

**[6450-01-P]**

**DEPARTMENT OF ENERGY**

**10 CFR Parts 429 and 431**

**[Docket No. EERE-2015-BT-TP-0015]**

**RIN 1904-AD54**

**Energy Conservation Program: Test Procedures for Small, Large, and Very Large Air-Cooled Commercial Package Air Conditioning and Heating Equipment**

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

**ACTION:** Final rule.

**SUMMARY:** In this final rule, the U.S. Department of Energy (DOE) reaffirms that the currently prescribed test procedure, with certain amendments adopted in this rulemaking, must be used when measuring the energy efficiency of certain categories of small, large, and very large air-cooled commercial package air conditioners and heating equipment. The final rule, in addition to satisfying the agency's obligation to periodically review its test procedures for covered equipment, also clarifies specific certification, compliance, and enforcement provisions related to this equipment. The final rule limits the incorporation by reference of the industry test procedure ANSI/AHRI Standard 340/360-2007, "2007 Standard for Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment," to certain sections and addenda; clarifies indoor airflow tolerance and adjustment specifications when meeting other rating conditions; clarifies requirements for condenser head pressure controls;

clarifies units of measurement for airflow; establishes a tolerance on part-load rating points and specifies the ambient temperatures used for the part-load rating points; and defines the term, "integrated energy efficiency ratio."

**DATES:** The effective date of this rule is **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The final rule changes will be mandatory for testing starting **[INSERT DATE 360 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The incorporation by reference of certain material listed in this rule is approved by the Director of the Federal Register as of **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

**ADDRESSES:** The docket, which includes Federal Register notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at [regulations.gov](http://www.regulations.gov). All documents in the docket are listed in the [regulations.gov](http://www.regulations.gov) index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

A link to the docket web page can be found at:  
<http://www.regulations.gov/#!documentDetail;D=EERE-2015-BT-TP-0015-0001>. This web page will contain a link to the docket for this notice on the [regulations.gov](http://www.regulations.gov) site. The [regulations.gov](http://www.regulations.gov) web page will contain simple instructions on how to access all documents, including public comments, in the docket.

For further information on how to review the docket, contact Ms. Brenda Edwards at (202) 586-2945 or by email: [Brenda.Edwards@ee.doe.gov](mailto:Brenda.Edwards@ee.doe.gov).

**FOR FURTHER INFORMATION CONTACT:** Ms. Ashley Armstrong, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE-2J, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-9590, or email [Ashley.Armstrong@ee.doe.gov](mailto:Ashley.Armstrong@ee.doe.gov).

For legal issues, please contact Mr. Michael Kido, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue SW., Washington, DC 20585-0121. Telephone: (202) 586-8145. Email: [Michael.Kido@hq.doe.gov](mailto:Michael.Kido@hq.doe.gov)

**SUPPLEMENTARY INFORMATION:**

DOE intends to incorporate by reference the following industry standard into part 429 and appendix A to subpart F of part 431: ANSI/AHRI Standard 340/360-2007, (“AHRI 340/360-2007”), “2007 Standard for Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment,” including Addenda 1 and 2, approved by ANSI on October 27, 2011. This industry standard provides guidance regarding a variety of different elements related to the testing of commercial and industrial unitary air-conditioning and heat pump equipment, including definitions, classifications, as well as testing, rating, data, and operating requirements. ANSI/AHRI Standard 340/360-2007 is readily available from the Air-Conditioning, Heating, and Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, (703) 524-8800, or go to: <http://www.ahrinet.org>.

DOE intends to incorporate by reference the following industry standard into appendix A to subpart F of part 431: ANSI/ASHRAE Standard 37-2009, ("ANSI/ASHRAE 37"), "Methods of Testing for Rating Electrically Driven Unitary Air-Conditioning and Heat Pump Equipment," approved by ASHRAE on June 20, 2009. This testing standard details test methods for the equipment addressed by this rulemaking. Copies of this testing standard are readily available from the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1791 Tullie Circle, N.E. Atlanta, GA 30329, (800) 527-4723, or through its website at <https://www.ashrae.org>.

These standards are described further in section IV.M.

## **Table of Contents**

### **I. Authority and Background**

#### **A. General Test Procedure Rulemaking Process**

### **II. Synopsis of the Final Rule**

### **III. Discussion**

#### **A. Clarifications to the Current DOE Test Procedure**

##### **1. Sections of ANSI/AHRI 340/360-2007 Incorporated by Reference**

##### **2. Indoor Airflow Adjustment and Reporting**

##### **3. Condenser Head Pressure Controls**

##### **4. Unit of Measurement for Airflow**

##### **5. Tolerance on Percent Load for IEER Part-Load Tests**

##### **6. Definition of IEER**

##### **7. Additional Test Procedure Provisions**

#### **B. Certification and Enforcement Issues and Compliance Dates**

##### **1. Measuring Cooling Capacity for Purposes of Certification, Assessment, and Enforcement**

##### **2. Compliance Dates of the Certification, Reporting, and Test Procedure Amendments**

#### **C. Future Test Procedure Rulemakings**

#### **D. Regulatory Text Language**

### **IV. Procedural Issues and Regulatory Review**

#### **A. Review Under Executive Order 12866**

#### **B. Review Under the Regulatory Flexibility Act**

#### **C. Review Under the Paperwork Reduction Act of 1995**

- D. Review Under the National Environmental Policy Act of 1969
- E. Review Under Executive Order 13132
- F. Review Under Executive Order 12988
- G. Review Under the Unfunded Mandates Reform Act of 1995
- H. Review Under the Treasury and General Government Appropriations Act, 1999
- I. Review Under Executive Order 12630
- J. Review Under Treasury and General Government Appropriations Act, 2001
- K. Review Under Executive Order 13211
- L. Review Under Section 32 of the Federal Energy Administration Act of 1974
- M. Description of Materials Incorporated by Reference
- N. Congressional Notification
- O. Approval of the Office of the Secretary

## **I. Authority and Background**

Title III of the Energy Policy and Conservation Act of 1975 (42 U.S.C. 6291, et seq.; “EPCA” or, “the Act”) sets forth a variety of provisions designed to improve energy efficiency. (All references to EPCA in this document refer to the statute as amended through the Energy Efficiency Improvement Act of 2015, Public Law 114-11 (April 30, 2015).) Part C of Title III, which for editorial reasons was redesignated as Part A-1 upon incorporation into the U.S. Code (42 U.S.C. 6311-6317, as codified), establishes the Energy Conservation Program for Certain Commercial and Industrial Equipment. Among the equipment covered under this statutory framework are small, large, and very large air-cooled commercial package air conditioning and heating equipment—which are referred to in this notice as commercial unitary air conditioners (CUACs) and commercial unitary heat pumps (CUHPs). These equipment are the subject of this document. (42 U.S.C. 6311(1)(B)-(D))

Under EPCA, the energy conservation 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 as the basis for (1) certifying to DOE that their equipment

complies with the applicable energy conservation standards adopted under EPCA, and (2) making representations about the efficiency of that equipment. Similarly, DOE must use these test procedures to determine whether the equipment complies with any relevant standards promulgated under EPCA.

DOE's test procedure for CUACs and CUHPs is codified at Title 10 of the Code of Federal Regulations (CFR), section 431.96. The current regulations require that manufacturers use ANSI/AHRI 340/360-2007, "2007 Standard for Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment" (ANSI/AHRI 340/360-2007), when measuring the efficiency of a given CUAC or CUHP and certifying that equipment as compliant with the applicable standard.<sup>1</sup> 77 FR 28928, 28990 (May 16, 2012) (final rule specifying applicable energy conservation standards and test procedures for various commercial and industrial equipment, including CUACs and CUHPs).

On February 1, 2013, DOE published a request for information and notice of document availability regarding the potential amendment of the energy conservation standards for CUACs and CUHPs. 78 FR 7296. DOE solicited information from the public to help determine whether national standards more stringent than the current ones would result in a significant amount of additional energy savings and whether those national standards would be technologically feasible and economically justified. DOE also sought information from the public on the merits of adopting the integrated energy efficiency ratio (IEER) as the energy efficiency descriptor for small, large, and very large air-cooled commercial air conditioners and heat pumps, and which

---

<sup>1</sup> DOE notes that for purposes of this notice, all references to ANSI/ASHRAE 340/360-2007 include Addenda 1 and 2 to this industry-based standard.

includes provisions to measure equipment performance under partial-load operating conditions. Currently, manufacturers must measure the energy efficiency of their equipment using the energy efficiency ratio (EER), which measures the full-load efficiency of a given unit. The procedure to follow when measuring and calculating that value, like the proposed IEER metric, is found in ANSI/ASHRAE 340/360-2007. See ANSI/ASHRAE 340/360-2007, sec. 6. Comments received on the topic of IEER are discussed in a related notice of proposed rulemaking (NOPR) published September 30, 2014, which sought to amend the CUAC and CUHP energy conservation standards. 79 FR 58948.

