate that AEDM within the validation classes to which it is applied. <sup>1</sup> Adjust the ratings as appropriate.
4 .....	Conduct double the minimum number of validation tests for the validation classes to which the AEDM is applied. Note, the tests required under this paragraph (c)(5)(viii) must be performed on different models than the original tests required under paragraph (c)(2) of this section.
6 .....	Conduct the minimum number of validation tests for the validation classes to which the AEDM is applied at a third-part test facility; And Conduct addition testing, which is equal to ½ the minimum number of validation tests for the validation classes to which the AEDM is applied, at either the manufacturer's facility or a third-party test facility, at the manufacturer's discretion. Note, the tests required under this paragraph (c)(5)(viii) must be performed on different models than the original tests performed under paragraph (c)(2) of this section.
> = 8 .....	Manufacturer has lost privilege to use AEDM. All ratings for models within the validation classes to which the AEDM applied should be rated via testing. Distribution cannot continue until certification(s) are corrected to reflect actual test data.

<sup>1</sup> A manufacturer may discuss with DOE's Office of Enforcement whether existing test data on different basic models within the validation classes to which that specific AEDM was applied may be used to meet this requirement.  
<sup>2</sup> The "same AEDM" means a computer simulation or mathematical model that is identified by the manufacturer at the time of certification as having been used to rate a model or group of models.  
<sup>3</sup> The twenty-four month period begins with a DOE determination that a rating is invalid through the process outlined above. Additional invalid ratings apply for the purposes of determining the appropriate consequences if the subsequent determination(s) is based on testing of a unit that was selected for testing within the twenty-four month period (i.e., subsequent determinations need not be made within 24 months).

(B) If, as a result of eight or more invalid ratings, a manufacturer has lost the privilege of using an AEDM for rating, the manufacturer may regain the ability to use an AEDM by:

- (1) Investigating and identifying cause(s) for failures;
- (2) Taking corrective action to address cause(s);
- (3) Performing six new tests per validation class, a minimum of two of which must be performed by an independent, third-party laboratory to validate the AEDM; and
- (4) Obtaining DOE authorization to resume use of the AEDM.

(d) *Alternative efficiency determination method for distribution transformers*—A manufacturer may use an AEDM to determine the efficiency of one or more of its untested basic models only if it determines the efficiency of at least five of its other basic models (selected

in accordance with paragraph (d)(3) of this section) through actual testing.

- (1) *Criteria an AEDM must satisfy.*
  - (i) The AEDM has been derived from a mathematical model that represents the electrical characteristics of that basic model;
  - (ii) The AEDM is based on engineering and statistical analysis, computer simulation or modeling, or other analytic evaluation of performance data; and
  - (iii) The manufacturer has substantiated the AEDM, in accordance with paragraph (d)(2) of this section, by applying it to, and testing, at least five other basic models of the same type, i.e., low-voltage dry-type distribution transformers, medium-voltage dry-type distribution transformers, or liquid-immersed distribution transformers.

(2) *Substantiation of an AEDM.* Before using an AEDM, the manufacturer

must substantiate the AEDM's accuracy and reliability as follows:

(i) Apply the AEDM to at least five of the manufacturer's basic models that have been selected for testing in accordance with paragraph (d)(3) of this section, and calculate the power loss for each of these basic models;

(ii) Test at least five units of each of these basic models in accordance with the applicable test procedure and § 429.47, and determine the power loss for each of these basic models;

(iii) The predicted total power loss for each of these basic models, calculated by applying the AEDM pursuant to paragraph (d)(2)(i) of this section, must be within plus or minus five percent of the mean total power loss determined from the testing of that basic model pursuant to paragraph (d)(2)(ii) of this section; and

(iv) Calculate for each of these basic models the percentage that its power loss calculated pursuant to paragraph (d)(2)(i) of this section is of its power loss determined from testing pursuant to paragraph (d)(2)(ii) of this section, compute the average of these percentages, and that calculated average power loss, expressed as a percentage of the average power loss determined from testing, must be no less than 97 percent and no greater than 103 percent.

(3) *Additional testing requirements.* (i) A manufacturer must select basic models for testing in accordance with the following criteria:

(A) Two of the basic models must be among the five basic models with the highest unit volumes of production by the manufacturer in the prior year, or during the prior 12-calendar-month period beginning in 2003,<sup>1</sup> whichever is later;

(B) No two basic models should have the same combination of power and voltage ratings; and

(C) At least one basic model should be single-phase and at least one should be three-phase.

(ii) In any instance where it is impossible for a manufacturer to select basic

models for testing in accordance with all of these criteria, the criteria shall be given priority in the order in which they are listed. Within the limits imposed by the criteria, basic models shall be selected randomly.

(4) *Subsequent verification of an AEDM.* (i) Each manufacturer that has used an AEDM under this section shall have available for inspection by the Department of Energy records showing:

(A) The method or methods used;

(B) The mathematical model, the engineering or statistical analysis, computer simulation or modeling, and other analytic evaluation of performance data on which the AEDM is based;

(C) Complete test data, product information, and related information that the manufacturer has generated or acquired pursuant to paragraph (d)(4) of this section; and

(D) The calculations used to determine the efficiency and total power losses of each basic model to which the AEDM was applied.

(ii) If requested by the Department, the manufacturer must perform at least one of the following:

(A) Conduct simulations to predict the performance of particular basic models of distribution transformers specified by the Department;

(B) Provide analyses of previous simulations conducted by the manufacturer;

(C) Conduct sample testing of basic models selected by the Department; or

(D) Conduct a combination of these.

(e) *Alternate Rating Method (ARM) for residential split-system central air conditioners and heat pumps—*

(1) *Criteria an ARM must satisfy.* The basis of the ARM referred to in § 429.16(a)(2)(ii) for residential central air conditioners and heat pumps must be a representation of the test data and calculations of a mechanical vapor-compression refrigeration cycle. The major components in the refrigeration cycle must be modeled as "fits" to manufacturer performance data or by graphical or tabular performance data. Heat transfer characteristics of coils may be modeled as a function of face area, number of rows, fins per inch, refrigerant circuitry, air-flow rate and entering-air enthalpy. Additional performance-related characteristics to be

<sup>1</sup>When identifying these five basic models, any basic model that does not comply with Federal energy conservation standards for distribution transformers that may be in effect shall be excluded from consideration.

considered may include type of expansion device, refrigerant flow rate through the expansion device, power of the indoor fan and cyclic-degradation coefficient. Ratings for untested combinations must be derived from the ratings of a combination tested in accordance with § 429.16(a)(2)(i). The seasonal energy efficiency ratio (SEER) and/or heating seasonal performance factor (HSPF) ratings for an untested combination must be set equal to or less than the lower of the SEER and/or HSPF calculated using the applicable DOE-approved alternative rating method (ARM). If the method includes an ARM/simulation adjustment factor(s), determine the value(s) of the factor(s) that yield the best match between the SEER/HSPF determined using the ARM versus the SEER/HSPF determined from testing in accordance with § 429.16(a)(2)(i). Thereafter, apply the ARM using the derived adjustment factor(s) only when determining the ratings for untested combinations having the same outdoor unit.

(2) *Approval of an ARM.* (i) Manufacturers who elect to use an ARM for determining measures of energy consumption under § 429.16(a)(2)(ii)(B)(1) and paragraph (e)(1) of this section must submit a request for DOE to review the ARM. Send the request to: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program (EE-2J), Attention: Alternative Rating Methods (ARM) for Certification and Compliance, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585-0121.

(ii) Each request to DOE for approval of an ARM must include:

(A) The name, mailing address, telephone number, and e-mail address of the official representing the manufacturer.

(B) Complete documentation of the alternative rating method to allow DOE to evaluate its technical adequacy. The documentation must include a description of the methodology, state any underlying assumptions, and explain any correlations. The documentation should address how the method accounts for the cyclic-degradation coefficient, the type of expansion device, and, if applicable, the in-

door fan-off delay. The requestor must submit any computer programs—including spreadsheets—having less than 200 executable lines that implement the ARM. Longer computer programs must be identified and sufficiently explained, as specified above, but their inclusion in the initial submittal package is optional. Applicability or limitations of the ARM (*e.g.*, only covers single-speed units when operating in the cooling mode, covers units with rated capacities of 3 tons or less, not applicable to the manufacturer's product line of non-ducted systems) must be stated in the documentation.

(C) Complete test data from laboratory tests on four mixed (*i.e.*, non-highest-sales-volume combination) systems per each ARM.

(1) The four mixed systems must include four different indoor units and at least two different outdoor units. A particular model of outdoor unit may be tested with up to two of the four indoor units. The four systems must include two low-capacity mixed systems and two high-capacity mixed systems. The low-capacity mixed systems may have any capacity. The rated capacity of each high-capacity mixed system must be at least a factor of two higher than its counterpart low-capacity mixed system. The four mixed systems must meet the applicable energy conservation standard in § 430.32(c) in effect at the time of the rating.

