DEPARTMENT OF ENERGY

10 CFR Parts 429 and 430

[Docket No. EERE–2010–BT–TP–0039]

RIN 1904–AC27

Energy Conservation Program: Test Procedures for Residential Dishwashers, Dehumidifiers, and Conventional Cooking Products (Standby Mode and Off Mode)

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

ACTION: Supplemental notice of proposed rulemaking.

SUMMARY: Where appropriate, the U.S. Department of Energy (DOE) has proposed to amend its test procedures for residential dishwashers, dehumidifiers, and conventional cooking products (which includes cooktops, ovens, and ranges) to include provisions for measuring standby mode and off mode energy consumption, as required by the Energy Independence and Security Act of 2007 (EISA 2007). These test procedure amendments would incorporate by reference certain provisions of the International Electrotechnical Commission (IEC) Standard 62301, ''Household electrical appliances—Measurement of standby power.'' Since publication of DOE's initial proposal in December 2010, the IEC has replaced the First Edition of this standard with the current Second Edition. This supplemental notice of proposed rulemaking proposes to incorporate the latest edition of IEC Standard 62301.

DATES: DOE will accept comments, data, and information regarding this supplemental notice of proposed rulemaking (SNOPR) submitted no later than October 20, 2011. See section 0, ''Public Participation,'' for details.

ADDRESSES: Any comments submitted must identify the SNOPR for Test Procedures for Residential Dishwashers, Dehumidifiers, and Conventional Cooking Products, and provide docket number EERE–2010–BT–TP–0039 and/or Regulatory Information Number (RIN) 1904–AC27. Comments may be submitted using any of the following methods:

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

2. *E-mail: Res-DW-Dehumid-CookingProd-2010-TP-0039@ee.doe.gov.* Include docket number EERE–2010–BT–TP-0039 and/or RIN 1904–AC27 in the subject line of the message.

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

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.

Written comments regarding the burden-hour estimates or other aspects of the collection-of-information requirements contained in this proposed rule may be submitted to Office of Energy Efficiency and Renewable Energy through the methods listed above and by e-mail to *Christine_J._Kymn@omb.eop.gov.*

No telefacsimilies (faxes) will be accepted. For detailed instructions on submitting comments and additional information on the rulemaking process, see section V of this document (Public Participation).

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

A link to the docket web page can be found at: *http://www.regulations.gov/#!docketDetail;rpp=10;po=0;D=EERE-2010-BT-TP-0039.* This web page contains a link to the docket for this notice on the *http://www.regulations.gov* site. The *http://www.regulations.gov* web page contains simple instructions on how to access all documents, including public comments, in the docket. See section 0 for information on how to submit comments through *http://www.regulations.gov.*

For further information on how to submit a comment or review other public comments and the docket, contact Ms. Brenda Edwards at (202) 586–2945 or e-mail: *Brenda.Edwards@ee.doe.gov.*

FOR FURTHER INFORMATION CONTACT:

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

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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

[1] For editorial reasons, upon codification in the U.S. Code, Part B was redesignated Part 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 include residential dishwashers, conventional cooking products,[3] and dehumidifiers, the subject of today's notice. (42 U.S.C. 6292(a)(6) and (10); 6295(cc))

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

A. 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. EPCA provides in relevant part that ''[a]ny test procedures prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency, energy use * * * or estimated annual operating cost of a covered product during a representative average use cycle or period of use, as determined by the Secretary [of Energy], and shall not be unduly burdensome to conduct.'' (42 U.S.C. 6293(b)(3))

In addition, if DOE determines that a test procedure amendment is warranted, it must publish proposed test procedures and offer the public an opportunity to present oral and written comments on them. (42 U.S.C. 6293(b)(2)) Finally, in any rulemaking to amend a test procedure, DOE must determine ''to what extent, if any, the proposed test procedure would alter the measured energy efficiency * * * of any covered product as determined under the existing test procedure.'' (42 U.S.C. 6293(e)(1)) If DOE determines that the amended test procedure would alter the measured efficiency of a covered product, DOE must amend the applicable energy conservation standard accordingly. (42 U.S.C. 6293(e)(2))

On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA 2007), Public Law 110–140, was enacted. The EISA 2007 amendments to EPCA, in relevant part, require DOE to amend the test procedures for all residential covered products to include measures of standby mode and off mode energy consumption. Specifically, section 310 of EISA 2007 provides definitions of ''standby mode'' and ''off mode'' (42 U.S.C. 6295(gg)(1)(A)) and permits DOE to amend these definitions in the context of a given product (42 U.S.C. 6295(gg)(1)(B)). The statute requires integration of such energy consumption ''into the overall energy efficiency, energy consumption, or other energy descriptor for each covered product, unless the Secretary determines that—

(i) The current test procedures for a covered product already fully account for and incorporate the standby mode and off mode energy consumption of the covered product; or

(ii) Such an integrated test procedure is technically infeasible for a particular covered product, in which case the Secretary shall prescribe a separate standby mode and off mode energy use test procedure for the covered product, if technically feasible.'' (42 U.S.C. 6295(gg)(2)(A))

Under the statutory provisions adopted by EISA 2007, any such amendment must consider the most current versions of IEC Standard 62301, ''Household electrical appliances—Measurement of standby power,'' and IEC Standard 62087, ''Methods of measurement for the power consumption of audio, video, and related equipment.''[4] *Id.* At the time of the enactment of EISA 2007, the most current versions of these standards were IEC Standard 62301 (First Edition 2005–06) and IEC Standard 62087 (Second Edition 2008–09).

1. Dishwashers

DOE's test procedure for dishwashers is found in the Code of Federal Regulations (CFR) at 10 CFR part 430, subpart B, appendix C. DOE originally established its test procedure for dishwashers in 1977. 42 FR 39964 (August 8, 1977). Since that time, the dishwasher test procedure has undergone a number of amendments, as discussed below. In 1983, DOE amended the test procedure to revise the representative average-use cycles to more accurately reflect consumer use and to address dishwashers that use 120 °F inlet water. 48 FR 9202 (March 3, 1983). DOE amended the test procedure again in 1984 to redefine the term ''water heating dishwasher.'' 49 FR 46533 (Nov. 27, 1984). In 1987, DOE amended the test procedure to address models that use 50 °F inlet water. 52 FR 47549 (Dec. 15, 1987). In 2001, DOE revised the test procedure's testing specifications to improve testing repeatability, changed the definitions of ''compact dishwasher'' and ''standard dishwasher,'' and reduced the average number of use cycles per year from 322 to 264. 66 FR 65091, 65095–97 (Dec. 18, 2001). In 2003, DOE again revised the test procedure to more accurately measure dishwasher efficiency, energy use, and water use. The 2003 dishwasher test procedure amendments included the following revisions: (1) the addition of a method to rate the efficiency of soil-sensing products; (2) the addition of a method to measure standby power; and (3) A reduction in the average-use cycles per year from 264 to 215. 68 FR 51887, 51899–903 (August 29, 2003). The current version of the test procedure includes provisions for determining estimated annual energy use (EAEU), estimated annual operating cost (EAOC), energy factor (EF) expressed in cycles per kilowatt-hour (kWh), and water consumption expressed in gallons per cycle. 10 CFR 430.23(c).

2. Dehumidifiers

The DOE test procedure for dehumidifiers is found at 10 CFR 430, subpart B, appendix X. The Energy Policy Act of 2005 (EPACT 2005), Public Law 109–58, amended EPCA to specify that the U.S. Environmental Protection Agency's (EPA) test criteria used under the ENERGY STAR® [5] program must serve as the basis for the test procedure for dehumidifiers. (EPACT 2005, section 135(b); 42 U.S.C. 6293(b)(13)) The ENERGY STAR test criteria require that American National Standards Institute (ANSI)/Association of Home Appliance Manufacturers (AHAM) Standard DH–1–2003,

[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] The term ''conventional cooking products,'' as used in this notice, refers to residential electric and gas kitchen ovens, ranges, and cooktops (other than microwave ovens).

[4] EISA 2007 directs DOE to also consider IEC Standard 62087 when amending its test procedures to include standby mode and off mode energy consumption. *See* 42 U.S.C. 6295(gg)(2)(A). However, IEC Standard 62087 addresses the methods of measuring the power consumption of audio, video, and related equipment. Accordingly, the narrow scope of this particular IEC standard reduces its relevance to today's proposal.

[5] For more information on the ENERGY STAR program, see: *http://www.energystar.gov.*

''Dehumidifiers,'' be used to measure energy use and that the Canadian Standards Association (CAN/CSA) standard CAN/CSA–C749–1994 (R2005), ''Performance of Dehumidifiers,'' be used to calculate EF. DOE has adopted these test criteria, along with related definitions and tolerances, as its test procedure for dehumidifiers. 71 FR 71340, 71347, 71366–68 (Dec. 8, 2006). The DOE test procedure provides methods for determining the EF for dehumidifiers, which is expressed in liters (l) of water condensed per kWh.

3. Conventional Cooking Products

DOE's test procedures for conventional ranges, cooktops, and ovens (including microwave ovens) are found at 10 CFR 430, subpart B, appendix I. DOE first established the test procedures included in appendix I in a final rule published in the *Federal Register* on May 10, 1978. 43 FR 20108, 20120–28. DOE revised its test procedure for cooking products to more accurately measure their efficiency and energy use, and published the revisions as a final rule in 1997. 62 FR 51976 (Oct. 3, 1997). These test procedure amendments included: (1) a reduction in the annual useful cooking energy; (2) a reduction in the number of self-cleaning oven cycles per year; and (3) incorporation of portions of IEC Standard 705–1988, ''Methods for measuring the performance of microwave ovens for household and similar purposes,'' and Amendment 2–1993 for the testing of microwave ovens. *Id.* The test procedure for conventional cooking products establishes provisions for determining EAOC, cooking efficiency (defined as the ratio of cooking energy output to cooking energy input), and EF (defined as the ratio of annual useful cooking energy output to total annual energy input). 10 CFR 430.23(i); 10 CFR 430 subpart B, appendix I. These provisions for conventional cooking products are not currently used for compliance with any energy conservation standards (because those standards currently involve design requirements), nor is there an EnergyGuide [6] labeling program for cooking products.

DOE has initiated a separate test procedure rulemaking to address standby mode and off mode power consumption for microwave ovens. This rulemaking was initiated separately in response to comments from interested parties on the advance notice of proposed rulemaking (ANOPR) for an earlier rulemaking concerning energy conservation standards for residential dishwashers, dehumidifiers, cooking products, and commercial clothes washers published on November 15, 2007 (hereafter referred to as the November 2007 ANOPR) (72 FR 64432), prior to the enactment of EISA 2007. As discussed in the subsequent notice of proposed rulemaking (NOPR) for that standards rulemaking, interested parties stated generally that DOE should amend the test procedures for all types of cooking products to allow for measurement of standby mode energy use in order to implement a standby power energy conservation standard. 73 FR 62034, 62043–44 (Oct. 17, 2008). However, DOE did not receive any specific data or inputs on standby power consumption in conventional cooking products. Also, at that time, interested parties did not submit any comments regarding DOE addressing new measures of standby mode and off mode energy use in the test procedures or energy conservation standards for the other products that were the subject of the November 2007 ANOPR (*i.e.,* dishwashers and dehumidifiers). Because DOE agreed with the comments supporting new measures of standby mode and off mode energy use for microwave ovens and the potential for early adoption of an energy conservation standard for microwave ovens addressing standby mode and off mode energy consumption, DOE published a NOPR proposing amendments to just the microwave oven test procedure for standby mode and off mode in the **Federal Register** on October 17, 2008. 73 FR 62134. DOE subsequently published a supplemental notice of proposed rulemaking (SNOPR) in the **Federal Register** on this topic on July 22, 2010 (75 FR 42612), and an interim final rule on March 9, 2011 (hereafter referred to as the March 2011 Interim Final Rule) (76 FR 12825). DOE issued this as an interim final rule in order to allow comment on a newly issued version of IEC Standard 62301 (which is discussed in more detail in the following section) for measuring standby mode and off mode energy use, the previous version of which was incorporated by reference in the microwave oven test procedure. Consequently, DOE is proposing amendments to its cooking products test procedure for only conventional cooking products in today's SNOPR.

B. Standby Mode and Off Mode

Section 310 of EISA 2007 amended EPCA to require DOE to amend the test procedures for covered products to address standby mode and off mode energy consumption. Specifically, the amendments require DOE to integrate standby mode and off mode energy consumption into the overall energy efficiency, energy consumption, or other energy descriptor for that product unless the current test procedures already fully account for such consumption. If integration is technically infeasible, DOE must prescribe a separate standby mode and off mode energy use test procedure, if technically feasible. (42 U.S.C. 6295(gg)(2)(A)) Any such amendment must consider the most current versions of IEC Standard 62301, ''Household electrical appliances—Measurement of standby power,'' and IEC Standard 62087, ''Methods of measurement for the power consumption of audio, video, and related equipment.'' *Id.*

C. The December 2010 NOPR

On December 2, 2010, DOE published a NOPR (hereafter called the December 2010 NOPR) in which it proposed to incorporate by reference into the test procedures for dishwashers, dehumidifiers, and conventional cooking products specific provisions from IEC Standard 62301 ''Household electrical appliances—Measurement of standby power,'' First Edition 2005–06 (IEC Standard 62301 (First Edition) or ''First Edition'') regarding test conditions and test procedures for measuring standby mode and off mode power consumption. 75 FR 75290, 75295–97. DOE also proposed to incorporate into each test procedure the definitions of ''active mode,'' ''standby mode,'' and ''off mode'' that were based on the definitions for those terms provided in the most current draft at that time of an updated version of IEC Standard 62301. *Id.* at 75297–300. Further, DOE proposed to include in each test procedure additional language that would clarify the application of clauses from IEC Standard 62301 (First Edition) for measuring standby mode and off mode power consumption.[7] *Id.* at 75300–04. DOE held a public meeting on December 17, 2010, to receive comments on the December 2010 NOPR, and accepted written comments, data, and information until February 15, 2011. Commenters to the December 2010 NOPR suggested that the draft

[6] For more information on the EnergyGuide labeling program, see: *http://www.access.gpo.gov/nara/cfr/waisidx_00/16cfr305_00.html.*

[7] EISA 2007 directs DOE to also consider IEC Standard 62087 when amending its test procedure to include standby mode and off mode energy consumption. See 42 U.S.C. 6295(gg)(2)(A). However, IEC Standard 62087 addresses the methods of measuring the power consumption of audio, video, and related equipment. The narrow scope of this particular IEC standard reduces its relevance to today's proposal.

updated version of IEC Standard 62301 would provide practical improvement to the mode definitions and testing methodology for the test procedures that are the subject of this rulemaking.

II. Summary of the Supplemental Notice of Proposed Rulemaking

Based upon the public comment received on the December 2010 NOPR, DOE decided to further analyze the draft materials associated with IEC Standard 62301 (Second Edition), which were in an advanced stage of development. Shortly thereafter, the IEC adopted and published IEC Standard 62301, ''Household electrical appliances—Measurement of standby power,'' Edition 2.0 2011–01 (IEC Standard 62301 (Second Edition) or ''Second Edition'') on January 27, 2011. Consistent with its statutory mandate, DOE has reviewed this latest version of the IEC standard and agrees that it does provide for improvement for some measurements of standby mode and off mode energy use. Accordingly, DOE proposes in today's SNOPR to incorporate certain provisions of the IEC Standard 62301 (Second Edition), along with clarifying language, into the DOE test procedures for residential dishwashers, dehumidifiers, and conventional cooking products. Other than the specific amendments newly proposed in today's SNOPR, DOE continues to propose the test procedure amendments originally included in the December 2010 NOPR. For the reader's convenience, DOE has reproduced in this SNOPR the entire body of proposed regulatory text from the December 2010 NOPR for the residential dishwasher, dehumidifier, and conventional cooking products test procedures, further amended as appropriate according to today's proposals. DOE's supporting analysis and discussion for the portions of the proposed regulatory text not affected by this SNOPR may be found in the December 2010 NOPR. 75 FR 75290 (Dec. 2, 2010).

III. Discussion

A. Incorporation of IEC Standard 62301 (Second Edition)

As noted above, EPCA, as amended by EISA 2007, requires that test procedures be amended to include standby mode and off mode energy consumption, taking into consideration the most current versions of IEC Standards 62301 and 62087. (42 U.S.C. 6295(gg)(2)(A)) The December 2010 NOPR proposed to incorporate in the test procedures for dishwashers, dehumidifiers, and conventional cooking products relevant provisions from IEC Standard 62301 (First Edition) for measuring standby mode and off mode power. The amended test procedures would use these measured wattages in calculations to accomplish the incorporation of standby mode and off mode energy consumption into the test procedures. DOE reviewed the IEC Standard 62301 (First Edition) and tentatively concluded that it would be generally applicable to dishwashers, dehumidifiers, and conventional cooking products, although some clarification would be needed. Specifically, DOE proposed in the December 2010 NOPR for standby mode and off mode power measurements to provide a stabilization period of at least 30 minutes followed by an energy use measurement period of not less than 10 minutes for each of the covered products. 75 FR 75290, 75300 (Dec. 2, 2010). Additionally, for conventional cooking products, DOE proposed a specific standby mode power measurement methodology for units in which power varies as a function of displayed time. 75 FR 75290, 75302–04 (Dec. 2, 2010). With these clarifications in place, the December 2010 NOPR proposed to reference IEC Standard 62301 (First Edition) for the standby mode and off mode wattage measurements. (DOE notes that IEC Standard 62301 (First Edition) has been incorporated by reference in 10 CFR 430.3, ''Materials incorporated by reference,'' as part of recent final amendments to the furnace and boiler test procedure. 75 FR 64621 (Oct. 20, 2010).)

DOE noted in the December 2010 NOPR that there were expected to be significant differences between the first and second editions of IEC Standard 62301, based upon DOE's review of the Final Draft International Standard (FDIS) version available at that time. 75 FR 75290, 75296 (Dec. 2, 2010). For example, IEC Standard 62301 (FDIS) modified certain provisions, such as clarifying the definition of ''standby mode'' and ''off mode'' to allow for the measurement of multiple standby power modes.

As part of the December 2010 NOPR, DOE reviewed IEC Standard 62301 (FDIS) and anticipated that, once finalized, it would ultimately define the various modes differently than IEC Standard 62301 (First Edition). 75 FR 75290, 75296–97 (Dec. 2, 2010). IEC Standard 62301 (FDIS) incorporated responses to comments from multiple national committees from member countries on several previous draft versions, and thus, DOE believed, it provided the best available mode definitions. Although the revised IEC Standard 62301 (Second Edition) had not yet been officially released, DOE decided to consider the substance of the new operational mode definitions from the draft version IEC Standard 62301 (FDIS) for the December 2010 NOPR. *Id.* DOE noted that the mode definitions in IEC Standard 62301 (FDIS) were substantively similar to those in the previous draft version (IEC Standard 62301 Committee Draft for Vote (CDV)), which were the subject of extensive comments from interested parties during recent DOE test procedure rulemakings addressing standby mode and off mode energy use in other products (*i.e.,* microwave ovens, clothes dryers, and room air conditioners). In those instances, interested parties indicated general support for adopting the mode definitions provided in IEC Standard 62301 (CDV). Due to the effective equivalence of the mode definitions in IEC Standard 62301 (CDV) and IEC Standard 62301 (FDIS), DOE stated in the December 2010 NOPR that the public comment support expressed for the mode definitions in IEC Standard 62301 (CDV) would extend to those in IEC Standard 62301 (FDIS). 75 FR 75290, 75297 (Dec. 2, 2010).

