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DEPARTMENT OF ENERGY

10 CFR Part 430

[Docket No. EERE–2009–BT–TP–0004]

RIN 1904–AB94

Energy Conservation Program for Consumer Products: Test Procedures for Residential Central Air Conditioners and Heat Pumps

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

ACTION: Supplemental notice of proposed rulemaking.

SUMMARY: The U.S. Department of Energy (DOE or the Department) proposes amendments to those it proposed to the DOE test procedures for residential central air conditioners and heat pumps released in a June 2010 notice of proposed rulemaking (June 2010 NOPR). The proposed amendments in this supplemental notice of proposed rulemaking (SNOPR) would change the off-mode laboratory test steps and calculation algorithm to determine off-mode power consumption for residential central air conditioners and heat pumps, as well as change the requirements for selection and metering of the low-voltage transformer used when testing coil-only residential central air conditioners and heat pumps. Additionally, the amendments proposed today provide a method of calculation to determine the energy efficiency ratio (EER) during cooling mode steady-state tests for use as a regional metric. Finally, today's notice proposes amendments that would combine the two seasonal off-mode ratings of *P1* and *P2* for residential central air conditioners and heat pumps, as set forth in the June 2010 NOPR, to yield a single overall rating, PW_{OFF}.

DATES: DOE will accept comments, data, and other information regarding this supplemental notice of proposed rulemaking (SNOPR) no later than May 2, 2011. *See* section 0, "Public Participation," of this SNOPR for details.

ADDRESSES: Interested parties may submit comments, identified by docket number EERE–2009–BT–TP–0004 or Regulation Identifier Number (RIN) 1904–AB94, by any of the following methods:

1. *Federal eRulemaking Portal: http://www.regulations.gov*. Follow the instructions for submitting comments.

2. *E-mail: RCAC-HP-2009-TP-0004@ee.doe.gov*. Include the docket number EERE–2009–BT–TP–0004 and/or RIN 1904–AB94 in the subject line of the message.

3. *Postal Mail:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121. If possible, please submit all items on a compact disc (CD), in which case it is not necessary to include printed copies. Otherwise, please submit one signed paper original.

4. *Hand Delivery/Courier:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 950 L'Enfant Plaza, SW., Suite 600, Washington, DC 20024. Telephone: (202) 586–2945. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies. Otherwise, please submit one signed paper original.

Instructions: No telefacsimilies (faxes) will be accepted. All submissions must include the docket number or RIN for this rulemaking. For detailed instructions on submitting comments and additional information on the rulemaking process, *see* section 0, "Public Participation," of this document.

Docket: The docket is available for review at www.regulations.gov, including **Federal Register** notices, framework documents, public meeting attendee lists and transcripts, comments, and other supporting documents/materials. All documents in the docket are listed in the *http://www.regulations.gov* index. However, not all documents listed in the index may be publicly available, such as information that is exempt from public disclosure.

A link to the docket Web page can be found at: *http://www1.eere.energy.gov/buildings/appliance_standards/residential/cac_heatpumps_new_rulemaking.html.* This Web page will contain a link to the docket for this notice on the Web site *http://www.regulations.gov.* The *http://www.regulations.gov* Web page will contain simple instructions on how to access all documents, including public comments, in the docket. *See* section 0, "Public Participation," for information on how to submit comments through regulations.gov.

For further information on how to submit or review public comments or view hard copies of the docket in the Resource Room, contact Ms. Brenda Edwards at (202) 586–2945 or e-mail: *Brenda.Edwards@ee.doe.gov*.

FOR FURTHER INFORMATION CONTACT: Mr. Wes Anderson, 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) 586–7335. E-mail: *Wes.Anderson@ee.doe.gov*.

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SUPPLEMENTARY INFORMATION:

I. Authority and Background

A. Authority

Title III, Part B of the Energy Policy and Conservation Act of 1975 (EPCA or the Act), Public Law 94–163 (42 U.S.C. 6291–6309, as codified), established the Energy Conservation Program for Consumer Products Other Than Automobiles, a program covering most major household appliances, including the residential central air conditioners and heat pumps with rated cooling capacities less than 65,000 British thermal units per hour (Btu/h) that are the focus of this notice.[1] (42 U.S.C. 6291(1)–(2), (21) and 6292(a)(3))

Under the Act, this program consists essentially of three parts: (1) Testing; (2) labeling; and (3) establishing Federal energy conservation standards. The testing requirements consist of test procedures that manufacturers of covered products must use as the basis for certifying to DOE that their products comply with applicable energy conservation standards adopted pursuant to EPCA and for representing the efficiency of those products. (42 U.S.C. 6293(c); 42 U.S.C. 6295(s)) Similarly, DOE must use these test procedures in any enforcement action to determine whether covered products comply with these energy conservation standards. (42 U.S.C. 6295(s)) Under 42 U.S.C. 6293, EPCA sets forth criteria and procedures for DOE's adoption and amendment of such test procedures. Specifically, EPCA provides that "[a]ny test procedures prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency, energy use * * * or estimated annual operating cost of a covered product during a representative average use cycle or period of use, as determined by the Secretary [of Energy], and shall not be unduly burdensome to conduct." (42 U.S.C. 6293(b)(3)) In addition, if DOE determines that a test procedure amendment is warranted, it must publish proposed test procedures and offer the public an opportunity to present oral and written comments on them. (42 U.S.C. 6293(b)(2)) Finally, in any rulemaking to amend a test procedure, DOE must determine "to what extent, if any, the proposed test procedure would alter the measured energy efficiency * * * of any covered product as determined under the existing test procedure." (42 U.S.C. 6293(e)(1)) If DOE determines that the amended test procedure would alter the measured efficiency of a covered product, DOE must amend the applicable energy conservation standard accordingly. (42 U.S.C. 6293(e)(2)) The amendments proposed in today's SNOPR will not alter the measured efficiency, as represented in the regulating metrics of seasonal energy efficiency ratio (SEER) and heating seasonal performance factor (HSPF) of residential central air conditioners and heat pumps. Thus, today's proposed test procedure changes can be adopted without amending the existing standards. (42 U.S.C. 6293(e)(2))

[1] For editorial reasons, upon codification in the U.S. Code, Part B was re-designated Part A.

On December 19, 2007, the President signed the Energy Independence and Security Act of 2007 (EISA 2007), Public Law 110–140, which contains numerous amendments to EPCA. Section 310 of EISA 2007 established that the Department's test procedures for all covered products must account for standby mode and off-mode energy consumption. (42 U.S.C. 6295(gg)(2)(A)) In addition, section 306(a) of EISA 2007 amended EPCA section 325(o)(6) to consider one or two regional standards for residential central air conditioners and heat pumps (among other products) in addition to a base national standard. (42 U.S.C. 6295(o)(6)(B)) Today's SNOPR includes proposals relevant to these statutory provisions.

DOE's existing test procedures for residential central air conditioners and heat pumps adopted pursuant to these provisions appear under Title 10 of the Code of Federal Regulations (CFR) part 430, subpart B, appendix M ("Uniform Test Method for Measuring the Energy Consumption of Central Air Conditioners and Heat Pumps"). These procedures establish the currently permitted means for determining annual energy efficiency and annual energy consumption of these products.

B. Background

DOE's initial proposals for calculating a regional performance metric, estimating off-mode energy consumption, and selecting the low-voltage transformer in the test procedure for residential central air conditioners and heat pumps were first shared with interested parties in a notice of proposed rulemaking published in the **Federal Register** on June 2, 2010 (June 2010 NOPR) and at a public meeting at DOE headquarters in Washington, DC on June 11, 2010. 75 FR 31224. Comments received in response to the June 2010 NOPR, as well as a transcript of the public meeting are available at *http://www.regulations.gov*. DOE received comments from twelve interested parties on or before the closing date of the June 2010 NOPR public review period, August 16, 2010. These parties raised significant issues and suggested changes to the test procedure proposals in the 2010 June NOPR, described below. Based on these comments and laboratory testing conducted by DOE, DOE's position on these topics has evolved. Today's SNOPR shares DOE's current position on the test procedure for residential central air conditioners and heat pumps, and provides interested parties with a second opportunity to comment.

II. Summary of the Proposal

Today's SNOPR revisits three issues proposed in the June 2010 NOPR: (1) Test methods and calculations for off-mode power and energy consumption; (2) the selection and metering of the low-voltage transformer used when testing coil-only units; and (3) the use of a regional SEER Hot-Dry metric.[2] 75 FR 31238–42. Today's SNOPR also proposes two additional items not covered in the June 2010 NOPR: (1) Calculation of the EER for use as a regional metric in the proposed hot-dry region and (2) combination of seasonal off-mode energy descriptors, *P1* and *P2*, into a single off-mode descriptor, PW_{OFF}.

Regarding the first issue, test methods and calculations for off-mode power and energy consumption, DOE now proposes to revise the off-mode laboratory tests and calculation algorithms set forth in the June 2010 NOPR to be more specific to the hardware and controls of the tested residential central air conditioner or heat pump. For units with a crankcase heater, DOE now proposes that the specific test and calculation combination will depend on whether (1) The heater is applied to a central air conditioner or heat pump; (2) the heater is fixed output or self-regulating; (3) the heater is thermostatically controlled or on continuously when the compressor is off; and (4) the thermostatic control is based on a local measurement that senses the temperature increase caused by the heater or based on a "global" measurement that is not influenced by the heater. For central air conditioning and heat pump units tested without an indoor blower installed, and for central air conditioners and heat pumps tested and rated with a particular furnace or modular blower, DOE proposes steps to separate out the power that will be reflected in the off-mode ratings of the furnace or modular blower, thus avoiding miscalculation of the off-mode energy consumption. Furthermore, DOE proposes to introduce the seasonal descriptor PW_{OFF} to describe the overall off-mode rating for residential central air conditioners and heat pumps.

Regarding the requirements proposed in the June 2010 NOPR for selecting and metering the lab-added, low voltage transformer used when testing coil-only residential central air conditioners and heat pumps, 75 FR 31238, DOE now

[2] The region specified as hot and dry for which this metric was proposed NOPR consists of Arizona, California, New Mexico, and Nevada. These States and the basis for their selection are described in the technical support document (TSD) prepared as part of the development of the residential central air conditioner and heat pump standards rulemaking.

proposes an additional requirement that the lab-added, low voltage transformer be a toroidal design. Further, today's proposal calls for the manufacturer to provide specifications for selecting the lab-added transformer. If the manufacturer fails to provide specifications for the low-voltage transformer, a set of default specifications are provided within the proposed test procedure. DOE also proposes today that the requirement to measure the power input to the lab-added transformer, and the low-voltage components that are connected to it, should apply only during off-mode tests as opposed to during all tests, as proposed in the June 2010 NOPR. 75 FR 31238. For all other tests on coil-only units tested using a lab-added transformer, metering the power consumed by the low voltage components would not be required under today's proposal.

Today's SNOPR also proposes an addition to the test procedure to calculate an EER metric for steady-state cooling mode testing. In this regard, the SNOPR proposes to add testing and calculation steps for estimating residential central air conditioners and heat pumps' cooling seasonal performance when applied in the proposed hot-dry region of Arizona, California, New Mexico, and Nevada. 75 FR 31239–41. DOE proposes to eliminate the descriptor proposed in the June 2010 NOPR for this regional rating, SEER Hot-Dry.

DOE proposes to make the off-mode test procedure additions in today's SNOPR effective 180 days after publication of the test procedure final rule in the **Federal Register**. By doing so, DOE would not require manufacturers to publish the new rating metrics by this time, but rather, would require that manufacturers use the amended test procedure as of this date. In addition, DOE proposes to make the compliance date for these test procedure amendments correspond to the compliance date for the amended energy conservation standards for residential central air conditioners and heat pumps.

III. Discussion

This section provides discussion on the revisions and additions to the test procedure that DOE proposes in this SNOPR, based in part on comments DOE received in response to the June 2010 NOPR. Section 0 describes DOE's proposed changes to test methods and calculations for off-mode power and energy consumption. Section 0 discusses DOE's proposed changes to the requirements for selecting and metering the lab-added low voltage transformer used when testing coil-only residential central air conditioners and heat pumps without a specific furnace or modular blower. Section 0 discusses DOE's proposal to abandon the regional SEER Hot-Dry metric that was proposed in the June 2010 NOPR. Sections 0 and 0 describe proposed amendments to the test procedure that were not included in the June 2010 NOPR; specifically, calculation of EER during cooling mode steady-state testing and the combination of the two seasonal off-mode ratings for residential central air conditioners proposed in the June 2010 NOPR, *P1* and *P2,* to yield a single overall rating, PW_{OFF}.

As part of today's rulemaking, DOE provides the specific proposed revisions to 10 CFR part 430, subpart B, appendix M, "Uniform Test Method for Measuring the Energy Consumption of Central Air Conditioners and Heat Pumps."

A. Test Methods and Calculations for Off-Mode Power and Energy Consumption of Residential Central Air Conditioners and Heat Pumps

In the June 2010 NOPR, DOE proposed test procedure amendments that quantified off-mode power consumption of residential central air conditioners and heat pumps, as required by 42 U.S.C. 6295(gg)(2)(A). 75 FR 31238–39. These proposals included testing and calculation methods for estimating the energy consumption of a residential central air conditioner during the heating season when the unit is typically turned off at the thermostat, but when its controls and protective devices remain energized. Additional amendments proposed in today's SNOPR consider those times when the products are idle during the shoulder season. The shoulder season is the period of time during the year when a residential central air conditioner or heat pump is providing neither heating nor cooling. The duration of the shoulder season for each generalized climatic region equals the difference between a full 8,760-hour year and the number of hours assigned to the cooling and heating seasons of each region as identified in Table 19 of appendix M to subpart B of 10 CFR part 430 (shown as Table 0.1 below).

