[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 431

[Docket No. EERE-2011-BT-TP-0024]

RIN: 1904-AC46

Energy Conservation Program: Alternative Efficiency Determination Methods, Basic Model Definition, and Compliance for Commercial HVAC, Refrigeration, and WH Equipment

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Final rule.

SUMMARY: The U.S. Department of Energy (DOE) is revising its existing regulations governing the use of particular methods as alternatives to testing for the purposes of certifying compliance with the applicable energy conservation standards and the reporting of related ratings for commercial and industrial equipment covered by EPCA. These regulations arose from a negotiated rulemaking effort on issues regarding certification of commercial heating, ventilating, air-conditioning (HVAC), water heating (WH), and refrigeration equipment. In addition, DOE is amending the compliance dates for the initial certification of commercial HVAC, WH, and refrigeration equipment.

DATES: *Effective Dates:* The amendments to 10 CFR 429.42, 429.43, 429.44, 429.70, and Part 431 are effective **[INSERT DATE 30 days AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The amendments to 10 CFR 429.12 are effective **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: This rulemaking can be identified by docket number EERE-2011-BT-TP-0024 and/or Regulatory Identification Number (RIN) 1904-AC46.

Docket: For access to the docket to read background documents, or comments received, go to the *Federal eRulemaking Portal* at www.regulations.gov.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

I. Authority and Background

A. Authority

Title III of the Energy Policy and Conservation Act of 1975, as amended ("EPCA" or, in context, "the Act") sets forth a variety of provisions designed to improve energy efficiency. Part A of Title III (42 U.S.C. 6291–6309) provides for the Energy Conservation Program for Consumer Products Other Than Automobiles. The National Energy Conservation Policy Act (NECPA), Pub. L. 95-619, amended EPCA to add Part A-1 of Title III, which established an energy conservation program for certain industrial equipment. (42 U.S.C. 6311–6317)[1] The Department of Energy ("DOE") is charged with implementing these provisions.

Under EPCA, this program consists essentially of four parts: (1) testing; (2) labeling; (3) Federal energy conservation standards; and (4) certification and enforcement procedures. The testing requirements consist of test procedures that manufacturers of covered equipment must use (1) as the basis for certifying to DOE that their equipment complies with the applicable energy conservation standards adopted under EPCA, and (2) for making representations about the efficiency of such equipment. Similarly, DOE must use these test requirements to determine whether the equipment complies with any relevant standards promulgated under EPCA. DOE's existing testing regulations allow manufacturers of commercial heating, ventilation, and air conditioning (HVAC) equipment, water heating (WH) equipment, distribution transformers, electric motors, and small electric motors the use of an alternative efficiency determination

[1] For editorial reasons, Parts B (consumer products) and C (commercial equipment) of Title III of EPCA were re-designated as parts A and A-1, respectively, in the United States Code.

method (AEDM), in lieu of actual testing, to simulate the energy consumption or efficiency of certain basic models of covered equipment under DOE's test procedure conditions.

In addition, sections 6299-6305, and 6316 of EPCA authorize DOE to enforce compliance with the energy and water conservation standards (all non-product specific references herein referring to energy use and consumption include water use and consumption; all references to energy efficiency include water efficiency) established for certain commercial equipment. (42 U.S.C. 6316 commercial equipment) DOE has promulgated enforcement regulations that include specific certification and compliance requirements. *See* 10 CFR part 429; 10 CFR part 431, subparts B, U, and V.

B. Background

On March 7, 2011, DOE published a final rule in the Federal Register that, in part, modified the requirements regarding manufacturer submission of compliance statements and certification reports to DOE (hereafter referred to as the March 2011 Final Rule). 76 FR 12421. As part of this rule, DOE imposed new or revised reporting requirements for some types of covered products and equipment, including a requirement that manufacturers submit annual reports to the Department certifying compliance of their basic models with applicable standards. See 76 FR 12428–12429 for more information.

In response to the initial deadline for certifying compliance imposed by the March 2011 Final Rule on commercial HVAC, refrigeration, and WH equipment manufacturers, certain manufacturers of particular types of commercial and industrial equipment stated that, for a

variety of reasons, they would be unable to meet that deadline. DOE initially extended the deadline for certifications for commercial HVAC, WH, and refrigeration equipment in a final rule published June 30, 2011 (hereafter referred to as the June 2011 Final Rule). 76 FR 38287 (June 30, 2011). DOE subsequently extended the compliance date for certification by an additional 12 months to December 31, 2013, for these types of equipment (December 2012 Final Rule) to allow, among other things, the Department to explore the negotiated rulemaking process for setting requirements for these equipment categories. 77 FR 72763.

In the summer of 2012, DOE had an independent convener evaluate the likelihood of success, analyzing the feasibility of developing certification requirements for commercial HVAC, WH, and refrigeration equipment (not including walk-in coolers and freezers) through consensus-based negotiations among affected parties. In October 2012, the convener issued his report based on a confidential interview process involving forty (40) parties from a wide range of commercial HVAC, WH, and refrigeration equipment interests. Ultimately, the convener recommended that, with the proper scope of issues on the table surrounding commercial HVAC, WH, and refrigeration equipment certification, a negotiated rulemaking appeared to have a reasonable likelihood of achieving consensus based on the factors set forth in the Negotiated Rulemaking Act because the interviewed parties believed the negotiated rulemaking was superior to notice and comment rulemaking for certification-related issues. Additional details of the report can be found at https://www1.eere.energy.gov/buildings/appliance_standards/pdfs/convening_report_hvac_cre_1.pdf.

On February 26, 2013, members of the Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) unanimously decided to form a working group to engage in a negotiated rulemaking effort on the certification of commercial HVAC, WH, and refrigeration equipment. A notice of intent to form the Commercial Certification Working Group (Working Group) was published in the **Federal Register** on March 12, 2013, to which DOE received 35 nominations. 78 FR 15653. On April 16, 2013, the Department published a notice of open meeting that announced the first meeting and listed the 22 nominees that were selected to serve as members of the Working Group, in addition to two members from ASRAC, and one DOE representative. 78 FR 22431. The members of the Working Group were selected to ensure a broad and balanced array of stakeholder interests and expertise, and included efficiency advocates, manufacturers, a utility representative, and third-party laboratory representatives.

AEDMs are computer modeling or mathematical tools that predict the performance of non-tested basic models. They are derived from mathematical models and engineering principles that govern the energy efficiency and energy consumption characteristics of a type of covered equipment. These computer modeling and mathematical tools, when properly developed, can provide a relatively straight-forward and reasonably accurate means to predict the energy usage or efficiency characteristics of a basic model of a given covered product or equipment and reduce the burden and cost associated with testing.

Where authorized by regulation, AEDMs enable manufacturers to rate and certify their basic models by using the projected energy use or energy efficiency results derived from these simulation models in lieu of testing. DOE has authorized the use of AEDMs for certain covered

products and equipment that are difficult or expensive to test in an effort to reduce the testing burden faced by manufacturers of expensive or highly customized basic models. DOE's regulations currently permit manufacturers of commercial HVAC, WHs, distribution transformers, electric motors, and small electric motors to use AEDMs to rate their non-tested basic models (and combinations, where applicable) provided they meet the Department's regulations governing such use.

Initially, DOE undertook a conventional rulemaking to consider expanding and revising its regulations for AEDMs. On April 18, 2011, DOE published a Request for Information (hereafter referred to as the April 2011 RFI). 76 FR 21673. The April 2011 RFI requested suggestions, comments, and information relating to the Department's intent to expand and revise its existing AEDM and ARM requirements. In response to comments it received on the April 2011 RFI, DOE published a Notice of Proposed Rulemaking (NOPR) in the **Federal Register** on May 31, 2012 (hereafter referred to as the May 2012 NOPR). 77 FR 32038. DOE proposed to permit AEDM-based ratings and certifications for additional types of equipment, such as commercial refrigeration equipment (CRE), automatic commercial ice makers (ACIMs), beverage vending machines (BVMs), and walk-in cooler and freezer (WICF or walk-in) refrigeration systems. 77 FR 32055. DOE also proposed a number of requirements for manufacturers to meet to use an AEDM and laid out a method that DOE would employ to determine if an AEDM had been used appropriately by a manufacturer -- along with the consequences if it had not. 77 FR 32055-32056.

