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[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Part 430

[Docket Number EERE-2013-BT-TP-0004]

RIN: 1904-AC94

Energy Conservation Program for Consumer Products: Test Procedures for Direct Heating Equipment and Pool Heaters

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

ACTION: Notice of proposed rulemaking and public meeting.

SUMMARY: The U.S. Department of Energy (DOE) proposes to revise its test procedures for direct heating equipment and pool heaters established under the Energy Policy and Conservation Act. This rulemaking will fulfill DOE's statutory obligation to review its test procedures for covered products at least once every seven years. For direct heating equipment, the proposed amendments would add provisions for testing vented home heating equipment that utilizes condensing technology, and to incorporate by reference six industry test standards to replace the outdated test standards which are referred to in the existing DOE test procedure. These industry standards reflect the current practice in test set-up and test conditions for testing direct heating equipment. For pool heaters, the proposed amendments would incorporate by reference ANSI/Air-conditioning, Heating, and Refrigeration Institute (AHRI) Standard 1160-2009, "Performance Rating of Heat Pump Pool Heaters," and ANSI/American Society of Heating,

Refrigerating, and Air-conditioning Engineers (ASHRAE) Standard 146-2011, "Method of Testing and Rating Pool Heaters," to establish a test method for electric pool heaters (including heat pump pool heaters). The proposed amendments would also clarify the test procedure's applicability to oil-fired pool heaters. DOE is also announcing a public meeting to discuss and receive comments on issues presented in this test procedure rulemaking.

DATES: DOE expects that any final rule in this proceeding would be effective 30 days after the date of publication of that final rule.

Meeting: DOE will hold a public meeting on Thursday, November 21, 2013, from 9:00 a.m. to 4:00 p.m., in Washington, DC. The meeting will also be broadcast as a webinar. See section V, "Public Participation," for webinar registration information, participant instructions, and information about the capabilities available to webinar participants.

Comments: DOE will accept comments, data, and information regarding this notice of proposed rulemaking (NOPR) before and after the public meeting, but no later than **[INSERT DATE 75 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. See section V, "Public Participation," for details.

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. To attend, please notify Ms. Brenda Edwards at (202) 586–2945. For more information, refer to section V, "Public Participation," near the end of this notice.

Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at www.regulations.gov. Alternatively, interested persons may submit comments, identified by docket number EERE-2013-BT-TP-0004 and/or RIN 1904-AC94, by any of the following methods:

- E-mail: DirectHeatingPoolHeaters2013TP0004@ee.doe.gov. Include EERE-2013-BT-TP-0004 and/or RIN 1904-AC94 in the subject line of the message. Submit electronic comments in WordPerfect, Microsoft Word, PDF, or ASCII file format, and avoid the use of special characters or any form of encryption.
- 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.
- Hand Delivery/Courier: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 950 L'Enfant Plaza, SW., 6th Floor, 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.

For detailed instructions on submitting comments and additional information on the rulemaking process, see section V of this document (Public Participation).

Docket: A link to the docket web page can be found at: http://www.regulations.gov/#!docketDetail;D=EERE-2013-BT-TP-0004. This web page

contains a link to the docket for this notice on the www.regulations.gov site. The www.regulations.gov web page contains simple instructions on how to access all documents, including Federal Register notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials in the docket. See section V, "Public Participation," for information on how to submit comments through www.regulations.gov.

For information on how to submit a comment, review other public comments and the docket, or participate in the public meeting, contact Ms. Brenda Edwards at (202) 586-2945 or by email: Brenda.Edwards@ee.doe.gov.

FOR FURTHER INFORMATION CONTACT: Mr. John Cymbalsky, 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) 287-1692. E-mail: John.Cymbalsky@ee.doe.gov.

Mr. Eric Stas, U.S. Department of Energy, Office of the General Counsel, GC–71, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 586-9507. E-mail: Eric.Stas@hq.doe.gov.

For information on how to submit or review public comments, contact Ms. Brenda Edwards, 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) 586-2945. E-mail: Brenda.Edwards@ee.doe.gov.

SUPPLEMENTARY INFORMATION:

Table of Contents

I. Authority and Background
II. Summary of the Notice of Proposed Rulemaking
III. Discussion
    A. Test Procedure for Direct Heating Equipment
        1. Vented Home Heating Equipment Employing Condensing Technology
        2. Updating of Industry Reference Standards
        3. Other Issues
    B. Test Procedure for Pool Heaters
        1. Electric Pool Heaters
        2. Other Issues
    C. Compliance with Other EPCA Requirements
IV. Procedural Issues and Regulatory Review
    A. Review Under Executive Order 12866
    B. Review Under the Regulatory Flexibility Act
    C. Review Under the Paperwork Reduction Act of 1995
    D. Review Under the National Environmental Policy Act of 1969
    E. Review Under Executive Order 13132
    F. Review Under Executive Order 12988
    G. Review Under the Unfunded Mandates Reform Act of 1995
    H. Review Under the Treasury and General Government Appropriations Act, 1999
    I. Review Under Executive Order 12630
    J. Review Under Treasury and General Government Appropriations Act, 2001
    K. Review Under Executive Order 13211
    L. Review Under Section 32 of the Federal Energy Administration Act of 1974
V. Public Participation
    A. Attendance at the Public Meeting
    B. Procedure for Submitting Requests to Speak and Prepared General Statements for Distribution
    C. Conduct of Public Meeting
    D. Submission of Comments
    E. Issues on Which DOE Seeks Comment
VI. Approval of the Office of the Secretary

I. Authority and Background

Title III, Part B[1] of the Energy Policy and Conservation Act of 1975 ("EPCA" or "the Act"), Pub. L. 94-163 (*codified at* 42 U.S.C. 6291-6309) sets forth a variety of provisions designed to improve energy efficiency and establishes the Energy Conservation Program for Consumer Products Other Than Automobiles.[2] These include two covered products that are the subject of today's notice: direct heating equipment and pool heaters.. (42 U.S.C. 6292(a)(9) and (11))

Under EPCA, this program generally consists of four parts: (1) testing; (2) labeling; (3) establishing Federal energy conservation standards; and (4) certification and enforcement procedures. The testing requirements consist of test procedures that manufacturers of covered products must use as the basis for making representations about the efficiency of those products, including representations to DOE of compliance with applicable energy conservation standards adopted pursuant to EPCA. (42 U.S.C. 6293(c); 42 U.S.C. 6295(s)) Similarly, DOE must use these test requirements to determine whether the products comply with any relevant standards promulgated under EPCA. (42 U.S.C. 6295(s))

Under 42 U.S.C. 6293, EPCA sets forth the criteria and procedures that DOE must follow when prescribing or amending test procedures for covered products. EPCA provides, in relevant part, that any test procedures prescribed or amended under this section must be reasonably designed to produce test results which measure energy efficiency, energy use, or estimated

[1] For editorial reasons, upon codification in the U.S. Code, Part B was redesignated as Part A.
[2] All references to EPCA in this document refer to the statute as amended through the American Energy Manufacturing Technical Corrections Act (AEMTCA), Pub. L. 112-210 (Dec. 18, 2012).

annual operating cost of a covered product during a representative average use cycle or period of use, and must not be unduly burdensome to conduct. (42 U.S.C. 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 the extent to which the proposed test procedure would alter the product's measured energy efficiency. (42 U.S.C. 6293(e)(1)) If DOE determines that the amended test procedure would alter the measured energy efficiency of a covered product, DOE must amend the applicable energy conservation standard accordingly. (42 U.S.C. 6293(e)(2))

Further, the Energy Independence and Security Act of 2007 (EISA 2007) amended EPCA to require that at least once every 7 years, DOE must review test procedures for all covered products and either amend test procedures (if the Secretary determines that amended test procedures would more accurately or fully comply with the requirements of 42 U.S.C. 6293(b)(3)) or publish notice in the Federal Register of any determination not to amend a test procedure. (42 U.S.C. 6293(b)(1)(A)) Under this requirement, DOE must review the test procedures for the various types of direct heating equipment and pool heaters not later than December 19, 2014 (i.e., 7 years after the enactment of EISA 2007). The final rule resulting from this rulemaking will satisfy this requirement.

There are separate test procedures for the two types of direct heating equipment (i.e., vented home heating equipment and unvented home heating equipment), specifically 10 CFR

430.23(g) and 10 CFR part 430, subpart B, appendix G for unvented home heating equipment ("unvented heater"); and 10 CFR 430.23(o) and 10 CFR part 430, subpart B, appendix O for vented home heating equipment ("vented heater"). The vented heater test procedures include provisions for determining energy efficiency (annual fuel utilization efficiency (AFUE)), as well as annual energy consumption. Unvented heaters are broken into two groups: those used as the primary heating source for the home and those not used for this purpose. There are no provisions for calculating either the energy efficiency or annual energy consumption of unvented heaters that are not used as the primary heating source for the home. For unvented heaters that are used as the primary heating source for the home, there is a calculation of annual energy consumption based on a single assignment of active mode hours; there is no provision for calculation of energy efficiency.

DOE's test procedures for pool heaters are found at 10 CFR 430.23(p) and 10 CFR part 430, subpart B, appendix P. The test procedures include provisions for determining two energy efficiency descriptors (i.e., thermal efficiency and integrated thermal efficiency), as well as annual energy consumption.

In addition to the test procedure review provision discussed above, EISA 2007 also amended EPCA to require DOE to amend its test procedures for all covered products to include measurement of standby mode and off mode energy consumption. (42 U.S.C. 6295(gg)(2)(A)) DOE recently completed a rulemaking to consider amending its test procedures for direct heating equipment and pool heaters to include provisions for measuring the standby mode and off mode energy consumption of those products. DOE published a notice of proposed rulemaking (NOPR)

in the Federal Register on August 30, 2010, which proposes amendments to the DOE test procedures for heating products to account for the standby mode and off mode energy consumption of these products, as required under EPCA.[3] 75 FR 52892. DOE published a supplemental notice of proposed rulemaking (SNOPR) in the Federal Register on September 13, 2011, which calls for the use of the second edition of International Electrotechnical Commission (IEC) Standard 62301, "Household Electrical Appliances – Measurement of standby power," in lieu of the first edition and also provides guidance on rounding and sampling. 76 FR 56347. DOE published a final rule adopting standby mode and off mode provisions for heating products in the Federal Register on December 17, 2012. 77 FR 74559. That rulemaking was limited to test procedure amendments to address standby mode and off mode requirements; it did not address several other potential issues in DOE's existing test procedures for the covered products. DOE addresses these non-standby/off mode issues separately in today's NOPR.

On October 12, 2011, DOE published in the Federal Register a request for information (RFI) that identified and requested comment on a number of issues regarding the test procedures for direct heating equipment and pool heaters. 76 FR 63211.[4] DOE accepted comments and information on the October 2011 RFI until November 28, 2011 and considered all feedback received when developing the proposals contained in this notice. Each of the issues raised in the October 2011 RFI are discussed in detail in section III, along with comments received on the

[3] For more information, please visit DOE's website at: http://www1.eere.energy.gov/buildings/appliance_standards/residential/waterheaters.html.

[4] The October 2011 RFI also requested information on the need to amend the test procedures for residential water heaters. However, because the American Energy Manufacturing and Technical Corrections Act amended EPCA to require that DOE develop a uniform efficiency descriptor for residential and commercial water heaters (42 U.S.C. 6295(e)(5)), DOE is addressing test procedure updates for that product in a separate rulemaking.

issues and DOE's responses. In addition, several topics not addressed in the October 2011 RFI, but brought up by interested parties in their comments, are discussed in section III of this NOPR.

II. Summary of the Notice of Proposed Rulemaking

In this NOPR, DOE proposes to modify the current test procedures for direct heating equipment and pool heaters. For direct heating equipment, the proposed amendments would add provisions for testing vented home heating equipment that utilizes condensing technology, and update all references in the existing test procedure. For pool heaters, the proposed amendments would incorporate by reference ANSI/Air-conditioning, Heating, and Refrigeration Institute (AHRI) Standard 1160-2009, "Performance Rating of Heat Pump Pool Heaters," and ANSI/American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE) Standard 146-2011, "Method of Testing and Rating Pool Heaters," to establish testing procedures for electric (including heat pump) pool heaters. The proposed amendments for pool heaters would also clarify the test procedure's applicability to gas-fired and oil-fired pool heaters. The following paragraphs summarize these proposed changes for both product types.

For direct heating equipment, DOE proposes in today's NOPR to incorporate by reference the following six current industry standards to replace the outdated standards referenced in the existing DOE test procedure: (1) ANSI/ASHRAE 103-2007, "Method of Test for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers"; (2) ANSI Z21.86-2008, "Gas-Fired Space Heating Appliances"; (3) ASTM D2156-09, "Standard Test Method for Smoke Density in Flue Gases from Burning Distillate Fuels"; (4) UL 729-2003, "Standard for Safety for Oil-Fired Floor Furnaces"; (5) UL 730-2003, "Standard for Safety for

Oil-Fired Wall Furnaces"; and (6) UL 896-1993, "Standard for Safety for Oil-Burning Stoves." DOE also proposes to establish a test method to determine the annual fuel utilization efficiency of vented home heating products that use condensing technology. Lastly, DOE proposes to reduce the test burden for floor furnaces by allowing a default assigned value for jacket loss in lieu of testing.