TABLE 0.1—REPRESENTATIVE COOLING AND HEATING LOAD HOURS FOR EACH GENERALIZED CLIMATIC REGION

Region	* CLH_R	** HLH_R
I	2400	750
II	1800	1250
III	1200	1750
IV	800	2250
V	400	2750
VI	200	2750

* CLH_R—Cooling Load Hours (representative).
** HLH_R– Heating Load Hours (representative).

DOE proposed in the June 2010 NOPR to modify the EISA 2007 definition of the term "off-mode," [3] pursuant to the authority granted under 42 U.S.C. 6295(gg)(1)(B), to include the operation of a residential central air conditioner or heat pump during the shoulder season and, for central air conditioners only, during the heating season. 75 FR 31231. DOE proposed new laboratory tests and calculation algorithms for estimating the average power consumption of residential central air conditioners and heat pumps operating during off-mode. 75 FR 31238–39. The June 2010 NOPR also proposed that the average off-mode power consumption for central air conditioners and heat pumps during the shoulder season be represented by the parameter *P1,* and the average off-mode power consumption of a residential central air conditioner during the heating season be represented by the parameter *P2.* 75 FR 31239.

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and the American Council for an Energy-Efficient Economy (ACEEE) both agreed

[3] Section 325(gg) of EPCA defines the term "off mode" as "the condition in which an energy-using product is connected to a main power source and is not providing any standby or active mode function." 42 U.S.C. 6295(gg)(1)(A)(ii).

with DOE that the off-mode rating should be separated from the existing regulating metrics of SEER and HSPF. (AHRI, Public Meeting Transcript, No. 5 at p. 161; ACEEE, Public Meeting Transcript, No. 5 at p. 161)[4] Trane acknowledged that inclusion of off-mode energy consumption in the basic performance descriptors was not feasible. (Trane, No. 10.1 at p. 3)

The Northwest Energy Efficiency Alliance (NEEA) concurred with DOE's proposed definition of "off-mode." (NEEA, No. 7.1 at p. 7) However, the People's Republic of China (China) stated that DOE should define off-mode for central air conditioners and heat pumps to be consistent with International Electrotechnical Commission (IEC) Standard 62301 (1st edition). (China, No. 18.1 at p. 5) China also commented that off-mode, as set forth in the June 2010 NOPR, is defined as a period of time, without including a description of the specific status of the product. China hoped DOE would clarify the specific status of the product in its definition of off-mode. (China, No. 18.1 at p. 5) Finally, China expressed its hope that DOE would further clarify the proposed test procedure for off-mode energy consumption, and whether off-mode energy consumption includes the energy consumption of protective devices. (China, No. 18.1 at p. 5)

The off-mode definition presented in the June 2010 NOPR is consistent with the objectives of EISA 2007. (42 U.S.C. 6295(gg)(2)(A)) The energy consumed by any protective device (e.g., a crankcase heater) that operates while the central air conditioner sits idle during the off-mode is included in the off-mode rating. The proposed off-mode definition accounts for all modes and intervals of energy consumption that are not captured in the existing regulating performance metrics. By comparison, IEC 62301 applies to a wide range of household appliances and seeks to quantify the standby power of these appliances, which is loosely defined as the power consumed when the appliance is not performing its main function. This simple definition is not readily applicable to residential central air conditioners and heat pumps because SEER and HSPF include power consumption during all possible operating modes. A more product-specific definition was needed and was proposed in the June 2010 NOPR. 75 FR 31238–39. DOE considered the comments received pertaining to the definition of off-mode, but has tentatively chosen to leave the definition proposed in the June 2010 NOPR unchanged.

At the June 2010 NOPR public meeting, Trane stated that the cooling load hours proposed in the amended test procedure do not correlate with the compressor running hours and, as a result, DOE is in danger of incorrectly counting the time when the compressor is running as time attributable to off-mode. (Trane, Public Meeting Transcript, No. 5 at p. 143) The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) stated that the cooling load hours have been used since the test procedure was established and that it may be time to review that. (AHRI, Public Meeting Transcript, No. 5 at p. 145) DOE agrees that it may be time to revisit the cooling load hour distributions, but lacks sufficient data to do so at this time. DOE requests input from interested parties that may be relevant to an update of the cooling load hour and heating load hour distributions.

DOE has evaluated these comments and determined that the approach for establishing the duration of the off-mode seasons proposed in the June 2010 NOPR, 75 FR at 31239, 31269–70, and repeated in today's SNOPR, remains the most defensible option. The approach obtains the hours for each off-mode season directly from the cooling and heating load hour combinations that have been used since the test procedure for residential central air conditioners and heat pumps was established in 1979. Until those load hour maps (Figures 2 and 3 from 10 CFR part 430, subpart B, appendix M), are updated based on newly available data, or an alternative approach is identified for defining the magnitude of the seasonal building loads (when expressed on an energy basis and, as a consequence, the hours in each season), DOE concludes that the proposed approach is appropriate.

With regard to the off-mode tests proposed in the June 2010 NOPR, Trane stated that it is unrealistic to expect that a thermostat would be accurate to 65 degrees plus or minus 2 degrees. (Trane, Public Meeting Transcript, No. 5 at p. 146) ACEEE stated that thermostatic controller testing will vary because the time constant for changing the temperature of the test chamber will differ based on the response of the system. (ACEEE, Public Meeting Transcript, No. 5 at p. 156) Johnson Controls concurred with the ACEEE comment. (Johnson Controls, Public Meeting Transcript, No. 5 at p. 158)

The proposed revisions to the off-mode test method in today's SNOPR address the above comments. For crankcase heaters whose ON/OFF operation is regulated by an ambient temperature thermostat, the manufacturer-provided ON and OFF temperatures—*T00* and *T100,* respectively—would be deemed verified if the lab-measured values are within ±5 °F of the manufacturer-provided values. If the manufacturer's values for *T00* or *T100* are not verified, the lab-measured value would be rounded to the nearest 5 °F increment of 65 °F, instead of to the nearest 2.5 °F increment, as proposed in the June 2010 NOPR. 75 FR 31261. For off-mode tests that will require longer intervals to complete because of the relatively slow thermal response of the compressor and crankcase heater system, options are provided in today's proposal for shortening the duration of the test. In the case of self-regulating crankcase heaters, rather than requiring the heater to achieve steady-state operation before measuring steady-state performance, collected data with respect to the heater's power output as a function of elapsed time would be extrapolated to reasonably approximate steady-state performance. Similarly, manufacturers would be given the option of taking a slightly conservative estimate of the off-mode power consumption for crankcase heaters whose operation is regulated based on local control, rather than extending the off-mode test for several extra hours.

At the public meeting, AHRI asked DOE if testing had been done to measure off-mode energy consumption. (AHRI, Public Meeting Transcript, No. 5 at p. 147) DOE responded that testing had not been done. AHRI stated DOE should take into account the fact that there had been no testing done on the products, and therefore DOE did not know if the proposed test procedure would work. (AHRI, Public Meeting Transcript, No. 5 at p. 162) AHRI stated that it does not support adding testing procedures and calculations for off-mode energy consumption since the algorithm proposed in the June 2010 NOPR had not been tested by DOE or any manufacturers. (AHRI, No. 6.1 at p. 5)[5] NEEA stated that it found DOE's proposals to measure off-mode energy

[4] In this discussion, comments presented in the form "AHRI, Public Meeting Transcript, No. 5 at p. 161" indicate a comment that was recorded in the public meeting transcript for the June 2010 NOPR and is included in docket for this rulemaking. This particular notation refers to a comment (1) by AHRI, (2) in document number 5 in the public meeting support materials, and (3) appearing on page 161.

[5] In this discussion, comments presented in the form "AHRI, No. 6.1 at p. 5" indicate a written comment that was submitted to DOE and is included in docket for this rulemaking. This particular notation refers to a comment (1) by AHRI, (2) in document number 6.1 in the public meeting support materials, and (3) appearing on page 5.

consumption problematic because there are no data from actual testing. In order for these values to be most useful to consumers, NEEA asserted that they would have to be published for each climatic region. (NEEA, No. 7.1 at p. 7) NEEA requested that DOE provide actual test data from systems with a crankcase heater so NEEA could better understand the interaction between test procedure requirements and the technologies and control strategies used in the field. (NEEA, No. 7.1 at p. 7) Lennox agreed with AHRI's recommendations that DOE provide more time for the consideration of its proposed testing procedures and calculations for off-mode energy consumption. (Lennox, No. 11.1 at p. 2)

After the close of the comment period following the June 2010 NOPR, DOE conducted laboratory testing on a complete heat pump system and a stand-alone compressor that were equipped with different crankcase heaters, regulated using different control strategies. As a result, DOE has revised its off-mode test methods. To provide a means for interested parties to consider these proposed methods, DOE has published this SNOPR. Interested parties are asked to consider and comment on these proposed off-mode test methods so that any changes that are warranted can be implemented prior to publication of the test procedure final rule.

The primary purpose of the off-mode test method is to develop a way to measure energy used by the crankcase heater, which represents the greatest consumption of energy during the off-mode period. For units with a crankcase heater, DOE proposes an off-mode test method designed to be more systematic and cover more specific cases. The revised off-mode test method proposed today differentiates between residential central air conditioners and heat pumps, between fixed-output and self-regulating crankcase heaters, and between thermostatically controlled and continuously on designs. Designs that regulate the ON/OFF status of the heater based on an outdoor ambient thermostat (global control) would be covered, as well as designs that regulate the heater based on measuring or inferring the temperature of the compressor's sump (local control). The proposed test methods are applicable to belly-band and insertion type heaters and to designs that use an insulating cover for the compressor and crankcase heater.

Today's proposed off-mode test method would cover coil-only units, blower coil units, and coil-only units tested and rated with a furnace fan or modular blower. The off-mode ratings for coil-only units would include the power consumption of the low-voltage components other than the lab-added, low-voltage transformer. Similarly, the off-mode ratings for coil-only units tested and rated with a particular furnace or modular blower would exclude the power consumption of any components housed within the furnace or modular blower. The power consumption of the lab-added transformer and the power consumption of the idle furnace or modular blower would be measured separately and then subtracted from the total off-mode power measured for the tested system. In these cases, the power consumption of the transformer and off-mode power used by a particular furnace or modular blower would be reflected in the electrical off-mode rating of the furnace or modular blower. The off-mode rating for conventional blower coil units would reflect all sources of off-mode power consumption.

In the vast majority of cases, the time required to complete the revised off-mode tests varies from less than 1 hour to up to 12 hours. Two of the more time-intensive off-mode tests proposed in this SNOPR pertain to approximating the "power consumption versus outdoor temperature" relationship of a self-regulating crankcase heater, and to measuring the average power consumption of crankcase heaters that use local thermostatic control. The electrical resistance of self-regulating heaters varies with temperature, with the resistance decreasing as temperature increases. Because of the relatively large thermal mass of the compressor, several hours are required to approach a power level that is representative of the final steady-state power output from a self-regulating heater when heating a compressor that is otherwise obtaining equilibrium with the ambient air. To balance test burden with reasonable repeatability, DOE proposes to require the regular measurement of the power over an interval during which the outdoor ambient temperature varies 2 °F or less, and the power data displays a monotonic trend as it approaches its steady-state value. Under today's proposal, manufacturers would be required to specify whether the test terminates after collecting 3 hours of data, or whether the test continues over a longer interval. "Power versus elapsed time" data would be curve-fitted using one of two equations—one equation if the power data decreases with elapsed time and another equation if the power data increases with elapsed time. Once the constants of the equations are determined using a curve-fitting program, the resulting equation would be used to estimate the power consumption of the heater had the asymptotic response been allowed to continue until it reached a steady-state. The test procedure would use an elapsed time of 24 hours to approximate the steady-state limit (rather than requiring the evaluation of the equation as time approaches infinity). DOE proposes limits on how much the extrapolated value could vary from the average power measured prior to terminating the test. This process would then be repeated at a second outdoor temperature.

Under the proposal, crankcase heaters that use local thermostatic control would be monitored until successive heater ON + heater OFF cycles yield average power consumption values that differ by 1 watt or less. As an alternative, the manufacturer could choose to discontinue the test as soon as a minimum of three consecutive heater ON + heater OFF cycles are recorded, where the average power from each complete cycle is less than the average power from the prior cycle. For both test termination options, two additional requirements would need to be met: (1) The elapsed time between the start of the first crankcase heater ON cycle and the test termination must be a minimum of 3 hours and (2) the outdoor temperature during the two or more complete cycles that meet the termination criteria must vary by 2 °F or less. If the manufacturer does not choose from the off-mode test termination criteria, testing requirements based on the average power differing by less than 1 watt for successive cycles would be used. For residential central air conditioners (but not heat pumps) with crankcase heaters that use local thermostatic control, the above off-mode test method would be repeated at a second outdoor temperature.

B. Selecting the Low-Voltage Transformer Used When Testing Coil-Only Central Air Conditioners and Heat Pumps and Required Metering of Low-Voltage Components During Off-Mode Test(s)

In today's SNOPR, DOE proposes that the test laboratory select a toroidal transformer when testing coil-only units. Toroidal transformers have fewer losses, less efficiency variation with loading, and lower power requirements at zero loading than laminated core transformers. DOE proposes that some of the characteristics of the toroidal transformer may be specified by the manufacturer (*e.g.,* volt-amp rating, voltage input, voltage output);

otherwise, a set of default criteria would be provided in the amended test procedure. DOE also proposes to change the load rating specification from an absolute volt-amp rating to a range of percent loading to better cover all possible units, ensure the transformer is adequately sized to meet the load, and provide more flexibility to the testing laboratory.