During the Working Group's first meeting, Working Group members voted to expand the scope of the negotiated rulemaking efforts to include developing methods of estimating equipment performance based on AEDM simulations. The issues discussed by the various participants during the negotiations with DOE were those raised by the commenters in response to the May 2012 NOPR. The discussion of those issues in the negotiated rulemaking and the consensus reached are summarized in two documents included in the docket of this final rule and constitute DOE's response to the comments on the May 2012 NOPR. The documents discuss the particular elements that the AEDM simulations for each equipment should address and other related considerations of note, including potential basic model definitions, test procedure issues, the treatment of certain features, and certification of these equipment. See http://www.regulations.gov/#!docketBrowser;rpp=25;po=0;dct=SR;D=EERE-2013-BT-NOC-0023.

As required, the Working Group submitted an interim report to ASRAC on June 26, 2013, summarizing the group's recommendations regarding AEDMs for commercial HVAC, WH, and refrigeration equipment. The interim report to ASRAC can be found at http://www.regulations.gov/#!documentDetail;D=EERE-2013-BT-NOC-0023-0046. ASRAC subsequently voted unanimously to approve the recommendations in the interim report for AEDMs. Subsequently, the Working Group submitted a final report on August 30, 2013, summarizing the Working Group's recommendations for model grouping, certification requirements and deadlines. That report also detailed the features to be excluded from certification, verification, and enforcement testing as long as specific conditions were met. ASRAC voted unanimously to approve the recommendations in the final report.

On October 22, 2013, the Department published in the **Federal Register** a Supplemental Notice of Proposed Rulemaking regarding AEDMs, basic model definitions, and the compliance process for commercial HVAC, refrigeration, and WH equipment (AEDM SNOPR). 78 FR 62472. DOE proposed the Working Group's recommendations in the AEDM SNOPR, without modification, for AEDMs, basic model definitions, and the initial compliance date for certification. DOE will be addressing the remaining recommendations of the Working Group regarding certification requirements, and for the treatment of specific features when testing, in a separate rulemaking or guidance document. DOE will also be addressing the AEDM proposals of the May 2012 NOPR for BVM, ACIM and WICFs in a separately supplemental notice of proposed rulemaking.

II. Discussion of Specific Revisions to DOE's Regulations for Alternative Efficiency Determination Methods and Alternative Rating Methods

On May 14-15, 2013, the Working Group held a two-day meeting at the U.S. Department of Energy's headquarters in Washington, DC. Sixty-nine interested parties, including members of the Working Group, attended. A more detailed account of the discussions and recommendations can be found in the Working Group meeting transcripts, which are located at http://www.regulations.gov/#!docketDetail;D=EERE-2013-BT-NOC-0023.

As noted above, DOE published the Working Group's recommendations in an SNOPR on October 22, 2013, and received comments from 14 stakeholders including manufacturers,

trade associations, advocacy groups, and a utility association. Table II.1 lists the entities that submitted comments and their affiliation. These comments are discussed in more detail below, and the full set of comments can be found at: http://www.regulations.gov/#!docketDetail;dct=FR%252BPR%252BN%252BO%252BSR%252BPS;rpp=25;po=0;D=EERE-2011-BT-TP-0024.

Table II.1: Stakeholders that Submitted Comments on the SNOPR

Name	Acronym	Organization Type
AAON, Inc.	AAON	Manufacturer
American Boiler Manufacturers Association	ABMA	Industry Trade Group
Air-Conditioning, Heating, and Refrigeration Institute	AHRI	Industry Trade Group
American Council for an Energy Efficient Economy, Appliance Standards Awareness Project, Earthjustice, and Northwest Energy Efficiency Alliance	ACEEE, ASAP, Earthjustice, NEEA (Joint Comment)	Advocacy Group
Florida Natural Gas Association	FNGA	Utility Association
Goodman Global, Inc.	Goodman	Manufacturer
Hoshizaki America, Inc.	Hoshizaki America	Manufacturer
Hussmann Corporation	Hussmann	Manufacturer
Lennox International, Inc.	Lennox	Manufacturer
Lochinvar, LLC	Lochinvar	Manufacturer
Mitsubishi Electric US, Inc.	MEUS	Manufacturer
Modine Manufacturing Company	Modine	Manufacturer
Traulsen Refrigeration	Traulsen	Manufacturer
Zero Zone, Inc.	Zero Zone	Manufacturer

DOE received general comments on the proposals in the AEDM SNOPR. Goodman, MEUS, and AHRI expressed support for the AEDM SNOPR. (Goodman, No. 0086.1 at p.1; MEUS, No. 0083.1 at p.1; AHRI, No.0076.1 at p.1) MEUS stated that the proposals in the AEDM SNOPR were representative of the Working Group's agreements. (MEUS, No. 0083.1 at p.1) The Joint Comment supported the AEDM SNOPR to the extent that it represented the

consensus agreements reached by the Working Group. The Joint Comment also recommended that DOE conduct a review of the AEDM process two years after implementation to assess whether the process is fair and prevents undue gaming of equipment ratings. (Joint Comment, No. 0081.1 at p.2)

While DOE appreciates the Joint Comment's recommendation, DOE currently does not plan at this time to re-evaluate the AEDM regulations in two years. DOE may reconsider this decision depending on whether new circumstances present themselves that may merit a review of these regulations.

Goodman made a general recommendation that in the regulatory text pertaining to AEDMs it is unnecessary to state "validated AEDM" because the regulations require all AEDMs to be validated before a manufacturer may use an AEDM for certification purposes. (Goodman, No. 0086.1 at p. 2) DOE agrees with Goodman and will remove the term "validated."

A. General Issues

1. Pre-Approval

The Working Group unanimously recommended that DOE not require pre-approval for AEDMs for commercial HVAC, WH, or refrigeration equipment. The SNOPR adopted this approach. 78 FR 62472. DOE did not receive any adverse comments on this proposal and thus DOE is not adopting a pre-approval process for AEDMs for the aforementioned equipment.

2. Applicable Equipment

The Working Group unanimously recommended the following types of covered equipment be allowed to use AEDMs.

- Commercial HVAC Equipment
    - Commercial packaged air-conditioning and heating equipment (air-cooled, water-cooled, evaporatively-cooled, and water-source)
    - Packaged terminal air conditioners and heat pumps
    - Computer room air conditioners
    - Single package vertical air conditioners and heat pumps
    - Variable refrigerant flow systems
- Commercial packaged boilers
- Commercial warm-air furnaces
- Commercial WH Equipment
    - Commercial electric storage water heaters
    - Commercial gas-fired and oil-fired storage water heaters
    - Commercial gas-fired and oil-fired instantaneous water heaters greater than or equal to 10 gallons
    - Commercial gas-fired and oil-fired hot water supply boilers greater than or equal to 10 gallons
    - Commercial gas-fired and oil-fired instantaneous water heaters less than 10 gallons
    - Commercial gas-fired and oil-fired hot water supply boilers less than 10 gallons

    - Commercial unfired hot water storage tanks
- Commercial Refrigeration Equipment

DOE currently allows the use of AEDMs for commercial HVAC and WH equipment. DOE proposed in the SNOPR to also permit manufacturers to use AEDMs when certifying CRE basic models. 78 FR 62472, 62474. Zero Zone stated that it was pleased that DOE plans to allow CRE manufacturers to use AEDMs because it would be impossible for manufacturers to evaluate the efficiency of all of their models without AEDMs. (Zero Zone, No. 0077.1 at p.1) Lennox and Hoshizaki American both supported extending AEDMs to commercial refrigeration equipment. (Lennox, No. 0080.1 at p.2; Hoshizaki America, No. 0087.1 at p.1) In this final rule, DOE is allowing CRE manufacturers to certify their basic models using AEDMs.

Lennox also recommended that DOE allow manufacturers to use AEDMs when certifying walk-in refrigeration systems. (Lennox, No. 0080.1 at p. 4) DOE notes that it has already proposed to allow the use of AEDMs for walk-in refrigeration systems in the May 2012 NOPR. See 77 FR 32038, 32041. The issue of using AEDMs for walk-ins is outside the scope of this notice, but the Department will continue to address this issue separately.