For pool heaters, DOE clarifies in today's NOPR the applicability of the test method for oil-fired products. DOE also proposes to adopt new provisions for testing electric pool heaters, including heat pump pool heaters. DOE proposes that electric pool heaters be tested in accordance with ASHRAE Standard 146-2011, and that heat pump pool heaters be tested using the test method prescribed in AHRI 1160-2009 with an accompanying conversion of the Coefficient of Performance metric used in that standard to thermal efficiency as required by EPCA. (42 U.S.C. 6291(22)(E))

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)) For both direct heating equipment and pool heaters, DOE has tentatively determined that the proposed test procedure amendments would have a *de minimis* impact on the products' measured efficiency. A full discussion of the rationale for this tentative conclusion is provided in section III.C below.

III. Discussion

In response to the October 2011 RFI, DOE received eight written comments related to two covered products, direct heating equipment (DHE) and pool heaters, from the following interested parties: American Council for an Energy-Efficient Economy (ACEEE), American Gas Association (AGA), Air-Conditioning, Heating, and Refrigeration Institute (AHRI), Empire Stove, Hearth & Home Technologies (HHT), National Propane Gas Association (NPGA), Hearth, Patio & Barbecue Association (HPBA), and Miles Industries Ltd. (Miles Industries). These interested parties commented on a range of issues, including those DOE identified in the October 2011 RFI, as well as several other pertinent issues. The issues on which DOE received comment, DOE's responses to those comments, and the proposed changes to the test procedures for direct heating equipment and pool heaters resulting from those comments are discussed in the subsections immediately below.

DOE notes that, because of a recent decision of the U.S. Court of Appeals for the District of Columbia (D.C. Circuit), DOE is not addressing the comments relating to the application of the test procedure to vented hearth heaters. On February 8, 2013, the D.C. Circuit issued a decision vacating the DOE definition of "Vented hearth heater" at 10 CFR 430.2, and remanded the issue to DOE to interpret the challenged provisions consistent with the court's opinion. Hearth, Patio & Barbecue Association v. U.S. Department of Energy, 706 F.3d 499, 509 (D.C. Cir. 2013). DOE will address the comments received on the October 2011 RFI regarding the application of the DHE test procedures to vented hearth heaters in a separate rulemaking devoted to those products.

A. Test Procedure for Direct Heating Equipment

In response to the October 2011 RFI, DOE received comments from eight interested parties, all of which addressed the DOE test procedures for direct heating equipment. (AGA, AHRI, Miles Industries, HPBA, Empire Stove, HHT, ACEEE, and NPGA) Generally, the comments were supportive of DOE's efforts to update, improve, and clarify its test procedures for DHE. The comments focused on two key issues: (1) clarification of the test procedures as applied to vented hearth heating products; and (2) the expansion of the test procedures to accommodate DHE with condensing technology. Regarding the first issue, as noted above, DOE will address comments related to vented hearth heaters in a later rulemaking. Regarding the second issue, as part of DOE's overall review of test procedures, these proposed DHE amendments include a complete updating of references to industry standards used in the DHE test procedures and modifications to the test procedures for jacket loss measurement.

1. Vented Home Heating Equipment Employing Condensing Technology

DOE received comments on the October 2011 RFI that encouraged DOE to develop and adopt new test procedure provisions to properly measure the efficiency of gas-fired direct heating equipment designed to operate using condensing technology. (Empire, No. 7at p. 1; AHRI, No. 12 at p. 3; HPBA, No. 26 at p. 1)

Condensing technology is a design strategy that increases the efficiency of a heating appliance by extracting additional thermal energy from the flue gases, thereby reducing the flue gas temperatures and air flow such that the water vapor created in the combustion process becomes a liquid condensate. Normally, in non-condensing systems, the water vapor created in

the combustion process remains as a vapor and is removed through the flue system along with the other products of combustion. However, in condensing systems, the condensing of the water vapor is a result of the reduction in the overall flue energy loss of the flue gas (*i.e.*, an energy efficiency improvement). The test procedures for furnaces and boilers have provisions to account for the increased efficiency of models that utilize condensing technology. However, no such provisions are included in the existing test procedures for vented heaters.

Today's proposed amendments would account for the increased efficiency of vented direct heating equipment utilizing condensing technology. The proposed amendments are similar to those found in DOE's furnace and boiler test procedures (10 CFR Part 430, Subpart B, Appendix N), with differences and clarifications appropriate for the vented direct heating equipment product type. More specifically, the additional provisions proposed for vented heaters are essentially the same as those contained in the latest version of the ANSI/ASHRAE Standard 103-2007, "Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers." DOE is proposing that ANSI/ASHRAE 103-2007 be incorporated by reference into these test procedures by this NOPR for purposes of certain other AFUE test provisions. However, because of the numerous clarifications and modifications needed to apply the condensing technology provisions of the industry standard for furnaces and boilers to vented heaters, DOE proposes incorporating the condensing procedures as stand-alone amendments to DOE's vented heater test procedure, rather than incorporating by reference select provisions of ANSI/ASHRAE Standard 103-2007.

Basically, the proposed amendments for vented heaters with condensing technology would utilize a condensate collection methodology that requires a separate test to be run to quantify directly the extent of the efficiency credit appropriate for a given vented heater's particular design of condensing technology. This methodology requires direct collection of liquid condensate. For vented heaters employing condensing technology that are not designed to collect and dispose of liquid condensate, the amendments clarify that such means must be provided during testing. The duration of the condensate collection test time would be 30 minutes for steady-state testing and 1-2 hours for cyclic testing.

DOE is interested in receiving comment on the adequacy of the proposed provisions for determining the efficiency improvement associated with vented heaters that utilize condensing technology. DOE is also interested in any further clarifications or modifications that might be necessary. This is identified as issue 1 in section V.E, "Issues on Which DOE Seeks Comment."

2. Updating of Industry Reference Standards

The October 2011 RFI sought comment on other relevant issues that would affect the test procedures for direct heating equipment (both vented type and unvented type). 76 FR 63211, 63215 (Oct. 12, 2011). Interested parties were encouraged to provide comments on any aspect of the test procedure, including updates to referenced standards, as part of this comprehensive 7-year-review rulemaking.

AGA commented that the existing test procedure for direct heating equipment cites installation requirements from ANSI standards for vented wall furnaces and vented floor

furnaces but does not reference the applicable ANSI standard for vented room heaters. (AGA, No. 13 at pp. 2-3) Accordingly, AGA recommended that DOE revise section 2.1.3 of the DOE test procedure in order to provide complete installation requirements for testing of vented room heaters based on the applicable ANSI design certification standards, which AGA identified as ANSI Z21.11, "Gas Fired Room Heaters."

In addition to addressing this referencing concern pointed out by AGA, DOE is taking this opportunity to fully review all the referenced standards in the DHE test procedure as part of this 7-year review process. The following is a list of the shorthand titles and full titles of all the referenced standards currently used and proposed for use in the DHE test procedure.

Standards Currently Used in Existing Test Procedures for DHE:

"ANSI Standard Z21.11.1–1974" means the American National Standard for Gas-Fired Room Heaters.

"ANSI Standard Z21.44–1973" means the American National Standard for Gas-Fired Gravity and Fan Type Direct Vent Wall Furnaces.

"ANSI Standard Z21.48–1976" means the American National Standard for Gas-Fired Gravity and Fan Type Floor Furnaces.

"ANSI Standard Z21.49–1975" means the American National Standard for Gas-Fired Gravity and Fan Type Vented Wall Furnaces.

"ANSI Standard Z91.1–1972" means the American National Standard for Performance Standards for Oil-Powered Central Furnaces.

"ANSI Standard Z11.182-1965 (R1971) (ASTM D 2156-65 (1970))" means the standard published by the American Society of Testing and Materials titled, "Standard Test Method for Smoke Density in Flue Gases from Burning Distillate Fuels."

"UL 729-1976" means the Underwriters Laboratories standard for Oil-Fired Floor Furnaces.

"UL 730-1974" means the Underwriters Laboratories standard for Oil-Fired Wall Furnaces.

"UL 896-1973" means the Underwriters Laboratories standard for Oil-Burning Stoves.

Standards Proposed for Use in the Test Procedures for DHE:

"ANSI/ASHRAE 103-2007" means the test standard published by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers titled, "Method of Test for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers."

"ANSI Z21.86-2008" means the standard published by the American National Standards Institute titled, "Vented Gas-Fired Space Heating Appliances."

"ASTM D2156-09" means the standard published by the American Society of Testing and Materials titled, "Standard Test Method for Smoke Density in Flue Gases from Burning Distillate Fuels."

"UL 729-2003" means the test standard published by the Underwriters Laboratory, Inc. titled, "Standard for Safety for Oil-Fired Floor Furnaces."

"UL 730-2003" means the test standard published by the Underwriters Laboratory, Inc. titled, "Standard for Safety for Oil-Fired Wall Furnaces."

"UL 896-1993" means the test standard published by the Underwriters Laboratory, Inc. titled, "Standard for Safety for Oil-Burning Stoves."

As a result of the full review, DOE proposes a number of changes. In most cases, the proposed changes reflect the updating of the specific references to the most current version. This updating allows for new users of the test procedures to execute the DOE test procedures without depending on outdated standards which may be difficult to obtain. In some cases, the updated reference bundles several of the current references under a new title. This is the case where the current separate ANSI standards for wall furnaces, floor furnaces, and room heaters have been combined into a single standard for these three types of vented heaters. This new standard is titled, "Vented Gas-Fired Space Heating Appliances" referred to as "ANSI Z21.86-2008" in the proposed amendments. ANSI Z21.86-2008 is proposed for purposes of specifying the testing procedures related to circulation air, section 2.5, and location of temperature measuring instrumentation, section 2.6.1. In addition, DOE is proposing to use ANSI Z21.86-2008 to specify the installation instructions for direct vent (section 6.1.3 and figure 6) and non-direct vent (section 8.1.3 and figure 7 or figure 10) wall furnaces. However, since ANSI Z21.86-2008 does not include installation specifications for vented room heaters and vented floor furnaces, the installation specifications of the corresponding UL standard for that product type would be used. Although the UL standards typically are used for oil-fired equipment and the ANSI standards typically are used for gas-fired equipment, in the existing DOE test procedure, where there is no distinction between installation provisions, the UL standards are cited in application to both gas and oil vented heaters (i.e., section 2.1.2). As there are no installation specifications available in

ANSI Z21.86-2008 for vented room heaters and vented floor furnaces, DOE tentatively proposes to follow this approach and use the corresponding UL standards for installation provisions.

Finally, in three places (sections 2.3 Fuel supply, 2.4 Burner adjustments, and 3.2 Jacket loss), DOE proposes to use a new reference thought to be more appropriate for these test procedures. Specifically, ANSI/ASHRAE Standard 103-2007, "Method of Testing for Annual Fuel Utilization Efficiency of Residential Furnaces and Boilers," is proposed for use in lieu of three older standards referenced in these three sections of the existing DOE test procedure. DOE believes this migration to ANSI/ASHRAE Standard 103 is appropriate because it is essentially the same test method used in the current DHE test procedure (i.e., the AFUE test method) and incorporates the latest industry consensus on such testing without the need to depend on other references. DOE tentatively concludes that these changes and updates would neither result in any material differences in test results nor increase the test procedure burden.

DOE proposes to list all of the referenced industry standards in 10 CFR 430.3, *Materials incorporated by reference*. As explained above, DOE tentatively concludes that these incorporation by reference changes and updates would neither result in any material differences in the test results nor increase test procedure burden. DOE solicits comment on this tentative conclusion, as well as the adequacy of the proposed updating of referenced standards. DOE is also interested in any further clarification or modifications that may be necessary. This is identified as issue 2 in section V.E, "Issues on Which DOE Seeks Comment."

3. Other Issues

As part of its review of the existing test procedures, DOE identified three additional test procedure issues that it believes should be addressed in this rulemaking: (1) the jacket loss test for floor furnaces; (2) testing of manually controlled vented heaters; and (3) clarification of section 3.3 tracer gas procedures as applied to vented heaters without thermal stack dampers.