In the June 2010 NOPR, DOE proposed requiring the measurement of the power consumption of the low-voltage components that are part of all tested units during every DOE-specified laboratory test. 75 FR 31238. The June 2010 NOPR targeted coil-only residential central air conditioners and heat pumps tested using a low-voltage transformer selected by the testing laboratory. Usually, the power consumption of low-voltage components powered by this lab-added transformer is not metered. The June 2010 NOPR also listed proposed specifications for the lab-added transformer. *Id.* Under this proposal, the instrument used to measure the electrical power supplied to the transformer would be required to do so within the measurement accuracy prescribed for the other electrical components. *Id.* Because the proposal would alter the SEER and HSPF ratings of the products, DOE planned to require the measurement of low-voltage components on the compliance date for the amended energy conservation standards for residential central air conditioners and heat pumps.

At the June 2010 NOPR public meeting, ACEEE supported DOE's premise while questioning whether the word "transformer" in the test procedure should be replaced with "power supply." (ACEEE, Public Meeting Transcript, No. 5 at p. 183) Trane stated that the usage of "transformer" is technically correct. (Trane, Public Meeting Transcript, No. 5 at p. 185). DOE concurs that the use of the word "transformer" to describe the low-voltage power source is correct. In its written comments, NEEA supported the inclusion of transformer energy use in the test procedure, but noted that there may be a wide variety of both transformer and power supply efficiencies, and therefore asked DOE to provide some documentation for its assumptions. (NEEA, No. 13.1 at p. 8) AHRI argued against specifying requirements for the low-voltage transformer used when testing coil-only residential central air conditioners and heat pumps and requiring the metering of all sources of energy consumption during all tests. AHRI noted that the SEER and HSPF values for coil-only units would decrease, causing the minimum Federal standards to need to be modified for these products. AHRI also noted that "accounting for the transformer power in SEER and HSPF [would] be double-dipping when the furnace standards are also revised to include the transformer power." (AHRI, No. 6.1 at p. 5)

Based on this discussion, DOE proposes to exclude changes that would alter the SEER and HSPF ratings of currently rated residential central air conditioners and heat pumps because such changes would require adjustments to the standard levels currently being considered. (42 U.S.C. 6293(e)(2)) As such, the proposed test procedure does not require metering the power consumption of the low-voltage components of a coil-only system when conducting the lab tests used in calculating SEER and HSPF. Instead, the power consumption of these low-voltage components, however, would be measured during the proposed off-mode testing.

C. Withdrawal of the Proposal To Add the New Regional Performance Metric SEER Hot-Dry

DOE has the option of implementing regional standards for residential central air conditioners and heat pumps, if justified. (42 U.S.C. 6295(o)(6)(D)(i)) In the June 2010 NOPR, DOE proposed additional testing and calculations to evaluate a new cooling season efficiency rating that was specific to the proposed region of the country with a hot-dry climate. The proposed regional regulating metric was identified as SEER Hot-Dry and applied to the States of California, Nevada, New Mexico, and Arizona. 75 FR 31239–42.

Comments made at the June 2010 NOPR public meeting and written comments that followed overwhelmingly supported the use of a steady-state EER descriptor over the proposed SEER Hot-Dry descriptor for the hot-dry region. EnergySolutions withdrew its support of SEER Hot-Dry in favor of EER, noting that the SEER Hot-Dry metric does not adequately represent conditions at full load and therefore does not give the manufacturer the opportunity to differentiate products that perform very well at high temperatures. (EnergySolutions, Public Meeting Transcript, No. 5 at p. 170) At the public meeting, ACEEE took the same position. (ACEEE, Public Meeting Transcript, No. 5 at p. 175; ACEEE, Public Meeting Transcript, No. 5 at p. 195) Two manufacturers stated their opposition to a SEER Hot-Dry metric due to the increased testing burden that it would create. (Mitsubishi, Public Meeting Transcript, No. 5 at p. 176; Trane, Public Meeting Transcript, No. 5 at p. 203) ACEEE stated that the building loads and bin temperature distributions for the proposed SEER Hot-Dry metric were not representative of typical weather and operating conditions in a hot-dry location. (ACEEE, No. 8.1 at p. 2) Several interested parties supported the consensus agreement [6] in general and the use of EER as the basis for establishing a regional standard in the hot-dry region in particular, a position outlined in the consensus agreement. (Mitsubishi, Public Meeting Transcript, No. 5 at p. 176; AHRI, No. 6.1 at p. 5; Lennox, No. 11.1 at p. 2; NEEA, No. 7.1 at p. 7; ACEEE, No. 8.1 at p. 2; EnergySolutions, No 9.1 at p. 1; NRDC, No. 13.1 at pp. 1–2). In addressing a statement DOE included in the June 2010 NOPR, the Natural Resources Defense Council (NRDC) commented that "DOE's statement on its statutory authority to use multiple performance metrics is incorrect. DOE should revise the proposed test procedures as outlined in the consensus agreement because DOE has authority under the EPCA to adopt the Southwest regional SEER and EER consensus standards agreed upon by manufacturers and efficiency advocates and test procedures for such standards." (NRDC, No. 13.1 at p. 2)

The seasonal metric proposed in the June 2010 NOPR for the hot-dry region was not meaningful due to the inclusion of New Mexico and especially California (with its large coastal population). 75 FR 31240–41. Although the region was composed of contiguous States as required by EISA 2007, 42 U.S.C. 6295(o)(6)(C), the inclusion of these two States caused the population-weighted average weather conditions to be neither hot nor dry. DOE agrees that a seasonal performance descriptor such as SEER Hot-Dry does not adequately represent performance at full load conditions. As a result, DOE is today proposing a method to calculate the EER during Cooling Mode Steady State Tests. Assuming DOE was to adopt as final such EER test procedure; as a Final rule, DOE espects to withdraw its earlier proposal to include additional tests and

[6] On January 15, 2010, several interested parties submitted a joint comment to DOE recommending adoption of minimum energy conservation standards for residential central air conditioners, heat pumps, and furnaces, as well as associated compliance dates for such standards, which represents a negotiated agreement among a variety of interested stakeholders including manufacturers and environmental and efficiency advocates. The original agreement (referred to as the "consensus agreement") was completed on October 13, 2009, and had 15 signatories.

calculations in the test procedure to determine a SEER Hot-Dry rating.

D. Calculation of the Energy Efficiency Ratio for Cooling Mode Steady-State Tests

For central air conditioners, the consensus agreement recommends that DOE adopt dual metrics (*i.e.,* SEER and EER) for the hot-dry region. Generally, DOE notes that EPCA's definition of "efficiency descriptor" at 42 U.S.C. 6291(22) specifies that the efficiency descriptor for both central air conditioners and heat pumps shall be SEER. However, DOE believes that the language at 42 U.S.C. 6295(p)(4) provides DOE some measure of discretion when considering recommended standards in a consensus agreement, if the Secretary determines that the recommended standards are in accordance with 42 U.S.C. 6295(o). Today, DOE proposes to include within the test procedure the steps needed to define the calculation of EER for the proposed hot-dry region from the results of cooling mode, steady-state testing.

E. Off-Mode Performance Ratings

Because off-mode operation occurs during specific seasons, the most appropriate form of an off-mode rating is a seasonal descriptor. Moreover, off-mode represents times when a unit is consuming power while not providing space conditioning; therefore, the seasonal descriptor must be expressed in terms of average power or a representative energy consumption quantity (as efficiency is not an option). Given these two options, average power provides the greater utility because it is not as location-specific as energy consumption. Whereas the same off-mode average power consumption applies to any location within a DOE generalized climatic region, an off-mode energy consumption only applies to a unique location within that same climatic region. As such, a single average off-mode power rating can be used to calculate many off-mode energy values, while the opposite is not true. A representative off-mode energy rating would be specific to one particular combination of cooling season hours, heating season hours, and shoulder season hours. For these reasons, DOE proposes that the off-mode ratings be expressed as average power values.

For residential central air conditioners, two off-mode average power values were proposed in the June 2010 NOPR, one for the shoulder season (parameter *P1),* and one for the heating season (parameter *P2).* 75 FR 31238–39. *P1* and *P2* are both expressed in units of watts. Since heat pumps are only idle during the shoulder season, they only have a *P1* value. For residential central air conditioners using compressor crankcase heaters with heating output that changes with the outdoor temperature, *P2* will depend on the distribution of outdoor temperatures during the heating season. In such cases, the *P2* value will be different for each of the six generalized climatic regions referenced in the current DOE test procedure. (Refer to Figures 2 and 3 in 10 CFR part 430, subpart B, appendix M).

To allow straightforward comparisons among a variety of residential central air conditioners and heat pumps that may have different combinations of *P1* and *P2* values, these average power values can be weighted based on the length of the shoulder and heating seasons to yield an overall average power consumption value. Furthermore, in terms of the establishment of a minimum standard(s) for the off-mode, a single standard is preferable to setting separate standard levels for *P1* and *P2.* The most representative weighting would be those seasonal hours associated with the national average cooling and heating load hours of 1,000 and 2,080 hours, respectively, with *P2* based on generalized climatic Region IV. Region IV is proposed because the HSPF conservation standard and rating that appear on the Federal Trade Commission (FTC) EnergyGuide Label are based on this region. 75 FR 31239. In sum, DOE proposes a national average off-mode power consumption rating, *PWOFF*, for residential central air conditioners and heat pumps. DOE proposes combining the off-mode power rating for the shoulder seasons, *P1,* with the off-mode power rating for the heating season, *P2,* by weighting these ratings with respect to the lengths of the national average seasons: 739 hours for the shoulder seasons and 5,216 hours for the heating season.

For residential central air conditioners, DOE proposes $PW_{OFF} = 0.124 \times P_1 + 0.876 \times P_2$.

For residential heat pumps, DOE proposes $PW_{OFF} = PM_{1.}$

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 proposed action was not subject to review under the Executive Order by the Office of Information and Regulatory Affairs (OIRA) in the 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 for any rule 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 (Aug. 16, 2002), DOE published procedures and policies on February 19, 2003, so that the potential impacts of its rules on small entities are properly considered during the rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website: *http://www.gc.doe.gov.*

DOE reviewed today's proposed rule, which would amend the test procedure for residential central air conditioners and heat pumps, under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. DOE tentatively concludes and certifies that the proposed rule, if adopted, would not result in a significant impact on a substantial number of small entities. The factual basis for this certification is set forth below.

For the purpose of the regulatory flexibility analysis for this rule, the DOE adopts the Small Business Administration (SBA) definition of a small entity within this industry as a manufacturing enterprise with 750 employees or fewer. DOE used the small business size standards published on January 31, 1996, as amended, by the SBA to determine whether any small entities would be required to comply with the rule. 61 FR 3280, 3286, as amended at 67 FR 3041, 3045 (Jan. 23, 2002) and at 69 FR 29192, 29203 (May 21, 2004); *see also* 65 FR 30836, 30850 (May 15, 2000), as amended at 65 FR 53533, 53545 (Sept. 5, 2000). The size standards are codified at 13 CFR part 121. The standards are listed by North American Industry Classification System (NAICS) code and industry description and are available at *http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.*

Residential central air conditioner and heat pump equipment manufacturing is classified under NAICS 333415, "Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration

Equipment Manufacturing." 70 FR 12395 (March 11, 2005). DOE reviewed AHRI's listing of residential central air conditioner and heat pump equipment manufacturer members and surveyed the industry to develop a list of domestic manufacturers. As a result of this review, DOE identified 22 manufacturers of residential central air conditioners and heat pumps, of which 15 would be considered small manufacturers with a total of approximately 3 percent of the market sales. DOE seeks comment on its estimate of the number of small entities that may be impacted by the proposed test procedure.

Potential impacts of the proposed test procedure on all manufacturers, including small businesses, come from impacts associated with the cost of proposed additional testing. DOE estimates the incremental cost of the proposed additional tests described in 10 CFR part 430, subpart B, appendix M (proposed section 3.13) to be an increase of $1,000 to $1,500 per unit tested. This estimate is based on private testing services quoted on behalf of DOE in the last 2 years for residential central air conditioners and heat pumps. Typical costs for running the cooling tests appear to be approximately $5,000. DOE estimated that the additional activities required by the revised test procedure would introduce a 20 to 30 percent increase in testing time, resulting in the additional cost.

Because the incremental cost of running the extra tests is the same for all manufacturers, DOE believes that all manufacturers would incur comparable costs for testing of individual basic models as a result of the proposed test procedure. DOE expects that small manufacturers will incur less testing expense compared with larger manufacturers as a result of the proposed testing requirements because they have fewer basic models and thus require proportionally less testing when compared with large manufacturers that have many basic models. DOE recognizes, however, that smaller manufacturers may have less capital available over which to spread the increased costs of testing.

DOE compared the cost of the testing to the total value added by the manufacturers to determine whether the impact of the proposed test procedure amendments is significant. The value added represents the net economic value that a business creates when it takes manufacturing inputs (*e.g.,* materials) and turns them into manufacturing outputs (*e.g.,* manufactured goods). Specifically, as defined by the U.S. Census, the value added statistic is calculated as the total value of shipments (products manufactured plus receipts for services rendered) minus the cost of materials, supplies, containers, fuel, purchased electricity, and contract work expenses.

DOE analyzed the impact on the smallest manufacturers of residential central air conditioners and heat pumps because these manufacturers would likely be the most vulnerable to cost increases. DOE calculated the additional testing expense as a percentage of the average value added statistic for the five individual firms in the 25 to 49 employee size category in NAICS 333415 as reported by the U.S. Census (U.S. Bureau of the Census, American Factfinder, 2002 Economic Census, Manufacturing, Industry Series, Industry Statistics by Employment Size, *http://factfinder.census.gov/servlet/EconSectorServlet?_lang=en&ds_name=EC0200A1&_SectorId=31&_ts=288639767147*). The average annual value for manufacturers in this size range from the census data was $1.26 million in 2001$, per the 2002 Economic Census, or approximately $1.52 million per year in 2009$ after adjusting for inflation using the implicit price deflator for gross domestic product (U.S. Department of Commerce Bureau of Economic Analysis, *http://www.bea.gov/national/nipaweb/SelectTable.asp*).

