Proposed Rules

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This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 430

[Docket No. EERE–2010–BT–TP–0010]

RIN 1904–AC21

Energy Conservation Program for Consumer Products: Test Procedures for Residential Furnace Fans

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

ACTION: Supplemental notice of proposed rulemaking.

SUMMARY: The U.S. Department of Energy (DOE) proposes to establish test procedures for electrically-powered devices used in residential heating, ventilation, and air-conditioning (HVAC) products to circulate air through ductwork, hereafter referred to as ''furnace fans.'' DOE proposes a test procedure that would be applicable to furnace fans that are used in weatherized and non-weatherized gas, oil and electric furnaces and modular blowers, even though DOE interprets its authority as encompassing more than just circulation fans used in furnaces. This notice proposes to establish a test method for measuring the electrical consumption of the furnace fans used in these products. Concurrently, DOE is undertaking an energy conservation standards rulemaking to address the electrical energy used by these products for circulating air. Once these energy conservation standards are promulgated, the adopted test procedures would be used to determine compliance with the standards. DOE is also requesting written comments on issues presented in this test procedure rulemaking. DOE does not plan to hold a public meeting to discuss the modified proposals of this supplemental notice.

DATES: *Comments:* DOE will accept comments, data, and information regarding this supplemental notice of proposed rulemaking (SNOPR) no later than May 2, 2013. For details, see section V, ''Public Participation,'' of this SNOPR.

ADDRESSES: Any comments submitted must identify the SNOPR on Test Procedures for Residential Furnace Fans, and provide docket number EERE–2010–BT–TP–0010 and/or regulatory information number (RIN) number 1904–AC21. Comments may be submitted using any of the following methods:

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

2. *Email: FurnFans-2010-TP-0010@ee.doe.gov*. Include docket number EERE–2010–BT–TP–0010 and RIN 1904–AC21 in the subject line of the message.

3. *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.

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

No telefacsimilies (faxes) will be accepted. See section V, ''Public Participation,'' for detailed instructions on submitting comments and additional information on the rulemaking process.

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

A link to the docket Web page can be found at: *http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/42*. 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 public comments, in the docket. See section V, ''Public Participation,'' for information on how to submit comments through *www.regulations.gov*.

For further 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: The residential furnace fans rulemaking electronic mailbox, Email: *Residential_furnace_fans@ee.doe.gov*.

Mr. Ari Altman, U.S. Department of Energy, Office of the General Counsel, GC–71, 1000 Independence Avenue SW., Washington, DC 20585–0121. Telephone: (202) 287–6307. Email: *Ari.Altman@hq.doe.gov*.

For information on how to submit or review public comments, contact Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, EE–2J, 1000 Independence Avenue SW., Washington, DC 20585–0121. Telephone: (202) 586–2945. Email: *Brenda.Edwards@ee.doe.gov*.

SUPPLEMENTARY INFORMATION:

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I. Authority and Background

Title III, Part B [1] of the Energy Policy and Conservation Act of 1975 (EPCA or the Act), Public Law 94–163 (42 U.S.C. 6291–6309, as codified) sets forth a variety of provisions designed to improve energy efficiency and established the Energy Conservation Program for Consumer Products Other Than Automobiles, a program covering most major household appliances.[2] These covered appliances include products that use electricity for the purposes of circulating air through ductwork, hereinafter referred to as ''furnace fans,'' the subject of today's notice.[3] (42 U.S.C. 6295(f)(4)(D))

Under the Act, this energy conservation program consists essentially of four parts: (1) Testing; (2) labeling; (3) Federal energy conservation standards; and (4) certification and enforcement procedures. The testing requirements consist of test procedures that manufacturers of covered products must use as the basis for certifying to DOE that their products comply with the applicable energy conservation standards adopted pursuant to EPCA and for making representations about the efficiency of those products. (42 U.S.C. 6293(c); 42 U.S.C. 6295(s)) Any representation made after September 30, 2013 for energy consumption of residential furnace fans must be based upon results generated under this test procedure. Upon the compliance date(s) of any energy conservation standard(s) for residential furnace fans, use of the applicable provisions of this test procedure to demonstrate compliance with the energy conservation standard will also be required. Similarly, DOE must use these test procedures in any enforcement action to determine whether covered products comply with these energy conservation standards. (42 U.S.C. 6295(s))

General Test Procedure Rulemaking Process

Under 42 U.S.C. 6293, EPCA sets forth the criteria and procedures DOE must follow when prescribing or amending test procedures for covered products. Under EPCA, ''[a]ny test procedures prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency, energy use, or estimated annual operating cost of a covered product during a representative average use cycle or period of use * * * and shall not be unduly burdensome to conduct.'' (42 U.S.C. 6293(b)(3)) In addition, if DOE determines that a test procedure amendment is warranted, it must publish proposed test procedures and offer the public an opportunity to present oral and written comments on them. (42 U.S.C. 6293(b)(2)) 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 a 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))

Energy Conservation Standards and Test Procedures for Furnace Fans

Pursuant to EPCA under 42 U.S.C. 6295(f)(4)(D), DOE is currently conducting a rulemaking to consider new energy conservation standards for furnace fans. EPCA directs DOE to establish test procedures in conjunction with new energy conservation standards, including furnace fans. (42 U.S.C. 6295(o)(3)(A)) DOE does not currently have a test procedure for furnace fans. Hence, to fulfill the statutory requirements, DOE initiated a test procedure rulemaking for furnace fans simultaneously to the energy conservation standards rulemaking for furnace fans. DOE intends for the test procedure to include an energy consumption metric and the methods necessary to measure the energy performance of the covered products. The proposed energy consumption metric does not account for the electrical energy consumption in standby mode and off mode because consumption in those modes is already accounted for in the DOE rulemakings for furnaces and central air conditioners (CAC) and heat pumps. 77 FR 76831, December 31, 2012; 76 FR 65616 (Oct. 24, 2011). Manufacturers would be required to use the proposed energy consumption metric, sampling plans, and testing methods developed during this rulemaking to verify compliance with the new energy conservation standards when they take effect and for making representations about the energy consumption of furnace fans.

On June 3, 2010, DOE published a Notice of Public Meeting and Availability of the Framework Document (the June 2010 Framework Document) to initiate the energy conservation standard rulemaking for furnace fans. 75 FR 31323. In the June 2010 Framework Document, DOE requested feedback from interested parties on many issues related to test methods for evaluating the electrical energy consumption of furnace fans. DOE held the framework public meeting on June 18, 2010. DOE originally scheduled the framework comment period to close on July 6, 2010. However, due to the large number and broad scope of questions and issues raised regarding the June 2010 Framework Document in writing and during the public meeting, DOE published a notice in the **Federal Register** reopening the comment period from July 15, 2010, until July 27, 2010, to allow additional time for interested parties to submit comments. 75 FR 41102 (July 15, 2010).

On May 15, 2012, DOE published a notice of proposed rulemaking in the **Federal Register** to initiate the test procedure rulemaking for furnace fans. 77 FR 28674. In the NOPR, DOE proposed a rating metric, fan efficiency rating (FER) and proposed methods to measure the performance of covered products based on FER. DOE held a public meeting on the test procedure NOPR on June 15, 2012. The test procedure NOPR comment period closed on September 10, 2012.

In response to the NOPR, many interested parties commented that the proposed test procedure was unduly burdensome. The Air-Conditioning, Heating and Refrigeration Institute (AHRI), with support from Goodman Global, Inc. (''Goodman''), Ingersoll Rand, Lennox International, Inc. (''Lennox''), and Morrison Products, Inc. (''Morrison''), proposed an alternative

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

[2] All references to EPCA in this rulemaking refer to the statute as amended through the Energy Independence and Security Act of 2007, Public Law 110–140.

[3] DOE interprets its authority as encompassing more than just circulation fans used in residential furnaces. At the present time, however, DOE is only proposing a test procedure that would cover those fans that are used in weatherized and non-weatherized gas, oil, and electric furnaces, and modular blowers.

test method that it argues would result in accurate and repeatable FER values that are comparable to the FER values resulting from the test procedure proposed in the NOPR, but are obtained at a significantly reduced test burden. (AHRI, No. 16 at p. 3; Goodman, No. 17 at p. 4; Ingersoll Rand, No. 14 at p. 1; Morrison, No. 21 at p. 3.) A detailed discussion of AHRI's proposed alternative method and interested parties' comments regarding the burden of the test procedure proposed in the NOPR is provided in section III.B of this notice.

DOE agrees that the key concept embodied in the alternative method suggested by AHRI and manufacturers (using the AFUE test set up and temperature rise to determine airflow) may provide accurate and repeatable FER values at a significantly reduced burden to manufacturers. In this supplemental notice of proposed rulemaking (SNOPR), DOE proposes to adopt a modified version of the test method presented by AHRI as the furnace fan test procedure. DOE also explains the changes reflected in the test procedure proposed herein compared to the test procedure proposed in the NOPR. This notice also provides interested parties with an opportunity to comment on the revised proposed test method.

In this SNOPR, DOE addresses only the changes to the test procedure it proposed in the NOPR and those comments received on the NOPR that are relevant to the proposed changes. All other comments received on the test procedure NOPR will be addressed in the test procedure final rule.

II. Summary of the Supplemental Notice of Proposed Rulemaking

Pursuant to EPCA, DOE is required to establish these test procedures in order to allow for the development of energy conservation standards to address the electrical consumption of the products covered under this rulemaking. (42 U.S.C. 6295(o)(3)(A)) The proposed test procedure would be applicable to electrically-powered devices used in central HVAC systems for the purposes of circulating air through ductwork (*referred to collectively as* furnace fans in this rulemaking). Furnace fans covered in the scope of the proposed test procedure include circulation fans used in weatherized and non-weatherized gas furnaces, oil furnaces, electric furnaces, and modular blowers. DOE's proposed definition of modular blowers is provided in section III.C. The proposed test procedure would not be applicable to any non-ducted products, such as whole-house ventilation systems without ductwork, central air-conditioning (CAC) condensing unit fans, room fans, and furnace draft inducer fans.

DOE proposes to adopt a modified version of the alternative test method recommended by AHRI and other furnace fan manufacturers to rate the electrical consumption of furnace fans. The AHRI-proposed method provides a framework for accurate and repeatable determinations of FER that is comparable to the test method previously proposed by DOE, but at a significantly reduced test burden. In general, the AHRI proposal reduces the test burden because it: (1) Does not require airflow to be measured directly; (2) avoids the need to make multiple determinations in each airflow-control setting because outlet restrictions to achieve the specified reference system external static pressure (ESP) would be set in the maximum airflow-control setting and maintained for measurements in subsequent airflow-control settings; and (3) can be conducted using the test set up currently required to rate furnace AFUE for compliance with furnace standards.

DOE proposes to align the proposed furnace fan test procedure with the DOE test procedure for furnaces by incorporating by reference specific provisions from an industry standard incorporated by reference in its test procedure for furnaces. DOE's test procedure for furnaces is codified in appendix N of subpart B of part 430 of the code of federal regulations (CFR). The DOE furnace test procedure incorporates by reference American National Standards Institute (ANSI)/ American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) 103–1993, *Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers* (ASHRAE 103). DOE proposes to incorporate by reference the definitions, test setup and equipment, and procedures for measuring steady state combustion efficiency provisions of the 2007 version of ASHRAE 103. In addition to these provisions, DOE proposes additional provisions for apparatuses and procedures for measuring throughput temperature, external static pressure, and furnace fan electrical input power. DOE also proposes calculations to derive FER based on the results of testing for each basic model.

DOE proposes to use the same definition for the fan efficiency rating (FER) metric as proposed in the NOPR, but to modify the title and calculation. In the NOPR, DOE proposed to define FER as the estimated annual electrical energy consumption of the furnace fan normalized by: (a) The estimated total number of annual fan operating hours (1,870); and (b) the airflow in the maximum airflow-control setting. DOE is aware that referring to the FER rating metric as the ''fan efficiency rating,'' as was done in the NOPR, is a misnomer because it is not a function of the output energy of the furnace fan, which is typical of an efficiency metric. FER is a function of fan energy consumption and as a result, DOE believes it is more appropriately categorized as an energy consumption metric. Thus DOE proposes to refer to FER as the ''fan energy rating.'' The estimated annual electrical energy consumption, as proposed, is a weighted average of the furnace fan electrical input power (in Watts) measured separately for multiple airflow-control settings at different external static pressures (ESPs). These ESPs are determined by a reference system that represents national average ductwork system characteristics. Table II.1 includes the proposed reference system ESP values by installation type. The reference system ESP values proposed in the NOPR included a value for ''heating-only'' installation types. Interested parties recommended that DOE eliminate this installation type because they are unaware of products that could be categorized as such. DOE agrees with interested parties and proposes to eliminate the heating-only designation for this SNOPR. Section III.F provides a detailed discussion of this issue.

TABLE II.1—PROPOSED REFERENCE SYSTEM ESP VALUES BY FURNACE FAN INSTALLATION TYPE

Installation type	Weighted average ESP (in. w.c.)
Units with an internal evaporator coil	0.50
Units designed to be paired with an evaporator coil	0.65
Units installed in a Manufactured homes [4]	0.30

The proposed rated airflow-control settings correspond to operation in cooling mode (which DOE finds is predominantly associated with the maximum airflow-control setting), heating mode, and constant-circulation mode. Table II.2 illustrates the airflow-

[4] Manufactured home external static pressure is much smaller because there is no return air ductwork in manufactured homes. Also, the United States Department of Housing and Urban Development (HUD) requirements for manufactured homes stipulate that the ductwork for cooling should be set at 0.3 in. w.c.

control settings that would be rated for various product types. The NOPR included proposed rated airflow control settings for heating-only installations. As discussed above, DOE proposes to eliminate the heating-only designation for the reasons outlined in section III.F.

TABLE II.2—PROPOSED RATED AIRFLOW-CONTROL SETTINGS BY PRODUCT TYPE

Product type	Rated airflow-control setting 1	Rated airflow-control setting 2	Rated airflow-control setting 3
Single-stage Heating	Default constant-circulation	Default heat	Absolute maximum.
Multi-stage or Modulating Heating	Default constant-circulation	Default low heat	Absolute maximum.