First, DOE noticed that the jacket loss measurement test, which is required for all vented floor furnaces by section 3.2 of the existing DOE test procedure, is inconsistent as compared to the similar procedures required for outdoor-installed (weatherized) furnaces and boilers. The current jacket loss test for DHE uses the procedures from outdated ANSI Standard Z21.48-1975. (As mentioned above in the discussion about updating references, the newly proposed industry reference for jacket loss testing is ANSI/ASHRAE Standard 103-2007). The jacket loss test in ANSI Standard Z21.48-1975, as well as the essentially identical provisions of ANSI/ASHRAE Standard 103-2007, represent a considerable test burden. In view of this burden, the DOE test procedures for furnaces and boilers, through the referencing of ANSI/ASHRAE Standard 103-1993, allow for an assignment of jacket loss in lieu of testing. The assigned jacket loss value of 1 percent for furnaces and boilers is thought to be a reasonably conservative value (i.e., one that typically would be higher than the tested value). This allows for the manufacturer to weigh the burden of jacket loss testing against the likely conservative rating associated with a default value. This conservative default value approach is used throughout the DOE test procedures where appropriate (e.g., cyclic degradation coefficient assignment for central air conditioners, jacket loss assignment for furnaces and boilers). In consideration of the test burden associated with the jacket loss test and the desire for consistency across the test procedures, DOE has tentatively

concluded that manufacturers should be allowed the choice either to conduct actual jacket loss testing or to accept a reasonably conservative default value under the DHE test procedure. Accordingly, DOE is proposing that section 3.2, *Jacket loss measurement,* be amended to include the option of assigning the value of one percent for the jacket loss in lieu of testing.

DOE solicits comment on adding this allowance and the appropriateness of the assigned value of 1 percent. This is identified as issue 3 in section V.E, "Issues on Which DOE Seeks Comment."

A second issue that was identified during DOE's review is the lack of an equation in the calculation procedures for manually controlled vented heaters. Specifically, section 4.2.4 *Weighted-average steady-state efficiency,* does not have a defining equation, so DOE is proposing an amendment to remedy this oversight, a matter of particular importance in terms of capturing latent heat loss.

The final issue identified in DOE's review was the need to clarify the application of the tracer gas procedures in section 3.3 for units not employing a thermal stack damper. To explain, it is noted that section 3.3 and 4.3 outlines a testing and calculation procedure that must be used to evaluate the efficiency of vented heaters employing a thermal stack damper. In the calculation section 4.3 it is noted that all vented heaters may use this procedure as an option. Although this option is clearly stated in the calculation section and no modification to the calculations are necessary, some clarification is felt necessary in the actual testing provisions of section 3.3 to accommodate vented heaters not employing thermal stack dampers. For example the location of

tracer gas introduction is not fully explained in the existing procedures for vented heaters not employing a thermal stack damper.

Finally, DOE proposes to correct typographical errors regarding the equation in section 4.3.6 of appendix O. Specifically, DOE is proposing to add a missing minus (" – ") sign and replace a plus ("+") sign with a multiplication symbol ("x"). These errors are obviously typographical in nature because similar efficiency equations in other parts of the test procedures, as well as those used in industry standards, do not include these errors. The relevant industry groups have determined the correct format of this equation since its adoption and have been utilizing the correct format when testing and rating product efficiency. DOE is interested in receiving comment on any other corrections that might be needed in this review of the DHE test procedures.

B. Test Procedure for Pool Heaters

1. Electric Pool Heaters

DOE's test procedures for pool heaters are found at 10 CFR 430.23(p) and 10 CFR part 430, subpart B, appendix P. In its definition of "efficiency descriptor," EPCA specifies that for pool heaters, the efficiency descriptor shall be "thermal efficiency." (42 U.S.C. 6291(22)(E)) Further, EPCA defines the "thermal efficiency of pool heaters" as the "measure of the heat in the water delivered at the heater outlet divided by the heat input of the pool heater as measured under test conditions specified in section 2.8.1 of the American National Standard for Gas Fired

Pool Heaters, Z21.56-1986, or as may be prescribed by the Secretary."[5] (42 U.S.C. 6291(26)) Current energy conservation standards for pool heaters do not account for standby mode and off mode energy use.

As part of a recent test procedure rulemaking, DOE prescribed a new efficiency metric for pool heaters, titled "integrated thermal efficiency." 77 FR 74559 (Dec. 17, 2012).[6] This prescribed integrated thermal efficiency metric builds on the existing thermal efficiency metric to include electrical energy consumption during standby mode and off mode operation, as required by EISA 2007. (42 U.S C. 6295(gg)(2)(A)) The amended test procedure was effective 30 days after publication of the final rule. Until such time as compliance is required with amended energy conservation standards that account for standby mode and off mode energy consumption, manufacturers must continue using the thermal efficiency metric for certification and compliance purposes. However, if manufacturers choose to make written statements regarding standby mode and off mode energy efficiency, those representations must be based on the amended test procedure as of June 17, 2013, 180 days after the date of publication of the test procedure final rule.

Because certain types of pool heaters are powered by energy sources other than gas, DOE requested comments in the October 2011 RFI regarding the appropriateness of the currently incorporated ANSI Z21.56 test method, titled "Gas-Fired Pool Heaters," for testing pool heaters

[5] In an August 2010 NOPR, DOE proposed to use the most recent version of this standard, ANZI Z21.56-2006. 75 FR 52892, 52899-901 (August 30, 2010).
[7] In the December 2009 NOPR, DOE mistakenly listed gas-fired pool heater manufacturing under NAICS code 335228. 74 FR 65852, 65984 (Dec. 11, 2009). The correct classification for pool heater manufacturing is NAICS 333414. Both NAICS categories have the same 500 employee limit.

that operate with electricity (including heat pump pool heaters) or oil. 76 FR 63211, 63215-16 (Oct. 12, 2011). In the October 2011 RFI, DOE tentatively concluded that the test procedure for pool heaters at 10 CFR part 430, subpart B, appendix P already contains provisions to allow the ANSI Z21.56 test method to be applied to oil-fired pool heaters, and, therefore, no further action is necessary for those products. DOE received no comments that were contrary to this conclusion.

In a December 2009 NOPR for energy conservation standards for heating products, DOE concluded that, as currently drafted, the DOE test procedure for pool heaters is not suitable for measuring energy efficiency for electric pool heaters (including heat pump pool heaters). 74 FR 65852, 65866-67 (Dec. 11, 2009). In the October 2011 RFI, DOE noted that for electric pool heaters (including those units using heat pump technology), the fuel source is electricity (measured in watts) instead of gas (measured in Btu/h), but "thermal efficiency," as required under EPCA and determined using ANSI Z21.56, is a measure of heat delivered to the water at the heater outlet (in Btu/h) divided by the heat input (in Btu/h) of the fuel. 76 FR 63211, 63215-16 (Oct. 12, 2011). It is technically feasible to develop an integrated thermal efficiency rating for a heat pump pool heater by converting the power input in watts to the input in Btu/h (which can be done for both the power used during active mode and during standby mode and off mode). However, if such an integrated thermal efficiency metric were applied to heat pump pool heaters, DOE noted that the numerical result would be efficiency ratings of over 100 percent, which may necessitate some reeducation among consumers because heat pumps are typically rated using industry standards for Coefficient of Performance (COP). In contrast, electric pool heaters that operate with resistance heating (as opposed to heat pump technology), are typically

rated with a thermal efficiency metric. Consequently, DOE noted in the October 2011 RFI that the ratings for electric pool heaters using these two competing technologies are not always directly comparable. Id. at 63215. Another consideration for heat pump pool heaters is that performance depends upon the ambient temperature and humidity, so environmental conditions for testing are much more important for heat pump pool heaters than for gas-fired pool heaters.

Because of these factors, DOE's October 2011 RFI requested comment on the potential to update the pool heater test procedures by adding provisions to address electric heat pump pool heaters through use of a COP metric drawn from industry standards, coupled with a separate conversion to thermal efficiency (i.e., the regulating metric specified in EPCA) and integrated thermal efficiency (i.e., the new regulating metric incorporating standby mode and off mode energy consumption as required by EISA 2007). Id. at 63216.

On this topic, DOE received comments from AHRI and ACEEE that supported the expansion of the test method to include electric pool heaters. AHRI further commented that DOE should not integrate the standby mode and off mode energy consumption into an integrated thermal efficiency metric. (AHRI, No. 12 at p. 3; ACEEE, No. 24 at p. 4)

After carefully considering these public comments, DOE is proposing to add test methods that are applicable to heat pump pool heaters and electric resistance pool heaters. DOE proposes to amend its pool heater test procedure by adding a proposed test method for heat pump pool heaters that would reference ANSI/AHRI Standard 1160-2009, "Performance Rating of Heat Pump Pool Heaters," and ANSI/ASHRAE Standard 146-2011, "Method of Testing and Rating

Pool Heaters." Additionally, DOE proposes to amend its pool heater test procedure by adding a proposed test method for electric resistance pool heaters that references ANSI/ASHRAE Standard 146-2011, "Method of Testing and Rating Pool Heaters." DOE has tentatively concluded that incorporation of these industry test standards is appropriate, because they represent current best practices for these pool heater products.

Because the statute requires use of an integrated metric where technically feasible (as is the case here), DOE proposes to maintain the integrated thermal efficiency metric in the test procedure, as set forth in the final rule published on December 17, 2012. 77 FR 74559. Once DOE arrives at the thermal efficiency value for electric pool heaters, that value will feed into the integrated thermal efficiency calculation, which is applicable for all types of pool heaters.

Although DOE may prescribe amended test procedures in the final rule, manufacturers are not required to certify compliance for electric heat pump and electric resistance pool heaters until such time as DOE sets minimum energy conservation standards for those products (which will include energy consumption in active, standby, and off modes). Prior to DOE setting minimum energy conservation standards for electric heat pump and electric resistance pool heaters, any representations as to the energy efficiency or energy use of those products must be based on the amended test procedure within 180 days after the effective date of the test procedure final rule. Manufacturers of heat pump pool heaters would be able to use the COP metric, the integrated thermal efficiency metric, or both for making efficiency representations until an energy conservation standard is set.

EPCA requires the use of the integrated thermal efficiency metric for all pool heaters, including electric resistance and heat pump pool heaters, upon the compliance date for new energy conservation standards. Therefore, if DOE were to set energy conservation standards for heat pump pool heaters and electric resistance pool heaters, manufacturers would then be required to rate their products using the integrated thermal efficiency metric, although manufacturers of heat pump pool heaters would still have the option of making supplemental representations of efficiency using the COP metric. DOE is proposing to include an approach to determine the integrated thermal efficiency based on a COP value for heat pump pool heaters.

2. Other Issues

In addition to the changes for electric pool heaters described in the previous section, DOE is also clarifying that the DOE test procedure is applicable to oil-fired pool heaters, despite the incorporation of a test method titled "Gas-Fired Pool Heaters." Section 4.1.1 of that test method contains a provision to compute the energy used when oil is the fuel, as opposed to natural gas.

DOE also seeks comments on other relevant issues that would affect the test procedures for pool heaters. Although DOE has attempted to identify those portions of the test procedure where it believes amendments may be warranted, interested parties are welcome to provide comments on any aspect of the test procedure as part of this comprehensive 7-year-review rulemaking.

C. Compliance with Other EPCA Requirements

As mentioned in the summary at section II above, in amending a test procedure, EPCA directs DOE to determine to what extent, if any, the test procedure would alter the measured energy efficiency or measured energy use of a covered product. (42 U.S.C. 6293(e)(1)) If the amended test procedure alters the measured energy efficiency or measured energy use, the Secretary must amend the applicable energy conservation standard accordingly. (42 U.S.C. 6293(e)(2)) The current energy conservation standards for direct heating equipment and pool heaters are based on existing test procedure efficiency metrics – AFUE and thermal efficiency (E_t), respectively.

The proposed test procedure amendments for DHE generally do not contain changes that would materially alter the measured energy efficiency of equipment. Rather, most of the proposed changes represent clarifications that would improve the uniform application of the test procedures for certain product types. Any change in the reported efficiency that might be associated with these clarifications is tentatively expected to be *de minimis*.

Consistent with 42 U.S.C. 6293(c), any representations of energy consumption of vented heaters must be based on any final amended test procedures 180 days after the publication of the test procedure final rule. Until that time, manufacturers may make such representations based either on the final amended test procedures or on the previous test procedures, set forth at 10 CFR part 430, subpart B, appendix O as contained in the 10 CFR parts 200 to 499 edition revised as of January 1, 2013. Consistent with 42 U.S.C. 6291 (8), representations of energy consumption means measures of energy use (including for this product, active mode, standby

mode, and off mode energy use), annual operating cost, energy efficiency (including for this product, Annual Fuel Utilization Efficiency (AFUE)), or other measure of energy consumption. DOE notes that manufacturers must use the same test procedure for both representations of energy efficiency and certifications of compliance.

Today's proposal does not include any changes to the current standby mode and off mode testing procedures and calculations as established in the December 2012 final rule. 77 FR 74559 (Dec. 17, 2012). Although fossil fuel standby mode and off mode energy consumption were already captured in the existing AFUE metric, the December 2012 final rule required manufacturers to use the new test procedures for determining electrical standby mode and off mode energy consumption in Appendix O beginning on June 17, 2013. Certifications of compliance with the electrical standby mode and off mode energy consumption standards are not required until the compliance date of DOE standards that include electrical standby mode and off mode energy consumption.