(2) The four indoor units must come from at least two different coil families, with a maximum of two indoor units coming from the same coil family. Data for two indoor units from the same coil family, if submitted, must come from testing with one of the "low-capacity mixed systems" and one of the "high-capacity mixed systems." A mixed system indoor coil may come from the same coil family as the highest-sales-volume-combination indoor unit (*i.e.*, the "matched" indoor unit) for the particular outdoor unit. Data on mixed systems where the indoor unit is now obsolete will be accepted towards the ARM-validation submittal requirement if it is from the same coil family as other indoor units still in production.

(3) The first two sentences of paragraph (e)(2)(ii)(C)(2) of this section do

not apply if the manufacturer offers indoor units from only one coil family. In this case only, all four indoor coils must be selected from this one coil family. If approved, the ARM will be specifically limited to applications for this one coil family.

(D) All product information on each mixed system indoor unit, each matched system indoor unit, and each outdoor unit needed to implement the proposed ARM. The calculated ratings for the four mixed systems, as determined using the proposed ARM, must be provided along with any other related information that will aid the verification process.

(E) If request for approval is for an updated ARM, manufacturers must identify modifications made to the ARM since the last submittal, including any ARM/simulation adjustment factor(s) added since the ARM was last approved by DOE.

(iii) Approval must be received from the Department to use the ARM before the ARM may be used for rating split-system central air conditioners and heat pumps. If a manufacturer has a DOE-approved ARM for products also distributed in commerce by a private labeler, the ARM may also be used by the private labeler for rating these products. Once an ARM is approved, DOE may contact a manufacturer to learn if their ARM has been modified in any way and to verify that the ARM is being applied as approved. DOE will give follow-up priority to individual combinations having questionably high ratings (*e.g.*, a coil-only system having a rating that exceeds the rating of a coil-only highest sales volume combination by more than 6 percent).

(3) *Changes to DOE's regulations requiring re-approval of an ARM.* Manufacturers who elect to use an ARM for determining measures of energy consumption under § 429.16(a)(2)(ii)(B)(1) and paragraph (e)(1) of this section must submit a request for DOE to review the ARM when:

(i) DOE amends the energy conservation standards as specified in § 430.32 for residential central air conditioners and heat pumps. In this case, any testing and evidence required under paragraph (e)(2) of this section shall be developed with units that meet the

amended energy conservation standards specified in § 430.32. Re-approval for the ARM must be obtained before the compliance date of amended energy conservation standards. (ii) DOE amends the test procedure for residential air conditioners and heat pumps as specified in appendix M to subpart B of part 430. Re-approval for the ARM must be obtained before the compliance date of amended test procedures.

(4) Manufacturers that elect to use an ARM for determining measures of energy consumption under § 429.16(a)(2)(ii)(B)(1) and paragraph (e)(1) of this section must regularly either subject a sample of their units to independent testing, *e.g.*, through a voluntary certification program, in accordance with the applicable DOE test procedure, or have the representations reviewed by an independent state-registered professional engineer who is not an employee of the manufacturer. The manufacturer may continue to use the ARM only if the testing establishes, or the registered professional engineer certifies, that the results of the ARM accurately represent the energy consumption of the unit(s). Any proposed change to the alternative rating method must be approved by DOE prior to its use for rating.

(5) Manufacturers who choose to use computer simulation or engineering analysis for determining measures of energy consumption under § 429.16(a)(2)(ii)(B)(1) and paragraphs (e)(1) through (e)(4) of this section must permit representatives of the Department of Energy to inspect for verification purposes the simulation method(s) and computer program(s) used. This inspection may include conducting simulations to predict the performance of particular outdoor unit “indoor” unit combinations specified by DOE, analysis of previous simulations conducted by the manufacturer, or both.

(f) *Alternative efficiency determination method (AEDM) for walk-in refrigeration equipment—*

(1) *Criteria an AEDM must satisfy.* A manufacturer may not apply an AEDM to a basic model to determine its efficiency pursuant to this section unless:

(i) The AEDM is derived from a mathematical model that estimates



the energy efficiency or energy consumption characteristics of the basic model as measured by the applicable DOE test procedure;

(ii) The AEDM is based on engineering or statistical analysis, computer simulation or modeling, or other analytical evaluation of performance data; and

(iii) The manufacturer has validated the AEDM, in accordance with paragraph (f)(2) of this section.

(2) *Validation of an AEDM.* Before using an AEDM, the manufacturer must validate the AEDM's accuracy and reliability as follows:

(i) The manufacturer must select at least the minimum number of basic models for each validation class specified in paragraph (f)(2)(iv) of this section to which the particular AEDM applies. Test a single unit of each basic model in accordance with paragraph (f)(2)(iii) of this section. Using the AEDM, calculate the energy use or energy efficiency for each of the selected basic models. Compare the results from the single unit test and the AEDM output according to paragraph (f)(2)(ii) of this section. The manufacturer is responsible for ensuring the accuracy and repeatability of the AEDM.

(ii) *Individual model tolerances.* (A) The predicted efficiency for each model calculated by applying the AEDM may not be more than five percent greater

than the efficiency determined from the corresponding test of the model.

(B) The predicted energy efficiency for each model calculated by applying the AEDM must meet or exceed the applicable federal energy conservation standard.

(iii) *Additional test unit requirements.* (A) Each AEDM must be supported by test data obtained from physical tests of current models; and

(B) Test results used to validate the AEDM must meet or exceed current, applicable Federal standards as specified in part 431 of this chapter;

(C) Each test must have been performed in accordance with the applicable DOE test procedure with which compliance is required at the time the basic model is distributed in commerce; and

(D) For rating WICF refrigeration system components, an AEDM may not simulate or model portions of the system that are not required to be tested by the DOE test procedure. That is, if the test results used to validate the AEDM are for either a unit cooler only or a condensing unit only, the AEDM must estimate the system rating using the nominal values specified in the DOE test procedure for the other part of the refrigeration system.

(iv) *WICF refrigeration validation classes.*

Validation class	Minimum number of distinct models that must be tested
Dedicated Condensing, Medium Temperature, Indoor System .....	2 Basic Models.
Dedicated Condensing, Medium Temperature, Outdoor System <sup>1</sup> .....	2 Basic Models.
Dedicated Condensing, Low Temperature, Indoor System .....	2 Basic Models.
Dedicated Condensing, Low Temperature, Outdoor System <sup>2</sup> .....	2 Basic Models.
Unit Cooler connected to a Multiplex Condensing Unit, Medium Temperature .....	2 Basic Models.
Unit Cooler connected to a Multiplex Condensing Unit, Low Temperature .....	2 Basic Models.
Medium Temperature, Indoor Condensing Unit .....	2 Basic Models.
Medium Temperature, Outdoor Condensing Unit <sup>3</sup> .....	2 Basic Models.
Low Temperature, Indoor Condensing Unit .....	2 Basic Models.
Low Temperature, Outdoor Condensing Unit <sup>4</sup> .....	2 Basic Models.

<sup>1</sup> AEDMs validated for dedicated condensing, medium temperature, outdoor systems may be used to determine representative values for dedicated condensing, medium temperature, indoor systems, and additional validation testing is not required. AEDMs validated for only dedicated condensing, medium temperature, indoor systems may not be used to determine representative values for dedicated condensing, medium temperature, outdoor systems.

<sup>2</sup> AEDMs validated for dedicated condensing, low temperature, outdoor systems may be used to determine representative values for dedicated condensing, low temperature, indoor systems, and additional validation testing is not required. AEDMs validated for only dedicated condensing, low temperature, indoor systems may not be used to determine representative values for dedicated condensing, low temperature, outdoor systems.

<sup>3</sup> AEDMs validated for medium temperature, outdoor condensing units may be used to determine representative values for medium temperature, indoor condensing units, and additional validation testing is not required. AEDMs validated for only medium temperature, indoor condensing units may not be used to determine representative values for medium temperature, outdoor condensing units.

<sup>4</sup> AEDMs validated for low temperature, outdoor condensing units may be used to determine representative values for low temperature, indoor condensing units, and additional validation testing is not required. AEDMs validated for only low temperature, indoor condensing units may not be used to determine representative values for low temperature, outdoor condensing units.

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(3) *AEDM records retention requirements.* If a manufacturer has used an AEDM to determine representative values pursuant to this section, the manufacturer must have available upon request for inspection by the Department records showing:

- (i) The AEDM, including the mathematical model, the engineering or statistical analysis, and/or computer simulation or modeling that is the basis of the AEDM;
- (ii) Equipment information, complete test data, AEDM calculations, and the statistical comparisons from the units tested that were used to validate the AEDM pursuant to paragraph (f)(2) of this section; and
- (iii) Equipment information and AEDM calculations for each basic model to which the AEDM has been applied.