As shown in Table II.2., for products with single-stage heating, the three proposed rating airflow-control settings are the default constant-circulation setting, the default heating setting, and the absolute maximum setting. For products with multi-stage heating or modulating heating, the proposed rating airflow-control settings are the default constant-circulation setting, the default low heating setting, and the absolute maximum setting. The absolute lowest default airflow-control setting is used to represent constant circulation if a default constant-circulation setting is not specified. DOE's proposes to define ''default airflow-control settings'' as the airflow-control settings specified for installed use by the manufacturer in the product literature shipped with the product in which the furnace fan is integrated. Manufacturers typically provide detailed instructions for setting the default heating airflow control-setting to ensure that the product in which the furnace fan is integrated operates safely. Manufacturer installation guides also provide detailed instructions regarding compatible thermostats and how to wire them to achieve the specified default settings.

DOE proposes to weight the Watt measurements using designated annual operating hours for each function (*i.e.,* cooling, heating, and constant circulation) that are intended to represent national average operation. Table II.3 shows the proposed estimated national average operating hours for each function to be used to calculate FER, which are the same as those proposed in the NOPR.

TABLE II.3—ESTIMATED NATIONAL AVERAGE OPERATING HOUR VALUES FOR CALCULATING FER

Operating mode	Variable	Single-stage (hours)	Multi-stage or modulating (hours)
Heating	HH	830	830/HCR
Cooling	CH	640	640
Constant Circulation	CCH	400	400

The specified operating hours for the heating mode for multi-stage heating or modulating heating products are divided by the heat capacity ratio (HCR) to account for variation in time spent in this mode associated with turndown of heating output. The HCR is the ratio of the reduced heat output capacity to maximum heat output capacity. In the NOPR, DOE proposed to incorporate HCR to adjust the heating operating hours in both the numerator (*i.e.* estimated annual energy consumption) and denominator (*i.e.* normalization factor of total operating hours times airflow in the maximum airflow-control setting). 77 FR at 28701 (May 15, 2012). In this SNOPR, DOE proposes to incorporate HCR in the numerator, and eliminate it from the denominator in the revised proposed FER equation. DOE finds that this modification results in FER values that more accurately reflect the relative efficiency of multi-stage and modulating units compared to single-stage units. The revised proposed FER equation is:

$$FER = \frac{(CH \times E_{Max}) + (HH \times E_{Heat}) + (CCH \times E_{Circ})}{(CH + 830 + CCH) \times Q_{Max}} \times 1000$$

III. SNOPR Discussion

A. Scope of Coverage

EPCA grants DOE authority to ''consider and prescribe energy conservation standards or energy use standards for electricity used for purposes of circulating air through ductwork.'' (42 U.S.C. 6295(f)(4)(D)) In the June 2010 Framework Document, DOE tentatively interpreted this EPCA language to allow DOE to cover any electrically-powered device used in a central HVAC system for the purpose of circulating air through ductwork. DOE sought comment on including the air circulation fans used in gas furnaces, oil furnaces, electric furnaces, CAC air handlers, and modular blowers in the scope of coverage. DOE also sought comment on excluding draft inducer fans, exhaust fans, heat recovery ventilators (HRV), and energy recovery ventilators (ERV) from the scope of coverage. DOE also requested comment on whether other products, such as small-duct, high-velocity (SDHV) and through-the-wall systems should be included in the scope of coverage of this rulemaking.

In the test procedure NOPR, DOE proposed a scope of applicability for the test procedure that was sufficiently broad to cover the products under consideration for the scope of coverage for the energy conservation standards. The NOPR test procedure's proposed scope of applicability included single-phase, electrically-powered devices that circulate air through ductwork in HVAC systems with heating input capacities less than 225,000 Btu per hour, cooling capacities less than 65,000 Btu per hour, and airflow capacities less than 3,000 cfm. These heating and cooling capacity limits are identical to those in the DOE definitions for residential ''furnace'' and ''central air conditioner'' (10 CFR

430.2), and the airflow typically required to provide these levels of heating and cooling. DOE proposed to exclude from the scope of applicability of the test procedure any non-ducted products such as whole-house ventilation systems without ductwork, CAC condensing unit fans, room fans, and furnace draft inducer fans because these products do not circulate air through ductwork.

In their comments on the test procedure NOPR, many interested parties commented that the scope of coverage should be limited to circulation fans used in residential furnaces. AHRI stated its view that DOE had misinterpreted the relevant provision of EPCA. According to AHRI, the heading of 42 U.S.C. 6295(f) entitled, ''standards for furnaces and boilers'' and subsections 1 through 4 under that section apply only to residential furnaces and boilers, as defined by EPCA. 10 CFR 430.2 AHRI suggested that this clear, consistent format strongly indicates that the scope of this requirement includes only the motor and blower combinations provided in residential warm air furnaces. AHRI added that there is nothing within section 42 U.S.C. 6295(f) that suggests that the provisions of that section apply to any other products that may be used to heat a residence. AHRI contended that if the intent of this change had been to include circulation fans used in residential air conditioners and heat pumps, then Congress would have added a corresponding paragraph to 42 U S C. 6295(d)—the section covering central air conditioners and heat pumps. (AHRI, No. 16 at pp. 1–2.) First Company (''First Co.''), Morrison, and Lennox echoed AHRI's arguments. (First Co., No. 9 at p. 1; Morrison, Public Meeting Transcript, No. 23 at p. 26; Lennox, No. 12 at p. 2.)

First Co. added that, although subsection (f)(4)(D) refers in more general terms to ''standards for electricity used for purposes of circulating air through ductwork,'' it is a well-established rule of statutory construction that, ''[w]here general words follow specific words in a statutory enumeration, the general words are construed to embrace only objects similar in nature to those objects enumerated by the preceding specific words.'' *Circuit City Stores, Inc.* v. *Adams,* 532 U.S. 105, 114–15, 121 S.Ct. 1302, 1308–09 (2001) (applying the statutory canon of ejusdem generis); *Air Conditioning and Refrigeration Inst.* v. *Energy Res. Conservation and Dev. Comm'n,* 410 F.3d 492,501 (9th Cir. 2005) (applying same statutory canon to interpretation of EPCA). According to First Co., the general language of subsection (f)(4)(D) is preceded in subsections (A), (B), and (C) by specific and repeated references to standards for furnaces. First Co. argues that applying the rules of statutory construction, the provisions of subsection (f)(4)(D) must be interpreted to apply to furnaces, and not to a broader category of products. (First Co., No. 10 at p. 1) DOE disagrees with this reading of the cases cited above, as the Supreme Court was in fact considering a ''residual phrase'' within the same sentence, finding it to be controlled by the specificity of the words that preceded it. With regard to the case of separate statutory provisions, the Supreme Court's opinion is silent. DOE provides a general response to the issue of authority under 42 U.S.C. 6295(f)(4)(D) later in this section.

AHRI, First Co., Ingersoll Rand, Morrison, Mortex Products, Inc., Goodman, and Lennox commented that CAC and heat pump products like split-system packaged central air conditioners and heat pump air handlers should be excluded because the electrical consumption of their circulation fans is already addressed in the seasonal energy efficiency ratio (SEER) and heating seasonal performance factor (HSPF) descriptors. (AHRI, Public Meeting Transcript, No. 23 at p. 74; First Co., No. 10 at p. 2; Ingersoll Rand, Public Meeting Transcript, No. 23 at p. 98; Morrison, No. 21 at p. 2; Mortex, No. 18 at p. 1; Goodman, No. 17 at p. 1; Lennox, No. 12 at p. 2). First Co. points out that in the NOPR, DOE proposed not to adopt additional test procedure provisions for standby and off mode electrical energy consumption of furnace fans used in furnaces and CAC and heat pumps given that consumption in these modes either has been or is in the process of being fully addressed in other rulemakings. Applying the same principle, First Co. states that there is no need for DOE to adopt additional test procedures for furnace fans in central air conditioners in this rulemaking because their energy usage is addressed by the SEER descriptor under the standard.

First Co. also commented that EPCA allows for the development of more than one standard for products that serve more than one major function, but limits DOE's authority to setting one standard for each major function. 42 U.S.C. 6295(o)(5) According to First Co., to the extent that DOE has the authority to regulate the energy efficiency of ''furnace fans,'' it does not have authority to require manufacturers of central air conditioners to meet a separate standard for a component of the system already tested and rated under the SEER standard. (First Co., No. 10 at p.2.) Ingersoll Rand echoed First Co.'s sentiments, stating that further testing of air handlers would be redundant and add regulatory burden with no benefit because all air handlers are currently tested as part of a CAC or HP system with the fan power included in the SEER, EER, and HSPF descriptors. Ingersoll Rand added that consumer confusion is a likely unintended consequence. (Ingersoll Rand, No. 14 at p. 2.) Goodman submitted that cooling hours and energy consumption should be removed from the metric for all covered products to eliminate duplicate regulations. (Goodman, No. 17 at p. 4.)

AHRI, Ingersoll Rand, and Morrison commented that modular blowers and hydronic air handlers should not be covered in this test procedure because they are beyond the authority provided by EPCA and are not currently regulated product classes. (AHRI, No. 16 at p. 2; Ingersoll Rand, No. 14 at p. 2; Morrison, Public Meeting Transcript, No. 23 at p. 88.)

Several interested parties commented that the test procedure should address operation of furnace fans as installed in the products in which they are sold rather than separately. DOE acknowledges that its NOPR may not have been clear in indicating that the test procedure proposal would apply to operation of fans while installed in these products. Consequently, some interested parties recommend that DOE consider the air handler (*i.e.* the entire HVAC product) and not just the furnace fan by testing furnace fans in-situ. The American Council for an Energy-Efficient Economy (ACEEE) commented that limiting the scope of the rule to a narrow box around the sheet metal, fan motor, impeller and shroud is inappropriate because a large fraction of the electricity consumption of these devices has to do with the aerodynamics of the air handler cabinet, as shown in previous DOE work conducted by Ian Walker of Lawrence Berkley National Lab (LBNL). (ACEEE, Public Meeting Transcript, No. 23 at p. 16.) Adjuvant Consulting (''Adjuvant''), the Northwest Power and Conservation Council (NPCC), and the Northwest Energy Efficiency Alliance (NEEA) agree with ACEEE that air handlers should be the covered product in this rulemaking. (Adjuvant, Public Meeting Transcript, No. 23 at pp. 29, 30; NPCC/NEEA, No. 22 at p. 3.) As mentioned above, the test procedure proposed in the NOPR and the test procedure proposed herein would apply to the energy use for air circulation of the furnace fan as factory-

installed in the HVAC product, rather than stand-alone performance.

During the comment period of the test procedure NOPR, DOE published a Notice of Public Meeting and Availability of Preliminary Analysis Support Document for the furnace fans energy conservation standard rulemaking on July 10, 2012. 77 FR 40530. For the preliminary analysis, DOE decided that, although the title of the statutory section refers to ''furnaces and boilers,'' the provision governing the products at issue in this rulemaking was written using notably broader language than the other provisions within the same section, referring to ''electricity used for purposes of circulating air through ductwork.'' [5] (42 U.S.C. 6295(f)) Consequently, DOE maintained its interpretation that its authority is not limited to circulation fans used in furnaces. DOE explained that it proposed to address in the current energy conservation standard rulemaking those products for which DOE has sufficient data and information to develop credible analyses, and that it may consider covering air circulation fans used in other HVAC products in a future rulemaking as data become available. DOE's preliminary analysis addressed furnace fans used in weatherized and non-weatherized gas furnaces, oil furnaces, electric furnaces, modular blowers, and hydronic air handlers. Many comments on DOE's preliminary analysis that address scope of coverage are discussed in this section because they provide additional commentary regarding the scope of applicability of the test procedure. The comments referenced below are available in docket number EERE–2010–BT–STD–0010 per the instructions provided in the **ADDRESSES** section of this SNOPR.

Efficiency advocates expressed concern at the exclusion of furnace fans used in split-system CAC and heat pump products and requested that they be added to the scope. (Appliance Standards Awareness Project (ASAP), Preliminary Analysis, No. 43 at p. 17; Adjuvant, Preliminary Analysis, No. 43 at p. 39.) Specifically, efficiency advocates commented that although the fan energy use is incorporated as part of the efficiency metrics—SEER and HSPF—prescribed by DOE for these products (10 CFR part 430, subpart B, appendix M), the external static pressures (ESPs) used to determine the SEER and HSPF do not reflect as-installed conditions, in which ESP is generally significantly higher. (ASAP, Preliminary Analysis, No. 43 at p. 38; Earthjustice, Preliminary Analysis, No. 49 at p. 1.) In a joint comment from ACEEE, ASAP, the National Consumer Law Center (NCLC), NEEA, and the Natural Resources Defense Council (NRDC), hereinafter referred to as ACEEE, *et al.,* in addition to a comment from the California investor-owned utilities (CA IOU), efficiency advocates stated that the reference ESP of 0.1 to 0.2 in. w.c. was too low when compared to the average field ESP of 0.73 in. w.c. as identified in the TSD. (ACEEE, *et al.,* Preliminary Analysis, No. 55 at p. 1; CA IOU, Preliminary Analysis, No. 56 at p. 2.) ACEEE, *et al.* also noted that SEER and HSPF do not account for continuous circulation operation, which is expected to increase as stricter building codes call for tighter building envelopes. (ACEEE, *et al.,* Preliminary Analysis, No. 55 at p. 2; CA IOU, Preliminary Analysis, No. 56 at p. 3.) By excluding these products from the analysis, ACEEE, *et al.* believes that DOE is ignoring a significant fraction of the furnace fan market. (ACEEE, *et al.,* Preliminary Analysis, No. 55 at p. 1.)

Manufacturers' comments in response to the preliminary analysis regarding the scope of coverage were similar to their comments on the test procedure NOPR. In contrast to efficiency advocates and utilities, many manufacturers believe that the scope of coverage presented in the preliminary analysis exceeds the authority granted to DOE by EPCA and should not include any non-furnace products such as central air conditioners, heat pumps, or condensing unit-blower-coil combinations. (First Co., Preliminary Analysis, No. 53 at p. 1.)

DOE notes that, although the title of this statutory section refers to ''furnaces and boilers,'' the applicable provision at 42 U.S.C. 6295(f)(4)(D) was written using broader language than the other provisions within 42 U.S.C. 6295(f). Specifically, that statutory provision directs DOE to ''consider and prescribe energy conservation standards or energy use standards for electricity used for purposes of circulating air through ductwork.'' Such language could be interpreted as encompassing electrically-powered devices used in any residential HVAC product to circulate air through ductwork, not just furnaces, and DOE has received numerous comments on both sides of this issue. At the present time, however, DOE is only proposing test procedures for those circulation fans that are used in residential furnaces and modular blowers. As a result, DOE is not addressing public comments that pertain to fans in other types of HVAC products. The following list describes the furnace fans which DOE proposes to address as well as those not addressed in this rulemaking.