Subsequently, on April 1, 2015, DOE issued a notice of intent to establish the Commercial Package Air Conditioners and Heat Pumps and Commercial Warm Air Furnaces Working Group to negotiate potential amendments to the energy conservation standards for this equipment. 80 FR 17363. This Working Group was established under the Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) in accordance with the Federal Advisory Committee Act and the Negotiated Rulemaking Act. See 5 U.S.C. Appendix – Federal Advisory Committee Act and 5 U.S.C. 561-570a. The Working Group, which consisted of 17 members, including one member from ASRAC and one DOE representative, met six times (five times in person and once by teleconference). The meetings were held on April 28, May 11-12, May 20-21, June 1-2, June 9-10, and June 15, 2015. The Working Group successfully reached consensus on energy conservation standards for CUACs, CUHPs, and commercial warm air furnaces, which the Working Group provided as recommendations as part of a Term Sheet for submission to ASRAC. The group also chose to provide test procedure and metric-related recommendations to the ASRAC. ASRAC voted unanimously to approve the Working Group's

recommendations on June 17, 2015. Participants in the Working Group consisted of the following entities aside from DOE:

<b>Organization</b>	<b>Acronym, Abbreviation</b>	<b>Affiliation</b>
Air Conditioning Contractors of America	ACCA	Contractor/Installer Group
Air-Conditioning, Heating, and Refrigeration Institute	AHRI	HVAC Manufacturers Group
American Council for an Energy Efficient Economy	ACEEE	Energy Efficiency Advocacy Group
Appliance Standards Awareness Project	ASAP	Energy Efficiency Advocacy Group
Emerson Climate Technologies	Emerson	Manufacturer
Goodman Manufacturing	Goodman	Manufacturer
Lennox International	Lennox	Manufacturer
Mitsubishi Electric	Mitsubishi	Manufacturer
Natural Resources Defense Council	NRDC	Energy Efficiency Advocacy Group
Northwest Energy Efficiency Alliance	NEEA	Energy Efficiency Advocacy Group
Pacific Gas & Electric Company, San Diego Gas & Electric Company, Southern California Edison, and Southern California Gas Company	Cal. IOUs	Investor-Owned Utilities
Rheem Manufacturing Company	Rheem	Manufacturer
Sheet Metal and Air Conditioning Contractors National Association, Inc.	SMACCNA	Contractor/Installer Group
Trane/Ingersoll Rand	Trane	Manufacturer
United Technologies Corporation (Carrier)	Carrier	Manufacturer
Underwriters Laboratories	UL	Test Lab

DOE initiated a rulemaking to amend the test procedure and associated certification requirements for CUACs and CUHPs to implement certain of the Working Group's recommendations regarding the metric and test procedure. On August 6, 2015, DOE published a NOPR (August 2015 NOPR), 80 FR 46870, in which DOE proposed to clarify aspects of the CUAC and CUHP test procedure. These clarifications include, among other things, limiting the incorporation by reference of ANSI/AHRI 340/360-2007 to certain sections and addenda, specifying requirements for indoor airflow adjustment and reporting, clarifying requirements for condenser head pressure controls, clarifying the unit of measurement for airflow, establishing a



tolerance on percent load for IEER part-load tests, and defining the term IEER. In this final rule, DOE responds to comments received from stakeholders in response to the NOPR.

#### A. General Test Procedure Rulemaking Process

EPCA sets forth the general criteria and procedures DOE must follow when prescribing or amending test procedures for covered equipment. See generally 42 U.S.C. 6314. EPCA provides in relevant part that any test procedures prescribed or amended under this section must be reasonably designed to produce test results that measure the energy efficiency, energy use or estimated annual operating cost of a covered product during a representative average use cycle or period of use, and must not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(2)) In addition, if DOE determines that a test procedure amendment is warranted, it must publish proposed test procedures and offer an opportunity for the public to present oral and written comments. (42 U.S.C. 6314(b))

EPCA also requires DOE to evaluate its test procedures at least once every 7 years for each class of covered equipment (including CUACs and CUHPs) to determine if an amended test procedure would more accurately or fully comply with the requirement to be reasonably designed to produce test results that reflect the energy efficiency, energy use, and operating costs during a representative average use cycle. DOE must either prescribe amended test procedures or publish a notice in the Federal Register regarding its determination not to amend test procedures. (42 U.S.C. 6314(a)(1)-(2))

DOE considers the activity associated with this rulemaking sufficient to satisfy this review requirement.

## **II. Synopsis of the Final Rule**

This final rule clarifies aspects of DOE's test procedure for CUACs and CUHPs to improve the consistency and accuracy of the results generated when using that procedure. The rule clarifies how to test for compliance with the current energy conservation standards along with those standards that DOE anticipates adopting consistent with the Working Group's Term Sheet. The rule also amends certain certification, compliance, and enforcement provisions. DOE has determined that this final rule will not change the measured energy efficiency of CUACs and CUHPs when compared to the current test procedure.

## **III. Discussion**

This final rule amends the test procedure for CUACs and CUHPs in appendix A to subpart F of Part 431 and adds new equipment-specific certification and enforcement provisions in 10 CFR 429.43 and 429.134. With respect to the latter of these changes, a new section 429.134(g) would be added to the pre-existing provisions already contained in section 429.134(a)-(f). The rule also amends certain definitions found in 10 CFR 431.92 and updates certain materials incorporated by reference in 10 CFR 431.95.

In response to the August 2015 NOPR, six interested parties submitted written comments: Air-Conditioning, Heating and Refrigeration Institute (AHRI); United Technologies Corporation (Carrier), Ingersoll Rand, the California Investor-Owned Utilities (Cal. IOUs), Goodman Manufacturing Company (Goodman), and Lennox International Inc. (Lennox). Interested parties commented on a range of issues, including those DOE identified in the August 2015 NOPR, as well as several other pertinent issues related to DOE's proposal. Commenters also offered thoughts on further opportunities to improve the clarity of the test procedure. These

issues, as well as DOE's responses to them and the resulting changes to DOE's proposal, are discussed in the subsequent sections.

#### A. Clarifications to the Current DOE Test Procedure

In response to the August 2015 NOPR, DOE received input on a variety of test procedure issues, including: (1) sections of ANSI/AHRI 340/360-2007 incorporated by reference; (2) indoor airflow adjustment and reporting; (3) condenser head pressure controls; (4) the unit of measurement for airflow; (5) the tolerance on percent load for IEER part-load tests; (6) the definition of IEER; and (7) additional provisions in the current test procedure. DOE's treatment of these issues is addressed below.

##### 1. Sections of ANSI/AHRI 340/360-2007 Incorporated by Reference

As noted previously, DOE intends to incorporate by reference ANSI/AHRI Standard 340/360-2007, ("AHRI 340/360-2007"), "2007 Standard for Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment," which was approved by ANSI on October 27, 2011, and updated by addendum 1 in December 2010 and addendum 2 in June 2011. This industry standard provides guidance regarding a variety of different elements related to the testing of commercial and industrial unitary air-conditioning and heat pump equipment, including definitions, classifications, as well as testing, rating, data, and operating requirements. (ANSI/AHRI Standard 340/360-2007 is readily available from the Air-Conditioning, Heating, and Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, (703) 524-8800, or go to: <http://www.ahrinet.org>.)

In its August 2015 NOPR, DOE proposed to specify that when testing CUACs and CUHPs for the EER, coefficient of performance (COP), and IEER metrics, only certain sections of ANSI/AHRI 340/360-2007 would be required -- specifically, sections 3, 4, and 6 (omitting section 6.3) -- rather than applying the entirety of ANSI/AHRI 340/360-2007. DOE also proposed not to incorporate section 5 of that testing standard, and to incorporate by reference ANSI/ASHRAE 37-2009, which was previously incorporated by reference through section 5 of ANSI/AHRI 340/360-2007. 80 FR at 46873.

Responding to this aspect of DOE's proposal, AHRI, Carrier, Ingersoll Rand, Goodman, and Lennox commented that DOE should reference ANSI/AHRI Standard 340/360-2015 after its final version is released. (AHRI, No. 8 at p. 1; Carrier, No. 11 at p. 2; Ingersoll Rand, No. 9 at p. 13; Goodman, No. 14 at p. 2; Lennox, No. 13 at p. 2, 6) They commented that this revised testing standard addresses the issues that DOE raised in the NOPR and additional items identified by industry to improve the test procedure. In addition, Lennox noted that EPCA requires DOE to use those test procedures that are generally accepted by industry. (Lennox No. 13 at pp. 2, 6) See also 42 U.S.C. 6314(a)(4)(A) (indicating that the test procedures for commercial package air conditioning and heating equipment shall be those "generally accepted industry testing procedures or rating procedures" developed or recognized by AHRI or ASHRAE "as referenced in ASHRAE/IES Standard 90.1 and in effect on June 30, 1992"). Additionally, AHRI commented that sections 6.5 and 6.6 of the soon-to-be-released version of AHRI 340/360-2015, which address verification testing uncertainty and uncertainty allowances, respectively, should be referenced as well. AHRI commented that doing so will help the user of the standard more fully understand the causes of why measured capacity and efficiency may vary, which, in its

view, will be helpful to laboratories performing tests to complete the uncertainty analyses required by ISO 17025.<sup>2</sup>

AHRI agreed with DOE's proposal to incorporate by reference ANSI/ASHRAE 37-2009. (AHRI, No. 8 at p. 2) AHRI noted that ANSI/AHRI 340/360-2015 has updated the reference to ANSI/ASHRAE 37-2009, and that section 5 of ANSI/AHRI 340/360-2015 addresses items related to unit setup and operating conditions that are not currently covered by ANSI/ASHRAE 37-2009.

Carrier commented that ANSI/AHRI 340/360-2015 requires that corrections be made for the impact of atmospheric pressure changes and resulting air density changes. Carrier requested that DOE adopt Appendix D of ANSI/AHRI 340/360-2015 to better account for changes in atmospheric pressure and altitude changes of test laboratories. (Carrier No. 11 at p. 3)

AHRI and Carrier commented that DOE uses a confidence level of 95 percent in the sampling requirements given in 10 CFR 429.43, whereas section 6.4 of ANSI/AHRI 340/360-2015 uses a confidence level of 90 percent. (AHRI, No. 8 at p. 2; Carrier No. 11 at p. 2) AHRI and Carrier noted that commercial equipment has as much, if not more, uncertainty and variability in testing than residential equipment, and that 90 percent is an appropriate confidence level.