After considering both versions of IEC Standard 62301 (*i.e.,* First Edition and FDIS), DOE tentatively concluded in the December 2010 NOPR that the definitions of ''standby mode,'' ''off mode,'' and ''active mode'' provided in IEC Standard 62301 (FDIS) were the most useful, in that they expanded upon the EPCA mode definitions and provided additional guidance as to which functions would be associated with each mode. Therefore, DOE proposed definitions of ''standby mode,'' ''off mode,'' and ''active mode'' based on the definitions provided in IEC Standard 62301 (FDIS) in the December 2010 NOPR. *Id.*

DOE noted in the December 2010 NOPR that other significant changes in the methodology of IEC Standard 62301 were first introduced only at the FDIS stage. DOE noted that those changes had not been, at that time, the subject of significant public comment from interested parties, nor had DOE had the opportunity to conduct a thorough analysis of those provisions. 75 FR 75290, 75297 (Dec. 2, 2010). Consequently, the merits of those latest changes had not been fully vetted, as would demonstrate that they would be preferable to the methodological provisions in IEC Standard 62301 (First Edition). Thus, DOE stated it was not able to determine whether the updated methodology represented the best available means to measure standby mode and off mode energy use. DOE,

therefore, tentatively decided to base the proposed test procedure amendments (other than mode definitions) on the provisions of IEC Standard 62301 (First Edition). *Id.* (DOE notes that while the statute requires consideration of the latest version of IEC 62301, it does not require the agency to ignore other draft versions that have achieved an advanced level of vetting, such as IEC Standard 62301 (FDIS), which had already been out for a final vote among members.)

In response to the December 2010 NOPR, DOE received comments from interested parties regarding the appropriate version of IEC Standard 62301 to use in its test procedures to measure standby mode and off mode energy use. Comments made at the public meeting were predicated upon IEC Standard 62301 (FDIS) being the most current, albeit draft, version of the updated standard. By the time the NOPR comment period ended on February 15, 2011, IEC Standard 62301 (Second Edition) had published, and thus, interested parties were able to consider this version as the most current in their written submissions to DOE.

Pacific Gas and Electric Company (PG&E), Southern California Gas Company, San Diego Gas and Electric, and Southern California Edison (jointly ''the California Utilities'') supported harmonizing with the mode definitions in IEC Standard 62301 (FDIS). (California Utilities, No. 16 at p. 3; PG&E, No. 17 at p. 3) [8] The Association of Home Appliance Manufacturers (AHAM), Northwest Energy Efficiency Alliance (NEEA), and Whirlpool Corporation (Whirlpool) supported basing the methodology as well as mode definitions on the FDIS or Second Edition of IEC Standard 62301. (AHAM, Public Meeting Transcript, No. 10 at pp. 27–30, 36 [9]; NEEA, No. 11 at pp. 1–2, 5–6; Whirlpool, No. 12 at pp. 1–2) AHAM and Whirlpool supported the use of IEC Standard 62301 (Second Edition) for reasons of: (1) international harmonization; (2) clarity and consistency in testing; and (3) reduced manufacturer test burden. (Whirlpool, No. 12 at pp. 1–2, AHAM, No. 14 at p. 3)

AHAM noted that IEC Standard 62301 (FDIS), and subsequently IEC Standard 62301 (Second Edition), contain a number of important clarifications that were not present in IEC Standard 62301 (First Edition) or IEC Standard 62301 (CDV) and that would provide more accurate testing and measurement. Specifically, AHAM identified new or expanded sections on the measurement of power uncertainty, crest factor, power measurement frequency response, sampling methods, average reading methods for non-cyclic loads, and instrument measurement methods. AHAM opined that these provisions become critical in light of DOE's announced intent to require third-party testing and verification testing of very small amounts of energy in standby mode. AHAM also commented that it would be difficult to pick and choose specific sections to adopt, because IEC Standard 62301 is intended to be read as a whole and that picking certain sections out may cause problems in how they are interpreted. For example, AHAM argued that picking out a definition from IEC Standard 62301 (FDIS) and then combining that with incorporation by reference to IEC Standard 62301 (First Edition) would be inconsistent. (AHAM, No. 14 at p. 3; AHAM, Public Meeting Transcript, No. 10 at pp. 27–30)

NEEA stated that DOE has the regulatory flexibility to adjust mode definitions and test methods if it believes that a definition or procedure other than that in IEC Standard 62301 would be more appropriate. On this point, NEEA argued that IEC Standard 62301 (First Edition) is inadequate for comprehensively capturing the energy use of the broad array of products and modes that DOE is trying to cover. NEEA commented that IEC Standard 62301 (FDIS) is particularly suitable for operational modes that have cyclic or unstable power consumption. NEEA commented that any measurement period that is 5 minutes or less, as allowed in IEC Standard 62301 (First Edition), is likely to be insufficient for capturing the energy use for these modes. However, NEEA also stated there could be certain specific modes for which the less complicated procedures from IEC Standard 62301 (First Edition) might be more suitable, specifically, if DOE includes cycle-finished mode as part of active mode rather than inactive (standby) mode.[10] (NEEA, No. 11 at pp. 1–2, 5–6)

Because IEC Standard 62301 (Second Edition) was issued on January 27, 2011, it became the most current version under the EPCA requirements at the time DOE considered comments on the December 2010 NOPR. Accordingly, DOE then conducted a comparative review of the FDIS and Second Edition versions of IEC Standard 62301, and the results of this review demonstrated that the provisions of the Second Edition are identical in substance to those of the FDIS version. Therefore, DOE interprets comments on IEC Standard 62301 (FDIS) to be equally applicable to IEC Standard 62301 (Second Edition).

DOE agrees with the commenters that IEC Standard 62301 (Second Edition) is an internationally-accepted test procedure for measuring standby power in residential appliances, and that this version provides clarification to certain sections as compared to the First Edition. Specifically, section 4, paragraph 4.4 of the Second Edition revises the power measurement accuracy provisions that were present in the First Edition. A more comprehensive specification of required accuracy is provided in the Second Edition, which depends upon the characteristics of the power being measured. Testers using the Second Edition are required to measure the crest factor and power factor of the input power, and to calculate a maximum current ratio (MCR). The Second Edition then specifies calculations to determine permitted uncertainty in MCR. DOE notes, however, that the allowable uncertainty is the same or less stringent than the allowable uncertainty specified in the First Edition, depending on the value of MCR and the power level being measured (see Table 0.1 for examples),

[8] A notation in the form ''PG&E, No. 17 at p. 3'' identifies a written comment: (1) Made by Pacific Gas and Electric Company; (2) recorded in document number 17 that is filed in the docket of the residential dishwasher, dehumidifier, and conventional cooking products test procedures rulemaking (Docket No. EERE–2010–BT–TP–0039) and available for review at *http://www.regulations.gov;* (3) which appears on page 3 of document number 17.

[9] A notation in the form ''AHAM, Public Meeting Transcript, No. 10 at pp. 27–30, 36'' identifies an oral comment that DOE received during the December 17, 2010, NOPR public meeting, was recorded in the public meeting transcript in the docket for the residential dishwasher, dehumidifier, and conventional cooking products test procedures rulemaking (Docket No. EERE–2010–BT–TP–0039), and is available for review at *http://www.regulations.gov.* This particular notation refers to a comment: (1) Made by the Association of Home Appliance Manufacturers during the public meeting; (2) recorded in document number 10, which is the public meeting transcript that is filed in the docket of the residential dishwasher, dehumidifier, and conventional cooking products test procedures rulemaking; and (3) which appears on pages 27–30 and 36 of document number 10.

[10] DOE proposed in the December 2010 NOPR to define ''active mode'' for dishwashers, dehumidifiers, and conventional cooking products as ''the condition in which the energy-using product is connected to a main power source, has been activated, and provides one or more main functions.'' DOE proposed to define ''inactive mode'' for dishwashers, dehumidifiers, and conventional cooking products as ''a standby mode that facilitates the activation of active mode by remote switch (including remote control), internal sensor, or timer, or that provides continuous status display.'' DOE proposed to define ''cycle finished mode'' for dishwashers and conventional cooking products as ''a mode which provides continuous status display following operation in active mode.'' 75 FR 75290, 75297–9 (Dec. 2, 2010).

so that sufficient accuracy of measurements is achieved under a full range of possible measured power levels without placing undue demands on the instrumentation. In addition, the wattage variations associated with the allowable uncertainty in power measurements are so small in relation to overall energy use that they would not result in measurable changes in the overall efficiency metric for dishwashers, dehumidifiers, or conventional cooking products. These power measurement accuracy requirements were based upon detailed technical submissions to the IEC in the development of IEC Standard 62301 (FDIS), which showed that commonly-used power measurement instruments were unable to meet the original requirements for certain types of loads. Therefore, DOE believes that the incremental testing burden associated with the additional measurements and calculations is offset by the more reasonable requirements for testing equipment, while maintaining measurement accuracy deemed acceptable and practical by voting members for IEC Standard 62301 (Second Edition). For these reasons, DOE proposes in today's supplemental notice to incorporate by reference the power equipment specifications in section 4, paragraph 4.4 of IEC Standard 62301 (Second Edition).

TABLE III.1—COMPARISON OF ALLOWABLE UNCERTAINTY IN MEASURED POWER

Measured power *(W)*	Allowable uncertainty *(W)*		
	IEC 62301 (First edition)	IEC 62301 (Second edition)	
		MCR = 5	MCR = 15
5.0	0.1	0.1	0.14
2.0	0.04	0.04	0.056
1.0	0.02	0.02	0.028
0.5	0.01	0.02	0.02
0.2	0.01	0.02	0.02

Additionally, IEC Standard 62301 (Second Edition) adds certain clarifications to the installation and setup procedures in section 5, paragraph 5.2 of the First Edition regarding products equipped with battery recharging circuits, as well as instructions for testing each relevant configuration option identified in the product's instructions for use. DOE is not aware of any dishwashers, dehumidifiers, or conventional cooking products with a recharging circuit. DOE also believes that a requirement to separately test each configuration option could substantially increase test burden and potentially conflicts with the requirement within the same section to set up the product in accordance with the instructions for use or, if no such instructions are available, to use the factory or ''default'' settings. Therefore, DOE tentatively concludes that the portions of the installation instructions in section 5, paragraph 5.2 of IEC Standard 62301 (Second Edition) pertaining to batteries and the requirement for the determination, classification, and testing of all modes associated with every combination of available product configuration options (which may be more numerous than the modes associated with operation at the default settings) are not appropriate for the dishwasher, dehumidifier, and conventional cooking products test procedures. Accordingly, DOE is proposing qualifying language in the test procedure amendments for these products to disregard those portions of the installation instructions.

The other major changes in the Second Edition that relate to the measurement of standby mode and off mode power consumption in covered products involve the measurement techniques and specification of the stability criteria required to measure that power. The Second Edition contains more detailed techniques to evaluate the stability of the power consumption and to measure the power consumption for loads with different stability characteristics. According to the Second Edition, the user is given a choice of measurement procedures, including sampling methods, average reading methods, and a direct meter reading method. DOE evaluated these new methods in terms of test burden and improvement in results as compared to those methods proposed in the December 2010 NOPR, which were based on IEC Standard 62301 (First Edition).

In the December 2010 NOPR, DOE proposed for all covered products to require measurement of standby mode and off mode power using section 5, paragraph 5.3 of IEC Standard 62301 (First Edition), clarified by requiring the product to stabilize for at least 30 minutes and using an energy use measurement period of not less than 10 minutes. Further, for any dishwasher or dehumidifier in which the power varies over a cycle, as described in section 5, paragraph 5.3.2 of the First Edition, the December 2010 NOPR proposed to require the use of the average power approach in section 5, paragraph 5.3.2(a), with the same 30-minute minimum stabilization and 10-minute minimum measurement periods, as long as the measurement period comprises one or more complete cycles. 75 FR 75290, 75300–01 (Dec. 2, 2010). DOE additionally proposed specific methodology for conventional cooking products in which power varies as a function of the time displayed. In that case, testers are allowed to choose measuring standby power by means of either:

(a) *10-Minute Test*

(1) Allow the product to stabilize according to section 5, paragraph 5.3 of IEC Standard 62301 (First Edition), which requires a minimum of 5 minutes;

(2) Set the clock time to 3:23;

(3) Allow another stabilization period until the clock time reaches 3:33;

(4) Use the average power approach in section 5, paragraph 5.3.2(a) to measure standby mode power for a period of 10 minutes +0/−2 seconds; or

(b) *12-Hour Test*

(1) At any clock time, allow the product to stabilize according to section 5, paragraph 5.3 of IEC Standard 62301 (First Edition), which requires a minimum of 5 minutes;

(2) Use the average power approach in section 5, paragraph 5.3.2(a) to measure standby mode power for a period of 12 hours +0/−30 seconds.

According to the proposal, manufacturers could elect to conduct either a 10-minute test or a 12-hour test, or both, and results of the 10-minute test that are within ± 2 percent of the results for the 12-hour test would be deemed to

be representative of average energy use. *Id.* at 75302–04, 75328.

For today's supplemental notice, to determine the potential impacts of referencing methodology from IEC Standard 62301 (Second Edition) rather than from the First Edition, DOE compared the provisions allowed by each under different scenarios of power consumption stability.

1. *Stable Power Consumption*

According to section 5, paragraph 5.3.1 of IEC Standard 62301 (First Edition), power consumption is defined as stable if it varies by less than 5 percent over 5 minutes. In such a case, a direct reading may be made at the end of the measurement period. With the proposed clarifications in the December 2010 NOPR, the total test time would be at minimum 40 minutes (comprised of a minimum 30-minute stabilization period, followed by a minimum 10-minute period during which the stability criterion could be evaluated and a direct power reading taken.) Alternatively, the tester may select an average power or accumulated energy approach, again with a minimum 30-minute stabilization period and a minimum 10-minute measurement period. The average power approach would simply require a different reading to be taken from the instrument (true average power instead of a direct reading of instantaneous power), while the accumulated energy approach would require the calculation of power by dividing an accumulated energy by the duration of the measurement period.

In comparison, section 5, paragraph 5.3.4 of IEC Standard 62301 (Second Edition) specifies a direct meter reading method that can be used for stable power consumption, in which a minimum 30-minute stabilization period must be observed, followed by a first power measurement. After an additional period of 10 minutes, a second power measurement is taken. If the average of the two measurements divided by the time interval between them meets certain threshold criteria, then the power consumption is considered to be the average of the two power measurements. Thus, the total test period would still be at minimum 40 minutes. DOE agrees that this method likely improves the validity of the test results, as it is a more stringent measure of the stability of the power consumption over a longer period of time than the First Edition requires. However, if the threshold criteria are not met at the end of the test, a different measurement method must be used, increasing test time and complexity. Further, the Second Edition specifies that the direct reading method shall not be used for verification purposes. Both of these qualifications potentially increase test burden as compared to the First Edition, possibly requiring the tester to conduct the more complex methodology of the methods available under the Second Edition.

DOE notes that section 5, paragraph 5.3.2 of IEC Standard 62301 (Second Edition) identifies a sampling method as the preferred means for all power consumption measurements and the fastest test method when the power is stable. For any non-cyclic power consumption, power readings are initially recorded over a period of at least 15 minutes after energizing the product. Data from the first third of the measurement period are discarded, and stability is evaluated by a linear regression through all power readings in the second two-thirds of the data. If the slope of the linear regression is less than 10 milliwatts per hour (mW/h) for input power less than or equal to 1.0 W, or less than 1 percent of the input power per hour for input power greater than 1.0 W, the power consumption is calculated as the average of the power readings during the second two-thirds of the measurement period. If the slope of the linear regression does not meet these stability criteria, the total period is continuously extended until the stability criteria are met for the second two-thirds of the data. In some cases, this is a more stringent requirement than the stability criteria of IEC Standard 62301 (First Edition). The lack of a definitive test period means that the test duration could extend past 15 minutes for certain products—up to 3 hours is allowed in the Second Edition—and could introduce added test burden as compared to the First Edition.

2. Unstable, Non-Cyclic Power Consumption

Section 5, paragraph 5.3 from IEC Standard 62301 (First Edition), which DOE proposed in the December 2010 NOPR to incorporate by reference with clarification, specifies that either an average power method or accumulated energy approach could be used for measuring non-cyclic unstable power consumption. As described previously, the clarifications proposed in the December 2010 NOPR would limit total test duration to 40 minutes.

In contrast, the Second Edition requires the use of either a sampling method or average reading method for measuring power consumption in standby mode or off mode. The sampling method is the same as described previously, but the measurement period must be at least 60 minutes, and the cumulative average of all data points recorded during the second two-thirds of the total period must fall within a band of ± 0.2 percent.

The average reading method in section 5, paragraph 5.3.3 IEC Standard 62301 (Second Edition) comprises both an average power method and accumulated energy method, either of which may be selected for unstable, non-cyclic power. For both types of the average reading method, a 30-minute stabilization period is specified, followed by two comparison measurement periods of not less than 10 minutes each. The average power values, either measured directly or calculated from accumulated energy during each period, are compared to determine whether they agree to within certain threshold criteria. If the threshold is not achieved, the comparison periods are each extended in approximately equal increments until the threshold is met. If agreement is not achieved after reaching 30 minutes for each comparison period, the sampling method must then be used. Therefore, the minimum test period is 50 minutes, but may extend up to 90 minutes, at which time an additional test may be required.

DOE believes that the stability criteria in either method improves the accuracy and representativeness of the measurement as compared to the First Edition, but would cause the required test time to increase (potentially quite significantly), with a corresponding increase in manufacturer burden due to the additional time and complexity of the test conduct.

3. Cyclic Power Consumption

Dishwashers and Dehumidifiers

As noted previously, DOE proposed in the December 2010 NOPR for these products to use the average power approach of section 5, paragraph 5.3.2(a) in IEC Standard 62301 (First Edition), with a minimum 30-minute stabilization period and 10-minute measurement period. The First Edition also requires that at least one or more complete cycles be measured.

In the Second Edition, cyclic power must be measured according to the sampling method in section 5, paragraph 5.3.2, but this method requires a measurement period of at least four complete cycles (for a total of at least 40 minutes) divided into two comparison periods, with stability criteria evaluated by calculating the difference in average power measured in each comparison period divided by the time difference of the mid-point of each

comparison period. This ''slope'' must be less than 10 mW/h for input powers less than or equal to 1 W, and less than 1 percent of the input power per hour for input powers greater than 1 W. If the appropriate stability criterion is not met, additional cycles are added to each comparison period until the criterion is achieved. Once stability has been reached, the power consumption is calculated as the average of all readings from both comparison periods. DOE believes that this methodology produces an improved measurement over the methodology from the First Edition, but the test duration could extend significantly longer, again potentially introducing issues of increased test burden.