- *Products addressed in this rulemaking:* furnace fans used in weatherized and non-weatherized gas furnaces, oil furnaces, electric furnaces, and modular blowers.
- *Products not addressed in this rulemaking:* furnace fans used in other products, such as split-system CAC and heat pump air handlers, through-the-wall air handlers, SDHV air handlers, ERVs, HRVs, draft inducer fans, exhaust fans, or hydronic air handlers.

DOE is using the term ''modular blower'' to refer to HVAC products powered by single-phase electricity that comprise an encased circulation blower that is intended to be the principal air circulation source for the living space of a residence. A modular blower is not contained within the same cabinet as a residential furnace, CAC, or heat pump. Instead, modular blowers are designed to be paired with separate residential HVAC products that provide heating and cooling, typically a separate CAC/HP coil-only unit. DOE finds that modular blowers and electric furnaces are very similar in design. In many cases, the only difference between a modular blower and electric furnace is the presence of an electric resistance heating kit. DOE is aware that some modular blower manufacturers offer electric resistance heating kits to be installed in their modular blower models so that the modular blowers can be converted to stand-alone electric furnaces. In addition, FER values for modular blowers can be easily calculated using the proposed test procedure. DOE proposes to address the furnace fans used in modular blowers in this rulemaking for these reasons. The proposed definition for ''modular blower'' is provided in section III.C.

This proposed furnace fan test procedure would adopt a significant number of provisions from the DOE furnace test procedure and would not result in significant capital expenditures for manufacturers because they would not have to acquire or use any test equipment beyond the equipment that they already use to conduct the test method specified in the DOE furnace test procedure (i.e. the AFUE test setup). DOE also finds that the time to conduct a single furnace fan test according to its proposed furnace fan test procedure would be less than 3 hours and cost less than one percent of the manufacturer selling price of the product in which the

[5] Please refer to Chapter 2 of the furnace fans preliminary analysis technical support document (TSD). The furnace fans preliminary analysis TSD is available on the DOE Web site: *http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/42.*

furnace fan is integrated. Section IV.B of this notice includes a more detailed discussion of manufacturer test burden. Consequently, DOE does not find that testing furnace fans according to this proposed test procedure would be unduly burdensome.

After considering available information and public comments regarding the test procedure being applicable to fan operation in cooling mode, DOE maintains its proposal to account for the electrical consumption of furnace fans while performing all active mode functions (*i.e.,* heating, cooling, and constant circulation). DOE recognizes that furnace fans are used not just for circulating air through ductwork during heating operation, but also for circulating air during cooling and constant-circulation operation. DOE anticipates that higher airflow-control settings are factory set for cooling operation. Therefore, DOE expects that the electrical energy consumption of a furnace fan is generally higher while performing the cooling function. Additionally, the design of the fan as well as its typical operating characteristics (*i.e.,* ESP levels during operation in different modes) is directly related to the performance requirements in cooling mode. DOE is also concerned that excluding some functions from consideration in rating furnace fan performance would incentivize manufacturers to design fans that are optimized to perform efficiently at the selected rating airflow-control settings but that are not efficient over the broad range of field operating conditions. In DOE's view, in order to obtain a complete assessment of overall performance and a metric that reflects the product's electrical energy consumption during a representative average use cycle, the test procedure must account for electrical consumption in a set of airflow-control settings that spans all active mode functions. This would ensure a more accurate accounting of the benefits of improved furnace fans.

DOE is aware that electrical consumption of the fan is accounted for in the SEER and HSPF metrics that DOE uses for CAC and heat pump products. However, DOE does not agree with First Co.'s interpretation that the EPCA language limits DOE's authority to setting one standard for each major product function and precludes DOE from rating furnace fan consumption in operating modes that are accounted for by these metrics. (42 U.S.C. 6295(o)(5)) EPCA's language in section 6295(o)(5) is phrased in the permissive, rather than the restrictive.[6] In DOE's view, this permissive language does not impose a limitation on DOE's authority to regulate fan electrical consumption for these products across all operating modes. Furthermore, it is inapposite in this situation, where two different products are being regulated, one the CAC or heat pump product, and one the separate furnace fan product, which may or may not be incorporated into a CAC or heat pump. SEER and HSPF are used to test cooling and heating performance of a CAC or heat pump product, whereas FER rates airflow performance of a furnace fan product. While furnace fan airflow performance contributes to cooling and heating performance, manufacturers can improve SEER and HSPF without improving fan performance. In short, SEER- and HSPF-based standards do not directly target the efficiency of furnace fans. DOE recognizes that the energy savings in cooling mode from higher-efficiency furnace fans used in some higher efficiency CAC and heat pumps is already accounted for in the analysis of standards on those products as a result. DOE conducted its preliminary analysis to avoid double-counting these benefits by excluding furnace fan electricity savings that were already included in DOE's analysis for CAC and heat pump products. Section 2.7 of chapter 2 and chapter 8 of the preliminary analysis TSD provide a discussion of this issue.

B. AHRI Test Method

In the NOPR in response to comments on the June 2010 Framework Document, DOE proposed to incorporate by reference ANSI/AMCA 210–07, citing comments that manufacturers currently use ANSI/AMCA 210–07 to measure furnace fan performance. The NOPR provides a more detailed discussion of DOE's consideration of ANSI/AMCA 210–07 and alternative reference standards. 77 FR at 28677 (May 15, 2012). Commenting on the NOPR, manufacturers recommended that DOE incorporate provisions from ASHRAE 37 instead of ANSI/AMCA 210–07. Ingersoll Rand commented that fan performance data from a DOE test procedure that references ANSI/AMCA 210–07 would not be consistent with existing data, which is generated using ASHRAE 37. (Ingersoll Rand, Public Meeting Transcript, No. 23 at p. 30) Lennox asserted that if DOE uses a test procedure that specifies an airflow calculation, then ANSI/AMCA 210 is not the appropriate standard. According to Lennox, ASHRAE 37 would be more appropriate if DOE specifies airflow calculations. (Lennox, No. 12 at p. 4.) Goodman stated that its airflow measurements for furnaces are currently performed using ASHRAE 37 setups and calculations. Further, Goodman pointed out that DOE test procedures to measure airflow and power input for central air conditioners and heat pumps as defined in Appendix M to Subpart B of 10 CFR part 430 require that furnace fan performance be measured per ASHRAE 37 for use in determining ratings for SEER and HSPF. Therefore, according to Goodman, DOE's proposal to use ANSI/AMCA 210–07 would require manufacturers to test the same product with two different test methods to rate furnace fans. Goodman believes that such an outcome is contrary to Congressional intent and the consumers' best interests. (Goodman, No. 17 at p. 4.) Morrison added that ANSI/AMCA 210–07 is designed to test stand-alone fans, while ASHRAE 37 is more appropriate for testing fans as part of appliances. (Morrison, Public Meeting Transcript, No. 23 at p. 38.) Interested parties commented that *in-situ* testing (*i.e.* installed in the HVAC product) is more appropriate than testing the furnace fan removed from the product in which it is integrated. In a joint comment, ASAP, ACEEE, NRDC, and NCLC, hereinafter referred to as the ''Joint Commenters,'' supported DOE's decision to test the furnace fan as factory-installed in an HVAC product, which would more accurately account for as-deployed energy consumption. (Joint Commenters, No. 13 at p. 2.) ACEEE explained that the impacts of the aerodynamics of the HVAC product cabinet on fan performance cannot be measured by testing the fan removed from the cabinet. Unico, Inc. (''Unico'') and Ingersoll Rand echoed these sentiments, stating that the furnace fan should be tested as part of the appliance because the appliance components dictate fan performance. (Unico, Public Meeting Transcript, No. 23 at p. 94; Ingersoll Rand, Public Meeting Transcript, No. 23 at p. 97.) Adjuvant stated that testing air handlers is more difficult than DOE's proposal depicts because of the necessity to specify appurtenances and other issues like cabinet leakage. (Adjuvant, Public Meeting Transcript, No. 23 at pp. 29, 30, 47.)

DOE agrees with interested parties that furnace fans should be tested in a laboratory and as factory-installed in the HVAC product with which it is

[6] Section 6295(o)(5) provides as follows: ''The Secretary may set more than 1 energy conservation standard for products that serve more than 1 major function by setting 1 energy conservation standard for each major function.''

integrated (*i.e., in-situ*) to account for the impacts of airflow path design on furnace fan performance. In the NOPR, DOE included language in the proposed regulatory text that specified that furnace fans be tested in-situ. 77 FR at 28699 (May 15, 2012). DOE recognizes that the preamble language of the NOPR may not have been clear in this regard. In this notice, DOE proposes to specify that furnace fans be tested in-situ.

In written comments, AHRI (with support from Goodman, Ingersoll Rand, Lennox, and Morrison) proposed an alternative test method that they argue would result in accurate and repeatable FER values that are comparable to the FER values resulting from the test procedure proposed in the NOPR, but at significantly reduced test burden. (AHRI, No. 16 at p. 3; Goodman, No. 17 at p. 4; Ingersoll Rand, No. 14 at p. 1; Morrison, No. 21 at p. 3.) AHRI recommends that DOE specify the following procedures to generate the measurements used to rate furnace fan performance (AHRI, No. 16 at p. 3):

- The furnace should be set up on the test stand that is used to measure AFUE.
- Initially, the furnace should be operated in the maximum airflow-control setting having adjusted the duct restrictions to achieve the external static pressure (ESP) proposed in the NOPR while in the heating mode (*i.e.,* firing the burner). Fuel input, temperature rise and power should be measured.
- Subsequently, power should be measured while operating the furnace in the heating airflow-control setting and again while operating the furnace in the constant circulation airflow-control setting, both without changing the initial duct restrictions in any way and without firing the furnace.
- The maximum airflow used to normalize the FER metric should be calculated (instead of measured directly) based on the measured temperature rise, measured fuel input, AFUE, and the known heat capacity of air.
- Measurements should be taken at nominal voltage and no voltage adjustments should be allowed.
- FER should be calculated using the annual operating hours that DOE proposed in the NOPR.

AHRI estimates an approximate 80–90% reduction in testing burden through the adoption of its proposed test method. AHRI stated that this reduction is due, in part, to manufacturers not having to acquire or use any test equipment beyond the equipment that is already used to conduct the testing specified in the DOE furnace test procedure (*i.e.,* the AFUE test setup). (AHRI, No. 16 at p. 3.) Most of the products to which this procedure applies are furnaces subject to the DOE furnace test procedure. Rheem Manufacturing Company (''Rheem''), Morrison, and Lennox also identified using the same test stand for FER and AFUE testing as an opportunity to minimize burden on manufacturers. (Rheem, No. 25 at p. 4; Morrison, No. 21 at p. 7; Lennox, No. 12 at p. 4.) Lennox stated that by requiring an additional setup and test process far outside the AFUE testing requirements, the burden on the engineering and documentation side of the proposed procedure is significant. (Lennox, No. 12 at p. 4.) Mortex, a small manufacturer, requested that furnace fan testing have a minimum burden on industry and be within the economic capabilities of the small manufacturers that would be impacted. Mortex explained that small manufacturers are low production volume, high product mix manufacturers and only build products when they are ordered. (Mortex, No. 18 at p. 2.) Goodman echoed Mortex's sentiments, stating that the cost to initiate and perform tests using the certified test facility required by ANSI/AMCA 210 as proposed in the NOPR is disproportionally burdensome to small manufacturers that produce 100 to 200 made-to-order units each needing individual certification. (Mortex, Public Meeting Transcript, No. 23 at p. 21, 232; Goodman, No. 17 at p. 2.) According to Mortex, capturing the airflow and electrical input power at a few additional airflow-control settings as part of testing for AFUE and $E_{ae,}$ as suggested by AHRI, would be relatively inexpensive. Mortex added that this simplified method should not require any capital outlay as compared to DOE's proposed method, which is estimated to require $150,000 for a code tester setup. (Mortex, No. 18 at p. 2.) Mortex stated during the public meeting that using the AFUE set up and calculating airflow based on temperature rise to rate furnace fans would be feasible for small manufacturers. Mortex added the caveat that such a method would only be feasible if paired with a reasonable confidence level (*i.e.,* the statistical confidence limit expressed as a percentage that must be achieved for the results of the group of samples tested according to the proposed sampling plan). (Mortex, Public Meeting Transcript, Public Meeting Transcript, No. 23 at p. 234.) A detailed discussion of the proposed sampling plan, including the proposed confidence limit, is provided in section III.D.

AHRI attributed some of the projected reduction in burden of its recommended test method to the labor savings that manufacturers would experience with respect to conducting tests and calculations. (AHRI, No. 16 at p. 3.) Allied Air Enterprises (''Allied Air'') commented that the time and cost of conducting the proposed test procedure would be unduly burdensome. (Allied Air, No 23 at p. 20.) Rheem and Lennox commented that measuring airflow is difficult, labor- and capital-intensive, and not necessary to rate furnace fan electrical energy use. (Rheem, No. 25 at p. 3; Lennox, No. 12 at p. 4.) As mentioned previously, Mortex suggested that airflow could be calculated by using the temperature rise methodology already employed for the DOE furnace test procedure prior to AHRI submitting its recommended alternative test method. (Mortex, Public Meeting Transcript, No. 23 at p. 234.) Goodman performed tests according to both DOE's proposed procedure and AHRI's suggested method and found that testing time is reduced by almost 60% using AHRI's method. (Goodman, No. 17 at p. 3.) Rheem also conducted tests according to both procedures and stated that the time to test a single-stage furnace was reduced from 4 hours to 45 minutes by using the AHRI method. (Rheem, No. 25 at p. 4.)

