



**[6450-01-P]**

**DEPARTMENT OF ENERGY**

**10 CFR Parts 429 and 430**

**[EERE-2014-BT-TP-0034]**

**RIN 1904-AD46**

**Energy Conservation Program: Test Procedure for Clothes Dryers**

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

**ACTION:** Notice of proposed rulemaking and announcement of public meeting.

**SUMMARY:** The U.S. Department of Energy (“DOE”) proposes to amend the test procedures for clothes dryers to provide additional direction in response to questions from manufacturers and test laboratories. DOE also proposes amendments to specify rounding requirements for all reported values; apply consistent use of nomenclature and correct typographical errors; and remove obsolete sections of the test procedures, including appendix D. DOE also seeks feedback from interested parties on issues such as consumer usage patterns and “connected” clothes dryer features. As part of this proposal, DOE is announcing a public meeting to solicit comments and data on its proposal. DOE also welcomes comment on changes to the test procedure to ensure that the test procedure measures the energy use of the clothes dryer during a representative average use cycle or period of use, and is not unduly burdensome to conduct.

**DATES:** *Comments:* Comments and information regarding this notice of proposed rulemaking (“NOPR”) will be accepted no later than **[INSERT DATE 60 DAYS**

**AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. See section V, “Public Participation,” for details. DOE will hold a public meeting on this proposed

test procedure if one is requested by **[INSERT DATE 14 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

*Meeting:* DOE will hold a webinar on Wednesday, August 14, from 10:00 a.m. to 1:00 p.m. See section V, “Public Participation,” for webinar registration information, participant instructions, and information about the capabilities available to webinar participants. If no participants register for the webinar then it will be cancelled.

**ADDRESSES:** Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at <http://www.regulations.gov>. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by “Test Procedure NOPR for Clothes Dryers” and by docket number EERE–2014–BT–TP–0034 and/or the regulatory information number (“RIN”) 1904-AD46, by any of the following methods:

- 1) *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.
- 2) *E-mail:* [ResClothesDryer2014TP0034@ee.doe.gov](mailto:ResClothesDryer2014TP0034@ee.doe.gov). Include the docket number EERE–2014–BT–TP–0034 and/or RIN 1904-AD46 in the subject line of the message.
- 3) *Postal Mail:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 287-1445. 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*: Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, 950 L'Enfant Plaza, SW., 6<sup>th</sup> Floor, Washington, DC, 20024. Telephone: (202) 287-1445. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

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

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

The docket web page can be found at <https://www.regulations.gov/docket?D=EERE-2014-BT-TP-0034>. The docket web page contains simple instructions on how to access all documents, including public comments, in the docket. See section V of this document for information on how to submit comments through <http://www.regulations.gov>.

**FOR FURTHER INFORMATION CONTACT:** Mr. Bryan Berringer, U.S.

Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-0371. E-mail: *ApplianceStandardsQuestions@ee.doe.gov*.

Elizabeth Kohl, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-7796. E-mail: *Elizabeth.Kohl@hq.doe.gov*.

For further information on how to submit a comment, review other public comments and the docket, or regarding a public meeting, contact the Appliance and Equipment Standards Program staff at (202) 287-1445 or by e-mail:

*ApplianceStandardsQuestions@ee.doe.gov*.

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## **I. Authority and Background**

Clothes dryers are included in the list of “covered products” for which DOE is authorized to establish and amend energy conservation standards and test procedures.

(42 U.S.C. 6292(a)(8)) The current DOE test procedures for clothes dryers appear at title 10 of the Code of Federal Regulations (“CFR”) part 430, subpart B, appendix D1 and

appendix D2 (“appendix D1” and “appendix D2”). The following sections discuss DOE’s authority to establish and amend test procedures for clothes dryers, as well as relevant background information regarding DOE’s proposed amendments to the test procedures for this product.

#### A. Authority

The Energy Policy and Conservation Act of 1975, as amended (“EPCA”),<sup>1</sup> among other things, authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) Title III, Part B<sup>2</sup> of EPCA established the Energy Conservation Program for Consumer Products Other Than Automobiles, which sets forth a variety of provisions designed to improve energy efficiency. These products include clothes dryers, the subject of this NOPR. (42 U.S.C. 6292(a)(8))

Under EPCA, DOE’s energy conservation program consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA specifically include definitions (42 U.S.C. 6291), energy conservation standards (42 U.S.C. 6295), test procedures (42 U.S.C. 6293), labeling provisions (42 U.S.C. 6294), and the authority to require information and reports from manufacturers (42 U.S.C. 6296).

Federal energy efficiency requirements for covered products established under EPCA generally supersede State laws and regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6297) DOE may, however, grant waivers of

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<sup>1</sup> All references to EPCA in this document refer to the statute as amended through America’s Water Infrastructure Act of 2018, Public Law 115–270 (October 23, 2018).

<sup>2</sup> For editorial reasons, upon codification in the U.S. Code, Part B was redesignated Part A.

Federal preemption for particular State laws or regulations, in accordance with the procedures and other provisions of EPCA. (42 U.S.C. 6297(d))

The Federal testing requirements consist of test procedures that manufacturers of covered products must use as the basis for: (1) certifying to DOE that their products comply with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6295(s)), and (2) making representations about the efficiency of those consumer products (42 U.S.C. 6293(c)). Similarly, DOE must use these test procedures to determine whether the products comply with relevant standards promulgated under EPCA. (42 U.S.C. 6295(s))

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 requires that any test procedures prescribed or amended under this section 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 not be unduly burdensome to conduct. (42 U.S.C. 6293(b)(3))

In addition, EPCA requires that DOE amend its test procedures for all covered products to integrate measures of standby mode and off mode energy consumption. (42 U.S.C. 6295(gg)(2)(A)) Standby mode and off mode energy consumption must be incorporated into the overall energy efficiency, energy consumption, or other energy descriptor for each covered product unless the current test procedures already account for and incorporate standby and off mode energy consumption or such integration is technically infeasible. If an integrated test procedure is technically infeasible, DOE must prescribe a separate standby mode and off mode energy use test procedure for the

covered product, if technically feasible. (U.S.C. 6295(gg)(2)(A)(ii)) Any such amendment must consider the most current versions of the International Electrotechnical Commission (“IEC”) Standard 62301<sup>3</sup> and IEC Standard 62087<sup>4</sup> as applicable. (42 U.S.C. 6295(gg)(2)(A))

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)) EPCA also requires that, at least once every 7 years, DOE evaluate test procedures for each type of covered product, including clothes dryers, to determine whether amended test procedures would more accurately or fully comply with the requirements for the test procedures to not be unduly burdensome to conduct and be reasonably designed to produce test results that reflect energy efficiency, energy use, and estimated operating costs during a representative average use cycle or period of use. (42 U.S.C. 6293(b)(1)(A)) If the Secretary determines, on his own behalf or in response to a petition by any interested person, that a test procedure should be prescribed or amended, the Secretary shall promptly publish in the *Federal Register* proposed test procedures and afford interested persons an opportunity to present oral and written data, views, and arguments with respect to such procedures. The comment period on a proposed rule to amend a test procedure shall be at least 60 days and may not exceed 270 days. In prescribing or amending a test procedure, the Secretary shall take into account such information as the Secretary determines relevant to such procedure, including technological developments relating to energy use or energy efficiency of the

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<sup>3</sup> IEC 62301, *Household electrical appliances—Measurement of standby power* (Edition 2.0, 2011-01).

<sup>4</sup> IEC 62087, *Methods of measurement for the power consumption of audio, video, and related equipment* (Edition 3.0, 2011-04).

type (or class) of covered products involved. (42 U.S.C. 6293(b)(2)). If DOE determines that test procedure revisions are not appropriate, DOE must publish its determination not to amend the test procedures. DOE is publishing this NOPR in satisfaction of the 7-year review requirement specified in EPCA. (42 U.S.C. 6293(b)(1)(A))

### B. Rulemaking History

DOE's existing test procedures for clothes dryers appear at appendix D1 and appendix D2. Manufacturers may use either appendix D1 or appendix D2 to show compliance with the applicable energy conservation standards, and must use a single appendix for all representations, including certifications of compliance.

DOE originally established the test procedure for clothes dryers at appendix D in a final rule published in the *Federal Register* on September 14, 1977. 42 FR 46145. On May 19, 1981, DOE published a final rule to amend the test procedure by establishing a field use factor<sup>5</sup> for clothes dryers with automatic termination controls, clarifying the test cloth specifications and clothes dryer preconditioning, and making editorial and minor technical changes. 46 FR 27324. The test procedure included provisions for determining the energy factor ("EF") for clothes dryers, which is a measure of the total energy required to dry a standard test load of laundry to a "bone dry"<sup>6</sup> state.

On January 6, 2011, DOE published in the *Federal Register* a final rule for the clothes dryer and room air conditioner test procedure rulemaking (the "January 2011 final rule"), in which it (1) adopted provisions for the measurement of standby mode and off

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<sup>5</sup> Per-cycle energy consumption is multiplied by the field use factor to account for consumers over-drying loads beyond the final remaining moisture content required in the test procedure.

<sup>6</sup> "Bone dry" refers to a condition of a load of test cloths in which the change in weight of the load is 1 percent or less after two successive 10-minute drying periods. See section 1.5 of appendix D1 and section 1.6 of appendix D2.

mode energy use for those products along with a new energy efficiency metric for clothes dryers, combined energy factor (“CEF”), which incorporates energy use in active mode, standby mode, and off mode; and (2) adopted several amendments to the clothes dryer and room air conditioner test procedures concerning the active mode for these products. DOE created a new appendix D1 in 10 CFR part 430 subpart B that contained the amended test procedure for clothes dryers. 76 FR 972.

DOE published a final rule on August 14, 2013 (the “August 2013 Final Rule”), amending the clothes dryer test procedure, in which it (1) amended appendix D1 to update the reference to the latest edition of IEC Standard 62301, “Household electrical appliances—Measurement of standby power,” Edition 2.0 2011-01<sup>7</sup> (“IEC Standard 62301”); (2) amended appendix D and appendix D1 to clarify the cycle settings used for the test cycle, the requirements for the gas supply for gas clothes dryers, the installation conditions for console lights, the method for measuring the drum capacity, the maximum allowable weighing scale range, and the allowable use of a relative humidity meter; and (3) established a new appendix D2 that includes procedures reflecting the amendments discussed above as well as testing methods for measuring the effects of automatic cycle termination. 78 FR 49608. Manufacturers must use the test procedures in either appendix D1 or appendix D2 to demonstrate compliance with the current energy conservation standards for clothes dryers. Manufacturers must use a single appendix for all representations for a given model, including certifications of compliance, and may not use appendix D1 for certain representations and appendix D2 for other representations for that model.

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<sup>7</sup> IEC Standard 62301 is available online at <https://webstore.iec.ch/publication/6789>.

DOE published a notice of public meeting (“NOPM”) on October 23, 2014 (the “October 2014 NOPM”) and held the public meeting on November 13, 2014 to facilitate a discussion among interested parties about potential changes to the DOE clothes dryer test procedures to produce test results that measure energy use during a representative average use cycle without being unduly burdensome to conduct.<sup>8</sup> 79 FR 63336.

## **II. Synopsis of the Notice of Proposed Rulemaking**

In this NOPR, DOE proposes to amend appendix D1 and appendix D2, both entitled “Uniform Test Method for Measuring the Energy Consumption of Clothes Dryers,” to provide additional detail in response to questions from manufacturers and test laboratories, including additional detail regarding the procedures for maintaining the required heat input rate for gas clothes dryers; additional detail for the test procedures for performing inactive and off mode power measurements; and specifications for the final remaining moisture content (“RMC”) required for testing automatic termination control dryers. In addition, DOE proposes amendments to provide further direction for additional provisions within the test procedures; specify rounding requirements for all reported values; apply consistent use of nomenclature and correct typographical errors; and remove obsolete sections of the test procedures, including appendix D. DOE also seeks feedback from interested parties on issues such as consumer usage patterns and “connected” clothes dryer features.