The proposed test procedure amendments for pool heaters would not alter the measured efficiency of equipment covered by the existing test procedure. However, it would provide a new method of test for electric resistance and heat pump pool heaters, which are not currently subject to energy conservation standards by DOE. Therefore, DOE has tentatively concluded that there is no need to address the impact of these amendments on current energy conservation standards for pool heaters.

Consistent with 42 U.S.C. 6293(c), any representations of energy consumption of pool heaters must be based on any final amended procedures and calculations in appendix P starting 180 days after the publication of any final amended test procedures. Until that time, manufacturers of gas-fired and oil-fired pool heaters may make such representations based either on the final amended test procedures or on the previous test procedures, set forth at 10 CFR part 430, subpart B, appendix P as contained in the 10 CFR parts 200 to 499 edition revised as of January 1, 2013. Consistent with 42 U.S.C. 6291 (8), representations of energy consumption means measures of energy use (including for this product, active mode, standby mode, and off mode energy use), annual operating cost, energy efficiency (including for this product, thermal efficiency (E_t), or integrated thermal efficiency (TE_I)), or other measure of energy consumption. Again, DOE notes that manufacturers must use the same test procedure for both representations of energy efficiency and certifications of compliance.

There are currently no energy conservation standards for electric resistance pool heaters, heat pump pool heaters, or oil-fired pool heaters. Upon the compliance date of any final energy conservation standards for these types of pool heaters, use of any final test procedures in appendix P will be required to demonstrate compliance. There are also currently no energy conservation standards for the standby mode and off mode energy use of gas-fired pool heaters. Upon the compliance date of any energy conservation standards that incorporate standby mode and off mode energy consumption for gas-fired pool heaters (i.e., for this product, a standard expressed as integrated thermal efficiency (TE_I)), use of any final test procedures in appendix P will be required to demonstrate compliance.

IV. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

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

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 et seq., as amended by the Small Business Regulatory Enforcement Fairness Act of 1996) requires preparation of an initial regulatory flexibility analysis (IFRA) for any rule that by law must be proposed for public comment and a final regulatory flexibility analysis (FRFA) for any such rule that an agency adopts as a final rule, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. A regulatory flexibility analysis examines the impact of the rule on small entities and considers alternative ways of reducing negative effects. Also, as required by Executive Order 13272, "Proper Consideration of Small Entities in Agency Rulemaking," 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the DOE rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website at: www.gc.doe.gov/gc/office-general-counsel.

Today's proposed rule would prescribe test procedure amendments that would be used to determine compliance with energy conservation standards for direct heating equipment and pool heaters. For direct heating equipment, the proposed amendments would add provisions for testing vented home heating equipment that utilizes condensing technology, and incorporate by reference the most appropriate or recent versions of several industry standards referenced in the DOE test procedure for the purposes of test set-up and installation specifications. For pool heaters, the proposed amendments would incorporate by reference ANSI/AHRI Standard 1160-2009 and ANSI/ASHRAE Standard 146-2011 to establish testing procedures for electric (including heat pump) pool heaters. The proposed amendments for pool heaters would also clarify the test procedure's applicability to oil-fired pool heaters. DOE reviewed today's proposed rule under the provisions of the Regulatory Flexibility Act and the policies and procedures published on February 19, 2003. 68 FR 7990.

1. Reasons for, Objectives of, and Legal Basis for the Proposed Rule.

The reasons for, objectives of, and legal basis for the proposed rule are stated elsewhere in the preamble and are not repeated here.

2. Description and Estimated Number of Small Entities Regulated.

For the manufacturers of the covered products, the Small Business Administration (SBA) has set a size threshold, which defines those entities classified as "small businesses" for the purposes of the statute. DOE used the SBA's small business size standards to determine whether any small entities would be subject to the requirements of the rule. 65 FR 30836, 30848-49

(May 15, 2000), as amended at 65 FR 53533, 53544-45 (Sept. 5, 2000) and codified at 13 CFR part 121. The size standards are listed by North American Industry Classification System (NAICS) code and industry description and are available at http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf. DHE and pool heater manufacturing are classified under NAICS 333414 – "Heating Equipment (except Warm Air Furnaces) Manufacturing." The SBA sets a threshold of 500 employees or less for an entity to be considered as a small business for both of these categories.[7]

To estimate the number of companies that could be small business manufacturers of products covered by this rulemaking, DOE conducted a market survey using available public information to identify potential small manufacturers. DOE's research involved reviewing several industry trade association membership directories (e.g., AHRI[8]), product databases (e.g., AHRI[9] and CEC[10] databases), individual company websites, and marketing research tools (e.g., Hoovers[11] reports) to create a list of all domestic small business manufacturers of heating products covered by this rulemaking. DOE has identified 2 manufacturers of vented DHE and 5 manufacturers of pool heaters (including heat pump pool heater manufacturers) that can be considered small businesses. DOE did not count manufacturers of vented hearth heaters because, as noted previously, the definition of "vented hearth heater" was remanded to DOE for further consideration by the DC Circuit Court. DOE plans to conduct a separate rulemaking that would

[7] In the December 2009 NOPR, DOE mistakenly listed gas-fired pool heater manufacturing under NAICS code 335228. 74 FR 65852, 65984 (Dec. 11, 2009). The correct classification for pool heater manufacturing is NAICS 333414. Both NAICS categories have the same 500 employee limit.
[8] See: http://www.ahrinet.org/ahri+members.aspx.
[9] See: http://www.ahridirectory.org/ahriDirectory/pages/home.aspx.
[10] See: http://www.appliances.energy.ca.gov/.
[11] See: http://www.hoovers.com/.

clarify the standards and test procedures for vented hearth products, and as a result, DOE will assess impacts on small business vented hearth product manufacturers as part of that proceeding.

3. Description and Estimate of Compliance Requirements.

For direct heating equipment, the proposed amendments would incorporate by reference the most recent version of various industry standards already referenced in the DHE test procedures for the purposes of specifying the test set-up provisions. In addition, the proposed test procedure would include provisions for determining the AFUE of products that use condensing technology. The updates to the most recent versions of the various industry standards would result in no material change to DOE's test procedure for direct heating equipment. The additional provisions for measuring energy efficiency of products with condensing technology may add a modest cost to testing for manufacturers of such products. The test could be conducted in the same test facility, but some additional testing and calculation would be required to determine AFUE. Specifically, the proposed provisions would require a condensate collection test to be conducted on vented heaters utilizing condensing technologies. The duration of the condensate collection test time would be 30 minutes for steady-state testing and 1-2 hours for cyclic testing. In some cases only steady-state testing would be required (i.e., all manually-controlled vented heaters and those vented heaters not utilizing the optional tracer gas procedures). Vented heaters tested utilizing the optional tracer gas procedures would be required to conduct both steady-state and cyclic condensate collection procedures. Therefore, DOE estimates that the additional testing for condensing units would add, in the worst case, 3 hours to the overall length of time it takes to conduct the AFUE test, as compared to DHE not utilizing condensing technology. At a rate of $30 an hour for a test lab technician, DOE

estimates that the added cost will be $90 per test unit, which is modest in comparison to the overall cost of product development and certification.

For pool heaters, the proposed updates to the test procedure would add provisions to determine the energy efficiency of electric pool heaters, including heat pump pool heaters, and would incorporate by reference ANSI/AHRI 1160-2009 and ANSI/ASHRAE 146-2011. These products are not currently regulated by DOE, but DOE's research showed that all domestic small business manufacturers of heat pump pool heaters that were identified already rate COP and capacity according to the rating conditions in ANSI/AHRI 1160 and typically at an additional rating point outside of the ANSI/AHRI 1160 test conditions. In addition, DOE notes that ASHRAE Standard 90.1-2010 contains efficiency levels for heat pump pool heaters and specifies ANSI/AHRI 1160-2009 as the test method. Several States (e.g., Florida, California) also have minimum efficiency requirements for heat pump pool heaters, which is another factor that may drive manufacturers to rate their products for efficiency. Because manufacturers of heat pump pool heaters are already rating their products using AHRI 1160-2009 due to the ASHRAE Standard 90.1-2010 requirements and State efficiency requirements, DOE does not believe there will be much, if any, additional burden from today's proposal for including a heat pump pool heater test method that references the industry standard. For electric resistance pool heaters, the proposed test method in ANSI/ASHRAE 146-2011 is comparable to that for gas-fired and oil-fired pool heaters in the existing test method. For these manufacturers to make any representation regarding the efficiency of their products, they must have been using a similar test, so it is not expected that the current proposal would add to the burden of manufacturers of electric resistance pool heaters. DOE requests comment on these tentative conclusions and on

the potential impacts of this proposed rule on small business manufacturers of pool heaters, particularly of heat pump pool heaters and electric resistance pool heaters. This is identified as issue 5 in section V.E, "Issues on Which DOE Seeks Comment."

4. Duplication, Overlap, and Conflict with Other Rules and Regulations.

DOE is not aware of any rules or regulations that duplicate, overlap, or conflict with the rule being proposed today.

5. Significant Alternatives to the Rule.

As noted earlier in the preamble, the proposed rule is largely based upon the industry testing procedures already in place for direct heating equipment and pool heaters. DOE believes the proposed amendments would be useful for both consumers and industry, and are consistent with the Department's goals and statutory requirements, while also minimizing the economic burden on manufacturers. DOE seeks comment and information on the need, if any, for alternative test methods that, consistent with the statutory requirements, would reduce the economic impact of this rule on small entities. DOE will consider any comments received regarding alternative methods of testing that would reduce economic impact of the rule on small entities. DOE will consider the feasibility of such alternatives and determine whether they should be incorporated into the final rule.

C. Review Under the Paperwork Reduction Act of 1995

Manufacturers of direct heating equipment and pool heaters must certify to DOE that their products comply with all applicable energy conservation standards. In certifying

compliance, manufacturers must test their products according to the DOE test procedures for direct heating equipment and pool heaters, including any amendments adopted for those test procedures, on the date that compliance is required. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including direct heating equipment and pool heaters. 76 FR 12422 (March 7, 2011). The collection-of-information requirement for certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement has been approved by OMB under OMB control number 1910-1400. Public reporting burden for the certification is estimated to average 20 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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

D. Review Under the National Environmental Policy Act of 1969

In this proposed rule, DOE proposes test procedure amendments that it expects will be used to develop and implement future energy conservation standards for direct heating equipment and pool heaters. DOE has determined that this rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) and DOE's implementing regulations at 10 CFR part 1021. Specifically,

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

E. Review Under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (August 10, 1999), imposes certain requirements on Federal agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States, and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this proposed rule and has tentatively determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the products that are the subject of today's proposed rule. States can

petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297(d)) No further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

Regarding the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform," 61 FR 4729 (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. Regarding the review required by section 3(a), section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and tentatively 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) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. No. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For regulatory actions likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a "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 them. 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 www.gc.doe.gov/gc/office-general-counsel.) DOE examined today's proposed rule according to UMRA and its statement of policy and has tentatively determined that the rule contains neither an intergovernmental mandate, nor a mandate that may result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of $100 million or more in any year. Accordingly, no further assessment or analysis is required under UMRA.

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 rule that may affect family well-being. This rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

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

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

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for Federal agencies to review most disseminations of information to the public under information quality guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed today's 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 at OMB, a Statement of Energy Effects for any significant energy action. A "significant energy action" is defined as any action by an agency that promulgates 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 to amend the test procedure for measuring the energy efficiency of direct heating equipment and pool heaters is not a significant regulatory action under Executive Order 12866 or any successor order. Moreover, it would not have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as a significant energy action by the Administrator of OIRA. Therefore, it is not a significant energy action, and, accordingly, DOE has not prepared a Statement of Energy Effects for this rulemaking.

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; 42 U.S.C. 7101 et seq.), DOE must comply with all laws applicable to the former Federal Energy Administration, including 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 (Pub. L. 95-70). (15 U.S.C. 788; FEAA) Section 32 essentially provides in relevant part that, where a proposed rule authorizes or requires use of commercial standards, the notice of proposed rulemaking must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Attorney General and the Chairman of the Federal Trade Commission (FTC) concerning the impact of the commercial or industry standards on competition.

Today's proposed rule incorporates testing methods contained in the following commercial standards: ANSI/ASHRAE 103-2007, "Method of Test for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers"; ANSI Z21.86-2008, "Vented Gas-Fired Space Heating Appliances"; ASTM D2156-09, "Standard Test Method for Smoke Density in Flue Gases from Burning Distillate Fuels"; UL 729-2003, "Standard for Safety for Oil-Fired Floor Furnaces"; UL 730-2003, "Standard for Safety for Oil-Fired Wall Furnaces"; UL 896-1993, "Standard for Safety for Oil-Burning Stoves"; AHRI 1160-2009, "Performance Rating of Heat Pump Pool Heaters"; and ASHRAE 146-2011, "Method of Testing Pool Heaters." While today's proposed test procedures are not exclusively based on these standards, components of the test procedures are adopted directly from these standards without amendment. The Department has evaluated these standards and is unable to conclude whether they fully comply with the

requirements of section 32(b) of the FEAA, (i.e., that they were developed in a manner that fully provides for public participation, comment, and review). DOE will consult with the Attorney General and the Chairman of the FTC concerning the impact on competition of requiring manufacturers to use the test methods contained in these standards prior to prescribing a final rule.