AHRI claimed that its suggested method would eliminate potential issues associated with fitting quadratic curves to the test data to derive FER as proposed in the NOPR. According to AHRI and Morrison, the quadratic curves can be easily manipulated. (AHRI, No. 16 at p. 3; Morrison, No. 21 at p. 5.) Furthermore, AHRI stated that the quadratic curves can be significantly skewed through a single incorrect measurement. (AHRI, No. 16 at p. 3.) Morrison agrees that DOE should abandon the system curve approach in favor of AHRI's proposed method because eliminating the need to curve fit and find the intersection of second order polynomials would reduce the burden on manufacturers. Morrison stated that the added burden of the NOPR method does not provide any added value to the purpose of saving energy, guiding consumers in making correct choices, or enhancing the regulatory process. (Morrison, No. 21 at p. 5.) NEEA explained that the need for quadratic curve-fitting could be eliminated by establishing the specified external static pressure values in a specific mode, and then running the remaining tests in other modes without modifying the physical test apparatus set-up. NEEA and NPPC suggested that DOE consider this simplified approach. According to NEEA and NPPC, the

result would be testing an air handler against a fixed intake and discharge configuration, accepting whatever static pressure the system generates when testing in modes other than the initial mode. NEEA and NPCC contended that this is how duct systems work in the field—they are in a fixed physical configuration and the air handler deals with the external static pressure created and imposed, regardless of what mode it is in. (NEEA/NPCC, No. 22 at pp. 2–3.)

Goodman commented that test results show that FER values generated using AHRI's test method are within 5% of the FER values generated using the test procedure proposed in the NOPR. (Goodman, No. 17 at p. 4.) Rheem's test results show similar results. (Rheem, No. 25 at p. 4.)

Efficiency advocates agreed that some hybrid of reference standards could be used to develop a test procedure that is less burdensome than wholly adopting ANSI/AMCA 210. However, the Joint Commenters stated that simply implementing ASHRAE 37 is an incomplete solution because this method lacks an electrical energy consumption measurement. (Joint Commenters, No. 13 at p. 3.) The CA IOU advised DOE to develop a hybrid test procedure that draws from AMCA 210, ASHRAE 37, and AHRI 210–240 but emphasized that portions of AMCA 210 are needed for measuring fan power at different airflow rates. (CA IOU, No. 20 at p. 1.) While unclear from CA IOU's comments, DOE infers that the CA IOU are referring to provisions for measuring fan performance in multiple airflow-control settings.

In today's notice, DOE proposes to adopt a modified version of the alternative test method proposed by AHRI. DOE agrees that the key concept embodied in the alternative method suggested by AHRI and manufacturers (using temperature rise to determine airflow) can be a viable approach to obtain accurate and repeatable FER values at significantly reduced burden. The methods suggested by AHRI are already used in existing industry and DOE test methods. ASHRAE 37 includes determining airflow based on temperature rise as an alternative method to using differential pressure across nozzles. In addition, the DOE test procedure for furnaces includes well established and accurate methods for measurement of temperature rise, fuel input, and steady state combustion efficiency based on flue gas temperature and carbon dioxide concentrations. Additionally, DOE recognizes the opportunity to reduce test burden by: (1) Aligning the furnace fan test set up and procedures with those of the existing DOE furnace test procedure; and (2) maintaining the same duct restrictions throughout the test after initial reference system conditions are met in lieu of the previously proposed methods of making multiple determinations in each airflow-control setting and curve-fitting to identify operating points. DOE also agrees with advocates and utilities that the proposed test procedure should reflect field ESP conditions and measure furnace fan electrical input power in multiple airflow-control settings. The AHRI method includes provisions that meet these goals. DOE has considered the AHRI approach and has concluded that some clarifications and modifications are necessary to make the approach more practicable and accurate. For these reasons, DOE proposes to adopt a modified version of the alternative furnace fan test procedure proposed by AHRI.

DOE proposes the following additions and modifications to the test method recommended by AHRI:

- Airflow in the maximum airflow-control setting would be calculated based on measured air temperature rise when the HVAC product is in a heating-mode airflow-control setting rather than in the maximum airflow-control setting.
- In the airflow calculation presented by AHRI, AFUE would be replaced by a function of steady state efficiency ($Effy_{SS}$), measured fuel energy input rate (Q_{IN}), jacket losses (L_J), and fan electrical input power (E_{Heat}) measured according to ASHRAE 103–2007 at the specified operating conditions.
- External static pressure would be measured as specified in ASHRAE 37.
- Additional thermocouples would be added to the outlet grids used to measure temperature rise.
- Use of a mixer, as described in ANSI/ASHRAE Standard 41.1–1986 (RA 2006), would be required to minimize outlet flow temperature gradients if the temperature difference between any two thermocouples is greater than 1.5 °F.
- Greater temperature measurement accuracy and tighter stabilization criteria would be specified.
- The 18 °F temperature rise minimum specified by ASHRAE 37–2005 would be incorporated by reference.

Each of the listed modifications is described and explained in more detail in subsequent sections.

1. Calculating Maximum Airflow

AHRI proposes to calculate airflow based on measured temperature rise, rated input heat capacity, and AFUE using the following equation (AHRI, No. 26 at p. 23):

$$Q = \frac{AFUE \times Q_{IN}}{1.08 \times \Delta T}$$

Where:

Q = airflow, in cubic feet per minute (CFM),
$AFUE$ = annual fuel utilization efficiency, as determined by the DOE furnace test procedure,
Q_{IN} = fuel energy maximum nameplate input rate at steady-state operating (including any pilot light input), in British Thermal Units per hour (Btu/h),
1.08 = Conversion from airflow and temperature rise to heating rate, and
ΔT = measured temperature rise.

DOE is concerned that using AFUE and the nameplate fuel energy input rate, as defined in AHRI's proposal, would not result in accurate representations of airflow at the proposed operating conditions because: (1) Neither parameter is measured at the proposed operating conditions; and (2) AFUE is a function of off-cycle parameters such as infiltration heat loss and pilot light heat generation, which do not contribute to the temperature rise proposed to be used to calculate airflow. While temperature rise would be measured at the ESP levels outlined in AHRI's alternative method (which are equivalent to those proposed in the NOPR and herein), AFUE and nameplate input rate would be determined based on measurements taken at the ESP levels required by the DOE furnace test procedure (*i.e.* specified in ASHRAE 103–1993), which are significantly lower. Also, results from a 2002 comparison of AFUE and steady stat efficiency show that the steady state efficiency ranges from zero to three percent higher than AFUE.[7] More recent DOE tests yielded similar results, with steady state efficiency reaching as high as six percent higher than AFUE. DOE proposes to use steady state efficiency and fuel energy input measured at the proposed operating conditions, instead of AFUE and nameplate fuel energy input, to address these discrepancies and minimize the resulting inaccuracies in calculated airflow. Manufacturers would only be required to take two additional measurements (flue or stack gas temperature and carbon dioxide concentration) using equipment that is already in place for AFUE testing as a result of the proposed modification. DOE recognizes that replacing AFUE with steady state combustion efficiency at operating conditions would also require that jacket losses and the usable heat generated by the motor be included

[7] Public Workshop on Residential Furnace and Boiler Venting. May 2002. *http://www1.eere.energy.gov/buildings/appliance_standards/furnboil_050802_reswh.html.*

in the calculation. The DOE test procedure for furnaces already includes methods for accounting for these additional factors. Accordingly, DOE proposes to use the following equation to calculate airflow:

$$Q = \frac{\left(Effy_{SS} - L_J\right) \times Q_{IN} + \left[(3413 \times E\right]_{Heat})}{1.08 \times \Delta T}$$

Where:

Q = airflow in CFM,

$Effy_{SS}$ = steady state efficiency in % as determined according to ASHRAE 103–2007 at the specified operating conditions,

L_J = jacket loss in % as determined according to ASHRAE 103–2007 at specified operating conditions,

Q_{IN} = measured fuel energy input in Btu/h at specified operating conditions based on the fuel's high heating value determined as required in section 8.2.1.3 or 8.2.2.3 of ASHRAE 103–2007,

3413 = conversion of kW to Btu/h;

E_{Heat} = electrical energy to the furnace fan motor in kW that is recovered as useable heat,

1.08 = conversion from airflow and temperature rise to heating rate, and

ΔT = temperature rise measured at specified operating conditions.

DOE requests comments on the proposed changes to the equation for calculating airflow. DOE recognizes that the use of the 1.08 conversion factor assumes that the airflow has standard air properties (*e.g.,* standard air density and specific heat). DOE anticipates that the properties of the airflow under test may deviate from these values at actual test conditions, resulting in inaccurate airflow calculation results. DOE expects that variation in airflow density would be the significant driver of these inaccuracies. Therefore, DOE also requests comment on whether the conversion factor should be adjusted by the barometric pressure at test conditions. (See Issue 1 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

DOE is concerned that certain of the test conditions proposed by AHRI could lead to test results that are not representative of actual furnace fan energy use. AHRI's recommended method specifies that the maximum airflow be calculated based on a temperature rise measurement taken while operating the furnace in the maximum airflow-control setting and firing the burner. (AHRI, No. 26 at p. 21.) DOE is aware that the maximum airflow-control setting is often designated for cooling operation and not for heating. DOE anticipates that firing the burner while the furnace is in the maximum airflow-control setting is not typical of furnace operation, and that achieving this combination of settings by interfacing with the furnace controls may not be possible. The AHRI approach also specifies electrical input power in the heating airflow-control setting be measured without firing the burner.

DOE proposes to modify the AHRI recommended method to specify that maximum airflow be calculated based on a temperature rise measurement taken while operating the furnace in the rated heating airflow-control setting and firing the burner at the heat input capacity associated with that airflow-control setting. For more details regarding the proposed rated airflow-control settings, refer to Table II.2 in the Summary of the NOPR, 77 FR at 28676 (May 15, 2012). DOE expects that these proposed combinations of operating conditions are typical of field furnace use. These requirements would help ensure that test results are representative of actual furnace fan energy use, and would minimize the potential difficulties associated with firing the furnace in an airflow-control setting not intended for heating. DOE is not proposing any changes in this notice to the rated airflow-control settings proposed in the NOPR. The procedure proposed herein would require that the temperature rise measurement be taken in the default heating airflow-control setting for single-stage furnaces and in the default low heating airflow-control setting for multi-stage and modulating furnaces.

DOE recognizes that, compared to AHRI's suggested method, more complex calculations are required to determine the airflow in the maximum airflow-control setting based on a temperature rise measurement in the heating airflow-control setting. DOE proposes to specify that ESP measurements be taken in conjunction with the temperature rise and furnace fan electrical input power measurements for each rated airflow-control setting. Airflow in the rated heating airflow-control setting can be calculated using the airflow calculation equation proposed above. Once the airflow in the rated heating airflow-control setting has been calculated, the physical constant (k_{ref}) can be calculated using the equation below. k_{ref} characterizes the reference system duct restrictions set in the initial test conditions.

$$k_{ref} = \frac{ESP_{Heat}}{Q_{Heat}^2}$$

Where:

k_{ref} = physical constant that characterizes the reference system duct restrictions,

ESP_{Heat} = external static pressure measured at the operating point in the heating airflow-control setting, and

Q_{Heat} = airflow in the rated heating airflow-control setting.

The same value for k_{ref} can be used to characterize the system for all airflow-control settings because the same duct restrictions would be used for all test settings. Airflow in the maximum airflow-control setting would be calculated using k_{ref} and the ESP measured in the maximum airflow-control setting using the following equation.

$$Q_{Max} = \sqrt{\frac{ESP_{Max}}{k_{ref}}} = Q_{Heat}\sqrt{\frac{ESP_{Max}}{ESP_{Heat}}}$$

DOE is aware that ESP, airflow, and electrical input measurements could vary due to the different physical properties of air (particularly density) at higher temperature. As a result, a different k_{ref} may apply when the furnace is firing as compared with room-temperature operation without firing. To a first order, the pressure drop imposed by flow through ductwork can be approximated as being proportional to fluid density multiplied by the square of the velocity. The velocity for a given mass flow is proportional to the inverse of the density. The density is inversely

proportional to absolute temperature (*i.e.* the temperature expressed in degrees Kelvin or Rankine). Hence, the relationship between ESP and temperature for a fixed mass flow of air approximately exhibits the following proportionality:

$$ESP \propto \rho v^2 \propto \frac{1}{\rho} \propto (T + 460)$$

Where:

ρ = Air density,
v = Air velocity,
T = Air temperature in degrees Fahrenheit (°F), and
460 = Conversion from degrees Fahrenheit to degrees Rankine.

For operation of a furnace, the higher ESP that occurs when it is firing would reduce the mass flow of air. Consequently, the value of $Q_{Max,}$ as calculated according to the Q_{Max} equation proposed by DOE above would be slightly lower than the actual maximum airflow. This is because ESP_{Heat} would be slightly elevated and Q_{Heat} slightly reduced for the hot flow that occurs during the measurement relative to the way the system would behave for room temperature operating conditions. DOE proposes an adjustment in the Q_{Max} equation proposed by DOE above to account for the elevated temperature in the ductwork during the measurement, as follows:

$$Q_{Max} = \sqrt{\frac{ESP_{Max}}{k_{ref}} \times \frac{(T_{Heat} + 460)}{(T_{Max} + 460)}} = Q_{Heat} \sqrt{\frac{ESP_{Max}}{ESP_{Heat}} \times \frac{(T_{Heat} + 460)}{((T)_{Max} + 460)}}$$

Where:

T_{Heat} = Outlet air temperature in the heating airflow-control setting, and
T_{Max} = Outlet air temperature in the maximum airflow-control setting.