(4) *Additional AEDM requirements.* If requested by the Department the manufacturer must perform at least one of the following:

- (i) Conduct simulations before representatives of the Department to predict the performance of particular basic models of the product to which the AEDM was applied;
- (ii) Provide analyses of previous simulations conducted by the manufacturer; or
- (iii) Conduct certification testing of basic models selected by the Department.

(5) *AEDM verification testing.* DOE may use the test data for a given individual model generated pursuant to § 429.104 to verify the certified rating determined by an AEDM as long as the following process is followed:

- (i) *Selection of units.* DOE will obtain units for test from retail, where available. If units cannot be obtained from retail, DOE will request that a unit be provided by the manufacturer.
- (ii) *Lab requirements.* DOE will conduct testing at an independent, third-party testing facility of its choosing. In cases where no third-party laboratory is capable of testing the equipment, it may be tested at a manufacturer's facility upon DOE's request.
- (iii) *Manufacturer participation.* Testing will be performed without manufacturer representatives on-site.

(iv) *Testing.* All verification testing will be conducted in accordance with the applicable DOE test procedure, as well as each of the following to the extent that they apply:

- (A) Any active test procedure waivers that have been granted for the basic model;
- (B) Any test procedure guidance that has been issued by DOE;
- (C) If during test set-up or testing, the lab indicates to DOE that it needs additional information regarding a given basic model in order to test in accordance with the applicable DOE test procedure, DOE may organize a meeting between DOE, the manufacturer and the lab to provide such information.
- (D) At no time during the process may the lab communicate directly with the manufacturer without DOE present.

(v) *Failure to meet certified rating.* If a model tests worse than its certified rating by an amount exceeding the tolerance prescribed in paragraph (f)(5)(vi) of this section, DOE will notify the manufacturer. DOE will provide the manufacturer with all documentation related to the test set up, test conditions, and test results for the unit. Within the timeframe allotted by DOE, the manufacturer may then present all claims regarding testing validity.

(vi) *Tolerances.* for efficiency metrics, the result from a DOE verification test must be greater than or equal to the certified rating  $\times$  (1 – the applicable tolerance).

Equipment	Metric	Applicable tolerance
Refrigeration systems (including components).	AWEF ....	5%

(vii) *Invalid rating.* If, following discussions with the manufacturer and a retest where applicable, DOE determines that the testing was conducted appropriately in accordance with the DOE test procedure, the rating for the model will be considered invalid. Pursuant to 10 CFR 429.13(b), DOE may require a manufacturer to conduct additional testing as a remedial measure.

(g) *Alternative determination of ratings for untested basic models of residential water heaters and residential-duty commercial water heaters.* For models of

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water heaters that differ only in fuel type or power input, ratings for untested basic models may be established in accordance with the following procedures in lieu of testing. This method allows only for the use of ratings identical to those of a tested basic model as provided below; simulations or other modeling predictions for ratings of the uniform energy factor, volume, first-hour rating, or maximum gallons per minute (GPM) are not permitted.

(1) *Gas Water Heaters.* For untested basic models of gas-fired water heaters that differ from tested basic models only in whether the basic models use natural gas or propane gas, the represented value of uniform energy factor, first-hour rating, and maximum gallons per minute for an untested basic model is the same as that for a tested basic model, as long as the input ratings of the tested and untested basic models are within  $\pm 10\%$ , that is:

$$\frac{|\text{input rating of untested basic model} - \text{input rating of tested basic model}|}{\text{input rating of tested basic model}} \leq 10\%.$$

(2) *Electric Storage Water Heaters.* Rate an untested basic model of an electric storage type water heater using the first-hour rating and the uniform energy factor obtained from a tested basic model as a basis for ratings of basic models with other input ratings, provided that certain conditions are met:

(i) For an untested basic model, the represented value of the first-hour rating and the uniform energy factor is the same as that of a tested basic model, provided that each heating element of the untested basic model is rated at or above the input rating for the corresponding heating element of the tested basic model.

(ii) For an untested basic model having any heating element with an input rating that is lower than that of the corresponding heating element in the tested basic model, the represented value of the first-hour rating and the uniform energy factor is the same as that of a tested basic model, provided that the first-hour rating for the untested basic model results in the same draw pattern specified in Table I of appendix E for the simulated-use test as was applied to the tested basic model. To establish whether this condition is met, determine the first-hour ratings for the tested and the untested basic models in accordance with the procedure described in section 5.3.3 of 10 CFR part 430, subpart B, appendix E, then compare the appropriate draw pattern specified in Table I of appendix E for the first-hour rating of the tested basic model with that for the untested basic

model. If this condition is not met, then the untested basic model must be tested and the appropriate sampling provisions applied to determine its uniform energy factor in accordance with appendix E and this part.

[76 FR 12451, Mar. 7, 2011; 76 FR 24780, May 2, 2011, as amended at 78 FR 79595, Dec. 31, 2013; 79 FR 25505, May 5, 2014; 79 FR 27410, May 13, 2014; 80 FR 152, Jan. 5, 2015; 79 FR 40565, July 11, 2014]

### § 429.71 Maintenance of records.

(a) The manufacturer of any covered product or covered equipment shall establish, maintain, and retain the records of certification reports, of the underlying test data for all certification testing, and of any other testing conducted to satisfy the requirements of this part, part 430, and part 431. Any manufacturer who chooses to use an alternative method for determining energy efficiency or energy use in accordance with § 429.70 must retain the records required by that section, any other records of any testing performed to support the use of the alternative method, and any certifications required by that section, on file for review by DOE for two years following the discontinuance of all models or combinations whose ratings were based on the alternative method.

(b) Such records shall be organized and indexed in a fashion that makes them readily accessible for review by DOE upon request.

(c) The records shall be retained by the manufacturer for a period of two

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years from the date that the manufacturer or third party submitter has notified DOE that the model has been discontinued in commerce.

**§ 429.72 Alternative methods for determining non-energy ratings.**

(a) *General.* Where § 429.14 through § 429.54 authorize the use of an alternative method for determining a physical or operating characteristic other than the energy consumption or efficiency, such characteristics must be determined either by testing in accordance with the applicable test procedure and applying the specified sampling plan provisions established in those sections or as described in the appropriate product-specific paragraph below. In all cases, the computer-aided design (CAD) models, measurements, and calculations used to determine the rating for the physical or operating characteristic shall be retained as part of the test records underlying the certification of the basic model in accordance with § 429.71.

(b) *Testing.* [Reserved]

(c) *Residential refrigerators, refrigerator-freezers, and freezers.* The total refrigerated volume of a basic model of refrigerator, refrigerator-freezer, or freezer may be determined by performing a calculation of the volume based upon computer-aided design (CAD) models of the basic model in lieu of physical measurements of a production unit of the basic model. Any value of total refrigerated volume of a basic model reported to DOE in a certification of compliance in accordance with § 429.14(b)(2) must be calculated using the CAD-derived volume(s) and the applicable provisions in the test procedures in 10 CFR part 430 for measuring volume, and must be within two percent, or 0.5 cubic feet (0.2 cubic feet for compact products), whichever is greater, of the volume of a production unit of the basic model measured in accordance with the applicable test procedure in 10 CFR part 430.

[79 FR 22348, Apr. 21, 2014]

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**APPENDIX A TO SUBPART B OF PART 429—STUDENT’S T-DISTRIBUTION VALUES FOR CERTIFICATION TESTING**

**FIGURE 1—T-DISTRIBUTION VALUES FOR CERTIFICATION TESTING**  
[One-Sided]

Degrees of freedom (from Appendix A)	Confidence Interval			
	90%	95%	97.5%	99%
1	3.078	6.314	12.71	31.82
2	1.886	2.920	4.303	6.965
3	1.638	2.353	3.182	4.541
4	1.533	2.132	2.776	3.747
5	1.476	2.015	2.571	3.365
6	1.440	1.943	2.447	3.143
7	1.415	1.895	2.365	2.998
8	1.397	1.860	2.306	2.896
9	1.383	1.833	2.262	2.821
10	1.372	1.812	2.228	2.764
11	1.363	1.796	2.201	2.718
12	1.356	1.782	2.179	2.681
13	1.350	1.771	2.160	2.650
14	1.345	1.761	2.145	2.624
15	1.341	1.753	2.131	2.602
16	1.337	1.746	2.120	2.583
17	1.333	1.740	2.110	2.567
18	1.330	1.734	2.101	2.552
19	1.328	1.729	2.093	2.539
20	1.325	1.725	2.086	2.528

[76 FR 12451, Mar. 7, 2011; 76 FR 24780, May 2, 2011]

**Subpart C—Enforcement**

**§ 429.100 Purpose and scope.**

This subpart describes the enforcement authority of DOE to ensure compliance with the conservation standards and regulations.