DOE has initially determined that the proposed amendments for appendix D1 and appendix D2 described in section III of this document would not alter the measured efficiency of clothes dryers.

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<sup>8</sup> A transcript of the public meeting and submitted comments are available in the docket for this rulemaking and can be accessed at <https://www.regulations.gov/docket?D=EERE-2014-BT-TP-0034>.

DOE’s proposed actions are summarized in Table II.1 and addressed in detail in section III of this notice of proposed rulemaking.

**Table II.1: Summary of Changes in Proposed Test Procedure Relative to Current Test Procedure**

<b>Current DOE Test Procedure</b>	<b>Proposed Test Procedure</b>	<b>Attribution</b>
Provides adjustments that can be made to maintain the required heat input rate for gas clothes dryers.	Specifies the order of adjustment, from least burdensome to most burdensome, for adjustments that can be made to maintain the required heat input rate for gas clothes dryers.	Response to test laboratory question
Requires distinction between standby mode and off mode based on control panel functionality that may not be readily apparent to a third-party tester.	Provides simpler, clearer procedures for measuring the low-power modes of a clothes dryer based on observable characteristics of the controls.	Response to test laboratory comment
Does not explicitly provide the RMC requirement for subsequent test runs if the prior run was deemed invalid.	Specifies that the requirement to achieve a final dryness level of 2 percent or less also applies to any subsequent run, if required.	Response to industry comment
Silent on selection of the middle dryness level setting for clothes dryers with an even number of settings.	Seeks comment on whether to specify use of next-highest setting above or next-lowest setting below the midpoint if an even number of discrete settings are provided.	Response to test laboratory comment
Does not include instructions for calculating annual operating cost, CEF, and other measures for clothes dryers optionally tested using appendix D2; does not include a calculation for annual energy consumption.	Adds instructions for calculating annual operating cost and CEF using appendix D2; adds annual energy consumption calculation using either appendix D1 or D2.	To provide consistency between appendices D1 and D2
Does not specify rounding requirements for reported values.	Specifies rounding requirements for all reported values.	To further specify reporting requirements
Contains nomenclature and formatting inconsistencies and typographical errors.	Applies consistent use of nomenclature, improves formatting, and fixes typographical errors.	To improve accuracy and readability

The Director of the Federal Register previously approved the following standards from the Association of Home Appliance Manufacturers (“AHAM”) and IEC for incorporation by reference into appendix D1 and appendix D2: AHAM HLD-1-2009, “Household Tumble Type Clothes Dryers”, and IEC 62301, “Household electrical appliances—Measurement of standby power”, (Edition 2.0, 2011-01).

### **III. Discussion**

#### **A. Scope of Coverage**

The proposed amendments to DOE's clothes dryer test procedures discussed in this NOPR cover both electric and gas clothes dryers. DOE regulations define “electric clothes dryer” and “gas clothes dryer” similarly as a cabinet-like appliance designed to dry fabrics in a tumble-type drum with forced air circulation, with blower(s) driven by an electric motor(s) and either electricity or gas, respectively, as the heat source. 10 CFR 430.2. This NOPR does not propose any changes to the scope of applicability of DOE’s clothes dryer test procedures.

#### **B. Consumer Usage Patterns and Capabilities**

As discussed in section I.B of this document, DOE requested comment as part of the October 2014 NOPM on potential changes to the DOE clothes dryer test procedures to produce test results that would better measure energy use during a representative average use cycle without being unduly burdensome to conduct. In response to the October 2014 NOPM, DOE received a number of comments regarding potential test procedure changes to reflect current consumer usage patterns and capabilities.

Efficiency advocates and utilities stated that DOE should investigate changes to the clothes dryer test procedure to better represent consumer use. (Ecova<sup>9</sup>, Public Meeting Transcript, No. 9 at p. 18<sup>10</sup>; Joint Efficiency Advocates<sup>11</sup>, No. 5 at pp. 1–2<sup>12</sup>;

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<sup>9</sup> Representing the California Investor Owned Utilities

<sup>10</sup> A notation in the form “Ecova, Public Meeting Transcript, No. 9 at p. 18” identifies an oral comment that DOE received on November 13, 2014 during the public meeting, and was recorded in the public meeting transcript in the docket for this test procedure rulemaking (Docket No. EERE-2014-BT-TP-0034). This particular notation refers to a comment (1) made by Ecova during the public meeting; (2) recorded in document number 9, which is the public meeting transcript that is filed in the docket of this test procedure rulemaking; and (3) which appears on page 18 of document number 9.

Northwest Energy Efficiency Alliance (“NEEA”) and Northwest Power and Conservation Council (“NPCC”), No. 10 at pp. 2, 8; Pacific Gas and Electric Company (“PG&E”) No. 7 at pp. 1–2; Southern California Edison (“SCE”), No. 11 at pp. 1–2; Super Efficient Dryer Initiative (“SEDI”), No. 6 at p. 2)

NEEA, NPCC, PG&E, and SCE commented that, based on their testing, clothes dryer performance under simulated “real-world” conditions is significantly different compared to tests conducted according to appendix D2. NEEA, NPCC, PG&E, and SCE also claimed that the relative ranking of efficiency for models in a given product category is different when tested using what they identified as real-world test conditions as compared to the current appendix D2. (NEEA & NPCC, No. 10 at p. 2; PG&E, No. 7 at pp. 3, 11; SCE, No. 11 at pp. 3, 11) Efficiency advocates and utilities stated that DOE should conduct a sufficient amount of testing to support the development of a test procedure that they believe would minimize testing burden, produce certified performance ratings that reasonably align with expected field performance, and produce appropriate relative performance rankings. (SEDI, No. 6 at pp. 2–3; NEEA & NPCC, No. 10 at p. 6; PG&E, No. 7 at p. 2; SCE, No. 11 at p. 2) The Joint Efficiency Advocates, NEEA and NPCC also commented that a more representative test procedure would result in more energy savings in the field by more accurately capturing the benefits of new technologies that could improve clothes dryer efficiency. (Joint Efficiency Advocates, No. 5 at pp. 1–2; NEEA & NPCC, No. 10 at p. 8) As discussed in the

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<sup>11</sup> The Joint Efficiency Advocates are the Appliance Standards Awareness Project, Alliance to Save Energy, American Council for an Energy-Efficient Economy, Consumer Federation of America, Natural Resources Defense Council, and Northeast Energy Efficiency Partnerships.

<sup>12</sup> A notation in the form “Joint Efficiency Advocates, No. 5 at pp. 1–2” identifies a written comment: (1) made by the Joint Efficiency Advocates; (2) recorded in document number 5 that is filed in the docket of this test procedure rulemaking (Docket No. EERE-2014-BT-TP-0034) and available for review at <http://www.regulations.gov>; and (3) which appears on pages 1 through 2 of document number 5.

following sections, efficiency advocates and utilities identified factors related to consumer usage, such as test load composition, test load size, and test cycle settings, that they stated account for differences between measured field performance and test results obtained using appendix D2.

Conversely, manufacturers commented that DOE should maintain the current test procedure because they stated it ensures the repeatability and reproducibility of test results. (General Electric Appliances (“GE”), No. 3 at p. 1; AHAM, No. 4 at p. 2; Samsung Electronics America, Inc. (“Samsung”), No. 8 at p. 2) AHAM expressed concern that attempts to adopt test load conditions intending to more accurately reflect consumer loads would impact the repeatability and reproducibility of the test procedure. (AHAM, No. 4 at p. 2) Samsung stated that it has found it impossible to obtain repeatable and reproducible test results with a “real-world” test load. (Samsung, No. 8 at p. 2)

The following sections discuss these issues related to specific testing conditions in the DOE clothes dryer test procedure. Note that DOE also recently issued an RFI to seek more information on whether its test procedures are reasonably designed, as required by EPCA, to produce results that measure the energy use or efficiency of a product during a representative average use cycle or period of use. 84 FR 9721 (Mar. 18, 2019). DOE seeks comment on this issue as it pertains to the test procedure for clothes dryers.

#### 1. Test Load Composition

Section 2.6 of appendix D1 and appendix D2 specify a test load composed of a pure finished bleached cloth, made with a momie or granite weave, which is a blended fabric of 50-percent cotton and 50-percent polyester. The “energy test cloth” is made

from material that is 24 inches by 36 inches, hemmed to 22 inches by 34 inches, and weighs within 10 percent of 5.75 ounces per square yard. Smaller “energy stuffer cloths” are made of material that is 12 inches by 12 inches, hemmed to 10 inches by 10 inches.<sup>13</sup>

In addition to the DOE test procedure clothing load, several industry test procedures specify clothing loads for measuring the drying performance of clothes dryers. American National Standards Institute (“ANSI”)/AHAM’s test procedure, HLD-1-2010, “Household Tumble Type Clothes Dryers” (“ANSI/AHAM HLD-1-2010”) specifies the use of 100-percent cotton bed sheets, towels, and pillowcases. The bedsheets and pillowcases are plain weave linen, while the towels are huckaback weave. IEC Standard 61121, Edition 4.0 2012-02, “Tumble dryers for household use—Methods for measuring the performance” (“IEC Standard 61121”) incorporates by reference from IEC’s consumer clothes washer test procedure two different test loads: (1) the “Cotton test load,” which comprises 100-percent cotton bed sheets, towels, and pillowcases consistent with ANSI/AHAM HLD-1-2010; and (2) the “Synthetics/blends test load,” which comprises pillowcases and buttoned men’s shirts fabricated from plain weave 35-percent cotton and 65-percent polyester fabric.

Efficiency advocates and utilities urged DOE to investigate the use of a test load or test loads that more closely resemble real-world clothing, including the test load and test methods specified in the “Utility Test Protocol” developed by NEEA and the California Investor-Owned Utilities (“IOUs”). (Joint Efficiency Advocates, No. 5 at p. 2; NEEA, Public Meeting Transcript, No. 9 at pp. 31, 32–33; NEEA & NPCC, No. 10 at pp. 2, 4; PG&E, No. 7 at p. 13; SEDI, No. 6 at p. 2; SCE, No. 11 at p. 13) PG&E and SCE

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<sup>13</sup> The test procedure specifies that the energy stuffer cloths are to be used to adjust the test load to achieve the proper weight, but that no more than five stuffer cloths may be added per test load.

stated that the Utility Test Protocol is an investigative test method that was developed based on data collected as part of the field study conducted by NEEA in 2012<sup>14</sup> and is aimed at producing energy use measurements that are more representative of real-world use. PG&E and SCE noted that the Utility Test Protocol consists of one test using the current appendix D2 test procedure and four supplemental tests that use a range of test load compositions, test load sizes, and cycle settings.<sup>15</sup> PG&E and SCE stated that the aim of the Utility Test Protocol is to develop a test procedure that better represents real-world conditions while also minimizing test burden to the extent possible and providing repeatable results. (PG&E, No. 7 at pp. 2–3, 12; SCE, No. 11 at pp. 2–3, 12)

Efficiency advocates commented that DOE should also consider the clothing load defined in AHAM HLD-1-1992, “Household Tumble Type Clothes Dryers,” as a more realistic test load.<sup>16</sup> (Ecova, Public Meeting Transcript, No. 9 at p. 18; Jonathan Gatzke, Public Meeting Transcript, No. 9 at p. 48; Joint Efficiency Advocates, No. 5 at p. 2; SEDI, No. 6 at p. 2; NEEA & NPCC, No. 10 at p. 4)

NEEA and NPCC commented that, based on their testing, there is a 12 to 15-percent gap between tested energy consumption using appendix D2 and energy consumption observed in the NEEA field study. According to NEEA and NPCC, this discrepancy is due to the composition of the DOE test load, which they stated is

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<sup>14</sup> The NEEA field study report can be found in the docket for this rulemaking at: <https://www.regulations.gov/document?D=EERE-2014-BT-TP-0034-0010>.