Conventional Cooking Products

For conventional cooking products in which standby mode power consumption varies as a function of displayed time, DOE proposed in the December 2010 NOPR to require the use of either the 10-minute or 12-hour test methodology described previously, based on the average power approach of section 5, paragraph 5.3.2(a) of IEC Standard 62301 (First Edition). If the results of the 10-minute test agree to within ±2 percent with the results of the 12-hour test, the 10-minute test results would be deemed representative and would require a minimum of 25 minutes to conduct. If a full 12-hour test is used, total test duration would be 12 hours and 5 minutes.

Under the Second Edition, testers would be required to use the sampling method of section 5, paragraph 5.3.2 for conventional cooking products that consume varying power as a function of the displayed time due to the cyclic nature of this power consumption. Because all of the clock displays which DOE observed to be incorporated in conventional cooking products are based on a 12-hour cycle, such a product which consumes varying power as a function of the displayed time would be required under the Second Edition to be tested for a minimum of 4 cycles, or 48 hours, in addition to an initial stabilization period of not less than 10 minutes. DOE notes that this test duration would impose a greatly increased test burden on manufacturers, particularly in comparison to the previously proposed 10-minute methodology.

4. Conclusions on Test Methodology

DOE, in evaluating IEC Standard 62301 (Second Edition) in comparison to the First Edition, confers substantial weight to the considerable body of comments on and input to the provisions and methodology that IEC developed as part of its latest revision process. DOE recognizes that, in some cases, test burden and complexity would be increased by requiring the use of the test methods specified in the Second Edition. However, DOE believes that in most cases, this added burden on manufacturers has been sufficiently considered by the IEC voting members as being outweighed by the improved accuracy and representativeness of the resulting power consumption measurement. Furthermore, manufacturers were aware of these differences, but nevertheless, they overwhelmingly expressed support for DOE's use of the Second Edition. In particular, DOE tentatively concludes that the application of the provisions of the Second Edition to all power measurements in standby mode and off mode for dishwashers and dehumidifiers would be appropriate, and is proposing incorporation by reference of the relevant paragraphs of section 5.3 of IEC Standard 62301 (Second Edition) in the test procedures for these products. Further, DOE observes that although the Second Edition allows the choice of multiple test methods for both stable and unstable non-cyclic power consumption, the IEC preferred sampling method provides for a test duration that is approximately the same or shorter than the allowable IEC alternative methods and does not require classification of the nature of the power consumption (*e.g.,* stable or unstable, non-cyclic) in advance of the test. By monitoring the variation in power consumption during the test, the test operator could determine whether it is stable or unstable, and, thus, the required duration of the sampling periods. For cyclic power consumption, the Second Edition requires the use of the sampling method. Thus, DOE proposes in today's SNOPR to specify the use of the sampling method in section 5.3.2 of IEC Standard 62301 (Second Edition) for all measures of standby mode and off mode power consumption for residential dishwashers and dehumidifiers.

Similarly, for conventional cooking products, DOE has tentatively concluded that section 5.3 of the Second Edition includes provisions that are appropriate for measuring off mode and standby modes (except in the case of a unit's clock whose power consumption varies by the time displayed), and that the sampling method in section 5.3.2 of the Second Edition would also provide for measurements with minimal test burden. Thus, DOE proposes for conventional cooking products to require the use of the sampling method in section 5.3.2 of the Second Edition, except as follows. In the narrow case of cooking products with power consumption that varies as a function of the time displayed, DOE tentatively concludes that the application of the test methodology from the Second Edition would cause manufacturers to incur significant burden that would not be warranted by any potential improved accuracy of the test measurement. For this reason, DOE continues to propose in this supplemental notice the 10-minute and 12-hour test methods for these products in the conventional cooking products test procedure. Because DOE proposes to base the other provisions incorporated by reference from IEC Standard 62301 on the Second Edition, DOE has revised its proposal regarding the 10-minute and 12-hour tests to include language equivalent to the average power method from the First Edition, without incorporating the First Edition by reference.

To this end, this supplemental notice is also proposing to amend the reference in 10 CFR 430.3 to add a reference to IEC Standard 62301 (Second Edition). DOE is not proposing to replace the reference to the First Edition in 10 CFR 430.3, because several test procedures for other covered products not addressed in today's supplemental notice incorporate provisions from it. In addition, there are a number of editorial changes necessary in the various appendices addressed in today's supplemental notice to allow for the correct referencing to the Second Edition. For example, the definition sections need to define the IEC Standard 62301 as the Second Edition instead of the First Edition. Also, there are some section numbering differences in the Second Edition which impact the text of the measurement provisions of the relevant test procedures.

DOE further notes that the proposed amendments to the cooking products test procedure would retain the references to certain provisions of IEC Standard 62301 (First Edition) which were adopted in the March 2011 Interim Final Rule for the purposes of measuring standby mode and off mode energy use in microwave ovens. As discussed above, the March 2011 Interim Final Rule invited comments on the merits of adopting additional provisions of IEC Standard 62301 (Second Edition) in the microwave oven test procedure (76 FR 12825, 12833 (March 9, 2011)), but at this time, DOE has not revised its microwave oven test procedure accordingly. Because today's supplemental notice addresses such

energy use for conventional cooking products but not microwave ovens, DOE is not proposing to remove or amend the references to the First Edition in the cooking products test procedure, which contains both types of products, other than to clarify that the First Edition is being referenced for microwave ovens rather than the Second Edition. DOE's proposal for conventional cooking products, based on relevant sections of IEC Standard 62301 (Second Edition) would neither be affected by, nor impact, the testing procedures for microwave ovens other than section renumbering as appropriate.

B. Technical Corrections

Due to a transcription error in publication, the December 2010 NOPR erroneously specified certain dates in the regulatory text for the proposed test procedure amendments. Specifically, the December 2010 NOPR indicated that representations as to energy use in standby mode and off mode for dishwashers, conventional cooking products, and dehumidifiers made after May 31, 2011, would have to be based upon the proposed amended dishwasher test procedure in 10 CFR part 430, subpart B, appendix C, the amended conventional cooking products test procedure in appendix I, and the amended dehumidifier test procedure in appendix X. 75 FR 75290, 75324, 75326, 75333 (Dec. 2, 2010). Similarly, the compliance date was erroneously specified in the December 2010 NOPR as May 31, 2011, in the calculations of dishwasher estimated annual operating cost and estimated annual energy use that incorporate measures of standby mode and off mode energy use, as proposed for the test procedures in 10 CFR 430.23(c). 75 FR 75290, 75321–22 (Dec. 2, 2010). In each of these instances, the December 2010 NOPR should have specified the date as ''180 days after date of publication of the test procedure final rule in the **Federal Register**.'' DOE is proposing to make this correction to the dates in today's SNOPR, and clarifies that manufacturers would not be subject to a May 31, 2011, deadline for any of the products as part of this rulemaking.

C. Compliance With Other EPCA Requirements

1. Test Burden

EPCA requires that ''[a]ny test procedures prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency, energy use * * * or estimated annual operating cost of a covered product during a representative average use cycle or period of use * * * and shall not be unduly burdensome to conduct.'' (42 U.S.C. 6293(b)(3))

In the December 2010 NOPR, DOE noted that the proposed amendments to the residential dishwasher, dehumidifier, and conventional cooking products test procedures would incorporate a test standard that is accepted internationally for measuring power consumption in standby mode and off mode (IEC Standard 62301). DOE analyzed the available versions of IEC Standard 62301 at that time—IEC Standard 62301 (First Edition), IEC Standard 62301 (CDV), and IEC Standard 62301 (FDIS)—and determined that the proposed amendments to the residential dishwashers, dehumidifiers, and conventional cooking products test procedures would produce standby mode and off mode average power consumption measurements that are representative of an average use cycle. DOE also determined that the test methods and equipment that the amendments would require for measuring standby mode and off mode power in these products would not be substantially different from the test methods and equipment required in the current DOE tests. Thus, DOE tentatively concluded that the proposed test procedure amendments would not require manufacturers to make significant investments in test facilities and new equipment. In sum, DOE tentatively concluded in the December 2010 NOPR that the amended test procedures would produce test results that measure the standby mode and off mode power consumption during representative use, and that the test procedures would not be unduly burdensome to conduct. 75 FR 75290, 75316 (Dec. 2, 2010).

Today's supplemental proposed amendments to the DOE test procedures are based on an updated version of IEC Standard 62301, IEC Standard 62301 (Second Edition), which has been the subject of significant review and input from interested parties and, thus, continues to be an internationally accepted test standard for measuring standby mode and off mode power consumption. As discussed in section 0 of this notice, DOE believes that the provisions of IEC Standard 62301 (Second Edition) that it proposes to incorporate by reference through today's SNOPR provide a means to measure power consumption with greater accuracy and repeatability than the provisions from IEC Standard 62301 (First Edition) that were originally proposed in the December 2010 NOPR. For this reason, DOE tentatively concludes that today's supplemental proposed amendments would also provide measurements representative of average consumer use of the product under test, even if the test conditions and procedures may not be identical to average consumer use (for example, specified display times). DOE further believes these new provisions in the applicable sections of IEC Standard 62301 (Second Edition) improve test results without undue testing burden. DOE acknowledges that certain methods from IEC Standard 62301 (Second Edition) may increase test duration somewhat, but where such an increase was deemed excessive (*i.e.,* for products with clocks that can vary in power consumption as a function of time displayed), DOE retained the method previously proposed in order to mitigate test burden. DOE also believes that the potential for increased test burden in other power consumption measurements is offset by more reasonable requirements for testing equipment, while maintaining measurement accuracy deemed acceptable and practical by voting members for IEC Standard 62301 (Second Edition). Thus, DOE tentatively concludes that the amended test procedures newly proposed in today's SNOPR would produce test results that measure the standby mode and off mode power consumption during representative use, and that the test procedures would not be unduly burdensome to conduct.

2. Potential Incorporation of IEC Standard 62087

Under 42 U.S.C. 6295(gg)(2)(A), EPCA directs DOE to consider IEC Standard 62087 when amending test procedures to include standby mode and off mode power measurements. For the December 2010 NOPR, DOE reviewed IEC Standard 62087, ''Methods of measurement for the power consumption of audio, video, and related equipment'' (Second Edition 2008–09), and tentatively determined that it would not be applicable to measuring power consumption of electrical appliances such as dishwashers, dehumidifiers, and conventional cooking products. Therefore, DOE tentatively concluded that referencing IEC Standard 62087 is not necessary for the proposed amendments to the test procedures that are the subject of this rulemaking. 75 FR 75290, 75316 (Dec. 2, 2010). For the same reason, DOE maintains the same tentative conclusion for today's SNOPR.

3. Integration of Standby Mode and Off Mode Energy Consumption Into the Efficiency Metrics

Under 42 U.S.C. 6295(gg)(2)(A), EPCA requires that standby mode and off mode energy consumption be ''integrated into the overall energy efficiency, energy consumption, or other energy descriptor for each covered product'' unless the current test procedures already fully account for the standby mode and off mode energy consumption or if such an integrated test procedure is technically infeasible. As noted in the December 2010 NOPR, DOE proposed to incorporate such energy consumption into existing metrics (''estimated annual energy use'' and ''estimated annual operating cost'' for dishwashers and ''estimated annual operating cost'' for conventional cooking products) and into new metrics (''integrated energy factor'' (IEF) for dehumidifiers and IEF and ''integrated annual energy consumption'' for conventional cooking products). 75 FR 75290, 75316 (Dec. 2, 2010).

EPCA further provides that test procedure amendments adopted to comply with the new statutory requirements for standby mode and off mode energy consumption shall not be used to determine compliance with previously established energy conservation standards. (42 U.S.C. 6295(gg)(2)(C)) Under this provision, the test procedure amendments pertaining to standby mode and off mode energy consumption that DOE proposes to adopt in this rulemaking would not apply to, and would have no impact on, existing energy conservation standards (although representations as to standby mode and off mode energy use for dishwashers, dehumidifiers, and conventional cooking products made later than 180 days after the date of publication of the final rule in this rulemaking would be required to be based upon results generated under the amended test procedures).

Even though 42 U.S.C. 6295(gg)(2)(C) clearly states that the test procedure amendments for measurement of standby mode and off mode energy consumption shall not apply in terms of compliance with existing energy conservation standards, DOE must nonetheless determine the effect of such test procedure amendments on measured energy efficiency, measured energy use, or measured water use of any covered product, pursuant to 42 U.S.C. 6293(e)(1). DOE provided analysis in the December 2010 NOPR which determined that the proposed amendments would not measurably alter the existing energy efficiency and energy use metrics for residential dishwashers, dehumidifiers, and conventional cooking products. In addition, those proposed amendments in each test procedure would clarify that manufacturers would not be required to use the provisions relating to standby mode and off mode energy use until the compliance date of new energy conservation standards addressing such energy use for the relevant product. Thus, no amendments to the energy conservation standards would be required pursuant to 42 U.S.C. 6293(e)(2), because such test procedure amendments would not impact the existing energy conservation standards until the compliance date of a subsequent final rule that amends the standard to comprehensively address standby mode and off mode energy consumption. 75 FR 75290, 75316–17 (Dec. 2, 2010).

Because DOE's proposed amendments in today's SNOPR: (1) Would not produce measurably different evaluations of standby mode and off mode energy use through the use of provisions from IEC Standard 62301 (Second Edition) in place of those from IEC Standard 62301 (First Edition); (2) would not alter the approaches for integrating standby mode and off mode energy use into the energy efficiency and energy use metrics; and (3) would retain the clarifications regarding test procedure and energy conservation standards compliance dates, DOE tentatively concludes that the supplemental proposed amendments would also comply with the EPCA requirements under 42 U.S.C. 6293(e)(2) and 6295(gg)(2)(A) and (C).

4. Certification Requirements

As codified at 42 U.S.C. 6299–6305 and 6316, EPCA authorizes DOE to enforce compliance with the energy and water conservation standards established for certain consumer products and industrial/commercial equipment. (42 U.S.C. 6299–6305 (consumer products), 6316 (industrial equipment)) On March 7, 2011, the Department published a final rule in the **Federal Register**, which revised, consolidated, and streamlined its existing certification, compliance, and enforcement regulations for certain consumer products and industrial/commercial equipment covered under EPCA, including dishwashers, dehumidifiers, and conventional cooking products. 76 FR 12422. The certification regulations are codified at 10 CFR 429.19 (dishwashers), 10 CFR 429.23 (conventional cooking tops, conventional ovens, microwave ovens), and 10 CFR 429.36 (dehumidifiers).

The certification requirements for each of the products covered in today's SNOPR consist of a sampling plan for selection of units for testing and requirements for certification reports. Because the proposed amendments to the residential dishwasher, dehumidifier, and conventional cooking products test procedures would not revise the current energy conservation standards, DOE is not proposing any amendments to the certification reporting requirements for these products. However, because DOE proposes in today's SNOPR to introduce a new metric (IEF) for both conventional cooking products and dehumidifiers, DOE additionally proposes amended provisions in the sampling plan at 10 CFR 429.23 and 10 CFR 429.36 that would include IEF along with the existing measure of EF. No such amendments are proposed for residential dishwashers, because DOE is not proposing any new energy efficiency metric for these products.

IV. Procedural Issues and Regulatory Review

DOE has concluded that the determinations made pursuant to the various procedural requirements applicable to the December 2010 NOPR remain unchanged for this SNOPR. These determinations are set forth in the December 2010 NOPR. 75 FR 75290, 75317–19 (Dec. 2, 2010). DOE acknowledges that certain provisions of IEC Standard 62301 (Second Edition) that are proposed to be incorporated by reference have the potential for somewhat greater test time as compared to the provisions from IEC Standard 62301 (First Edition), and, therefore, DOE gave particular consideration to its review under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*). DOE believes that the proposed amendments in today's SNOPR would still result in a duration of standby mode and off mode testing that is generally not expected to exceed the time required to conduct current energy testing. DOE further believes that the newly proposed revisions would not alter the costs it estimated for standby mode and off mode testing in the December 2010 NOPR. Thus, DOE continues to tentatively conclude and certify that the proposed rule would not have a significant economic impact on a substantial number of small entities. Accordingly, DOE has not prepared a regulatory flexibility analysis for this rulemaking. DOE will transmit the certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the SBA for review under 5 U.S.C. 605(b).

V. Public Participation

A. Submission of Comments

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

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

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

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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 e-mail, postal mail, or hand delivery two well-marked copies: one copy of the document marked ''confidential'' including all the information believed to be confidential, and one copy of the document marked ''non-confidential'' with the information believed to be confidential deleted. Submit these documents via e-mail or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

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

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

B. Issues on Which DOE Seeks Comment

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

1. *Incorporation of IEC Standard 62301 (Second Edition).* DOE invites comment on the adequacy of IEC Standard 62301 (Second Edition) to measure standby mode and off mode power consumption for residential dishwashers, dehumidifiers, and conventional cooking products, and the suitability of incorporating into DOE regulations the following specific provisions from IEC Standard 62301 (Second Edition): section 4 (''General conditions for measurements''), paragraph 4.2, ''Test room,'' paragraph 4.3.2, ''Supply voltage waveform,'' and paragraph 4.4, ''Power measuring instruments,'' and section 5 (''Measurements''), paragraph 5.1, ''General,'' paragraph 5.2 ''Preparation of product'', and paragraph 5.3.2, ''Sampling method.'' (*See* section 0)

2. *Methods Based on IEC Standard 62301 (First Edition) for Conventional Cooking Products with Clocks.* DOE welcomes comment on its determination that the provisions of IEC Standard 62301 (Second Edition) would cause manufacturers to incur significant test burden for conventional cooking products with power consumption that varies as a function of the time displayed, and the continued proposal of 10-minute and 12-hour test methods of measuring standby mode power for these products in the conventional cooking products test procedure. (*See* section 0)

3. *Test Burden.* DOE seeks comment on its analysis of the test burden associated with standby mode and off mode testing as proposed in today's SNOPR. (*See* sections 0 and 0)

VI. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this supplemental notice of proposed rulemaking.

List of Subjects

10 CFR Part 429

Administrative practice and procedure, Buildings and facilities, Business and industry, Energy conservation, Grant programs—energy, Housing, Reporting and recordkeeping requirements, Technical assistance.

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 August 30, 2011.

Kathleen B. Hogan,

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

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

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

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

Authority: 42 U.S.C. 6291–6317.

2. Section 429.23 is amended by revising paragraph (a)(2)(ii) introductory text to read as follows:

§ 429.23 Conventional cooking tops, conventional ovens, microwave ovens.

(a) * * *

(2) * * *

(ii) Any represented value of the energy factor, integrated energy factor, or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

* * * * *

3. Section 429.36 is amended by revising paragraph (a)(2)(ii) introductory text to read as follows:

§ 429.36 Dehumidifiers.

(a) * * *

(2) * * *

(ii) Any represented value of the energy factor, integrated energy factor, or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

* * * * *

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

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

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

2. Section 430.3 is amended by adding paragraph (l)(2) to read as follows:

§ 430.3 Materials incorporated by reference.

* * * * *

(l) * * *

(2) IEC Standard 62301 (''IEC 62301''), *Household electrical appliances–Measurement of standby power* (Edition 2.0, 2011–01), IBR approved for Appendix C, Appendix I, and Appendix X.