DOE also examined the average value added statistic provided by census for all manufacturers with fewer than 500 employees in this NAICS classification as the most representative value from the 2002 Economic Census data of the residential central air conditioner manufacturers with fewer than 750 employees that are considered small businesses by the SBA (15 manufacturers). The average annual value added statistic for all small manufacturers with fewer than 500 employees was $7.88 million (2009$).

Given this data, and assuming the high-end estimate of $1,500 for the additional testing costs, DOE concluded that the additional costs for testing of a single basic model product under the proposed requirements would be approximately 0.1 percent of annual value added for the 5 smallest firms, and approximately 0.02 percent of the average annual value added for all small residential central air conditioner manufacturers (15 firms). DOE estimates that testing of basic models may not have to be updated more than once every 5 years, and therefore the average incremental burden of testing one basic model may be one fifth of these values when the cost is spread over several years.

DOE requires that only the highest sales volume split system combinations be lab tested. 10 CFR 430.24(m). The majority of air conditioners and heat pumps offered by a manufacturer are typically split systems that are not required to be lab tested but can be certified using an alternative rating method that does not require DOE testing of these units. DOE reviewed the available data for five of the smallest manufacturers to estimate the incremental testing cost burden for those small firms that might experience the greatest relative burden from the revised test procedure. These manufacturers had an average of 10 models requiring testing (AHRI Directory of Certified Product Performance, *http://www.ahridirectory.org/ahridirectory/pages/home.aspx*), while large manufacturers will have well over 100 such models. The additional testing cost for final certification for 10 models was estimated at $15,000. Meanwhile, these certifications would be expected to last the product life, estimated to be at least 5 years based on the time frame established in EPCA for DOE review of residential central air conditioner efficiency standards. This test burden is therefore estimated to be approximately 0.2 percent of the estimated 5-year value added for the smallest five manufacturers. DOE believes that these costs are not significant given other, much more significant costs that the small manufacturers of residential central air conditioners and heat pumps incur in the course of doing business. DOE seeks comment on its estimate of the impact of the proposed test procedure amendments on small entities and its conclusion that this impact is not significant.

Accordingly, as stated above, DOE tentatively concludes and certifies that this proposed rule would not have a significant economic impact on a substantial number of small entities. Accordingly, DOE has not prepared an initial regulatory flexibility analysis (IRFA) for this rulemaking. DOE will provide its 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 residential central air conditioners and heat pumps must certify to DOE that their product complies with any applicable energy conservation standard. In certifying compliance, manufacturers must test their product according to the DOE test procedure for residential central air conditioners and heat pumps, including any amendments adopted for that test procedure. DOE has proposed regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including residential central air conditioners and heat pumps. 75 FR 56796 (Sept. 16, 2010). The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act of 1995 (PRA). This requirement has been submitted to OMB for approval. Public reporting burden for the certification is estimated to average 20 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Public comment is sought regarding: whether this proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; the accuracy of the burden estimate; ways to enhance the quality, utility, and clarity of the information to be collected; and ways to minimize the burden of the collection of information, including through the use of automated collection techniques or other forms of information technology. Send comments on these or any other aspects of the collection of information to Wes Anderson (*see* **ADDRESSES**) and by e-mail to *Christine_J._Kymn@omb.eop.gov.*

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 proposed rule, DOE proposes amendments to test procedures that may be used to implement future energy conservation standards for residential central air conditioners and heat pumps. 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 (NEPA; 42 U.S.C. 4321 *et seq.*). The rule is covered by Categorical Exclusion A5, for rulemakings that interpret or amend an existing rule without changing the environmental effect, as set forth in DOE's NEPA regulations in appendix A to subpart D, 10 CFR part 1021. This rule will not affect the quality or distribution of energy usage and, therefore, will not result in any environmental impacts. 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 (Aug. 4, 1999), imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined today's proposed rule and has determined that it does not preempt State law and does 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 products that are the subjects of today's proposed rule. States can petition DOE for a waiver of such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297) No further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform," 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) Eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide a clear legal standard for affected conduct rather than a general standard; and (4) promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort so 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 United States Attorney General (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, the proposed 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; Pub. L. 104–4, codified at 2 U.S.C. 1501 *et seq.*) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. For proposed regulatory actions likely to result in a rule that may cause expenditures 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 estimates of the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) 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. (This policy is also available at *http://www.gc.doe.gov.*) Today's proposed 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 (Pub. L. 105–277) requires Federal agencies to issue a Family Policymaking Assessment for any proposed rule that may affect family well-being. Today's proposed rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is unnecessary 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 15, 1988), that this proposed regulation, if promulgated as a final rule, would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

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

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516, note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. The OMB's guidelines were published in 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed today's proposed 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 OIRA, Office of Management and Budget, a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

Today's regulatory action would not have a significant adverse effect on the supply, distribution, or use of energy and, therefore, it is not a significant energy action. 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 (Pub. L. 95–91), DOE must comply with section 32 of the Federal Energy Administration Act of 1974 (Pub. L. 93–275), as amended by the Federal Energy Administration Authorization Act of 1977 (15 U.S.C. 788). Section 32 essentially provides, in relevant part, that where a proposed rule contains or involves 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 FTC concerning the impact of the commercial or industry standards on competition.

Today's SNOPR does not incorporate testing methods contained in commercial standards.

V. Public Participation

A. Submission of Comments

DOE will accept comments, data, and other information regarding the SNOPR no later than the date provided in the **DATES** section at the beginning of this notice. Interested parties may submit comments using any of the methods described in the **ADDRESSES** section at the beginning of this rulemaking.

Submitting comments via regulations.gov. The regulations.gov webpage will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to regulations.gov information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (CBI)). Comments submitted through regulations.gov cannot be claimed as CBI. Comments received through the Web site will waive any CBI claims for the information submitted. For information on submitting CBI, *see* the *Confidential Business Information* section.

DOE processes submissions made through regulations.gov before posting them online. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that regulations.gov provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery, or mail. Comments and documents submitted via email, hand delivery, or mail also will be posted to regulations.gov. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information on a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. Email submissions are preferred. If you submit via mail or hand delivery, please provide all items on a CD, if feasible. It is not necessary to submit printed copies. No facsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in

PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, are written in English, and are free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 and 500 form letters per PDF, or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery two well-marked copies: one copy of the document marked confidential including all the information believed to be confidential, and one copy of the document marked non-confidential with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Factors of interest to DOE when evaluating requests to treat submitted information as confidential include: (1) A description of the items; (2) whether and why such items are customarily treated as confidential within the industry; (3) whether the information is generally known by or available from other sources; (4) whether the information has previously been made available to others without obligation concerning its confidentiality; (5) an explanation of the competitive injury to the submitting person which would result from public disclosure; (6) when such information might lose its confidential character due to the passage of time; and (7) why disclosure of the information would be contrary to the public interest.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

B. Issues on Which DOE Seeks Comment

Although comments are welcome on all aspects of this rulemaking, DOE is particularly interested in receiving comments on the following issues:

1. What is/are the best curve fit(s) to approximate how the power consumption of a self-regulating crankcase heater approaches steady-state during an off-mode test? DOE offers equations in this SNOPR to fit two operational scenarios: that in which crankcase heater power increases with time, and that in which crankcase heater power decreases with time.

2. Which hardware and controls designs would not be adequately covered by the proposed off-mode tests and calculations, if any? Please be as specific as possible in responding to this question.

3. Is the proposed approach for not crediting coil-only units with any power consumption associated with the furnace or modular blower that it will be combined with in the field, including the low voltage transformer, acceptable?

4. When testing a coil-only unit, the proposed requirement is that the selected low voltage transformer must be a "toroidal type," with additional specifications provided by the manufacturer. Is this proposed requirement sufficient or insufficient in promoting repeatable results?

5. For the case in which the manufacturer does not provide instructions for selecting the low voltage transformer used to test a coil-only unit, do the default specifications listed in proposed section 2.2(d) suffice and, if not, how can they be improved?

6. To cover the different types of crankcase heaters and control strategies, the proposed lab testing and calculations require several steps. Are any of the specific steps unclear? If so, which ones and why?

7. To update the cooling load hour and heating load hour distributions, more information is needed. Is there relevant data available to update these distributions?

VI. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this SNOPR.

List of Subjects in 10 CFR Part 430

Administrative practice and procedure, Confidential business information, Energy conservation test procedures, Household appliances, Imports, Intergovernmental relations, Small businesses.

Issued in Washington, DC, on March 24, 2011.

Kathleen B. Hogan,

Deputy Assistant Secretary for Energy Efficiency, Office of Technology Development, Energy Efficiency and Renewable Energy.

For the reasons set forth in the preamble, DOE proposes to amend part 430 of chapter II of Title 10, Subpart B, Code of Federal Regulations, to read as follows:

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

1. The authority citation for Part 430 continues to read as follows:

Authority: 42 U.S.C. 6291–6309; 28 U.S.C. 2461 note.

2. Appendix M to subpart B of part 430 is amended:

a. In section 1, Definitions, by:

1. Redesignating sections 1.13 through 1.47 as follows:

Old sections	New sections
1.13	1.14.
1.14 to 1.17	1.16 to 1.19, respectively.
1.18 to 1.25	1.21 to 1.28, respectively.
1.26 to 1.28	1.31 to 1.33, respectively.
1.29	1.35.
1.30 to 1.33	1.37 through 1.40, respectively.
1.34 to 1.47	1.42 through 1.55, respectively.

2. Adding new sections 1.13, 1.15, 1.20, 1.29, 1.30, 1.34, 1.36, and 1.41.

b. In section 2, Testing Conditions, by adding, in section 2.2 new paragraph d.

c. In section 3, Testing Procedures, by:

1. Revising section 3.1.

2. Adding new section 3.13.

d. In section 4, Calculations of Seasonal Performance Descriptors, by:

1. Adding new section 4.2.6.

2. Revising section 4.3.1.

3. Adding new section 4.5.

4. Redesignating Tables 17 through 19 as 18 through 20, respectively.

The additions and revisions read as follows:

APPENDIX M TO SUBPART B OF PART 430—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF CENTRAL AIR CONDITIONERS AND HEAT PUMPS

* * * * *

1. * * *

* * * * *

1.13 *Blower coil unit* means a residential central air conditioner or heat pump where the indoor-side refrigerant-to-air heat exchanger coil is packaged in the same cabinet as the indoor blower. All single-packaged units are blower coil units; split-system units may be either blower coil units or coil-only units.

* * * * *

1.15 Coil-only unit means a split-system residential central air conditioner or split-system heat pump where the indoor section includes a refrigerant-to-air heat exchanger coil but not a blower (fan). Coil-only units are designed to be installed and used in combination with a furnace or a modular blower.

* * * * *

1.20 Crankcase heater includes all devices and mechanisms for intentionally generating heat within and/or around the compressor sump volume to minimize the diluting of the compressor's refrigerant oil by condensed refrigerant.

* * * * *

1.29 Fixed-output crankcase heater means any heater that is designed for its power dissipation rate to not change more than 5 percent per 20 °C change in outdoor ambient temperature, if all other operating parameters are held constant.

* * * * *

1.30 Global control designates equipment having a thermostatically controlled crankcase heater in which the electrical power supplied to the heater is switched on and off based on a temperature measurement or thermostat that is not influenced by crankcase heater, when energized (*e.g.,* a thermostat that responds to ambient air temperature).

* * * * *

1.34 Local control designates equipment having a thermostatically controlled crankcase heater in which the electrical power supplied to the heater is switched on and off based on measurement or inference of the compressor's sump temperature.

* * * * *

1.36 Modular blower means a separate, self-contained indoor section that contains a blower (fan) and is designed to be installed and operate with a variety of coil-only units.

* * * * *

1.41 Self-regulating crankcase heater means any heater whose power dissipation changes in a consistent and repeatable manner in proportion to changes in the outdoor ambient temperature, if all other operating parameters are held constant. A heater made from a material having a positive temperature coefficient is an example of a self-regulating crankcase heater.

* * * * *

2.2 * * *

* * * * *

d. When testing coil-only residential central air conditioners and heat pumps, install a toroidal type transformer to power the low-voltage components of the coil-only system. The manufacturer shall designate any additional specification for this transformer. If the manufacturer does not so designate, use a transformer having the following features: a nominal V-amp rating that results in the transformer being loaded from 25 and 90 percent based on the highest power value expected and then confirmed during the off-mode test; designed to operate with a primary input of 230 V, single phase, 60 Hz; and that provides an output voltage that is within the allowed range for each low-voltage component. The power consumption of the lab-added low-voltage transformer, and the components connected to it, must be measured as part of the total system power consumption during the off-mode tests. This total system power for the coil-only unit, however, must then be reduced by the power consumed by the lab-added transformer when no load is connected to it.

* * * * *

3. * * *

3.1 General Requirements. If, during the testing process, an equipment set-up adjustment is made that would alter the performance of the unit when conducting an already completed test, then repeat all tests affected by the adjustment. For cyclic tests, instead of maintaining an air volume rate for each airflow nozzle, maintain the static pressure difference or velocity pressure during an ON period at the same pressure difference or velocity pressure as measured during the steady-state test conducted at the same test conditions.