<sup>15</sup> The “Utility Test Protocol” consists of a series of five tests: (1) using the current appendix D2 test method; (2) using a 4.22-pound real-world load with the medium temperature setting and eco mode deactivated; (3) using a 16.9-pound real-world load with the medium temperature setting and eco mode deactivated; (4) using an 8.45-pound real-world load using the most efficient setting configuration possible; and (5) using an 8.45-pound real-world load using settings that achieves the fastest rate of drying possible.

<sup>16</sup> The AHAM 1992 test load consists of 100% cotton items intended to represent clothes items regularly laundered, and includes sheets, tablecloths, shirts, bath towels, t-shirts, pillowcases, shorts, wash cloths, and handkerchiefs.

representative of an unspecified fraction of the loads dried in typical households. (NEEA & NPCC, No. 10 at p. 2) NEEA and NPCC added that loads of heavier fabric for any given load size took longer to dry and, as a result, used more energy in their testing than loads consisting of the DOE test cloth. (NEEA & NPCC, No. 10 at p. 3) NEEA, NPCC, PG&E and SCE also commented that hybrid heat pump clothes dryers (*i.e.*, clothes dryers that use a heat pump along with a supplemental electric resistance heater) are more impacted based on their testing by the use of “real-world” test loads and have only marginally better efficiency than conventional clothes dryers when measured using the Utility Test Protocol. (NEEA & NPCC, No. 10 at p. 3; PG&E, No. 7 at p. 3; SCE, No. 11 at p. 3) PG&E and SCE noted that, based on their testing with the small, medium, and large “real-world” test loads, the hybrid heat pumps had lower measured efficiencies in some cases than several conventional electric clothes dryers. PG&E and SCE expressed concern that these results may indicate that hybrid heat pump clothes dryers achieve no energy savings for consumers in practice. (PG&E, No. 7 at pp. 7–10; SCE, No. 11 at pp. 7–10)

Efficiency advocates and utilities commented that testing conducted by NEEA and the California IOUs showed that the test-to-test variation was often lower for the supplemental tests under their Utility Test Protocol using clothing test loads they claimed to be more representative of consumer use than when using the current DOE test load, ranging from 2.3 percent to 5.4 percent for their clothing test loads, compared to 5.1 percent for the current DOE test load. Efficiency advocates and utilities concluded that, based on this testing, a test load that they believe is more representative of consumer use would not introduce an unacceptable level of test-to-test variability in the certification

process. (NEEA & NPCC, No. 10 at p. 4) Efficiency advocates and utilities also noted that using a weighted average of multiple tests, as with the Utility Test Protocol, reduces variability in test results compared to the single test specified in appendix D2. (Joint Efficiency Advocates, No. 5 at p. 3; NEEA, Public Meeting Transcript, No. 9 at pp. 62, 68; NEEA & NPCC, No. 10 at p. 4; PG&E, No. 7 at pp. 11–12; SCE, No. 11 at pp. 11–12) PG&E and SCE added that they did not yet have data on the reproducibility of results obtained using the test load specified in their Utility Test Protocol, and that DOE should conduct additional testing using this test method to assess reproducibility. (PG&E, No. 7 at p. 12; SCE, No. 11 at p. 12) The Joint Efficiency Advocates also encouraged DOE to consider how the certification and enforcement provisions could be amended to avoid repeatability and reproducibility concerns in an improved test procedure. (Joint Efficiency Advocates, No. 10 at p. 4)

AHAM and GE stated that it is critical to have a test procedure that produces repeatable and reproducible results. AHAM and GE expressed support for the continued use of the current DOE test load and noted that more than a decade has been spent developing the DOE test load, which has been demonstrated to yield results that are repeatable and reproducible. AHAM and GE commented that developing a “real-world” test load that produces repeatable and reproducible results is not feasible. (AHAM, No. 4 at p. 2; GE, No. 3 at p. 1) AHAM and GE stated that the studies conducted by Oak Ridge National Laboratory (“ORNL”)<sup>17</sup> and Pacific Northwest National Laboratory

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<sup>17</sup> K. Gluesenkamp. *Residential Clothes Dryer Performance Under Timed and Automatic Cycle Termination Test Procedures*. 2014. Oak Ridge National Laboratory. Report No. ORNL/TM-2014/431. <http://web.ornl.gov/sci/buildings/docs/2014-10-09-ORNL-DryerFinalReport-TM-2014-431.pdf>.

(“PNNL”)<sup>18,19</sup> showed that use of the current DOE test load produces repeatable results and is a good predictor of relative performance with other clothing loads, while the repeatability of test results decreases when the load composition is less uniform (*i.e.*, contains different fabrics and varying thicknesses). (AHAM, No. 4 at p. 2; GE, No. 3 at p. 1)

Samsung similarly supported the continued use of the DOE test load to minimize measurement uncertainty and stated that it is not possible to obtain repeatable and reproducible test results with a “real-world” test load. Samsung suggested that DOE consider results from the IEC technical subcommittee 59D working group, which is developing an alternate test load that is based on DOE test cloth material but includes differently sized items to better represent “real-world” conditions while maintaining reproducibility. (Samsung, No. 8 at p. 2)

## 2. Test Load Size

Section 2.7 of appendix D1 and appendix D2 specify a test load weight of 8.45 pounds  $\pm$  .085 pounds for standard-sized clothes dryers (*i.e.*, with a drum capacity of 4.4 cubic feet or greater) and a test load weight of 3 pounds  $\pm$  .03 pounds for compact-sized clothes dryers (*i.e.*, with a drum capacity of less than 4.4 cubic feet).

ANSI/AHAM HLD-1-2010 and IEC Standard 61121 provide a range of test load sizes, with specifications for the number of test articles within each load for a given load size (and, for IEC Standard 61121, for the selected load composition). ANSI/AHAM

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<sup>18</sup> W. TeGrotenhuis. *Clothes Dryer Automatic Termination Sensor Evaluation. Volume 1: Characterization of Energy Use in Residential Clothes Dryers*. 2014. Pacific Northwest National Laboratory. Report No. PNNL-23621. [http://www.pnnl.gov/main/publications/external/technical\\_reports/PNNL-23621.pdf](http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23621.pdf).

<sup>19</sup> W. TeGrotenhuis. *Clothes Dryer Automatic Termination Sensor Evaluation. Volume 2: Improved Sensor and Control Designs*. 2014. Pacific Northwest National Laboratory. Report No. PNNL-23616. [http://www.pnnl.gov/main/publications/external/technical\\_reports/PNNL-23616.pdf](http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23616.pdf).

HLD-1-2010 specifies that a clothes dryer may be tested using loads of any or all sizes. IEC Standard 61121 requires the selection of load size according to the manufacturer's rating of the capacity of the unit.

NEEA and NPCC commented that although the average clothes dryer load size observed in the NEEA field study was reasonably close to the 8.45-pound test load currently specified in appendix D1 and appendix D2, this load size constituted only a small fraction (less than 15 percent) of all loads dried in the NEEA field study and there were a significant number of smaller loads dried by consumers in the NEEA field study data. NEEA and NPCC also stated that the load size has a significant impact on the measured efficiency under the Utility Test Protocol. According to NEEA and NPCC, the measured efficiency under the Utility Test Protocol for conventional clothes dryers using small loads of clothing, as opposed to test cloths, was about half of the measured efficiency for large loads of the same clothing. NEEA and NPCC commented that DOE should require testing with at least one small load in addition to the current load size and weighting the results to calculate CEF. (NEEA & NPCC, No. 10 at pp. 2, 4–5)

The Joint Efficiency Advocates, PG&E, SEDI, and SCE supported the investigation of additional smaller and larger test load sizes to reflect the findings of the NEEA field study and not discourage technologies that could improve the efficiency of drying different loads sizes. (Ecova, Public Meeting Transcript, No. 9 at pp. 122–123; Joint Efficiency Advocates, No. 5 at p. 2; PG&E, No. 7 at pp. 3, 13; SEDI, No. 6 at p. 2; SCE, No. 11 at pp. 3, 13) PG&E and SCE commented that the Utility Test Protocol, which was developed based on the NEEA field study data, specifies testing of a smaller 4.22-pound load and a larger 16.9-pound load, in addition to the existing 8.45-pound load

for standard-size clothes dryers. (PG&E, No. 7 at p. 3; SCE, No. 11 at p. 3) Referencing the NEEA field study, Samsung similarly commented that DOE should consider adding a small load size to the test procedure to better represent consumer behavior. (Samsung, No. 8 at p. 2)

SEDI also commented that testing has shown that heat pump clothes dryers demonstrate improved efficiency when drying larger loads. (SEDI, No. 6 at p. 2) SEDI commented that DOE should include heat pump and hybrid heat pump clothes dryers in its investigative testing to ensure that the test procedure accurately assesses the performance of these new technologies, in particular when drying larger laundry loads. (SEDI, No. 6 at pp. 2, 3)

### 3. Test Cycle Selections

Section 3.3.2 of appendix D2 specifies that for automatic termination control dryers, the “normal” program shall be selected for the test cycle. For clothes dryers that do not have a “normal” program, the cycle recommended by the manufacturer for drying cotton or linen shall be selected. *Id.* If the drying temperature setting can be chosen independently of the program, it shall be set to the maximum. *Id.* If the dryness level setting can be chosen independently of the program, it shall be set to the “normal” or “medium” dryness level setting. *Id.* After the completion of the test cycle, the test load is removed and weighed. If the final moisture content is greater than 2 percent, the test is considered invalid and a new run shall be conducted using the highest dryness level setting. *Id.*

Industry standards address cycle selection differently from the DOE test procedure. ANSI/AHAM HLD-1-2010 specifies that the test cycle be run using the

maximum temperature setting without allowing the clothes dryer to advance into the cool down period. If the required final moisture content (6 percent) cannot be met using this setting, a new test run must be conducted using a different user-selected setting that will achieve the target final moisture content. IEC Standard 61121 requires that the test cycle for a given load composition be run using the cycle program and settings specified in the manufacturer's instructions to achieve a target final moisture content, which is based on the test load composition. In the absence of any instructions from the manufacturer, or if the specified cycle program and settings do not achieve the required final moisture content, then the test shall be run using a user-selected combination of cycle program and settings that will achieve the required final moisture content.

NEEA and NPCC stated that because of the increasing use of clothes dryers with electronic controls and the proliferation of cycle options on many models, it will be difficult to define what cycles should be used with each test load composition and size to determine a CEF rating that is representative of consumer use. NEEA and NPCC commented that, based on the NEEA field study data, consumers only use two or three cycle programs for the vast majority of clothes dryer loads. According to NEEA and NPCC, consumers choose a cycle program based on the size and composition of the load being dried. (NEEA & NPCC, No. 10 at pp. 2, 5)

Additionally, NEEA and NPCC commented that the NEEA field study data shows that the medium or low temperature settings are used for 57.5 percent of consumer drying cycles, with the medium temperature setting accounting for 46 percent of cycles, regardless of the cycle program. Thus, NEEA and NPCC stated that the test procedure

should require at least one additional test cycle using a medium temperature setting.