Lochinvar requested that DOE allow water volume for commercial water heaters to be calculated by an AEDM and have a 5 percent tolerance. (Lochinvar, No. 0088.1 at p. 1) DOE notes that AEDMs are used specifically for determining the energy efficiency or energy consumption of covered equipment but expects that capacity or volume measurements may be generated as a step in determining the model's applicable efficiency rating. DOE did not propose

tolerances on measurements other than energy efficiency descriptors, thus this issue is beyond the scope of this rulemaking.

B. Validation

Prior to use for certifying the energy efficiency or energy use of a basic model, DOE generally requires AEDMs to be validated. The Working Group recommended the following validation process for AEDMs, which DOE proposed in the AEDM SNOPR. 78 FR 62472, 62474.

1. Number of Tested Units Required for Validation

To validate an AEDM, a manufacturer must select at least the minimum number of basic models, specified in Table II.2 through Table II.6, for each of the validation classes to which the AEDM will apply. Each selection represents a single test conducted in accordance with the DOE test procedure (TP) or applicable DOE TP waiver at a manufacturer's testing facility or a third-party testing facility, whose test result is directly compared to the result for that model from the AEDM.

Table II.2: Commercial HVAC Validation Classes

Validation Class	Minimum Number of Basic 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
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	2 Basic Models

HPs, All Capacities	
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

Table II.3: Commercial Water Heaters Validation Classes

Validation Class	Minimum Number of Basic Models that Must be Tested
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

Table II.4: Commercial Packaged Boilers Validation Classes

Validation Class	Minimum Number of Basic Models that Must be Tested
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

Table II.5: Commercial Furnaces Validation Classes

Validation Class	Minimum Number of Basic Models that Must be Tested
Gas-fired Furnaces	2 Basic Models
Oil-fired Furnaces	2 Basic Models

Table II.6: Commercial Refrigeration Equipment Validation Classes

Validation Class*	Minimum Number of Basic Models that Must be Tested
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

* 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.

A manufacturer may elect to develop multiple AEDMs per validation class and each AEDM may span multiple validation classes; however, the minimum number of tests must be maintained per validation class for each AEDM a manufacturer chooses to develop and use. An AEDM may be applied to any individual model within the applicable validation classes at the manufacturer's discretion. All documentation of test results for the models used to validate each AEDM, the AEDM results, and the subsequent comparisons to the AEDM must be maintained as part of both the test data underlying the certified rating and the AEDM validation package pursuant to 10 CFR 429.71. 78 FR 62472, 62474.

DOE received two comments in support of the minimum number of basic models required for each validation class. AAON commented in support of the number of validation tests for commercial HVAC equipment. (AAON, No. 0082.1 at p.1) Zero Zone agreed with the number of basic models required for each specific validation class. (Zero Zone, No. 0077.1 at p.2)

Hussmann requested that DOE clarify in the preamble that two tests, one per basic model, are required at a minimum for each validation class. (Hussmann, No. 0079 at p. 1) DOE agrees with Hussmann that DOE intended that the proposal indicate that only one sample is required to

be tested for each basic model selected to validate an AEDM. The result of each test must be directly compared to the result for that model from the AEDM.

DOE has modified the language in paragraph 429.70(a) to remove language that appeared to contradict this provision. Paragraph 429.70(a) now states that testing must be conducted in accordance with 429.11. Section 429.11 states that the general rule is that two units must be tested but that the testing requirement may be modified by another, more specific provision. Therefore, for equipment types permitted to use an AEDM that were not subject to the negotiated rulemaking, the default rule of testing two units still applies. For the equipment types that were subject to the negotiated rulemaking, the paragraphs directly applicable to those equipment types state that only one unit of each basic model must be tested. DOE also notes, as was often discussed during Working Group meetings, that these testing limits are absolute minimums. A manufacturer must ensure that its AEDM(s) accurately predict performance for the full range of equipment classes to which the manufacturer is applying the AEDM.

ABMA commented that existing test data for large commercial packaged, built-to-order boilers are based on ASME PTC-4.1 instead of the DOE test procedure. ABMA requested that DOE grant a blanket waiver allowing these types of commercial boilers to be rated to ASME PTC-4.1 instead of the DOE test procedure so that AEDMs can be developed around this existing data. Additionally, ABMA suggested that large commercial packaged, built-to-order boilers be reclassified as "industrial" boilers to help distinguish these equipment types from smaller, high-volume boilers. (ABMA, No. 0075 at p.1) DOE appreciates ABMA's suggestion, but clarifies that each manufacturer of a large commercial packaged, built-to-order boilers must

individually submit a petition for waiver as outlined in 10 CFR 431.401. Pursuant to the test procedure waiver regulations, DOE cannot issue a blanket waiver for a test procedure waiver. While it is outside the scope of this rulemaking to consider a petition for waiver and propose alternative methods of testing requirements for commercial packaged boilers, DOE currently has an open rulemaking for commercial boilers where it may address the testing issues.

As DOE did not receive adverse comments regarding the AEDM SNOPR proposal for the minimum number of basic models, specified in Table II.2 through Table II.6, required to validate an AEDM, DOE is adopting these requirements as part of today's final rule.

2. Tolerances

To validate the AEDM, the test results from each model required to be tested according to the validation requirements described in the previous section must be compared to the simulated results from the applicable AEDM. The Working Group recommended that for energy consumption metrics, the AEDM result for a model must be greater than or equal to 95 percent of the tested results for that same model. Similarly, for energy efficiency metrics, the AEDM results for a model would need to be less than or equal to 105 percent of the tested results for that same model. In the AEDM SNOPR, DOE proposed this one-sided 5 percent tolerance for AEDM validation for all commercial HVAC, WH, and refrigeration equipment. 78 FR 62472, 62476.

DOE received several comments on validation tolerances. AAON commented in support of the one-sided tolerances for comparing test results to the AEDM output proposed in the

SNOPR. (AAON, No. 0082.1 at p.1) Zero Zone commented that DOE should provide tolerances for AEDMs, but requested DOE modify the regulatory language to state that test results used to validate an AEDM can be less than the energy efficiency standard or more than the energy consumption standard by the proposed 5 percent tolerance. (Zero Zone, No. 0077.1 at p. 1) DOE does not agree with Zero Zone. All test results used to validate an AEDM must at least meet the applicable energy conservation standard – Zero Zone's approach would not ensure the applicable standard would be met.

Hussmann commented that although the Working Group agreed on a one-sided 5 percent tolerance when comparing the validation test results to the AEDM output, this tolerance is only acceptable if a manufacturer can control the test conditions. Hussmann stated that inherent component tolerances, fluctuation of the internal average temperature, and fluctuation of the test room conditions could produce test results that vary more than 5 percent from the rating produced by an AEDM. (Hussmann, No.0079 at p.1) In response to Hussmann's comment, DOE clarifies that validation testing refers only to the requirements manufacturers must satisfy to confirm the functionality of an AEDM before such AEDM can be used to produce certified ratings. DOE did not propose any requirements on the test labs or test process for validation testing. A manufacturer may conduct its own validation testing within its facilities and control the test conditions to the extent allowable by the applicable test procedure. Conversely, verification testing, which is discussed in more detail in section II.C, is testing conducted by the Department as a means of checking the performance of an equipment model distributed in commerce. Verification testing is conducted at a third-party laboratory unless extenuating circumstances prevent third-party testing in which case the Department may allow testing at a

manufacturer's lab. DOE has added regulatory text to clarify this issue. DOE notes Hussmann's concern that fluctuations in test conditions can produce test results that may vary more than 5 percent from the estimated performance rating produced by an AEDM. However, this concern is more germane to verification testing and will be discussed in more detail in section II.C.4.

In today's final rule, DOE is adopting the one-sided five percent tolerance for AEDM validation. As previously stated, for energy consumption metrics, the AEDM result for a model must be greater than or equal to 95 percent of the tested results for that same model. For energy efficiency metrics, the AEDM results for a model must be less than or equal to 105 percent of the tested results for that same model. In addition, AEDM results must meet the applicable standard.

3. Certified Ratings

For each basic model of commercial HVAC, WH, and refrigeration equipment distributed in commerce, manufacturers must determine the certified rating based on testing or use of a validated AEDM. DOE's current regulations provide manufacturers with some flexibility in rating each basic model by allowing the manufacturer the discretion to rate conservatively. The Working Group recommended that in the case of models rated with energy consumption metrics, those values must use a certified rating less than or equal to the applicable Federal standard and greater than or equal to the model's AEDM result. For energy efficiency metrics, each model's certified rating must be less than or equal to the model's AEDM result and greater than or equal to the applicable Federal standard. DOE proposed in the AEDM SNOPR to

retain the flexibility provided by its current regulatory approach and proposed the Working Group's recommendation without modification. 78 FR 62472, 62476.