* * * * *

3. Section 430.23 is amended by revising paragraphs (c), (i), and (z) to read as follows:

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

* * * * *

(c) *Dishwashers.* (1) The Estimated Annual Operating Cost (EAOC) for dishwashers must be rounded to the nearest dollar per year and is defined as follows:

(i) When cold water (50 °F) is used,

(A) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart, and which are manufactured before (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$$EAOC = (D_e \times S) + (D_e \times N \times (M - (E_D/2)))$$

(B) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart, and which are manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$$EAOC = (D_e BV \times V\ E_{TSO}) + (D_e \times N \times (M - (E_D/2)))$$

(C) For dishwashers not having a truncated normal cycle, and which are manufactured before (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$$EAOC = (D_e \times S) + (D_e \times N \times M)$$

(D) For dishwashers not having a truncated normal cycle, and which are manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$$EAOC = (D_e \times E_{TSO}) + (D_e \times N \times M)$$

Where:

D_e = the representative average unit cost of electrical energy, in dollars per kilowatt-hour, as provided by the Secretary,

S = the annual simplified standby energy consumption in kilowatt-hours per year and determined according to section 5.6 of appendix C to this subpart,

E_{TSO} = the annual standby mode and off mode energy consumption in kilowatt-hours per year and determined according to section 5.7 of appendix C to this subpart,

N = the representative average dishwasher use of 215 cycles per year,

M = the machine energy consumption per-cycle for the normal cycle as defined in section 1.10 of appendix C to this subpart, in kilowatt-hours and determined according to section 5.1 of appendix C to this subpart,

E_D = the drying energy consumption defined as energy consumed using the power-dry feature after the termination of the last rinse option of the normal cycle and determined according to section 5.2 of appendix C to this subpart.

(ii) When electrically-heated water (120 °F or 140 °F) is used,

(A) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart, and which are manufactured before (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$$EAOC = (D_e \times S) + (D_e \times N \times (M - (E_D/2))) + (D_e \times N \times W)$$

(B) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart, and which are manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$$EAOC = (D_e \times E_{TSO}) + (D_e \times N \times (M - (E_D/2))) + (D_e \times N \times W)$$

(C) For dishwashers not having a truncated normal cycle, and which are manufactured before (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$$EAOC = (D_e \times S) + (D_e \times N \times M) + (D_e \times N \times W)$$

(D) For dishwashers not having a truncated normal cycle, and which are

manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$EAOC = (D_e \times E_{TSO}) + (D_e \times N \times M) + (D_e \times N \times W)$

Where:

D_e, S, E_{TSO}, N, M, and E_D, are defined in paragraph (c)(1)(i) of this section, and

W = the water energy consumption per cycle for the normal cycle as defined in section 1.10 of appendix C to this subpart, in kilowatt-hours per cycle and determined according to section 5.4 of appendix C to this subpart.

(iii) When gas-heated or oil-heated water is used,

(A) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart, and which are manufactured before (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$EAOC_g = (D_e \times S) + (D_e \times N \times (M - (E_D/2))) + (D_g \times N \times W_g)$

(B) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart, and which are manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$EAOC_g = (D_e \times E_{TSO}) + (D_e \times N \times (M - (E_D/2))) + (D_g \times N \times W_g)$

(C) For dishwashers not having a truncated normal cycle, and which are manufactured before (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$EAOC_g = (D_e \times S) + (D_e \times N \times M) + (D_g \times N \times W_g)$

(D) For dishwashers not having a truncated normal cycle, and which are manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***):

$EAOC_g = (D_e \times E_{TSO}) + (D_e \times N \times M) + (D_g \times N \times W_g)$

Where:

D_e, S, E_{TSO}, N, M, and E_D are defined in paragraph (c)(1)(i) of this section,

D_g = the representative average unit cost of gas or oil, as appropriate, in dollars per Btu, as provided by the Secretary, and

W_g = the water energy consumption per cycle for the normal cycle as defined in section 1.10 of appendix C to this subpart, in Btus per cycle and determined according to section 5.5 of appendix C to this subpart.

(2) The energy factor for dishwashers, EF, expressed in cycles per kilowatt-hour must be rounded to two decimal places and is defined as follows:

(i) When cold water (50 °F) is used,

(A) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart,

$EF = 1/(M - (E_D/2))$

(B) For dishwashers not having a truncated normal cycle,

$EF = 1/M$

Where:

M, and E_D are defined in paragraph (c)(1)(i) of this section.

(ii) When electrically-heated water (120 °F or 140 °F) is used,

(A) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart,

$EF = 1/(M - (E_D/2) + W)$

(B) For dishwashers not having a truncated normal cycle,

$EF = 1/(M + W)$

Where:

M, and E_D are defined in paragraph (c)(1)(i) of this section, and W is defined in paragraph (c)(1)(ii) of this section.

(3) The estimated annual energy use, EAEU, expressed in kilowatt-hours per year must be rounded to the nearest kilowatt-hour per year and is defined as follows:

(i) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart, and which are:

(A) Manufactured before (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***); or

(B) Manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***) and for which EAEU is calculated to determine compliance with energy conservation standards for dishwashers:

$EAEU = (M - (E_D/2) + W) \times N + S$

(C) For dishwashers having a truncated normal cycle as defined in section 1.21 of appendix C to this subpart, and which are manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***) and for which EAEU is calculated for purposes other than to determine compliance with energy conservation standards for dishwashers:

$EAEU = (M - (E_D/2) + W) \times N + E_{TSO}$

Where:

M, E_D, N, S, and E_{TSO} are defined in paragraph (c)(1)(i) of this section, and W is defined in paragraph (c)(1)(ii) of this section.

(ii) For dishwashers not having a truncated normal cycle and which are:

(A) Manufactured before (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***); or

(B) Manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***) and for which EAEU is calculated to determine compliance with energy conservation standards for dishwashers:

$EAEU = (M + W) \times N + S$

(C) For dishwashers not having a truncated normal cycle and which are manufactured on or after (*date 180 days after date of publication of test procedure final rule in the* ***Federal Register***) and for which EAEU is calculated for purposes other than to determine compliance with energy conservation standards for dishwashers:

$EAEU = (M+W) \times N + E_{TSO}$

Where:

M, N, S, and E_{TSO} are defined in paragraph (c)(1)(i) of this section, and W is defined in paragraph (c)(1)(ii) of this section.

(4) The water consumption, V, expressed in gallons per cycle and defined in section 5.3 of appendix C to this subpart, must be rounded to one decimal place.

(5) Other useful measures of energy consumption for dishwashers are those which the Secretary determines are likely to assist consumers in making purchasing decisions and which are derived from the application of appendix C to this subpart.

* * * * *

(i) *Kitchen ranges and ovens.* (1) The estimated annual operating cost for conventional ranges, conventional cooking tops, and conventional ovens shall be the sum of the following products:

(i) The total integrated annual electrical energy consumption for any electrical energy usage, in kilowatt-hours (kWhs) per year, times the representative average unit cost for electricity, in dollars per kWh, as provided pursuant to section 323(b)(2) of the Act; plus

(ii) The total annual gas energy consumption for any natural gas usage, in British thermal units (Btus) per year, times the representative average unit cost for natural gas, in dollars per Btu, as provided pursuant to section 323(b)(2) of the Act; plus

(iii) The total annual gas energy consumption for any propane usage, in Btus per year, times the representative average unit cost for propane, in dollars per Btu, as provided pursuant to section 323(b)(2) of the Act. The total annual energy consumption for conventional ranges, conventional cooking tops, and

conventional ovens shall be as determined according to sections 4.3, 4.2.2, and 4.1.2, respectively, of appendix I to this subpart. For conventional gas cooking tops, total integrated annual electrical energy consumption shall be equal to E_{CTSO}, defined in section 4.2.2.2.4 of appendix I to this subpart. The estimated annual operating cost shall be rounded off to the nearest dollar per year.

(2) The cooking efficiency for conventional cooking tops and conventional ovens shall be the ratio of the cooking energy output for the test to the cooking energy input for the test, as determined according to sections 4.2.1 and 4.1.3, respectively, of appendix I to this subpart. The final cooking efficiency values shall be rounded off to three significant digits.

(3) [Reserved]

(4) The energy factor for conventional ranges, conventional cooking tops, and conventional ovens shall be the ratio of the annual useful cooking energy output to the total annual energy input, as determined according to sections 4.3, 4.2.3.1, and 4.1.4.1, respectively, of appendix I to this subpart. The final energy factor values shall be rounded off to three significant digits.

(5) The integrated energy factor for conventional ranges, conventional cooking tops, and conventional ovens shall be the ratio of the annual useful cooking energy output to the total integrated annual energy input, as determined according to sections 4.3, 4.2.3.2, and 4.1.4.2, respectively, of appendix I to this subpart. The final integrated energy factor values shall be rounded off to three significant digits.

(6) There shall be two estimated annual operating costs, two cooking efficiencies, and two energy factors for convertible cooking appliances—

(i) An estimated annual operating cost, a cooking efficiency, and an energy factor which represent values for those three measures of energy consumption for the operation of the appliance with natural gas; and

(ii) An estimated annual operating cost, a cooking efficiency, and an energy factor which represent values for those three measures of energy consumption for the operation of the appliance with LP-gas.

(7) There shall be two integrated energy factors for convertible cooking appliances—

(i) An integrated energy factor which represents the value for this measure of energy consumption for the operation of the appliance with natural gas; and

(ii) An integrated energy factor which represents the value for this measure of energy consumption for the operation of the appliance with LP-gas.

(8) The estimated annual operating cost for convertible cooking appliances which represents natural gas usage, as described in paragraph (i)(6)(i) of this section, shall be determined according to paragraph (i)(1) of this section using the total annual gas energy consumption for natural gas times the representative average unit cost for natural gas.

(9) The estimated annual operating cost for convertible cooking appliances which represents LP-gas usage, as described in paragraph (i)(6)(ii) of this section, shall be determined according to paragraph (i)(1) of this section using the representative average unit cost for propane times the total annual energy consumption of the test gas, either propane or natural gas.

(10) The cooking efficiency for convertible cooking appliances which represents natural gas usage, as described in paragraph (i)(6)(i) of this section, shall be determined according to paragraph (i)(2) of this section when the appliance is tested with natural gas.

(11) The cooking efficiency for convertible cooking appliances which represents LP-gas usage, as described in paragraph (i)(6)(ii) of this section, shall be determined according to paragraph (i)(2) of this section, when the appliance is tested with either natural gas or propane.

(12) The energy factor for convertible cooking appliances which represents natural gas usage, as described in paragraph (i)(6)(i) of this section, shall be determined according to paragraph (i)(4) of this section when the appliance is tested with natural gas.

(13) The integrated energy factor for convertible cooking appliances which represents natural gas usage, as described in paragraph (i)(7)(i) of this section, shall be determined according to paragraph (i)(5) of this section when the appliance is tested with natural gas.

(14) The energy factor for convertible cooking appliances which represents LP-gas usage, as described in paragraph (i)(6)(ii) of this section, shall be determined according to paragraph (i)(4) of this section when the appliance is tested with either natural gas or propane.

(15) The integrated energy factor for convertible cooking appliances which represents LP-gas usage, as described in paragraph (i)(7)(ii) of this section, shall be determined according to paragraph (i)(5) of this section when the appliance is tested with natural gas or propane.

(16) Other useful measures of energy consumption for conventional ranges, conventional cooking tops, and conventional ovens shall be those measures of energy consumption which the Secretary determines are likely to assist consumers in making purchasing decisions and which are derived from the application of appendix I to this subpart.

* * * * *

(z) *Dehumidifiers.*

(1) The energy factor for dehumidifiers, expressed in liters per kilowatt hour (L/kWh), shall be measured in accordance with section 4.1 of appendix X of this subpart.

(2) The integrated energy factor for dehumidifiers, expressed in L/kWh, shall be determined according to paragraph 5.2 of appendix X to this subpart.

* * * * *

Appendix C—[Amended]

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

a. By revising the introductory text after the appendix heading;

b. By revising section 1, Definitions;

c. By revising section 2, Testing Conditions;

d. In section 3. Instrumentation, by:

1. Adding new section 3.8;

e. In section 4, Test Cycle and Measurements, by:

1. Revising section 4.4; and

2. Adding new sections 4.5 and 4.5.1 through 4.5.3;

f. In section 5, Calculation of Derived Results From Test Measurements, by:

1. Revising section 5.6; and

2. Adding new section 5.7.

The additions and revisions read as follows:

Appendix C to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Dishwashers

Note: The procedures and calculations that refer to standby mode and off mode energy consumption (*i.e.,* sections 4.5, 4.5.1 through 4.5.3, and 5.7 of this Appendix C) need not be performed to determine compliance with energy conservation standards for dishwashers at this time. However, any representation related to standby mode and off mode energy consumption of these products made after (*date 180 days after date of publication of the test procedure final rule in the* ***Federal Register***) must be based upon results generated under this test procedure using sections 4.5, 4.5.1 through 4.5.3, and 5.7 and disregarding sections 4.4 and 5.6 of this Appendix, consistent with the requirements of 42 U.S.C. 6293(c)(2). After July 1, 2010, any adopted energy conservation standard shall incorporate standby mode and off mode energy consumption, and upon the compliance date for such standards, compliance with the applicable provisions of this test procedure will also be required.

1. Definitions

1.1 *Active mode* means a mode in which the dishwasher is connected to a mains power source, has been activated, and is performing one of the main functions of washing, rinsing, or drying (when a drying process is included) dishware, glassware, eating utensils, and most cooking utensils by chemical, mechanical, and/or electrical means, or is involved in functions necessary for these main functions, such as admitting water into the dishwasher or pumping water out of the dishwasher.

1.2 *AHAM* means the Association of Home Appliance Manufacturers.

1.3 *Compact dishwasher* means a dishwasher that has a capacity of less than eight place settings plus six serving pieces as specified in ANSI/AHAM DW–1 (incorporated by reference; see § 430.3), using the test load specified in section 2.7 of this Appendix.

1.4 *Cycle* means a sequence of operations of a dishwasher which performs a complete dishwashing function, and may include variations or combinations of washing, rinsing, and drying.

1.5 *Cycle finished mode* means a standby mode which provides continuous status display following operation in active mode.

1.6 *Cycle type* means any complete sequence of operations capable of being preset on the dishwasher prior to the initiation of machine operation.

1.7 *IEC 62301* means the standard published by the International Electrotechnical Commission, titled ''Household electrical appliances—Measurement of standby power,'' Publication 62301 (Edition 2.0, 2011–01) (incorporated by reference; see § 430.3).

1.8 *Inactive mode* means a standby mode that facilitates the activation of active mode by remote switch (including remote control), internal sensor, or timer, or that provides continuous status display.

1.9 *Non-soil-sensing dishwasher* means a dishwasher that does not have the ability to adjust automatically any energy consuming aspect of a wash cycle based on the soil load of the dishes.

1.10 *Normal cycle* means the cycle type recommended by the manufacturer for completely washing a full load of normally soiled dishes including the power-dry feature.

1.11 *Off mode* means a mode in which the dishwasher is connected to a mains power source and is not providing any active mode or standby mode function, and where the mode may persist for an indefinite time. An indicator that only shows the user that the product is in the off position is included within the classification of an off mode.

1.12 *Power-dry feature* means the introduction of electrically-generated heat into the washing chamber for the purpose of improving the drying performance of the dishwasher.

1.13 *Preconditioning cycle* means any cycle that includes a fill, circulation, and drain to ensure that the water lines and sump area of the pump are primed.

1.14 *Sensor heavy response* means, for standard dishwashers, the set of operations in a soil-sensing dishwasher for completely washing a load of dishes, four place settings of which are soiled according to ANSI/AHAM DW–1 (incorporated by reference; see § 430.3). For compact dishwashers, this definition is the same, except that two soiled place settings are used instead of four.

1.15 *Sensor light response* means, for both standard and compact dishwashers, the set of operations in a soil-sensing dishwasher for completely washing a load of dishes, one place setting of which is soiled with half of the gram weight of soils for each item specified in a single place setting according to ANSI/AHAM DW–1 (incorporated by reference; see § 430.3).

1.16 *Sensor medium response* means, for standard dishwashers, the set of operations in a soil-sensing dishwasher for completely washing a load of dishes, two place settings of which are soiled according to ANSI/AHAM DW–1 (incorporated by reference; see § 430.3). For compact dishwashers, this definition is the same, except that one soiled place setting is used instead of two.

1.17 *Simplified standby mode* means the lowest power consumption mode which cannot be switched off or influenced by the user and that may persist for an indefinite time when the dishwasher is connected to the main electricity supply and used in accordance with the manufacturer's instructions.

1.18 *Soil-sensing dishwasher* means a dishwasher that has the ability to adjust any energy-consuming aspect of a wash cycle based on the soil load of the dishes.

1.19 *Standard dishwasher* means a dishwasher that has a capacity equal to or greater than eight place settings plus six serving pieces as specified in ANSI/AHAM DW–1 (incorporated by reference; see § 430.3), using the test load specified in section 2.7 of this Appendix.

1.20 *Standby mode* means a mode in which the dishwasher is connected to a main power source and offers one or more of the following user-oriented or protective functions which may persist for an indefinite time: (a) to facilitate the activation of other modes (including activation or deactivation of active mode) by remote switch (including remote control), internal sensor, or timer; (b) continuous functions, including information or status displays (including clocks) or sensor-based functions. A timer is a continuous clock function (which may or may not be associated with a display) that provides regular scheduled tasks (*e.g.,* switching) and that operates on a continuous basis.

1.21 *Truncated normal cycle* means the normal cycle interrupted to eliminate the power-dry feature after the termination of the last rinse operation.

1.22 *Truncated sensor heavy response* means the sensor heavy response interrupted to eliminate the power-dry feature after the termination of the last rinse operation.

1.23 *Truncated sensor light response* means the sensor light response interrupted to eliminate the power-dry feature after the termination of the last rinse operation.

1.24 *Truncated sensor medium response* means the sensor medium response interrupted to eliminate the power-dry feature after the termination of the last rinse operation.

1.25 *Water-heating dishwasher* means a dishwasher which, as recommended by the manufacturer, is designed for heating cold inlet water (nominal 50 °F) or designed for heating water with a nominal inlet temperature of 120 °F. Any dishwasher designated as water-heating (50 °F or 120 °F inlet water) must provide internal water heating to above 120 °F in a least one wash phase of the normal cycle.

2. Testing Conditions

2.1 *Installation requirements.* Install the dishwasher according to the manufacturer's instructions. A standard or compact under-counter or under-sink dishwasher must be tested in a rectangular enclosure constructed of nominal 0.374 inch (9.5 mm) plywood painted black. The enclosure must consist of a top, a bottom, a back, and two sides. If the dishwasher includes a counter top as part of the appliance, omit the top of the enclosure. Bring the enclosure into the closest contact with the appliance that the configuration of the dishwasher will allow. For standby mode and off mode testing, these products shall also be installed in accordance with Section 5, Paragraph 5.2 of IEC 62301 (incorporated by reference; see § 430.3), disregarding the provisions regarding batteries and the determination, classification, and testing of relevant modes.