---

<sup>2</sup> ISO 17025 is a test facility standard that provides general requirements for standard operating procedures for accuracy of laboratory measurements and tests.

After reviewing the comments from the August 2015 NOPR, DOE agrees that many of the raised issues are addressed in the draft version of ANSI/AHRI 340/360-2015. However, DOE is still investigating whether certain provisions in the draft ANSI/AHRI 340/360-2015 will change measured efficiency. Furthermore, a final version of the new standard was not available during the preparation of this final rule. For these reasons, DOE declines to adopt ANSI/AHRI 340/360-2015 in whole or in part at this time. In this final rule, DOE amends its test procedure to reference sections 3, 4, and 6 (omitting section 6.3) of ANSI/AHRI 340/360-2007. DOE may, however, consider incorporating the final version of ANSI/AHRI 340/360-2015, or additional provisions within it, in a future test procedure rulemaking, as discussed in section III.C. With respect to ANSI/ASHRAE 37-2009, DOE already incorporates by reference this testing standard in Part 431.

In the NOPR, DOE did not make any proposals regarding the confidence level in its certification and enforcement provisions. Accordingly, DOE declines to adopt provisions on this issue without holding further public comment. While DOE is open to considering changes to its confidence level in the future, manufacturers or other parties with access to relevant data should provide data regarding the variability of units in production and testing to enable DOE to facilitate its efforts to make any necessary adjustments in an appropriate future rulemaking proceeding.

## 2. Indoor Airflow Adjustment and Reporting

In the August 2015 NOPR, DOE proposed that equipment must be tested using the motor and drive assembly and settings specified in the certification report (supplemental testing

instruction PDF), and that the external static pressure (ESP) during testing remain within the tolerances set forth in Section 6.1.3.2 of ANSI/AHRI 340/360-2007 with the indoor airflow rate staying within +/-5 percent of the manufacturer-rated full-load indoor airflow rate. DOE proposed that the unit and/or test facility be adjusted to set up the unit such that both the airflow and ESP are within the required tolerances. See 80 FR at 46873 (noting situations in which a test facility's equipment may need adjusting to maintain the proposed tolerances).

ANSI/AHRI 340/360-2007, section 6.1.3.2.e, specifies that the full-load cooling airflow rate (in SCFM) must be employed, irrespective of resulting ESP, for all situations other than full-load cooling in which full-load airflow is used (e.g., full-load heating). DOE proposed that the +/- 5 percent tolerance for airflow rate must be applied for these other conditions as well. DOE also indicated that it interpreted this section to mean that a test facility adjustment can be made to obtain the proper airflow (i.e. to maintain airflow within the proposed tolerance), but that the unit under test itself cannot be adjusted, and that there is no ESP requirement for this part of the test. 80 FR at 46873.

In addition, DOE proposed that in cases where a unit is designed to operate with a different indoor airflow rate for cooling and heating modes, manufacturers would report the individual indoor airflow rates in cooling and heating modes. DOE also proposed that a manufacturer must include in its certification report the adjusted indoor airflow at each part-load condition. 80 FR at 46873.

Responding to the NOPR, AHRI and Carrier agreed that the tester must use the same motor and drive kit that was used to determine the certified rating, as specified in the manufacturer's certification information. (AHRI, No. 8 at p. 5; Carrier No. 11 at p. 4) AHRI, Carrier, Goodman, and Lennox agreed that a tolerance for indoor airflow is needed to ensure that it closely approximates the manufacturer's rated full-load indoor airflow rate. (AHRI, No. 8 at p. 5; Carrier No. 11 at p. 4; Goodman, No. 14 at p. 1; Lennox, No. 13 at p. 4) However, these commenters indicated that a 5 percent tolerance would result in too much variation in EER and cooling capacity. The commenters recommended that the airflow should be allowed to vary by  $\pm 3$  percent of the rated full-load indoor airflow rate to reduce test uncertainty and to ensure the variations in EER and cooling capacity are at acceptable levels. (AHRI, No. 8 at p. 5; Carrier No. 11 at p. 4; Goodman, No. 14 at p. 1; Lennox, No. 13 at p. 4)

In contrast, AHRI commented that no adjustments should be made to the airflow or the ESP during the heating test after it is set during the cooling test. (AHRI, No. 8 at p. 5). Goodman generally agreed with this view. (Goodman, No. 14 at p. 2) DOE's proposal would require adjustments to the test facility's equipment (but not the tested unit's fan settings) to maintain the full-load airflow rate when switching from the cooling test to the heating test, without regard to the resulting ESP. The method AHRI described is inconsistent with DOE's proposed method, because it would prohibit making adjustments to the ESP when switching from the cooling test to the heating test, whereas the proposal would allow the ESP to change between the cooling and heating tests as long as the full-load airflow rate is maintained. Lennox agreed with DOE's proposed approach to maintain the full-load airflow rate when switching from the cooling test to the heating test by making adjustments to the test facility's equipment—and not to the tested



unit's fan settings—without regard to the resulting ESP. Lennox suggested that a  $\pm 3$  percent tolerance should apply to the full-load indoor airflow rate during the heating test. (Lennox, No. 13 at p. 5) Carrier also supported making adjustments to the test facility's equipment, but not to the unit's fan settings, to maintain proper airflow. Carrier also commented that the proposed ANSI/AHRI 340/360-2015 includes a requirement to manually adjust fan speed during the heating cycle if the unit is equipped with automatic controls that control the fan speed in heating mode. (Carrier No. 11 at pp. 4-5)

AHRI, Carrier, Goodman, and Lennox agreed with DOE that indoor airflow should be reported in both cooling and heating mode if they are different. (AHRI, No. 8 at p. 6; Carrier, No. 11 at p. 5; Goodman, No. 14 at p. 2; Lennox, No. 13 at p. 5) AHRI and Carrier are not aware of any equipment that has a different airflow for heating and cooling but believe that it could be an option in the future.

After reviewing the comments on the NOPR, DOE agrees that a 5-percent tolerance on the rated full-load indoor airflow rate would allow more variation than desired in the EER and cooling capacity. Test results provided by manufacturers regarding the range of potential variation are greater than the estimates DOE initially made, which supported the 5 percent proposal. Based on the additional information provided by manufacturers, DOE is revising its proposed tolerance level on the rated full-load indoor airflow rate from 5 percent to 3 percent. Additionally, given the generally positive feedback received in response to its proposed approach, DOE is also adopting its proposal that full-load airflow rate be maintained when switching from cooling mode to heating mode by adjusting the test facility (but not the unit under test) without regard to the resulting ESP. In addition, DOE is adopting its proposed

certification and reporting requirements with minor clarifications. Specifically, a manufacturer must include in its certification report the adjusted indoor airflow at each part-load condition for both cooling and heating modes. In cases where a model is designed to operate with the same indoor airflow rate for cooling and heating modes, the reported numbers may be the same for each mode.

### 3. Condenser Head Pressure Controls

In the August 2015 NOPR, DOE proposed to specify that condenser head pressure controls, if included with the unit, must be active during testing. DOE proposed that if a unit with condenser head pressure controls cannot achieve steady-state operation with the controls active, and thus cannot be tested, the manufacturer would have to request a waiver. DOE also requested comment on whether there are any units on the market with condenser head pressure controls that would prevent the unit from achieving steady-state under the test conditions, and if so, how should DOE address these kinds of units for testing purposes. 80 FR at 46873-46874.

In response, AHRI, Carrier, Ingersoll Rand, Goodman, and Lennox agreed with DOE's proposal to keep the head pressure controls active in automatic mode if present. (AHRI, No. 8 at p. 6; Carrier, No. 11 at p. 5; Ingersoll Rand, No. 9 at p. 31; Goodman, No. 14 at p. 2; Lennox, No. 13 at p. 5) AHRI, Carrier, Goodman, and Lennox also commented that the current draft of ANSI/AHRI 340/360-2015 clarifies the requirements for running the head pressure control in automatic mode and also provides a new test procedure to determine the rating performance when head pressure control results in unstable operation.

After reviewing the comments, DOE is clarifying the current test procedure to specify that condenser head pressure controls, if included with the unit, must be active during testing, as proposed in the NOPR. As noted previously, AHRI 340/360-2015 is still a draft document, and DOE is not incorporating it by reference in this rule. In addition, DOE declines at this time to adopt a test method like that in AHRI 340/360-2015 regarding rating performance when head pressure control results in unstable operation. DOE will continue to review this industry testing standard and may consider adopting a method to address this issue in the future after a full public comment process.

#### 4. Unit of Measurement for Airflow

DOE also proposed that all instances of CFM as a unit of airflow must be interpreted to mean SCFM where they appear in the sections of ANSI/AHRI 340/360-2007, incorporated by reference in 10 CFR 431, subpart F. 80 FR at 46874.

In response, AHRI, Carrier and Ingersoll Rand agreed with this approach. (AHRI, No. 8 at p. 4; Carrier No. 11 at p. 3; Ingersoll Rand No. 9 at p. 14) Each of these commenters recommended adopting ANSI/AHRI 340/360-2015, which would provide clear instructions to ensure that airflow is measured in SCFM for testing. AHRI noted that this issue is already addressed in ANSI/AHRI 340/360-2007 through the reference to ASHRAE 37-2009, which defines the unit of airflow as standard CFM.