DOE requests comment on the proposed adjustment to the Q_{Max} calculation above, which would result in greater accuracy in determination of the maximum airflow rate. DOE also requests comments on the proposed modified method for calculating airflow in the maximum airflow-control setting. Specifically, DOE requests comments on how ESP, furnace fan electrical input power, and airflow measurements are impacted by temperature rise. DOE also seeks comment on how those relationships would impact the accuracy of the calculated value of Q_{Max} and, ultimately, FER. (See Issue 2 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

DOE recognizes that a more accurate measurement of temperature rise could be made at higher temperature rises because the allowable error in temperature measurements would represent a lower percentage of the overall temperature rise. For example, the maximum allowable proposed error of ± 1 °F (± 0.5 °F at both the inlet and outlet) would represent an approximate error of 3 percent for a temperature rise of 30 °F, and half as much for a 60 °F temperature rise. DOE is aware that operating the furnace in the reduced heat setting for multi-stage furnaces would result in a lower temperature rise than if fired in the maximum heat setting. DOE requests comment on whether the maximum airflow should be calculated based on the temperature rise measured while operating the furnace fan in the maximum default heat airflow-control setting and at maximum heat input capacity to minimize the effect of temperature measurement error on the overall FER calculation. (See Issue 3 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

DOE is concerned that at higher elevations the temperature rise would be greater due to reduced air mass flow, resulting in a higher calculated airflow. DOE requests comments on the magnitude of potential elevation impacts on calculated airflow and FER values. DOE also requests comments on whether specifications, such as a maximum test elevation or elevation adjustment factor, should be used to avoid circumvention associated with conducting this test at high elevation. (See Issue 4 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

2. ASHRAE 37 External Static Pressure Measurements

DOE believes that more detailed specifications for setting and measuring ESP are required than those in the AHRI suggested test method. AHRI's suggested test method specifies that the reference system ESP be achieved by ''symmetrically restricting the outlet of the test duct.'' (AHRI, No. 26 at pp. 8, 19, 20) The AHRI test method does not provide details on the equipment or procedures that should be used to meet this requirement. (DOE is aware that independent test labs typically apply cardboard ducting or tape to the corners of the outlet to achieve the desired ESP.) DOE requests comments on whether one or more methods for restricting the outlet duct should be included in the test procedure. (See Issue 5 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

According to AHRI's suggested test method, use of a return air duct in the test setup is optional. (AHRI, No. 26 at p. 20.) DOE proposes to also allow for the optional use of a return air duct; however, DOE is concerned that ESP may differ when measured with a return air duct compared to when measured without a return air duct. DOE believes that each different motor type may react differently with the use of a return air duct, but the impacts on the FER measurements may be small. DOE requests comments on the ESP measurements and FER values that result when not using a return air duct compared to when a return air duct is used, and whether the test procedure should explicitly require use of a return air duct. (See Issue 6 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

AHRI's suggested test method specifies that ESP measurements be made between the furnace openings and any restrictions or elbows in the test plenums or ducts and as close as possible to the air supply and return openings of the furnace. (AHRI, No. 26 at p. 20) DOE proposes to incorporate by reference the ASHRAE 37 provisions for measuring ESP (sections 6.4 and 6.5), which are consistent with AHRI's suggested specifications and provide more detail. DOE anticipates that these more detailed specifications would minimize variations in test setups and, in turn, improve repeatability. DOE proposes to specify that ESP be measured according to the setup illustrated in Figure 8 of ASHRAE 37 when a return air duct is used. This setup would require direct measurement of the static pressure difference between the inlet and outlet of the unit under test as opposed to taking separate static measurements at the inlet and outlet and calculating the difference between the two measurements. Direct measurement in this context means that the inlet and outlet pressure signal tubing would be connected on opposite sides of a single manometer, rather than using two manometers or transducers, each being open to the ambient on one

side. DOE proposes to specify that ESP be measured according to the setup illustrated in Figure 7 of ASHRAE 37 when a return air duct is not used. DOE does not anticipate any issues with specifying ASHRAE 37 provisions for measuring ESP because, as mentioned above, manufacturers commented that ASHRAE 37 is a widely used standard for testing HVAC products and is recommended for rating furnace fans. DOE requests comments on its proposed provisions for measuring ESP, which are adopted from ASHRAE 37–2005. (See Issue 7 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

3. Temperature Rise Measurements

DOE recognizes that FER results generated according to the proposed test procedure are sensitive to the temperature rise measurement that would be used to calculate the airflow in the maximum airflow-control setting. DOE expects that the equipment and methods used to measure temperature rise in the AHRI method can be improved, which would result in a more accurate and repeatable test procedure. The modifications that DOE proposes are mostly derived from the provisions of the alternative method for calculating airflow specified in section 7.7.1.2 and 7.7.4 of ASHRAE 37–2005.

AHRI's recommended method adopts ASHRAE 103–2007 provisions that specify that temperature measurements shall have an error no greater than ±2 °F. In the worst case scenario, an error of 2 °F on both the inlet and outlet temperature measurements could result in an error of 4 °F. DOE estimates that an error of 4 °F for the temperature rise measurement could yield an error of approximately 10% in FER for a typical temperature rise between 30 °F and 60 °F.

DOE proposes to specify that temperature measurements have an error no greater than ±0.5 °F. The accuracy requirements of existing test standards that are used to test these products are more stringent—Table 1 in section 4 of ASHRAE 37–2005 requires temperature measurement accuracy of ±0.2 °F. DOE requests comment on whether ±0.5 °F is reasonably achievable. (See Issue 8 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

AHRI's proposed method does not include a minimum temperature rise requirement. DOE is concerned that the allowable error in temperature measurements coupled with a low temperature rise could result in inaccurate test results. For this reason, DOE proposes to require a minimum temperature rise of 18 °F, as specified in ASHRAE 37–2005. DOE notes that with its proposed ±0.5 °F temperature measurement accuracy requirement and its proposed minimum 18 °F temperature rise, the maximum potential error in measured airflow associated with the temperature rise measurement is approximately 5.6%. DOE requests comments on whether a minimum temperature rise should be required and, if so, what is an appropriate value for the minimum temperature rise. (See Issue 9 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

AHRI's recommended method adopts the stabilization criteria of the DOE test procedure for residential furnaces. 10 CFR part 430, subpart B, appendix N, section 7.0. According to section 7.0 of the DOE test procedure for furnaces, which references section 8.0 of ASHRAE 103–1993, steady-state conditions for gas and oil furnaces are attained as indicated by a temperature variation in three successive readings, taken 15 minutes apart, of not more than:

- 3 °F in the stack gas temperature for furnaces equipped with draft diverters;
- 5 °F in the stack gas temperature for furnaces equipped with either draft hoods, direct exhaust, or direct vent systems; and
- 1 °F in the flue gas temperature for condensing furnaces.

For electric furnaces, steady-state conditions are reached as indicated by a temperature variation of not more than 5 °F in the outlet temperature in four successive temperature readings taken 15 minutes apart.

DOE is concerned that the temperature variations specified in the above stabilization criteria are not stringent enough to maximize accuracy and repeatability for evaluating furnace fan performance. As mentioned above, the FER results generated according to the proposed test procedure are sensitive to temperature variation because they are a function of the airflow calculated using measured temperature rise. DOE proposes the following stabilization criteria to address this concern. For testing furnace fans used in gas and oil furnaces, DOE proposes that steady-state conditions are attained as indicated by a temperature variation in three successive readings, taken 15 minutes apart, of not more than:

- 1.5 °F in the stack gas temperature for furnaces equipped with draft diverters;
- 2.5 °F in the stack gas temperature for furnaces equipped with either draft hoods, direct exhaust, or direct vent systems; and
- 0.5 °F in the flue gas temperature for condensing furnaces.

For electric furnaces, DOE proposes that steady-state conditions are reached as indicated by a temperature variation of not more than 1 °F in the outlet temperature in four successive temperature readings taken 15 minutes apart. DOE requests comments on whether the proposed stabilization criteria are reasonably achievable, and whether the stabilization criteria for the AFUE test would be sufficient to assure that the entire furnace has thermally stabilized to a point such that the measured air temperature rise would no longer significantly change. (See Issue 10 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

AHRI's approach does not include provisions to account for potential inlet or outlet airflow temperature gradients. DOE is concerned that temperature gradients are likely to be present, which would compromise the accuracy and repeatability of the temperature rise measurement results. DOE proposes to specify the use of a mixer, as depicted in Figure 10 of ASHRAE 37–2005, which references ANSI/ASHRAE Standard 41.1–1986 (RA 2001), to minimize outlet flow temperature gradients if the temperature difference between any two thermocouples of the outlet air temperature grid is greater than 1.5 °F. DOE has not had the opportunity to evaluate the potential inaccuracies associated with allowing larger temperature gradients, and instead bases this selection on its use as the maximum allowable temperature difference threshold in ASHRAE 210/240 for the ''C'' and ''D'' tests for CAC products. These tests use temperature rise and airflow measurement to determine cooling capacity. The proposed furnace fan test method uses the inverse of the relationship for these factors to determine airflow based on measured temperature rise and input heat capacity. Hence, the implications for temperature gradients to result in measurement errors are equivalent. DOE requests comment on whether the effect on static pressure of adding a mixer would prevent the test setup from achieving the ESP levels specified in the DOE test procedure for residential furnaces or the lower ESP levels specified in this notice for measuring fan performance in the lowest rated airflow setting. DOE also seeks comment on whether additional thermocouples are needed to measure the inlet air temperature. (See Issue 11 under ''Issues

on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

C. Definitions

DOE proposes to adopt all definitions in section 3 of ASHRAE 103, which are already codified in section 2 of Appendix N to Subpart B of Part 430. DOE also proposes to include the additional and modified definitions listed below.

- *Active mode* means the condition in which the product in which the furnace fan is integrated is connected to a power source and circulating air through ductwork.
- *Airflow-control settings* are programmed or wired control system configurations that control a fan to achieve discrete, differing ranges of airflow, often designated for performing a specific HVAC function (*e.g.,* cooling, heating, or constant circulation), without manual adjustment other than interaction with a user-operable control such as a thermostat that meets the manufacturer specifications for installed use found in the product literature shipped with the unit.
- *Default airflow-control settings* are the airflow-control settings specified for installed use by the manufacturer in the product literature shipped with the product in which the furnace fan is integrated. In instances where a manufacturer specifies multiple airflow-control settings for a given function to account for varying installation scenarios, the highest airflow-control setting specified for the given function shall be used for the DOE test procedure.
- *External static pressure* means the difference between static pressures measured in the outlet duct and return air opening (or return air duct when used for testing) of the product in which the furnace fan is integrated.
- *Furnace fan* is an electrically-powered device used in a consumer product for the purpose of circulating air through ductwork.
- *Modular blower* means a product which only uses single-phase electric current, and which:

(a) Is designed to be the principal air circulation source for the living space of a residence;

(b) Is not contained within the same cabinet as a furnace or central air conditioner; and

(c) Is designed to be paired with HVAC products that have a heat input rate of less than 225,000 Btu per hour and/or cooling capacity less than 65,000 Btu per hour.

- *Off mode* means the condition in which the product in which the furnace fan is integrated is either not connected to the power source or connected to the power source but not energized.
- *Standby mode* means the condition in which the product in which the furnace fan is integrated is connected to the power source and the furnace fan is not circulating air.

D. Sampling Plans

DOE provides sampling plans for all covered products. The purpose of a sampling plan is to provide statistically valid representations of energy consumption or energy efficiency for each covered product by capturing the variability inherent in the manufacturing and testing process. These sampling plans apply to all aspects of the EPCA program for consumer products, including public representations, labeling, and compliance with energy conservation standards. 10 CFR 429.11. In the NOPR, DOE proposed that the existing sampling plans used for furnaces be adopted and applied to measures of energy consumption for furnace fans. 77 FR at 28691 (May 15, 2012).

AHRI and manufacturers commented that the 97.5 percent confidence limit required by the furnace sampling plan is too stringent. *See* 10 CFR 429.18(a). Morrison and Allied Air commented on the difficulty of obtaining accurate, precise airflow measurements. According to Morrison, the uncertainty allowable per AMCA 210–07 is much greater than what is permissible in the furnaces sampling plan. (Morrison, Public Meeting Transcript, No. 23 at p. 219; Allied Air, Public Meeting Transcript, No. 23 at p. 218.) Unico stated that it would have a problem with meeting anything close to 97.5 percent confidence. (Unico, Public Meeting Transcript, No. 23 at p. 224.) AHRI stated that the confidence limits used for the AFUE measurement are inappropriate for the proposed electrical measurements. (AHRI, Public Meeting Transcript, No. 23 at p. 226.) Ingersoll Rand stated that the 97.5 percent confidence limit is not going to work and would require at least three sample units for every model to meet the requirement. (Ingersoll Rand, Public Meeting Transcript, No. 23 at p. 230.) Carrier explained that the components of the furnace fan (*i.e.* electric motors, blower wheels and blower housings) are more analogous to an air conditioner or refrigerator than to the combustion process of a fuel-fired furnace. According to Carrier, AFUE does not consider the electrical efficiency of the furnace fan components. Carrier recommends the certification and enforcement level for furnaces fans to be 90%, which is consistent with the confidence limit for CAC. (Carrier, No. 10 at p. 4.) Allied Air, Goodman, Rheem, Ingersoll Rand, Lennox, and Morrison agreed that a sampling plan requiring a 90 percent confidence limit would be more appropriate. (Allied Air, Public Meeting Transcript, No. 23 at p. 225; Goodman, No. 17 at p. 6; Rheem, No. 25 at p. 11; Ingersoll Rand, No. 14 at p. 2; Lennox, No. 12 at p. 5; Morrison, No. 21 at p. 8.)

Efficiency advocates also support a less stringent confidence interval. Adjuvant commented that it strives for a 90 percent confidence interval in its work with HVAC products, which Adjuvant finds to be an appropriate level. Adjuvant added that it rarely uses 95 percent and would not push for anything higher than 90. (Adjuvant, Public Meeting Transcript, No. 23 at p. 229.) NPCC and NEEA commented that a 97.5 percent confidence limit is unrealistically stringent and might cause enforcement testing issues that are not helpful in certifying efficiency levels. NPCC and NEEA added that air flow and external static pressure measurements are prone to larger error bands than measurements such as power levels or temperatures, and are likely to cause real problems for manufacturers trying to certify to the 97.5 percent confidence limit. NPCC and NEEA recommended using the same confidence limits as those used for heat pump and air conditioning systems, which are subject to some of the same measurement error bands as air handlers. (NPCC/NEEA, No. 22 at p. 7.) AHRI stated that confidence limits historically have been set without supporting data and suggested that DOE do a rigorous analysis to determine an appropriate confidence limit. (AHRI, Public Meeting Transcript, No. 23 at p. 225.)

DOE agrees with interested parties that the furnace fan electrical input power measurements and external static pressure measurements that would be required by the test procedure proposed herein are different and inherently more variable than the measurements required for AFUE. DOE proposes to adopt a sampling plan that requires any represented value of FER to be greater or equal to the mean of the sample or the upper 90 percent (one-tailed) confidence limit divided by 1.05, as specified in the sampling plan for CAC/HP products. 10 CFR 429.16 DOE will continue to analyze the available test data to evaluate the proposed sampling plan parameters. DOE requests comments, including detailed data, regarding test result variance that it can use to assess the appropriateness of the sampling plan proposed herein. (See

Issue 12 under ''Issues on Which DOE Seeks Comment'' in section V.B of this SNOPR.)