2.2 *Electrical energy supply.*

2.2.1 *Dishwashers that operate with an electrical supply of 115 volts.* Maintain the electrical supply to the dishwasher at 115 volts ±2 percent and within 1 percent of the nameplate frequency as specified by the manufacturer.

2.2.2 *Dishwashers that operate with an electrical supply of 240 volts.* Maintain the electrical supply to the dishwasher at 240 volts ±2 percent and within 1 percent of the nameplate frequency as specified by the manufacturer.

2.2.3 *Supply voltage waveform.* For the standby mode and off mode testing, maintain the electrical supply voltage waveform indicated in Section 4, Paragraph 4.3.2 of IEC 62301 (incorporated by reference; see § 430.3).

2.3 *Water temperature.* Measure the temperature of the water supplied to the dishwasher using a temperature measuring device as specified in section 3.1 of this Appendix.

2.3.1 *Dishwashers to be tested at a nominal 140 °F inlet water temperature.* Maintain the water supply temperature at 140° ±2 °F.

2.3.2 *Dishwashers to be tested at a nominal 120 °F inlet water temperature.* Maintain the water supply temperature at 120° ±2 °F.

2.3.3 *Dishwashers to be tested at a nominal 50 °F inlet water temperature.* Maintain the water supply temperature at 50° ±2 °F.

2.4 *Water pressure.* Using a water pressure gauge as specified in section 3.4 of this Appendix, maintain the pressure of the water supply at 35 ±2.5 pounds per square inch gauge (psig) when the water is flowing.

2.5 *Ambient temperature.*

2.5.1 *Active mode ambient and machine temperature.* Using a temperature measuring

device as specified in section 3.1 of this Appendix, maintain the room ambient air temperature at 75° ±5 °F and ensure that the dishwasher and the test load are at room ambient temperature at the start of each test cycle.

2.5.2 *Standby mode and off mode ambient temperature.* For standby mode and off mode testing, maintain room ambient air temperature conditions as specified in Section 4, Paragraph 4.2 of IEC 62301 (incorporated by reference; see § 430.3).

2.6 *Test cycle and load.*

2.6.1 *Non-soil-sensing dishwashers to be tested at a nominal inlet temperature of 140 °F.* These units must be tested on the normal cycle and truncated normal cycle without a test load if the dishwasher does not heat water in the normal cycle.

2.6.2 *Non-soil-sensing dishwashers to be tested at a nominal inlet temperature of 50 °F or 120 °F.* These units must be tested on the normal cycle with a clean load of eight place settings plus six serving pieces, as specified in section 2.7 of this Appendix. If the capacity of the dishwasher, as stated by the manufacturer, is less than eight place settings, then the test load must be the stated capacity.

2.6.3 *Soil-sensing dishwashers to be tested at a nominal inlet temperature of 50 °F, 120 °F, or 140 °F.* These units must be tested first for the sensor heavy response, then tested for the sensor medium response, and finally for the sensor light response with the following combinations of soiled and clean test loads.

2.6.3.1 For tests of the sensor heavy response, as defined in section 1.14 of this Appendix:

(A) For standard dishwashers, the test unit is to be loaded with a total of eight place settings plus six serving pieces as specified in section 2.7 of this Appendix. Four of the eight place settings must be soiled according to ANSI/AHAM DW–1 (incorporated by reference, see § 430.3) while the remaining place settings, serving pieces, and all flatware are not soiled.

(B) For compact dishwashers, the test unit is to be loaded with four place settings plus six serving pieces as specified in section 2.7 of this Appendix. Two of the four place settings must be soiled according to ANSI/AHAM DW–1 while the remaining place settings, serving pieces, and all flatware are not soiled.

2.6.3.2 For tests of the sensor medium response, as defined in section 1.16 of this Appendix:

(A) For standard dishwashers, the test unit is to be loaded with a total of eight place settings plus six serving pieces as specified in section 2.7 of this Appendix. Two of the eight place settings must be soiled according to ANSI/AHAM DW–1 (incorporated by reference, see § 430.3) while the remaining place settings, serving pieces, and all flatware are not soiled.

(B) For compact dishwashers, the test unit is to be loaded with four place settings plus six serving pieces as specified in section 2.7 of this Appendix. One of the four place settings must be soiled according to ANSI/AHAM DW–1 while the remaining place settings, serving pieces, and all flatware are not soiled.

2.6.3.3 For tests of the sensor light response, as defined in section 1.15 of this Appendix:

(A) For standard dishwashers, the test unit is to be loaded with a total of eight place settings plus six serving pieces as specified in section 2.7 of this Appendix. One of the eight place settings must be soiled with half of the soil load specified for a single place setting according to ANSI/AHAM DW–1 (incorporated by reference, see § 430.3) while the remaining place settings, serving pieces, and all flatware are not soiled.

(B) For compact dishwashers, the test unit is to be loaded with four place settings plus six serving pieces as specified in section 2.7 of this Appendix. One of the four place settings must be soiled with half of the soil load specified for a single place setting according to the ANSI/AHAM DW–1 while the remaining place settings, serving pieces, and all flatware are not soiled.

2.7 *Test load.*

Dishware/glassware/ flatware item	Primary source	Description	Primary No.	Alternate source	Alternate source No.
Dinner Plate	Corning Comcor®/Corelle®	10 inch Dinner Plate	6003893		
Bread and Butter Plate	Corning Comcor®/Corelle®	6.75 inch Bread & Butter	6003887	Arzberg	8500217100
Fruit Bowl	Corning Comcor®/Corelle®	10 oz. Dessert Bowl	6003899	Arzberg	3820513100
Cup	Corning Comcor®/Corelle®	8 oz. Ceramic Cup	6014162	Arzberg	3824732100
Saucer	Corning Comcor®/Corelle®	6 inch Saucer	6010972	Arzberg	3824731100
Serving Bowl	Corning Comcor®/Corelle®	1 qt. Serving Bowl	6003911		
Platter	Corning Comcor®/Corelle®	9.5 inch Oval Platter	6011655		
Glass—Iced Tea	Libbey		551 HT		
Flatware—Knife	Oneida®—Accent		2619KPVF		
Flatware—Dinner Fork	Oneida®—Accent		2619FRSF		
Flatware—Salad Fork	Oneida®—Accent		2619FSLF		
Flatware—Teaspoon	Oneida®—Accent		2619STSF		
Flatware—Serving Fork	Oneida®—Flight		2865FCM		
Flatware—Serving Spoon	Oneida®—Accent		2619STBF		

2.8 *Detergent.* Use half the quantity of detergent specified according to ANSI/AHAM DW–1 (incorporated by reference, see § 430.3).

2.9 *Testing requirements.* Provisions in this Appendix pertaining to dishwashers that operate with a nominal inlet temperature of 50 °F or 120 °F apply only to water-heating dishwashers as defined in section 1.25 of this Appendix.

2.10 *Preconditioning requirements.* Precondition the dishwasher by establishing the testing conditions set forth in sections 2.1 through 2.5 of this Appendix. Set the dishwasher to the preconditioning cycle as defined in section 1.13 of this Appendix, without using a test load, and initiate the cycle.

3. Instrumentation

* * * * *

3.8 *Standby mode and off mode watt meter.* The watt meter used to measure standby mode and off mode power consumption shall meet the requirements specified in Section 4, Paragraph 4.4 of IEC 62301 (incorporated by reference, see § 430.3).

4. Test Cycle and Measurements

* * * * *

4.4 *Simplified standby mode power.* Connect the dishwasher to a standby wattmeter or a standby watt-hour meter as specified in sections 3.6 and 3.7, respectively, of this Appendix. Select the conditions necessary to achieve operation in the simplified standby mode as defined in section 1.17 of this Appendix. Monitor the power consumption but allow the dishwasher to stabilize for at least 5 minutes. Then monitor the power consumption for at least an additional 5 minutes. If the power level does not change by more than 5 percent from the maximum observed value during the later 5 minutes and if there is no cyclic or pulsing behavior of the load, the load can be considered stable. For stable operation, simplified standby mode power, S_m, can be recorded directly from the standby watt meter in watts or accumulated using the standby watt-hour meter over a period of at least 5 minutes. For unstable operation, the energy must be accumulated using the standby watt-hour meter over a period of at least 5 minutes and must capture the energy use over one or more complete cycles. Calculate the average simplified standby mode power, S_m, expressed in watts by dividing the accumulated energy consumption by the duration of the measurement period.

4.5 *Standby mode and off mode power.* Connect the dishwasher to a standby mode and off mode watt meter as specified in

section 3.8 of this Appendix. Establish the testing conditions set forth in sections 2.1, 2.2, and 2.5.2 of this Appendix. For dishwashers that take some time to enter a stable state from a higher power state as discussed in Section 5, Paragraph 5.1, note 1 of IEC 62301 (incorporated by reference; see § 430.3), allow sufficient time for the dishwasher to reach the lower power state before proceeding with the test measurement. Follow the test procedure specified in Section 5, Paragraph 5.3.2 of IEC 62301 for testing in each possible mode as described in sections 4.5.1 through 4.5.3 of this Appendix.

4.5.1 If the dishwasher has an inactive mode, as defined in section 1.8 of this Appendix, measure and record the average inactive mode power of the dishwasher, P_{IA}, in watts.

4.5.2 If the dishwasher has an off mode, as defined in section 1.11 of this Appendix, measure and record the average off mode power, P_{OM}, in watts.

4.5.3 If the dishwasher has a cycle finished mode, as defined in section 1.5 of this Appendix, measure and record the average cycle finished mode power, P_{CF}, in watts.

5. Calculation of Derived Results From Test Measurements

* * * * *

5.6 *Annual simplified standby energy consumption.* Calculate the estimated annual simplified standby energy consumption. First determine the number of standby hours per year, H_s, defined as:

$H_s = H - (N \times L)$

Where:

H = the total number of hours per year = 8766 hours per year,

N = the representative average dishwasher use of 215 cycles per year,

L = the average of the duration of the normal cycle and truncated normal cycle, for non-soil-sensing dishwashers with a truncated normal cycle; the duration of the normal cycle, for non-soil-sensing dishwashers without a truncated normal cycle; the average duration of the sensor light response, truncated sensor light response, sensor medium response, truncated sensor medium response, sensor heavy response, and truncated sensor heavy response, for soil-sensing dishwashers with a truncated cycle option; the average duration of the sensor light response, sensor medium response, and sensor heavy response, for soil-sensing dishwashers without a truncated cycle option.

Then calculate the estimated annual simplified standby power use, S, expressed in kilowatt-hours per year and defined as:

$S = S_m \times ((H_s)/1000)$

Where:

S_m = the simplified standby mode power in watts as determined in section 4.4 of this Appendix.

5.7 *Annual standby mode and off mode energy consumption.* Calculate the standby mode and off mode annual energy consumption for dishwashers, E_{TSO}, expressed in kilowatt-hours per year, according to the following:

$E_{TSO} = [(P_{IA} \times S_{IA}) + (P_{OM} \times S_{OM}) + (P_{CF} \times S_{CF})] \times K$

Where:

P_{IA}= dishwasher inactive mode power, in watts, as measured in section 4.5.1 of this Appendix.

P_{OM} = dishwasher off mode power, in watts, as measured in section 4.5.2 of this Appendix.

P_{CF} = dishwasher cycle finished mode power, in watts, as measured in section 4.5.3 of this Appendix.

If the dishwasher has both inactive mode and off mode, S_{IA} and S_{OM} both equal $S_{TOT}/2$;

S_{TOT} equals the total number of inactive mode and off mode hours per year, defined as:

If the dishwasher has cycle finished mode, S_{TOT}, in hours, equals $H_{TSO} - S_{CF}$;

If the dishwasher does not have cycle finished mode, S_{TOT} equals H_{TSO};

H_{TSO} equals the total number of standby mode and off mode hours per year, defined as:

$H_{TSO} = H - (N \times L)$

Where:

H = the total number of hours per year = 8766 hours per year,

N = the representative average dishwasher use of 215 cycles per year,

L = the average of the duration of the normal cycle and truncated normal cycle, for non-soil-sensing dishwashers with a truncated normal cycle; the duration of the normal cycle, for non-soil-sensing dishwashers without a truncated normal cycle; the average duration of the sensor light response, truncated sensor light response, sensor medium response, truncated sensor medium response, sensor heavy response, and truncated sensor heavy response, for soil-sensing dishwashers with a truncated cycle option; the average duration of the sensor light response, sensor medium response, and sensor heavy response, for soil-sensing dishwashers without a truncated cycle option;

If the dishwasher has an inactive mode but no off mode, the inactive mode annual hours, S_{IA}, is equal to S_{TOT}, and the off mode annual hours, S_{OM}, is equal to 0;

If the dishwasher has an off mode but no inactive mode, S_{IA} is equal to 0, and S_{OM} is equal to S_{TOT};

S_{CF} = 237, dishwasher cycle finished mode annual hours;

K = 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

Appendix I—[Amended]

5. Appendix I to subpart B of part 430 is amended:

a. By revising the Note after the appendix heading;

b. By revising section 1. Definitions;

c. In section 2. Test Conditions, by:

1. Revising sections 2.1, 2.1.1, 2.1.2, 2.1.3, 2.2.1.2, 2.5.2, 2.6, and 2.9.1.3;

d. In section 3. Test Methods and Measurements, by:

1. Revising sections 3.1.1, 3.1.1.1, and 3.1.2;

2. Adding new sections 3.1.1.3, 3.1.1.3.1, 3.1.1.3.2, and 3.1.1.3.3;

3. Adding new sections 3.1.2.2, 3.1.2.2.1, and 3.1.2.2.2;

4. Redesignating sections 3.1.3 and 3.1.3.1 as 3.1.4 and 3.1.4.1 and revising newly redesignated section 3.1.4.1;

5. Adding new sections 3.1.3, 3.1.3.1, 3.1.3.2, and 3.1.3.3;

6. Revising sections 3.2.1, 3.2.1.1, 3.2.1.2, and 3.2.1.4;

7. Redesignating section 3.2.2.1 as 3.2.2.3;

8. Revising section 3.2.2 and adding new sections 3.2.2.1 and 3.2.2.2;

9. Redesignating section 3.2.3 as 3.2.4 and revising newly redesignated section 3.2.4;

10. Adding new section 3.2.3;

11. Revising section 3.3.8; and

12. Revising section 3.3.13;

e. In section 4. Calculation of Derived Results From Test Measurements, by:

1. Revising section 4.1.1, 4.1.1.1, 4.1.2.3.1, 4.1.2.4, and 4.1.2.5.1;

2. Redesignating section 4.1.2.5.2 as 4.1.2.5.3, and revising newly redesignated section 4.1.2.5.3;

3. Adding new section 4.1.2.5.2;

4. Revising section 4.1.2.6.1;

5. Redesignating section 4.1.2.6.2 as 4.1.6.2.3, and revising newly redesignated section 4.1.6.2.3;

6. Adding new section 4.1.2.6.2;

7. Revising section 4.1.4;

8. Adding new sections 4.1.4.1 and 4.1.4.2;

9. Revising section 4.2.1.1;

10. Revising section 4.2.2.1;

11. Adding new sections 4.2.2.1.1 and 4.2.2.1.2;

12. Revising section 4.2.2.2.3;

13. Adding new section 4.2.2.2.4;

14. Revising section 4.2.3;

15. Adding new sections 4.2.3.1 and 4.2.3.2; and

16. Revising section 4.3.

The additions and revisions read as follows:

Appendix I to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Conventional Ranges, Conventional Cooking Tops, Conventional Ovens, and Microwave Ovens

Note: The procedures and calculations in this Appendix I need not be performed to determine compliance with energy conservation standards for conventional ranges, conventional cooking tops, conventional ovens, and microwave ovens at this time. However, any representation related to standby mode and off mode energy consumption of conventional ranges, conventional cooking tops, and conventional ovens made after (*date 180 days after date of publication of the test procedure final rule in the* ***Federal Register***) and of microwave ovens made after September 6, 2011 must be

based upon results generated under this test procedure, consistent with the requirements of 42 U.S.C. 6293(c)(2). After July 1, 2010, however, when DOE adopts an energy conservation standard that incorporates standby mode and off mode energy consumption, and upon the compliance date for such standards, compliance with the applicable provisions of this test procedure will also be required. Future revisions may add relevant provisions for measuring active mode in microwave ovens.

1. Definitions

1.1 *Active mode* means a mode in which the product is connected to a mains power source, has been activated, and is performing the main function of producing heat by means of a gas flame, electric resistance heating, or microwave energy. Delay start mode is a one-off, user-initiated, short-duration function that is associated with an active mode.

1.2 *Built-in* means the product is supported by surrounding cabinetry, walls, or other similar structures.

1.3 *Cycle finished mode* means a standby mode in which a conventional cooking top, conventional oven, or conventional range provides continuous status display following operation in active mode.

1.4 *Drop-in* means the product is supported by horizontal surface cabinetry.

1.5 *Forced convection* means a mode of conventional oven operation in which a fan is used to circulate the heated air within the oven compartment during cooking.

1.6 *Freestanding* means the product is not supported by surrounding cabinetry, walls, or other similar structures.

1.7 *IEC 62301 First Edition* means the test standard published by the International Electrotechnical Commission, titled ''Household electrical appliances—Measurement of standby power,'' Publication 62301 (First Edition 2005–06) (incorporated by reference; see § 430.3).

1.8 *IEC 62301 Second Edition* means the test standard published by the International Electrotechnical Commission, titled ''Household electrical appliances—Measurement of standby power,'' Publication 62301 (Edition 2.0 2011–01) (incorporated by reference; see § 430.3).

1.9 *Inactive mode* means a standby mode that facilitates the activation of active mode by remote switch (including remote control), internal sensor, or timer, or that provides continuous status display.

1.10 *Normal nonoperating temperature* means the temperature of all areas of an appliance to be tested are within 5 °F (2.8 °C) of the temperature that the identical areas of the same basic model of the appliance would attain if it remained in the test room for 24 hours while not operating with all oven doors closed and with any gas pilot lights on and adjusted in accordance with manufacturer's instructions.

1.11 *Off mode* means a mode in which the product is connected to a mains power source and is not providing any active mode or standby mode function, and where the mode may persist for an indefinite time. An indicator that only shows the user that the product is in the off position is included within the classification of an off mode.

1.12 *Primary energy consumption* means either the electrical energy consumption of a conventional electric oven or the gas energy consumption of a conventional gas oven.

1.13 *Secondary energy consumption* means any electrical energy consumption of a conventional gas oven.

1.14 *Standard cubic foot (L) of gas* means that quantity of gas that occupies 1 cubic foot (L) when saturated with water vapor at a temperature of 60 °F (15.6 °C) and a pressure of 30 inches of mercury (101.6 kPa) (density of mercury equals 13.595 grams per cubic centimeter).

1.15 *Standby mode* means any modes where the product is connected to a mains power source and offers one or more of the following user-oriented or protective functions which may persist for an indefinite time: (a) to facilitate the activation of other modes (including activation or deactivation of active mode) by remote switch (including remote control), internal sensor, or timer; (b) continuous functions, including information or status displays (including clocks) or sensor-based functions. A timer is a continuous clock function (which may or may not be associated with a display) that provides regular scheduled tasks (*e.g.,* switching) and that operates on a continuous basis.

1.16 *Thermocouple* means a device consisting of two dissimilar metals which are joined together and, with their associated wires, are used to measure temperature by means of electromotive force.