Use the testing procedures in this section to collect the data used for calculating (1) Performance metrics for residential central air conditioners and heat pumps during the cooling season; (2) performance metrics for heat pumps during the heating season; and (3) power consumption metric(s) for residential central air conditioners and heat pumps during the off-mode season(s). For residential central air conditioners, the off-mode seasons are the shoulder seasons that separate the cooling and heating seasons and the entire heating season. For residential heat pumps, the shoulder season is the only off-mode season.

* * * * *

3.13 Laboratory testing to determine off-mode average power ratings.

3.13.1 Determine if the residential central air conditioner or heat pump has a compressor crankcase heater (*see* definition 1.51). If so equipped, determine from the manufacturer if the compressor crankcase heater's on/off operation is regulated using global control (*see* definition 1.53), local control (*see* definition 1.54), both local and global control, or is unregulated, with the heater operating continuously when the compressor is off. Also determine from the manufacturer if the crankcase heater is a fixed-output type (*see* definition 1.52) or a self-regulating type (*see* definition 1.56). Use Table 17 to determine the required test methods based on the type of crankcase heater installed.

Table 17. Selection of Test Procedure Section for Determining Off-Mode Power

Test Procedure Section	3.13.2	3.13.3	3.13.4.2	3.13.4.3 3.13.4.4	3.13.4.5.1	3.13.4.52	3.13.5	3.13.6	3.13.7 3.13.7.2	3.13.7 3.13.7.3 3.13.7.4	3.13.7.5.1	3.13.7.5.2	3.13.8	3.13.9
No Crankcase Heater	AC	HP												
Unregulated Crankcase Heater			AC						HP					
Globally Controlled Crankcase Heater				AC						HP				
Fixed Output Heater					AC						HP			
Self Regulating Heater						AC						HP		
Locally Controlled Crankcase Heater							AC						HP	
Globally and Locally Controlled Crankcase Heater								AC						HP

3.13.2 For residential central air conditioners not having a compressor crankcase heater, conduct the following off-mode test.

3.13.2.1 Configure the controls of the residential central air conditioner to mimic the operating mode as if connected to a building thermostat that is set to the OFF position. No requirements are placed on the ambient conditions within the indoor and outdoor test rooms. The room conditions are allowed to change for the duration of this particular test.

3.13.2.2 After the controls have been configured, wait at least 2 minutes. Then integrate the power consumption of the residential central air conditioner over a 5-minute interval. This integrated power consumption must include the power consumed by the low-voltage transformer and the low-voltage components connected to it. Calculate the average power consumption rate for the integration interval and designate it as P_5.

3.13.2.3 Power adjustment if testing a coil-only residential central air conditioner. For coil-only residential central air conditioners tested without an indoor blower installed and for residential central air conditioners tested and rated with a specific furnace or modular blower, reduce the overall system off-mode power measurement, P_5, by the power supplied to components not part of the residential central air conditioner. If tested without an indoor blower, disconnect all low-voltage wiring from the low-voltage transformer and integrate the power consumption of the fully unloaded transformer over a 5-minute interval. If tested and rated with a specific furnace or specific modular blower, measure only the power supplied to the furnace or modular blower while idle (*e.g.,* disconnect the low-voltage wiring for the components housed in the residential central air conditioner parts of the system from the transformer) and integrate this power over a 5-minute interval. Calculate the average power consumption of the fully unloaded transformer, idle furnace, or idle modular blower over the integration interval and designate it as P_X. Subtract this average power consumption (P_X) from the previously calculated overall system average power (P_5) and designate it as P_{5X}.

3.13.2.4 For blower coil residential central air conditioners, round P_5 to the nearest integer wattage value and record this rounded value as both *P1* and *P2*. For coil-only residential central air conditioners, round P_{5X} to the nearest integer wattage value and record this rounded value as both *P1* and *P2*. If the resulting *P1* and *P2* are each less than 1 watt, assign each of them the value of zero.

3.13.3 For heat pumps not having a compressor crankcase heater, conduct the following off-mode test.

3.13.3.1 Configure the controls of the heat pump to mimic the operating mode as if connected to a building thermostat that is set to the COOL mode but whose temperature setpoint is satisfied. No requirements are placed on the ambient conditions within the indoor and outdoor test rooms. The room conditions are allowed to change for the duration of this particular test.

3.13.3.2 After the controls have been configured, wait at least 2 minutes. Then integrate the power consumption of the heat pump over a 5-minute interval. This integrated power consumption must include the power consumed by the low-voltage transformer and the low-voltage components connected to it. Calculate the average power consumption rate for the integration interval. Record this value as P_{5C}.

3.13.3.3 Reconfigure the controls of the heat pump to mimic the operating mode as if connected to a building thermostat that is set to the HEAT mode but with its temperature setpoint satisfied.

3.13.3.4 After the controls have been reconfigured, wait at least 2 minutes. Then integrate the power consumption of the heat pump over a 5-minute interval. Calculate the average power consumption rate for the integration interval. Record this value as P_{5H}.

3.13.3.5 Power adjustment if testing a coil-only heat pump. For coil-only heat pumps tested without an indoor blower installed, and for heat pumps tested with a specific furnace or modular blower, reduce the overall system off-mode power measurements, P_{5C} and P_{5H}, by the power supplied to components not part of the heat pump. If tested without an indoor blower, disconnect all low-voltage wiring from the low-voltage transformer and integrate the power consumption of the fully unloaded transformer over a 5-minute interval. If tested and rated with a specific furnace or specific modular blower, take steps to measure only the power supplied to the furnace or modular blower while idle (*i.e.,* disconnect the low-voltage wiring for the components housed in the heat pump parts of the system from the transformer) and integrate this power over a 5-minute interval. Calculate the average power consumption of the fully unloaded transformer, idle furnace, or idle modular blower over the integration interval and designate it as P_X. Subtract this average power consumption (P_X) from the previously calculated overall system average power values (P_{5C} and P_{5H}) and designate the differences as P_{5CX} and P_{5HX}.

3.13.3.6 For blower coil heat pumps, calculate $P1 = (P_{5C} + P_{5H})/2$ and round to the nearest integer wattage. For coil-only heat pumps, calculate $P1 = (P_{5CX} + P_{5HX})/2$ and round to the nearest integer wattage.

3.13.4 For residential central air conditioners having a compressor crankcase heater whose on/off operation is either unregulated or is regulated using only global control, conduct the following off-mode test.

3.13.4.1 Configure the controls of the residential central air conditioner to mimic the operating mode as if connected to a building thermostat set to the OFF position and then wait at least 2 minutes.

3.13.4.2 If the compressor crankcase heater is unregulated and so operates continuously when the unit is sitting idle, assign *T00* = *T100* = 75 °F. Skip to section 3.13.4.5.

3.13.4.3 If the compressor crankcase heater is regulated using global control, conduct the following steps. If the manufacturer-provided *T00* is greater than or equal to 75 °F, *T00* and *T100* are deemed verified; skip to section 3.13.4.5. Otherwise, first evaluate *T00* and *T100* as described in section 3.13.4.4.

3.13.4.4 If the compressor crankcase heater is regulated using global control and the manufacturer-provided *T00* is less than 75 °F, position a lab-added temperature sensor in the air between 2 and 6 inches from the crankcase heater thermostat used for the global control, or between 2 and 6 inches of the temperature sensor used by the crankcase heater's global controller. For this off-mode test only, use this lab-added temperature sensor to measure the outdoor dry bulb temperature. Also, monitor the power measurement that includes the crankcase heater to provide an indication of when the crankcase heater is on versus off. Maintain the dry bulb temperature in the indoor test room between 75 °F and 85 °F.

If the crankcase heater is energized by the global control device at the beginning of this evaluation process, achieve a dry bulb temperature in the outdoor test room that is equal to or less than the quantity of *T100*—5 °F, where *T100* is the manufacturer provided value, and wait for 30 minutes. Thereafter, increase the dry bulb temperature in the outdoor test room in increments of no more than 1 °F per 5 minutes until the crankcase heater cycles off. When the heater cycles off, record the reading of the lab-added temperature sensor. If this reading is within ±5 °F of the manufacturer-provided *T100,* then the manufacturer-provided value is deemed verified; otherwise, round the measured temperature of the lab-added sensor to the nearest 5 °F increment relative to a 65 °F reference (*e.g.,* 65 °F, 70 °F, 75 °F, * * * or 60 °F, 55 °F, 50 °F, * * *) and designate this rounded value as the new *T100*. If the crankcase heater cycled off prior to beginning the 1 °F per 5 minute increases within the outdoor test room, the evaluation of *T100* must be repeated after first evaluating *T00* as described below. For this second attempt at evaluating *T100,* begin the 1 °F per 5 minute increases after achieving a steady outdoor temperature for at least 30 minutes during which the heater does not cycle off.

Next, achieve a dry bulb temperature in the outdoor test room that is equal to or greater than the quantity of *T00* + 5 °F, where *T00* is the manufacturer provided value, and wait for 30 minutes. Thereafter, begin decreasing the dry bulb temperature in the outdoor test room in increments of no more than 1 °F per 5 minutes until the crankcase heater cycles on. When the heater cycles on, record the reading of the lab-added temperature sensor. If this reading is within ±5 °F of the manufacturer-provided *T00,* then the manufacturer-provided value is deemed verified; otherwise, round the measured temperature of the lab-added sensor to the nearest 5 °F increment relative to a 65 °F reference (*e.g.,* 65 °F, 70 °F, 75 °F, * * * or 60 °F, 55 °F, 50 °F, * * *) and designate this rounded value as the new *T00*. If the crankcase heater cycled on prior to beginning the 1 °F per 5 minute decreases within the outdoor test room, the evaluation of *T00* must be repeated after first evaluating *T100* as described above. For this second attempt at evaluating *T00,* begin the 1 °F per 5 minute decreases after achieving a steady outdoor temperature for at least 30 minutes during which the heater does not cycle on.

If the crankcase heater is de-energized at the beginning of this evaluation process, reverse the steps described above: evaluate *T00* and then *T100.*

3.13.4.5 For crankcase heaters that are the fixed output type, conduct the average power consumption measurement(s) described in 3.13.4.5.1. For crankcase heaters that are the self-regulating type, conduct the average power consumption measurements described in 3.13.4.5.2.

3.13.4.5.1 If the crankcase heater is a fixed output type, integrate the power consumption of the residential central air conditioner over a 5-minute interval when the crankcase heater is on continuously. The temperature in the outdoor test room may need to be lowered to activate the heater for this test. This integration period may be conducted in combination with the steps described in section 3.13.4.4. The temperature of the outdoor test room is allowed to vary during the 5-minute data collection interval. Calculate the average power consumption rate for the integration interval and record it as P_{5N}.

If *T00* is less than 75 °F, also integrate the power consumption of the residential central air conditioner over a 5-minute interval where the crankcase heater is off for the entire interval. The temperature in the outdoor test room may need to be increased to deactivate the heater for this test. Disconnecting the power to the heater is also permitted to temporarily disable it and obtain the off-mode power corresponding to no crankcase heater operation. The power integration period may be conducted in combination with the steps described in section 3.13.4.4. The temperature of the outdoor test room is allowed to vary during the 5-minute data collection interval. Calculate the average power from the integration interval and record it as P_{5F}.

The integrated power consumption measurements P_{5N} and P_{5F}, described above, must include the power consumed by the low-voltage transformer and the low-voltage components connected to it.

3.13.4.5.1.1 For coil-only residential central air conditioners tested without an indoor blower installed and for residential central air conditioners tested with a specific furnace or modular blower, reduce the overall system off-mode power measurements, P_{5N} and P_{5F}, by the power supplied to the components that are not part of the residential central air conditioner. If tested without an indoor blower, disconnect all low-voltage wiring from the low-voltage transformer and integrate the power consumption of the fully unloaded transformer over a 5-minute interval. If tested and rated with a specific furnace or specific modular blower, measure only the power supplied to the furnace or modular blower while idle (*e.g.,* disconnect the low-voltage wiring for the components housed in the residential central air conditioner parts of the system from the transformer) and integrate this power over a 5-minute interval. Calculate the average power consumption of the fully unloaded transformer, idle furnace, or idle modular blower for the integration interval and designate it as P_X. Subtract this average power consumption (P_X) from the previously calculated overall system average power to obtain the adjusted values. Calculate:

$$P_{CC} = P_{5N} - P_X \text{ and}$$

$$P_{NC} = P_{5F} - P_X .$$

3.13.4.5.1.2 For blower-coil residential central air conditioners, set $P_{CC} = P_{5N}$ and $P_{NC} = P_{5F}$.

3.13.4.5.2 If the crankcase heater is a self-regulating type, either three or four data collection intervals are required. Prior to beginning a data collection interval, maintain the outdoor room temperature at a nominally steady value that is between *T00* and *T00*—

10 °F for at least 15 minutes. Also, for at least 5 minutes prior to the start of a data collection interval, operate with the crankcase heater on. Then, with the crankcase heater remaining on continuously, record the power consumption of the residential central air conditioner and the outdoor room temperature at equal time intervals that each span 5 minutes or less. Discontinue the data collection when the outdoor room temperature varies 2 °F or less over at least a 3-hour interval; do not collect data for more than 24 hours. From power data recorded during the last 15 minutes of the data collection interval, calculate an average value and record it as P_{15}.