**§ 429.102 Prohibited acts subjecting persons to enforcement action.**

(a) Each of the following actions is prohibited:

(1) Failure of a manufacturer to provide, maintain, permit access to, or copying of records required to be supplied under the Act and this part or failure to make reports or provide other information required to be supplied under the Act and this part, including but not limited to failure to properly certify covered products and covered equipment in accordance with § 429.12 and §§ 429.14 through 429.54;

(2) Failure to test any covered product or covered equipment subject to an applicable energy conservation standard in conformance with the applicable

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test requirements prescribed in 10 CFR parts 430 or 431;

(3) Deliberate use of controls or features in a covered product or covered equipment to circumvent the requirements of a test procedure and produce test results that are unrepresentative of a product's energy or water consumption if measured pursuant to DOE's required test procedure;

(4) Failure of a manufacturer to supply at the manufacturer's expense a requested number of covered products or covered equipment to a designated test laboratory in accordance with a test notice issued by DOE;

(5) Failure of a manufacturer to permit a DOE representative to observe any testing required by the Act and this part and inspect the results of such testing;

(6) Distribution in commerce by a manufacturer or private labeler of any new covered product or covered equipment that is not in compliance with an applicable energy conservation standard prescribed under the Act;

(7) Distribution in commerce by a manufacturer or private labeler of a basic model of covered product or covered equipment after a notice of non-compliance determination has been issued to the manufacturer or private labeler;

(8) Knowing misrepresentation by a manufacturer or private labeler by certifying an energy use or efficiency rating of any covered product or covered equipment distributed in commerce in a manner that is not supported by test data;

(9) For any manufacturer, distributor, retailer, or private labeler to distribute in commerce an adapter that—

(i) Is designed to allow an incandescent lamp that does not have a medium screw base to be installed into a fixture or lamp holder with a medium screw base socket; and

(ii) Is capable of being operated at a voltage range at least partially within 110 and 130 volts; or

(10) For any manufacturer or private labeler to knowingly sell a product to a distributor, contractor, or dealer with knowledge that the entity routinely violates any regional standard applicable to the product.

(b) When DOE has reason to believe that a manufacturer or private labeler has undertaken a prohibited act listed in paragraph (a) of this section, DOE may:

(1) Issue a notice of noncompliance determination;

(2) Impose additional certification testing requirements;

(3) Seek injunctive relief;

(4) Assess a civil penalty for knowing violations; or

(5) Undertake any combination of the above.

### § 429.104 Assessment testing.

DOE may, at any time, test a basic model to assess whether the basic model is in compliance with the applicable energy conservation standard(s).

### § 429.106 Investigation of compliance.

(a) DOE may initiate an investigation that a basic model may not be compliant with an applicable conservation standard, certification requirement or other regulation at any time.

(b) DOE may, at any time, request any information relevant to determining compliance with any requirement under parts 429, 430 and 431, including the data underlying certification of a basic model. Such data may be used by DOE to make a determination of compliance or noncompliance with an applicable standard.

### § 429.110 Enforcement testing.

(a) *General provisions.* (1) If DOE has reason to believe that a basic model is not in compliance it may test for enforcement.

(2) DOE will select and test units pursuant to paragraphs (c) and (e) of this section.

(3) Testing will be conducted at a lab accredited to the International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC), "General requirements for the competence of testing and calibration laboratories," ISO/IEC 17025:2005(E) (incorporated by reference; see § 429.4). If testing cannot be completed at an independent lab, DOE, at its discretion, may allow enforcement testing at a manufacturer's lab, so long as the lab is accredited to ISO/IEC 17025:2005(E)

and DOE representatives witness the testing.

(b) *Test notice.* (1) To obtain units for enforcement testing to determine compliance with an applicable standard, DOE will issue a test notice addressed to the manufacturer in accordance with the following requirements:

(i) DOE will send the test notice to the manufacturer's certifying official or other company official.

(ii) The test notice will specify the basic model that will be selected for testing, the method of selecting the test sample, the maximum size of the sample and the size of the initial test sample, the dates at which testing is scheduled to be started and completed, and the facility at which testing will be conducted. The test notice may also provide for situations in which the selected basic model is unavailable for testing and may include alternative models or basic models.

(iii) DOE will state in the test notice that it will select the units of a basic model to be tested from the manufacturer, from one or more distributors, and/or from one or more retailers. If any unit is selected from a distributor or retailer, the manufacturer shall make arrangements with the distributor or retailer for compensation for or replacement of any such units.

(iv) DOE may require in the test notice that the manufacturer of a basic model ship or cause to be shipped from a retailer or distributor at its expense the requested number of units of a basic model specified in such test notice to the testing laboratory specified in the test notice. The manufacturer shall ship the specified initial test unit(s) of the basic model to the testing laboratory within 5 working days from the time units are selected.

(v) If DOE determines that the units identified are low-volume or built-to-order products, DOE will contact the manufacturer to develop a plan for enforcement testing in lieu of paragraphs (ii)–(iv) of this section.

(2) [Reserved]

(c) *Test unit selection.* (1) To select units for testing from a:

(i) Manufacturer's warehouse, distributor, or other facility affiliated with the manufacturer. DOE will select a batch sample at random in accord-

ance with the provisions in paragraph (e) of this section and the conditions specified in the test notice. DOE will randomly select an initial test sample of units from the batch sample for testing in accordance with appendices A through C of this subpart. DOE will make a determination whether an alternative sample size will be used in accordance with the provisions in paragraph (e)(1)(iv) of this section.

(ii) Retailer or other facility not affiliated with the manufacturer. DOE will select an initial test sample of units at random that satisfies the minimum units necessary for testing in accordance with the provisions in appendices A through C of this subpart and the conditions specified in the test notice. Depending on the results of the testing, DOE may select additional units for testing from a retailer in accordance with appendices A through C of this subpart. If the full sample is not available from a retailer, DOE will make a determination whether an alternative sample size will be used in accordance with the provisions in paragraph (e)(1)(iv) of this section.

(2) Units tested in accordance with the applicable test procedure under this part by DOE or another Federal agency, pursuant to other provisions or programs, may count toward units in the test sample.

(3) The resulting test data shall constitute official test data for the basic model. Such test data will be used by DOE to make a determination of compliance or noncompliance if a sufficient number of tests have been conducted to satisfy the requirements of paragraph (e) of this section and appendices A through C of this subpart.

(d) *Test unit preparation.* (1) Prior to and during testing, a test unit selected for enforcement testing shall not be prepared, modified, or adjusted in any manner unless such preparation, modification, or adjustment is allowed by the applicable DOE test procedure. One test shall be conducted for each test unit in accordance with the applicable test procedures prescribed in parts 430 and 431.

(2) No quality control, testing or assembly procedures shall be performed

on a test unit, or any parts and sub-assemblies thereof, that is not performed during the production and assembly of all other units included in the basic model.

(3) A test unit shall be considered defective if such unit is inoperative or is found to be in noncompliance due to failure of the unit to operate according to the manufacturer's design and operating instructions. Defective units, including those damaged due to shipping or handling, shall be reported immediately to DOE. DOE may authorize testing of an additional unit on a case-by-case basis.

(e) *Basic model compliance.* (1) DOE will evaluate whether a basic model complies with the applicable energy conservation standard(s) based on testing conducted in accordance with the applicable test procedures specified in parts 430 and 431, and with the following statistical sampling procedures:

(i) For products with applicable energy conservation standard(s) in § 430.32, and commercial pre-rinse spray valves, illuminated exit signs, traffic signal modules and pedestrian modules, commercial clothes washers, and metal halide lamp ballasts, DOE will use a sample size of not more than 21 units and follow the sampling plans in appendix A of this subpart (Sampling for Enforcement Testing of Covered Consumer Products and Certain High-Volume Commercial Equipment).

(ii) For automatic commercial ice makers; commercial refrigerators, freezers, and refrigerator-freezers; refrigerated bottled or canned vending machines; and commercial HVAC and WH equipment, DOE will use an initial sample size of not more than four units and follow the sampling plans in appendix B of this subpart (Sampling Plan for Enforcement Testing of Covered Equipment and Certain Low-Volume Covered Products). If fewer than four units of a basic model are available for testing when the manufacturer receives the notice, then:

(A) DOE will test the available unit(s); or

(B) If one or more other units of the basic model are expected to become available within 30 calendar days, DOE may instead, at its discretion, test either:

(1) The available unit(s) and one or more of the other units that subsequently become available (up to a maximum of four); or

(2) Up to four of the other units that subsequently become available.