As noted in section III.A.1, DOE declines to reference ANSI/AHRI 340/360-2015 at this time. Further, although section 7.7.2.3 of ASHRAE 37-2009 may be interpreted as an indication that airflow rate is to be expressed in terms of standard air in all test standards that incorporate it

by reference, this interpretation may not be sufficiently clear from the relevant text of the current test procedure, which refers to both CFM and SCFM in various locations. Hence, DOE is clarifying the test procedure to indicate that all instances of CFM as a unit of airflow must be interpreted to mean SCFM where they appear in the sections of ANSI/AHRI 340/360-2007 incorporated by reference in 10 CFR part 431, subpart F.

#### 5. Tolerance on Percent Load for IEER Part-Load Tests

DOE proposed applying a +/- 3-percent tolerance to each part-load test point in the IEER calculation, and formally requested comment on the appropriateness of establishing such a tolerance level. See 80 FR at 46878-46879 (request for comment) and 80 FR at 46874 (discussing DOE's +/- 3-percent tolerance proposal). Specifically, if the measured load fraction is within 3 percent of the target load fraction, the measured EER would not have to be adjusted using interpolation or application of the degradation factor for cyclic operation.

Responding to this aspect of the proposal, AHRI, Goodman, and Lennox agreed in principle with setting a tolerance on the part-load percent load when the unit cannot run at precisely 75-percent, 50-percent, and 25-percent part-load capacities. The commenters also agreed with DOE's tolerance level of 3 percent. (AHRI, No. 8 at p. 6; Goodman, No. 14 at p. 2; Lennox, No. 13 at p. 6)

However, AHRI and Carrier commented that implementing the 3-percent tolerance without also adopting some other provisions of ANSI/AHRI 340/360-2015 would vary IEER results by as much as 5 percent, a magnitude they considered inappropriate. (AHRI, No. 8 at p. 6; Carrier No. 11 at p. 3) AHRI stated that this variation could be reduced significantly by changing

the condenser air inlet temperature used for each given part-load point. Specifically, AHRI 340/360-2007 relies on condenser air inlet temperatures as a function of percent load, while AHRI 340/360-2015 specifies condenser air inlet temperatures that are fixed for each rating point percent load. (AHRI, No. 9 at p. 6) The relationship between condenser air inlet temperature and percent load is provided in section 6.2.2 of AHRI 340/360-2007. AHRI stated that adopting the proposed 3-percent tolerance for part-load tests with the current approach would result in an IEER variation of -4.6 percent to +4.8 percent. However, if the condenser air entering temperature is fixed to the target percent load, then IEER variations would be reduced to 1.5 or 1.6 percent. (AHRI, Public Meeting Transcript, No. 15 at p. 33-36) AHRI and Carrier, as well as Goodman and Lennox, proposed that DOE reference ANSI/AHRI 340/360-2015 (section 6.2) which includes the +/- 3-percent load fraction tolerance along with the other revisions to the IEER testing procedures. (AHRI, No. 8 at pp. 6-7; Carrier, No. 11 at p. 3; Goodman, No. 14 at p. 2; Lennox, No. 13 at p. 6)

After reviewing the comments on the appropriateness of establishing a 3-percent tolerance on each part-load test point, as proposed in the NOPR, DOE is adopting the 3-percent part-load test point tolerance, and is also adopting the suggestion from several commenters for setting the condenser inlet air temperature for the test, which commenters viewed as being linked to the revised 3-percent tolerance level. DOE is adopting this suggestion in response to stakeholders' comments that a 3-percent tolerance on part-load testing would not be appropriate unless the condenser air entering temperature is fixed at the temperature for the target part-load point. Adopting this suggested approach will help reduce the variability in test results for variations in percent load within 3-percent of the target part-load point. AHRI supported this

approach with data demonstrating how implementing this requirement for setting the condenser air entering temperature would reduce the variability in test results. (AHRI, No. 7 at p. 18) In addition, this change has the potential to significantly reduce test burden, since the current test procedure requirement, by specifying condenser inlet air temperature as a function of the measured load fraction, can lead to multiple repetitions of the test if the measured load fraction is different than the load fraction used to calculate the air temperature used for the test. Also, the suggested approach from the commenters is more consistent with the way a unit would actually operate in the field. Specifically, when a unit cycles between operating levels to satisfy an average load represented by the target load fraction, the ambient temperature remains constant. DOE investigated potential changes in measurement associated with this test procedure change and found that it would not change the measurement unless the interpolation method is used to determine one or more of the part-load EER levels and for which one of the measurements used for the interpolation(s) has a measured percent load less than 44.4 percent. Also, for typical units that fit this description, the change in the measurement is less than one percent. With respect to IEER, DOE concludes this is a de minimis change, the extent of which would not impact a model's ability to comply with a given IEER standard or alter the measured energy efficiency of the covered equipment.

DOE has elected to implement the additional change regarding condenser air inlet temperature by noting this difference with respect to AHRI 340/360-2007 within the regulatory language in the CFR rather than incorporating by reference the 2015 version of the standard—DOE's decision not to incorporate AHRI 340/360-2015 by reference is discussed in section III.A.1.

## 6. Definition of IEER

DOE proposed to define IEER (i.e. integrated energy efficiency ratio) as meaning “a single number part-load efficiency based on weighting of EER at various load capacities, as measured in Appendix A to Subpart F of part 431, expressed in Btu/watt-hour.” (80 FR at 46880)

In response to this proposed definition, AHRI and Carrier agreed that the definition of IEER must be improved and clarified. (AHRI, No. 8 at p. 4; Carrier, No. 11 at pp. 3-4) However, AHRI and Carrier commented that DOE’s definition does not account for the operating conditions and rating conditions required to accurately rate IEER. They commented that this is a significant aspect of the IEER metric and it should be mentioned in the definition to avoid any misrepresentation. AHRI and Carrier further commented that the DOE definition also proposes to reference the new DOE appendix A, which does not directly address the requirements for IEER and refers back to AHRI 340/360. AHRI and Carrier suggested as an alternative that DOE use the IEER definition in ANSI/AHRI 340/360-2015. (AHRI, No. 8 at p. 4; Carrier, No. 11 at pp. 3-4)

The draft version of ANSI/AHRI 340/360-2015 section 3.11 defines IEER as "a weighted calculation of mechanical cooling EERs at full-load and part-load Standard Rating Conditions, defined in Section 6.2, expressed in Btu/Wh."

Ingersoll Rand suggested a different definition for IEER: “Integrated energy efficiency ratio, or IEER, means the cooling energy efficiency descriptor for packaged air-conditioning and heating equipment (air-cooled with a rated cooling capacity  $\geq 65,000$  Btu/h), determined as a single number part-load efficiency based on weighting of EER at various load capacities, as

measured in appendix A to subpart F of part 431, expressed in Btu/watt-hour.” (Ingersoll Rand, No. 9 at p. 2) Ingersoll Rand made this suggestion to clarify that: (1) IEER is the only cooling efficiency descriptor for CUAC and CUHP and (2) IEER is specific to CUAC and CUHP and does not apply to other commercial package air-conditioning and heating equipment. (Id.)

DOE agrees that the rating conditions for IEER could be acknowledged in the definition. However, DOE declines to reference AHRI 340/360 directly, as all representations of IEER must be made based on DOE’s test procedure, which contains additional provisions beyond those in the referenced industry standard. Therefore, DOE is adopting a modified definition for IEER that references rating conditions rather than load capacities, but still specifies that measurements be made in accordance with Appendix A. DOE also declines to include equipment references at this time. In the future, DOE may adopt energy conservation standards based on IEER for equipment other than CUAC and CUHP. Hence, DOE declines to specify or otherwise limit what equipment uses this metric. DOE addresses Ingersoll Rand’s concern regarding the efficiency descriptor in section III.D.

DOE does agree that the IEER is intended to measure cooling provided by the refrigeration system, i.e. “mechanical cooling”, and does not address other modes of cooling that the equipment might provide. As an example, CUAC and CUHP equipment may provide economizer cooling, which involves use of cool outdoor air during cool weather to cool the interior of a building without the use of refrigeration system operation.

For these reasons, DOE is adopting the following definition for IEER:



Integrated energy efficiency ratio, or IEER, means a weighted average calculation of mechanical cooling EERs determined for four load levels and corresponding rating conditions, as measured in Appendix A to Subpart F of part 431, expressed in Btu/watt-hour.

## 7. Additional Test Procedure Provisions

Current DOE regulations include provisions for refrigerant charging and airflow rate relevant to multiple equipment categories, including CUACs and CUHPs. (10 CFR 431.96(e)) DOE proposed adding these provisions to the proposed appendix A, section (5) for CUACs and CUHPs, while maintaining the original provision in 431.96(e) for the other relevant equipment categories. 80 FR at 46881. These provisions require that if a manufacturer specifies a range (rather than a specific rating value) of superheat, sub-cooling, and/or refrigerant charge pressure in its installation and operation manual, any value within that range may be used to determine refrigerant charge or mass of refrigerant.

In response to the NOPR, Goodman stated that manufacturers typically specify a broader range of superheat or subcooling for field charging than would be accepted in the laboratory (because field measurement equipment is not as accurate as laboratory measurement equipment). Goodman further added that the AHRI certification program has a policy of adjusting charge to the middle of the range, which makes the test more accurate. (Goodman, No. 14 at p. 3)

DOE notes that the refrigerant charge, superheat, and subcooling values are interrelated such that DOE does not believe Goodman's suggestion of hitting the midpoint of all of the ranges can be achieved in all cases. Consequently, DOE is not requiring that the test be performed at the midpoint of each of the ranges. Instead, DOE is clarifying that test labs should

only be adjusting charge once for both the cooling and heating test and a test lab should aim for the middle of the subheat or subcool range. However, DOE emphasizes that any point in the range is still acceptable at this point in time. Should industry believe additional specificity regarding these provisions would improve repeatability or reproducibility, DOE may consider further amendments in a future rulemaking. For consistency in testing, DOE will follow the approach of attempting to achieve the midpoint of one of the values, which it considers to be a best practice.