(NEEA & NPCC, No. 10 at p. 7)

NEEA and NPCC stated that clothes dryer energy use is significantly different for a cycle with a “normal” dryness level setting than one with a “more dry” dryness level setting, with all other settings the same. According to NEEA and NPCC, this suggests that clothes dryers will behave very differently when drying loads of heavy fabrics where the “more dry” dryness level setting is necessary compared to drying the DOE test load using the “normal” dryness level setting. (NEEA & NPCC, No. 10 at pp. 5–6)

NEEA and NPCC commented that there may be a relatively small combination of cycle selections and load compositions/sizes that would fully represent the entire range of annual consumer use. NEEA and NPCC added that they will continue to conduct testing and field studies and urged DOE to conduct testing as well to determine appropriate cycle selections for the test procedure. (NEEA & NPCC, No. 10 at p. 6) As discussed in section III.B.1 of this document, PG&E and SCE commented that the Utility Test Protocol, which was developed based on the NEEA field study data, includes testing with a variety of cycle selections and corresponding load sizes and compositions. (PG&E, No. 7 at pp. 3, 25–27; SCE, No. 11 at pp. 3, 25–27)

The Joint Efficiency Advocates and SEDI similarly commented that it will be important for the test procedure to require testing of multiple cycle selections as clothes dryers continue to offer an increasing number of cycle options that can significantly impact energy consumption and performance. (Joint Efficiency Advocates, No. 5 at p. 2; SEDI, No. 6 at p. 3) The Joint Efficiency Advocates added that testing with only a single cycle program could allow for test procedure circumvention, noting that a clothes dryer

could be designed with a “normal” program that has a very long cycle time that many consumers would never select over a cycle program with a shorter cycle time. The Joint Efficiency Advocates encouraged DOE to measure and report the cycle time for each clothes dryer it tests in each of the cycles tested, and to use this data to develop an efficiency calculation that properly weights the results from each of the tested cycle selections. (Joint Efficiency Advocates, No. 5 at p. 2)

NEEA and NPCC also commented that there has been a proliferation of models with an “eco mode” setting offered by most manufacturers, but that eco mode may operate differently for different manufacturers. (NEEA & NPCC, No. 10 at p. 5) PG&E and SCE stated that cycles using eco mode can be up to three times longer than the “normal” program without eco mode. (PG&E, No. 7 at p. 3; SCE No. 11 at p. 3) PG&E and SCE added that although an eco mode may be activated by default in the as-shipped condition, many consumers may easily disable it. (*Id.*) The Joint Efficiency Advocates encouraged DOE to develop a test procedure that would incentivize clothes dryer designs that make it more likely for consumers to use an eco mode. (Joint Efficiency Advocates, No. 5 at p. 3) The Joint Efficiency Advocates referenced two heat pump clothes dryers that have received the ENERGY STAR Emerging Technology Award, and that have efficiency ratings in their most efficient setting that are 29 percent and 13 percent higher than the efficiency ratings using the “normal” cycle program. (*Id.*) The Joint Efficiency Advocates stated that, as a result, energy savings associated with new clothes dryer technologies will be highly dependent on the cycle programs and settings that consumers select. (*Id.*)

Conversely, manufacturers recommended that DOE maintain the existing test cycle selections. Whirlpool Corporation (“Whirlpool”) stated that its own data indicate that consumers primarily use the “normal” cycle program. (Whirlpool, Public Meeting Transcript, No. 9 at p. 110) AHAM commented that there are no comprehensive data available to accurately gauge consumer behavior in terms of drying cycle selections. (AHAM, No. 4 at p. 3) GE also commented that it is not aware of any studies that categorically demonstrate that certain cycle selections will more accurately represent consumer usage across all demographics. (GE, No. 3 at p. 2) AHAM and GE both commented that the current DOE test procedure represents the upper limits of energy consumption by requiring use of the maximum temperature setting. (AHAM, No. 4 at pp. 2–3; GE, No. 3 at p. 2) AHAM stated that additional tests should not be required until there is a better understanding of consumer usage patterns and cycle selections to avoid burdensome testing and costs that would ultimately be passed on to the consumer. (AHAM, No. 4 at p. 3)

#### 4. Remaining Moisture Content

In response to the October 2014 NOPM, DOE received comments on the initial RMC specifications in appendix D2. Sections 2.7.1 and 2.7.2 of appendix D2 specify that the initial RMC of a test load for a compact-size and standard-size clothes dryer, respectively, must be 57.5 percent  $\pm$  0.33 percent. To achieve the required RMC, the test procedure specifies that the test load be dampened by agitating in water whose temperature is 60 degrees Fahrenheit (“°F”)  $\pm$  5 °F and consists of 0 to 17 parts per million hardness for approximately 2 minutes to saturate the fabric. *Id.* The water is then extracted from the load by spinning until the RMC is between 52.5 and 57.5 percent of

the bone-dry weight of the test load. *Id.* Final mass adjustments to achieve the specified initial RMC must be made by uniformly adding water to each test cloth using a spray bottle. *Id.*

SEDI encouraged DOE to investigate the initial RMC associated with clothes washers to more closely reflect the RMC found in “real-world” washing conditions. (SEDI, No. 6 at p. 3) SEDI stated that this would avoid double-counting the energy consumption and savings associated with the clothes washer and clothes dryer. (*Id.*) NEEA and NPCC commented that the NEEA field study data showed that different load compositions had different levels of RMC at the end of the washing cycle, which corresponds to the clothes dryer initial RMC. (NEEA & NPCC, No. 10 at p. 6) For example, NEEA and NPCC stated, loads with heavier fabrics had higher initial RMCs going into the clothes dryer than a load of the same size but made of lighter fabrics. (*Id.*) NEEA and NPCC stated that if DOE adopts the use of different test load compositions, the initial RMC should be different (*i.e.*, a higher initial RMC for heavier fabrics) than the initial RMC used for the current DOE test load. (NEEA & NPCC, No. 10 at p. 6) PG&E and SCE commented that the Utility Test Protocol, which was developed based on the NEEA field study data, specifies an initial RMC of 62 percent for the supplemental tests using a “real-world” test load. (PG&E, No. 7 at pp. 3, 24; SCE, No. 11 at pp. 3, 24)

DOE also received comments, which are discussed in the following section, regarding the final RMC specifications in appendix D2. Section 3.3.1 of appendix D2 specifies that for timer dryers, the test load is dried until the final RMC is between 1 and 2.5 percent of the bone-dry weight of the test load. The measured energy consumption is then normalized to determine the energy consumption required to dry the test load to 2-

percent RMC, with a field use factor applied to account for the over-drying energy consumption. *Id.* For automatic termination control dryers, section 3.3.2 of appendix D2 specifies that a test is considered valid if the final RMC of the test load is less than 2 percent.

NEEA, NPCC, PG&E and SCE commented that the Utility Test Protocol uses a final RMC of 4 percent for specific supplemental tests using a “real-world” test load, which was based on their laboratory investigations, consumer acceptability testing, and consultations with industry. (NEEA & NPCC, No. 10 at p. 6; PG&E, No. 7 at pp. 3, 25–27; SCE, No. 11 at pp. 3, 25–27) NEEA and NPCC added that the 4-percent final RMC value for “real-world” loads is consistent with a 2-percent final RMC for the current DOE test load when using the same automatic cycle termination drying mode. (NEEA & NPCC, No. 10 at p. 6)

Samsung commented that requiring a final RMC of 2 percent or less would tend to promote over-drying and unnecessary additional energy use because clothes that are over-dried will typically absorb moisture from ambient air and reach a final state of between 5-percent and 8-percent RMC. (Samsung No. 8 at p. 1) Samsung stated that NEEA data suggest a final RMC of about 5 percent, and the IEC standard estimates about an 8-percent moisture absorption from the ambient humidity. (*Id.*) Accordingly, Samsung commented that DOE should consider changing the target final RMC to 5 percent. (Samsung No. 8 at pp. 1–2)

##### 5. Annual Drying Cycles and Hours Per Year

Section 4.5 of appendix D1 and appendix D2 assume the representative average use for clothes dryers is 283 drying cycles per year. NEEA and NPCC commented that

the data from the Energy Information Administration (“EIA”) Residential Energy Consumption Survey (“RECS”) used to develop DOE’s current estimate for the number of drying cycles per year exhibit a very wide variance. (NEEA & NPCC, No. 10 at p. 7) NEEA and NPCC stated while the data from the NEEA field study may not be strictly representative of the entire United States, in the absence of additional field data, DOE should use the NEEA field study estimate of 311 cycles per year. (*Id.*) NEEA and NPCC noted that the data from the NEEA field study showed a significant number of clothes dryer loads required multiple cycles, either because the clothes washer load was split, or because the load was not dried to a satisfactory RMC. (*Id.*) NEEA and NPCC also noted that the NEEA field study data showed that nearly 94 percent of loads washed in a clothes washer were dried in a clothes dryer, compared to the 91 percent assumed in the current DOE test procedure. (*Id.*) According to NEEA and NPCC, this difference could be one source for the discrepancy in the number of annual drying cycles. (NEEA & NPCC, No. 10 at p. 8)

Additionally, NEEA and NPCC stated that the large variation in drying cycle times observed between the DOE test load and a “real-world” load, in addition to the discrepancy in the number of annual drying cycles discussed above, suggests that DOE’s estimate of the annual active mode hours and thus, standby mode and off mode hours, is not consistent with actual field use. (NEEA & NPCC, No. 10 at p. 8) NEEA and NPCC stated that, in the absence of additional field use data, DOE should use the NEEA field study estimate of 8,463 standby and off-mode hours per year in place of the current estimate of 8,620 hours per year. (*Id.*)

## 6. DOE Response to Comments

As previously stated, test procedures promulgated by DOE must be reasonably designed to produce test results which measure the energy efficiency of a clothes dryer during a representative average use cycle or period of use as determined by DOE. (42 U.S.C. 6293(b)(3)) The Federal test procedure must also not be unduly burdensome to conduct. (*Id.*)

DOE appreciates the issues raised by interested parties regarding test procedure repeatability and reproducibility and consumer usage habits, as well as the field data provided by NEEA. While the NEEA field study data provides valuable information regarding the consumer usage habits for clothes dryers, DOE recognizes that these data may not be entirely representative of the consumer usage habits across the entire United States over the course of a year. For example, because the data were collected in the Pacific Northwest in the winter months, the data may reflect heavier fabrics and larger quantities of clothing items, which would also retain more moisture during the washing and drying cycles. Such fabrics and quantities may not be representative of consumer loads throughout the year, or consumer loads across varying geographical regions.

In addition, it is not clear whether the NEEA field study data presented regarding the cycle selections are an accurate reflection of consumers actively selecting certain settings. For example, NEEA and NPCC noted that the NEEA field study data showed that the medium temperature setting accounted for 46 percent of cycles, while the high temperature setting accounted for 43 percent of cycles. However, DOE observes that a common control scheme is for clothes dryers, when set to the normal cycle program, to automatically default to the medium temperature setting and not allow the consumer to

change the temperature setting. It is not clear whether this control scheme occurred in the NEEA field study, and if so, to what extent. Additionally, it is unknown whether, in instances in which the consumer may adjust the temperature setting under the “normal” cycle program, the consumer may be selecting the highest temperature setting more frequently. Without knowledge of the controls of each clothes dryer monitored in the field study, it is difficult to draw conclusions regarding the frequency of setting selections. DOE notes that the cycle programs and settings could also be influenced by the potentially heavier clothing and larger laundry load sizes during the winter months during which the NEEA field study was conducted.