V. Public Participation

A. Attendance at the Public Meeting

The time, date and location of the public meeting are listed in the **DATES** and **ADDRESSES** sections at the beginning of this document. If you plan to attend the public meeting, please notify Ms. Brenda Edwards at (202) 586-2945 or Brenda.Edwards@ee.doe.gov. Please note that foreign nationals visiting DOE Headquarters are subject to advance security screening procedures. Any foreign national wishing to participate in the meeting should advise DOE of this fact as soon as possible by contacting Ms. Brenda Edwards to initiate the necessary procedures.

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 website at: http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/68. Please also note that any person wishing to bring a laptop computer or tablet into the Forrestal Building will be required to obtain a property pass. Visitors should avoid bringing such devices, or allow

an extra 45 minutes. Persons may also attend the public meeting via webinar. Participants are responsible for ensuring their systems are compatible with the webinar software.

B. Procedure for Submitting Requests to Speak and Prepared General Statements for Distribution

Any person who has an interest in the topics addressed in this notice, or who is representative of a group or class of persons that has an interest in these issues, may request an opportunity to make an oral presentation at the public meeting. Such persons may hand-deliver requests to speak to the address show in the **ADDRESSES** section at the beginning of this notice between 9:00 a.m. and 4:00 p.m., Monday through Friday, except Federal holidays. Requests may also be sent by mail or email to Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE-2J, 1000 Independence Avenue, SW, Washington, DC 20585-0121, or Brenda.Edwards@ee.doe.gov. Persons who wish to speak should include in their request a computer diskette or CD-ROM in WordPerfect, Microsoft Word, PDF, or text (ASCII) file format that briefly describes the nature of their interest in this rulemaking and the topics they wish to discuss. Such persons should also provide a daytime telephone number where they can be reached.

DOE requests persons selected to make an oral presentation to submit an advance copy of their statements at least one week before the public meeting. DOE may permit persons who cannot supply an advance copy of their statement to participate, if those persons have made advance alternative arrangements with the Building Technologies Program. As necessary, request to give an oral presentation should ask for such alternative arrangements.

Any person who has plans to present a prepared general statement may request that copies of his or her statement be made available at the public meeting. Such persons may submit requests, along with an advance electronic copy of their statement in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format, to the appropriate address shown in the **ADDRESSES** section at the beginning of this notice. The request and advance copy of statements must be received at least one week before the public meeting and may be emailed, hand-delivered, or sent by mail. DOE prefers to receive requests and advance copies via email. Please include a telephone number to enable DOE staff to make follow-up contact, if needed.

C. Conduct of Public Meeting

DOE will designate a DOE official to preside at the public meeting and may also use a professional facilitator to aid discussion. The meeting will not be a judicial or evidentiary-type public hearing, but DOE will conduct it in accordance with section 336 of EPCA (42 U.S.C. 6306). A court reporter will be present to record the proceedings and prepare a transcript. DOE reserves the right to schedule the order of presentations and to establish the procedures governing the conduct of the public meeting. There shall not be discussion of proprietary information, costs or prices, market share, or other commercial matters regulated by U.S. anti-trust laws. After the public meeting, interested parties may submit further comments on the proceedings, as well as on any aspect of the rulemaking, until the end of the comment period.

The public meeting will be conducted in an informal, conference style. DOE will present summaries of comments received before the public meeting, allow time for prepared general

statements by participants, and encourage all interested parties to share their views on issues affecting this rulemaking. Each participant will be allowed to make a general statement (within time limits determined by DOE), before the discussion of specific topics. DOE will allow, as time permits, other participants to comment briefly on any general statements.

At the end of all prepared statements on a topic, DOE will permit participants to clarify their statements briefly and comment on statements made by others. Participants should be prepared to answer questions by DOE and by other participants concerning these issues. DOE representatives may also ask questions of participants concerning other matters relevant to this rulemaking. The official conducting the public meeting will accept additional comments or questions from those attending, as time permits. The presiding official will announce any further procedural rules or modification of the above procedures that may be needed for the proper conduct of the public meeting.

A transcript of the public meeting will be included in the docket, which can be viewed as described in the Docket section at the beginning of this notice, and will be accessible on the DOE website. In addition, any person may buy a copy of the transcript from the transcribing reporter.

D. Submission of Comments

DOE will accept comments, data, and information regarding this proposed rule before or after the public meeting, but no later than the date provided in the **DATES** section at the beginning of this proposed rule. Interested parties may submit comments using any of the methods described in the **ADDRESSES** section at the beginning of this notice.

All submissions received must include the agency name and docket number and/or RIN for this rulemaking. No telefacsimilies (faxes) will be accepted.

Submitting comments via regulations.gov. The www.regulations.gov web page 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 itself 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. Otherwise, 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 www.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 www.regulations.gov cannot be claimed as CBI. Comments received through the website 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 www.regulations.gov before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that www.regulations.gov provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery/courier, or mail. Comments and documents submitted via email, hand delivery/courier, or mail also will be posted to www.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 in 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. If you submit via mail or hand delivery/courier, please provide all items on

a CD, if feasible, in which case it is not necessary to submit printed copies. No telefacsimiles (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, 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 to 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/courier 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).

E. Issues on Which DOE Seeks Comment

Although DOE welcomes comments on any aspect of this proposal, DOE is particularly interested in receiving comments and views of interested parties concerning the following issues:

1. Are the proposed provisions for testing vented heaters that are capable of condensing operation appropriate and sufficient?

2. Are the updates to the material incorporated by reference into the direct heating equipment test procedure appropriate and sufficient?

3. Is the assignment of a 1-percent default jacket loss in lieu of testing for vented floor furnaces appropriate?

4. Are the proposed provisions to allow testing of electric resistance and heat pump pool heaters appropriate and sufficient?

5. What are the impacts of this proposed rule on small business entities?

VI. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of today's notice of proposed rulemaking.

List of Subjects in 10 CFR Part 430

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

Issued in Washington, DC, on

September 30, 2013.

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

For the reasons stated in the preamble, DOE is proposing to amend part 430 of Chapter II, Subchapter D of Title 10, Code of Federal Regulations, as set forth below:

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. Section 430.3 is amended by:

(1) Redesignating paragraph (d)(18) as (d)(19) and adding "and Appendix O" at the end of redisignated (d)(19);

(2) Redesignating paragraph s (f)(10)as (f)(11) and (i) through (p) as (j) through (q) respectively; and

(2) Adding paragraphs (b)(2), (d)(18), (f)(10), (f)(12), (i), and (r).

The additions read as follows:

§ 430.3 Materials incorporated by reference.

* * * * *

(b) <u>AHRI.</u> * * *

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(2) ANSI/AHRI Standard 1160-2009 ("ANSI/AHRI 1160"), Performance Rating of Heat Pump Pool Heaters, ANSI approved November 4, 2011, IBR approved for appendix P to subpart B.

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(d) ANSI. * * *

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(18) ANSI Z21.86-2008 (CSA 2.32-2008), ("ANSI Z21.86"), Vented Gas-Fired Space Heating Appliances, Fifth Edition, ANSI approved March 28, 2008, IBR approved for appendix O to subpart B.

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(f) ASHRAE. * * *

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(11) ANSI/ASHRAE 103-2007, Method of Test for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers, ASHRAE approved June 27, 2007, ANSI approved March 25, 2008, IBR approved for appendix O to subpart B.

(12) ANSI/ASHRAE 146 -2011 ("ANSI /ASHRAE 146"), Method of Testing and Rating Pool Heaters, ASHRAE approved February 2, 2011, ANSI approved February 3, 2011, IBR approved for appendix P to subpart B.

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(i) ASTM. American Society for Testing and Materials International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 (www.astm.org)

(1) ASTM D2156-09, ("ASTM D2156"), Standard Test Method for Smoke Density in Flue Gases from Burning Distillate Fuels, Edition 09, ASTM approved December 1, 2009, IBR approved for and appendix O to subpart B.

(2) [Reserved]

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(r) UL. Underwriters Laboratories, Inc., 2600 N.W. Lake Rd., Camas WA 98607-8542 (www.UL.com)

(1) UL 729-2003 ("UL 729"), Standard for Safety for Oil-Fired Floor Furnaces, dated August 29, 2003, Sixth Edition including revisions through April 22, 2010, IBR approved for appendix O to subpart B.

(2) UL 730-2003 ("UL 730"), Standard for Safety for Oil-Fired Wall Furnaces, dated August 29, 2003, 5th edition including revisions through April 22, 2010, IBR approved for appendix O to subpart B.

(3) UL 896-1993 ("UL 896"), Standard for Safety for Oil-Burning Stoves, dated July 29, 1993, 5th edition including revisions through May 7, 2010, IBR approved for appendix O to subpart B.

3. Section 430.23 is amended by revising paragraphs (o) and (p) to read as follows:

§ 430.23 Test procedures for the measurement of energy and water consumption.

* * * * *

(o) Vented home heating equipment. (1) When determining the annual fuel utilization efficiency (AFUE) of vented home heating equipment (see the note at the beginning of appendix

O), expressed in percent (%), AFUE shall be calculated in accordance with section 4.1.17 or 4.3.7 of appendix O of this subpart for vented heaters without either manual controls or thermal stack dampers; according to section 4.2.6 or 4.3.7 of appendix O of this subpart for vented heaters equipped with manual controls; or according to section 4.3.7 of appendix O of this subpart for vented heaters equipped with thermal stack dampers.

(2) When estimating the annual operating cost for vented home heating equipment, calculate the sum of: (i) The product of the average annual fuel energy consumption, in Btu's per year for natural gas, propane, or oil-fueled vented home heating equipment, determined according to section 4.6.2 of appendix O of this subpart, and the representative average unit cost in dollars per Btu for natural gas, propane, or oil, as appropriate, as provided pursuant to section 323(b)(2) of the Act; plus (ii) The product of the average annual auxiliary electric energy consumption in kilowatt-hours per year determined according to section 4.6.3 of appendix O of this subpart, and the representative average unit cost in dollars per kilowatt-hours as provided pursuant to section 323(b)(2) of the Act, the resulting sum then being rounded off to the nearest dollar per year.

(3) When estimating the estimated operating cost per million Btu output for gas or oil vented home heating equipment with an auxiliary electric system, calculate the product of: (A) The quotient of one million Btu divided by the sum of: (1) The product of the maximum fuel input in Btu's per hour as determined in 3.1.1 or 3.1.2 of appendix O of this subpart times the annual fuel utilization efficiency in percent as determined in 4.1.17, 4.2.6, or 4.3.7 of this appendix as appropriate divided by 100, plus (2) the product of the maximum electric power in

watts as determined in 3.1.3 of appendix O of this subpart times the quantity 3.412; and (B) of the sum of: (1) the product of the maximum fuel input in Btu's per hour as determined in 3.1.1 or 3.1.2 of this appendix times the representative unit cost in dollars per Btu for natural gas, propane, or oil, as appropriate, as provided pursuant to section 323(b)(2) of the Act; plus (2) the product of the maximum auxiliary electric power in kilowatts as determined in 3.1.3 of appendix O of this subpart times the representative unit cost in dollars per kilowatt-hour as provided pursuant to section 323(b)(2) of the Act, the resulting quantity shall be rounded off to the nearest 0.01 dollar per million Btu output.

(p) Pool heaters. (1) Prior to the compliance date of any energy conservation standards that incorporate standby mode and off mode energy consumption for pool heaters, when determining the thermal efficiency of pool heaters (see the note at the beginning of appendix P of this subpart) expressed as a percent (%), thermal efficiency shall be calculated in accordance with section 5.1 of appendix P to this subpart.

(2) After the compliance date of any energy conservation standards that incorporate standby mode and off mode energy consumption for pool heaters, when determining the integrated thermal efficiency of pool heaters (see the note at the beginning of appendix P of this subpart) expressed as a percent (%), integrated thermal efficiency shall be calculated in accordance with section 5.4 of appendix P to this subpart.

(3) When estimating the annual operating cost of pool heaters, calculate the sum of: (i) The product of the average annual fuel energy consumption, in Btu's per year, of natural gas or oil-fueled pool heaters, determined according to section 5.2 of appendix P to this subpart, and the representative average unit cost in dollars per Btu for natural gas or oil, as appropriate, as provided pursuant to section 323(b)(2) of the Act; plus (ii) The product of the average annual

electrical energy consumption in kilowatt-hours per year determined according to section 5.3 of appendix P to this subpart and converted to kilowatt-hours using a conversion factor of 3412 Btu = 1 kilowatt-hour, and the representative average unit cost in dollars per kilowatt-hours as provided pursuant to section 323(b)(2) of the Act, the resulting sum then being rounded off to the nearest dollar per year.