E. Standby Mode and Off Mode Energy Consumption

EPCA, as amended by the Energy Independence and Security Act of 2007, Public Law 110–140 (EISA), requires that any final rule for a new or amended energy conservation standard adopted after July 1, 2010, must address standby mode and off mode energy use pursuant to 42 U.S.C. 6295(o). (42 U.S.C. 6295(gg)(3)) Thus, the statute implicitly directs DOE, when developing test procedures to support new energy conservation standards, to account for standby mode and off mode energy consumption. EISA also requires that such energy consumption be integrated into the overall energy efficiency, energy consumption, or other energy descriptor, unless the current test procedure already accounts for standby mode and off mode energy use. If an integrated test procedure is technically infeasible, DOE must prescribe a separate standby mode and off mode test procedure for the covered product, if technically feasible. (42 U.S.C. 6295(gg)(2)(A)) Accordingly, DOE must address the standby mode and off mode energy use of furnace fans in this test procedure. However, DOE has already fully incorporated standby mode and off mode energy use in the test procedures (or proposed test procedures) for all of the products to which this test procedure rulemaking would be applicable.

Table III.1 summarizes the test procedure rulemaking vehicles through which DOE addresses standby mode and off mode energy consumption for the various types of products which circulate air through ductwork.

TABLE III.1—RULEMAKING ACTIVITIES ADDRESSING FURNACE FAN STANDBY MODE AND OFF MODE ENERGY CONSUMPTION

HVAC products	Status	DOE rulemaking activity
• Gas Furnaces • Oil-fired Furnaces • Electric Furnaces	Addressed in separate rulemaking	• Codified Furnaces Test Procedure October 20, 2010 final rule (75 FR 64621) (10 CFR part 430, subpart B, appendix N, section 8.0). • September 13, 2011 NOPR (76 FR 56339).
• Modular Blowers • Weatherized Gas Furnace	Addressed in separate rulemaking	• June 2, 2010 NOPR (75 FR 31224). • April 1, 2011 SNOPR (76 FR 18105). • October 24, 2011 SNOPR (76 FR 65616).

DOE prescribed the measurement of standby mode and off mode energy use for non-weatherized gas furnaces, oil-fired furnaces, and electric furnaces in the furnace test procedure, 10 CFR part 430, subpart B, appendix N, section 8.0. DOE proposed coverage of standby mode and off mode energy use for modular blowers and weatherized gas furnaces in a June 2, 2010 NOPR. 75 FR 31224. In a September 13, 2011 NOPR, DOE proposed amendments to its furnace test procedure related to standby mode and off mode. 76 FR 56339. DOE subsequently published one SNOPR on April 1, 2011, and another on October 24, 2011, regarding standby mode and off mode test procedures for these products. 76 FR 18105; 76 FR 65616. DOE published a furnaces standby and off mode test procedure final rule on December 31, 2012. 77 FR 76831. Furnace fans are integrated in the electrical systems of the HVAC products in which they are used and controlled by the main control board. Therefore, the standby mode and off mode energy use associated with these furnace fans would be measured by the established or proposed test procedures associated with these products. There is no need for DOE to adopt additional test procedure provisions for these modes in this rulemaking.

F. Reference System Product Types

In the NOPR, DOE identified four installation types with unique reference system ESP considerations:

- Heating-only units;
- Units with an internal evaporator coil;
- Units designed to be paired with an evaporator coil; and
- Manufactured home units.

DOE anticipated that some HVAC products may not be designed to provide cooling. Specifically, DOE identified hydronic air handler models that are not designed to be paired with an evaporator coil (either factory-installed or separate). DOE proposed to specify a lower reference system ESP for these products because they do not experience the additional pressure drop of circulating air past an evaporator coil.

Ingersoll Rand commented that it was not aware of any product that would be categorized as a heating-only product. Ingersoll Rand added that including this installation type could provide manufacturers with a means of gaming the test procedure by modifying its furnaces to eliminate factory-installed cooling capabilities, which would allow such furnaces to be tested at the lower ESP specified for heating-only units. For these reasons, Ingersoll Rand recommended that DOE eliminate the heating-only designation. (Ingersoll Rand, Public Meeting Transcript, No. 23 at p. 50.) NPCC and NEEA also suggested that DOE eliminate the heating-only installation type. (NPCC/NEEA, No. 22 at p. 6)

DOE agrees with interested parties that the heating-only installation type should be eliminated from consideration. The scope of applicability of the test procedure proposed herein does not include hydronic air handlers as discussed in section III.A. Consequently, DOE proposes to eliminate the heating-only product designation as a result.

IV. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

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

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis (IFRA) for any rule that by law must be proposed for public comment 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, would not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, ''Proper Consideration of Small Entities in Agency Rulemaking,'' 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the DOE rulemaking process, 68 FR 7990. DOE's procedures and policies may be viewed on the Office of the General Counsel's Web site (*http://energy.gov/gc/office-general-counsel*).

DOE reviewed today's proposed rule under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003, 68 FR 7990. DOE has tentatively concluded that the proposed rule would not have a significant economic impact on a substantial number of small entities under the provisions of the Regulatory Flexibility Act. The factual basis for this certification is as follows:

The Small Business Administration (SBA) considers an entity to be a small business if, together with its affiliates, it employs fewer than a threshold number of workers as specified in 13 CFR part 121. The threshold values set forth in these regulations use size standards and codes established by the North American Industry Classification System (NAICS) that are available at: *http://www.sba.gov/sites/default/files/Size_Standards_Table.pdf.* The threshold number for NAICS classification for 333415, which applies to Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing (this includes furnace fan manufacturers) is 750 employees.[8] DOE reviewed AHRI's Directory of Certified Product Performance for Residential Furnaces and Boilers (2009),[9] the ENERGY STAR Product Databases for Gas and Oil Furnaces (May 15, 2009),[10] the California Energy Commission's Appliance Database for Residential Furnaces and Boilers,[11] and the Consortium for Energy Efficiency's Qualifying Furnace and Boiler List (April 2, 2009).[12] From this review, DOE identified 14 small businesses within the furnace fan industry. DOE does not believe the test procedure amendments described in this proposed rule would represent a substantial burden to any manufacturer, including small manufacturers, as explained below. DOE requests comments on its characterization of the furnace fan industry in terms of the number of and impacts on small businesses.

This proposed rule would establish test procedures that would be used for representations of energy use and to test compliance with new energy conservation standards, which are being developed in a concurrent rulemaking, for the products that are the subject of this rulemaking. This notice proposes new test procedures for active mode testing for all such products. The proposed rule would require a modified version of the testing methods prescribed in a public submission from AHRI (the trade organization that represents manufacturers of furnace fans). The AHRI proposal recommends test methods that are purposely aligned with the current DOE test procedure for furnaces in order to minimize test burden. (AHRI, No. 26); Appendix N of subpart B of 10 CFR part 430. As discussed above, this would not represent a substantial burden to any furnace fan manufacturer, small or large. According to AHRI, its proposed method would result in an 80 to 90 percent reduction in test burden compared to the test procedure proposed by DOE in the NOPR. AHRI attributed this reduction primarily to manufacturers not having to acquire or use any test equipment beyond the equipment that is already used to conduct the test method specified in the DOE furnace test procedure (*i.e.* the AFUE test setup). (AHRI, No. 16 at p. 3.) Mortex, a small manufacturer, stated that measuring airflow and electrical power input at a few more airflow-control settings as a part of the existing AFUE test procedure should not require any capital outlay, unlike the method proposed by DOE in the NOPR. (Mortex, No. 18 at p. 2.) DOE's proposed modifications to AHRI's approach would require minimal, low-cost equipment beyond what is currently used to perform the AFUE test. This additional equipment would include additional thermocouples and potentially an air mixer. Manufacturers commented that this equipment is already used by furnace fan manufacturers because it is required by either ASHRAE 103 or ASHRAE 37, which are currently used to test the HVAC products considered in this rulemaking. Therefore, DOE expects little or no additional cost as the result of the new test procedure.

DOE also expects that the time and cost to conduct testing according to the proposed test procedure will not be significantly burdensome. During discussions with manufacturers, DOE received feedback that the time to test a single unit according to the AHRI method would be 30 to 60 percent less relative to using the procedure DOE proposed in the NOPR. Goodman performed tests according to both DOE's NOPR test procedure proposal and AHRI's suggested method and found that testing time is reduced by almost 60 percent using AHRI's method. (Goodman, No. 17 at p. 3.) Rheem also conducted tests according to both procedures and stated that the time to test a single-stage furnace was reduced from 4 hours to 45 minutes by using the AHRI method. (Rheem, No. 25 at p. 4.) Assuming that the labor rate for a given manufacturer would be the same regardless of test method, DOE expects that the cost to conduct a test would also be reduced by 30 to 60 percent. DOE estimated that conducting a test according to its NOPR proposed test procedure would cost a small manufacturer $2.30 per unit shipped. This estimate is largely based on DOE's experience with third-party test lab labor rates for fan testing, 77 FR at 28691 (May 15, 2012). A 30 percent reduction would yield a conservative cost estimate of $1.61 per unit shipped to conduct a test according to AHRI's method. DOE does not expect that its proposed modifications to the AHRI method would result in additional costs to conduct a test. DOE finds that the selling price for HVAC products that incorporate furnace fans ranges from approximately $400 to $4,000. Therefore, the added cost of testing per DOE's revised proposed test procedure would be less than one percent of the manufacturer selling price (and lower than 0.1 percent in some cases).

For these reasons, DOE certifies that the proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. Accordingly, DOE has not prepared a

[8] U.S. Small Business Administration, Table of Small Business Size Standards (August 22, 2008) (Available at: *http://www.sba.gov/sites/default/files/Size_Standards_Table.pdf*).

[9] The Air-Conditioning, Heating, and Refrigeration Institute, Directory of Certified Product Performance (June 2009) (Available at: *http://www.ahridirectory.org/ahridirectory/pages/home.aspx*).

[10] The U.S. Environmental Protection Agency and the U.S. Department of Energy, ENERGY STAR Furnaces—Product Databases for Gas and Oil Furnaces (May 15, 2009) (Available at: *http://www.energystar.gov/index.cfm?c=furnaces.pr_furnaces*).

[11] The California Energy Commission, Appliance Database for Residential Furnaces and Boilers (2009) (Available at: *http://www.appliances.energy.ca.gov/QuickSearch.aspxh*).

[12] Consortium of Energy Efficiency, Qualifying Furnace and Boiler List (April 2, 2009) (Available at: *http://www.ceedirectory.org/ceedirectory/pages/cee/ceeDirectoryInfo.aspx*).

regulatory flexibility analysis for this rulemaking. DOE will provide its certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the SBA for review under 5 U.S.C. 605(b).

C. Review Under the Paperwork Reduction Act of 1995

There is currently no information collection requirement related to the test procedure for furnace fans. In the event that DOE proposes an energy conservation standard with which manufacturers must demonstrate compliance, or otherwise proposes to require the collection of information derived from the testing of furnace fans according to this test procedure, DOE will seek OMB approval of such information collection requirement.

Manufacturers of covered products must certify to DOE that their products comply with any applicable energy conservation standard, 10 CFR 429.12. In certifying compliance, manufacturers must test their products according to the applicable DOE test procedure, including any amendments adopted for that test procedure. *See* 10 CFR 429.13.

DOE established regulations for the certification and recordkeeping requirements for certain covered consumer products and commercial equipment, 76 FR 12422 (March 7, 2011). The collection-of-information requirement for the certification and recordkeeping was subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement was approved by OMB under OMB Control Number 1910–1400. Public reporting burden for the certification was 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.

As stated above, in the event DOE proposes an energy conservation standard for furnace fans with which manufacturers must demonstrate compliance, DOE will seek OMB approval of the associated information collection requirement. DOE will seek approval either through a proposed amendment to the information collection requirement approved under OMB control number 1910–1400 or as a separate proposed information collection requirement.

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 notice of proposed rulemaking, DOE proposes a new test procedure for furnace fans. DOE has determined that this rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*) and DOE's implementing regulations at 10 CFR part 1021. Specifically, this rule proposes a test procedure without affecting the amount, quality or distribution of energy usage, and, therefore, will not result in any environmental impacts. Thus, this rulemaking is covered by Categorical Exclusion A5 under 10 CFR part 1021, subpart D, which applies to any rulemaking that does not result in any environmental impacts. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

E. Review Under Executive Order 13132

Executive Order 13132, ''Federalism,'' 64 FR 43255 (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. With regard to 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 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. 104–4, sec. 201 (codified at 2 U.S.C. 1531)) For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process

to permit timely input by elected officers of State, local, and Tribal governments on a ''significant intergovernmental mandate,'' and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820. DOE's policy statement is also available at *http://energy.gov/gc/office-general-counsel.* DOE examined today's proposed rule according to UMRA and its statement of policy and determined that the rule contains neither an intergovernmental mandate, nor a mandate that may result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of $100 million or more in any year. Accordingly, no 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

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

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 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 provide 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.

DOE has tentatively concluded that today's regulatory action, which would prescribe the test procedure for measuring the energy efficiency of furnace fans, is not a significant energy action because the proposed test procedure is not a significant regulatory action under Executive Order 12866 and is not likely to 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. Accordingly, DOE has not prepared a Statement of Energy Effects on the proposed rule.

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

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91), DOE must comply with 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) Section 32 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.

The proposed rule incorporates testing methods contained in the DOE test procedure for furnaces codified in Appendix N or subpart B of part 430 of the CFR (which incorporates by reference ANSI/ASHRAE Standard 103, ''*Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers,*'' and ANSI/ASHRAE Standard 37–2005, *''Methods of Testing for Rating Electrically Driven Unitary Air-Conditioning and Heat Pump Equipment.''* While today's proposed test procedure is not exclusively based on these standards, some components of the DOE test procedure would adopt definitions, test setup, measurement techniques, and additional calculations from them without any change. 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 of these test procedures on competition prior to prescribing a final rule.

V. Public Participation

A. 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 SNOPR.

Submitting comments via www.regulations.gov. The *www.regulations.gov* Web page requires 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 Web site will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through *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, or mail. Comments and documents submitted via email, hand delivery, 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 compact disk (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).