If the data collection interval is 20 hours or longer, set P_{241} equal to P_{15}. Otherwise, curve fit the collected power [P_{OM} (τ_{OM})] versus elapsed time (τ_{OM}) data from the data collection interval using the designated equation and determine the value of each curve fit constant *U, V, W,* and if applicable, *Y.* If the power data are generally decreasing with time over the data collection interval, use Equation 13.3–1; if the power data are generally increasing with time over the data collection interval, use Equation 13.3–2.

$$P_{OM}(\tau_{OM}) = U + V \cdot \exp\left(-\frac{W}{\tau_{OM}}\right) \qquad [13.3\text{-}1]$$

$$P_{OM}(\tau_{OM}) = U + \frac{V}{1 + \left[\frac{\tau_{OM}}{W}\right]^{Y}} \qquad [13.3\text{-}2]$$

Evaluate the equation for an elapsed time of 24 hours (τ_{OM} = 24 hours); make sure to express the elapsed time in the same units as used for the curve fit. If Equation 13.3–1 is used and the calculated value of power consumption at 24 hours is greater than P_{15}, then set P_{241} equal to P_{15}. If Equation 13.3–1 is used and the calculated value of power consumption at 24 hours is less than $0.85 \times P_{15}$, then set P_{241} equal to $0.85 \times P_{15}$. If Equation 13.3–2 is used and the calculated value of power consumption at 24 hours is less than P_{15}, then set P_{241} equal to P_{15}. If Equation 13.3–2 is used and the calculated value of power consumption at 24 hours is greater than $1.15 \times P_{15}$, then set P_{241} equal to $1.15 \times P_{15}$. Otherwise, set the off-mode power P_{241} equal to P_{OM}(24 hr). Also calculate the average outdoor room temperature for the data collection interval and record it as T_{CC1}.

Repeat the above steps, only now at an outdoor test room temperature that is 25 °F to 35 °F lower than T_{CC1}. Record the predicted power as P_{242} and the average outdoor temperature as T_{CC2}.

If *T00* is less than 75 °F, also integrate the power consumption of the residential central air conditioner over a 5-minute interval where the crankcase heater is off for the entire interval. The temperature in the outdoor test room may need to be increased to deactivate the heater for this test. Disconnecting the power to the heater is also permitted to temporarily disable it and obtain the off-mode power corresponding to no crankcase heater operation. The power integration period may be conducted in combination with the steps described in section 3.13.4.4. The temperature of the outdoor test room is allowed to vary during this 5-minute data collection interval. Calculate the average power from the integration interval and record it as P_{5F}.

The above-described integrated power consumption measurements—P_{241}, P_{242}, and P_{5F}—must include the power consumed by the low-voltage transformer and the low-voltage components connected to it.

3.13.4.5.2.1 For coil-only residential central air conditioners tested without an indoor blower installed and for residential central air conditioners tested and rated with a specific furnace or modular blower, reduce the overall system off-mode power measurements P_{241}, P_{242}, and P_{5F} by the power supplied to the components that are not part of the residential central air conditioner. If tested without an indoor blower, disconnect all low-voltage wiring from the low-voltage transformer and integrate the power consumption of the full unloaded transformer over a 5-minute interval. If tested and rated with a specific furnace or a specific modular blower, measure only the power supplied to the furnace or modular blower while idle (*e.g.,* disconnect the low-voltage wiring for the components housed in the residential central air conditioner parts of the system from the transformer) and integrate this power over a 5-minute interval. Calculate the average power consumption of the fully unloaded transformer, idle furnace, or idle modular blower for the integration interval and designate it as P_X. Subtract this average power consumption (P_X) from the previously calculated overall system average power values to obtain the adjusted values. Calculate:

$$P_{CC1} = P_{241} - P_X\,,$$

$$P_{CC2} = P_{242} - P_X\text{, and}$$

$$P_{NC} = P_{5F} - P_X\,.$$

3.13.4.5.2.2 For blower-coil residential central air conditioners, set $P_{CC1} = P_{241}$, $P_{CC2} = P_{242}$, and $P_{NC} = P_{5F}$.

3.13.5 For residential central air conditioners having a compressor crankcase heater that is regulated using only local control, conduct the following off-mode test.

3.13.5.1 Configure the controls of the residential central air conditioner to mimic the operating mode as if connected to a building thermostat set to the OFF position.

3.13.5.2 Obtain and maintain an outdoor room temperature that is any temperature between 60 °F and 70 °F. Collect data over each complete ON + OFF cycle of the crankcase heater, from heater initiation to heater initiation. Integrate the power consumption of the residential central air conditioner and record outdoor room temperature during each complete cycle. Calculate the average power and average outdoor room temperature from each ON + OFF complete cycle and record them as P_{LC1} and T_{CC1}, respectively. The elapsed time between the start of the first crankcase heater ON cycle and the test termination must be a minimum of 3 hours. Terminate the test when P_{LC1} changes by 1 watt or less for consecutive cycles and the outdoor temperature changes 2 °F or less over the entire interval required for the final two ON + OFF cycles. As an alternative to waiting until this test termination criteria is satisfied, the manufacturer can choose to terminate the test when at least three consecutive ON + OFF cycles occur where the average power from each cycle is less than the average power from the prior cycle and the outdoor temperature changes 2 °F or less over the entire interval required for the final three ON + OFF cycles. Save the P_{LC1} and T_{CC1} from the final cycle. Repeat these steps, only now at an outdoor test room temperature that is 25 °F to 35 °F lower than T_{CC1}. Record the average values from the final ON + OFF complete cycle as P_{LC2} and T_{CC2}. The integrated power consumption measurements must include the power consumed by the low-voltage transformer and the low-voltage components connected to it.

3.13.5.3 For coil-only residential central air conditioners tested without an indoor blower installed and for residential central air conditioners tested with a specific furnace or modular blower, reduce the overall system off-mode power measurement—P_{LC1} and P_{LC2}—by power supplied to the components that are not part of the residential central air conditioner. If tested without an indoor blower, disconnect all low-voltage wiring from the low-voltage transformer and integrate the power consumption of the fully unloaded transformer over a 5-minute interval. If tested and rated with a specific furnace or specific modular blower, measure only the power supplied to the furnace or modular blower while idle (*i.e.,* disconnect the low-voltage wiring for the components housed in the residential central air conditioner parts of the system from the transformer) and integrate this power over a 5-minute interval. Calculate the average power consumption of the fully unloaded transformer, idle furnace, or idle modular blower for the integration interval and designate it as P_X. Subtract this average power consumption from the previously calculated overall system average power values to obtain the adjusted values. Calculate:

$$P_{CC1} = P_{LC1} - P_X \text{ and}$$

$$P_{CC2} = P_{LC2} - P_X .$$

3.13.5.4 For blower-coil residential central air conditioners, set $P_{CC1} = P_{LC1}$ and $P_{CC2} = P_{LC2}$.

3.13.6 For residential central air conditioners having a compressor crankcase heater that is regulated using both local and global control, conduct the following off-mode test.

3.13.6.1 Configure the controls of the residential central air conditioner to mimic the operating mode as if connected to a building thermostat set to the OFF position. If the manufacturer-provided *T00* is greater than or equal to 75 °F, *T00* and *T100* are deemed verified; conduct the testing specified in section 3.13.5 to determine P_{CC1}, T_{CC1}, P_{CC2}, and T_{CC2}. Otherwise, first evaluate *T00* and *T100* as described in section 3.13.4.4. In conducting the procedure specified in section 3.13.4.4, either temporarily disable the local control or confirm that the lab-derived values for *T00* and *T100* correspond to the global control and not the local control of the crankcase heater. Thereafter, determine P_{CC1}, T_{CC1}, P_{CC2}, and T_{CC2}, as specified in section 3.13.5, only now conducting the first multiple ON + OFF cycle test at an outdoor temperature between *T00* and *T00* − 10 °F, rather than between 60 °F and 70 °F.

3.13.6.2 If *T00* is less than 75 °F, also integrate the power consumption of the residential central air conditioner over a 5-minute interval where the crankcase heater is off for the entire interval. The temperature in the outdoor test room may need to be increased to deactivate the heater for this test. Disconnecting the power to the heater is also permitted to temporarily disable it and obtain the off-mode power corresponding to no crankcase heater operation. The power integration period may be conducted in combination with the steps described in section 3.13.4.4. The temperature of the outdoor test room is allowed to vary during the 5-minute data collection interval. Calculate the average power from the integration interval and record it as P_{5F}. This quantity, P_{5F}, must include the power consumed by the low-voltage transformer and the low-voltage components connected to it.

3.13.6.2.1 For coil-only residential central air conditioners tested without an indoor blower installed and for residential central air conditioners tested with a specific furnace or modular blower, reduce P_{5F} by the average power determined from the 5-minute power integration test described in 3.13.5.3 that corresponds to the fully unloaded transformer, idle furnace, or idle modular blower (P_X). Record this adjusted value as P_{NC}.

3.13.6.2.2 For blower-coil residential central air conditioners, set $P_{NC} = P_{5F}$.

3.13.7 For heat pumps having a compressor crankcase heater whose on/off operation is either unregulated or regulated using only global control, conduct the following off-mode test.

3.13.7.1 Configure the controls of the heat pump to mimic the operating mode as if connected to a building thermostat that is set to the COOL mode but whose temperature setpoint is satisfied. Wait at least 2 minutes.

3.13.7.2 If the compressor crankcase heater is unregulated and therefore operates continuously when the unit is sitting idle, assign *T00* = *T100* = 75 °F. Skip to section 3.13.7.5.

3.13.7.3 If the compressor crankcase heater is regulated using global control, conduct the following steps. If the manufacturer-provided *T00* is greater than or equal to 75 °F, *T00* and *T100* are deemed verified; skip to section 3.13.7.5. Otherwise, first evaluate *T00* and *T100* as described in section 3.13.7.4.

3.13.7.4 If the compressor crankcase heater is regulated using global control and the manufacturer-provided *T00* is less than 75 °F, verify or determine *T00* and *T100* as specified in section 3.13.4. 4.

3.13.7.5 If *T100* is less than 55 °F, calculate the off-mode power consumption as designated for a heat pump not having a crankcase heater, as per Section 3.13.3. Otherwise, for crankcase heaters that are the fixed output type, conduct the average power consumption measurement(s) described in 3.13.7.5.1. For crankcase heaters that are the self-regulating type, conduct the average power consumption measurements described in 3.13.7.5.2.

3.13.7.5.1 If the crankcase heater is a fixed output type, integrate the power consumption of the heat pump over a 5-minute interval when the crankcase heater is on continuously. The temperature in the outdoor test room may need to be lowered to activate the heater for this test. This integration period may be conducted in combination with the steps described in section 3.13.4.4. The temperature of the outdoor test room is allowed to vary during the 5-minute data collection interval. Calculate the average power from the integration interval and record it as P_{5N}.

3.13.7.5.2 If the crankcase heater is a self-regulating type, maintain the outdoor room temperature at a nominally steady value that is between 70 °F and 75 °F or between *T100* − 3 °F and *T100* − 8 °F, whichever is lower, for at least 15 minutes prior to beginning a data collection interval. Also, for at least 5 minutes prior to the start of a data collection interval, operate with the crankcase heater on. Then, with the crankcase heater remaining on continuously, record the power consumption of the heat pump and the outdoor room temperature at equal time intervals that each span 5 minutes or less. Discontinue the data collection when the outdoor room temperature varies 2 °F or less over at least a 3-hour interval; do not collect data for more than 24 hours. From power data recorded during the last 15 minutes of the data collection interval, calculate an average value and record it as P_{15}.

If the data collection interval is 20 hours or longer, set P_{241} equal to P_{15}. Otherwise, curve fit the collected data, determine the curve fit constants, and evaluate the power quantity P_{241} and the average outdoor room temperature T_{CC1} as specified in section 3.13.4.5.2. Repeat these steps, only now at an outdoor test room temperature that is 7 °F to 12 °F lower than T_{CC1}. Record the power quantity as P_{242} and the average outdoor temperature as T_{CC2}.

3.13.7.6 Integrate the power consumption of the heat pump over a 5-minute interval where the crankcase heater is off for the entire interval. The temperature in the outdoor test room may need to be increased to deactivate the heater for this test. Disconnecting the power to the heater to temporarily disable it is also permitted. The integration period may be conducted in combination with the steps described in section 3.13.4.4. The temperature of the outdoor test room is allowed to vary during this 5-minute data collection interval. Calculate the average power from the integration interval and record it as P_{5FC}.

Reconfigure the controls of the heat pump to mimic the operating mode if connected to a building thermostat that is set to the HEAT mode but whose temperature setpoint is satisfied. Wait at least 2 minutes. Then integrate the power consumption of the heat pump over a 5-minute interval where the crankcase heater is off for the entire interval. Calculate the average power from the integration interval and record it as P_{5FH}. Calculate the mean of the two average power measurements where the crankcase heater was off and designate the average value as $P_{5F} = ([P_{5FC} + P_{5FH}]/2)$.

3.13.7.7 The integrated power consumption measurements must include the power consumed by the low-voltage transformer and the low-voltage components connected to it.

3.13.7.8 For coil-only heat pumps tested without an indoor blower installed and for heat pumps tested with a specific furnace or modular blower, reduce the overall system off-mode power measurements—P_{5N}, P_{5FC}, and P_{5F} or P_{241}, P_{242}, P_{5FC}, and P_{5F}—by power supplied to the components not part of the heat pump. If tested without an indoor blower, disconnect all low-voltage wiring from the low-voltage transformer and integrate the power consumption of the fully unloaded transformer over a 5-minute interval. If tested with a specific furnace or specific modular blower, measure only the power supplied to the furnace or modular blower while idle (*e.g.,* disconnect the low-voltage wiring for the components housed in the heat pump parts of the system) and integrate this power over a 5-minute interval. Calculate the average power consumption of the fully unloaded transformer, idle furnace, or idle modular blower for the integration interval and designate it as P_X. Subtract this average power consumption from the previously calculated overall system average power values to obtain the adjusted values. For heat pumps having a fixed-output type crankcase heater, calculate:

$$P_{CC} = P_{5N} - P_X,$$

$$PC_{NC} = P_{5FC} - P_X \text{, and}$$

$$P_{NC} = P_{5F} - P_X .$$

For heat pumps having a self-regulating type crankcase heater, calculate:

$$P_{CC1} = P_{241} - P_X ,$$

$$P_{CC2} = P_{242} - P_X ,$$

$$PC_{NC} = P_{5FC} - P_X \text{, and}$$

$$P_{NC} = P_{5F} - P_X .$$

3.13.7.9 For blower-coil heat pumps having a fixed output type crankcase heater, set $P_{CC} = P_{5N}$, $PC_{NC} = P_{5FC}$, and $P_{NC} = P_{5F}$. For blower-coil heat pumps having a self-regulating type crankcase heater, set $P_{CC1} = P_{241}$, $P_{CC2} = P_{242}$, $PC_{NC} = P_{5FC}$, and $P_{NC} = P_{5F}$.