* * * * *

4. Appendix O to subpart B of part 430 is amended by:

a. Revising the note after the appendix heading ;

b. Redesignating sections 1.5 through 1.38 as 1.6 through 1.39;

c. Adding sections 1.5, 2.2.4, 3.8, 3.8.1, 3.8.2, 4.1.6.1, 4.1.6.2, 4.1.6.3, and 4.1.6.4;

d. Revising section 2.6.1 by removing the words "ANSI Z21.49 -1975, section 2.14." and adding in their place "Part VIII section 8.7 of ANSI Z21.86."

e. Revising section 2.6.2 by removing the words "Figure 34.4 of UL 730-1974, or Figures 35.1 and 35.2 of UL 729-1976" and adding in their place "Figure 36.4 of UL 730, or Figure 38.1 and 38.2 of UL 729." and by removing the words "sections 35.12 through 35.17 of UL 730-1974." and adding in their place "sections 37.5.8 through 37.5.18 of UL 730."

f. Revising sections 2.1.1, 2.1.2, 2.1.3, 2.2.2, 2.3.3, 2.3.4, 2.4.2, 2.5.1, 3.1.2, 3.2, 3.3, 4.1.6, 4.1.10, 4.2.4.1, 4.3.3, and 4.3.6;

These additions and revisions read as follows:

APPENDIX O TO SUBPART B OF PART 430–UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF VENTED HOME HEATING EQUIPMENT

Note: After [date 180 days after publication of the final rule in the federal register], any representations made with respect to the energy use or efficiency of vented home heating equipment must be made in accordance with the results of testing pursuant to this appendix. After this date, if a manufacturer elects to make representations with regard to standby mode and off mode energy consumption, then testing must also include the provisions of this appendix related to standby mode and off mode energy consumption.

Manufacturers conducting tests of vented home heating equipment after [date 30 days after publication of the final rule in the federal register] and prior to [date 180 days after publication of the final rule in the federal register], must conduct such test in accordance with either this appendix or appendix O as it appeared at 10 CFR part 430, subpart B, appendix X, in the 10 CFR parts 200 to 499 edition revised as of January 1, 2013,. Any representations made with respect to the energy use or efficiency of such vented home heating equipment must be in accordance with whichever version is selected. Given that after [date 180 days after publication of the final rule in the federal register] representations with respect to the energy use or efficiency of vented home heating equipment must be made in accordance with tests conducted pursuant to this appendix, manufacturers may wish to begin using this test procedure as soon as possible

On or after the compliance date for any amended energy conservation standards that incorporate standby mode and off mode energy consumption, all representations must be based on testing performed in accordance with this appendix in its entirety.

* * * * *

1.5 "*Condensing vented heater*" means a vented heater that will, during the laboratory tests prescribed in this appendix, condense part of the water vapor in the flue gases.

* * * * *

2.1.1 Vented wall furnaces (including direct vent systems). Install non-direct vent gas-fueled vented wall furnaces as specified in section 8.1.3 and figure 7 or figure 10 of ANSI Z21.86 (incorporated by reference; see §430.3). Install direct vent gas-fueled vented wall furnaces as specified in section 6.1.3 and figure 6 of ANSI Z21.86. Install oil-fueled vented wall furnaces as specified in section 36.1 of UL 730.

2.1.2 Vented floor furnaces. Install vented floor furnaces for test as specified in section 38.1 of UL 729.

2.1.3 Vented room heaters. Install vented room heaters for test as specified in section 37.1.1 of UL 896.

* * * * *

2.2.2 *Oil-fueled vented home heating equipment (excluding direct vent systems).* Use flue connections for oil-fueled vented floor furnaces as specified in section 38.2 of UL 729, sections 36.2 of UL 730 for oil-fueled vented wall furnaces, and sections 37.1.2 and 37.1.3 of UL 896 for oil-fueled vented room heaters (incorporated by reference; see §430.3).

* * * * *

2.2.4 *Condensing vented heater, additional flue requirements*. The flue pipe installation must not allow condensate formed in the flue pipe to flow back into the unit. An initial downward slope from the unit's exit, an offset with a drip leg, annular collection rings, or drain holes must be included in the flue pipe installation without disturbing normal flue gas flow. Flue gases should not flow out of the drain with the condensate. For condensing vented heaters not designed for collection and draining of condensate, a means to collect condensate must be provided for the purposes of testing.

* * * * *

2.3.3 *Other test gas.* Use other test gases with characteristics as described in table 1 of ANSI/ASHRAE 103-2007 (incorporated by reference; see §430.3). Use gases with a measured higher heating value within ±5 percent of the values specified in the above ANSI/ASHRAE standard. Determine the actual higher heating value of the gas used in the test with an error no greater than one percent.

2.3.4 *Oil supply.* For a vented heater utilizing fuel oil, use No. 1, fuel oil (kerosene) for vaporizing-type burners and either No. 1 or No. 2 fuel oil, as specified by the manufacturer, for mechanical atomizing type burners. Use test fuel conforming to the specifications given in tables 2 and 3 of ANSI/ASHRAE 103-2007 (incorporated by reference; see §430.3). Measure the higher heating value of the test fuel with an error no greater than one percent.

* * * * *

2.4.2 *Oil burner adjustments.* Adjust the burners of oil-fueled vented heaters to give the CO_2 reading recommended by the manufacturer and an hourly Btu input, during the steady-state performance test described below, which is within ±2 percent of the heater manufacturer's specified normal hourly Btu input rating. On units employing a power burner, do not allow smoke in the flue to exceed a No. 1 smoke during the steady-state performance test as measured by the procedure in ASTM D2156 (incorporated by reference; see §430.3). If, on units employing a power burner, the smoke in the flue exceeds a No. 1 smoke during the steady-state test, readjust the burner to give a lower smoke reading, and, if necessary a lower CO_2 reading, and start all tests over. Maintain the average draft over the fire and in the flue during the steady-state performance test at that recommended by the manufacturer within ±0.005 inches of water gauge. Do not make additional adjustments to the burner during the required series of performance tests. The instruments and measuring apparatus for this test are described in section 6 and shown in Figure 8 of ANSI/ASHRAE 103-2007 (incorporated by reference; see §430.3).

* * * * *

2.5.1 *Forced air vented wall furnaces (including direct vent systems).* During testing, maintain the air flow through the heater as specified by the manufacturer and operate the vented heater with the outlet air temperature between 80 °F and 130 °F above room temperature. If adjustable air discharge registers are provided, adjust them so as to provide the maximum possible air restriction. Measure air discharge temperature as specified in section 8.7 of ANSI Z21.86 (incorporated by reference; see §430.3).

* * * * *

3.1.2 *Oil-fueled vented home heating equipment (including direct vent systems).* Set up and adjust the vented heater as specified in sections 2.1, 2.2, and 2.3.4 of this appendix. Begin the steady-state performance test by operating the burner and the circulating air blower, on units so equipped, with the adjustments specified by sections 2.4.2 and 2.5 of this appendix until steady-state conditions are attained as indicated by a temperature variation of not more than 5 °F (2.8 C) in the flue gas temperature in three successive readings taken 15 minutes apart.

For units equipped with power burners, do not allow smoke in the flue to exceed a No. 1 smoke during the steady-state performance test as measured by the procedure described in ASTM D 2156 (incorporated by reference; see §430.3). Maintain the average draft over the fire and in the breeching during the steady-state performance test at that recommended by the manufacturer ±0.005 inches of water gauge.

Measure the room temperature (T_{RA}) as described in section 2.9 of this appendix and measure the steady-state flue gas temperature ($T_{F,SS}$) using nine thermocouples located in the flue pipe as described in section 2.6.2 of this appendix. Secure a sample of the flue gas in the plane of temperature measurement and determine the concentration by volume of CO_2 (X_{CO2F}) present in dry flue gas. Measure and record the steady-state heat input rate (Q_{in}).

For manually controlled oil-fueled vented heaters, determine the steady-state efficiency at a fuel input rate that is within ±5 percent of 50 percent of the maximum fuel input rate or at the minimum fuel input rate as measured in section 3.1.2 to this appendix for manually controlled oil-fueled vented heaters if the design of the heater is such that the ±5 percent of 50 percent of the maximum fuel input rate cannot be set.

* * * * *

3.2 *Jacket loss measurement.* Conduct a jacket loss test for vented floor furnaces. Measure the jacket loss (L_j) in accordance with the ANSI/ASHRAE 103-2007 section 8.6 (incorporated by reference; see §430.3), applying the provisions for furnaces and not the provisions for boilers. In lieu of testing, the jacket loss can be assigned a value of 1%.

3.3 *Measurement of the off-cycle losses for vented heaters equipped with thermal stack dampers.* As noted in section 4.3, this procedure may be optionally used for all vented heaters. Install the thermal stack damper, if required, according to the manufacturer's instructions. Unless specified otherwise, the thermal stack damper should be at the draft diverter exit collar. Attach a five foot length of bare stack to the outlet of the damper. Install thermocouples as specified in section 2.6.1 of this appendix.

For vented heaters equipped with single-stage thermostats, measure the off-cycle losses at the maximum fuel input rate. For vented heaters equipped with two-stage thermostats, measure the off-cycle losses at the maximum fuel input rate and at the reduced fuel input rate. For vented heaters equipped with step-modulating thermostats, measure the off-cycle losses at the reduced fuel input rate.

Let the vented heater heat up to a steady-state condition. Feed a tracer gas at a constant metered rate into the stack directly above and within one foot above the stack damper. For units not employing a thermal stack damper, introduce the tracer gas within the first foot of the test stack. Record tracer gas flow rate and temperature. Measure the tracer gas concentration in the

stack at several locations in a horizontal plane through a cross-section of the stack at a point sufficiently above the stack damper to ensure that the tracer gas is well mixed in the stack.

Continuously measure the tracer gas concentration and temperature during a 10-minute cool-down period. Shut the burner off and immediately begin measuring tracer gas concentration in the stack, stack temperature, room temperature, and barometric pressure. Record these values as the midpoint of each one-minute interval between burner shut-down and ten minutes after burner shut-down. Meter response time and sampling delay time shall be considered in timing these measurements.

* * * * *

3.8 *Condensing vented heaters measurement of condensate under steady-state and cyclic conditions.* Condensate drain lines shall be attached to the vented heater as specified in the manufacturer's installation instructions. The test unit shall be level prior to all testing. A continuous downward slope of drain lines from the unit shall be maintained. Additional precautions shall be taken to facilitate uninterrupted flow of condensate during the test. Collection container must be glass or polished stainless steel to facilitate removal of interior deposits. The collection container shall have a vent opening to the atmosphere, be dried prior to each use, and be at room ambient temperature. The humidity of the room air shall at no time exceed 80% relative humidity. For condensing units not designed for collecting and draining condensate, drain lines need to be provided during testing that meet the criteria set forth in this section 3.8. Units employing manual controls and units not tested under the optional tracer gas procedures of section 3.3 and 3.6 shall only conduct the steady-state condensate collection test.

3.8.1 *Steady-state condensate collection test*. Begin a steady-state condensate collection immediately after the steady-state testing of section 3.1 has been completed. The steady-state condensate collection period shall be an additional 30 minutes. Condensate mass shall be measured immediately at the end of the collection period to minimize evaporation loss from the sample. Fuel input shall be recorded for the 30-minute condensate collection steady-state test period. Fuel higher heating value (HHV), temperature, and pressures necessary for determining fuel energy input ($Q_{c,ss}$) will be measured and recorded. The fuel quantity and HHV shall be measured with errors no greater than 1%. Determine the mass of condensate for the steady-state test ($M_{c,ss}$) in pounds by subtracting the tare container weight from the total container and condensate weight measured at the end of the 30-minute condensate collection test period.

For units with step modulating or two-stage controls, the steady-state condensate collection test shall be conducted at both the maximum and reduced input rates.

3.8.2 *Cyclic condensate collection tests*. (only for vented heaters tested under the optional tracer gas procedures of section 3.3 or 3.6) Control devices shall be installed to allow cyclical operation of the vented heater. The unit shall be operated in a cyclical manner until flue gas temperatures at the end of each on-cycle are within 5°F of each other for two consecutive cycles. On-cycle and off-cycle times are 4 minutes and 13 minutes respectively. Control of ON and OFF operation actions shall be within +/- 6 seconds of the scheduled time. Begin three test cycles. For fan-type vented heaters, maintain circulating air adjustments as specified in section 2.5 of this appendix. Begin condensate collection at one minute before the on-cycle period of the first test cycle. The container shall be removed one minute before the end of each off-cycle period. Condensate mass shall be measured for each test-cycle.

Fuel input shall be recorded during the entire test period starting at the beginning of the on-time period of the first cycle to the beginning of the on-time period of the second cycle, etc., for each of the test cycles. Fuel higher heating value (HHV), temperature, and pressure necessary for determining fuel energy input, Q_c, shall be recorded. Determine the mass of condensate for each cycle, M_c, in pounds. If at the end of three-cycles, the sample standard deviation is within 20% of the mean value for three cycles, use total condensate collected in the three cycles as M_c; if not, continue collection for an additional three cycles and use the total condensate collected for the six cycles as M_c. Determine the fuel energy input, Q_c, during the three or six test cycles, expressed in Btu.