B. 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. Airflow Equation

DOE is concerned that using AFUE and Q_{IN}, as defined in AHRI's proposal, would not result in accurate representations of airflow at the proposed operating conditions because neither parameter is measured at the proposed operating conditions. DOE proposes to use steady state combustion efficiency and fuel energy input measured at the proposed operating conditions instead of AFUE and Q_{IN} to address this discrepancy and minimize the potential resulting inaccuracies in calculated airflow. DOE recognizes that replacing AFUE with steady state combustion efficiency would also require that jacket losses and the usable heat generated by the motor also be included in the calculation. Section III.B.1 includes a detailed discussion of this issue and DOE's proposed modified version of the airflow calculation equation. DOE requests comments on these modifications to the equation proposed by AHRI to calculate airflow.

DOE recognizes that the use of the 1.08 conversion factor assumes that the airflow has standard air properties (*i.e.* standard air density and specific heat). DOE anticipates that the properties of the airflow under test may deviate from these values at actual test conditions. Therefore, DOE also requests comment on whether the conversion factor should be adjusted by the barometric pressure at test conditions.

2. Using Temperature Rise in the Rated Heating Airflow-Control Setting To Calculate Maximum Airflow

DOE proposes to modify the AHRI recommended method to specify that maximum airflow be calculated based on a temperature rise measurement taken while operating the furnace in the rated heating airflow-control setting and firing the burner at the heat input capacity associated with that airflow-control setting. DOE recognizes that, compared to AHRI's suggested method, more complex calculations are required to determine the airflow in the maximum airflow-control setting based on a temperature rise measurement in the heating airflow-control setting. Section III.B.1 includes a detailed discussion of DOE's reasoning, methodology, and equations for the modified approach to calculating airflow in the maximum airflow control setting. DOE requests comments on the proposed modified method for calculating airflow in the maximum airflow-control setting. DOE also requests comment on whether the

proposed adjustment to this calculation, which accounts for the elevated temperature in the ductwork, should be incorporated to achieve greater accuracy in determination of the maximum airflow rate. Specifically, DOE requests comments on how ESP, furnace fan electrical input power, and airflow measurements are impacted by temperature rise. DOE also seeks comment on how those relationships would impact the accuracy of the calculated value of Q_{Max} and, ultimately, FER.

3. Using the Maximum Heat Setting to Measure Temperature Rise

DOE recognizes that a more accurate measurement of temperature rise could be made at higher throughput temperatures because the allowable error in temperature measurements would represent a lower percentage of the overall temperature rise. DOE requests comment on whether the maximum airflow should be calculated based on the temperature rise measured while operating the furnace fan in the maximum default heat airflow-control setting and at maximum heat input capacity to minimize temperature measurement error. Section III.B.1 includes a detailed discussion of this issue.

4. Elevation Impacts

DOE is concerned that at higher elevations the temperature rise would be high due to reduced air mass flow, resulting in higher calculated airflow. DOE requests comments on the magnitude of potential elevation impacts on calculated airflow and FER values. DOE also requests comments on whether specifications, such as a maximum test elevation or elevation adjustment factors, should be used to avoid circumvention associated with conducting this test at high elevation.

5. Outlet Duct Restriction Specifications

AHRI's suggested test method specifies that the reference system ESP be achieved by ''symmetrically restricting the outlet of the test duct.'' (AHRI, No. 26 at p. 19.) The AHRI test method does not provide details on the method or equipment to be used to meet this requirement. DOE is aware that independent test labs typically apply cardboard ducting or tape to the corners of the outlet until the desired ESP is achieved. DOE requests comments on whether more specific methods for restricting the outlet duct should be included and what these specific duct restriction requirements should be. Section III.B.2 includes a detailed discussion of this issue.

6. Optional Return Air Duct

According to AHRI's suggested test method, use of an return air duct in the test setup is optional. (AHRI, No. 26 at p. 20.) DOE proposes to also allow for the optional use of a return air duct; however, DOE is concerned that ESP may differ when measured with a return air duct compared to when measured without a return air duct. DOE requests comments on the relative ESP measurements and FER values that result when not using an air return duct compared to when an air return duct is used, and whether the test procedure should explicitly require use of a return air duct. Section III.B.2 includes a detailed discussion of this issue.

7. ASHRAE 37–2005 External Static Pressure Measurement Provisions

AHRI's suggested test method specifies that ESP measurements be made as close as possible to the air supply and return openings of the furnace and in all cases, between the furnace openings and any restrictions or elbows in the test plenums or ducts. (AHRI, No. 26 at p. 20.) DOE agrees with these specifications, but proposes to incorporate by reference the ASHRAE 37 provisions for measuring ESP (sections 6.4 and 6.5), which are consistent with AHRI's suggested specifications but are more detailed. DOE anticipates that these more detailed specifications would minimize variations in test setups and, in turn, improve repeatability. DOE requests comments on its proposed provisions for measuring ESP, which are adopted from ASHRAE 37–2005. Section III.B.2 includes details of DOE's proposal for measuring external static pressure.

Temperature Measurement Accuracy Requirement

AHRI's recommended method adopts ASHRAE 103–1993 provisions that specify that temperature measurements shall have an error no greater than ±2 °F. DOE proposes to specify that temperature measurements have an error no greater than ±0.5 °F to minimize error in the resulting FER values. DOE requests comment on whether ±0.5 °F is reasonably achievable. Section III.B.3 includes a more detailed discussion of this issue.

9. Minimum Temperature Rise

AHRI's method does not include a minimum temperature rise requirement. DOE is concerned that the allowable error in temperature measurements coupled with a low temperature rise could result in inaccurate test results. For this reason, DOE also proposes to require a minimum temperature rise of 18 °F, as specified in ASHRAE 37–2005. DOE requests comments on whether a minimum temperature rise should be required, and if so, what an appropriate value for the minimum temperature rise would be. Section III.B.3 includes a detailed discussion of this issue.

10. Steady-State Stabilization Criteria

AHRI's recommended method adopts the stabilization criteria of the DOE test procedure for residential furnaces. 10 CFR part 430, subpart B, appendix N, section 7.0 DOE is concerned that the temperature variations specified in the residential furnace stabilization criteria are not stringent enough to maximize accuracy and repeatability for evaluating furnace fan performance according to the proposed test procedure. In section III.B.3 DOE proposes modified stabilization criteria to address this concern.. DOE requests comments on whether the proposed stabilization criteria are reasonably achievable, and whether the stabilization criteria for the AFUE test would be sufficient to assure that the entire furnace has thermally stabilized to a point such that the measured air temperature rise would no longer significantly change.

11. Inlet and Outlet Airflow Temperature Gradients

AHRI's approach does not include provisions to account for potential inlet or outlet airflow temperature gradients. DOE is concerned that temperature gradients are likely to be present, which would compromise the accuracy and repeatability of the temperature rise measurement results. DOE proposes to specify the use of a mixer, as depicted in Figure 10 of ASHRAE 37–2005, which references ANSI/ASHRAE Standard 41.1–1986 (RA 2001), to minimize outlet flow temperature gradients if the temperature difference between any two thermocouples of the outlet air temperature grid is greater than 1.5 °F. DOE requests comments on the proposed requirements for use of an air mixer. DOE also requests comment on whether the static pressure drop of adding a mixer would prevent the test setup from achieving the ESP levels specified in the DOE test procedure for furnaces or the lower ESP levels specified in this notice for measuring fan performance in the lowest rated airflow setting. DOE also seeks comment on whether additional thermocouples are needed for the inlet. Section III.B.3 includes a detailed discussion of this issue.

12. Sampling Plan Criteria

DOE agrees with interested parties that the furnace fan electrical input power measurements and external static pressure measurements that would be required by the test procedure proposed herein are different and inherently more variable than the measurements required for AFUE. DOE proposes to adopt a sampling plan that requires any represented value of FER to be greater or equal to the mean of the sample or the upper 90 percent (one-tailed) confidence limit divided by 1.05, as specified in the sampling plan for CAC/HP products. 10 CFR 429.16 DOE requests comments that include detailed data regarding test result variance that it can use to assess the appropriateness of the sampling plan proposed herein.

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

10 CFR Part 429

Confidential business information, Energy conservation, Household appliances, Imports, Reporting and recordkeeping requirements.

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 March 25, 2013.

Kathleen B. Hogan,

Deputy Assistant Secretary for Energy Efficiency, Energy Efficiency and Renewable Energy .

For the reasons stated in the preamble, DOE proposes to amend parts 429 and 430 of chapter II, subchapter D, of Title 10 of the Code of Federal Regulations as set forth below:

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

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

Authority: 42 U.S.C. 6291–6317.

■ 2. Add § 429.58 to read as follows:

§ 429.58 Furnace fans.

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

(2) For each basic model of heating, ventilation, and air-conditioning (HVAC) product using a furnace fan, a sample of sufficient size shall be randomly selected and tested to ensure that any represented value of fan energy rating (FER), rounded to the nearest integer, shall be greater than or equal to the higher of:

(i) The mean of the sample, where:

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

And, $\bar{x}$ is the sample mean; n is the number of samples; and x_i is the measured value for the ith sample; or,

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

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

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

(b) *Certification reports.* [Reserved]

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

■ 3. The authority citation for part 430 continues to read as follows:

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

■ 4. Section 430.3 is amended by:

■ a. Removing, in paragraph (f)(3) ''appendix M to subpart B'' and adding in its place ''appendix M and appendix AA to subpart B'';

■ b. Removing, in paragraph (f)(4), ''Reaffirmed 2001'' and adding in its place ''Reaffirmed 2006''; and removing ''appendix E and appendix M to subpart B'' and adding in its place ''appendices E, M, and AA to subpart B'';

■ c. Redesignating paragraph (f)(10) as (f)(11); and

■ d. Adding paragraph (f)(10);

The addition reads as follows:

§ 430.3 Materials incorporated by reference.

* * * * *

(f) * * *

(10) ANSI/ASHRAE Standard 103–2007, (''ASHRAE 103–2007''), Methods of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers, except for sections 7.2.2.5, 8.6.1.1, 9.1.2.2, 9.5.1.1, 9.5.1.2.1, 9.5.1.2.2, 9.5.2.1, 9.7.1, 11.2.12, 11.3.12, 11.4.12, 11.5.12 and appendices B and C, ASHRAE approved June 27, 2007, ANSI approved March 25, 2008, IBR approved for appendix AA to subpart B.

* * * * *

■ 5. Section 430.23 is amended by adding paragraph (cc) to read as follows:

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

* * * * *

(cc) *Furnace Fans.* The energy consumption of a single unit of furnace fan basic model expressed in watts per 1000 cubic feet per minute (cfm) to the nearest integer shall be calculated in accordance with appendix AA of this subpart.

■ 6. Appendix AA to subpart B of part 430 is added to read as follows:

Appendix AA to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Furnace Fans

Note: Any representation made after September 30, 2013 for energy consumption of furnace fans must be based upon results generated under this test procedure. Upon the compliance date(s) of any energy conservation standard(s) for furnace fans, use of the applicable provisions of this test procedure to demonstrate compliance with the energy conservation standard will also be required.

1. *Scope.* This appendix covers the test requirements used to measure the energy consumption of a furnace fan.

2. *Definitions.* Definitions include the definitions as specified in section 3 of ASHRAE 103–2007 (incorporated by reference, see § 430.3) and the following additional definitions, some of which supersede definitions found in ASHRAE 103–2007:

2.1. *Active mode* means the condition in which the product in which the furnace fan is integrated is connected to a power source and circulating air through ductwork.

2.2. *Airflow-control settings* are programmed or wired control system configurations that control a fan to achieve discrete, differing ranges of airflow—often designated for performing a specific function (*e.g.,* cooling, heating, or constant circulation)—without manual adjustment other than interaction with a user-operable control such as a thermostat that meets the manufacturer specifications for installed-use. For the purposes of this appendix, manufacturer specifications for installed-use shall be found in the product literature shipped with the unit.

2.3. *ASHRAE 103–2007* means ANSI/ASHRAE Standard 103–2007, published in 2007 by ASHRAE, approved by the American National Standards Institute (ANSI) on March 25, 2008, and entitled ''Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers''. Only those sections of ASHRAE 103–2007 (incorporated by reference; see

§ 430.3) specifically referenced in this test procedure are part of this test procedure. In cases where there is a conflict, the language of the test procedure in this appendix takes precedence over ASHRAE 103–2007.

2.4. *ANSI/ASHRAE Standard 41.1–1986 (RA 2006)* means the test standard published in 1986, approved by ANSI on February 18, 1987, reaffirmed in 2006, and entitled ''Standard Method for Temperature Measurement''.

2.5. *ASHRAE Standard 37–2005* means the test standard published in 2005 by ASHRAE entitled ''Methods of Testing for Rating Unitary Air-Conditioning and Heat Pump Equipment''.

2.6. *Default airflow-control settings* are the airflow-control settings specified for installed-use by the manufacturer. For the purposes of this appendix, manufacturer specifications for installed-use are those specifications provided for typical consumer installations in the product literature shipped with the product in which the furnace fan is installed. In instances where a manufacturer specifies multiple airflow-control settings for a given function to account for varying installation scenarios, the highest airflow-control setting specified for the given function shall be used for the procedures specified in this appendix.

2.7. *External static pressure* (ESP) means the difference between static pressures measured in the outlet duct and return air opening (or return air duct when used for testing) of the product in which the furnace fan is integrated.

2.8. *Furnace fan* is an electrically-powered device used in a consumer product for the purpose of circulating air through ductwork.

2.9. *Modular blower* means a product which only uses single-phase electric current, and which:

(a) Is designed to be the principal air circulation source for the living space of a residence;

(b) Is not contained within the same cabinet as a furnace or central air conditioner; and

(c) Is designed to be paired with HVAC products that have a heat input rate of less than 225,000 Btu per hour or cooling capacity less than 65,000 Btu per hour.

2.10. *Off mode* means the condition in which the product in which the furnace fan is integrated is either not connected to the power source or connected to the power source but not energized.

2.11. *Seasonal off switch* means a switch on the product in which the furnace fan is integrated that, when activated, results in a measurable change in energy consumption between the standby and off modes.

2.12. *Standby mode* means the condition in which the product in which the furnace fan is integrated is connected to the power source and the furnace fan is not circulating air.

2.13. *Thermal stack damper* means a type of stack damper that opens only during the direct conversion of thermal energy of the stack gases.

3. *Classifications.* Classifications are as specified in section 4 of ASHRAE 103–2007 (incorporated by reference, see § 430.3).