(iii) For distribution transformers, DOE will use an initial sample size of not more than five units and follow the sampling plans in appendix C of this subpart (Sampling Plan for Enforcement Testing of Distribution Transformers). If fewer than five units of a basic model are available for testing when the manufacturer receives the test notice, then:

(A) DOE will test the available unit(s); or

(B) If one or more other units of the basic model are expected to become available within 30 calendar days, the Department may instead, at its discretion, test either:

(1) The available unit(s) and one or more of the other units that subsequently become available (up to a maximum of five); or

(2) Up to five of the other units that subsequently become available.

(iv) Notwithstanding paragraphs (e)(1)(i) through (e)(1)(iii) of this section, if testing of the available or subsequently available units of a basic model would be impractical, as for example when a basic model has unusual testing requirements or has limited production, DOE may in its discretion decide to base the determination of compliance on the testing of fewer than the otherwise required number of units.

(v) When DOE makes a determination in accordance with section (e)(1)(iv) to test less than the number of units specified in parts (d)(1)(i) through (d)(1)(iii) of this section, DOE will base the compliance determination on the results of such testing in accordance with appendix B of this subpart (Sampling Plan for Enforcement Testing of Covered Equipment and Certain Low-Volume Covered Products) using a sample size ( $n_1$ ) equal to the number of units tested.

(vi) For the purposes of paragraphs (e)(1)(i) through (e)(1)(v) of this section, available units are those that are available for distribution in commerce within the United States.

**§ 429.114 Notice of noncompliance and notice to cease distribution of a basic model.**

(a) In the event that DOE determines a basic model is noncompliant with an applicable energy conservation standard, or if a manufacturer or private labeler determines a basic model to be in noncompliance, DOE may issue a notice of noncompliance determination to the manufacturer or private labeler. This notice of noncompliance determination will notify the manufacturer or private labeler of its obligation to:

(1) Immediately cease distribution in commerce of the basic model;

(2) Give immediate written notification of the determination of noncompliance to all persons to whom the manufacturer has distributed units of the basic model manufactured since the date of the last determination of compliance; and

(3) Provide DOE, within 30 calendar days of the request, records, reports and other documentation pertaining to the acquisition, ordering, storage, shipment, or sale of a basic model determined to be in noncompliance.

(b) In the event that DOE determines a manufacturer has failed to comply with an applicable certification requirement with respect to a particular basic model, DOE may issue a notice of noncompliance determination to the manufacturer or private labeler. This notice of noncompliance determination will notify the manufacturer or private labeler of its obligation to:

(1) Immediately cease distribution in commerce of the basic model;

(2) Immediately comply with the applicable certification requirement; and/or

(3) Provide DOE within 30 days of the request, records, reports and other documentation pertaining to the acquisition, ordering, storage, shipment, or sale of the basic model.

(c) If a manufacturer or private labeler fails to comply with the required actions in the notice of noncompliance determination as set forth in paragraphs (a) or (b) of this section, the General Counsel (or delegee) may seek, among other remedies, injunctive action and civil penalties, where appropriate.

(d) The manufacturer may modify a basic model determined to be noncompliant with an applicable energy conservation standard in such manner as to make it comply with the applicable standard. Such modified basic model shall then be treated as a new basic model and must be certified in accordance with the provisions of this part; except that in addition to satisfying all requirements of this part, any models within the basic model must be assigned new model numbers and the manufacturer shall also maintain, and provide upon request to DOE, records that demonstrate that modifications have been made to all units of the new basic model prior to distribution in commerce.

**§ 429.116 Additional certification testing requirements.**

Pursuant to § 429.102(b)(2), if DOE determines that independent, third-party testing is necessary to ensure a manufacturer's compliance with the rules of this part, part 430, or part 431, a manufacturer must base its certification of a basic model under subpart B of this part on independent, third-party laboratory testing.

**§ 429.118 Injunctions.**

If DOE has reason to seek an injunction under the Act:

(a) DOE will notify the manufacturer, private labeler or any other person as required, of the prohibited act at issue and DOE's intent to seek a judicial order enjoining the prohibited act unless the manufacturer, private labeler or other person, delivers to DOE within 15 calendar days a corrective action and compliance plan, satisfactory to DOE, of the steps it will take to ensure that the prohibited act ceases. DOE will monitor the implementation of such plan.

(b) If the manufacturer, private labeler or any other person as required, fails to cease engaging in the prohibited act or fails to provide a satisfactory corrective action and compliance plan, DOE may seek an injunction.

**§ 429.120 Maximum civil penalty.**

Any person who knowingly violates any provision of § 429.102(a) of this part may be subject to assessment of a civil



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penalty of no more than \$200 for each violation. As to § 429.102(a)(1) with respect to failure to certify, and as to § 429.102(a)(2), (5) through (9), each unit of a covered product or covered equipment distributed in violation of such paragraph shall constitute a separate violation. For violations of § 429.102(a)(1), (3), and (4), each day of noncompliance shall constitute a separate violation for each basic model at issue.

### § 429.122 Notice of proposed civil penalty.

(a) The General Counsel (or delegee) shall provide notice of any proposed civil penalty.

(b) The notice of proposed penalty shall:

(1) Include the amount of the proposed penalty;

(2) Include a statement of the material facts constituting the alleged violation; and

(3) Inform the person of the opportunity to elect in writing within 30 calendar days of receipt of the notice to have the procedures of § 429.128 (in lieu of those of § 429.126) apply with respect to the penalty.

### § 429.124 Election of procedures.

(a) In responding to a notice of proposed civil penalty, the respondent may request:

(1) An administrative hearing before an Administrative Law Judge (ALJ) under § 429.126 of this part; or

(2) Elect to have the procedures of § 429.128 apply.

(b) Any election to have the procedures of § 429.128 apply may not be revoked except with the consent of the General Counsel (or delegee).

(c) If the respondent fails to respond to a notice issued under § 429.120 or otherwise fails to indicate its election of procedures, DOE shall refer the civil penalty action to an ALJ for a hearing under § 429.126.

### § 429.126 Administrative law judge hearing and appeal.

(a) When elected pursuant to § 429.124, DOE shall refer a civil penalty action brought under § 429.122 of this part to an ALJ, who shall afford the respond-

ent an opportunity for an agency hearing on the record.

(b) After consideration of all matters of record in the proceeding, the ALJ will issue a recommended decision, if appropriate, recommending a civil penalty. The decision will include a statement of the findings and conclusions, and the reasons therefore, on all material issues of fact, law, and discretion.

(c)(1) The General Counsel (or delegee) shall adopt, modify, or set aside the conclusions of law or discretion contained in the ALJ's recommended decision and shall set forth a final order assessing a civil penalty. The General Counsel (or delegee) shall include in the final order the ALJ's findings of fact and the reasons for the final agency actions.

(2) Any person against whom a penalty is assessed under this section may, within 60 calendar days after the date of the final order assessing such penalty, institute an action in the United States Court of Appeals for the appropriate judicial circuit for judicial review of such order in accordance with chapter 7 of title 5, United States Code. The court shall have jurisdiction to enter a judgment affirming, modifying, or setting aside in whole or in part, the final order, or the court may remand the proceeding to the Department for such further action as the court may direct.

### § 429.128 Immediate issuance of order assessing civil penalty.

(a) If the respondent elects to forgo an agency hearing pursuant to § 429.124, the General Counsel (or delegee) shall issue an order assessing the civil penalty proposed in the notice of proposed penalty under § 429.122, 30 calendar days after the respondent's receipt of the notice of proposed penalty.

(b) If within 60 calendar days of receiving the assessment order in paragraph (a) of this section the respondent does not pay the civil penalty amount, DOE shall institute an action in the appropriate United States District Court for an order affirming the assessment of the civil penalty. The court shall have authority to review de novo the law and the facts involved and

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shall have jurisdiction to enter a judgment enforcing, modifying, and enforcing as so modified, or setting aside in whole or in part, such assessment.

### § 429.130 Collection of civil penalties.

If any person fails to pay an assessment of a civil penalty after it has become a final and unappealable order under § 429.126 or after the appropriate District Court has entered final judgment in favor of the Department under § 429.128, the General Counsel (or delegatee) shall institute an action to recover the amount of such penalty in any appropriate District Court of the United States. In such action, the validity and appropriateness of such final assessment order or judgment shall not be subject to review.

### § 429.132 Compromise and settlement.

(a) DOE may compromise, modify, or remit, with or without conditions, any civil penalty (with leave of court if necessary).

(b) In exercising its authority under paragraph (a) of this section, DOE may consider the nature and seriousness of the violation, the efforts of the respondent to remedy the violation in a timely manner, and other factors as justice may require.