3.13.8 For heat pumps having a compressor crankcase heater that is regulated using only local control, conduct the following off-mode test.

3.13.8.1 Configure the controls of the heat pump to mimic the operating mode if connected to a building thermostat that is set to the COOL mode with its temperature setpoint satisfied.

3.13.8.2 Obtain and maintain an outdoor room temperature that is between 64 °F and 66 °F. Collect data over each complete ON + OFF cycles of the crankcase heater, from heater initiation to heater initiation. Integrate the power consumption of the heat pump and record outdoor room temperature during each complete cycle. Calculate the average power and average outdoor room temperature from each ON + OFF complete cycle and record them as P_{LC} and T_{CC}, respectively. The elapsed time between the start of the first crankcase heater ON cycle and the test termination must be a minimum of 3 hours. Terminate the test when: (1) P_{LC} changes 1 watt or less for consecutive cycles, (2) the T_{CC} for each of the final two complete cycles is between 64 °F and 66 °F, and (3) the outdoor temperature changes 2 °F or less over the entire interval required for the final two ON + OFF cycles. As an alternative to waiting until these test termination criteria are satisfied, the manufacturer may choose to terminate the test when: (1) at least three consecutive ON + OFF cycles occur where the average power from each cycle is less than the average power from the prior cycle, (2) the T_{CC} for each of the final three complete cycles is between 64 °F and 66 °F, and (3) the outdoor temperature changes 2 °F or less over the entire interval required for the final three ON + OFF cycles. Save the P_{LC} from the final cycle.

3.13.8.3 Next, integrate the power consumption of the heat pump over a 5-minute interval where the crankcase heater is off for the entire interval. Take whatever steps are needed to deactivate the heater for this test. Disconnecting the power to the heater is permitted. The temperature of the outdoor test room is allowed to vary during this 5-minute data collection interval. Calculate the average power from the integration interval and record it as P_{5FC}.

Reconfigure the controls of the heat pump to mimic the operating mode as if connected to a building thermostat that is set to the HEAT mode but whose temperature setpoint is satisfied. Wait at least 2 minutes. Then, integrate the power consumption of the heat pump over a 5-minute interval where the crankcase heater is off for the entire interval. Calculate the average power from the integration interval and record it as P_{5FH}. Calculate the mean of the two average power measurements where the crankcase heater was off and designate this mean value as P_{5F} = $[(P_{5FC} + P_{5FH})/2]$.

3.13.8.4 The integrated power consumption measurements specified in sections 3.13.8.2 and 3.13.8.3 must include the power consumed by the low-voltage transformer and the low-voltage components connected to it.

3.13.8.5 For coil-only heat pumps tested without an indoor blower installed and for heat pumps tested with a specific furnace or modular blower, reduce the overall system off-mode power measurements—P_{LC}, P_{5FC}, and P_{5F}—by power supplied to the components that are not part of the heat pump. If tested without an indoor blower, disconnect all low-voltage wiring from the low-voltage transformer and integrate the power consumption of the fully unloaded transformer over a 5-minute interval. If tested with a specific furnace or specific modular blower, measure only the power supplied to the furnace or modular blower while idle (*e.g.,* disconnect the low-voltage wiring for the components housed in the heat pump parts of the system) and integrate this power over a 5-minute interval. Calculate the average power consumption of the fully unloaded transformer, idle furnace, or idle modular blower for the integration interval and designate it as P_X. Subtract this average power consumption from the previously calculated overall system average power values to obtain the adjusted values. Calculate:

$$P_{CC} = P_{LC} - P_X ,$$

$$PC_{NC} = P_{5FC} - P_X \text{, and}$$

$$P_{NC} = P_{5F} - P_X .$$

3.13.8.6 For blower-coil heat pumps, set $P_{CC} = P_{LC}$, $PC_{NC} = P_{5FC}$, and $P_{NC} = P_{5F}$.

3.13.9 For heat pumps having a compressor crankcase heater that is regulated using both local and global control, conduct the following off-mode test.

3.13.9.1 Configure the controls of the heat pump to mimic the operating mode as if connected to a building thermostat that is set to the COOL mode and its temperature setpoint is satisfied.

3.13.9.2 If the manufacturer-provided *T00* is greater than or equal to 75 °F, *T00* and *T100* are deemed verified; conduct the testing specified in section 3.13.8 to determine P_{CC}, PC_{NC}, and P_{NC}. Otherwise, first evaluate *T00* and *T100* as described in section 3.13.7.4. In conducting the procedure specified in section 3.13.7.4, take steps to either temporarily disable the local control or to confirm that the lab-derived values for *T00* and *T100* correspond to the global thermostatic control and not the local thermostatic control. Thereafter, determine P_{CC}, PC_{NC}, and P_{NC} as specified in section 3.13.8, only now conducting the ON + OFF complete cyclic test at an average outdoor temperature that is within ±1 °F of the quantity ½ × [55 °F + (*T00* + *T100*)/2], rather than a value that is between 64 °F and 66 °F.

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4.2.6 Off-mode seasonal power and energy consumption calculations.

4.2.6.1 Off-mode seasonal power consumption for the shoulder season, *P1*. For residential central air conditioners and heat pumps, the off-mode power consumption for the shoulder seasons is a single value that applies for all locations. Calculate *P1* as specified in 4.2.6.1.1 to 4.2.6.1.3.4.

4.2.6.1.1 Residential central air conditioners and heat pumps that do not have a compressor crankcase heater. For residential central air conditioners and heat pumps not having a compressor crankcase heater, assign *P1* as specified in sections 3.13.2 and 3.13.3, respectively.

4.2.6.1.2 Residential central air conditioners that have a compressor crankcase heater. Evaluate *P1* using

$$P1 = \frac{P1(57) + P1(62) + P1(67) + P1(72)}{4} \text{, rounded to the nearest integer watt,}$$

where the off-mode power values for the four outdoor temperatures depend on whether the heater is thermostatically controlled and, in some cases, whether the crankcase heater is a fixed output type or a self-regulating type. The thermostatic control may qualify as global, local, or both—*see* definitions 1.53 and 1.54. The most common example of global control is a crankcase heater that is regulated by an outdoor temperature thermostat.

4.2.6.1.2.1 Residential central air conditioner crankcase heater is unregulated. For fixed-output type crankcase heaters, set *P1* = P_{CC}, as determined in section 3.13.4.5.1 and its subsections, and round to the nearest integer watt. For self-regulating type crankcase heaters, evaluate:

$$P1(T_j) = \frac{(P_{CC2} - P_{CC1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CC1}$$, where,

P_{CC1}, P_{CC2}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.4.5.2 and its subsections.

4.2.6.1.2.2 Residential central air conditioner crankcase heater is regulated using only global control.

If the residential central air conditioner's *T00* is greater than or equal to 75 °F, determine the shoulder season off-mode power consumption as specified in sections 4.2.6.1.2 and 4.2.6.1.2.1. If *T00* is less than 75 °F, use the following. For fixed-output type crankcase heaters, calculate

$$P_{CH} = P_{CC} - P_{NC}$$

$$P1(T_j) = P_{NC} + F_{CC}(T_j) \cdot P_{CH}$$, where

P_{CC} and P_{NC} are determined as specified in section 3.13.4.5.1 and its subsections, and

$$F_{CC}(T_j) = \begin{cases} 0, if\ T_j \geq T100 \\ 1 - \frac{(T_j - T00)}{(T100 - T00)}, if\ T00 < T_j < T100 \\ 1, if\ T_j \leq T00 \end{cases}$$, where

T00 and *T100* are determined as specified in 3.13.4.3 or 3.13.4.4.

For self-regulating type crankcase heaters, calculate:

$$P_{CH1} = P_{CC1} - P_{NC}$$

$$P_{CH2} = P_{CC2} - P_{NC}$$

$$P1(T_j) = P_{NC} + F_{CC}(T_j)\left[\frac{(P_{CH2} - P_{CH1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CH1}\right]$$, where

P_{CC1}, P_{CC2}, P_{NC}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.4.5.2 and its subsections, and $F_{CC}(T_j)$ is calculated as shown above.

4.2.6.1.2.3 Residential central air conditioner crankcase heater is regulated using only local control.

For both fixed-output type and self-regulating type crankcase heaters, calculate

$$P1(T_j) = \frac{(P_{CC2} - P_{CC1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CC1}$$, where

P_{CC1}, P_{CC2}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.5.

4.2.6.1.2.4 Residential central air conditioner crankcase heater is regulated using both global and local control. If the heat pump's *T00* is greater than or equal to 75 °F, determine the off-mode power consumption as specified in sections 4.2.6.1.2 and 4.2.6.1.2.3. If *T00* is less than 75 °F, use the following. For both fixed-output type and self-regulating type crankcase heaters, calculate

$$P_{CH1} = P_{CC1} - P_{NC}$$

$$P_{CH2} = P_{CC2} - P_{NC}$$

$$P1(T_j) = P_{NC} + F_{CC}(T_j)\left[\frac{(P_{CH2} - P_{CH1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CH1}\right]$$, where

P_{CC1}, P_{CC2}, P_{NC}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.6 and $F_{CC}(T_j)$ is calculated as shown in section 4.2.6.1.2.2.

4.2.6.1.3 Heat pumps that have a compressor crankcase heater. The calculations for the heat pump's shoulder season off-mode power value depends on whether the heater is thermostatically controlled and, in some cases, whether the crankcase heater is a fixed-output type or a self-regulating type. The thermostatic control may qualify as global, local, or both—*see* definitions 1.53 and 1.54.

4.2.6.1.3.1 Heat pump crankcase heater is unregulated. For fixed-output type crankcase heaters, evaluate:

$$P1 = (P_{CC} - PC_{NC}) + P_{NC}$$, rounded to the nearest integer watt, where

$\underline{P_{CC}}$, $\underline{PC_{NC}}$, and $\underline{P_{NC}}$ are determined as specified in section 3.13.7 and its subsections.

P_{CC}, PC_{NC}, and P_{NC} are determined as specified in section 3.13.7 and its subsections.

For self-regulating type crankcase heaters, evaluate:

$$P1 = \frac{P1(57) + P1(62) + P1(67) + P1(72)}{4}$$, rounded to the nearest integer watt, where

$$P1(T_j) = \frac{(P_{CH2} - P_{CH1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CH1} + P_{NC}$$,

$$P_{CH1} = P_{CC1} - PC_{NC}$$

$$P_{CH2} = P_{CC2} - PC_{NC}$$, and

P_{CC1}, P_{CC2}, PC_{NC}, P_{NC}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.7 and its subsections.

4.2.6.1.3.2 Heat pump crankcase heater is regulated using only global control. If the heat pump's *T00* is greater than or equal to 75 °F, determine the shoulder season off-mode power consumption as specified in section 4.2.6.1.3.1. If the heat pump's *T100* is less than 55 °F, determine the shoulder season off-mode power consumption as designated for a heat pump not having a crankcase heater, as per section 4.2.6.1.1. If *T00* is less than 75 °F and *T100* is greater than 55 °F, use the following:

$$P1 = \frac{P1(57) + P1(62) + P1(67) + P1(72)}{4}$$, rounded to the nearest integer watt.

For fixed-output type crankcase heaters, calculate

$$P_{CH} = P_{CC} - PC_{NC}$$

$$P1(T_j) = P_{NC} + F_{CC}(T_j) \cdot P_{CH}$$, where

P_{CC}, PC_{NC}, and P_{NC} are determined as specified in Section 3.13.7 and its subsections, and

$$F_{CC}(T_j) = \begin{cases} 0, & if\ T_j \geq T100 \\ 1 - \frac{(T_j - T00)}{(T100 - T00)}, & if\ T00 < T_j < T100 \\ 1, & if\ T_j \leq T00 \end{cases}$$, where

T00 and *T100* are determined as specified in 3.13.7.3 or 3.13.7.4.

For self-regulating type crankcase heaters, calculate:

$$P_{CH1} = P_{CC1} - PC_{NC}$$

$$P_{CH2} = P_{CC2} - PC_{NC}$$

$$P1(T_j) = P_{NC} + F_{CC}(T_j)\left[\frac{(P_{CH2} - P_{CH1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CH1}\right]$$, where

P_{CC1}, P_{CC2}, PC_{NC}, P_{NC}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.7 and its subsections, and $F_{CC}(T_j)$ is calculated as shown above.

4.2.6.1.3.3 Heat pump crankcase heater is regulated using local control. For both fixed-output type and self-regulating type crankcase heaters, calculate

$$P1 = (P_{CC} - PC_{NC}) + P_{NC}$$, where

P_{CC}, PC_{NC}, and P_{NC} are determined as specified in section 3.13.8 and its subsections.