4. *Requirements.* Requirements are as specified in section 5 of ASHRAE 103–2007 (incorporated by reference, see § 430.3). In addition, Fan Energy Rating (FER) of furnace fans shall be determined using test data and estimated national average operating hours pursuant to section 10.10 of this appendix.

5. *Instruments.* Instruments must be as specified in section 6, except section 6.2, of ASHRAE 103–2007 (incorporated by reference, see § 430.3); and as specified in section 5.1 of this appendix.

5.1. *Temperature.* Temperature measuring instruments shall meet the provisions specified in section 5.1 of ASHRAE 37–2005 (incorporated by reference, see § 430.3) and shall be accurate to within 0.5 degree Fahrenheit.

5.1.1. *Outlet Air Temperature Thermocouple Grid.* Outlet air temperature shall be measured as described in section 8.2.1.5.5 of ASHRAE 103–2007 (incorporated by reference, see § 430.3) and illustrated in Figure 2 of ASHRAE 103–2007. If the temperature range of the nine individual measurements exceeds 1.5 °F, an air mixer as described in section 6 of ASHRAE 41.1–1986 (RA 2006) (incorporated by reference, see § 430.3) shall be used to reduce the temperature range to within 1.5 °F. Thermocouples shall be placed downstream of pressure taps used for external static pressure measurement.

6. *Apparatus.* The apparatus used in conjunction with the furnace during the testing shall be as specified in section 7 of ASHRAE 103–2007 (incorporated by reference, see § 430.3) except for section 7.1, the second paragraph of section 7.2.2.2, section 7.2.2.5, and section 7.7, and as specified in sections 6.1, 6.2, 6.3, 6.4, 6.5 and 6.6 of this appendix.

6.1. *General.* The product in which the furnace fan is integrated shall be installed in the test room in accordance with the product manufacturer's written instructions that are shipped with the product unless required otherwise by a specific provision of this appendix. The apparatus described in this section is used in conjunction with the product in which the furnace fan is integrated. Each piece of the apparatus shall conform to material and construction specifications and the reference standard cited. Test rooms containing equipment shall have suitable facilities for providing the utilities necessary for performance of the test and be able to maintain conditions within the limits specified.

6.2. *Downflow furnaces.* Install the internal section of vent pipe the same size as the flue collar for connecting the flue collar to the top of the unit, if not supplied by the manufacturer. Do not insulate the internal vent pipe during the jacket loss test (if conducted) described in section 8.6 of ASHRAE 103–2007 (incorporated by reference, see § 430.3) or the steady-state test described in section 9.1 of ASHRAE 103–2007. Do not insulate the internal vent pipe before the cool-down and heat-up tests described in sections 9.5 and 9.6, respectively, of ASHRAE 103–2007. If the vent pipe is surrounded by a metal jacket, do not insulate the metal jacket. Install a 5-ft test stack of the same cross sectional area or perimeter as the vent pipe above the top of the furnace. Tape or seal around the junction connecting the vent pipe and the 5-ft test stack. Insulate the 5-ft test stack with insulation having a minimum R-value of 7 and an outer layer of aluminum foil. (See Figure 3–E of ASHRAE 103–2007.)

6.3. *Modular Blowers.* A modular blower shall be equipped with the electric heat resistance kit that is likely to have the largest volume of retail sales with that particular basic model of modular blower.

6.4. *Ducts and Plenums.* An apparatus for measuring external static pressure as specified in sections 6.4 and 6.5 of ASHRAE 37–2005 (incorporated by reference, see § 430.3) shall be integrated in the plenum and test duct. External static pressure measuring instruments shall be placed between the furnace openings and any restrictions or elbows in the test plenums or ducts. For tests conducted using a return air duct, the external static pressure shall be directly measured as a differential pressure as depicted in Figure 8 of ASHRAE 37–2005 rather than determined by separately measuring inlet and outlet static pressure and subtracting the results. For tests conducted without a return air duct, the external static pressure shall be directly measured as the differential pressure between the duct static pressure and the ambient static pressure as depicted in Figure 7a of ASHRAE 37–2005.

6.5. *Air Filters.* Air filters shall be removed.

6.6. *Electrical Measurement.* Only electrical input power to the furnace fan shall be measured for the purposes of this appendix. Electrical input power to all other electricity-consuming components of the product in which the furnace fan is integrated shall not be included in the electrical input power measurements used in the FER calculation. If the procedures of this appendix are being conducted at the same time as another test that requires metering of components other than the furnace fan, the electrical input power to the furnace fan shall be sub-metered.

7. *Test Conditions.* The testing conditions shall be as specified in section 8, except for section 8.6.1.1, of ASHRAE 103–2007 (incorporated by reference, see § 430.3); and as specified in section 7.1 of this appendix.

7.1. *Measurement of Jacket Surface Temperature.* The jacket of the furnace or boiler shall be subdivided into 6-inch squares when practical, and otherwise into 36-square-inch regions comprising 4 in. × 9 in. or 3 in. × 12 in. sections, and the surface temperature at the center of each square or section shall be determined with a surface thermocouple. The 36-square-inch areas shall be recorded in groups where the temperature differential of the 36-square-inch area is less than 10 °F for temperature up to 100 °F above room temperature and less than 20 °F for temperature more than 100 °F above room temperature. For forced air central furnaces, the circulating air blower compartment is considered as part of the duct system and no surface temperature measurement of the blower compartment needs to be recorded for the purpose of this test. For downflow furnaces, measure all cabinet surface temperatures of the heat exchanger and combustion section, including the bottom around the outlet duct, and the burner door, using the 36 square-inch thermocouple grid.

The cabinet surface temperatures around the blower section do not need to be measured (*see* figure 3–E of ASHRAE 103–2007.)

8. *Test Procedure.* Testing and measurements shall be as specified in section 9 of ASHRAE 103–2007 (incorporated by reference, see § 430.3) except for sections 9.1.2.1, 9.3, 9.5.1.1, 9.5.1.2.1, 9.5.1.2.2, 9.5.2.1, and section 9.7.1; and as specified in sections 8.1 through 8.6 of this appendix.

8.1. *Direct Measurement of Off-Cycle Losses Testing Method.* [Reserved]

8.2. *Measurement of Electrical Standby and Off Mode Power.* [Reserved]

8.3. *Steady-State Conditions for Gas and Oil Furnaces.* Steady-state conditions are indicated by a temperature variation in three successive readings, taken 15 minutes apart, of not more than

(a) 1.5 °F in the stack gas temperature for furnaces equipped with draft diverters;

(b) 2.5 °F in the stack gas temperature for furnaces equipped with either draft hoods, direct exhaust, or direct vent systems; and

(c) 0.5 °F in the flue gas temperature for condensing furnaces.

8.4. *Steady-state Conditions for Electric Furnaces and Modular Blowers.* Steady state conditions are indicated by a temperature variation of not more than 1 °F in the outlet air temperature in four successive temperature readings taken 15 minutes apart.

8.5. *Steady-State Conditions for Cold Flow Tests.* For tests during which the burner or electric heating elements are turned off (*i.e.,* cold flow tests), steady-state conditions are indicated by a temperature variation of not more than 1 °F in the outlet air temperature in four successive temperature readings taken 15 minutes apart.

8.6. *Fan Energy Rating (FER) Test.*

8.6.1. *Initial FER test conditions and maximum airflow-control setting measurements.* The main burner or electric heating elements shall be turned off. The furnace fan controls shall be adjusted to the maximum airflow-control setting. The external static pressure shall be adjusted to the value shown in Table VI.1 by symmetrically restricting the outlet of the test duct. Maintain these settings until steady-state conditions are attained as specified in section 8.3, 8.4, and 8.5 of this appendix. Measure and record furnace fan electrical input power (E_{Max}) and external static pressure (ESP_{Max}).

TABLE VI.1—REQUIRED MINIMUM EXTERNAL STATIC PRESSURE IN THE MAXIMUM AIRFLOW-CONTROL SETTING BY INSTALLATION TYPE

Installation type	ESP (in.w.c.)
Units with an internal, factory-installed evaporator coil	0.50
Units designed to be paired with an evaporator coil, but without one installed	0.65
Manufactured home	0.30

Once the specified ESP has been achieved, the same outlet duct restrictions shall be used for the remainder of the furnace fan test.

8.6.2. *Constant circulation airflow-control setting measurements.* The furnace fan controls shall be adjusted to the default constant circulation airflow-control setting. If the manufacturer does not specify a constant circulation airflow-control setting, the lowest airflow-control setting shall be used. Maintain these settings until steady-state conditions are attained as specified in section 8.3, 8.4, and 8.5 of this appendix. Measure and record furnace fan electrical input power (E_{Circ}) and external static pressure (ESP_{Circ}).

8.6.3. *Heating airflow-control setting measurements.* For single-stage gas and oil furnaces, the burner shall be fired at the maximum heat input rate. Burner adjustments shall be made as specified by section 8.4.1 of ASHRAE 103–2007 (incorporated by reference, see § 430.3). For single-stage electric furnaces, the electric heating elements shall be energized at the maximum heat input rate. For multi-stage and modulating furnaces the reduced heat input rate settings shall be used. After the burner is activated and adjusted or the electric heating elements are energized, the furnace fan controls shall be adjusted to operate the fan in the default heat airflow-control setting. Maintain these settings until steady-state conditions are attained as specified in section 8.3, 8.4, and 8.5 of this appendix. Measure and record furnace fan electrical input power (E_{Heat}), external static pressure (ESP_{Heat}), flue or stack carbon dioxide concentration ($X_{CO2,a}$), flue or stack gas temperature ($T_{a,SS,X}$), and temperature rise (ΔT_{Heat}).

9. *Nomenclature.* Nomenclature shall include the nomenclature specified in section 10 of ASHRAE 103–2007 (incorporated by reference, see § 430.3) and the following additional variables:

CH = annual furnace fan cooling hours

CCH = annual furnace fan constant-circulation hours

E_{Circ} = furnace fan electrical consumption at the default constant-circulation airflow-control setting operating point (or minimum airflow-control setting operating point if a default constant-circulation airflow-control setting is not specified), in watts

E_{Heat} = furnace fan electrical consumption in the default heat airflow-control setting for single-stage heating products or the default low-heat setting for multi-stage heating products, in watts

E_{Max} = furnace fan electrical consumption in the maximum airflow-control setting, in watts

ESP_i = external static pressure, in inches water column, at time of the electrical power measurement in airflow-control setting *i,* where *i* can be ''Circ'' to represent constant-circulation (or minimum airflow) mode, ''Heat'' to represent heating mode, or ''Max'' to represent cooling (or maximum airflow) mode.

FER= fan energy rating, in watts/1000 cfm

HH = annual furnace fan heating operating hours

HCR = heating capacity ratio (reduced heat input capacity divided by maximum input heat capacity)

k_{ref} = physical descriptor characterizing the reference system

ΔT_i = air throughput temperature rise in setting *i,* in °F

Q_{Max} = airflow at maximum airflow-control setting at, in cubic feet per minute (CFM)

10. *Calculation of derived results from test measurements for a single unit.* Calculations shall be as specified in section 11 of ASHRAE 103–2007 (incorporated by reference, see § 430.3), except for appendices B and C; and as specified in sections 10.1 through 10.10 and Figure 1 of this appendix.

10.1. *Fan Energy Rating (FER)*

$$FER = \frac{(CH \times E_{Max}) + (HH \times E_{Heat}) + (CCH \times E_{Circ})}{(CH + 830 + CCH) \times Q_{Max}} \times 1000$$

Where:

$$Q_{Max} = Q_{Heat}\sqrt{\frac{ESP_{Max}}{ESP_{Heat}} \times \frac{(T_{Heat} + 460)}{[(T]_{Max} + 460)}}$$

; and

$$Q = \frac{(Effy_{SS} - L_J) \times Q_{IN} + (3413 \times E_{Heat})}{1.08 \times \Delta T}$$

The estimated national average operating hours presented in Table VI.2 shall be used to calculate FER.

TABLE VI.2—ESTIMATED NATIONAL AVERAGE OPERATING HOUR VALUES FOR CALCULATING FER

Operating mode	Variable	Single-stage (hours)	Multi-stage or modulating (hours)
Heating	HH	830	830/HCR
Cooling	CH	640	640
Constant Circulation	CCH	400	400

Where:

$$HCR = \frac{Q_{IN,R}}{Q_{IN}}$$

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA–2013–0186; Directorate Identifier 2013–NE–11–AD]

RIN 2120–AA64

Airworthiness Directives; General Electric Company Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: We propose to adopt a new airworthiness directive (AD) for certain General Electric Company (GE) GE90–76B, –85B, –90B, –94B, –110B1, and –115B turbofan engines. This proposed AD was prompted by multiple reports of failure of certain stage 1 high-pressure turbine (HPT) stator shrouds due to accelerated corrosion and oxidation. This proposed AD would require initial and repetitive on-wing borescope inspections (BSIs) for corrosion and oxidation, of the affected stage 1 HPT stator shrouds, and removal from service before further flight, if the parts fail the inspection. We are proposing this AD to prevent failure of the stage 1 HPT stator shrouds, resulting in in-flight shutdown of one or more engines, loss of thrust control, and damage to the airplane.

DATES: We must receive comments on this proposed AD by June 3, 2013.

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov.* Follow the instructions for submitting comments.
- *Fax:* 202–493–2251.
- *Mail:* U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- *Hand Delivery:* Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this proposed AD, contact General Electric Company, One Neumann Way, MD Y–75, Cincinnati, OH; phone: 513–552–2913; email: *geae.aoc@ge.com;* and Web site: *www.GE.com.* You may view the referenced service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781–238–7125.

Examining the AD Docket

You may examine the AD docket on the Internet at *http://www.regulations.gov;* or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this proposed AD, the regulatory evaluation, any comments received, and other information. The street address for the Docket Office (phone: 800–647–5527) is in the **ADDRESSES** section. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: Jason Yang, Aerospace Engineer, Engine Certification Office, FAA, 12 New England Executive Park, Burlington, MA 01803; phone: 781–238–7747; fax: 781–238–7199; email: *jason.yang@faa.gov.*

SUPPLEMENTARY INFORMATION:

Comments Invited

We invite you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under the **ADDRESSES** section. Include ''Docket No. FAA–2013–0186; Directorate Identifier 2013–NE–11–AD'' at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this proposed AD. We will consider all comments received by the closing date and may amend this proposed AD because of those comments.

We will post all comments we receive, without change, to *http://www.regulations.gov,* including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this proposed AD.