(c) DOE's authority to compromise, modify or remit a civil penalty may be exercised at any time prior to a final decision by the United States Court of Appeals if § 429.126 procedures are utilized, or prior to a final decision by the United States District Court, if § 429.128 procedures are utilized.

(d) Notwithstanding paragraph (a) of this section, DOE or the respondent may propose to settle the case. If a settlement is agreed to by the parties, the respondent is notified and the case is closed in accordance with the terms of the settlement.

### § 429.134 Product-specific enforcement provisions.

(a) *General.* The following provisions apply to assessment and enforcement testing of the relevant products and equipment.

(b) *Refrigerators, refrigerator-freezers, and freezers—* (1) *Verification of total refrigerated volume.* The total refrigerated volume of the basic model will be

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measured pursuant to the test requirements of 10 CFR part 430 for each unit tested. The results of the measurement(s) will be averaged and compared to the value of total refrigerated volume certified by the manufacturer. The certified total refrigerated volume will be considered valid only if:

(i) The measurement is within two percent, or 0.5 cubic feet (0.2 cubic feet for compact products), whichever is greater, of the certified total refrigerated volume, or

(ii) The measurement is greater than the certified total refrigerated volume.

(A) If the certified total refrigerated volume is found to be valid, the certified adjusted total volume will be used as the basis for calculation of maximum allowed energy use for the basic model.

(B) If the certified total refrigerated volume is found to be invalid, the average measured adjusted total volume will serve as the basis for calculation of maximum allowed energy use for the tested basic model.

(2) *Test for models with two compartments, each having its own user-operable temperature control.* The test described in section 3.3 of the applicable test procedure for refrigerators or refrigerator-freezers in appendix A to subpart B of 10 CFR part 430 shall be used for all units of a tested basic model before DOE makes a determination of non-compliance with respect to the basic model.

(c) *Clothes washers.* (1) *Determination of Remaining Moisture Content.* The procedure for determining remaining moisture content (RMC) will be performed once in its entirety, pursuant to the test requirements of section 3.8 of appendix J1 and appendix J2 to subpart B of part 430, for each unit tested.

(i) The measured RMC value of a tested unit will be considered the tested unit's final RMC value if the measured RMC value is within two RMC percentage points of the certified RMC value of the basic model (expressed as a percentage), or is lower than the certified RMC value.

(ii) If the measured RMC value of a tested unit is more than two RMC percentage points higher than the certified RMC value of the basic model,

DOE will perform two additional replications of the RMC measurement procedure, each pursuant to the provisions of section 3.8.5 of appendix J1 and appendix J2 to subpart B of part 430, for a total of three independent RMC measurements of the tested unit. The average of the three RMC measurements will be the tested unit's final RMC value and will be used as the basis for the calculation of per-cycle energy consumption for removal of moisture from the test load for that unit.

(2) [Reserved]

(d) *Residential Water Heaters and Residential-Duty Commercial Water Heaters—*

(1) *Verification of first-hour rating and maximum GPM rating.* The first-hour rating or maximum gallons per minute (GPM) rating of the basic model will be measured pursuant to the test requirements of 10 CFR part 430 for each unit tested. The mean of the measured values will be compared to the rated values of first-hour rating or maximum GPM rating as certified by the manufacturer. The certified rating will be considered valid only if the measurement is within five percent of the certified rating.

(i) If the rated value of first-hour rating or maximum GPM rating is found to be within 5 percent of the mean of the measured values, then the rated value will be used as the basis for determining the applicable draw pattern pursuant to the test requirements of 10 CFR part 430 for each unit tested.

(ii) If the rated value of first-hour rating or maximum GPM rating is found to vary more than 5 percent from the measured values, then the mean of the measured values will serve as the basis for determining the applicable draw pattern pursuant to the test requirements of 10 CFR part 430 for each unit tested.

(2) *Verification of rated storage volume.* The storage volume of the basic model will be measured pursuant to the test requirements of 10 CFR part 430 for each unit tested. The mean of the measured values will be compared to the rated storage volume as certified by the manufacturer. The rated value will be considered valid only if the measurement is within five percent of the certified rating.

(i) If the rated storage volume is found to be within 5 percent of the mean of the measured value of storage volume, then that value will be used as the basis for calculation of the required uniform energy factor for the basic model.

(ii) If the rated storage volume is found to vary more than 5 percent from the mean of the measured values, then the mean of the measured values will be used as the basis for calculation of the required uniform energy factor for the basic model.

(e) *Packaged terminal air conditioners and packaged terminal heat pumps—(1) Verification of cooling capacity.* The total cooling capacity of the basic model will be measured pursuant to the test requirements of 10 CFR part 431 for each unit tested. The results of the measurement(s) will be averaged and compared to the value of cooling capacity certified by the manufacturer. The certified cooling capacity will be considered valid only if the average measured cooling capacity is within five percent of the certified cooling capacity.

(i) If the certified cooling capacity is found to be valid, that cooling capacity will be used as the basis for calculation of minimum allowed EER (and minimum allowed COP for PTHP models) for the basic model.

(ii) If the certified cooling capacity is found to be invalid, the average measured cooling capacity will serve as the basis for calculation of minimum allowed EER (and minimum allowed COP for PTHP models) for the tested basic model.

(2) [Reserved]

(f) *Dehumidifiers—(1) Verification of capacity.* The capacity will be measured pursuant to the test requirements of part 430 of this chapter for each unit tested. The results of the measurement(s) will be averaged and compared to the value of capacity certified by the manufacturer for the basic model. The certified capacity will be considered valid only if the measurement is within five percent, or 1.00 pint per day, whichever is greater, of the certified capacity.

(i) If the certified capacity is found to be valid, the certified capacity will be used as the basis for determining

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the minimum energy factor allowed for the basic model.

(ii) If the certified capacity is found to be invalid, the average measured capacity of the units in the sample will be used as the basis for determining the minimum energy factor allowed for the basic model.

(2) Verification of whole-home dehumidifier case volume. The case volume will be measured pursuant to the test requirements of part 430 of this chapter for each unit tested. The results of the measurement(s) will be averaged and compared to the value of case volume certified by the manufacturer for the basic model. The certified case volume will be considered valid only if the measurement is within two percent, or 0.2 cubic feet, whichever is greater, of the certified case volume.

(i) If the certified case volume is found to be valid, the certified case volume will be used as the basis for determining the minimum energy factor allowed for the basic model.

(ii) If the certified case volume is found to be invalid, the average measured case volume of the units in the sample will be used as the basis for determining the minimum energy factor allowed for the basic model.

[79 FR 22348, Apr. 21, 2014, as amended at 79 FR 40566, July 11, 2014; 80 FR 37148, June 30, 2015; 80 FR 45824, July 31, 2015; 80 FR 46760, Aug. 5, 2015]

$$x_1 = \frac{1}{n_1} \left( \sum_{i=1}^{n_1} x_i \right) \quad [1]$$

where  $x_i$  is the measured energy or water efficiency or consumption from test  $i$ , and  $n_1$  is the total number of tests.

$$s_1 = \sqrt{\frac{\sum_{i=1}^{n_1} (x_i - x_1)^2}{n_1 - 1}} \quad [2]$$

EFFECTIVE DATE NOTE: At 80 FR 79669, Dec. 23, 2015, §429.134 was amended by adding paragraph (g), effective Jan. 22, 2016. For the convenience of the user, the added text is set forth as follows:

**§ 429.134 Product-specific enforcement provisions.**

\* \* \* \* \*

(g) *Air-cooled small (≥65,000 Btu/h and <135,000 Btu/h), large (≥135,000 Btu/h and <240,000 Btu/h), and very large (≥240,000 Btu/h and <760,000 Btu/h) commercial package air conditioning and heating equipment—verification of cooling capacity.* The cooling capacity of each tested unit of the basic model will be measured pursuant to the test requirements of part 431 of this chapter. The mean of the measurement(s) will be used to determine the applicable standards for purposes of compliance.

**APPENDIX A TO SUBPART C OF PART 429—SAMPLING PLAN FOR ENFORCEMENT TESTING OF COVERED CONSUMER PRODUCTS AND CERTAIN HIGH-VOLUME COMMERCIAL EQUIPMENT**

(a) The first sample size ( $n_1$ ) for enforcement testing must be four or more units, except as provided by §429.57(e)(1)(i).

(b) Compute the mean of the measured energy performance ( $x_1$ ) for all tests as follows:

(c) Compute the standard deviation ( $s_1$ ) of the measured energy performance from the  $n_1$  tests as follows:

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(d) Compute the standard error ( $s_{x_1}$ ) of the measured energy performance from the  $n_1$  tests as follows:

$$s_{x_1} = \frac{s_1}{\sqrt{n_1}} \tag{3}$$

(e)(1) Compute the upper control limit ( $UCL_1$ ) and lower control limit ( $LCL_1$ ) for the mean of the first sample using the applicable DOE energy efficiency standard (EES) as the

desired mean and a probability level of 95 percent (two-tailed test) as follows:

$$LCL_1 = EES - t s_{x_1}$$

$$LCL_1 = EES - t s_{x_1} \tag{4} \text{ and } UCL_1 = EES + t s_{x_1} \tag{5}$$

where  $t$  is the statistic based on a 95 percent two-tailed probability level with degrees of freedom ( $n_1 - 1$ ).

then the basic model is in compliance and testing is at an end. (Do not go on to any of the steps below.)