DOE also recognizes the difficulty in drawing conclusions regarding load weights along with the initial and final RMC based on the NEEA field study data. DOE notes that in the NEEA field study, a fixed correction was used to calculate the bone-dry weight and measured RMC of the laundry loads based on the load weight in ambient room conditions prior to any washing or drying. In cases where the estimated RMC of the laundry load was higher than 5 percent prior to any washing or drying, the load was assumed to be wet and the weight after the drying cycle was used as the bone-dry weight. DOE notes that different clothing materials and load sizes may retain moisture differently, and may be significantly impacted by ambient temperature and humidity conditions. DOE also notes that the clothes washer and clothes dryer for some sites monitored in the field study were located in unconditioned spaces (*e.g.*, garages or unconditioned basements), which could also have a significant impact on the amount of moisture retained in the clothing at ambient conditions. The NEEA field study data showed a wide range of final RMC values, including negative RMC values, which

suggests that a single fixed correction factor may not be an accurate reflection of the weight and RMC of the load.

DOE is also concerned about placing too much emphasis on the field study data as a means of developing representative load sizes or other test parameters because different conclusions may be drawn depending on how the data are aggregated for analysis. For example, as discussed in section III.B.2 of this document, NEEA and NPCC commented that the 8.45-pound load size is fairly representative of the average load size observed in the NEEA field study even though this load size represents less than 15 percent of all loads in the field study. However, in the NEEA field study report, loads in the 6–8 pound range and 9–11 pound range accounted for the majority (over 50 percent) of all laundry loads.<sup>20</sup> In addition, a 16.9-pound load was suggested as part of the Utility Test Protocol, but the NEEA field study data showed that loads over 15 pounds accounted for less than 3 percent of all laundry loads in the study.

While the NEEA field study data and comments from efficiency advocates and utilities provide valuable information regarding the consumer usage habits for clothes dryers, DOE does not have sufficient information at this time to determine appropriate changes to the test procedure.

To ensure that the test procedure measures energy use during a representative average use cycle or period of use, DOE continues to seek consumer usage data (*e.g.*, load composition and sizes, cycle selections, RMC, cycles per year) that are representative of the entire United States over the course of a year. DOE requests data on how frequently consumers select different cycle programs, temperature settings, dryness

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<sup>20</sup> *Dryer Field Study*. 2014. Northwest Energy Efficiency Alliance. Report No. E14-287. Pg. 29. <https://www.neea.org/docs/default-source/reports/nee-clothes-dryer-field-study.pdf>.

settings, and other settings that could impact energy use (e.g., “eco mode”). DOE seeks data on representative load compositions (materials, fabric, weave, *etc.*) and sizes, as well as the corresponding cycle selections chosen by consumers for each particular load. DOE also seeks consumer usage data on initial RMC and consumer-acceptable final RMC levels for varying load compositions/sizes and cycle selections.

DOE notes that the IEC is currently investigating alternative clothes dryer test methods, including alternative load compositions and sizes. IEC is in the process of qualifying alternative load compositions and sizes to develop potential revisions to IEC Standard 61121. DOE recognizes that the test method required for certification to and compliance with applicable energy conservation standards must be designed to measure energy use during a representative average use cycle or period of use, and not unduly burdensome to conduct. DOE will consider any available information developed for the revised IEC Standard 61121 as IEC’s development program progresses.

For the reasons discussed, DOE is not proposing to amend the test load composition and size, test cycle selections, RMC, and cycles per year in its test procedures at this time.

DOE seeks comment on whether requiring the drying temperature setting to be set to the maximum, if it can be chosen independently of the program, is representative of the energy use of the clothes dryer during a representative use cycle or period of use, or whether a lower temperature setting would meet this statutory criterion. DOE also seeks comment on whether a 2-percent final RMC under DOE test conditions is representative of the energy use during an average use cycle or period of use for clothes dryers with automatic termination controls, or whether a different RMC meets this statutory criterion;

and on whether any other test conditions should be revised so that the test procedure meets the applicable EPCA requirements.

DOE will continue to review and consider consumer usage data as it becomes available and engage with stakeholders to collect additional information regarding potential amendments to the DOE clothes dryer test procedure to better represent consumer use. DOE expects that continued work in this area will include collaboration with stakeholders, including industry stakeholders, to determine if there are test load composition and size specifications that may be more representative of actual load composition and size, while providing sufficient repeatability and reproducibility of test results and that are not unduly burdensome. DOE would expect any such updated conditions to be considered in future test procedure rulemakings and potentially to provide the basis for evaluating amended energy conservation standards following the current evaluation initiated through the Request for Information published on March 27, 2015. 80 FR 16309.

### C. Other Comments

#### 1. Energy Use Metric

PG&E and SCE commented that when the performance of gas and electric clothes dryers are compared on a site energy basis, gas clothes dryers appear less efficient than electric clothes dryers because losses associated with electricity generation are not considered. (PG&E, No. 7 at p. 3; SCE, No. 11 at p. 3) According to PG&E and SCE, based on their testing, using a metric based on carbon dioxide emissions that they state fully accounts for losses of electricity generation would result in gas clothes dryer

efficiencies being higher than those for all other clothes dryer types, including heat pump clothes dryers. (PG&E, No. 7 at pp. 4–5, 12; SCE, No. 11 at pp. 4–5, 12)

As DOE has explained in the context of test procedures for other products, *i.e.*, residential furnaces and boilers, the test procedure is not the appropriate vehicle for deriving a full fuel cycle (“FFC”) energy use metric, such as carbon dioxide emissions, for clothes dryers. See, 81 FR 2628, 2638–2639 (Jan. 15, 2016). DOE may estimate the FFC energy savings as part of any concurrent energy conservation standards rulemaking for clothes dryers and take those savings into account in proposing amended standards.

## 2. Effects of Clothes Dryers on Heating, Ventilation, and Air Conditioning Energy Use

SEDI commented that DOE should investigate the effect of clothes dryers on residential heating, ventilation, and air conditioning (“HVAC”) energy consumption. (SEDI, No. 6 at p. 3) SEDI stated that vented clothes dryers expel air from the house, causing make-up air to be drawn from outside the house that must be conditioned (either by heating or cooling), which consumes energy as a direct consequence of the clothes dryer operation, and that clothes dryers themselves also heat and add moisture directly to the air inside a house. (*Id.*) According to SEDI, these effects are significant in comparison to the energy consumed by the clothes dryer and cause the energy performance of ventless clothes dryers to be rated inaccurately in relation to vented clothes dryers. (SEDI, No. 6 at pp. 3–4)

As described, EPCA requires that any prescribed or amended test procedures be reasonably designed to produce test results that measure energy efficiency, energy use, water use, or estimated annual operating cost of a covered product during a representative average use cycle or period of use. (42 U.S.C. 6293(b)(3)) In prior clothes dryer energy

conservation standards and test procedure rulemakings, DOE considered the issue SEDI raises here, and concluded that “accounting for the effects of clothes dryers on HVAC energy use is inconsistent with the EPCA requirement that a test procedure measure the energy efficiency, energy use, or estimated annual operating cost of a covered product. As a result, DOE did not revise the clothes dryer test procedure to account for HVAC energy use in the TP Final Rule and does not account for HVAC energy use in these standards.” 76 FR 22454, 22474 (Apr. 21, 2011); see also 76 FR 972, 1004-1005 (Jan. 6, 2011) (test procedure final rule) For the same reasons, DOE is not proposing in this rulemaking to amend its clothes dryer test procedure to account for the clothes dryer impacts on HVAC energy use.

### 3. Washer-Dryer Test Procedure

PG&E and SCE commented that DOE should consider an integrated washer-dryer test procedure in which the test load would be transferred directly from the clothes washer at the end of the wash cycle to the clothes dryer. (PG&E, No. 7 at p. 12; SCE, No. 11 at p. 12) PG&E and SCE stated that development of an integrated washer-dryer test procedure would provide additional data on clothes washer performance, allow for a better understanding of “synergies” between the clothes washer and clothes dryer in terms of energy efficiency and cycle times, and reduce test burden by eliminating the step of wetting the clothing to tight tolerances prior to running the clothes dryer test cycle, which they deemed to be labor intensive. (*Id.*) NEEA and NPCC similarly commented that DOE should consider an integrated test procedure in which the clothes washer and matching clothes dryer are tested as a pair. (NEEA & NPCC, No. 10 at p. 7) NEEA and NPCC stated that the NEEA field study data show that the initial RMC for the drying

cycle depends substantially on the type of clothes washer, with clothes dryer loads having an average initial RMC of 61 percent in homes with a horizontal-axis clothes washer and 74 percent in homes with a vertical-axis clothes washer. (NEEA & NPCC, No. 10 at p. 7) NEEA and NPCC added that this large difference significantly impacts clothes dryer energy use. (*Id.*)

EPCA requires DOE to establish test procedures that measure the energy use or efficiency “of a covered product” during a representative average use cycle or period of use. 42 U.S.C. 6293(b)(3). EPCA does not authorize DOE to establish test procedures that measure the energy use of two covered products when paired together. In addition, different clothes washer models spin clothing loads to different RMC levels, which in turn would affect the clothes dryer initial RMC and the amount of moisture needed to be removed during the drying cycle. As such, the measured efficiency of a clothes dryer could be significantly impacted by the clothes washer with which it is paired for the purpose of testing. Whether a clothes dryer would comply with the energy conservation standard would be dependent, in part, on the performance of the paired clothes washer.

SEDI commented that DOE should investigate test procedures for combination washer-dryers so that the test procedure measures the total energy consumption of the unit during a complete washing and drying cycle. (SEDI, No. 6 at p. 4) SEDI commented that the total energy consumption could then be allocated between the clothes washer and clothes dryer energy use metrics based on an assumed RMC value between the cycles. (*Id.*) SEDI stated that this would avoid giving combination washer-dryers either an unfair advantage or disadvantage compared to stand-alone clothes washers and clothes dryers. (*Id.*)

For combination washer-dryers, the clothes washer component is required to demonstrate compliance with the current energy conservation standards for consumer clothes washers using the clothes washer test procedure at 10 CFR part 430, subpart B, appendix J2 (“appendix J2”). The clothes dryer component of a combination washer-dryer is required to demonstrate compliance with the current energy conservation standards for clothes dryers using the clothes dryer test procedures in either appendix D1 or appendix D2. EPCA similarly does not authorize DOE to establish a single test procedure for combination washer-dryers that would measure the total energy consumption of the unit during a complete washing and drying cycle. 42 U.S.C. 6293(b)(3).

#### D. “Connected” Clothes Dryers

DOE is currently aware of a growing number of “connected” clothes dryer models on the market, from at least six major manufacturers. These products offer wireless network connectivity to enable features such as remote monitoring and control via smartphone, as well as demand response features<sup>21</sup> available through partnerships with a small number of local electric utilities. DOE observes a variety of implementations of these connected features across different brands, and that the design and operation of these features is continuously evolving as the market continues to grow for these products.

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<sup>21</sup> “Demand response features” refers to product functionality that can be controlled by the “smart grid” to improve the overall operation of the electrical grid, for example by reducing energy consumption during peak periods and/or shifting power consumption to off-peak periods.

DOE notes that the ENERGY STAR program has incorporated connected criteria into version 1.1 of the Product Specification for Clothes Dryers.<sup>22</sup> Products that qualify as “connected”<sup>23</sup> are eligible for a bonus of 5 percent applied to the model’s CEF rating, which is required to be measured using appendix D2.

If the availability of “connected” features on a clothes dryer affects its standby mode power consumption (*e.g.*, by energizing a wireless communication chip on the circuit board) in the as-shipped configuration, such impact would be measured by the current test procedure provisions in section 3.6 of appendices D1 and D2 for measuring standby mode and off mode power. Whereas, if the standby power consumption is not affected unless the consumer actively enables the connected functionality on the unit, any incremental standby power consumption resulting from the connected features would not be measured by the current test procedure because the test procedure does not include instructions for activating any such features before performing the standby mode and off mode measurement. Similarly, any incremental energy consumption in active mode, or any other modes of operation impacted by the product’s connected features, would not be measured as part of the DOE test procedure, because the test cycle requirements within section 3.3 of appendices D1 and D2 do not include instructions for activating any such features before performing the active mode drying cycle measurements.