In regards to airflow, DOE currently requires that the airflow rate used for testing must be in the installation and operations manual shipped with the basic model and clearly identified as the value used to generate DOE performance ratings; otherwise, a value of 400 SCFM per ton is used. See 10 CFR 431.96(e). Responding to DOE's proposal to include this set of requirements as part of appendix A, Goodman noted that manufacturers who certify through AHRI have the full-load cooling capacity shown in the AHRI Directory of Certified Product Performance, and that the value in that directory should be used as opposed to using 400 SCFM per ton. (Goodman, No. 14 at p. 3)

DOE notes that for commercial package air conditioning and heating equipment, manufacturers are currently required to certify rated airflow in SCFM for each fan coil. See 10 CFR 429.43(b)(4)(i)-(ii) (specifying certification report contents for commercial package air conditioning and heating equipment). As noted earlier, DOE is clarifying this requirement as described in section III.A.2. DOE expects the certified airflow values to be consistent with those in the installation manual and reported to AHRI, because the airflow used in tests (whether for

certifying performance to DOE or as used by AHRI) should be the same airflow that installers would use when setting up the unit based on the installation instructions. However, in the event a manufacturer fails to report airflow to DOE, the specified value of 400 SCFM per ton prescribed by 10 CFR 431.96(e) will continue to apply.

## B. Certification and Enforcement Issues and Compliance Dates

In addition to addressing various aspects related to the testing of CUACs and CUHPs, DOE also proposed various certification and enforcement-related provisions with respect to this equipment. Additionally, DOE proposed including provisions related to the reporting of IEER values for certification and compliance purposes once the compliance dates for the standards recommended by the Working Group are reached. These issues are addressed in the following sections.

### 1. Measuring Cooling Capacity for Purposes of Certification, Assessment, and Enforcement

DOE proposed that the cooling capacity represented and subsequently certified to DOE for a given basic model must be the average of the capacities measured for the sample of units tested to certify that basic model, rounded according to the multiples in Table 4 in ANSI/AHRI 340/360-2007. DOE also proposed that when conducting assessment and enforcement testing, it would measure the total cooling capacity pursuant to the test requirements of 10 CFR 431.96 for each unit tested, and the results of the measurement(s) would be compared to the value of cooling capacity certified by the manufacturer. The manufacturer-certified cooling capacity will be considered valid if the cooling capacity determined through DOE testing is within 5 percent of the certified cooling capacity. (80 FR at 46874)

With respect to the certification requirements, Lennox disagreed with DOE's proposal to require that the certified cooling capacity be the average of the capacities measured for the sample of units tested. (Lennox, No. 13 at p. 3) Lennox stated that conservative capacity ratings subject equipment to more stringent efficiency standards. Lennox further commented that if forced to reclassify equipment into higher-capacity classes, manufacturers could face unduly burdensome administrative and procedural obligations without any benefit to energy efficiency. Lennox also stated that if conservatively-rated equipment is categorized into a larger equipment class, it can change the test conditions (i.e. ESP), resulting in a further change from the designed capacity and IEER level of the product. Lennox added that in the past, DOE has allowed manufacturers to conservatively rate products, such as in the final rule establishing AEDMs for commercial air-conditioning and refrigeration equipment and walk-in coolers and freezers. (Lennox, No. 13 at pp. 3-4)

Ingersoll Rand commented that, while DOE's certification regulations typically require manufacturers to report capacity, DOE does not specify that manufacturers determine capacity through testing specified by DOE, and that DOE has not found that capacity is a measure of energy consumption as defined by EPCA at 42 U.S.C. 6291(8). (Ingersoll Rand, No. 9 at p. 13) Ingersoll Rand also noted that DOE had not demonstrated why such a proposal is necessary. (Id.)

With respect to the enforcement testing provisions, AHRI, Ingersoll Rand, and Goodman commented that a tolerance of 5 percent should not be applied to capacity because there are many factors that can affect measured capacity and performance, including variance in airflow, refrigerant charge levels, ambient conditions, test labs, and test setup. (AHRI, No. 8 at p. 3; Ingersoll Rand, No. 9 at p. 14; Goodman, No. 14 at p. 3) Goodman commented that a 5-percent

tolerance is too low because, due to a number of variables, the true uncertainty of the test is probably at least 8 percent. (Goodman, No. 14 at p. 3)

AHRI commented that in the event that a verification test for its certification program shows that the cooling capacity is less than 95 percent of its rated value, the manufacturer fails the test and is then subject to stiff penalties, which are, in its view, strong incentives to discourage manufacturers from over-rating cooling capacity and energy efficiency. AHRI recommended that DOE base the equipment classification on the rated capacity only. However, in the event that DOE feels compelled to move forward with its proposal, AHRI requested that the proposed requirement apply only when the tested cooling capacity is less than 95 percent of the certified value, and not when the tested cooling capacity is greater than 105 percent of the certified value. (AHRI, No. 7 at p. 3) Carrier agreed that any tolerance should be a one-sided tolerance, allowing manufacturers to choose to rate products conservatively. (Carrier, No. 11 at p.3)

Trane commented that, in common practice, a tolerance on capacity becomes an issue at 240,000 Btu/h, which is a break between equipment classes as well as a nominal equipment tonnage. However, manufacturers do not always hit this design point, which puts them on one side or the other of the equipment class dividing line. For this reason, they tend to rate conservatively to avoid risk. (Trane, NOPR public meeting transcript, No. 15 at pp. 54-55) Carrier added that the need to conservatively rate will increase with the change in refrigerants, and that the current AHRI statistics show that they exceed 105 percent on many tests. (Carrier, NOPR public meeting transcript, No. 15 at pp. 55-56)

DOE notes that the August 2015 NOPR proposed to add a provision that the represented value of cooling capacity must be the average of the capacities measured for the units in the sample selected for testing or the output of the AEDM when simulating results rounded according to the multiples in Table 4 in ANSI/AHRI 340/360-2007. DOE further proposed to add enforcement provisions for verifying the rated cooling capacity, as the rated cooling capacity determines both the equipment class and which testing conditions apply. See 80 FR at 46874 (discussing proposed clarification) and 46879 (presenting detailed regulatory text). Without reporting and enforcement provisions for cooling capacity, manufacturers may choose to over- or under-rate cooling capacity intentionally in order to achieve more favorable testing conditions or less stringent efficiency standards. DOE does not believe industry intended to suggest a regulatory approach where a manufacturer would self-declare its rating conditions and standards, as that approach could cause unintended consequences such as inequitable ratings due to differences in self-declarations. Many in industry, including commenters who participate in the AHRI Certification Program, saw the importance of including provisions surrounding cooling capacity since there is a verification tolerance reflected in that program, as AHRI noted. Consequently, in DOE's view, provisions regarding the determination of represented cooling capacity along the lines of the August 2015 proposal are needed.

While DOE acknowledges that multiple factors may affect the measurement of cooling capacity, DOE maintains that capacity-related provisions are necessary to ensure the reliability and consistency of the reported ratings because, as commenters pointed out, DOE expects there to be variation in the capacity measurement from different units being tested at different laboratories. Consequently, DOE is modifying its proposal for determining represented cooling capacity based on the comments received to allow for conservative rating declared according to

the multiples in Table 4 in ANSI/AHRI 340/360-2007 but is not less than 95% of the mean values of the two or more units in the sample for certification testing or the output from the AEDM. DOE believes this is consistent with that currently used in the industry, including the certified ratings program approach developed by AHRI. In the industry program, this tolerance serves as the basis for penalizing manufacturers if the tested cooling capacity is lower than 95% of the rated cooling capacity of that equipment. This tolerance will help to ensure that equipment is capable of performing at the cooling capacity for which it is represented to consumers. At this time, DOE is declining to adopt specific capacity-related enforcement provisions and will evaluate compliance with standards based on the testing results from the enforcement sample. DOE believes it is important that products comply with the applicable standards based on actual tested performance rather than based on a manufacturer self-declaration.

## 2. Compliance Dates of the Certification, Reporting, and Test Procedure Amendments

In the August 2015 NOPR, DOE indicated that its proposal would be unlikely to alter the measured efficiency of CUACs and CUHPs. DOE proposed to require the reporting of IEER and indoor part-load airflow rates used in the IEER calculation when certifying compliance with the 2018 or 2023 standards. DOE also proposed to apply a +/- 3-percent tolerance to each part-load test point for manufacturers to use when developing the IEER ratings for a given basic model. This clarification would be required when testing to determine EER for part-load rating points. See 80 FR at 46879-82.

DOE stated that its proposed amendments that were not specifically related to IEER would clarify how to test a given unit. The proposals, if adopted, would result in no procedural changes related to how testing would be performed. The proposed amendments, if adopted, would become effective 30 days after publication of the final rule in the Federal Register. Consistent with 42 U.S.C. 6314(d), DOE proposed that any representations of energy consumption or efficiency of CUACs and CUHPs must be based on any final amended test procedures 360 days after the publication of the test procedure final rule. 80 FR at 46874-74685.