(2) For an energy efficiency or water efficiency standard, compare the mean of the first sample ( $x_1$ ) with the upper and lower control limits ( $UCL_1$  and  $LCL_1$ ) to determine one of the following:

(iii) If the sample mean is equal to or greater than the lower control limit but less than the upper control limit, then no determination of compliance or noncompliance can be made and a second sample size is determined by Step (e)(3).

(i) If the mean of the first sample is below the lower control limit, then the basic model is in noncompliance and testing is at an end. (Do not go on to any of the steps below.)

(3) For an energy efficiency or water efficiency standard, determine the second sample size ( $n_2$ ) as follows:

(ii) If the mean of the first sample is equal to or greater than the upper control limit,

$$n_2 = \left( \frac{t s_1}{0.05 EES} \right)^2 - n_1 \tag{6}$$

where  $s_1$  and  $t$  have the values used in equations 2 and 4, respectively. The term "0.05 EES" is the difference between the applicable energy efficiency or water efficiency standard and 95 percent of the standard, where 95 percent of the standard is taken as the lower control limit. This procedure yields a sufficient combined sample size ( $n_1 + n_2$ ) to give an estimated 97.5 percent probability of obtaining a determination of compliance when the true mean efficiency is equal to the applicable standard. Given the solution value of  $n_2$ , determine one of the following:

to or greater than the lower control limit ( $LCL_1$ ) or equal to or greater than 95 percent of the applicable energy efficiency or water efficiency standard (EES), whichever is greater, *i.e.*, if  $n_2 \leq 0$  and  $x_1 \geq \max(LCL_1, 0.95 EES)$ , the basic model is in compliance and testing is at an end.

(i) If the value of  $n_2$  is less than or equal to zero and if the mean energy or water efficiency of the first sample ( $x_1$ ) is either equal

(ii) If the value of  $n_2$  is less than or equal to zero and the mean energy efficiency of the first sample ( $x_1$ ) is less than the lower control limit ( $LCL_1$ ) or less than 95 percent of the applicable energy or water efficiency standard (EES), whichever is greater, *i.e.*, if  $n_2 \leq 0$  and  $x_1 \leq \max(LCL_1, 0.95 EES)$ , the basic model is not in compliance and testing is at an end.

(iii) If the value of  $n_2$  is greater than zero, then, the value of the second sample size is

determined to be the smallest integer equal to or greater than the solution value of  $n_2$  for equation (6). If the value of  $n_2$  so calculated is greater than  $21 - n_1$ , set  $n_2$  equal to  $21 - n_1$ .

(4) Compute the combined mean ( $x_2$ ) of the measured energy or water efficiency of the  $n_1$  and  $n_2$  units of the combined first and second samples as follows:

$$\bar{x}_2 = \frac{1}{n_1 + n_2} \left( \sum_{i=1}^{n_1+n_2} x_i \right) \quad [7]$$

(5) Compute the standard error ( $S_{x_2}$ ) of the measured energy or water performance of

the  $n_1$  and  $n_2$  units in the combined first and second samples as follows:

$$s_{x_2} = \frac{s_1}{\sqrt{n_1 + n_2}} \quad [8]$$

NOTE:  $s_1$  is the value obtained in Step (c).  
 (6) For an energy efficiency standard (EES), compute the lower control limit ( $LCL_2$ ) for the mean of the combined first and second samples using the DOE EES as

the desired mean and a one-tailed probability level of 97.5 percent (equivalent to the two-tailed probability level of 95 percent used in Step (e)(1)) as follows:

$$LCL_2 = EES - ts_{x_2} \quad [9]$$

where the t-statistic has the value obtained in Step (e)(1) and  $s_{x_2}$  is the value obtained in Step (e)(5).

(7) For an energy efficiency standard (EES), compare the combined sample mean ( $x_2$ ) to the lower control limit ( $LCL_2$ ) to determine one of the following:

(iii) If the mean of the combined sample ( $x_2$ ) is equal to or greater than the lower control limit ( $LCL_2$ ) or 95 percent of the applicable energy efficiency standard (EES), whichever is greater, *i.e.*, if  $x_2 \geq \max(LCL_2, 0.95 \text{ EES})$ , the basic model is in compliance and testing is at an end.

(i) If the mean of the combined sample ( $x_2$ ) is less than the lower control limit ( $LCL_2$ ) or 95 percent of the applicable energy efficiency standard (EES), whichever is greater, *i.e.*, if  $x_2 < \max(LCL_2, 0.95 \text{ EES})$ , the basic model is not compliant and testing is at an end.

(f)(1) Compute the upper control limit ( $UCL_1$ ) and lower control limit ( $LCL_1$ ) for the mean of the first sample using the applicable DOE energy consumption standard (ECS) as the desired mean and a probability level of 95 percent (two-tailed test) as follows:

$$LCL_1 = ECS - ts_{x_1} \quad \text{and} \quad UCL_1 = ECS + ts_{x_1} \quad [10]$$

where t is the statistic based on a 95 percent two-tailed probability level with degrees of freedom ( $n_1 - 1$ ).

(i) If the mean of the first sample is above the upper control limit, then the basic model is in noncompliance and testing is at an end. (Do not go on to any of the steps below.)

(2) For an energy or water consumption standard, compare the mean of the first sample ( $x_1$ ) with the upper and lower control limits ( $UCL_1$  and  $LCL_1$ ) to determine one of the following:

(ii) If the mean of the first sample is equal to or less than the lower control limit, then the basic model is in compliance and testing is at an end. (Do not go on to any of the steps below.)

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(iii) If the sample mean is equal to or less than the upper control limit but greater than the lower control limit, then no determination of compliance or noncompliance

can be made and a second sample size is determined by Step (f)(3).

(3) For an Energy or Water Consumption Standard, determine the second sample size ( $n_2$ ) as follows:

$$n_2 = \left( \frac{ts_1}{0.05ECS} \right)^2 - n_1 \quad [11]$$

where  $s_1$  and  $t$  have the values used in equations (2) and (10), respectively. The term "0.05 ECS" is the difference between the applicable energy or water consumption standard and 105 percent of the standard, where 105 percent of the standard is taken as the upper control limit. This procedure yields a sufficient combined sample size ( $n_1 + n_2$ ) to give an estimated 97.5 percent probability of obtaining a determination of compliance when the true mean consumption is equal to the applicable standard. Given the solution value of  $n_2$ , determine one of the following:

(i) If the value of  $n_2$  is less than or equal to zero and if the mean energy or water consumption of the first sample ( $x_1$ ) is either equal to or less than the upper control limit ( $UCL_1$ ) or equal to or less than 105 percent of the applicable energy or water consumption standard (ECS), whichever is less, *i.e.*, if  $n_2 \leq 0$  and  $x_1 \leq \min(UCL_1, 1.05 \text{ ECS})$ , the basic

model is in compliance and testing is at an end.

(ii) If the value of  $n_2$  is less than or equal to zero and the mean energy or water consumption of the first sample ( $x_1$ ) is greater than the upper control limit ( $UCL_1$ ) or more than 105 percent of the applicable energy or water consumption standard (ECS), whichever is less, *i.e.*, if  $n_2 \leq 0$  and  $x_1 > \min(UCL_1, 1.05 \text{ ECS})$ , the basic model is not compliant and testing is at an end.

(iii) If the value of  $n_2$  is greater than zero, then the value of the second sample size is determined to be the smallest integer equal to or greater than the solution value of  $n_2$  for equation (11). If the value of  $n_2$  so calculated is greater than  $21 - n_1$ , set  $n_2$  equal to  $21 - n_1$ .

(4) Compute the combined mean ( $x_2$ ) of the measured energy or water consumption of the  $n_1$  and  $n_2$  units of the combined first and second samples as follows:

$$\bar{x}_2 = \frac{1}{n_1 + n_2} \left( \sum_{i=1}^{n_1+n_2} x_i \right) \quad [12]$$

(5) Compute the standard error ( $S_{x_2}$ ) of the measured energy or water consumption of

the  $n_1$  and  $n_2$  units in the combined first and second samples as follows:

$$S_{x_2} = \frac{s^1}{\sqrt{n_1 + n_2}} \quad [13]$$

NOTE:  $s_1$  is the value obtained in Step (c).  
 (6) For an energy or water consumption standard (ECS), compute the upper control limit ( $UCL_2$ ) for the mean of the combined first and second samples using the DOE ECS

as the desired mean and a one-tailed probability level of 97.5 percent (equivalent to the two-tailed probability level of 95 percent used in Step (f)(1)) as follows:

$$UCL_1 = ECS + ts_{x_1} \quad [14]$$

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where the t-statistic has the value obtained in (f)(1).