* * * * *

4.1.6 *Latent heat loss.* For non-condensing vented heaters, obtain the latent heat loss ($L_{L,A}$) from Table 2 of this appendix. For condensing vented heaters, a modified latent heat loss ($L_{L,A}$*) is obtained as follows:

For steady-state conditions:

$L_{L,A}^* = L_{L,A} - L_{G,SS} + L_{C,SS}$

where:

$L_{L,A}$ = Latent heat loss, based on fuel type, from table 2 of this appendix

$L_{G,SS}$ = Steady-state latent heat gain due to condensation as determined in 4.1.6.1 of this appendix

$L_{C,SS}$ = Steady-state heat loss due to hot condensate going down the drain as determined in 4.1.6.2 of this appendix

For cyclic conditions: (only for vented heaters tested under the optional tracer gas procedures of section 3.3 or 3.6)

$L_{L,A}^{*} = L_{L,A} - L_G + L_C$

where:

$L_{L,A}$ = Latent heat loss, based on fuel type, from table 2 of this appendix

L_G = Latent heat gain due to condensation under cyclic conditions as determined in 4.1.6.3 of this appendix

L_C = Heat loss due to hot condensate going down the drain under cyclic conditions as determined in 4.1.6.4 of this appendix

4.1.6.1 Latent heat gain due to condensation under steady-state conditions. Calculate the latent heat gain ($L_{G,SS}$) expressed as a percent and defined as:

$$L_{G,SS} = 100\frac{(1053.3)M_{C.SS}}{Q_{C,SS}}$$

where:

100 = conversion factor to express a decimal as a percent

1053.3 = latent heat of vaporization of water, Btu per pound

$M_{c,ss}$ = mass of condensate for the steady-state test as determined in 3.8.1 of this appendix, pounds

$Q_{c,ss}$ = fuel energy input for steady-state test as determined in 3.8.1 of this appendix, Btu

4.1.6.2 Heat loss due to hot condensate going down the drain under steady-state conditions. Calculate the steady-state heat loss due to hot condensate going down the drain ($L_{C,SS}$) expressed as a percent and defined as:

$$L_{C,SS} = L_{G,SS}\frac{1.0\left(T_{F,SS} - 70\right) - 0.45\left(T_{F,SS} - 45\right)}{1053.3}$$

where:

$L_{G,SS}$ = Latent heat gain due to condensation under steady-state conditions as defined in 4.1.6.1 of this appendix

1.0 = specific heat of water, Btu/lb - ^{o}F

$T_{F,SS}$ = Flue (or stack) gas temperature as defined in 3.1 of this appendix, ^{o}F.

70 = assumed indoor temperature, ^{o}F

0.45 = specific heat of water vapor, Btu/lb-^{o}F

45 = average outdoor temperature for vented heaters, ^{o}F

4.1.6.3 Latent heat gain due to condensation under cyclic conditions. (only for vented heaters tested under the optional tracer gas procedures of section 3.3 or 3.6) Calculate the latent heat gain (L_G) expressed as a percent and defined as:

$$L_G = 100\frac{(1053.3)M_C}{Q_C}$$

where:

100 = conversion factor to express a decimal as a percent

1053.3 = latent heat of vaporization of water, Btu per pound

M_c = mass of condensate for the cyclic test as determined in 3.8.2 of this appendix, pounds

Q_c = fuel energy input for cyclic test as determined in 3.8.2 of this appendix, Btu

4.1.6.4 Heat loss due to hot condensate going down the drain under cyclic conditions. (only for vented heaters tested under the optional tracer gas procedures of section 3.3 or 3.6) Calculate the cyclic heat loss due to hot condensate going down the drain (L_C) expressed as a percent and defined as:

$$L_C = L_G \frac{1.0\left(T_{F,SS} - 70\right) - 0.45\left(T_{F,SS} - 45\right)}{1053.3}$$

where:

L_G = Latent heat gain due to condensation under cyclic conditions as defined in 4.1.6.3 of this appendix

1.0 = specific heat of water, Btu/lb - ^oF

$T_{F,SS}$ = Flue (or stack) gas temperature as defined in 3.1 of this appendix.

70 = assumed indoor temperature, ^oF

0.45 = specific heat of water vapor, Btu/lb-^oF

45 = average outdoor temperature for vented heaters, ^oF

* * * * *

4.1.10 *Steady-state efficiency.* For vented heaters equipped with single-stage thermostats, calculate the steady-state efficiency (excluding jacket loss, η_{SS}, expressed in percent and defined as:

$\eta_{SS} = 100 - L_{L,A} - L_{S,SS,A}$

where:

$L_{L,A}$ = latent heat loss, as defined in 4.1.6 of this appendix (for condensing vented heaters $L_{L,A}$* for steady-state conditions)

$L_{S,SS,A}$ = sensible heat loss at steady-state operation, as defined in 4.1.9 of this appendix

For vented heaters equipped with either two-stage thermostats or with step-modulating thermostats, calculate the steady-state efficiency at the reduced fuel input rate, η_{SS-L}, expressed in percent and defined as:

$\eta_{SS-L} = 100 - L_{L,A} - L_{S,SS,A}$

where:

$L_{L,A}$ = latent heat loss, as defined in 4.1.6 of this appendix (for condensing vented heaters $L_{L,A}$* for steady-state conditions at the reduced firing rate)

$L_{S,SS,A}$ = sensible heat loss at steady-state operation, as defined in 4.1.9 of this appendix in which $L_{S,SS,A}$is determined at the reduced fuel input rate

For vented heaters equipped with two-stage thermostats, calculate the steady-state efficiency at the maximum fuel input rate,

η_{SS-H}, expressed in percent and defined as:

$\eta_{SS-H} = 100 - L_{L,A} - L_{S,SS,A}$

where:

$L_{L,A}$ = latent heat loss, as defined in 4.1.6 of this appendix (for condensing vented heaters $L_{L,A}$* for steady-state conditions at the maximum fuel input rate)

$L_{S,SS,A}$ = sensible heat loss at steady-state operation, as defined in 4.1.9 of this appendix in which $L_{S,SS,A}$is measured at the maximum fuel input rate

For vented heaters equipped with step-modulating thermostats, calculate the weighted-average steady-state efficiency in the modulating mode, η_{SS-MOD}, expressed in percent and defined as:

$$\eta_{SS-MOD} = \left[\eta_{SS-H} - \eta_{SS-L}\right]\left[\frac{T_C - T_{OA*}}{T_C - 15}\right] + \eta_{SS-L}$$

where:

η_{SS-H} = steady-state efficiency at the maximum fuel input rate, as defined in 4.1.10 of this appendix

η_{SS-L} = steady-state efficiency at the reduced fuel input rate, as defined in 4.1.10 of this appendix

T_{OA}* = average outdoor temperature for vented heaters with step-modulating thermostats operating in the modulating mode and is obtained from Table 3 or Figure 1 of this appendix

T_C = balance point temperature which represents a temperature used to apportion the annual heating load between the reduced input cycling mode and either the modulating mode or maximum input cycling mode and is obtained either from Table 3 of this appendix or calculated by the following equation:

$T_C = 65-[(65-15)R]$

where:

65 = average outdoor temperature at which a vented heater starts operating

15 = national average outdoor design temperature for vented heaters

R = ratio of reduced to maximum heat output rates, as defined in 4.1.13 of this appendix

* * * * *

4.2.4.1 For manually-controlled heaters with various input rates the weighted average steady-state efficiency (η_{SS-WT}), is determined as follows:

$\eta_{SS-WT} = 100-L_{L,A}-L_{S,SS,A}$

where:

$L_{L,A}$ = latent heat loss, as defined in 4.1.6 of this appendix (for condensing vented heaters, $L_{L,A}$* for steady-state conditions)

$L_{S,SS,A}$ = steady-state efficiency at the reduced fuel input rate, as defined in 4.1.9 of this appendix

and where $L_{L,A}$ and $L_{S,SS,A}$ are determined: (1) at 50 percent of the maximum fuel input rate as measured in either section 3.1.1 of this appendix for manually-controlled gas vented heaters or section 3.1.2 of this appendix for manually-controlled oil vented heaters, or

(2) at the minimum fuel input rate as measured in either section 3.1.1 to this appendix for manually-controlled gas vented heaters or section 3.1.2 to this appendix for manually-controlled oil vented heaters if the design of the heater is such that the ±5 percent of 50 percent of the maximum fuel input rate cannot be set, provided this minimum rate is no greater than 2/3 of the maximum input rate of the heater.

* * * * *

4.3.3 *Off-cycle sensible heat loss.* For vented heaters equipped with single-stage thermostats, calculate the off-cycle sensible heat loss ($L_{S,OFF}$) at the maximum fuel input rate. For vented heaters equipped with step-modulating thermostats, calculate $L_{S,OFF}$ defined as:

$$L_{S,OFF} = X_1 L_{S,OFF,red}$$

where:

X_1 =as defined in 4.1.14 of this appendix

$L_{S,OFF,red}$ =as defined as $L_{S,OFF}$ in 4.3.3 of this appendix at the reduced fuel input rate

For vented heaters equipped with two-stage thermostats, calculate $L_{S,OFF}$ defined as:

$$L_{S,OFF} = X_1 L_{S,OFF,red} + X_2 L_{S,OFF,Max}$$

where:

X_1 =as defined in 4.1.14 of this appendix

$L_{S,OFF,red}$ =as defined as $L_{S,OFF}$ in 4.3.3 of this appendix at the reduced fuel input rate

X_2 =as defined in 4.1.15 of this appendix

$L_{S,OFF,Max}$ =as defined as $L_{S,OFF}$ in 4.3.3 of this appendix at the maximum fuel input rate

Calculate the off-cycle sensible heat loss ($L_{S,OFF}$) expressed as a percent and defined as:

$$L_{s,OFF} = \frac{100\ (0.24)}{Q_{in} t_{on}} \sum m_{s,OFF}(T_{s,OFF} - T_{RA})$$

where:

100=conversion factor for percent

0.24=specific heat of air in Btu per pound−°F

Q_{in} =fuel input rate, as defined in 3.1 of this appendix in Btu per minute (as appropriate for the firing rate)

t_{on} =average burner on-time per cycle and is 20 minutes

$\Sigma\ m_{S,OFF}\ (T_{S,OFF} - T_{RA})$=summation of the ten values (for single-stage or step-modulating models) or twenty values (for two-stage models) of the quantity, $m_{S,OFF}\ (T_{S,OFF} - T_{RA})$, measured in accordance with 3.3 of this appendix

$m_{S,OFF}$ =stack gas mass flow rate pounds per minute

$$m_{s,OFF} = \frac{1.325 P_B V_T (100 - C_T)}{C_T (T_T + 460)}$$

$T_{S,OFF}$ =stack gas temperature measured in accordance with 3.3 of this appendix

T_{RA} =average room temperature measured in accordance with 3.3 of this appendix

P_B =barometric pressure in inches of mercury

V_T =flow rate of the tracer gas through the stack in cubic feet per minute

C_{T*} =concentration by volume of the active tracer gas in the mixture in percent and is 100 when the tracer gas is a single component gas

C_T =concentration by volume of the active tracer gas in the diluted stack gas in percent

T_T =temperature of the tracer gas entering the flow meter in degrees Fahrenheit

(T_T +460)=absolute temperature of the tracer gas entering the flow meter in degrees Rankine

* * * * *

4.3.6 *Part-load fuel utilization efficiency.* Calculate the part-load fuel utilization efficiency (η_u) expressed as a percent and defined as:

$$\eta_u = 100 - L_{L,A} - C_j L_j - \left[\frac{t_{on}}{t_{on} + P_F\, t_{off}}\right] \times \left[L_{S,ON} + L_{S,OFF} + L_{I,ON} + L_{I,OFF}\right]$$

where:

C_j = 2.8, adjustment factor

L_j = jacket loss as defined in 4.1.5

$L_{L,A}$ = Latent heat loss, as defined in 4.1.6 of this appendix (for condensing vented heaters $L_{L,A}$* for cyclic conditions)

t_{on} = Average burner on time which is 20 mins.

$L_{S,ON}$ = On-cycle sensible heat loss, as defined in 4.3.1 of this appendix

$L_{S,OFF}$ = Off-cycle sensible heat loss, as defined in 4.3.3 of this appendix

$L_{I,ON}$ = On-cycle infiltration heat loss, as defined in 4.3.2 of this appendix

$L_{I,OFF}$ = Off-cycle infiltration heat loss, as defined in 4.3.5 of this appendix

P_F = Pilot fraction, as defined in 4.1.4 of this appendix

t_{OFF} = average burner off-time per cycle, which is 20 minutes

* * * * *

5. Appendix P to subpart B of part 430 is revised to read as follows:

APPENDIX P TO SUBPART B OF PART 430–UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF POOL HEATERS

NOTE: After [date 180 days after publication of the final rule in the federal register], any representations made with respect to the energy use or efficiency of pool heaters must be made in accordance with the results of testing pursuant to this appendix. After this date, if a manufacturer elects to make representations with regard to standby mode and off mode energy consumption, then testing must also include the provisions of this appendix related to standby mode and off mode energy consumption.