Ingersoll Rand disagreed with DOE's assertion that the proposed clarifications and amendments would not result in any changes to the energy efficiency of current equipment. While Ingersoll Rand agreed that the proposed changes would likely not affect the measure of EER for air-cooled commercial package air conditioning equipment, the proposed changes would add the IEER metric, which, in Ingersoll Rand's view, is a significant change to the measure of energy efficiency of current equipment. Ingersoll Rand commented that the proposed amendments to the test procedures will change the measure of energy itself, and, as DOE's proposal would require re-rating units within 360 days of publication of the final rule, that this would be a "change in the representations of the energy efficiency of current equipment." (Ingersoll Rand, No. 9 at p. 12)

Ingersoll Rand also noted that while many manufacturers, including itself, already include an IEER rating in the AHRI Directory of Certified Product Performance, that information is not based on testing units in accordance with the sampling plan contained in the proposed section 429.43, but is often based on testing a single unit. Therefore, to comply with the proposed rule, manufacturers would be required to perform a substantial amount of additional



testing. Furthermore, since the testing requirements would go into effect before the compliance date of the energy conservation standards proposed by the ASRAC Commercial Package Air Conditioners and Commercial Warm Air Furnaces Working Group, those units currently offered for sale but not meeting the January 2018 standards proposed by the Working Group would still need to be tested in order for manufacturers to make IEER representations on which builders would rely for purposes of meeting the provisions contained in ASHRAE 90.1.2013. (That industry-based standard sets a minimum level of efficiency for CUAC and CUHP equipment and includes a minimum rating level based on IEER.) In its view, the proposal's impact will be far more than modest and must be addressed by DOE or accounted for in its estimates under the Paperwork Reduction Act. (Ingersoll Rand, No. 9 at pp. 10-11)

For these reasons, Ingersoll Rand recommended that the effective date of compliance with the test procedure amendments with respect to testing, representations, and reporting of IEER be made to coincide with the effective date of the amended standard setting the initial IEER standard. (Ingersoll Rand, No. 9 at p. 12)

DOE has carefully considered Ingersoll Rand's comments. DOE is adopting its proposal that reporting of IEER and indoor part-load airflow rates used in the IEER calculation will be required when certifying compliance with any amended standards and finds that this approach is consistent with Ingersoll Rand's comments. However, DOE also maintains that, consistent with 42 U.S.C. 6314(d), any representations of energy consumption or efficiency of CUACs and CUHPs must be based on any final amended test procedures 360 days after the publication of the test procedure final rule. See 80 FR at 46874-46875. Although Ingersoll Rand argued that this

amendment would subject units that will not meet the recommended January 2018 standards to the testing requirements to demonstrate that the units meet the IEER levels of ASHRAE 90.1–2013 that many builders require, those units were already subject to those testing requirements. DOE recognizes that manufacturers currently do not need to certify their equipment to meet IEER. Manufacturers must, however, follow the applicable test procedure requirements when making representations of energy efficiency, including those aspects of the test procedure that apply to another metric should they decide to report the efficiency of their equipment using that metric. DOE’s current test procedure for CUACs and CUHPs already includes a test method for measuring IEER. See 10 CFR 431.96(b)(2) (incorporating, through Table 2, various test procedures used for assessing compliance, including the procedures specified by AHRI 340/360-2007, which contains testing methods for measuring IEER). EPCA restricts representations of efficiency where DOE has prescribed a test method. Specifically, any representation of efficiency for a CUAC or CUHP must fairly disclose the results of testing in accordance with the DOE test procedure within 360 days of DOE having prescribed the test procedure. Therefore, all existing representations of IEER for this equipment would have already been made in accordance with DOE’s regulations regarding test procedures and sampling plans, even though submission of a certification report for that metric is not required. As discussed in section III.A.5, DOE has determined that the amended requirements on part-load test points will produce only a de minimis change and not impact a model’s ability to comply with an IEER standard or alter the measured and rated energy efficiency of the covered equipment. For these reasons, DOE does not anticipate that manufacturers will require additional time to comply with pre-existing requirements that they already must meet.

Furthermore, with respect to Ingersoll Rand's claim that significant additional testing will be required to meet the sampling requirements, based on manufacturer compliance certifications, most CUAC and CUHP manufacturers use alternative efficiency determination methods ("AEDMs") to rate the majority of their equipment for EER. Ingersoll Rand states that manufacturers have been testing for IEER and have single tests of a wide variety of basic models, so manufacturers already have sufficient test data to develop and support an AEDM, even if they have not yet developed AEDMs to simulate IEER. Therefore, even if a manufacturer is not currently making representations in accordance with the DOE test procedure (as it is already required to do), DOE believes a 360-day compliance period provides sufficient time for such a manufacturer to do so, particularly if the manufacturer already has a collection of existing test data for its equipment.

Finally, DOE disagrees that the information collection approved by the Office of Management and Budget requires modification as a result of this rule. This rule does not change the test burden or record retention requirements that are reflected in the existing approval. Furthermore, although the metric reported to DOE will change from EER to IEER, there will be no increase in burden. DOE will revise its certification information collection to reflect the metric change prior to the reporting change in 2018.

### C. Future Test Procedure Rulemakings

The California IOUs encouraged DOE to initiate a more expansive test procedure rulemaking before January 1, 2016, as recommended by the ASRAC Working Group.

(California IOUs, No. 10 at p. 1) The California IOUs commented that a new, more representative, metric is needed.

The California IOUs also suggested that DOE research the impact of fan energy on equipment ratings, specifically the external static pressure settings for equipment and whether it reflects field conditions. (California IOUs, No. 10 at p. 2) The IOUs further noted that the IEER test procedure proposed for inclusion by DOE in its regulations specified ESP ratings that are unrealistically low in the four test points, which results in measured fan energy consumption during testing conditions being lower than that found in actual operating conditions, which artificially inflates the IEER ratings. The California IOUs also encouraged DOE to create a test procedure that accounts for economizer energy consumption, as this aspect is omitted in the current proposed test procedure. See *id.*

The California IOUs suggested further that DOE should investigate the impact of requiring an additional higher temperature test point rating, such as 105 °F or 115 °F, to better reflect operating conditions experienced in hotter climates. (California IOUs, No. 10 at p. 2) The California IOUs noted that the current efficiency rating measures equipment at a maximum outside dry bulb air temperature of 95 °F. In their collective view, while this value is appropriate for much of the United States, it does not reflect peak values often experienced in parts of the desert southwest.

DOE notes that the Working Group recommended that a rulemaking to amend the test procedure shall be initiated no later than January 1, 2016, with the final rule issued no later than

January 1, 2019. That rulemaking, based on the Working Group's recommendation, would be to focus on better representing the total fan energy use by considering (a) alternative external static pressures and (b) operation for other than mechanical cooling and heating. EERE-2013-BT-STD-0007-0093, ASRAC Working Group Term Sheet (recommending a series of actions for DOE to take with respect to CUAC and CUHP standards and testing). DOE plans to initiate an additional test procedure rulemaking focused on revising the IEER metric consistent with this recommendation. DOE may consider additional test procedure revisions at that time.

#### D. Regulatory Text Language

Ingersoll Rand asserted that the proposed IEER definition and the test procedure table (Table 1 to 10 CFR 431.96) are inconsistent with the terms of the ASRAC Working Group Term Sheet because they add IEER as a cooling metric but keep EER. Ingersoll Rand stated that the Working Group agreed that, subsequent to the effective date of the January 2018 energy conservation standard, IEER would be the sole DOE measure of cooling efficiency required to be reported to DOE. (Ingersoll Rand, No. 9 at pp. 1-2)

Ingersoll Rand added that it believed that DOE proposed amending 10 CFR 431.96 in order to make it easier for the user to follow, but without consideration of the Working Group recommendation to initiate a rulemaking to amend the test procedure for small, large, and very large air-cooled commercial package air conditioning and heating equipment. In its view, Table 1 to 10 CFR 431.96 could be confusing to the user if it included a distinction between the different measures of energy consumption and the two different test procedures before and after the expected effective date of the IEER standards. Ingersoll Rand commented that it would be

clearer and simpler for DOE to return to the earlier format of section 431.96 and add the test procedure and energy descriptor updates in separate tables with their effective dates. It offered alternative tables for DOE to consider. (Ingersoll Rand, No. 9 at pp. 3-8)

DOE notes that that the primary purpose of the test procedure tables in 10 CFR 431.96 is to describe the test procedure relevant to each equipment category. The metrics required to be reported to DOE can be found in 10 CFR 429.43. As proposed (and amended by this rule), 10 CFR 429.43 will not require EER to be reported to DOE when certifying compliance with any IEER standards. However, consistent with DOE's incorporation of AHRI 340/360-2007, the test procedure itself will still include EER, which manufacturers are required to use when making EER-based representations when they choose to do so, independent of their representations required under DOE's compliance requirements.

Ingersoll Rand also criticized DOE's proposed reference to the "January 1, 2018 and January 1, 2023 standards" that would be added to 10 CFR 429.43(b)(2)(i)(B), as being vague, particularly in light of the changes made to the standards table in 10 CFR 431.97(b) by the July 17, 2015 final rule regarding energy conservation standards for small three-phase commercial air-cooled air conditioners. 80 FR 42614. Ingersoll Rand suggested that DOE consider the format of 10 CFR 429.43(b)(2)(i) and 10 CFR 431.97 that will result from both the test procedure and energy conservation standards rulemakings in completing this test procedure rulemaking, rather than waiting for the standards rulemaking. Ingersoll Rand suggested wording for 10 CFR 429.43(b)(2)(i) and recommended that DOE insert two new tables (as Tables 4 and 5) that would

accommodate the 2018 and 2023 standards and would be reserved until DOE completes the energy conservation standards rulemakings. (Ingersoll Rand, No. 9 at pp. 9-10)

Ingersoll Rand also disagreed with the proposed language in §429.43(b)(4) that lists certification report requirements (including the rated airflow for part-load operation which is needed for testing to measure IEER), and which refers to the “January 1, 2018 or the January 1, 2023 energy conservation standards.” Ingersoll Rand indicated that such references are vague and could lead to misinterpretations regarding DOE’s regulations, recommending instead that DOE refer in these sections specifically to the appropriate standards listed in specific tables of section 431.97. (Ingersoll Rand, No. 9 at p. 12)

DOE acknowledges the potential for misinterpretation. Therefore, DOE has revised the language in 429.43 to refer to compliance with EER standards or IEER standards rather than making a reference to future 2018 or 2023 standards that have not been finalized.