Lennox and Zero Zone agreed that DOE should allow manufacturers to rate their products conservatively. (Lennox, No. 0080.1 at p. 3; Zero Zone, No. 0077.1 at p.3) AAON also supported the concept of rating conservatively based on AEDM results as long as such ratings are better than the applicable energy conservation standards. (AAON, No. 0082.1 at p. 1) DOE received no adverse comments and thus is continuing to allow manufacturers to rate conservatively.

C. DOE Verification

Once a basic model has been distributed in commerce, DOE may select any model and verify the equipment's performance at any time. 10 CFR 429.104. The Working Group recommended the process described below in sections II.C.1 through II.C.7 for DOE's verification of certified ratings determined by an AEDM. DOE proposed this process in the AEDM SNOPR. 78 FR 62472, 62476.

DOE received several comments on the verification process. Specifically, manufacturers commented on existing regulatory text that allows the Department to verify the performance of an AEDM used for certified ratings by observing the operation of the AEDM, collecting analyses of previous simulations, and/or conducting testing on units certified using an AEDM. Traulsen requested an explanation as to the purpose of this text. (Traulsen, No. 0085.1 at p. 2) AHRI

commented that although this regulatory text currently exists in the CFR, the AEDM validation requirements recommended by the Working Group makes these regulations unnecessary and redundant. AHRI recommended that DOE remove this text in its entirety. (AHRI, No. 0076.1 at p. 2)

DOE disagrees that these provisions are redundant with the validation requirements. The validation requirements provide for a manufacturer to ensure that its AEDM is functioning properly prior to using the AEDM. The verification testing requirements allow DOE to ensure that a specific basic model is properly rated using the AEDM. These provisions provide a mechanism for DOE to verify that a manufacturer is using its AEDM in conformance with the regulations.

1. Witness Testing

Currently, DOE's regulations do not permit a manufacturer to be present for DOE-initiated testing to verify equipment performance of a given basic model. The Working Group considered a variety of approaches to ensure manufacturers have an opportunity to witness the test set-up for verification testing of a basic model.

DOE received a number of comments regarding its proposal. Some comments supported the witness testing process proposed in the SNOPR. See AAON, No. 82.1 at p.1 and Zero Zone, No. 0077.1 at p. 3) Zero Zone added that a manufacturer may not be able to witness the initial

verification test unless it knows in advance which units will be tested. (Zero Zone, No. 0077.1 at p. 3)

Other commenters, however, raised specific issues regarding the proposal. Hoshizaki America, for example, disagreed with the proposed requirement that up to 10 percent of a manufacturer's certified basic models be subjected to witness testing because the affected units are so complex that slight changes could result in separate basic models. Instead, Hoshizaki America suggested DOE collaborate with existing bodies that test annually like the EPA's ENERGY STAR program. (Hoshizaki, No. 0087.1 at p. 1) Hussmann noted that CRE manufacturers have concerns about the expertise of third-party test facilities to either operate the CRE units under test or to conduct the DOE test procedure. (Hussmann, No. 0079.1 at p. 2)

Hussmann also remarked that manufacturers are responsible for the expense of any retesting needed. (Hussmann, No. 0079.1 at p. 2)

DOE has given consideration to the concerns raised by these commenters. In reviewing their comments, DOE now believes that its proposed regulatory text, which was based in large part on the Working Group's recommendation, may not have been sufficiently clear. Accordingly, DOE has decided to not finalize any regulation on witness testing at this time. To ensure that the regulatory text adequately reflects the recommendation of the Working Group, DOE will propose revised regulatory text for this particular aspect of the rule in order to provide additional clarification regarding the witness testing process. As part of this effort, DOE will provide interested parties with additional time within which to file comments before these

particular provisions would be finalized and incorporated into DOE's regulations. DOE will issue a separate notice to address specifically this issue.

DOE notes that the witness testing provisions are triggered by DOE performing verification testing, which ensures that certified ratings are within specified tolerances of test results. DOE notes that manufacturers are not required to certify these equipment types for six to eighteen months (depending on equipment type) plus an additional six month enforcement grace period; therefore, DOE will have sufficient time to adopt final witness testing provisions before these verification testing procedures would be triggered.

2. Verification Process

In the AEDM SNOPR, DOE proposed the Working Group's recommended verification process that DOE will use to assess a unit's performance through third-party testing. Under this approach, DOE will begin the verification process by selecting a single unit of a given basic model for testing either from retail or by obtaining a sample from the manufacturer, with a preference for a unit from retail. DOE will select a third-party testing laboratory at its discretion to test the unit selected. The lab will adhere to the requirements recommended by the Working Group described in section II.C.3. As discussed in section II.C.1, DOE will address the witness testing arrangements in a subsequent rulemaking. In all cases, the Department will be responsible for the logistics of arranging a witnessed test, and the laboratory is not allowed to communicate directly with the manufacturer. 78 FR 62472, 62476.

Further, under this process, the manufacturer will provide any additional information regarding test set up or testing to DOE through the certification process in pdf format. (This provision will be addressed in a separate rulemaking on commercial certification of HVAC, WH, and refrigeration equipment.) DOE will provide this information to the test facility as long as the additional instructions do not conflict with the DOE test procedure or an applicable DOE test procedure waiver. The test facility may not use any additional information during the testing process that has not been approved by DOE or shipped in the packaging of the unit. If needed, the test facility may request from DOE additional information on test set up, installation, or testing. Upon receiving a request from the test facility for additional information, DOE may hold and coordinate a meeting with the manufacturer and the test facility to discuss the additional details needed for testing. Additional instructions may be given to the test facility as agreed upon by DOE and the manufacturer. At no time may the test facility discuss DOE verification testing with the manufacturer without the Department present. 78 FR 62472, 62476.

Zero Zone agreed with the Department's proposal since, in its view, manufacturers should be able to provide additional test and set up information for third-party labs. (Zero Zone, No. 0077.1 at p. 3) Goodman, which also largely agreed with DOE's proposal, suggested that DOE amend the proposed regulatory text to allow a third-party test lab to use any manual that a manufacturer submits in connection with its certification report for verification testing. Goodman recommended this amendment to account for the possibility of a literature change after the initial production of the unit. (Goodman, No. 0086.1 at p. 2) As discussed in the Working Group, DOE will use supplementary information submitted with the certification report as long as the

information was submitted to DOE before the unit was selected for verification testing. DOE will not use manuals that only reside on a manufacturer's website; DOE will only use supplementary information that is submitted with the certification report. DOE also notes that the supplementary information submitted with the certification report is only one of the types of information to which DOE will refer when testing. In no case shall the contents of these supplemental items displace the provisions specified in the DOE test procedure..

If a unit is tested and determined to fall outside the rating tolerances described in section II.C.4, DOE will notify the manufacturer. The manufacturer will receive all documentation related to the test set up, test conditions, and test results for the unit if the unit falls outside the rating tolerances. At that time, a manufacturer may present all claims regarding any issues directly associated with the test and initiate a discussion regarding retesting. If the manufacturer was not on-site for the initial test, the manufacturer may request a retest of the same unit, and DOE and the manufacturer can be present for the retest. DOE will not retest 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. 78 FR 62472, 62476.

Lennox commented that DOE should clarify that the AEDM verification process codified in 429.70(c)(6) is based on a "single unit" unless a manufacturer has elected to have verification tests for up to 10 percent of the manufacturer's certified basic models rated with an AEDM. DOE concurs that an invalid rating can be determined by conducting verification testing on a single unit; however, to clarify, DOE did not propose to permit a manufacturer to have 10 percent of its basic models tested using the verification testing process. Instead, DOE proposed

to permit a manufacturer to designate up to 10% of its basic models that were certified with an AEDM for witness testing if selected for verification testing. As discussed in section II.C.1, DOE will address the witness testing arrangements in a subsequent rulemaking.