Manufacturers conducting tests of gas-fired pool heaters after [date 30 days after publication of the final rule in the federal register] and prior to [date 180 days after publication of the final rule in the federal register], must conduct such test in accordance with either this appendix or appendix X as it appeared at 10 CFR part 430, subpart B, appendix P, in the 10 CFR parts 200 to 499 edition revised as of January 1, 2013. Any representations made with respect to the energy use or efficiency of such gas-fired pool heaters must be in accordance with whichever version is selected. Given that after [date 180 days after publication of the final rule in the federal register] representations with respect to the energy use or efficiency of pool heaters must

be made in accordance with tests conducted pursuant to this appendix, manufacturers may wish to begin using this test procedure as soon as possible.

On or after the compliance date for any amended energy conservation standards that incorporate standby mode and off mode energy consumption, all representations must be based on testing performed in accordance with this appendix in its entirety.

1. Definitions.

1.1 Active mode means the condition during the pool heating season in which the pool heater is connected to the power source, and the main burner, electric resistance element, or heat pump is activated to heat pool water.

1.2 Coefficient of Performance (COP), as applied to heat pump pool heaters, means the ratio of heat output in kW to the total power input in kW

1.3 Electric heat pump pool heater means an appliance designed for heating nonpotable water employing a compressor, water-cooled condenser, and outdoor air coil.

1.4 Electric resistance pool heater means an appliance designed for heating nonpotable water employing electric resistance heating elements.

1.5 Fossil fuel-fired pool heater means an appliance designed for heating nonpotable water employing natural gas or oil burners.

1.6 Hybrid pool heater means an appliance designed for heating nonpotable water employing both a heat pump (compressor, water-cooled condenser, and outdoor air coil) and a fossil fueled burner as heating sources.

1.7 Off mode means the condition during the pool non-heating season in which the pool heater is connected to the power source, and neither the main burner, nor the electric resistance elements, nor the heat pump is activated, and the seasonal off switch, if present, is in the "off" position.

1.8 Seasonal off switch means a switch that effects a difference in off mode energy consumption as compared to standby mode energy consumption.

1.9 Standby mode means the condition during the pool heating season in which the pool heater is connected to the power source, and neither the main burner, nor the electric resistance elements, nor the heat pump is activated.

2. Test method.

2.1 Active mode.

2.1.1 Fossil fuel-fired pool heaters. The test method for testing fossil fuel-fired pool heaters in active mode is as specified in ANSI Z21.56 (incorporated by reference; see §430.3).

2.1.2 Electric resistance pool heaters. The test method for testing electric resistance pool heaters in active mode is as specified in ANSI/ASHRAE 146 (incorporated by reference; see §430.3).

2.1.3 Electric heat pump pool heaters. The test method for testing electric heat pump pool heaters in active mode is as specified in ANSI/AHRI 1160 (incorporated by

reference; see §430.3), which references ANSI/ASHRAE 146 (incorporated by reference; see §430.3).

2.1.4 Hybrid pool heaters. [Reserved]

2.2 Standby mode. The test method for testing the energy consumption of pool heaters in standby mode is as described in sections 3 through 5 of this appendix.

2.3 Off mode.

2.3.1 Pool heaters with a seasonal off switch. For pool heaters with a seasonal off switch, no off mode test is required.

2.3.2 Pool heaters without a seasonal off switch. For pool heaters without a seasonal off switch, the test method for testing the energy consumption of the pool heater is as described in sections 3 through 5 of this appendix.

3. Test conditions.

3.1 Active mode.

3.1.1 Fossil fuel-fired pool heaters. Establish the test conditions specified in section 2.10 of ANSI Z21.56 (incorporated by reference; see §430.3).

3.1.2 Electric resistance pool heaters. Establish the test conditions specified in section 9.1.4 of ANSI/ASHRAE 146 (incorporated by reference; see §430.3).

3.1.3 Electric heat pump pool heaters. Establish the test conditions specified in section 5 of ANSI/AHRI 1160. The air temperature surrounding the unit shall be at the "High

Air Temperature – Mid Humidity (63% RH)" level specified in section 6 of ANSI/AHRI 1160 (80.6 ^{0}F [27.0 ^{o}C] Dry-Bulb, 71.2 ^{o}F [21.8 ^{o}C]).

3.1.4 Hybrid pool heaters. [Reserved]

3.2 Standby mode and off mode. After completing the active mode tests described in section 3.1, reduce the thermostat setting to a low enough temperature to put the pool heater into standby mode. Reapply the energy sources and operate the pool heater in standby mode for 60 minutes.

4. Measurements

4.1 Active mode

4.1.1 Fossil fuel-fired pool heaters. Measure the quantities delineated in section 2.10 of ANSI Z21.56 (incorporated by reference; see §430.3). The measurement of energy consumption for oil-fired pool heaters in Btu is to be carried out in appropriate units (e.g., gallons).

4.1.2 Electric resistance pool heaters. Measure the quantities delineated in section 9.1.4 of ANSI/ASHRAE 146 (incorporated by reference; see §430.3) during and at the end of the 30-minute period when water is flowing through the pool heater.

4.1.3 Electric heat pump pool heaters. Measure the quantities delineated in section 9.1.1 and Table 2 of ANSI/ASHRAE 146 (incorporated by reference; see §430.3). The elapsed time, t_{HP}, from the start of electric power metering to the end shall be recorded, in minutes.

4.1.4 Hybrid pool heaters. [Reserved]

4.2 Standby mode. For all pool heaters, record the average electric power consumption during the standby mode test, $P_{W,SB}$, in W, in accordance with section 5 of IEC 62301 (Second Edition) (incorporated by reference; see §430.3). For fossil fuel-fired pool heaters, record the fossil fuel energy consumption during the standby test, Q_p, in Btu. (Milli-volt electrical consumption need not be considered in units so equipped.) Ambient temperature and voltage specifications in section 4.1 of this appendix shall apply to this standby mode testing. The recorded standby power ($P_{W,SB}$) shall be rounded to the second decimal place, and for loads greater than or equal to 10W, at least three significant figures shall be reported.

4.3 Off mode.

4.3.1 Pool heaters with a seasonal off switch. For pool heaters with a seasonal off switch, the average electric power consumption during the off mode, $P_{W,OFF} = 0$, and the fossil fuel energy consumed during the off mode, $Q_{off} = 0$.

4.3.2 Pool heaters without a seasonal off switch. For all pool heaters without a seasonal off switch, record the average electric power consumption during the standby/off mode test, $P_{W,OFF}$ (= $P_{W,SB}$), in W, in accordance with section 5 of IEC 62301 (Second Edition) (incorporated by reference; see §430.3). For fossil fuel-fired pool heaters without a seasonal off switch, record the fossil fuel energy consumption during the off mode test, Q_{off} (= Q_p), in Btu. (Milli-volt electrical consumption need not be considered in units so equipped.) Ambient temperature and voltage specifications in section 4.1 of this appendix shall apply to this off mode testing. The recorded off mode power ($P_{W,OFF}$) shall be rounded to the second decimal place, and for loads greater than or equal to 10W, at least three significant figures shall be reported.

5. Calculations.

5.1 Thermal efficiency.

5.1.1 Fossil fuel-fired pool heaters. Calculate the thermal efficiency, E_t (expressed as a percent), as specified in section 2.10 of ANSI Z21.56 (incorporated by reference; see §430.3). The expression of fuel consumption for oil-fired pool heaters shall be in Btu.

5.1.2 Electric resistance pool heaters. Calculate the thermal efficiency, E_t (expressed as a percent), as specified in section 11.1 of ANSI/ASHRAE 146 (incorporated by reference; see §430.3).

5.1.3 Electric heat pump pool heaters. Calculate the COP according to section 11.1 of ANSI/ASHRAE 146. Calculate the thermal efficiency, E_t (expressed as a percent): E_t = 100 * COP.

5.1.4 Hybrid pool heaters. [Reserved]

5.2 Average annual fossil fuel energy for pool heaters. For electric resistance and electric heat pump pool heaters, the average annual fuel energy for pool heaters, E_F =0.

For fossil fuel-fired pool heaters, the average annual fuel energy for pool heaters, E_F, is defined as:

$$E_F = BOH\ Q_{IN} + (POH - BOH)Q_{PR} + (8760 - POH)\ Q_{off,R}$$

where:

BOH = average number of burner operating hours = 104 h

POH = average number of pool operating hours = 4464 h

Q_{IN} = rated fuel energy input as defined according to section 2.10.1 or section 2.10.2 of ANSI Z21.56 (incorporated by reference; see §430.3), as appropriate. (For electric resistance and heat pump pool heaters, Q_{IN} = 0.)

Q_{PR} = average energy consumption rate of continuously operating pilot light, if employed, = (Q_P / 1 h)

Q_P = energy consumption of continuously operating pilot light, if employed, as measured in section 4.2 of this appendix, in Btu

8760 = number of hours in one year

$Q_{off,R}$ = average off mode fossil fuel energy consumption rate = Q_{off} / (1 h)

Q_{off} = off mode energy consumption as defined in section 4.3 of this appendix

5.3 Average annual electrical energy consumption for pool heaters. The average annual electrical energy consumption for pool heaters, E_{AE}, is expressed in Btu and defined as:

(1) $E_{AE} = E_{AE,active} + E_{AE,standby,off}$

(2) $E_{AE,active}$ = BOH * PE

(3) $E_{AE,standby,off}$ = (POH – BOH) $P_{W,SB}$(Btu/h) + (8760 – POH) $P_{W,OFF}$(Btu/h)

where:

$E_{AE,active}$ = electrical consumption in the active mode

$E_{AE,standby,off}$ = auxiliary electrical consumption in the standby mode and off mode

PE = $2E_c$, for fossil fuel-fired heaters tested according to section 2.10.1 of ANSI Z21.56 (incorporated by reference; see §430.3) and for electric resistance pool heaters, in Btu/h

= 3.412 PE_{rated}, for fossil fuel-fired heaters tested according to section 2.10.2 of ANSI Z21.56, in Btu/h

= $E_{c,HP}$ * (60/t_{HP}), for heat pump pool heaters, in Btu/h.

E_c = electrical consumption of the heater (converted to equivalent unit of Btu), including the electrical energy to the recirculating pump if used, during the 30-minute thermal efficiency test, as defined in section 2.10.1 of ANSI Z21.56 for fossil fuel-fired pool

heaters and section 9.1.4 of ANSI/ASHRAE 146 (incorporated by reference; see §430.3) for electric resistance pool heaters, in Btu per 30 min.

2 = conversion factor to convert unit from per 30 min. to per h.

PE_{rated} = nameplate rating of auxiliary electrical equipment of heater, in Watts

$E_{c,HP}$ = electrical consumption of the heat pump pool heater (converted to equivalent unit of Btu), including the electrical energy to the recirculating pump if used, during the thermal efficiency test, as defined in section 9.1 of ANSI/ASHRAE 146, in Btu.

t_{HP} = elapsed time of data recording during the thermal efficiency test on heat pump pool heater, as defined in section 9.1 of ANSI/ASHRAE 146, in minutes.

BOH = as defined in 5.2 of this appendix

POH = as defined in 5.2 of this appendix

$P_{W,SB}$ (Btu/h) = electrical energy consumption rate during standby mode expressed in Btu/h = 3.412 $P_{W,SB}$, Btu/h

$P_{W,SB}$ = as defined in 4.2 of this appendix

$P_{W,OFF}$ (Btu/h) = electrical energy consumption rate during off mode expressed in Btu/h = 3.412 $P_{W,OFF}$, Btu/h

$P_{W,OFF}$ = as defined in 4.3 of this appendix

5.4 Integrated thermal efficiency.

5.4.1 Calculate the seasonal useful output of the pool heater as:

$E_{OUT} = BOH[(E_t/100)(Q_{IN} + PE)]$

where:

BOH = as defined in 5.2 of this appendix

E_t = thermal efficiency as defined in 5.1 of this appendix

Q_{IN} = as defined in 5.2 of this appendix

PE = as defined in 5.3 of this appendix

100 = conversion factor, from percent to fraction

5.4.2 Calculate the annual input to the pool heater as:

$E_{IN} = E_F + E_{AE}$

where:

E_F = as defined in 5.2 of this appendix

E_{AE} = as defined in 5.3 of this appendix

5.4.3 Calculate the pool heater integrated thermal efficiency (TE_I) (in percent).

$TE_I = 100(E_{OUT}/E_{IN})$

where:

E_{OUT} = as defined in 5.4.1 of this appendix

E_{IN} = as defined in 5.4.2 of this appendix

100 = conversion factor, from fraction to percent