#### **IV. Procedural Issues and Regulatory Review**

##### **A. Review Under Executive Order 12866**

The Office of Management and Budget (OMB) 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. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 et seq.) requires preparation of an initial regulatory flexibility analysis (IFRA) 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: <http://energy.gov/gc/office-general-counsel>.

DOE reviewed today’s final rule under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. This final rule prescribes clarifications to DOE’s already-existing test procedures that will be used to test compliance with energy conservation standards for the equipment that are the subject of this rulemaking. DOE has concluded that the final rule would not have a significant impact on a substantial number of small entities.

For manufacturers of small, large, and very large air-cooled CUAC and CUHP, the Small Business Administration (SBA) has set a size threshold, which defines those entities classified as “small businesses” for the purposes of the statute. DOE used the SBA’s small business size standards to determine whether any small entities would be subject to the requirements of the rule. 65 FR 30836, 30848 (May 15, 2000), as amended at 65 FR 53533, 53544 (Sept. 5, 2000) and codified at 13 CFR part 121. The size standards are listed by North American Industry



Classification System (NAICS) code and industry description and are available at <http://www.sba.gov/category/navigation-structure/contracting/contracting-officials/small-business-size-standards>. Manufacturing of small, large, and very large air-cooled CUAC and CUHP is classified under NAICS 333415, “Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing.” The SBA sets a threshold of 750 employees or less for an entity to be considered as a small business for this category. DOE initially identified 13 potential manufacturers of commercial packaged air conditioners sold in the U.S. DOE then determined that 10 were large manufacturers, manufacturers that are foreign-owned and -operated, or manufacturers that do not produce equipment covered by this rulemaking. DOE was able to determine that the other three companies met the SBA’s definition of a small business and sell CUAC/CUHP products.

The first small company specialized in manufacturing double-duct CUAC/CUHP products, which would not subject to the amended IEER standards recommended by the Working Group formed to negotiate the CUAC/CUHP standards.<sup>3</sup> This manufacturer did not produce any equipment that would be covered under the recommended IEER standards. The second small company did not own any production assets for CUAC/CUHP equipment. This company outsourced the design and manufacture of equipment to a supplier. The third small company manufactured covered equipment that are subject to the amended test procedures. Based on DOE’s research, this small manufacturer has three product platforms with 11 models that would potentially be subject to testing to determine IEER, and no IEER ratings have been

---

<sup>3</sup> See Docket No. EERE-2013-BT-STD-0007-0093. DOE must effectuate such change in metric through the rulemaking process and in a manner consistent with all applicable statutory requirements.

published for these units. Based on literature reviews, this small manufacturer specializes in custom and semi-custom products.

DOE expects the impact of the final rule on manufacturers, including small businesses, to be minimal. The final rule amends DOE's certification requirements to specify additional reporting requirements and add enforcement provisions for verifying cooling capacity. The final rule also clarifies or amends DOE's test procedures to amend ANSI/AHRI 340/360-2007, "2007 Standard for Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment," to incorporate certain sections by reference, specify requirements for airflow adjustment and tolerance to meet other rating conditions, require units with condenser head pressure controls to be tested with those controls active, clarify the unit of measurement for airflow, and establish a tolerance on part-load rating points.

The amended energy conservation standards for CUAC/CUHP recommended by the Working Group would be based on IEER rather than EER. DOE expects the impact on test burden to be modest. AHRI ratings already include IEER, indicating that many manufacturers, representing a large portion of the market, already determine IEER for their units.

ANSI/ASHRAE/IES Standard 90.1-2013, "Energy Standard for Buildings Except Low-Rise Residential Buildings" (ASHRAE 90.1-2013), has adopted an IEER requirement, which makes reporting of IEER necessary for shipment to those states and localities that will adopt that standard in building codes. Current procedures relating to alternative efficiency determination methods (AEDMs), including procedures for certifying IEER, require a limited amount of testing to be conducted when validating an AEDM for CUACs and CUHPs. 10 CFR 429.70(c)(2)(iv)

(detailing the minimum number of distinct basic models required to be test for purposes of AEDM validation for different equipment types and classes). DOE expects that most CUAC and CUHP ratings will be based on results obtained from AEDMs. Although DOE recognizes that some ratings will be based on testing, DOE expects these ratings to comprise a small minority of products.

For these reasons, DOE certifies that this final rule will not have a significant economic impact on a substantial number of small entities. Accordingly, DOE has not prepared a regulatory flexibility analysis for this rulemaking. DOE will transmit the certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the SBA for review under 5 U.S.C. 605(b).

#### C. Review Under the Paperwork Reduction Act of 1995

Manufacturers of CUACs and CUHPs 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 DOE test procedures for CUACs and CUHPs, including any amendments adopted for those test procedures. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including CUACs and CUHPs. 10 CFR part 429, Subpart B. The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA).

In the Certification of Commercial Equipment Final Rule published in May 2014, DOE amended existing regulations governing compliance certification for a variety of commercial equipment covered by EPCA, which affected CUAC and CUHP manufacturers. 79 FR 25486, 25502 (May 5, 2014). DOE amends its certification requirements to specify additional reporting requirements. DOE does not believe that these additions to the certification requirements constitute a significant additional burden upon respondents, as they require minimal additional information over what manufacturers must already report in their certification reports. DOE believes that the Certification of Commercial Equipment Final Rule provides an accurate estimate of the existing burden on respondents and would continue to apply to the relevant aspects of the proposed amendments. 79 FR 25496-25498 (detailing burden estimates and indicating an average burden of approximately 30 hours per company on an annual basis). OMB has approved the revised information collection for DOE's certification and recordkeeping requirements. 80 FR 5099 (January 30, 2015).

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.

#### D. Review Under the National Environmental Policy Act of 1969

In this final rule, DOE amends its test procedure for CUACs and CUHPs. 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 amends an existing rule without affecting the amount, quality or distribution of energy usage, and, therefore, will not result in any environmental impacts. Thus, this rulemaking is covered by Categorical Exclusion A5 under 10 CFR part 1021, subpart D, which applies to any rulemaking that interprets or amends an existing rule without changing the environmental effect of that rule. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

#### E. 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 examined this final rule and determined that it will 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 are the subject of this 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.

#### F. 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 (February 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 final rule meets the relevant standards of Executive Order 12988.

#### G. 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. 2 U.S.C. 1531 For a regulatory action resulting 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 <http://energy.gov/gc/office-general-counsel>. DOE examined this final 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.

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

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Public Law 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This final rule will 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.

#### I. 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 will not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

J. Review Under 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 (February 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed this final rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

K. 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 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 significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use if the regulation is implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.



This regulatory action 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.

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

Under section 301 of the Department of Energy Organization Act, 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.

While this final rule does not require use of any commercial standards not already incorporated by reference for the relevant section of the code of federal regulations, DOE consulted with both DOJ and FTC and received no comments.

M. Description of Materials Incorporated by Reference

In this final rule, DOE is incorporating by reference ANSI/AHRI Standard 340/360-2007, “2007 Standard for Performance Rating of Commercial and Industrial Unitary Air-Conditioning

and Heat Pump Equipment” (including Addenda 1 and 2) into part 429 and appendix A to subpart F of part 431. This testing standard details various provisions regarding the testing and calculation of results for the equipment addressed by this rulemaking. The adoption of these provisions are necessary to ensure consistent and repeatable test results. Copies of this testing standard are readily available from the Air-Conditioning, Heating, and Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, (703) 524-8800, or through its website at <http://www.ahrinet.org>.

DOE is also incorporating by reference ANSI/ASHRAE Standard 37-2009, “Methods of Testing for Rating Electrically Driven Unitary Air-Conditioning and Heat Pump Equipment” into appendix A to subpart F of part 431. This testing standard details test methods for the equipment addressed by this rulemaking. The adoption of these provisions are necessary to ensure consistent and repeatable test results. Copies of this testing standard are readily available from the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1791 Tullie Circle, N.E. Atlanta, GA 30329, (800) 527-4723, or through its website at <https://www.ashrae.org>.

#### N. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of this rule before its effective date. The report will state that it has been determined that the rule is not a “major rule” as defined by 5 U.S.C. 804(2).

O. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this final rule.

**List of Subjects**

**10 CFR Part 429**

Confidential business information, Energy conservation, Commercial equipment, Imports, Incorporation by reference, Reporting and recordkeeping requirements.

**10 CFR Part 431**

Administrative practice and procedure, Confidential business information, Energy conservation, Commercial equipment, Imports, Incorporation by reference, Intergovernmental relations, Small businesses.

Issued in Washington, DC, on December 11, 2015.



---

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

For the reasons stated in the preamble, DOE amends parts 429 and 431 of Chapter II, Subchapter D, of Title 10 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. Amend §429.4 by redesignating paragraph (c) as (d) and adding a new paragraph (c) to read as follows:

**§429.4 Materials incorporated by reference.**

\* \* \* \* \*

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

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

(2) Reserved

3. Amend §429.43 by adding a new paragraph (a)(1)(iv), and revising paragraphs (a)(2) and (b)(2)(i) and (ii) and (b)(4)(i), and (ii) to read as follows:

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

(a) \* \* \*

(1) \* \* \*

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

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

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

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

than or equal to the output of the AEDM and greater than or equal to the Federal standard for that basic model.