DOE recently published a request for information (RFI) on the emerging smart technology appliance and equipment market. 83 FR 46886 (Sept. 17, 2018). In that RFI,

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<sup>22</sup> ENERGY STAR criteria for clothes dryers are available at [https://www.energystar.gov/products/appliances/clothes\\_dryers/partners](https://www.energystar.gov/products/appliances/clothes_dryers/partners).

<sup>23</sup> The ENERGY STAR criteria define a “connected clothes dryer system” as including a base appliance plus all hardware and software elements required to enable communication in response to consumer-authorized energy related commands.

DOE sought information to better understand market trends and issues in the emerging market for appliances and commercial equipment that incorporate smart technology. DOE's intent in issuing the RFI was to ensure that DOE did not inadvertently impede such innovation in fulfilling its statutory obligations in setting efficiency standards for covered products and equipment. In this NOPR, consistent with the September 2018 RFI, DOE proposes to specify in section 3.3 of appendix D1, and sections 3.3.1 and 3.3.2 of appendix D2, that units with network capabilities be tested with the network-connected functions in the "off" position.

DOE seeks comment on the proposal to specify that units with network capabilities be tested with the network-connected functions in the "off" position and on the issues presented in the September 2018 RFI as they may be applicable to clothes dryers.

DOE also seeks the following information regarding connected clothes dryers that could inform future test procedure considerations:

DOE requests feedback on its characterization of connected clothes dryers currently on the market. Specifically, DOE requests input on the types of features or functionality enabled by connected clothes dryers that exist on the market or that are under development.

DOE requests data on the percentage of users purchasing connected clothes dryers, and, for those users, the percentage of the time when the connected functionality of the clothes dryer is used.

DOE requests feedback on the types of impacts that should be included in any future assessments of features associated with connected clothes dryers.

DOE requests data on the amount of additional or reduced energy use of connected clothes dryers.

DOE requests data on the pattern of additional or reduced energy use of connected clothes dryers; for example, whether it is constant, periodic, or triggered by the user.

DOE requests information on any existing testing protocols that account for connected features of clothes dryers, as well as any testing protocols that may be under development within the industry.

#### E. Maintaining Hourly Btu Rating for Gas Clothes Dryers

Section 2.3.2.1 of appendix D1 and appendix D2 provides requirements for natural gas clothes dryers for maintaining the hourly British thermal unit (“Btu”) rating of the burner during testing to within  $\pm 5$  percent of the hourly Btu rating specified by the manufacturer.<sup>24</sup> Section 2.3.2.2 provides analogous requirements for propane clothes dryers. The intent of these requirements is to provide repeatable test conditions, recognizing that the rate of heat input into a clothes dryer can significantly affect its performance. Both sections provide instructions regarding tolerances and adjustments that can be made to the inlet gas pressure,<sup>25</sup> gas pressure regulator setpoint,<sup>26</sup> and/or

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<sup>24</sup> The hourly Btu rating of a gas clothes dryer is typically specified on the product’s nameplate sticker.

<sup>25</sup> For natural gas clothes dryers, section 2.3.2.1 specifies maintaining the gas supply pressure immediately ahead of all controls within a range of 7 to 10 inches of water column. For propane clothes dryers, section 2.3.2.2 specifies maintaining the gas supply pressure immediately ahead of all controls within a range of 11 to 13 inches of water column.

<sup>26</sup> For both natural gas and propane clothes dryers, if the clothes dryer is equipped with a gas appliance pressure regulator for which the manufacturer specifies an outlet pressure, the regulator outlet pressure must be maintained within  $\pm 10$  percent of the value recommended by the manufacturer in the installation manual, on the nameplate sticker, or wherever the manufacturer makes such a recommendation for the basic model.

modifications to the orifice,<sup>27</sup> in order to maintain the hourly Btu rating within  $\pm 5$  percent of the rating specified by the manufacturer.

DOE has received questions regarding the order for considering adjustments to either the regulator setpoint or inlet gas pressure, or modifying the orifice. The test procedures currently provide for modifying the orifice of the gas burner as necessary if the required hourly Btu rating cannot be achieved under the allowable range in gas inlet pressure, indicating that adjustments to the gas inlet pressure should be made before considering modifications to the orifice. However, the large majority of clothes dryers on the market include a gas pressure regulator, which is situated between the gas inlet and the orifice. Since the purpose of a gas pressure regulator is to provide a constant output pressure regardless of fluctuations in upstream supply pressure, adjusting the gas inlet pressure upstream of a pressure regulator will typically have no impact on the pressure of the gas exiting the regulator and entering the orifice, or likewise the hourly Btu rating.

To provide further direction applicable to the large majority of clothes dryers on the market that include a gas pressure regulator, DOE proposes to specify that the order of adjustment for maintaining the hourly Btu rating within specification is as follows: (first) adjust the supply gas pressure, (second) adjust the pressure regulator setpoint, or (third) modify the orifice as necessary. This proposed order specifies using an approach with the least amount of test burden necessary to achieve the specified test conditions. This also corresponds to the least amount of modification to the unit that would be necessary to achieve the specified test conditions. Adjusting the supply gas inlet pressure

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<sup>27</sup> The orifice is an attachment that typically screws into the outlet of the gas pressure regulator and has a small-diameter outlet hole, through which the gas flows into the burner. For both natural gas and propane clothes dryers, the test procedures provide for modifying the orifice of the gas burner as necessary if the required hourly Btu rating cannot be achieved under the allowable range in gas inlet pressure.

requires no modifications to the clothes dryer itself. Adjusting the pressure regulator setpoint typically requires removing an access panel on the clothes dryer and tightening or loosening a screw on the regulator. Modifying the orifice typically requires removing an access panel on the clothes dryer, disassembling the burner, removing the orifice, modifying the orifice (*e.g.*, by drilling a larger-diameter outlet hole), reinstalling the orifice, and finally reassembling the burner.

In DOE's testing experience, any deviation of the hourly Btu rating beyond  $\pm 5$  percent of the rated value can be remedied with a minor adjustment to the gas pressure regulator (within the allowable range of  $\pm 10$  percent of the recommended pressure level). Based on DOE's experience with third-party test laboratories, preferentially starting with the least burdensome adjustments before trying progressively more burdensome adjustments is generally consistent with industry practice.

DOE proposes to provide this direction in a new section 2.3.2.3 in both appendix D1 and appendix D2, which would apply to both natural gas and propane clothes dryers. In conjunction, DOE proposes simplifying the existing provisions within sections 2.3.2.1 and 2.3.2.2 to reduce duplication with provisions that would be included in the new section 2.3.2.3, and therefore improve the overall readability of the test procedures.

DOE requests comment on its proposal to specify that the order of adjustment for maintaining the hourly Btu rating within specification is as follows: (first) adjust the supply gas pressure, (second) adjust the pressure regulator setpoint, or (third) modify the orifice as necessary.

## F. Inactive and Off Mode Power Measurements

Section 3.6 of appendix D1 and appendix D2<sup>28</sup> provides the instructions for measuring standby<sup>29</sup> (“inactive”<sup>30</sup>) mode and off mode<sup>31</sup> power on the clothes dryer. The per-cycle combined total energy consumption of a clothes dryer includes the combined representative measures of inactive mode and off mode power. Appendix D1, sections 4.5 and 4.6; appendix D2, sections 4.5 and 4.6. The test procedure distinguishes between inactive mode and off-mode. *Id.* However, when only one of the low-power modes is present, regardless of whether the low-power mode is considered inactive mode or off mode, the same measurement and calculation is performed.<sup>32</sup> *Id.*

DOE has received questions from interested parties regarding difficulties in determining whether the low-power mode on certain products, including clothes dryers, is considered inactive mode or off mode when only one of the modes is present. Because the test procedure calculation treats both modes in the same manner, requiring this distinction creates unnecessary test burden. DOE addressed a similar issue in the final

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<sup>28</sup> As proposed in this NOPR, section 3.6 of appendix D2 would be renumbered as section 3.5, as a result of removing obsolete provisions from the test procedures. See section 0 of this notice for additional details.

<sup>29</sup> Section 1.17 of appendix D1 and section 1.18 of appendix D2 define “standby mode” as any mode in which the product is connected to a mains power source and offers one or more of the following user-oriented or protective functions that may persist for an indefinite period of time: (1) a function that facilitates the activation of other modes (including activation or deactivation of active mode) by remote switch (including remote control), internal sensor, or timer; or (2) continuous functions, including information or status displays (including clocks) or sensor-based functions. The definition also specifies that 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.

<sup>30</sup> Section 1.12 of appendix D1 and section 1.13 of appendix D2 define “inactive mode” 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.

<sup>31</sup> Section 1.15 of appendix D1 and section 1.16 of appendix D2 define “off mode” as a mode in which the clothes dryer is connected to a mains power source and is not providing any active mode or standby function, and where the mode may persist for an indefinite period of time. The definition further states that an indicator that only shows the user that the product is in the off position is included within the classification of an off mode.

<sup>32</sup> Distinguishing inactive mode from off mode is not an issue when both are present. When both modes are present, inactive mode and off mode can be distinguished from each other based on the measured energy use; *i.e.*, inactive mode will result in a higher measured energy use than off mode.

rule published August 5, 2015 (the “August 2015 Final Rule”) amending the clothes washer test procedure. 80 FR 46730, 46747–46749.

As discussed in the August 2015 Final Rule, a third-party laboratory stated that the “off” state on some appliances is achieved through a software/firmware action (*i.e.*, through a “soft switch”) rather than a hard on/off switch (*i.e.*, a switch that physically breaks the connection to the mains power supply), and that it is not clear whether the product is providing any active mode or standby function while in the “off” state. 80 FR 46730, 46748. Another third-party laboratory described the difficulty for an independent third-party laboratory to determine if the on/off button is a hard switch or a soft switch. *Id.* According to the commenter, if the third-party laboratory is unable to obtain this information from the manufacturer, the next best option is to review the product’s electrical schematic; however, the schematic is often located somewhere inside the machine, such as behind the console. *Id.* The commenter further questioned whether a third-party laboratory could remove the console during testing to determine if the switch is a hard switch or soft switch; or, alternatively, if the machine must not be disassembled, whether DOE could specify another method to determine the type of switch. *Id.*

The current procedure for measuring inactive and/or off mode power is as follows. Section 3.6.1 of appendix D1 and appendix D2 instructs the testing party to measure the inactive mode power, if the clothes dryer has an inactive mode. Similarly, section 3.6.2 of both appendices instructs the testing party to measure the off mode power, if the clothes dryer has an off mode. In section 4.5 of both appendices, if a clothes dryer has either inactive mode or off mode (but not both), the measured power is multiplied by 8,620, representing the combined annual hours that the clothes dryer is not

in active mode (*i.e.*, idle). Alternatively, if a clothes dryer has both inactive mode and off mode (*e.g.*, an electronic control panel that also provides a hard off switch that can completely disconnect all power to the product), the power of each mode is measured and multiplied by one-half of 8,620 (*i.e.*, 4,310), and the results are summed.<sup>33</sup> As these sections are currently structured, the test laboratory must first determine whether the low-power mode(s) that exists on the clothes dryer meets the definition of inactive mode or off mode—even though the same calculation applies, yielding the same end result, regardless of the distinction.

As discussed, it may be difficult to determine whether a product is providing any active mode or standby function while in the idle low-power state. To avoid the unnecessary burden associated with potentially needing to remove a product’s console to access the electrical schematic and/or determine if the switch is a “hard” switch or “soft” electronic switch, DOE is proposing to amend the test provisions in appendix D1 and appendix D2 for measuring inactive mode<sup>34</sup> and off mode using nomenclature based on observable and measurable characteristics of the clothes dryer, rather than based on knowledge of the control panel switch type or internal functionality of the clothes dryer.