Lennox also requested that DOE clarify that the verification provisions and tolerances proposed in this section and in section II.C.4, respectively, supersede and replace those in 10 CFR 429.110 with respect to a model rated using an AEDM. (Lennox, No. 0080.1 at p. 2) DOE notes that these proposals do not replace the enforcement regulatory text to which Lennox is referring. The enforcement regulations allow DOE to determine if a model complies with the applicable standard. The verification process outlined in today's final rule is specifically for determining if a unit was certified with a valid rating, i.e., that the test results for the basic model that was verification tested are within the permitted tolerance range from the AEDM-derived performance rating. The verification process also serves to ensure that the AEDM is generating valid results across a range of basic models.

ABMA commented that, as long as no efficiency or energy use criteria have changed, DOE should not require a retest for built-to-order packaged boilers on a periodic basis as there are enough checks and balances built into the boiler manufacturing system. Alternatively, company officers could issue a statement to DOE stating that no efficiency-related changes have been made within a certain period of time. (ABMA, No. 0075.1 at p. 2) DOE understands ABMA's comment to mean that no verification testing is necessary for built-to-order boilers. While it may be true that the boiler industry has a number of safeguards to ensure consistent energy performance from built-to-order boilers, the Department still reserves the right to verify a

boiler's certified efficiency. DOE is not requiring boiler manufacturers to periodically retest units for the purposes of certification or AEDM validation, and the Department already requires manufacturers to submit a compliance statement with their annual certification that states, among other things, that all basic models included in the certification report comply with the applicable energy conservation standards. 10 CFR 429.12(c). DOE also notes that the certification deadline for these products is being delayed an additional 18 months as part of this final rule.

In today's final rule, DOE is adopting the verification process outlined in this section.

3. Verification Lab Requirements

The Working Group recommended that all AEDM verification tests should be conducted in a third-party testing facility of DOE's choice. Commercial equipment that cannot be tested at an independent third-party facility may be tested at a manufacturer's facility upon DOE's request. DOE proposed the Working Group's recommendation in the AEDM SNOPR. 78 FR 62472, 62477.

FGNA supported the Department's proposal that verification testing should generally take place at a third-party facility but should allow for equipment to be tested at the manufacturer's facility if the equipment cannot be tested at a third-party laboratory. (FGNA, No. 0085.1 at p. 2) AAON also agreed that verification testing should be conducted at a third-party facility qualified to conduct the specific test procedure. (AAON, No. 0082.1 at p. 2) Goodman encouraged DOE to utilize laboratories that are ISO 17025-certified to reduce the probability of

questionable or disputed test results from incorrect testing or test set-ups. (Goodman, No. 0086.1 at p.1) Regarding Goodman's recommendation, DOE notes that 10 CFR 429.110(a)(3) requires all DOE enforcement testing be performed at a lab accredited to ISO 17025:2005(E). While this requirement does not preclude verification testing from occurring at an unaccredited laboratory, DOE generally will use an ISO 17025:2005(E) accredited lab so that any verification test results could be used as part of an enforcement testing sample, if necessary, to reduce redundant testing. Therefore, DOE is not specifying that verification testing must occur at an ISO 17025:2005(E) accredited lab.

Zero Zone and Hoshizaki America recommended that for verification testing, a manufacturer's test facilities should be the primary facility to conduct this testing (rather than a third-party lab), in part to reduce cost. (Zero Zone, No. 0077.1 at p. 3; Hoshizaki, no. 0087.1 at p. 1) DOE does not agree that verification testing at a manufacturer's test facility should be preferred over testing at a third-party lab. Testing at a third-party lab inherently offers impartiality in the test results, which a manufacturer-run test facility does not.

ABMA commented that the proposal to require all testing to be performed at an ISO-certified, third-party test facility or witnessed by personnel from such a facility has the potential to pose logistical problems. (ABMA, No. 0075.1 at p. 2) DOE did not propose to require all testing to be performed at an ISO-accredited, third-party test facility or witnessed by personnel from such a facility. As discussed in this section, DOE proposed to conduct verification testing at a third-party test facility but does not require that facility to be ISO-accredited.

DOE is adopting the Certification Working Group recommendation that all AEDM verification tests should be conducted in a third-party testing facility of DOE's choice and commercial equipment for which there is no third-party lab capable of conducting testing may be tested at a manufacturer's facility upon DOE's request.

4. Verification Tolerances

DOE proposed in the AEDM SNOPR that to verify the certified rating of a given model, the test results from a single unit test of the model will be compared to the certified rating in accordance with the tolerances set forth below. For energy consumption metrics, the Working Group recommended:

$$\text{Test Result} \leq \text{Certified Rating} \times (1 + \text{Applicable Tolerance})$$

For energy efficiency metrics, the Working Group recommended:

$$\text{Test Result} \geq \text{Certified Rating} \times (1 - \text{Applicable Tolerance})$$

Table II.7. Rating Tolerances

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)
	Energy Efficiency Ratio	10% (0.1)
Air-Cooled, Split and Packaged ACs	Energy Efficiency Ratio	5% (0.05)

and HPs greater than or equal to 65,000 Btu/h Cooling Capacity and Less than 760,000 Btu/h Cooling Capacity	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)
Evaporatively-Cooled, Split and Packaged ACs and HPs, All Capacities	Energy Efficiency Ratio	5% (0.05)
	Coefficient of Performance	5% (0.05)
	Integrated Energy Efficiency Ratio	10% (0.1)
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)

DOE received several comments regarding the confidence level for HVAC equipment. Goodman commented in support of the verification tolerances in the SNOPR but commented that HVAC equipment should have a 90% confidence level due to the uncertainty in psychrometric testing. (Goodman, No. 0086.1 at p. 2) MEUS and AHRI also commented that DOE should change the confidence level for HVAC equipment from 95% to 90% to match the

confidence level of residential central air conditioners. (MEUS, No. 0083.1 at p. 1) Lennox requested that DOE change the confidence level for the IEER metric from 95% to 90%. (Lennox, No. 0080.1 at p. 3) DOE assumes that the references made by Goodman, AHRI, MEUS, and Lennox to "confidence level" refers to certification testing instead of verification testing because "confidence level" is the term used in 10 CFR 429.43, which applies in the certification context. DOE notes that aspects regarding the certification testing process fall outside the scope of this rulemaking.

AHRI and AAON also recommended that DOE adopt sampling procedures for low volume equipment as discussed in the Working Group meetings. (AHRI, No. 0076.1 at p. 2; AAON, No. 0082.1 at p. 2) DOE intends to address certification testing of low volume equipment and the remaining recommendations from the Working Group in a separate rulemaking. See, infra section IV.

Zero Zone noted that the proposed tolerances are too low to account for variability in products and testing. It asserted that DOE should have tolerances that do not penalize a manufacturer if one verification test does not meet the energy conservation standard plus the AEDM tolerance. Zero Zone recommended that DOE commission a study to evaluate the amount of experimental error in the Department's test procedures, and until its completion, DOE should include an additional 5% test tolerance to account for experimental errors. (Zero Zone, No.0077.1 at pp. 1-3) DOE notes that the verification tolerances proposed in this notice were developed by a Working Group that included representatives of CRE, HVAC, and WH manufacturers, efficiency advocates, a utility representative, and third-party laboratory

representatives. The collective expertise of these different parties helped shape the provisions contained in today's final rule, which reflects the technical expertise of the different industries that will be affected by the rule. Consequently, the tolerance provisions in today's final rule account for the relevant technical factors. As a result, after careful consideration of these factors, DOE believes that the proposed tolerances – which are being adopted in today's rule -- are reasonable and is declining to increase the tolerances by an additional 5% as suggested by Zero Zone.

Hussmann asked what the tolerance level would be to exceed the Federal energy conservation standards. (Hussmann, No. 0079.1 at p. 2) DOE clarifies that a certified rating, calculated in accordance with the applicable sampling plan in part 429 or as determined using an AEDM, must, at a minimum, meet the applicable energy conservation standard. However, a rating will not be deemed invalid by a single unit verification test result as long as the result adheres to the verification tolerances described in this section. This means, for example, for equipment with an energy efficiency standard, a verification result may be less than the efficiency standard level as long it does not fall outside the applicable tolerance level listed in Table II.7. However, DOE may initiate enforcement testing -- in which case, a basic model will be determined compliant or non-compliant with the energy conservation standards based on the applicable enforcement statistics provided in 10 CFR 429.110.