1.17 *Symbol usage.* The following identity relationships are provided to help clarify the symbology used throughout this procedure.

A—Number of Hours in a Year
B—Number of Hours Pilot Light Contributes to Cooking
C—Specific Heat
E—Energy Consumed
Eff—Cooking Efficiency
H—Heating Value of Gas
K—Conversion for Watt-hours to Kilowatt-hours
K_e—3.412 Btu/Wh, Conversion for Watt-hours to Btus
M—Mass
n—Number of Units
O—Annual Useful Cooking Energy Output
P—Power
Q—Gas Flow Rate
R—Energy Factor, Ratio of Useful Cooking Energy Output to Total Energy Input
S—Number of Self-Cleaning Operations per Year
T—Temperature
t—Time
V—Volume of Gas Consumed
W—Weight of Test Block

2. Test Conditions

2.1 *Installation.* A free standing kitchen range shall be installed with the back directly against, or as near as possible to, a vertical wall which extends at least 1 foot above and on either side of the appliance. There shall be no side walls. A drop-in, built-in, or wall-mounted appliance shall be installed in an enclosure in accordance with the manufacturer's instructions. These appliances are to be completely assembled with all handles, knobs, guards, and the like mounted in place. Any electric resistance heaters, gas burners, baking racks, and baffles shall be in place in accordance with the manufacturer's instructions; however, broiler pans are to be removed from the oven's baking compartment.

2.1.1 *Conventional electric ranges, ovens, and cooking tops.* These products shall be connected to an electrical supply circuit with voltage as specified in section 2.2.1 with a watt-hour meter installed in the circuit. The watt-hour meter shall be as described in section 2.9.1.1. For standby mode and off mode testing, these products shall also be installed in accordance with Section 5, Paragraph 5.2 of IEC 62301 (Second Edition) (incorporated by reference; see § 430.3), disregarding the provisions regarding batteries and the determination, classification, and testing of relevant modes.

2.1.2 *Conventional gas ranges, ovens, and cooking tops.* These products shall be connected to a gas supply line with a gas meter installed between the supply line and the appliance being tested, according to manufacturer's specifications. The gas meter shall be as described in section 2.9.2. Conventional gas ranges, ovens, and cooking tops with electrical ignition devices or other electrical components shall be connected to an electrical supply circuit of nameplate voltage with a watt-hour meter installed in the circuit. The watt-hour meter shall be as described in section 2.9.1.1. For standby mode and off mode testing, these products shall also be installed in accordance with Section 5, Paragraph 5.2 of IEC 62301 (Second Edition) (incorporated by reference; see § 430.3), disregarding the provisions regarding batteries and the determination, classification, and testing of relevant modes.

2.1.3 *Microwave ovens.* Install the microwave oven in accordance with the manufacturer's instructions and connect to an electrical supply circuit with voltage as specified in section 2.2.1. The microwave oven shall also be installed in accordance with Section 5, Paragraph 5.2 of IEC 62301 (First Edition) (incorporated by reference; see § 430.3). A watt meter shall be installed in the circuit and shall be as described in section 2.9.1.3.

* * * * *

2.2.1.2 *Supply voltage waveform.* For conventional range, conventional cooking top, and conventional oven standby mode and off mode testing, maintain the electrical supply voltage waveform indicated in Section 4, Paragraph 4.3.2 of IEC 62301 (Second Edition) (incorporated by reference; see § 430.3). For microwave oven standby mode and off mode testing, maintain the electrical supply voltage waveform indicated in Section 4, Paragraph 4.4 of IEC 62301 (First Edition) (incorporated by reference; see § 430.3).

* * * * *

2.5.2 *Standby mode and off mode ambient temperature.* For conventional range, conventional cooking top, and conventional oven standby mode and off mode testing, maintain room ambient air temperature conditions as specified in Section 4, Paragraph 4.2 of IEC 62301 (Second Edition) (incorporated by reference;

see § 430.3). For microwave oven standby mode and off mode testing, maintain room ambient air temperature conditions as specified in Section 4, Paragraph 4.2 of IEC 62301 (First Edition) (incorporated by reference; see § 430.3).

2.6 *Normal nonoperating temperature.* All areas of the appliance to be tested shall attain the normal nonoperating temperature, as defined in section 1.10 of this Appendix, before any testing begins. The equipment for measuring the applicable normal nonoperating temperature shall be as described in sections 2.9.3.1, 2.9.3.2, 2.9.3.3, and 2.9.3.4, as applicable.

* * * * *

2.9.1.3 *Standby mode and off mode watt meter.* The watt meter used to measure conventional range, conventional cooking top, and conventional oven standby mode and off mode shall have a resolution as specified in Section 4, Paragraph 4.4 of IEC 62301 (Second Edition) (incorporated by reference, see § 430.3). The watt meter used to measure microwave oven standby mode and off mode shall have a resolution as specified in Section 4, Paragraph 4.5 of IEC 62301 (First Edition) (incorporated by reference, see § 430.3), and shall also be able to record a ''true'' average power as specified in Section 5, Paragraph 5.3.2(a) of IEC 62301 (First Edition).

* * * * *

3. Test Methods and Measurements

* * * * *

3.1.1 *Conventional oven.* Perform a test by establishing the testing conditions set forth in section 2, *Test Conditions,* of this Appendix, and adjust any pilot lights of a conventional gas oven in accordance with the manufacturer's instructions and turn off the gas flow to the conventional cooking top, if so equipped. Before beginning the test, the conventional oven shall be at its normal nonoperating temperature as defined in section 1.10 and described in section 2.6. Set the conventional oven test block W_1 approximately in the center of the usable baking space. If there is a selector switch for selecting the mode of operation of the oven, set it for normal baking. If an oven permits baking by either forced convection by using a fan, or without forced convection, the oven is to be tested in each of those two modes. The oven shall remain on for at least one complete thermostat ''cut-off/cut-on'' of the electrical resistance heaters or gas burners after the test block temperature has increased 234 °F (130 °C) above its initial temperature.

3.1.1.1 *Self-cleaning operation of a conventional oven.* Establish the test conditions set forth in Section 2, *Test Conditions,* of this Appendix. Adjust any pilot lights of a conventional gas oven in accordance with the manufacturer's instructions and turn off the gas flow to the conventional cooking top. The temperature of the conventional oven shall be its normal nonoperating temperature as defined in section 1.10 and described in section 2.6. Then set the conventional oven's self-cleaning process in accordance with the manufacturer's instructions. If the self-cleaning process is adjustable, use the average time recommended by the manufacturer for a moderately soiled oven.

* * * * *

3.1.1.3 *Conventional oven standby mode and off mode power.* Establish the standby mode and off mode testing conditions set forth in Section 2, *Test Conditions,* of this Appendix. For conventional ovens that take some time to enter a stable state from a higher power state as discussed in Section 5, Paragraph 5.1, Note 1 of IEC 62301 (Second Edition) (incorporated by reference; see § 430.3), allow sufficient time for the conventional oven to reach the lower power state before proceeding with the test measurement. Follow the test procedure as specified in Section 5, Paragraph 5.3.2 of IEC 62301 (Second Edition) for testing in each possible mode as described in 3.1.1.3.1 through 3.1.1.3.3. For units in which power varies as a function of displayed time in standby mode, either: (1) set the clock time to 3:23 at the end of the stabilization period specified in Section 5, Paragraph 5.3 of IEC 62301 (First Edition), and use the average power approach described in Section 5, Paragraph 5.3.2(a) of IEC 62301 (First Edition), but with a single test period of 10 minutes +0/−2 sec after an additional stabilization period until the clock time reaches 3:33; or (2) at any starting clock time, allow a stabilization period as described in Section 5, Paragraph 5.3 of IEC 62301 (First Edition), and use the average power approach described in Section 5, Paragraph 5.3.2(a) of IEC 62301 (First Edition), but with a single test period of 12 hours +0/−30 sec. Testing may be conducted using either a 12-hour test, a 10-minute test, or both tests; however, if a manufacturer elects to perform both tests on a unit, the manufacturer may only use the results from one of the tests (*i.e.,* the 12-hour test or the 10-minute test) as the test results for that unit. Results of the 10-minute test that are within ±2 percent of the 12-hour test are deemed to be representative of average energy use.

3.1.1.3.1 If the conventional oven has an inactive mode, as defined in section 1.9, measure and record the average inactive mode power of the conventional oven, P_{IA}, in watts.

3.1.1.3.2 If the conventional oven has an off mode, as defined in section 1.11, measure and record the average off mode power of the conventional oven, P_{OM}, in watts.

3.1.1.3.3 If the conventional oven has a cycle finished mode, as defined in section 1.3, measure and record the average cycle finished mode power of the conventional oven, P_{CF}, in watts.

3.1.2 *Conventional cooking top.* Establish the test conditions set forth in section 2, *Test Conditions,* of this Appendix. Adjust any pilot lights of a conventional gas cooking top in accordance with the manufacturer's instructions and turn off the gas flow to the conventional oven(s), if so equipped. The temperature of the conventional cooking top shall be its normal nonoperating temperature as defined in section 1.10 and described in section 2.6. Set the test block in the center of the surface unit under test. The small test block, W_2, shall be used on electric surface units of 7 inches (178 mm) or less in diameter. The large test block, W_3, shall be used on electric surface units over 7 inches (178 mm) in diameter and on all gas surface units. Turn on the surface unit under test and set its energy input rate to the maximum setting. When the test block reaches 144 °F (80 °C) above its initial test block temperature, immediately reduce the energy input rate to 25±5 percent of the maximum energy input rate. After 15±0.1 minutes at the reduced energy setting, turn off the surface unit under test.

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3.1.2.2 *Conventional cooking top standby mode and off mode power.* Establish the standby mode and off mode testing conditions set forth in section 2, *Test Conditions,* of this Appendix. For conventional cooktops that take some time to enter a stable state from a higher power state as discussed in Section 5, Paragraph 5.1, Note 1 of IEC 62301 (Second Edition) (incorporated by reference; see § 430.3), allow sufficient time for the conventional cooktop to reach the lower power state before proceeding with the test measurement. Follow the test procedure as specified in Section 5, Paragraph 5.3.2 of IEC 62301 (Second Edition) for testing in each possible mode as described in sections 3.1.2.2.1 and 3.1.2.2.2 of this Appendix. For units in which power varies as a function of displayed time in standby mode, either: (1) Set the clock time to 3:23 at the end of the stabilization period specified in Section 5, Paragraph 5.3 of IEC 62301 (First Edition), and use the average power approach described in Section 5, Paragraph 5.3.2(a) of IEC 62301 (First Edition), but with a single test period of 10 minutes +0/−2 sec after an additional stabilization period until the clock time reaches 3:33; or (2) at any starting clock time, allow a stabilization period as described in Section 5, Paragraph 5.3 of IEC 62301 (First Edition), and use the average power approach described in Section 5, Paragraph 5.3.2(a) of IEC 62301 (First Edition), but with a single test period of 12 hours +0/−30 sec. Testing may be conducted using either a 12-hour test, a 10-minute test, or both tests; however, if a manufacturer elects to perform both tests on a unit, the manufacturer may only use the results from one of the test (*i.e.,* the 12-hour test or the 10-minute test) as the test results for that unit. Results of the 10-minute test that are within ±2 percent of the 12-hour test are deemed to be representative of average energy use.

3.1.2.2.1 If the conventional cooking top has an inactive mode, as defined in section 1.9, measure and record the average inactive mode power of the conventional cooking top, P_{IA}, in watts.

3.1.2.2.2 If the conventional cooking top has an off mode, as defined in section 1.11, measure and record the average off mode power of the conventional cooking top, P_{OM}, in watts.

3.1.3 *Conventional range standby mode and off mode power.* Establish the standby mode and off mode testing conditions set forth in section 2, *Test Conditions,* of this Appendix. For conventional ranges that take some time to enter a stable state from a higher power state as discussed in Section 5, Paragraph 5.1, Note 1 of IEC 62301 (Second

Edition) (incorporated by reference; see § 430.3), allow sufficient time for the conventional range to reach the lower power state before proceeding with the test measurement. Follow the test procedure as specified in Section 5, Paragraph 5.3.2 of IEC 62301 (Second Edition) for testing in each possible mode as described in sections 3.1.3.1 through 3.1.3.3 of this Appendix. For units in which power varies as a function of displayed time in standby mode, either: (1) Set the clock time to 3:23 at the end of the stabilization period specified in Section 5, Paragraph 5.3 of IEC 62301 (First Edition), and use the average power approach described in Section 5, Paragraph 5.3.2(a) of IEC 62301 (First Edition), but with a single test period of 10 minutes +0/−2 sec after an additional stabilization period until the clock time reaches 3:33; or (2) at any starting clock time, allow a stabilization period as described in Section 5, Paragraph 5.3 of IEC 62301 (First Edition), and use the average power approach described in Section 5, Paragraph 5.3.2(a) of IEC 62301 (First Edition), but with a single test period of 12 hours +0/−30 sec. Testing may be conducted using either a 12-hour test, a 10-minute test, or both tests; however, if a manufacturer elects to perform both tests on a unit, the manufacturer may only use the results from one of the test (*i.e.,* the 12-hour test or the 10-minute test) as the test results for that unit. Results of the 10-minute test that are within ±2 percent of the 12-hour test are deemed to be representative of average energy use.

3.1.3.1 If the conventional range has an inactive mode, as defined in section 1.9, measure and record the average inactive mode power of the conventional range, P_{IA}, in watts.

3.1.3.2 If the conventional range has an off mode, as defined in section 1.11, measure and record the average off mode power of the conventional range, P_{OM}, in watts.

3.1.3.3 If the conventional range has a cycle finished mode, as defined in section 1.3, measure and record the average cycle finished mode power of the conventional range, P_{CF}, in watts.

3.1.4 *Microwave oven.*

3.1.4.1 *Microwave oven test standby mode and off mode power.* Establish the testing conditions set forth in section 2, *Test Conditions,* of this Appendix. For microwave ovens that drop from a higher power state to a lower power state as discussed in Section 5, Paragraph 5.1, Note 1 of IEC 62301 (First Edition) (incorporated by reference; see § 430.3), allow sufficient time for the microwave oven to reach the lower power state before proceeding with the test measurement. Follow the test procedure as specified in Section 5, Paragraph 5.3 of IEC 62301 (First Edition). For units in which power varies as a function of displayed time in standby mode, set the clock time to 3:23 and use the average power approach described in Section 5, Paragraph 5.3.2(a), but with a single test period of 10 minutes +0/−2 sec after an additional stabilization period until the clock time reaches 3:33. If a microwave oven is capable of operation in either standby mode or off mode, as defined in sections 1.15 or 1.11, respectively, or both, test the microwave oven in each mode in which it can operate.

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3.2.1 *Conventional oven test energy consumption.* If the oven thermostat controls the oven temperature without cycling on and off, measure the energy consumed, E_O, when the temperature of the block reaches T_O (T_O is 234 °F (130 °C) above the initial block temperature, T_I). If the oven thermostat operates by cycling on and off, make the following series of measurements: Measure the block temperature, T_A, and the energy consumed, E_A, or volume of gas consumed, V_A, at the end of the last ''ON'' period of the conventional oven before the block reaches T_O. Measure the block temperature, T_B, and the energy consumed, E_B, or volume of gas consumed, V_B, at the beginning of the next ''ON'' period. Measure the block temperature, T_C, and the energy consumed, E_C, or volume of gas consumed, V_C, at the end of that ''ON'' period. Measure the block temperature, T_D, and the energy consumed, E_D, or volume of gas consumed, V_D, at the beginning of the following ''ON'' period. Energy measurements for E_O, E_A, E_B, E_C, and E_D should be expressed in watt-hours (kJ) for conventional electric ovens, and volume measurements for V_A, V_B, V_C, and V_D should be expressed in standard cubic feet (L) of gas for conventional gas ovens. For a gas oven, measure in watt-hours (kJ) any electrical energy, E_{IO}, consumed by an ignition device or other electrical components required for the operation of a conventional gas oven while heating the test block to T_O.

3.2.1.1 *Conventional oven average test energy consumption.* If the conventional oven permits baking by either forced convection or without forced convection and the oven thermostat does not cycle on and off, measure the energy consumed with the forced convection mode, $(E_O)_1$, and without the forced convection mode, $(E_O)_2$, when the temperature of the block reaches T_O (T_O is 234 °F (130 °C) above the initial block temperature, T_I). If the conventional oven permits baking by either forced convection or without forced convection and the oven thermostat operates by cycling on and off, make the following series of measurements with and without the forced convection mode: Measure the block temperature, T_A, and the energy consumed, E_A, or volume of gas consumed, V_A, at the end of the last ''ON'' period of the conventional oven before the block reaches T_O. Measure the block temperature, T_B, and the energy consumed, E_B, or volume of gas consumed, V_B, at the beginning of the next ''ON'' period. Measure the block temperature, T_C, and the energy consumed, E_C, or volume of gas consumed, V_C, at the end of that ''ON'' period. Measure the block temperature, T_D, and the energy consumed, E_D, or volume of gas consumed, V_D, at the beginning of the following ''ON'' period. Energy measurements for E_O, E_A, E_B, E_C, and E_D should be expressed in watt-hours (kJ) for conventional electric ovens, and volume measurements for V_A, V_B, V_C, and V_D should be expressed in standard cubic feet (L) of gas for conventional gas ovens. For a gas oven that can be operated with or without forced convection, measure in watt-hours (kJ) any electrical energy consumed by an ignition device or other electrical components required for the operation of a conventional gas oven while heating the test block to T_O using the forced convection mode, $(E_{IO})_1$, and without using the forced convection mode, $(E_{IO})_2$.

3.2.1.2 *Energy consumption of self-cleaning operation.* Measure the energy consumption, E_S, in watt-hours (kJ) of electricity or the volume of gas consumption, V_S, in standard cubic feet (L) during the self-cleaning test set forth in section 3.1.1.1 of this Appendix. For a gas oven, also measure in watt-hours (kJ) any electrical energy, E_{IS}, consumed by ignition devices or other electrical components required during the self-cleaning test.

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3.2.1.4 *Standby mode and off mode energy consumption.* Make measurements as specified in section 3.1.1.3 of this Appendix. If the conventional oven is capable of operating in inactive mode, measure the average inactive mode power of the conventional oven, P_{IA}, in watts as specified in section 3.1.1.3.1 of this Appendix. If the conventional oven is capable of operating in off mode, measure the average off mode power of the conventional oven, P_{OM}, in watts as specified in section 3.1.1.3.2 of this Appendix. If the conventional oven is capable of operating in cycle finished mode, measure the average cycle finished mode power of the conventional oven, P_{CF}, in watts as specified in section 3.1.1.3.3 of this Appendix.

3.2.2 *Conventional surface unit test energy consumption.*

3.2.2.1 *Conventional surface unit average test energy consumption.* For the surface unit under test, measure the energy consumption, E_{CT}, in watt-hours (kJ) of electricity or the volume of gas consumption, V_{CT}, in standard cubic feet (L) of gas and the test block temperature, T_{CT}, at the end of the 15 minute (reduced input setting) test interval for the test specified in section 3.1.2 of this Appendix and the total time, t_{CT}, in hours, that the unit is under test. Measure any electrical energy, E_{IC}, consumed by an ignition device of a gas heating element or other electrical components required for the operation of the conventional gas cooktop in watt-hours (kJ).