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

(b) \* \* \*

(2) \* \* \*

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

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

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

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

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

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

*	*	*	*	*
(4)	*	*	*	

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

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

\* \* \* \* \*

4. Amend §429.134 by adding a new paragraph (g) to read as follows:



**§429.134 Product-specific enforcement provisions.**

\* \* \* \* \*

(g) *Air-cooled small ( $\geq 65,000$  Btu/h and  $< 135,000$  Btu/h), large ( $\geq 135,000$  Btu/h and  $< 240,000$  Btu/h), and very large ( $\geq 240,000$  Btu/h and  $< 760,000$  Btu/h) commercial package air conditioning and heating equipment—Verification of cooling capacity.* The cooling capacity of each tested unit of the basic model will be measured pursuant to the test requirements of part 431. The mean of the measurement(s) will be used to determine the applicable standards for purposes of compliance.

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

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

**Authority:** 42 U.S.C. 6291-6317.

6. Amend §431.92 by adding a definition of “integrated energy efficiency ratio, or IEER,” in alphabetical order to read as follows:

**§431.92 Definitions concerning commercial air conditioners and heat pumps.**

\* \* \* \* \*

Integrated energy efficiency ratio, or IEER, means a weighted average calculation of mechanical cooling EERs determined for four load levels and corresponding rating conditions, as measured in 10 CFR, Part 431, Subpart F, Appendix A, expressed in Btu/watt-hour.

\* \* \* \* \*

**§431.95 [Amended]**

7. Amend §431.95 by:

- a. Removing paragraph (b)(4); and
- b. Redesignating paragraphs (b)(5) through (b)(8) as (b)(4) through (b)(7), respectively; and
- c. Adding “and appendix A of subpart F” to the end of redesignated paragraph (b)(4) and paragraph (c)(2).

8. Amend §431.96 by revising paragraphs (b)(1) and (c), and Table 1 to read as follows:

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

\* \* \* \* \*

(b) \* \* \*

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

\* \* \* \* \*

**Table 1 to §431.96—Test Procedures for Commercial Air Conditioners and Heat Pumps**

Equipment type	Category	Cooling capacity	Energy efficiency descriptor	Use tests, conditions, and procedures <sup>1</sup> in	Additional test procedure provisions as indicated in the listed paragraphs of this section
----------------	----------	------------------	------------------------------	---	--

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

<b>Equipment type</b>	<b>Category</b>	<b>Cooling capacity</b>	<b>Energy efficiency descriptor</b>	<b>Use tests, conditions, and procedures<sup>1</sup> in</b>	<b>Additional test procedure provisions as indicated in the listed paragraphs of this section</b>
		<760,000 Btu/h		and 6.6).	
Variable Refrigerant Flow Multi-split Systems, Air-cooled	HP	<65,000 Btu/h (3-phase)	SEER and HSPF	AHRI 1230-2010 (omit sections 5.1.2 and 6.6).	Paragraphs (c), (d), (e), and (f)
		≥65,000 Btu/h and <760,000 Btu/h	EER and COP	AHRI 1230-2010 (omit sections 5.1.2 and 6.6).	Paragraphs (c), (d), (e), and (f)
Variable Refrigerant Flow Multi-split Systems, Water-source	HP	<760,000 Btu/h	EER and COP	AHRI 1230-2010 (omit sections 5.1.2 and 6.6).	Paragraphs (c), (d), (e), and (f)
Single Package Vertical Air Conditioners and Single Package Vertical Heat Pumps	AC and HP	<760,000 Btu/h	EER and COP	AHRI 390-2003 (omit section 6.4).	Paragraphs (c) and (e)

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

(c) *Optional break-in period for tests conducted using AHRI 210/240-2008, AHRI 390-2003, AHRI 1230-2010, and ASHRAE 127-2007.* Manufacturers may optionally specify a “break-in” period, not to exceed 20 hours, to operate the equipment under test prior to conducting the test method specified by AHRI 210/240-2008, AHRI 390-2003, AHRI 1230-2010, or ASHRAE 127-2007 (incorporated by reference; see §431.95). A manufacturer who elects to use an optional compressor break-in period in its certification testing should record this information (including the duration) in the test data underlying the certified ratings that is required to be maintained under 10 CFR 429.71.

\* \* \* \* \*

9. Add appendix A to subpart F of part 431 to read as follows:

**Appendix A to Subpart F of Part 431—Uniform Test Method for the Measurement of Energy Consumption of Air-Cooled Small ( $\geq 65,000$  Btu/h), Large, and Very Large Commercial Package Air Conditioning and Heating Equipment.**

Note: Prior to **[INSERT DATE 360 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, representations with respect to the energy use or efficiency of air-cooled small, large, and very large commercial package air conditioning and heating equipment, including compliance certifications, must be based on testing conducted in accordance with either Table 1 to §431.96 as it now appears or Table 1 to §431.96 as it appeared at 10 CFR part 431, subpart F, in the 10 CFR parts 200 to 499 edition revised as of January 1, 2015. After **[INSERT DATE 360 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, representations with respect to energy use or efficiency of air-cooled small, large, and very large commercial package air conditioning and heating equipment, including compliance certifications, must be based on testing conducted in accordance with Table 1 to §431.96 as it now appears.

(1) Cooling mode test method. The test method for cooling mode consists of the methods and conditions in AHRI 340/360-2007 sections 3, 4, and 6 (omitting section 6.3) (incorporated by reference; see §431.95), and in ANSI/ASHRAE 37-2009 (incorporated by reference; see §431.95). In case of a conflict between AHRI 340/360-2007 or ANSI/ASHRAE 37-2009 and the CFR, the CFR provisions control.

(2) Heating mode test method. The test method for heating mode consists of the methods and conditions in AHRI 340/360-2007 sections 3, 4, and 6 (omitting section 6.3) (incorporated

by reference; see §431.95), and in ANSI/ASHRAE 37-2009 (incorporated by reference; see §431.95). In case of a conflict between AHRI 340/360-2007 or ANSI/ASHRAE 37-2009 and the CFR, the CFR provisions control.

(3) Minimum External Static Pressure. Use the certified cooling capacity for the basic model to choose the minimum external static pressure found in table 5 of section 6 of AHRI 340/360-2007 (incorporated by reference; see §431.95) for testing.

(4) Optional Break-in Period. Manufacturers may optionally specify a “break-in” period, not to exceed 20 hours, to operate the equipment under test prior to conducting the test method in Appendix A of this part. A manufacturer who elects to use an optional compressor break-in period in its certification testing must record this information (including the duration) as part of the information in the supplemental testing instructions under 10 CFR 429.43.

(5) Additional Provisions for Equipment Set-up. The only additional specifications that may be used in setting up a unit for test are those set forth in the installation and operation manual shipped with the unit. Each unit should be set up for test in accordance with the manufacturer installation and operation manuals. Paragraphs (5)(i) through (ii) of this section provide specifications for addressing key information typically found in the installation and operation manuals.

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

(ii) The airflow rate used for testing must be that set forth in the installation and operation manuals being shipped to the customer with the basic model and clearly identified as that used to generate the DOE performance ratings. If a certified airflow value for testing is not clearly identified, a value of 400 standard cubic feet per minute (scfm) per ton shall be used.

(6) Indoor airflow testing and adjustment.

(i) When testing full-capacity cooling operation at the required external static pressure condition, the full-load indoor airflow rate must be within  $\pm 3$  percent of the certified-rated airflow at full-capacity cooling operation. If the indoor airflow rate at the required minimum external pressure is outside the  $\pm 3$ -percent tolerance, the unit and/or test setup must be adjusted such that both the airflow and ESP are within the required tolerances. This process may include, but is not limited to, adjusting any adjustable motor sheaves, adjusting variable drive settings, or adjusting the code tester fan.

(ii) When testing other than full-capacity cooling operation using the full-load indoor airflow rate (e.g., full-load heating), the full-load indoor airflow rate must be within  $\pm 3$  percent of the certified-rated full-load cooling airflow (without regard to the resulting external static pressure), unless the unit is designed to operate at a different airflow for cooling and heating mode. If necessary, a test facility setup may be made in order to maintain airflow within the required tolerance; however, no adjustments to the unit under test may be made.

(7) Condenser head pressure controls. Condenser head pressure controls, if typically shipped with units of the basic model by the manufacturer or available as an option to the basic model, must be active during testing.

(8) Standard CFM. In the referenced sections of AHRI 340/360-2007 (incorporated by reference; see §431.95), all instances of CFM refer to standard CFM (SCFM). Likewise, all references to airflow or air quantity refer to standard airflow and standard air quantity.

(9) Capacity rating at part-load. When testing to determine EER for the part-load rating points (i.e. 75-percent load, 50-percent load, and 25-percent load), if the measured capacity expressed as a percent of full-load capacity for a given part-load test is within three percent above or below the target part-load percentage, the EER calculated for the test may be used without any interpolation to determine IEER.

(10) Condenser air inlet temperature for part-load testing. When testing to determine EER for the part-load rating points (i.e. 75-percent load, 50-percent load, and 25-percent load), the condenser air inlet temperature shall be calculated (using the equation in Table 6 of AHRI 340/360-2007; incorporated by reference; see §431.95) for the target percent load rather than for the percent load measured in the test. Table 1 of this appendix shows the condenser air inlet temperature corresponding with each target percent load, as calculated using the equation in Table 6 of AHRI 340/360-2007.

**Table 1 to Appendix A to Subpart F of Part 431—Condenser Air Inlet Temperatures for Part-Load Tests**

Target Percent Load (%)	Condenser Air Inlet Temperature (°F)
25	65
50	68
75	81.5