Modine stated that the DOE test procedure for water-source heat pumps does not require part load tests, which result in the integrated energy efficiency ratio (IEER). In its view, DOE should not propose tolerances on IEER ratings. (Modine, No. 0084.1 at p. 1) DOE agrees that, at

this time, part load testing is not required by the DOE test procedure and adds that DOE cannot verify a metric that is not certified to the Department. However, in light of the Working Group's recommended tolerances for part load metrics, the Department is not inclined at this time to remove these tolerances from the approach recommended by Working Group.

Lennox requested DOE clarify whether the tolerances discussed above in this section supersede the tolerances currently found in Appendix B to Subpart C of 10 CFR part 429, with respect to products certified with an AEDM. (Lennox, No. 0080.1 at p. 3) DOE notes that the proposed tolerances do not replace the sampling plan for enforcement testing of covered equipment and certain low-volume covered products as found in 10 CFR part 429, subpart C, appendix B. As discussed in section II.C.2, the regulations on enforcement testing are not superseded by today's verification testing proposals. Enforcement testing is the Department's method to determine if a model complies with the energy conservation standard; in contrast, verification testing determines if a model was rated correctly using an AEDM.

AAON supported the proposed tolerances for product and test uncertainty. (AAON, No. 0082.1 at p. 2). For the reasons stated above, DOE is adopting the tolerances described in this section as recommended by the Working Group.

5. Invalid Rating Process

In those cases where DOE has determined that a basic model's test results fall outside of the tolerances based on the verification process described in sections II.C.1 through II.C.4, the

Working Group recommended that the following process apply when remedying the invalid rating. First, DOE will notify the manufacturer and the manufacturer will have 15 days to select and report one of the following options: (1) conservatively rerate and recertify the model based on the DOE test data only, (2) discontinue the model through the certification process, or (3) conduct additional testing, rerate, and recertify the model in accordance with the sampling provisions of part 429, subpart B, using all additional manufacturer test data and the DOE test data. The manufacturer and DOE will determine the specific date by which the manufacturer must complete the process for correcting the invalid rating, but the process shall not take more than 180 days to complete.

AAON and Zero Zone support the options manufacturers can select to address an invalid rating. (AAON, No. 0082.1 at p. 2; Zero Zone, No. 0077.1 at p. 3) Lennox remarked that DOE should clarify that any notice of noncompliance shall not be issued pursuant to 10 CFR 429.114, with respect to a model rated with an AEDM, until after a manufacturer has been provided an opportunity to respond to an invalid rating as outlined in 429.70(c)(6)(vii). (Lennox, No. 0077.1 at p. 2) DOE notes that an invalid rating, which is determined by verification testing, is not equivalent to a determination of noncompliance. A unit may be found to be noncompliant based on enforcement testing, which is codified in 10 CFR 429.110. As no adverse comments were received regarding the Working Group's recommended process for addressing invalid ratings, DOE will adopt the process in today's final rule.

6. Consequences of an Invalid Rating

The Working Group negotiated the consequences of DOE determining that a rating is invalid for a given basic model based on assessment testing, which DOE proposed in the AEDM SNOPR. If the Department finds that within 24 rolling months a manufacturer has more than one basic model with an invalid rating whose results were derived from the same AEDM, then the manufacturer will be subject to the requirements listed in Table II.8. In general, to continue using the AEDM, if a manufacturer has between two and seven basic models with invalid ratings that were derived from the same AEDM, then the manufacturer must re-validate the AEDM according to the requirements in Table II.8 by conducting new testing of different basic models. If the manufacturer has eight or more basic models with invalid ratings from the same AEDM, then all the basic models to which the AEDM applied must be re-rated with physical testing in accordance with the applicable sampling plans in part 429. 10 CFR 429.11. 78 FR 62472, 62478.

Table II.8. Consequences for Invalid Ratings as Proposed in the SNOPR

Number of Invalid Certified Ratings from the same AEDM within a rolling 24 month period†**	**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.* Adjust the rating 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 subsection (c)(5)(H)(1) must be different tests on different models than the original tests performed under subsection (c)(2).
6	Conduct the minimum number of validation tests for the validation classes to which the AEDM is applied; And Conduct additional 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 subsection (c)(5)(H)(1) must be different tests on different

	models than the original tests performed under subsection (c)(2).
>=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.

*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.
**Where 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.
† 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).

DOE received comments in support of the consequences proposed in the AEDM SNOPR from AAON and Zero Zone. (AAON, No. 0082.1 at p.2; Zero Zone, No. 0077.1 at p.3) Hussmann commented that the penalty for six failures appeared less severe than the penalty for four failures. (Hussmann, No. 0079.1 at p. 2) DOE agrees with Hussmann that the table does not clearly indicate that if a manufacturer has 6 invalid certified ratings from the same AEDM within a rolling 24-month period then the manufacturer must conduct the minimum number of validation tests at a third-party test facility. The manufacturer must conduct additional testing, at least half the minimum number of validation tests for the validation classes to which the AEDM is applied, at either a third-party test facility or at the manufacturer's lab.

Goodman commented that Table II.8 should be modified from "adjust the rating as appropriate" to "adjust the ratings as appropriate." (Goodman, No. 0086.1 at p. 2) DOE agrees with Goodman's suggestion to correct the typographical error. In today's final rule, DOE is adopting the proposed penalties for invalid ratings with Hussmann's and Goodman's suggested modifications as discussed in further detail above.

7. Regaining the Use of AEDMs

If, as a result of eight or more invalid ratings, a manufacturer has lost the privilege of using an AEDM for rating purposes, the manufacturer may regain the ability to use an AEDM by (1) investigating the cause(s) for the failures, (2) identifying the root cause(s) for the failures, (3) taking corrective action to address the root cause(s), (4) validating the AEDM by performing six new tests for each validation class with a minimum of two of the tests performed at a third-party test facility, and (5) obtaining DOE authorization to resume the use of the AEDM. At its discretion, DOE may reduce or waive these requirements, in which case, DOE will provide public notice and a written explanation of the grounds for reducing or waiving the requirements.78 FR 62472, 62478. AAON and Zero Zone commented in support of the process outlined for allowing manufacturers to regain the use of AEDMs. (AAON, No. 0082.1 at p.2; Zero Zone, No. 0077.1 at p. 3) As no adverse comments were received, DOE is adopting this proposed process.

III. Basic Model Definitions

The Working Group recommended amended basic model definitions for commercial refrigeration equipment; commercial warm air furnaces; commercial packaged boilers; and commercial water heaters. Additionally, the Working Group recommended distinct basic model definitions for each type of commercial HVAC equipment, such as packaged terminal air conditioners (PTACs) and heat pumps (PTHPs); small, large, and very large air-cooled commercial package air conditioning and heating equipment; small, large, and very large water-cooled, evaporatively-cooled, and water source commercial package air conditioning and heating

equipment; single package vertical air conditioners and heat pumps (SPVUs); computer room air conditioners; and variable refrigerant flow multi-split air conditioners and heat pumps with capacities greater than 65,000 Btu/h. The AEDM SNOPR presented the basic model definitions by covered equipment type that the Working Group developed and added several clarifications made by DOE to harmonize the wording of the definitions for consistency purposes. These clarifications did not change the meaning of the definitions as agreed upon by the Working Group. 78 FR 62472, 62478.

Goodman commented that DOE added the term "within a single equipment class" to all the definitions, and in some cases this term is not applicable. (Goodman, No. 0086.1 at p. 2) DOE does not agree with Goodman's comment. When evaluating and establishing energy conservation standards, DOE divides covered equipment into equipment classes by the type of energy used or by capacity or other performance-related features that justify a different standard. (42 U.S.C. 6295(q)) Currently, DOE has established a number of different equipment classes for commercial HVAC, WH, and refrigeration equipment in the course of the individual standards rulemakings by considering the type of energy use, capacity, or other performance-related features of the equipment. Each equipment class has a different standard that applies. Thus, DOE does not believe manufacturers are able to group models into basic models that span equipment classes and may have different standards that apply. Consequently, DOE is clarifying that a basic model cannot extend across multiple equipment classes. In today's rule, DOE is adopting the basic model definitions as they were proposed in the AEDM SNOPR.