The proposed approach would not change what energy is measured. This proposed approach would still measure inactive mode and off mode energy use to the extent that a product has one or both modes, but would not require specifying the specific mode being measured when only one is present, as the calculation treats both modes the same. This proposal is similar to the approach DOE adopted for the clothes washer test

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<sup>33</sup> This calculation represents an estimate that such a clothes dryer would spend half of its low-power mode hours in inactive mode, and the other half of its low-power mode hours in off mode.

<sup>34</sup> Inactive mode is the only type of standby mode required to be measured in appendix D1 and appendix D2.

procedures. 10 CFR part 430 subpart B appendix J2 section 3.9; 80 FR 46730, 46747–46749.

Currently, sections 3.6.1 and sections 3.6.2 of appendix D1 and appendix D2 provide separate symbol designations for the inactive mode and off mode power measurements:  $P_{IA}$  and  $P_{OFF}$ , respectively. If a clothes dryer has either inactive mode or off mode (but not both), the average power consumption of the available mode is measured and labeled as either  $P_{IA}$  or  $P_{OFF}$ , accordingly. *Id.* As described, regardless of whether the average low-power measurement is designated as  $P_{IA}$  or  $P_{OFF}$ , section 4.5 of both appendices applies the total 8,620 annual hours to the measurement. If both inactive mode and off mode are available on the clothes dryer, section 4.5 applies 4,310 hours to each of the two average power measurements. *Id.*

In this NOPR, DOE is proposing to amend the testing methodology in section 3.6 of appendix D1 and newly renumbered section 3.5 of appendix D2 and the calculations in section 4.5 of both appendix D1 and appendix D2 by revising the nomenclature and symbols used for the standby and off mode measurements. DOE proposes to change these symbols,  $P_{IA}$  and  $P_{OFF}$ , to  $P_{default}$  and  $P_{lowest}$ , and the assignment of each symbol to its respective measurement would be based on observable and measurable characteristics of the clothes dryer rather than the control panel switch type or internal functionality of the clothes dryer. If only inactive mode or off mode is available, the measured average energy use would be represented by  $P_{default}$ . If both inactive mode and off mode are available,  $P_{default}$  would represent the average measured energy use of inactive mode and  $P_{lowest}$  would represent the measured energy use of off mode. In addition, DOE is proposing to revise the wording of the testing instructions in section 3.6 of appendix D1

and in newly renumbered section 3.5 of appendix D2 to specify how the procedure corresponds to the sequence of events as they would be performed during testing. This proposed procedure would produce test results that yield the same measured energy as in section 3.6 of the current procedures for all clothes dryer types currently on the market.

The proposed amendments would revise the current structure of section 3.6 in both appendix D1 and appendix D2. Section 3.6 of appendix D1 and newly renumbered section 3.5 of appendix D2 would state that for a clothes dryer that takes some time to automatically enter a stable inactive/off mode state from a higher power state, as discussed in Section 5, Paragraph 5.1, note 1 of IEC Standard 62301, allow sufficient time for the clothes dryer to automatically reach the default inactive/off mode state before proceeding with the test measurement. The revised wording would replace the currently used term “lower power state” with “default standby/off mode state,” recognizing that the lower power state that the clothes dryer reaches by default may be either a standby (inactive) mode or an off mode.

The proposed amendment would also include the procedural instructions for performing the power measurement, with the calculation symbols revised, in section 3.6.1 of appendix D1 and 3.5.1 of appendix D2. The proposed instructions would state that once the stable inactive/off mode state has been reached, the default inactive/off mode power,  $P_{\text{default}}$ , in watts, is measured and recorded following the test procedure for the sampling method specified in Section 5, Paragraph 5.3.2 of IEC Standard 62301.

For clothes dryers with both an inactive mode and off mode as contemplated in the current test procedure (*i.e.*, clothes dryers with electronic controls that offer an optional switch (or other means) that can be selected by the end user to achieve a lower

power state than the default inactive/off mode state),<sup>35</sup> the proposed section 3.6.2 of appendix D1 and 3.5.2 of appendix D2 would require that, after performing the measurement in section 3.6.1 of appendix D1 or 3.5.1 of appendix D2, the switch (or other means) be activated to the position resulting in the lowest power consumption and the measurement procedure described in section 3.6.1 and 3.5.1, respectively, be repeated. The average power consumption would be measured and recorded as the lowest standby/off mode power,  $P_{\text{lowest}}$ , in watts.

The proposed revisions to section 4.5 of both appendix D1 and appendix D2 would apply annual hours to the average power measurement(s) performed in section 3.6 of both appendix D1 and appendix D2, consistent with the current test procedure. For those clothes dryers with a single low-power mode average power consumption measurement (newly labeled as  $P_{\text{default}}$ ), the calculation would apply the total 8,620 annual hours to this measurement. For those clothes dryers with two average power measurements (relabeled as  $P_{\text{default}}$  and  $P_{\text{lowest}}$ ), section 4.5 would apply 4,310 hours to each of the two measurements.

In addition, DOE testing suggests that testing a clothes dryer's standby or off mode power consumption directly after connecting the clothes dryer to the electrical energy supply is not always representative of the standby or off mode power consumption after its first use. Therefore, DOE proposes to specify that standby mode and off mode testing in section 3.6 of appendix D1 and newly renumbered section 3.5 of appendix D2 be performed after completion of an active mode drying cycle; after removing the test load; without changing the control panel settings used for the active

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<sup>35</sup> Such a feature could be labeled on the control panel as a “master power” or “on/off” switch, for example.

mode drying cycle; with the door closed; and without disconnecting the electrical energy supply to the clothes dryer between completion of the active mode drying cycle and the start of standby mode and off mode testing. This specification would preclude performing standby mode and off mode testing directly after connecting the clothes dryer to the electrical energy supply. DOE notes that the order of sections within the clothes dryer test procedures suggests that the standby mode and off mode measurement (section 3.6 of appendix D1 and section 3.5 of appendix D2) is performed after the active mode test cycle (sections 3.3 through 3.5 of appendix D1 and sections 3.3 and 3.4 of appendix D2); therefore, the proposed approach likely reflects current practice within the industry. This revision also would ensure that the results of the standby mode and off mode testing accurately represent the conditions most likely to be experienced during a representative average use cycle or period of use. These changes would be consistent with the approach that was adopted as part of the August 2015 Final Rule amending the DOE clothes washer test procedure. 80 FR 46730, 46747–46749.

DOE requests comments on whether the order of sections within the test procedure reflects the order in which test laboratories perform the test. Specifically, DOE requests comments on whether performing the standby mode and off mode testing after the active mode testing reflects current practice by test laboratories.

The proposed revisions to sections 3.6 of appendix D1 and 3.5 of appendix D2 are intended to provide a clearer set of procedural instructions for performing the standby mode and off mode measurements required in sections 3.6 of the current test procedures. Under the proposed sections 3.6 of appendix D1 and 3.5 of appendix D2, the same sequence of measurements would be performed as in the current sections 3.6, and thus

would yield the same power measurement(s) for clothes dryers with inactive mode, off mode, or both. Further, the same annual hours as are currently specified would be applied to the average power measurement(s) in section 4.5 of both appendix D1 and appendix D2. Therefore, DOE has initially determined that these proposed amendments to sections 3.6 and 4.5 of both appendix D1 and appendix D2 would not impact the measured efficiency of clothes dryers.

DOE requests comments on its proposal to amend the methods for measuring inactive mode and off mode power consumption of clothes dryers.

#### G. Final RMC Requirements for Automatic Termination Control Dryers

Section 3.3.2 of appendix D2 specifies that for automatic termination control dryers, a “normal” program must be selected for the test cycle. In addition, where the temperature and dryness level settings can be chosen independently of the program, the test procedure specifies that they be set to maximum temperature setting and the “normal” or “medium” dryness level setting, respectively. *Id.* The clothes dryer is then operated until the completion of the programmed cycle, including the cool down period. *Id.* The test procedure provides that, if the final RMC is greater than 2 percent, the test is invalid and that a new run must be conducted using the highest dryness level setting. *Id.*

DOE received an inquiry regarding whether any second test run using the highest dryness level setting must also result in a final RMC of 2 percent or less for the test to be considered valid.

DOE notes that, as part of the August 2013 Final Rule, interested parties submitted a joint comment presenting test results that demonstrate that a final RMC of 2 percent using the DOE test cloth is representative of the consumer-accepted dryness level

after completion of a drying cycle. 78 FR 49608, 49614. DOE agreed with this conclusion and adopted provisions that specify that a test conducted on the “normal” or “medium” dryness setting is considered valid only if the final RMC is 2 percent or lower. 78 FR 49608, 49621, 49624. DOE interprets that the 2-percent final RMC threshold for a valid test should apply to all test cycles run according to section 3.3.2 of appendix D2, including test runs using the highest dryness level setting, so that the energy consumption of the clothes dryer will be measured for drying the load to the consumer-accepted dryness level. DOE provided this interpretation in guidance issued on January 10, 2017.<sup>36</sup> This approach is consistent with the EPCA requirements that test procedures must be “reasonably designed to produce test results” that measure energy use “during a representative average use cycle.” 42 U.S.C. 6293(b)(3). Based on the information presented during the prior rulemaking, during the representative average use of a clothes dryer, clothes are dried to a final RMC that is equivalent to 2-percent RMC in the DOE test load.

In this NOPR, DOE is proposing to amend section 3.3.2 of appendix D2 to explicitly specify that any second test run using the highest dryness level setting must result in a final RMC of 2 percent or less for the test to be considered valid. As discussed, DOE has applied the final RMC value of 2 percent as representative of the energy use during an average use cycle or period of use. If the basic model under test fails to achieve an RMC of 2 percent or less when tested at the highest dryness level setting, the dryer has not sufficiently dried the clothes and the test results may not be used for certification of compliance with energy conservation standards. Further, DOE

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<sup>36</sup> Clothes Dryer Final Guidance issued January 10, 2017. Available at [https://www1.eere.energy.gov/guidance/detail\\_search.aspx?IDQuestion=665&pid=2&spid=1](https://www1.eere.energy.gov/guidance/detail_search.aspx?IDQuestion=665&pid=2&spid=1).

proposes to amend the nomenclature of sections 4.1 through 4.4 of appendix D2 to clarify that the measured energy consumption values represented by  $E_{ce}$ ,  $E_{ge}$ ,  $E_{gg}$ , and  $E_{cg}$ , respectively, reflect the energy required to achieve a final RMC of 2 percent or less.

DOE requests comments on its proposal to specify explicitly that any second test run using the highest dryness level setting must result in a final RMC of 2 percent or less for the test to be considered valid, and its proposal to amend the nomenclature of sections 4.1 through 4.4 of appendix D2 to clarify that the measured energy consumption represented by  $E_{ce}$ ,  $E_{ge}$ ,  $E_{gg}$ , and  $E_{cg}$ , respectively, reflects the energy required to achieve a final RMC of 2 percent or less. DOE also requests comment on whether a different final RMC would more appropriately represent the consumer-acceptable end point of an average use cycle.

#### H. Dryness Level Selection for Automatic Termination Control Dryers

Section 3.3.2 of appendix D2 states that where the dryness level setting can be chosen independently of the program, it shall be set to the “normal” or “medium” dryness level setting. If such designation is not provided, then the dryness level is set at the mid-point between the minimum and maximum settings. *Id.* DOE has received inquiries from third-party test laboratories regarding clothes dryers that have four dryness settings, such that a single mid-point between the minimum and maximum settings is not available.