4.2.6.1.3.4 Heat pump crankcase heater is regulated using both global and local control. If the heat pump's *T00* is greater than or equal to 75 °F, determine the shoulder season off-mode power consumption as specified in section 4.2.6.1.3.1. If the heat pump's *T100* is less than 55 °F, determine the shoulder season off-mode power consumption as designated for a heat pump not having a crankcase heater, as per section 4.2.6.1.1. If *T00* is less than 75 °F and *T100* is greater than 55 °F, use the following. For both fixed-output type and self-regulating type crankcase heaters, calculate

$$P_{CH} = P_{CC} - PC_{NC}$$

$$P1 = P_{NC} + F_{CC}(T_j) \cdot P_{CH}$$, where

P_{CC}, PC_{NC}, and P_{NC} are determined as specified in section 3.13.9 and its subsections, and $F_{CC}(T_j)$ is calculated as shown in section 4.2.6.1.3.2.

4.2.6.2 Off-mode seasonal power consumption for residential central air conditioners during the heating season, *P2*. For residential central air conditioners, the off-mode seasonal power consumption for the heating season is calculated as a single value that depends on the bin weather distribution. Refer to Table 18 for the fractional bin hour distribution, n_j/N, for the six generalized climatic regions depicted in Figure 2. The calculation of *P2,* in addition, varies for different types of systems. For residential central air conditioners having a compressor crankcase heater, for example, the off-mode power consumption depends on whether the heater is thermostatically controlled and, in some cases, whether the crankcase heater is a fixed-output type or a self-regulating type. The thermostatic control may qualify as global, local, or both—*see* definitions 1.53 and 1.54. The most common example of global control is a crankcase heater that is regulated by an outdoor temperature thermostat. In all cases, round *P2* to the nearest integer watt.

Heat pumps do not have a *P2* rating because they are either in an active mode or a standby mode during the heating season, with their seasonal heating performance being represented by their HSPF rating.

4.2.6.2.1 Residential central air conditioners that do not have a compressor crankcase heater. For residential central air conditioners and heat pumps not having a compressor crankcase heater, assign *P2* as specified in section 3.13.2.

4.2.6.2.2 Residential central air conditioners that have a compressor crankcase heater that is unregulated. For fixed-output type crankcase heaters, set *P2* = P_{CC}, as determined in sections 3.13.4.2 and 3.13.4.5 and their subsections. For self-regulating type crankcase heaters, evaluate:

$$P2 = \sum_{j}^{J}\left[\frac{n_j}{N} \cdot P2(T_j)\right]$$, where

$$P2(T_j) = \frac{(P_{CC2} - P_{CC1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CC1}$$, where,

P_{CC1}, P_{CC2}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.4.5 and its subsections.

4.2.6.2.3 Residential central air conditioners that have a compressor crankcase heater that is regulated using global control. If the residential central air conditioner's *T00* is greater than or equal to 65 °F, determine the heating season off-mode power consumption as specified in section 4.2.6.2.2. If *T00* is less than 65 °F, use the following:

$$P2 = P_{NC} + \sum_{j}^{J}\left[\frac{n_j}{N} \cdot F_{CC}(T_j) \cdot P_{CH}(T_j)\right]$$

For fixed-output type crankcase heaters,

$$P_{CH}(T_j) = P_{CC} - P_{NC}\text{, for all outdoor bin temperatures, } T_j.$$

P_{CC} and P_{NC} are determined as specified in section 3.13.4.5 and its subsections, and

$$F_{CC}(T_j) = \begin{cases} 0, & if\ T_j \geq T100 \\ 1 - \frac{(T_j - T00)}{(T100 - T00)}, & if\ T00 < T_j < T100 \\ 1, & if\ T_j \leq T00 \end{cases}\text{, where}$$

T00 and *T100* are determined as specified in 3.13.4.3 or 3.13.4.4.

For self-regulating type crankcase heaters,

$$P_{CH}(T_j) = \frac{(P_{CH2} - P_{CH1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CH1}\text{, where}$$

$$P_{CH1} = P_{CC1} - P_{NC}\text{, and}$$

$$P_{CH2} = P_{CC2} - P_{NC}\text{, where}$$

P_{CC1}, P_{CC2}, P_{NC}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.4.5 and its subsections, and $F_{CC}(T_j)$ is calculated as shown above.

4.2.6.2.4 Residential central air conditioners that have a compressor crankcase heater that is regulated using local control. For both fixed-output type and self-regulating type crankcase heaters, calculate:

$$P2 = \sum_j^J \left[\frac{n_j}{N} \cdot P2(T_j)\right]\text{, where}$$

$$P2(T_j) = \frac{(P_{CC2} - P_{CC1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CC1}.$$

P_{CC1}, P_{CC2}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.5 and its subsections.

4.2.6.2.5 Residential central air conditioners that have a compressor crankcase heater that is regulated using both global and local control. If the heat pump's *T00* is greater than or equal to 65 °F, determine the off-mode power consumption as specified in section 4.2.6.2.4. If *T00* is less than 65 °F, use the following. For both fixed-output type and self-regulating type crankcase heaters,

$$P2 = P_{NC} + \sum_j^J \left[\frac{n_j}{N} \cdot F_{CC}(T_j) \cdot P_{CH}(T_j)\right]\text{, where}$$

$$P_{CH}(T_j) = \frac{(P_{CH2} - P_{CH1})}{(T_{CC2} - T_{CC1})}(T_j - T_{CC1}) + P_{CH1}\text{, and}$$

$$P_{CH1} = P_{CC1} - P_{NC}$$

$$P_{CH2} = P_{CC2} - P_{NC}.$$

P_{CC1}, P_{CC2}, P_{NC}, T_{CC1}, and T_{CC2} are determined as specified in section 3.13.6 and its subsections, and $F_{CC}(T_j)$ is calculated as shown in section 4.2.6.2.3.

4.2.6.3 National-average off-mode power rating. For residential central air conditioners, combine the off-mode power rating for the shoulder season, *P1,* with the off-mode seasonal power rating for the heating season, *P2,* by weighting these ratings with respect to the lengths of respective national average seasons: 739 hours for the shoulder seasons and 5,216 hours for the heating season.

For residential central air conditioners:

$PW_{OFF} = PW_{OFF} = 0.124 \times P1 + 0.876 \times P2$

For heat pumps, assign $PW_{OFF} = P1$

4.2.6.4 Off-mode seasonal energy consumption.

4.2.6.4.1 For the shoulder seasons. Calculate the off-mode energy consumption for the shoulder season, *E1,* using

$E1 = P1 \cdot SSH$

where *P1* is determined as specified in section 4.2.8.1 and the *SSH* are provided in Table 19 for the six generalized climatic regions along with the national average rating values.

TABLE 20—REPRESENTATIVE COOLING AND HEATING LOAD HOURS AND THE CORRESPONDING SET OF SEASONAL HOURS FOR EACH GENERALIZED CLIMATIC REGION

Climatic region	Cooling load hours CLH_R	Heating load hours HLH_R	Cooling season hours CSH_R	Heating season hours HSH_R	Shoulder season hours SSH_R
I	2400	750	6731	1826	203
II	1800	1250	5048	3148	564
III	1200	1750	3365	4453	942
IV	800	2250	2244	5643	873
Rating Values	1000	2080	2805	5216	739
V	400	2750	1122	6956	682
VI	200	2750	561	6258	1941

4.2.6.4.2 For the heating season—residential central air conditioners only. Calculate the off-mode energy consumption of a residential central air conditioner during the heating season, *E2,* using

$E2 = P2 \cdot HSH$

where *P2* is determined as specified in section 4.2.6.2 and the HSH are provided in Table 19 for the six generalized climatic regions along with the national average rating values.

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4.3.1 Calculation of actual regional annual performance factors (APF_A) for a particular location and for each standardized design heating requirement.

$$APF_A = \frac{CLH_A \cdot \dot{Q}_c^k(95) + HLH_A \cdot DHR \cdot C}{\frac{CLH_A \cdot \dot{Q}_c^k(95)}{SEER} + \frac{HLH_A \cdot DHR \cdot C}{HSPF} + P1 \cdot SSH + P2 \cdot HSH}$$

where,

CLH_A = the actual cooling hours for a particular location as determined using the map given in Figure 3, hr.

$\dot{Q}_c^k(95)$ = the space cooling capacity of the unit as determined from the A or A_2 Test, whichever applies, Btu/h.

HLH_A = the actual heating hours for a particular location as determined using the map given in Figure 2, hr.

DHR = the design heating requirement used in determining the HSPF; refer to section 4.2 and definition 1.22, Btu/h.

C = defined in section 4.2 following Equation 4.2–2, dimensionless.

SEER = the seasonal energy efficiency ratio calculated as specified in section 4.1, Btu/W · h.

HSPF = the heating seasonal performance factor calculated as specified in section 4.2 for the generalized climatic region that includes the particular location of interest (*see* Figure 2), Btu/W·h. The HSPF should correspond to the actual design heating requirement (DHR), if known. If it does not, it may correspond to one of the standardized design heating requirements referenced in section 4.2.

P1 = the off-mode seasonal power consumption for the shoulder season, as determined in section 4.2.6.1, W, and

P2 = the off-mode seasonal power consumption for the heating season, as determined in section 4.2.6.2, W.

Evaluate the *HSH* using

$$HSH = \frac{HLH \cdot (65 - T_{OD})}{\sum_{j=1}^{J} (65 - T_j) \cdot \frac{n_j}{N}}$$

Where T_{OD} and n_j/N are listed in Table 19 and depend on the location of interest relative to Figure 2. For the six generalized climatic regions, this equation simplifies to the following set of equations:

Region I	$HSH = 2.4348 \times HLH$
Region II	$HSH = 2.5182 \times HLH$
Region III	$HSH = 2.5444 \times HLH$
Region IV	$HSH = 2.5078 \times HLH$
Region V	$HSH = 2.5295 \times HLH$
Region VI	$HSH = 2.2757 \times HLH$

Evaluate the shoulder season hours using

$SSH = 8760 - (CSH + HSH)$

where,

CSH = the cooling season hours calculated using $CSH = 2.8045 \times CLH$.

* * * * *

4.5 Energy Efficiency Ratio (EER) Calculations.

Calculate the energy efficiency ratio using,

$$EER = \frac{\text{Total Cooling Capacity}}{\text{Total Electrical Power Consumption}}$$

$$= \frac{\dot{Q}_c^k(T)}{\dot{E}_c^k(T)}$$

where $\dot{Q}_c^k(T)$ and $\dot{E}_c^k(T)$ are the space cooling capacity and electrical power consumption determined from the 30-minte data collection interval of the same steady-state wet coil cooling mode test and calculated as specified in section 3.3. To help differentiate among the resulting EER values, add the letter identification for each steady-state test as a subscript (e.g., EER_{A_2}) These letter identifiers are noted in Tables 3, 4, 5 and 6 and can be any of the following: A, A_2, A_1, B, B_2, B_1, E_V, and F_1.

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DEPARTMENT OF ENERGY

10 CFR Part 431

[Docket No. EERE–2009–BT–STD–0018]

RIN 1904–AC00

Energy Conservation Standards for Metal Halide Lamp Fixtures: Public Meeting and Availability of the Preliminary Technical Support Document

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

ACTION: Notice of public meeting and availability of preliminary technical support document.

SUMMARY: The U.S. Department of Energy (DOE) will hold a public meeting to discuss and receive comments on: the equipment classes that DOE plans to analyze for purposes of establishing energy conservation standards for metal halide lamp fixtures (MHLFs); the analytical framework, models, and tools that DOE is using to evaluate standards for this equipment; the results of preliminary analyses DOE performed for this equipment; and potential energy conservation standard levels derived from these analyses that DOE could consider for this equipment. DOE encourages written comments on these subjects. To inform interested parties and facilitate this process, DOE has prepared an agenda, a preliminary technical support document (TSD), and briefing materials, which are available at *http://www1.eere.energy.gov/buildings/appliance_standards/commercial/metal_halide_lamp_fixtures.html.*

DATES: DOE will hold a public meeting on Monday, April 18, 2011 beginning at 9 a.m. in Washington, DC. The agenda for the public meeting will cover this energy conservation standards rulemaking for MHLFs. Any person requesting to speak at the public meeting should submit such a request, along with an electronic copy of the statement to be given at the public meeting, before Monday, April 11, 2011. Written comments are welcome, especially following the public meeting, and should be submitted by May 16, 2011.

In addition, you can attend the public meeting via webinar. Webinar registration information, participant instructions, and information about the capabilities available to webinar participants will be published on DOE's Web site at: *http://www1.eere.energy.gov/buildings/appliance_standards/commercial/metal_halide_lamp_fixtures.html.* Participants are responsible for ensuring their systems are compatible with the webinar software.

ADDRESSES: The public meeting will be held at the U.S. Department of Energy, Forrestal Building, Room 8E–089, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Please note that foreign nationals participating in the public meeting are subject to advance security screening procedures. If a foreign national wishes to participate in the public meeting, please inform DOE of this fact as soon as possible by contacting Ms. Brenda Edwards at (202) 586–2945 so that the necessary procedures can be completed. Interested persons may submit comments, identified by docket number EERE–2009–BT–STD–0018, by any of the following methods:

- *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the instructions for submitting comments.
- *E-mail: MHLF-2009-STD-0018@ee.doe.gov.* Include EERE–2009–BT–STD–0018 and/or RIN 1904–AC00 in the subject line of the message.
- *Postal Mail:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE–2J, Public Meeting for Metal Halide Lamp Fixtures, EERE–2009–BT–STD–0018, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone (202) 586–2945. Please submit one signed paper original.
- *Hand Delivery/Courier:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Sixth Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024. Telephone (202) 586–2945. Please submit one signed paper original.

Instructions: All submissions received must include the agency name and docket number.

Docket: Access to the docket to review background documents, the transcript of the public meeting, or comments received is available at the U.S. Department of Energy, Sixth Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024, (202) 586–2945, between 9 a.m. and 4 p.m., Monday through Friday,