3.2.2.2 *Conventional surface unit standby mode and off mode energy consumption.* Make measurements as specified in section 3.1.2.2 of this Appendix. If the conventional surface unit is capable of operating in inactive mode, as defined in section 1.9 of this Appendix, measure the average inactive mode power of the conventional surface unit, P_{IA}, in watts as specified in section 3.1.2.2.1 of this Appendix. If the conventional surface unit is capable of operating in off mode, as defined in section 1.11 of this Appendix, measure the average off mode power of the conventional surface unit, P_{OM}, in watts as specified in section 3.1.2.2.2 of this Appendix.

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3.2.3 *Conventional range standby mode and off mode energy consumption.* Make measurements as specified in section 3.1.3 of this Appendix. If the conventional range is capable of operating in inactive mode, as

defined in section 1.9 of this Appendix, measure the average inactive mode power of the conventional range, P_{IA}, in watts as specified in section 3.1.3.1 of this Appendix. If the conventional range is capable of operating in off mode, as defined in section 1.11 of this Appendix, measure the average off mode power of the conventional range, P_{OM}, in watts as specified in section 3.1.3.2 of this Appendix. If the conventional range is capable of operating in cycle finished mode, as defined in section 1.3 of this Appendix, measure the average cycle finished mode power of the conventional range, P_{CF}, in watts as specified in section 3.1.3.3 of this Appendix.

3.2.4 *Microwave oven test standby mode and off mode power.* Make measurements as specified in Section 5, Paragraph 5.3 of IEC 62301 (First Edition) (incorporated by reference; see § 430.3). If the microwave oven is capable of operating in standby mode, as defined in section 1.15 of this Appendix, measure the average standby mode power of the microwave oven, P_{SB}, in watts as specified in section 3.1.4.1. If the microwave oven is capable of operating in off mode, as defined in section 1.11 of this Appendix, measure the average off mode power of the microwave oven, P_{OM}, as specified in section 3.1.4.1.

* * * * *

3.3.8 For conventional ovens, record the conventional oven standby mode and off mode test measurements P_{IA}, P_{OM}, and P_{CF}, if applicable. For conventional cooktops, record the conventional cooktop standby mode and off mode test measurements P_{IA} and P_{OM}, if applicable. For conventional ranges, record the conventional range standby mode and off mode test measurements P_{IA}, P_{OM}, and P_{CF}, if applicable.

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3.3.13 Record the average standby mode power, P_{SB}, for the microwave oven standby mode, as determined in section 3.2.4 for a microwave oven capable of operating in standby mode. Record the average off mode power, P_{OM}, for the microwave oven off mode power test, as determined in section 3.2.4 for a microwave oven capable of operating in off mode.

4. Calculation of Derived Results From Test Measurements

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4.1.1 *Test energy consumption.* For a conventional oven with a thermostat which operates by cycling on and off, calculate the test energy consumption, E_O, expressed in watt-hours (kJ) for electric ovens and in Btus (kJ) for gas ovens, and defined as:

$$E_O = E_{AB} + \left[\left(\frac{T_O - T_{AB}}{T_{CD} - T_{AB}} \right) \times \left(E_{CD} - E_{AB} \right) \right]$$

for electric ovens, and,

$$E_O = \left(V_{AB} \times H \right) + \left[\left(\frac{T_O - T_{AB}}{T_{CD} - T_{AB}} \right) \times \left(V_{CD} - V_{AB} \right) \times H \right]$$

for gas ovens,

Where:

H = either H_n or H_p, the heating value of the gas used in the test as specified in section 2.2.2.2 and section 2.2.2.3 of this Appendix, expressed in Btus per standard cubic foot (kJ/L).

T_O = 234 °F (130 °C) plus the initial test block temperature.

and,

$$E_{AB} = \frac{\left(E_A + E_B \right)}{2}, \; E_{CD} = \frac{\left(E_C + E_D \right)}{2},$$

$$V_{AB} = \frac{\left(V_A + V_B \right)}{2}, \; V_{CD} = \frac{\left(V_C + V_D \right)}{2},$$

$$T_{AB} = \frac{\left(T_A + T_B \right)}{2}, \; T_{CD} = \frac{\left(T_C + T_D \right)}{2},$$

Where:

T_A = block temperature in °F (°C) at the end of the last ''ON'' period of the conventional oven before the test block reaches T_O.

T_B = block temperature in °F (°C) at the beginning of the ''ON'' period following the measurement of T_A.

T_C = block temperature in °F (°C) at the end of the ''ON'' period which starts with T_B.

T_D = block temperature in °F (°C) at the beginning of the ''ON'' period which follows the measurement of T_C.

E_A = electric energy consumed in Wh (kJ) at the end of the last ''ON'' period before the test block reaches T_O.

E_B = electric energy consumed in Wh (kJ) at the beginning of the ''ON'' period following the measurement of T_A.

E_C = electric energy consumed in Wh (kJ) at the end of the ''ON'' period which starts with T_B.

E_D = electric energy consumed in Wh (kJ) at the beginning of the ''ON'' period which follows the measurement of T_C.
V_A = volume of gas consumed in standard cubic feet (L) at the end of the last ''ON'' period before the test block reaches T_O.
V_B = volume of gas consumed in standard cubic feet (L) at the beginning of the ''ON'' period following the measurement of T_A.
V_C = volume of gas consumed in standard cubic feet (L) at the end of the ''ON'' period which starts with T_B.
V_D = volume of gas consumed in standard cubic feet (L) at the beginning of the ''ON'' period which follows the measurement of T_C.

4.1.1.1 *Average test energy consumption.* If the conventional oven can be operated with or without forced convection, determine the average test energy consumption, E_O and $E_{IO,}$ in watt-hours (kJ) for electric ovens and Btus (kJ) for gas ovens using the following equations:

$$E_O = \frac{(E_O)_1 + (E_O)_2}{2}$$

$$E_{IO} = \frac{(E_{IO})_1 + (E_{IO})_2}{2}$$

Where:

$(E_O)_1$ = test energy consumption using the forced convection mode in watt-hours (kJ) for electric ovens and in Btus (kJ) for gas ovens as measured in section 3.2.1.1 of this Appendix.
$(E_O)_2$ = test energy consumption without using the forced convection mode in watt-hours (kJ) for electric ovens and in Btus (kJ) for gas ovens as measured in section 3.2.1.1 of this Appendix.
$(E_{IO})_1$ = electrical energy consumption in watt-hours (kJ) of a gas oven in forced convection mode as measured in section 3.2.1.1 of this Appendix.
$(E_{IO})_2$ = electrical energy consumption in watt-hours (kJ) of a gas oven without using the forced convection mode as measured in section 3.2.1.1 of this Appendix.

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4.1.2.3.1 *Annual primary energy consumption.* Calculate the annual primary energy consumption for conventional oven self-cleaning operations, $E_{SC,}$ expressed in kilowatt-hours (kJ) per year for electric ovens and in Btus (kJ) for gas ovens, and defined as:

$E_{SC} = E_S \times S_e \times K$, for electric ovens,

Where:

E_S = energy consumption in watt-hours, as measured in section 3.2.1.2 of this Appendix.
S_e = 4, average number of times a self-cleaning operation of a conventional electric oven is used per year.
K = 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

or

$E_{SC} = V_S \times H \times S_g$, for gas ovens,

Where:

V_S = gas consumption in standard cubic feet (L), as measured in section 3.2.1.2 of this Appendix.
H = H_n or H_p, the heating value of the gas used in the test as specified in sections 2.2.2.2 and 2.2.2.3 of this Appendix in Btus per standard cubic foot (kJ/L).
S_g = 4, average number of times a self-cleaning operation of a conventional gas oven is used per year.

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4.1.2.4 *Annual standby mode and off mode energy consumption of a single conventional oven.* Calculate the annual standby mode and off mode energy consumption for conventional ovens, $E_{OTSO,}$ expressed in kilowatt-hours (kJ) per year and defined as:

$E_{OTSO} = [(P_{IA} \times S_{IA}) + (P_{OM} \times S_{OM}) + (P_{CF} \times S_{CF})] \times K$

Where:

P_{IA} = conventional oven inactive mode power, in watts, as measured in section 3.1.1.3.1 of this Appendix.
P_{OM} = conventional oven off mode power, in watts, as measured in section 3.1.1.3.2 of this Appendix.
P_{CF} = conventional oven cycle finished mode power, in watts, as measured in section 3.1.1.3.3 of this Appendix.

If the conventional oven has cycle finished mode, S_{TOT} equals 8,522.1 hours:

Where:

S_{TOT} equals the total number of inactive mode and off mode hours per year;

If the conventional oven does not have cycle finished mode, S_{TOT} equals 8,540.1 hours;

If the conventional oven has both inactive mode and off mode, S_{IA} and S_{OM} both equal $S_{TOT}/2$;

If the conventional oven has an inactive mode but no off mode, the inactive mode annual hours, S_{IA}, is equal to S_{TOT} and the off mode annual hours, S_{OM}, is equal to 0;

If the conventional oven has an off mode but no inactive mode, S_{IA} is equal to 0 and S_{OM} is equal to S_{TOT};

S_{CF} = 18, conventional oven cycle finished mode annual hours;
K = 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

* * * * *

4.1.2.5.1 *Conventional electric oven energy consumption.* Calculate the total annual energy consumption of a conventional electric oven, $E_{AO,}$ expressed in kilowatt-hours (kJ) per year and defined as:

$E_{AO} = E_{CO} + E_{SC}$,

Where:

E_{CO} = annual primary cooking energy consumption as determined in section 4.1.2.1.1 of this Appendix.
E_{SC} = annual primary self-cleaning energy consumption as determined in section 4.1.2.3.1 of this Appendix.

4.1.2.5.2 *Conventional electric oven integrated energy consumption.* Calculate the total integrated annual electrical energy consumption of a conventional electric oven, $IE_{AO,}$ expressed in kilowatt-hours (kJ) per year and defined as:

$IE_{AO} = E_{CO} + E_{SC} + E_{OTSO}$,

Where:

E_{CO} = annual primary cooking energy consumption as determined in section 4.1.2.1.1 of this Appendix.
E_{SC} = annual primary self-cleaning energy consumption as determined in section 4.1.2.3.1 of this Appendix.
E_{OTSO} = annual standby mode and off mode energy consumption as determined in section 4.1.2.4 of this Appendix.

4.1.2.5.3 *Conventional gas oven energy consumption.* Calculate the total annual gas energy consumption of a conventional gas oven, $E_{AOG,}$ expressed in Btus (kJ) per year and defined as:

$E_{AOG} = E_{CO} + E_{SC} + E_{PO}$,

Where:

E_{CO} = annual primary cooking energy consumption as determined in section 4.1.2.1.1 of this Appendix.
E_{PO} = annual pilot light energy consumption as determined in section 4.1.2.2 of this Appendix.
E_{SC} = annual primary self-cleaning energy consumption as determined in section 4.1.2.3.1 of this Appendix.

If the conventional gas oven uses electrical energy, calculate the total annual electrical energy consumption, E_{AOE}, expressed in kilowatt-hours (kJ) per year and defined as:

$E_{AOE} = E_{SO} + E_{SS}$,

Where:

E_{SO} = annual secondary cooking energy consumption as determined in section 4.1.2.1.2 of this Appendix.
E_{SS} = annual secondary self-cleaning energy consumption as determined in section 4.1.2.3.2 of this Appendix.

If the conventional gas oven uses electrical energy, also calculate the total integrated annual electrical energy consumption, IE_{AOE}, expressed in kilowatt-hours (kJ) per year and defined as:

$IE_{AOE} = E_{SO} + E_{SS} + E_{OTSO}$,

Where:

E_{SO} = annual secondary cooking energy consumption as determined in section 4.1.2.1.2 of this Appendix.
E_{SS} = annual secondary self-cleaning energy consumption as determined in section 4.1.2.3.2 of this Appendix.
E_{OTSO} = annual standby mode and off mode energy consumption as determined in section 4.1.2.4 of this Appendix.

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4.1.2.6.1 *Conventional electric oven energy consumption.* Calculate the total annual energy consumption, $E_{TO,}$ in kilowatt-hours (kJ) per year and defined as:

$E_{TO} = E_{ACO} + E_{ASC}$,

Where:

$$E_{ACO} = \frac{1}{n}\sum_{i=1}^{n}(E_{CO})_i,$$

is the average annual primary energy consumption for cooking, and where:

n = number of conventional ovens in the basic model.

E_{CO} = annual primary energy consumption for cooking as determined in section 4.1.2.1.1 of this Appendix.

$$E_{ASC} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{SC}\right)_i ,$$

average annual self-cleaning energy consumption,

Where:

n = number of self-cleaning conventional ovens in the basic model.

E_{SC} = annual primary self-cleaning energy consumption as determined according to section 4.1.2.3.1 of this Appendix.

4.1.2.6.2 *Conventional electric oven integrated energy consumption.* Calculate the total integrated annual energy consumption, IE_{TO}, in kilowatt-hours (kJ) per year and defined as:

$IE_{TO} = E_{ACO} + E_{ASC} + E_{OTSO}$,

Where:

$$E_{ACO} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{CO}\right)_i ,$$

is the average annual primary energy consumption for cooking, and where:

n = number of conventional ovens in the basic model.

E_{CO} = annual primary energy consumption for cooking as determined in section 4.1.2.1.1 of this Appendix.

$$E_{ASC} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{SC}\right)_i ,$$

average annual self-cleaning energy consumption,

Where:

n = number of self-cleaning conventional ovens in the basic model.

E_{SC} = annual primary self-cleaning energy consumption as determined according to section 4.1.2.3.1 of this Appendix.

E_{OTSO} = annual standby mode and off mode energy consumption for the cooking appliance as determined in section 4.1.2.4 of this Appendix.

4.1.2.6.3 *Conventional gas oven energy consumption.* Calculate the total annual gas energy consumption, E_{TOG}, in Btus (kJ) per year and defined as:

$E_{TOG} = E_{ACO} + E_{ASC} + E_{TPO}$,

Where:

E_{ACO} = average annual primary energy consumption for cooking in Btus (kJ) per year and is calculated as:

$$E_{ACO} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{CO}\right)_i ,$$

Where:

n = number of conventional ovens in the basic model.

E_{CO} = annual primary energy consumption for cooking as determined in section 4.1.2.1.1 of this Appendix.

and,

E_{ASC} = average annual self-cleaning energy consumption in Btus (kJ) per year and is calculated as:

$$E_{ASC} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{SC}\right)_i ,$$

Where:

n = number of self-cleaning conventional ovens in the basic model.

E_{SC} = annual primary self-cleaning energy consumption as determined according to section 4.1.2.3.1 of this Appendix.

$$E_{TPO} = \sum_{i=1}^{n}\left(E_{PO}\right)_i ,$$

total energy consumption of any pilot lights,

Where:

E_{PO} = annual energy consumption of any continuously-burning pilot lights determined according to section 4.1.2.2 of this Appendix.

n = number of pilot lights in the basic model.

If the oven also uses electrical energy, calculate the total annual electrical energy consumption, E_{TOE}, in kilowatt-hours (kJ) per year and defined as:

$E_{TOE} = E_{ASO} + E_{AAS}$,

Where:

$$E_{ASO} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{SO}\right)_i ,$$

is the average annual secondary energy consumption for cooking,

Where:

n = number of conventional ovens in the basic model.

E_{SO} = annual secondary energy consumption for cooking of gas ovens as determined in section 4.1.2.1.2 of this Appendix.

$$E_{AAS} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{SS}\right)_i ,$$

is the average annual secondary self-cleaning energy consumption,

Where:

n = number of self-cleaning ovens in the basic model.

E_{SS} = annual secondary self-cleaning energy consumption of gas ovens as determined in section 4.1.2.3.2 of this Appendix.

If the oven also uses electrical energy, also calculate the total integrated annual electrical energy consumption, IE_{TOE}, in kilowatt-hours (kJ) per year and defined as:

$IE_{TOE} = E_{ASO} + E_{AAS} + E_{OTSO}$,

Where:

$$E_{ASO} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{SO}\right)_i ,$$

is the average annual secondary energy consumption for cooking,

Where:

n = number of conventional ovens in the basic model.

E_{SO} = annual secondary energy consumption for cooking of gas ovens as determined in section 4.1.2.1.2 of this Appendix.

$$E_{AAS} = \frac{1}{n}\sum_{i=1}^{n}\left(E_{SS}\right)_i ,$$

is the average annual secondary self-cleaning energy consumption,

Where:

n = number of self-cleaning ovens in the basic model.

E_{SS} = annual secondary self-cleaning energy consumption of gas ovens as determined in section 4.1.2.3.2 of this Appendix.

E_{OTSO} = annual standby mode and off mode energy consumption as determined in section 4.1.2.4 of this Appendix.

* * * * *

4.1.4 *Conventional oven energy factor and integrated energy factor.*

4.1.4.1 *Conventional oven energy factor.* Calculate the energy factor, or the ratio of useful cooking energy output to the total energy input, R_O, using the following equations:

$$R_O = \frac{O_O}{E_{AO}}$$

For electric ovens,

Where:

O_O = 29.3 kWh (105,480 kJ) per year, annual useful cooking energy output.

E_{AO} = total annual energy consumption for electric ovens as determined in section 4.1.2.5.1 of this Appendix.

For gas ovens:

$$R_O = \frac{O_O}{E_{AOG} + \left(E_{AOE} \times K_e\right)}$$

Where:

O_O = 88.8 kBtu (93,684 kJ) per year, annual useful cooking energy output.

E_{AOG} = total annual gas energy consumption for conventional gas ovens as determined in section 4.1.2.5.3 of this Appendix.

E_{AOE} = total annual electrical energy consumption for conventional gas ovens as determined in section 4.1.2.5.3 of this Appendix.

K_e = 3,412 Btu/kWh (3,600 kJ/kWh), conversion factor for kilowatt-hours to Btus.

4.1.4.2 *Conventional oven integrated energy factor.* Calculate the integrated energy factor, or the ratio of useful cooking energy output to the total integrated energy input, IR_O, using the following equations:

$$IR_O = \frac{O_O}{IE_{AO}}$$

For electric ovens,

Where:

O_O = 29.3 kWh (105,480 kJ) per year, annual useful cooking energy output.

IE_{AO} = total integrated annual energy consumption for electric ovens as determined in section 4.1.2.5.2 of this Appendix.

For gas ovens:

$$IR_O = \frac{O_O}{E_{AOG} + \left(E_{AOE} \times K_e\right)}$$

Where:

O_O = 88.8 kBtu (93,684 kJ) per year, annual useful cooking energy output.

E_{AOG} = total annual gas energy consumption for conventional gas ovens as determined in section 4.1.2.5.3 of this Appendix.

IE_{AOE} = total integrated annual electrical energy consumption for conventional gas ovens as determined in section 4.1.2.5.3 of this Appendix.

K_e = 3,412 Btu/kWh (3,600 kJ/kWh), conversion factor for kilowatt-hours to Btus.