IV. Discussion of Specific Revisions to the Compliance Date for Certification of Commercial HVAC, WH, and Refrigeration Equipment

In the AEDM SNOPR, DOE proposed the Working Group's recommendation that certification reports must be initially submitted for all basic models distributed in commerce according to the schedule shown in Table IV.1. After the initial certification date, DOE's existing regulations require that manufacturers certify: (1) new basic models before distribution in commerce; (2) existing basic models, whose certified rating remains valid, annually; (3) existing basic models, whose design is altered resulting in a change in rating that is more consumptive or less efficient, at the time the design change is made; and (4) previously certified basic models that have been discontinued annually.

Table IV.1: Initial Certification Compliance Schedule

The Initial Certification Date is the Number of Months Shown Below After the AEDM Final Rule is Published in the Federal Register	Equipment Type
6	Commercial Warm Air Furnaces PTACs and PTHPs
9	Commercial gas-fired and oil-fired instantaneous water heaters less than 10 gallons Commercial gas-fired and oil-fired hot water supply boilers less than 10 gallons
12	Commercial water heaters (all others types) Small commercial packaged boilers (≤2.5 million Btu/h) Self-Contained CRE with solid or transparent doors
15	VRFs
18	Small, large and very large air, water, and evaporatively-cooled and water source commercial

	packaged ACs and HPs SPVUs CRACs Large packaged boilers (> 2.5 million Btu/h CRE (all other types)

The Working Group also agreed to the following caveats on the above schedule. If, in the separate, certification rulemaking, DOE adopts regulations that are significantly different from the remainder of the Working Group recommendations, then the initial certification compliance dates will be based on the final rule date for the separate rulemaking effort. The Working Group agreed that in no instance should the initial certification compliance date be less than two months after the issuance of the final rule adopting the remainder of the Working Group's recommendations. Additionally, the Working Group recommended that DOE allow a six-month grace period following each certification date during which DOE will not pursue civil penalties for certification violations. The Working Group emphasized that a grace period would allow manufacturers time to gain familiarity with the certification process and remedy any problems. 78 FR 62472, 62478.

Lennox commented that it is essential for DOE to extend the current compliance dates by the timeline outlined in the AEDM SNOPR and include the 6-month grace period, agreed upon by the Working Group, in the finalized regulatory text. Additionally, Lennox indicated that DOE should reiterate the caveats to the compliance date extensions that the Working Group recommended (Lennox, No. 0080.1 at p. 2). DOE notes that the six-month grace period and caveats agreed upon by the working group are clearly stated in the previous paragraph.

Hoshizaki America requested that DOE give more time to allow each manufacturer to review and validate its AEDMs. (Hoshizaki American, No. 0087.1 at p. 1) The Working Group determined that the extension to the certification deadlines described in Table IV.1 allowed manufacturers sufficient time to validate AEDMs and certify compliance. The Department agrees with the Working Group's proposal.

DOE plans to issue a notice of proposed rulemaking containing the remaining issues from the Working Group recommendations before the end of the year, which was the target timeframe discussed by the Working Group. Accordingly, DOE is adopting the schedule in today's final rule.

V. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

The Office of Management and Budget has determined that test procedure rulemakings do not constitute "significant regulatory actions" under section 3(f) of Executive Order 12866, Regulatory Planning and Review, 58 FR 51735 (Oct. 4, 1993). Accordingly, this action was not subject to review under the Executive Order by the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB).

B. Administrative Procedure Act

DOE has determined, pursuant to authority at 5 U.S.C. 553(d)(1), that the amendment to 10 CFR 429.12 is not subject to a 30-day delay in effective date because this rule extending the compliance date for a requirement relieves a restriction.

C. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601, et seq.) requires the preparation of an initial regulatory flexibility analysis (RFA) for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, "Proper Consideration of Small Entities in Agency Rulemaking," 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the DOE rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website: www.gc.doe.gov. DOE reviewed the test procedures considered in today's final rule under the provisions of the Regulatory Flexibility Act (RFA) and the policies and procedures published on February 19, 2003.

DOE reviewed the AEDM requirements being adopted under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. As discussed in more detail below, DOE found that because the provisions of this rule will not result in increased testing and/or reporting burden for manufacturers already eligible to use an AEDM and will extend AEDM use to a number of manufacturers, thus reducing their testing burden.

Manufacturers will not experience increased financial burden as a result of this rule.

Today's final rule, which adopts voluntary methods for certifying compliance in lieu of conducting actual physical testing, would not increase the testing or reporting burden of manufacturers who currently use, or are eligible to use, an AEDM to certify their products. Furthermore, the requirements for validation of an AEDM adopted in today's final rule do not require more testing than that required by the AEDM provisions included in the March 7, 2011 Certification, Compliance and Enforcement Final Rule (76 FR 12422) ("March 2011 Final Rule"), and would relax tolerances that tested equipment are required to meet in order to substantiate the AEDM.

DOE has also clarified in today's final rule how it intends to exercise its authority to verify the performance of equipment certified using an AEDM. DOE negotiated the process with industry, resulting in the requirements that are being adopted in today's final rule. Because testing conducted to verify AEDM performance would be DOE-initiated and conducted testing and the process to determine an invalid rating includes manufacturer involvement throughout, DOE does not believe that verification of ratings resulting from an AEDM will have a substantial impact on small businesses.

Today's final rule also permits the manufacturer of other types of covered equipment that are currently not permitted to use an AEDM to rate and certify equipment using an AEDM. Manufacturers that are not eligible to use AEDMs must currently test at least two units of every basic model that they produce to certify compliance to the Department pursuant to the March

2011 Final Rule. The provisions in today's final rule would, if followed by a manufacturer choosing to use an AEDM rather than conduct a full physical test, reduce that manufacturer's testing burden by enabling it to simulate testing based on test data derived from a reduced number of units. While the Department believes that permitting the greater use of AEDMs will reduce the affected manufacturer's test burden, use of an AEDM is at the manufacturer's discretion. If, as a result of any of the regulations in this final rule, a manufacturer believes that use of an AEDM would increase rather than decrease its financial burden, the manufacturer may choose not to employ this alternative method. Should a manufacturer choose to abstain from using an AEDM, this provision would not apply and the manufacturer would continue to remain subject to the requirements of any DOE test procedure that applies to that product, which would result in no change in burden from that which is required currently.

Finally, DOE is codifying two aspects regarding the certification of commercial HVAC, WH, and refrigeration equipment that should further decrease the burden of existing DOE regulations. First, DOE is clarifying its basic model definitions, which allow a manufacturer to group individual models based on certain characteristics. The basic model definitions provide the manufacturer with flexibility in making these groupings and were negotiated as part of the Working Group's meetings to develop a recommended proposal for adoption by DOE. Lastly, DOE is extending the initial compliance date for the certification of commercial HVAC, WH, and refrigeration equipment from the current date of December 31, 2013. The new compliance dates range from 6 months to 18 months from publication of this final rule.

For the reasons enumerated above, DOE is certifying that this final rule will not have a

significant impact on a substantial number of small entities.

D. Review Under the Paperwork Reduction Act

Manufacturers of the covered equipment addressed in today's final rule must certify to DOE that their equipment comply with any applicable energy conservation standards. In certifying compliance, manufacturers must test their equipment according to the applicable DOE test procedures for the given equipment type, including any amendments adopted for those test procedures, or use an AEDM to develop the certified ratings of the basic models. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including the equipment at issue in this final rule. (76 FR 12422 (March 7, 2011)). The collection-of-information requirement for these certification and recordkeeping provisions is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement has been approved by OMB under OMB Control Number 1910-1400. Public reporting burden for the certification is estimated to average 20 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB Control Number.

E. Review Under the National Environmental Policy Act

DOE has determined that this rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321, et seq.) and DOE's implementing regulations at 10 CFR part 1021. Specifically, this rule would adopt changes for certifying certain covered equipment, so it would not affect the amount, quality or distribution of energy usage, and, therefore, would not result in any environmental impacts. Thus, this rulemaking is covered by Categorical Exclusion A6 under 10 CFR part 1021, subpart D. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

F. Review Under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (August 4, 1999) imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this rule and has determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of

government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the equipment that is the subject of today's final rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297(d)) No further action is required by Executive Order 13132.

G. Review Under Executive Order 12988

Regarding the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform," 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide a clear legal standard for affected conduct rather than a general standard; and (4) promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this rule meets the relevant standards of Executive Order 12988.

H. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. No. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed "significant intergovernmental mandate," and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820; also available at www.gc.doe.gov. DOE examined today's rule according to UMRA and its statement of policy and determined that the rule contains neither an intergovernmental mandate, nor a mandate that may result in the expenditure of $100 million or more in any year, so these requirements do not apply.

I. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This rule would not have any impact on the autonomy or integrity

of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

J. Review Under Executive Order 12630

DOE has determined, under Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights" 53 FR 8859 (March 18, 1988),that this regulation would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

K. Review Under the Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed today's rule under the OMB and DOE guidelines and has concluded that it is consistent with the applicable policies in those guidelines.

L. Review Under Executive Order 13211

Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OMB, a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as any action by an agency that promulgated or is

expected to lead to promulgation of a final rule, and that: (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

Today's rule to establish alternate certification requirements for certain covered equipment is not a significant regulatory action under Executive Order 12866. Moreover, it would not have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as a significant energy action by the Administrator of OIRA. Therefore, it is not a significant energy action, and, accordingly, DOE has not prepared a Statement of Energy Effects.

M. Review Under Section 32 of the Federal Energy Administration Act of 1974

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91; 42 U.S.C. 7101), DOE must comply with section 32 of the Federal Energy Administration Act of 1974, as amended by the Federal Energy Administration Authorization Act of 1977. (15 U.S.C. 788; FEAA) Section 32 essentially provides in relevant part that, where a proposed rule authorizes or requires use of commercial standards, the notice of proposed rulemaking must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Attorney General and the Chairman of the Federal Trade Commission

(FTC) concerning the impact of the commercial or industry standards on competition. Today's rule to amend regulations relating to AEDMs does not propose the use of any commercial standards.

VI. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of today's final rule.

List of Subjects in 10 CFR Parts 429 and 431

Administrative practice and procedure, Confidential business information, Energy conservation, Reporting and recordkeeping requirements.

Issued in Washington, DC, on December 24, 2013.

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Kathleen B. Hogan
Deputy Assistant Secretary for Energy Efficiency
Energy Efficiency and Renewable Energy

For the reasons set forth in the preamble, DOE amends parts 429 and 431 of chapter II, subchapter D, of title 10 of the Code of Federal Regulations, as set forth below:

PART 429 – CERTIFICATION, COMPLIANCE AND ENFORCEMENT FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT

1. The authority citation for part 429 continues to read as follows:

Authority: 42 U.S.C. 6291–6317.

2. Section 429.12 is amended by revising paragraph (i) to read as follows:

§ 429.12 General requirements applicable to certification reports.

* * * * *

(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.

3. Section 429.42 is amended by revising paragraph (a) to read as follows:

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

(a) Determination of represented value. Manufacturers can 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^{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 ,

(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^{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.

* * * * *

4. Section 429.43 is amended by revising paragraph (a) to read as follows:

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

(a) Determination of represented value. Manufacturers can determine the represented 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^{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:

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

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 $t_{0.95}$ 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 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:

(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.

* * * * *

5. Section 429.44 is amended by revising paragraph (a) to read as follows:

§ 429.44 Commercial water heating equipment.

(a) Determination of represented value. Manufacturers can determine the represented value, which includes the certified rating, for each basic model of commercial water heating 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 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^{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:

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

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:

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

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 water heating equipment 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.

* * * * *

6. Section 429.70 is amended by revising paragraphs (a), (b) and (c) to read as follows:

§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, 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 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. (A) Commercial HVAC 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
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:

Validation Class	Minimum Number of Distinct Models that Must be Tested
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:

Validation Class	Minimum Number of Distinct Models that Must be Tested
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:

Validation Class	Minimum Number of Distinct Models that Must be Tested
Gas-fired Furnaces	2 Basic Models
Oil-fired Furnaces	2 Basic Models

(E) Commercial refrigeration equipment validation classes:

Validation Class[1]	Minimum Number of Distinct Models that Must be Tested
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

[1] 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. [Reserved]

(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 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 × (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 × (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	Seasonal Energy-Efficiency Ratio	5% (0.05)

Cooling Capacity (3-Phase)	Heating Season Performance Factor	5% (0.05)
	Energy Efficiency Ratio	10% (0.1)
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	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)
Evaporatively-Cooled, Split and Packaged ACs and HPs, All Capacities	Energy Efficiency Ratio	5% (0.05)
	Coefficient of Performance	5% (0.05)
	Integrated Energy Efficiency Ratio	10% (0.1)
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.

(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[2] within a rolling 24 month period[3]	**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.[1] 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.

[1]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.

[2] 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.

[3] 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.

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PART 431 – ENERGY EFFICIENCY PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT

7. The authority citation for part 431 continues to read as follows:

Authority: 42 U.S.C. 6291–6317.

8. Section 431.62 is amended by revising the definition of "basic model" to read as follows:

§ 431.62 Definitions concerning commercial refrigerators, freezers and refrigerator-freezers.

* * * * *

Basic model means all commercial refrigeration equipment manufactured by one manufacturer within a single equipment class, having the same primary energy source, and that have essentially identical electrical, physical, and functional characteristics that affect energy consumption.

* * * * *

9. Section 431.72 is amended by revising the definition of "basic model" to read as follows:

§ 431.72 Definitions concerning commercial warm air furnaces.

* * * * *

Basic model means all commercial warm air furnaces manufactured by one manufacturer within a single equipment class, that have the same nominal input rating and the same primary energy source (e.g. gas or oil) and that do not have any differing physical or functional characteristics that affect energy efficiency.

* * * * *

10. Section 431.82 is amended by revising the definition of "basic model" to read as follows:

§ 431.82 Definitions concerning commercial packaged boilers.

* * * * *

Basic model means all commercial packaged boilers manufactured by one manufacturer within a single equipment class having the same primary energy source (e.g., gas or oil) and that have essentially identical electrical, physical and functional characteristics that affect energy efficiency.

* * * * *

11. Section 431.92 is amended by revising the definition of "basic model" to read as follows:

§ 431.92 Definitions concerning commercial air conditioners and heat pumps.

* * * * *

Basic model includes:

(1) *Packaged terminal air conditioner (PTAC)* or packaged terminal heat pump (PTHP) means all units manufactured by one manufacturer within a single equipment class, having the same primary energy source (e.g., electric or gas), and which have the same or comparable compressors, same or comparable heat exchangers, and same or comparable air moving systems that have a cooling capacity within 300 Btu/h of one another.

(2) *Small, large, and very large air-cooled or water-cooled commercial package air conditioning and heating equipment* means all units manufactured by one manufacturer within a single equipment class, having the same or comparably performing compressor(s), heat exchangers, and air moving system(s) that have a common "nominal" cooling capacity.

(3) *Single package vertical units* means all units manufactured by one manufacturer within a single equipment class, having the same primary energy source (e.g., electric or gas), and which have the same or comparably performing compressor(s), heat exchangers, and air moving system(s) that have a rated cooling capacity within 1500 Btu/h of one another.

(4) *Computer room air conditioners* means all units manufactured by one manufacturer within a single equipment class, having the same primary energy source (e.g., electric or gas), and which have the same or comparably performing compressor(s), heat exchangers, and air moving system(s) that have a common "nominal" cooling capacity.

(5) *Variable refrigerant flow systems* means all units manufactured by one manufacturer within a single equipment class, having the same primary energy source (e.g., electric or gas), and which have the same or comparably performing compressor(s) that have a common "nominal" cooling capacity and the same heat rejection medium (e.g., air or water) (includes VRF water source heat pumps).

(6) *Small, large, and very large water source heat pump* means all units manufactured by one manufacturer within a single equipment class, having the same primary energy source (e.g., electric or gas), and which have the same or comparable compressors, same or comparable heat exchangers, and same or comparable "nominal" capacity.

* * * * *

12. Section 431.102 is amended by revising the definition of "basic model" to read as follows:

§ 431.102 Definitions concerning commercial water heaters, hot water supply boilers, and unfired hot water storage tanks.

* * * * *

Basic model means all water heaters, hot water supply boilers, or unfired hot water storage tanks manufactured by one manufacturer within a single equipment class, having the same primary energy source (e.g., gas or oil) and that have essentially identical electrical, physical and functional characteristics that affect energy efficiency.

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