(7) For an energy or water consumption standard (ECS), compare the combined sample mean ( $\bar{x}_2$ ) to the upper control limit ( $UCL_2$ ) to determine one of the following:

(i) If the mean of the combined sample ( $\bar{x}_2$ ) is greater than the upper control limit ( $UCL_2$ ) or 105 percent of the ECS whichever is less, *i.e.*, if  $\bar{x}_2 > \min(UCL_2, 1.05 \text{ ECS})$ , the basic model is not compliant and testing is at an end.

(ii) If the mean of the combined sample ( $\bar{x}_2$ ) is equal to or less than the upper control limit ( $UCL_2$ ) or 105 percent of the applicable energy or water performance standard (ECS), whichever is less, *i.e.*, if  $\bar{x}_2 \leq \min(UCL_2, 1.05$

ECS), the basic model is in compliance and testing is at an end.

**APPENDIX B TO SUBPART C OF PART 429—SAMPLING PLAN FOR ENFORCEMENT TESTING OF COVERED EQUIPMENT AND CERTAIN LOW-VOLUME COVERED PRODUCTS**

The Department will determine compliance as follows:

(a) The first sample size ( $n_1$ ) must be four or more units, except as provided by § 429.57(e)(1)(ii).

(b) Compute the mean of the measured energy performance ( $\bar{x}_1$ ) for all tests as follows:

$$\bar{x}_1 = \frac{1}{n_1} \left( \sum_{i=1}^{n_1} x_i \right) \quad [1]$$

where  $x_i$  is the measured energy efficiency or consumption from test  $i$ , and  $n_1$  is the total number of tests.

(c) Compute the standard deviation ( $s_1$ ) of the measured energy performance from the  $n_1$  tests as follows:

$$s_1 = \sqrt{\frac{\sum_{i=1}^{n_1} (x_i - \bar{x}_1)^2}{n_1 - 1}} \quad [2]$$

(d) Compute the standard error ( $s_{x_1}$ ) of the measured energy performance from the  $n_1$  tests as follows:

$$s_{x_1} = \frac{s_1}{\sqrt{n_1}} \quad [3]$$

(e)(1) For an energy efficiency standard (EES), determine the appropriate lower control limit ( $LCL_1$ ) according to:



$$LCL_1 = EES - ts_{x_1} \quad [4a]$$

or

$$LCL_1 = 0.95EES, \quad [4b]$$

And use whichever is greater. Where EES is the energy efficiency standard and t is a statistic based on a 97.5 percent, one-sided confidence limit and a sample size of  $n_1$ .

(2) For an energy consumption standard (ECS), determine the appropriate upper control limit ( $UCL_1$ ) according to:

$$UCL_1 = ECS + ts_{x_1} \quad [5a]$$

or

$$UCL_1 = 1.05ECS, \quad [5b]$$

And use whichever is less, where ECS is the energy consumption standard and t is a statistic based on a 97.5 percent, one-sided confidence limit and a sample size of  $n_1$ .

APPENDIX C TO SUBPART C OF PART 429—SAMPLING PLAN FOR ENFORCEMENT TESTING OF DISTRIBUTION TRANSFORMERS

(f)(1) Compare the sample mean to the control limit.

(a) When testing distribution transformers, the number of units in the sample ( $m_1$ ) shall be in accordance with §429.47(a) and DOE shall perform the following number of tests:

(i) The basic model is in compliance and testing is at an end if:

(1) If DOE tests four or more units, it will test each unit once;

(A) For an energy or water efficiency standard, the sample mean is equal to or greater than the lower control limit, or

(2) If DOE tests two or three units, it will test each unit twice; or

(B) For an energy or water consumption standard, the sample mean is equal to or less than the upper control limit.

(3) If DOE tests one unit, it will test that unit four times.

(b) DOE shall determine compliance as follows:

(1) Compute the mean ( $X_1$ ) of the measured energy performance of the  $n_1$  tests in the first sample as follows:

$$X_1 = \frac{1}{n_1} \sum_{i=1}^{n_1} X_i \quad [1]$$

where  $X_i$  is the measured efficiency of test  $i$ .

(2) Compute the sample standard deviation ( $S_1$ ) of the measured efficiency of the  $n_1$  tests in the first sample as follows:

$$S_1 = \sqrt{\sum_{i=1}^{n_1} \frac{(X_i - X_1)^2}{n_1 - 1}} \quad [2]$$

(3) Compute the standard error ( $SE(X_1)$ ) of the mean efficiency of the first sample as follows:

$$SE(X_1) = \frac{S_1}{\sqrt{n_1}} \quad [3]$$

(4) Compute the sample size discount ( $SSD(m_1)$ ) as follows:

$$SSD(m_1) = \frac{100}{1 + \left(1 + \frac{0.08}{\sqrt{m_1}}\right) \left(\frac{100}{RE} - 1\right)} \quad [4]$$

where  $m_1$  is the number of units in the sample, and  $RE$  is the applicable DOE efficiency when the test is to determine compliance with the applicable energy conservation standard, or is the labeled efficiency when

the test is to determine compliance with the labeled efficiency value.

(5) Compute the lower control limit ( $LCL_1$ ) for the mean of

$$LCL_1 = SSD(m_1) - tSE(\bar{X}_1) \quad [5]$$

Where  $t$  is statistic based on a 97.5 percent one-tailed  $t$  test with degrees of freedom

(from Appendix A)  $n_1 - 1$ .

(6) Compare the mean of the first sample ( $X_1$ ) with the lower control limit ( $LCL_1$ ) to determine one of the following:

(i) If the mean of the first sample is below the lower control limit, then the basic model is not compliant and testing is at an end.

(ii) If the mean is equal to or greater than the lower control limit, no final determination of compliance or noncompliance can be made; proceed to Step (7).

(7) Determine the recommended sample size ( $n$ ) as follows:

$$n = \left[ \frac{tS_1(108 - 0.08RE)}{RE(8 - 0.08RE)} \right]^2 \quad [6]$$

Given the value of n, determine one of the following:

- (i) If the value of n is less than or equal to n<sub>1</sub> and if the mean energy efficiency of the first sample ( $\bar{X}_1$ ) is equal to or greater than the lower control limit (LCL<sub>1</sub>), the basic model is in compliance and testing is at an end.
- (ii) If the value of n is greater than n<sub>1</sub>, the basic model is not compliant. The size of a

second sample n<sub>2</sub> is determined to be the smallest integer equal to or greater than the difference n - n<sub>1</sub>. If the value of n<sub>2</sub> so calculated is greater than 21 - n<sub>1</sub>, set n<sub>2</sub> equal to 21 - n<sub>1</sub>.

- (8) Compute the combined ( $\bar{X}_2$ ) mean of the measured energy performance of the n<sub>1</sub> and n<sub>2</sub> units of the combined first and second samples as follows:

$$\bar{X}_2 = \frac{1}{n_1 + n_2} \sum_{i=1}^{n_1+n_2} X_i \quad [7]$$

- (9) Compute the standard error (SE(X<sub>2</sub>)) of the mean full-load efficiency of the n<sub>1</sub> and n<sub>2</sub>

units in the combined first and second samples as follows:

$$SE(\bar{X}_2) = \frac{S_1}{\sqrt{n_1 + n_2}} \quad [8]$$

(Note that S<sub>1</sub> is the value obtained above in (2).)

- (10) Set the lower control limit (LCL<sub>2</sub>) to,

$$LCL_2 = SSD(m_1) - tSE(\bar{X}_2) \quad [9]$$

where t has the value obtained in (5) and SSD(m<sub>1</sub>) is sample size discount determined in (4), and compare the combined sample mean ( $\bar{X}_2$ ) to the lower control limit (LCL<sub>2</sub>) to determine one of the following:

- (i) If the mean of the combined sample ( $\bar{X}_2$ ) is less than the lower control limit (LCL<sub>2</sub>), the basic model is not compliant and testing is at an end.
- (ii) If the mean of the combined sample ( $\bar{X}_2$ ) is equal to or greater than the lower control limit (LCL<sub>2</sub>), the basic model is in compliance and testing is at an end.

[76 FR 12451, Mar. 7, 2011; 76 FR 24781, May 2, 2011]

**PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS**

**Subpart A—General Provisions**

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- 430.3 Materials incorporated by reference.
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**Subpart B—Test Procedures**

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