* * * * *

4.2.1.1 *Electric surface unit cooking efficiency.* Calculate the cooking efficiency, Eff_{SU}, of the electric surface unit under test, defined as:

$$Eff_{SU} = W \times C_P \times \left(\frac{T_{SU}}{K_e \times E_{CT}}\right)$$

Where:

W = measured weight of test block, W_2 or W_3, expressed in pounds (kg).

C_p = 0.23 Btu/lb-°F (0.96 kJ/kg ÷ °C), specific heat of test block.

T_{SU} = temperature rise of the test block: final test block temperature, T_{CT}, as determined in section 3.2.2 of this Appendix, minus the initial test block temperature, T_I, expressed in °F (°C) as determined in section 2.7.5 of this Appendix.

K_e = 3.412 Btu/Wh (3.6 kJ/Wh), conversion factor of watt-hours to Btus.

E_{CT} = measured energy consumption, as determined according to section 3.2.2 of this Appendix, expressed in watt-hours (kJ).

* * * * *

4.2.2.1 *Conventional electric cooking top.*

4.2.2.1.1 *Annual energy consumption of a conventional electric cooking top.* Calculate the annual electrical energy consumption of an electric cooking top, E_{CA}, in kilowatt-hours (kJ) per year, defined as:

$$E_{CA} = \frac{O_{CT}}{Eff_{CT}}$$

Where:

O_{CT} = 173.1 kWh (623,160 kJ) per year, annual useful cooking energy output.

Eff_{CT} = conventional cooking top cooking efficiency as defined in section 4.2.1.3 of this Appendix.

4.2.2.1.2 *Integrated annual energy consumption of a conventional electric cooking top.* Calculate the total integrated annual electrical energy consumption of an electric cooking top, IE_{CA}, in kilowatt-hours (kJ) per year, defined as:

$$IE_{CA} = \frac{O_{CT}}{Eff_{CT}} + E_{CTSO}$$

Where:

O_{CT} = 173.1 kWh (623,160 kJ) per year, annual useful cooking energy output.

Eff_{CT} = conventional cooking top cooking efficiency as defined in section 4.2.1.3 of this Appendix.

$E_{CTSO} = [(P_{IA} \times S_{IA}) + (P_{OM} \times S_{OM})] \times K$

Where:

P_{IA} = conventional cooktop inactive mode power, in watts, as measured in section 3.1.2.2.1 of this Appendix.

P_{OM} = conventional cooktop off mode power, in watts, as measured in section 3.1.2.2.2 of this Appendix.

If the conventional cooktop has both inactive mode and off mode annual hours, S_{IA} and S_{OM} both equal 4273.4;

If the conventional cooktop has an inactive mode but no off mode, the inactive mode annual hours, S_{IA}, is equal to 8546.9, and the off mode annual hours, S_{OM}, is equal to 0;

If the conventional cooktop has an off mode but no inactive mode, S_{IA} is equal to 0, and S_{OM} is equal to 8546.9;

K = 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

* * * * *

4.2.2.2.3 *Total annual energy consumption of a conventional gas cooking top.* Calculate the total annual gas energy consumption of a conventional gas cooking top, E_{CA}, in Btus (kJ) per year, defined as:

$E_{CA} = E_{CC} + E_{PC}$,

Where:

E_{CC} = energy consumption for cooking as determined in section 4.2.2.2.1 of this Appendix.

E_{PC} = annual energy consumption of the pilot lights as determined in section 4.2.2.2.2 of this Appendix.

4.2.2.2.4 *Total integrated annual energy consumption of a conventional gas cooking top.* Calculate the total integrated annual energy consumption of a conventional gas cooking top, IE_{CA}, in Btus (kJ) per year, defined as:

$IE_{CA} = E_{CC} + E_{PC} + E_{CTSO}$,

Where:

E_{CC} = energy consumption for cooking as determined in section 4.2.2.2.1 of this Appendix.

E_{PC} = annual energy consumption of the pilot lights as determined in section 4.2.2.2.2 of this Appendix.

$E_{CTSO} = [(P_{IA} \times S_{IA}) + (P_{OM} \times S_{OM})] \times K$

Where:

P_{IA} = conventional cooktop inactive mode power, in watts, as measured in section 3.1.2.2.1 of this Appendix.

P_{OM} = conventional cooktop off mode power, in watts, as measured in section 3.1.2.2.2 of this Appendix.

If the conventional cooktop has both inactive mode and off mode annual hours, S_{IA} and S_{OM} both equal 4273.4;

If the conventional cooktop has an inactive mode but no off mode, the inactive mode annual hours, S_{IA}, is equal to 8546.9, and the off mode annual hours, S_{OM}, is equal to 0;

If the conventional cooktop has an off mode but no inactive mode, S_{IA} is equal to 0, and S_{OM} is equal to 8546.9;

K = 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

4.2.3 *Conventional cooking top energy factor and integrated energy factor.*

4.2.3.1 *Conventional cooking top energy factor.* Calculate the energy factor or ratio of useful cooking energy output for cooking to the total energy input, R_{CT}, as follows:

For an electric cooking top, the energy factor is the same as the cooking efficiency as determined according to section 4.2.1.3 of this Appendix.

For gas cooking tops,

$$R_{CT} = \frac{O_{CT}}{E_{CA}}$$

Where:

O_{CT} = 527.6 kBtu (556,618 kJ) per year, annual useful cooking energy output of cooking top.

E_{CA} = total annual energy consumption of cooking top determined according to section 4.2.2.2.3 of this Appendix.

4.2.3.2. *Conventional cooking top integrated energy factor.* Calculate the integrated energy factor or ratio of useful cooking energy output for cooking to the total integrated energy input, IR_{CT}, as follows:

For electric cooking tops,

$$IR_{CT} = \frac{O_{CT}}{IE_{CA}}$$

Where:

O_{CT} = 527.6 kBtu (556,618 kJ) per year, annual useful cooking energy output of cooking top.

IE_{CA} = total annual integrated energy consumption of cooking top determined according to section 4.2.2.1.2 of this Appendix.

For gas cooking tops,

$$IR_{CT} = \frac{O_{CT}}{IE_{CA}}$$

Where:

O_{CT} = 527.6 kBtu (556,618 kJ) per year, annual useful cooking energy output of cooking top.

IE_{CA} = total integrated annual energy consumption of cooking top determined according to section 4.2.2.2.4 of this Appendix.

4.3 *Combined components.* The annual energy consumption of a kitchen range (*e.g.,* a cooktop and oven combined) shall be the sum of the annual energy consumption of each of its components. The integrated annual energy consumption of a kitchen range shall be the sum of the annual energy consumption of each of its components plus the conventional range integrated annual standby mode and off mode energy consumption, E_{RTSO}, defined as:

$E_{RTSO} = [(P_{IA} \times S_{IA}) + (P_{OM} \times S_{OM}) + (P_{CF} \times S_{CF})] \times K$

Where:

P_{IA} = conventional range inactive mode power, in watts, as measured in section 3.1.3.1 of this Appendix.

P_{OM} = conventional range off mode power, in watts, as measured in section 3.1.3.2 of this Appendix.

P_{CF} = conventional range cycle finished mode power, in watts, as measured in section 3.1.3.3 of this Appendix.

If the conventional range has cycle finished mode, S_{TOT}, equals 8,311.2 hours;

Where:

S_{TOT} equals the total number of inactive mode and off mode hours per year;

If the conventional range does not have cycle finished mode, S_{TOT}, equals 8,329.2 hours;

If the conventional range has both inactive mode and off mode, S_{IA} and S_{OM} both equal $S_{TOT}/2$;

If the conventional range has an inactive mode but no off mode, the inactive mode annual hours, S_{IA}, is equal to S_{TOT}, and the off mode annual hours, S_{OM}, is equal to 0;

If the conventional range has an off mode but no inactive mode, S_{IA} is equal to 0, and S_{OM} is equal to S_{TOT};

S_{CF} = 18, conventional range cycle finished mode annual hours;

K = 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

The annual energy consumption for other combinations of ovens and cooktops will also be treated as the sum of the annual energy consumption of each of its components. The energy factor of a combined component is the sum of the annual useful cooking energy output of each component divided by the sum of the total annual energy consumption of each component. The integrated energy factor of other combinations of ovens and cooktops is the sum of the annual useful cooking energy output of each component divided by the sum of the total integrated annual energy consumption of each component.

6. Appendix X to subpart B of part 430 is revised to read as follows:

Appendix X to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Dehumidifiers

Note: The procedures and calculations that refer to standby mode and off mode energy consumption (*i.e.,* sections 3.2, 3.2.1 through 3.2.4, 4.2, 4.2.1 through 4.2.4, 5.1, and 5.2 of this Appendix X) need not be performed to determine compliance with energy conservation standards for dehumidifiers at this time. However, any representation related to standby mode and off mode energy consumption of these products made after (*date 180 days after date of publication of the test procedure final rule in the* ***Federal Register***) must be based upon results generated under this test procedure, consistent with the requirements of 42 U.S.C. 6293(c)(2). After July 1, 2010, any adopted energy conservation standard shall incorporate standby mode and off mode energy consumption, and upon the compliance date for such standards, compliance with the applicable provisions of this test procedure will also be required.

1. Scope

This Appendix covers the test requirements used to measure the energy performance of dehumidifiers.

2. Definitions

a. *Active mode* means a mode in which a dehumidifier is connected to a mains power source, has been activated, and is performing the main functions of removing moisture from air by drawing moist air over a refrigerated coil using a fan, or circulating air through activation of the fan without activation of the refrigeration system.

b. *Bucket full/removed mode* means a standby mode in which the dehumidifier has automatically powered off its main function by detecting when the water bucket is full or has been removed.

c. *Energy factor for dehumidifiers* means a measure of energy efficiency of a dehumidifier calculated by dividing the water removed from the air by the energy consumed, measured in liters per kilowatt-hour (L/kWh).

d. *IEC 62301* means the test standard published by the International Electrotechnical Commission, titled ''Household electrical appliances—Measurement of standby power,'' Publication 62301 (Edition 2.0 2011–01) (incorporated by reference; see § 430.3).

e. *Inactive mode* means a standby mode that facilitates the activation of active mode by remote switch (including remote control), internal sensor, or timer, or that provides continuous status display.

f. *Off mode* means a mode in which the dehumidifier is connected to a mains power source and is not providing any active mode or standby mode function, and where the mode may persist for an indefinite time. An indicator that only shows the user that the dehumidifier is in the off position is included within the classification of an off mode.

g. *Off-cycle mode* means a standby mode in which the dehumidifier:

(1) Has cycled off its main function by humidistat or humidity sensor;

(2) Does not have its fan or blower operating; and

(3) Will reactivate the main function according to the humidistat or humidity sensor signal.

h. *Product capacity for dehumidifiers* means a measure of the ability of the dehumidifier to remove moisture from its surrounding atmosphere, measured in pints collected per 24 hours of continuous operation.

i. *Standby mode* means any modes where the dehumidifier is connected to a mains power source and offers one or more of the following user-oriented or protective functions which may persist for an indefinite time:

(1) To facilitate the activation of other modes (including activation or deactivation of active mode) by remote switch (including remote control), internal sensor, or timer;

(2) Continuous functions, including information or status displays (including clocks) or sensor-based functions. A timer is a continuous clock function (which may or may not be associated with a display) that provides regular scheduled tasks (*e.g.,* switching) and that operates on a continuous basis.

3. Test Apparatus and General Instructions

3.1 *Active mode.* The test apparatus and instructions for testing dehumidifiers shall conform to the requirements specified in Section 1, ''Definitions,'' Section 2, ''Qualifying Products,'' and Section 4, ''Test Criteria,'' of the EPA's ''ENERGY STAR Program Requirements for Dehumidifiers,'' effective January 1, 2001 (incorporated by reference, see § 430.3). Record measurements at the resolution of the test instrumentation. Round off calculations to the same number of significant digits as the previous step. Round the final minimum energy factor value to two decimal places as follows:

(i) A fractional number at or above the midpoint between two consecutive decimal places shall be rounded up to the higher of the two decimal places; or

(ii) A fractional number below the midpoint between two consecutive decimal places shall be rounded down to the lower of the two decimal places.

3.2 *Standby mode and off mode.*

3.2.1 *Installation requirements.* For the standby mode and off mode testing, the dehumidifier shall be installed in accordance with Section 5, Paragraph 5.2 of IEC 62301 (incorporated by reference, see § 430.3), disregarding the provisions regarding

batteries and the determination, classification, and testing of relevant modes.

3.2.2 *Electrical energy supply.*

3.2.2.1 *Electrical supply.* For the standby mode and off mode testing, maintain the electrical supply voltage indicated in Section 4, ''Test Criteria,'' of the EPA's ''ENERGY STAR Program Requirements for Dehumidifiers,'' effective January 1, 2001, (incorporated by reference, see § 430.3) and the electrical supply frequency indicated in Section 4, ''Test Criteria,'' of the EPA's ''ENERGY STAR Program Requirements for Dehumidifiers,'' ± 1 percent.

3.2.2.2 *Supply voltage waveform.* For the standby mode and off mode testing, maintain the electrical supply voltage waveform indicated in Section 4, Paragraph 4.3.2 of IEC 62301, (incorporated by reference; see § 430.3).

3.2.3 *Standby mode and off mode watt meter.* The watt meter used to measure standby mode and off mode power consumption shall meet the requirements specified in Section 4, Paragraph 4.4 of IEC 62301 (incorporated by reference, see § 430.3).

3.2.4 *Standby mode and off mode ambient temperature.* For standby mode and off mode testing, maintain room ambient air temperature conditions as specified in Section 4, Paragraph 4.2 of IEC 62301 (incorporated by reference; see § 430.3).

4. Test Measurement

4.1 *Active mode.* Measure the energy factor for dehumidifiers, expressed in liters per kilowatt hour (L/kWh) and product capacity in pints per day (pints/day), in accordance with the test requirements specified in Section 4, ''Test Criteria,'' of EPA's ''ENERGY STAR Program Requirements for Dehumidifiers,'' effective January 1, 2001 (incorporated by reference, see § 430.3).

4.2 *Standby mode and off mode.* Establish the testing conditions set forth in section 3.2 of this Appendix. For dehumidifiers that take some time to enter a stable state from a higher power state as discussed in Section 5, Paragraph 5.1, Note 1 of IEC 62301, (incorporated by reference; see § 430.3), allow sufficient time for the dehumidifier to reach the lower power state before proceeding with the test measurement. Follow the test procedure specified in Section 5, Paragraph 5.3.2 of IEC 62301 for testing in each possible mode as described in sections 4.2.1 through 4.2.4 of this Appendix.

4.2.1 If the dehumidifier has an inactive mode, as defined in section 2(e) of this Appendix, measure and record the average inactive mode power of the dehumidifier, P_{IA}, in watts.

4.2.2 If the dehumidifier has an off-cycle mode, as defined in section 2(g) of this Appendix, measure and record the average off-cycle mode power of the dehumidifier, P_{OC}, in watts.

4.2.3 If the dehumidifier has a bucket full/removed mode, as defined in section 2(b) of this Appendix, measure and record the average bucket full/removed mode power of the dehumidifier, P_{BFR}, in watts.

4.2.4 If the dehumidifier has an off mode, as defined in section 2(f) of this Appendix, measure and record the average off mode power, P_{OM}, in watts.

5. Calculation of Derived Results From Test Measurements

5.1 *Standby mode and off mode annual energy consumption.* Calculate the standby mode and off mode annual energy consumption for dehumidifiers, E_{TSO}, expressed in kilowatt-hours per year, according to the following:

$$E_{TSO} = [(P_{IA} \times S_{IA}) + (P_{OC} \times S_{OC}) + (P_{BFR} \times S_{BFR}) + (P_{OM} \times S_{OM})] \times K$$

Where:

P_{IA} = dehumidifier inactive mode power, in watts, as measured in section 4.2.1 of this Appendix.

P_{OC} = dehumidifier off-cycle mode power, in watts, as measured in section 4.2.2 of this Appendix.

P_{BFR} = dehumidifier bucket full/removed mode power, in watts, as measured in section 4.2.3 of this Appendix.

P_{OM} = dehumidifier off mode power, in watts, as measured in section 4.2.4 of this Appendix.

If the dehumidifier has an inactive mode and off-cycle mode but no off mode, the inactive mode annual hours, S_{IA}, is equal to $S_{TOT}/2$; the off-cycle mode annual hours, S_{OC}, is equal to $S_{TOT}/2$; and the off mode annual hours, S_{OM}, is equal to 0;

S_{TOT} equals the total number of inactive mode, off-cycle mode, and off mode hours per year, defined as:

If the dehumidifier has bucket full/removed mode, S_{TOT} equals 3,024 hours;

If the dehumidifier does not have bucket full/removed mode, S_{TOT} equals 3,681 hours;

If the dehumidifier has an inactive mode and off mode but no off-cycle mode, the inactive mode annual hours, S_{IA}, is equal to $S_{TOT}/2$; the off mode annual hours, S_{OM}, is equal to $S_{TOT}/2$; and the off-cycle mode annual hours, S_{OC}, is equal to 0;

If the dehumidifier has an inactive mode but no off-cycle mode or off mode, the inactive mode annual hours, S_{IA}, is equal to S_{TOT}, and the off-cycle mode annual hours, S_{OC}, and the off mode annual hours, S_{OM}, are each equal to 0;

If the dehumidifier has an off-cycle mode and off mode but no inactive mode, the off-cycle mode annual hours, S_{OC}, is equal to $S_{TOT}/2$; the off mode annual hours, S_{OM}, is equal to $S_{TOT}/2$; and the inactive mode annual hours, S_{IA}, is equal to 0;

If the dehumidifier has an off-cycle mode but no off mode or inactive mode, the off-cycle mode annual hours, S_{OC}, is equal to S_{TOT}, and the off mode annual hours, S_{OM}, and the inactive mode annual hours, S_{IA}, are each equal to 0;

If the dehumidifier has an off mode but no inactive mode or off-cycle mode, the off mode annual hours, S_{OM}, is equal to S_{TOT}, and the inactive mode annual hours, S_{IA}, and the off-cycle mode annual hours, S_{OC}, are both equal to 0;

If the dehumidifier has an inactive mode, off-cycle mode, and off mode, the inactive mode annual hours, S_{IA}, is equal to $S_{TOT}/3$; the off-cycle mode annual hours, S_{OC}, is equal to $S_{TOT}/3$; and the off mode annual hours, S_{OM}, is equal to $S_{TOT}/3$;

S_{BFR} = 657, dehumidifier bucket full/removed mode annual hours;

K = 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

5.2 *Integrated energy factor.* Calculate the integrated energy factor, IEF, expressed in liters per kilowatt-hour, rounded to two decimal places, according to the following:

$$IEF = L_W/(E_{active} + ((E_{TSO} \times 24)/S_{active}))$$

Where:

L_W = water removed from the air during dehumidifier energy factor test, in liters, as measured in section 4.1 of this Appendix.

E_{active} = dehumidifier energy factor test energy consumption, in kilowatt-hours, as measured in section 4.1 of this Appendix.

E_{TSO} = standby mode and off mode annual energy consumption, in kilowatt-hours per year, as calculated in section 5.1 of this Appendix.

24 = hours per day.

S_{active} = 1,095, dehumidifier active mode annual hours.

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