DOE is proposing to specify in section 3.3.2 of appendix D2 that if an even number of discrete settings are provided, the next-highest setting above the midpoint, in the direction of the maximum dryness setting, or the next-lowest setting below the midpoint, in the direction of the minimum dryness setting, should be used.

DOE requests comment on its proposal to specify the dryness setting for clothes dryers that provide an even number of discrete dryness settings that can be chosen independently of the program.

#### I. General Test Procedure Provisions at 10 CFR 430.23(d)

The general test procedure provisions for clothes dryers in 10 CFR 430.23(d) include methods for calculating the estimated annual operating cost, CEF, and other useful measures of energy consumption using appendix D1. In this NOPR, DOE is proposing to amend 10 CFR 430.23(d) to also allow for calculating each of these metrics using appendix D2, to accommodate clothes dryers that are optionally tested using appendix D2.

DOE recognizes that consumers may also value information about clothes dryer annual energy use, in addition to annual operating cost. Therefore, DOE is proposing to include methods for calculating the estimated annual energy use, which would be calculated as the product of the number of drying cycles per year and the per-cycle combined total energy consumption, in kilowatt-hours (“kWh”).<sup>37</sup> Both of these factors are already included in the existing calculation of annual operating cost. This new calculation would be inserted at 10 CFR 430.23(d)(1), with existing paragraph (d)(1) renumbered as (d)(2) accordingly.

DOE requests comment on its proposal to allow for calculating each useful measure of energy consumption in 10 CFR 430.23(d) using appendix D2, to accommodate clothes dryers that are optionally tested using appendix D2. DOE also

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<sup>37</sup> For gas clothes dryers, the gas dryer per-cycle gas energy consumption is converted from Btu to kWh and then added to the per-cycle gas dryer electrical energy consumption to calculate the per-cycle combined total energy consumption in kWh.

requests comment on its proposal to include a new method for calculating estimated annual energy use of a clothes dryer.

#### J. Rounding Requirements for Reported Values

DOE proposes adding a new section at 10 CFR 429.21(c) to specify the rounding requirements of all numeric reported values for clothes dryers as follows: CEF to the nearest 0.01 pound per kilowatt hour (lb/kWh), capacity to the nearest 0.1 cubic feet (cu.ft.), voltage to the nearest volt, and hourly Btu rating to the nearest Btu. Similarly, DOE proposes adding the same rounding requirement for the capacity measurement in section 3.1 of both appendix D1 and D2, which would add specificity to the measurement of drum capacity as it relates to determining whether a compact-size load (for a drum capacity less than 4.4 cu.ft.) or standard-size load must be used for testing.

The proposed rounding requirements for CEF, capacity, voltage, and Btu rating would maintain consistency with the level of precision currently provided in DOE's Compliance Certification Management System.

DOE also proposes to specify the rounding instructions provided at 10 CFR 430.23(d)(1) (renumbered to paragraph (d)(2) as proposed in this document) pertaining to estimated annual operating cost. Currently, the rounding instructions for an electric clothes dryer are embedded within paragraph (d)(1)(i)(C). DOE proposes moving the rounding instructions to paragraph (d)(1)(i) to clarify that the rounding provision applies to the product of all three factors multiplied in paragraphs (d)(1)(i)(A), (B), and (C). Similarly, for gas clothes dryers, DOE proposed to move the rounding instructions from its current location embedded within paragraph (d)(1)(ii)(B) to the higher-level paragraph at (d)(1)(ii).

DOE requests comment on the appropriateness of its proposed rounding requirements of all numeric reported values and estimated annual operating cost for clothes dryers.

#### K. Formatting Changes and Typographical Errors

In an effort to improve the readability of the text in certain sections of appendix D1 and appendix D2, DOE is proposing to make minor typographical corrections and formatting modifications as follows. These minor proposed modifications are not intended to change the substance of the test methods or descriptions provided in these sections.

##### 1. “Conventional” and “Vented” Nomenclature

Appendix D1 and appendix D2 define the term “conventional clothes dryer” as a clothes dryer that exhausts the evaporated moisture from the cabinet. This definition is synonymous with a “vented clothes dryer.” Conversely, “ventless clothes dryer” is defined as a clothes dryer that uses a closed-loop system with an internal condenser to remove the evaporated moisture from the heated air. The moist air is not discharged from the cabinet.

DOE’s product class definitions for clothes dryers use the terms “vented clothes dryer” and “ventless clothes dryer” to refer to the different methods used by the clothes dryer to remove moisture from the cabinet. To provide consistency between DOE’s product class definitions and the terminology used in the clothes dryer test procedures, DOE is proposing to replace the word “conventional” with “vented” throughout both appendix D1 and appendix D2. This change would affect the nomenclature only and

would not affect the classification of clothes dryers or conduct of the test procedure for any clothes dryers.

## 2. Symbol Definitions

Appendix D1 and appendix D2 include inconsistent use of symbol definitions for the measured bone-dry weight and moisture content values. DOE is proposing to add the symbol definition for bone-dry weight ( $W_{\text{bonedry}}$ ) to section 3.4.1 of both appendices, where it is first referenced. DOE is proposing to change the symbol definitions for moisture content of the wet test load (currently  $W_w$ ) and moisture content of the dry test load (currently  $W_d$ ) to  $MC_w$  and  $MC_d$ , respectively, to better differentiate these percentage values from  $W_{\text{bonedry}}$ , which is a weight value. Similarly, DOE also proposes to add the symbol definitions  $MC_w$  and  $MC_d$  to sections 3.4.2 and 3.4.3, respectively, where they are first referenced in both appendix D1 and appendix D2. These revised symbol definitions would also be updated throughout section 4 of both appendices in each calculation in which they are used. The addition and revision of these symbol definitions will more readily provide an understanding of the measured values associated with each of these symbols, as well as improve the readability of subsequent sections of the test procedures where these symbols are referenced.

## 3. Removal of Duplicate Instructions for Test Load Preparation

Sections 2.7.1 and 2.7.2 of both appendix D1 and appendix D2 include duplicative instructions for preparing a damp test load before loading. DOE is proposing to remove this duplication by creating one new section that defines the test load sizes and one new section that describes test load preparation. For both appendices, the revised section 2.7.1 would include a table showing the required test loads for standard-size and

compact-size clothes dryers, in addition to the requirement that each test load must consist of energy test cloths and no more than five energy stuffer cloths. For both appendices, the revised section 2.7.2 would provide the procedure for dampening the test load. These amendments would not change the conduct of the test procedure for either appendix D1 or appendix D2, but would provide improved readability of the test procedures.

#### 4. Typographical Errors

DOE proposes to correct the following typographical errors in appendix D1 and appendix D2:

Sections 1.5 and 2.6 of appendix D1 and sections 1.6, 2.7.1, and 2.7.2 of appendix D2 use the term “test clothes,” where “test cloths” should be used instead. Section 1.16 of appendix D2 misspells the term “classification” in the definition of “off mode.”

Section 2.4.1 of both appendix D1 and appendix D2 contain section numbering errors. Currently, section 2.4.1 is titled *Weighing scale for test cloth* and includes specifications for the scale used to weigh the test loads, and the section that follows is incorrectly numbered as 2.4.1.2 *Weighing scale for drum capacity measurements*. DOE is proposing to correct this in both appendix D1 and appendix D2 by inserting a new title section 2.4.1 *Weighing scales* and renumbering existing section 2.4.1 *Weighing scale for test cloth* as 2.4.1.1.

The calculation of the total per-cycle electric dryer energy consumption in section 4.1 of appendix D1 references an undefined symbol “ $E_{tt}$ ”, which should instead be “ $E_t$ ”, the total energy consumed during the test cycle as recorded in section 3.4.5 of appendix D1. The word “for” is also missing from the wording of the 1.04 field use factor.

In addition, section 4.3 of both appendix D1 and appendix D2 reference the symbol “E<sub>ge</sub>”, which should instead be “E<sub>gg</sub>”, the calculated gas dryer gas energy consumption per cycle.

## 5. Removal of Obsolete Provisions

Section 1.14 of appendix D1 and section 1.15 of appendix D2 provide a definition for “moisture sensing control”<sup>38</sup>; similarly, section 1.18 of appendix D1 and section 1.19 of appendix D2 provide a definition for “temperature sensing control.”<sup>39</sup> Both of these definitions are obsolete, having been incorporated into a broader term “automatic termination control”<sup>40</sup> in section 1.4 of both appendices as part of the January 2011 final rule. 76 FR 972, 978. In addition, the terms “moisture sensing control” and “temperature sensing control” are not referenced anywhere else within appendix D1 or appendix D2. DOE therefore proposes removing these definitions from both appendices and renumbering the subsequent sections of the test procedure accordingly.

Section 3.5 of appendix D2 describes the application of a field use factor for clothes dryers with automatic termination controls. In the August 2013 Final Rule, DOE eliminated the field use factor in appendix D2 for automatic termination control dryers, in conjunction with new procedures that directly measure any over-drying energy consumption of automatic termination control dryers. 78 FR 49608, 49611. In the

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<sup>38</sup> “Moisture sensing control” is defined as a system which utilizes a moisture sensing element within the dryer drum that monitors the amount of moisture in the clothes and automatically terminates the dryer cycle.

<sup>39</sup> “Temperature sensing control” is defined as a system which monitors dryer exhaust air temperature and automatically terminates the dryer cycle.

<sup>40</sup> “Automatic termination control” is defined as a dryer control system with a sensor which monitors either the dryer load temperature or its moisture content and with a controller which automatically terminates the drying process. A mark, detent, or other visual indicator or detent which indicates a preferred automatic termination control setting must be present if the dryer is to be classified as having an “automatic termination control.” A mark is a visible single control setting on one or more dryer controls.

August 2013 final rule, DOE erroneously omitted regulatory language to remove the obsolete section 3.5 of appendix D2. DOE therefore proposes to remove section 3.5 of appendix D2, and to adjust the numbering of subsequent sections accordingly.

Section 4.7 of both appendix D1 and appendix D2 provides the equation for calculating EF. DOE's energy conservation standards for clothes dryers were based on EF for clothes dryers manufactured on or after May 14, 1994 and before January 1, 2015. However, as of January 1, 2015, clothes dryer energy conservation standards are based on the CEF metric. Similarly, DOE's certification reporting requirements for clothes dryers at 10 CFR 429.21(b)(2) require reporting CEF when using appendix D1 or appendix D2; EF was required only when using appendix D, which is now obsolete. Furthermore, ENERGY STAR qualification is based on the CEF metric. DOE is not aware of any current regulatory programs or criteria that use the EF metric. Therefore, DOE is proposing to remove the obsolete calculation of EF in section 4.7 of both appendix D1 and appendix D2, and renumbering the subsequent sections of the test procedures accordingly, and removing EF as a measure of energy consumption described at 10 CFR 430.23(d)(2).

DOE requests comment on any potential unintended consequences of its proposals regarding minor typographical corrections and formatting modifications.

#### L. Removing Obsolete Appendix D

DOE is proposing to remove appendix D from 10 CFR part 430 since this version of the test procedure is no longer used. DOE is also proposing to remove the references to appendix D from 10 CFR 430.23(d), as well as in the clothes dryer certification reporting requirements in 10 CFR 429.21(b)(2).

DOE requests comment on its proposal to remove appendix D and all associated references throughout 10 CFR 429.21 and 10 CFR 430.23(d).

#### M. Compliance Date

EPCA prescribes that all representations of energy efficiency and energy use, including those made on marketing materials and product labels, must be made in accordance with an amended test procedure, beginning 180 days after publication of such a test procedure final rule in the *Federal Register*. (42 U.S.C. 6293(c)(2)) If DOE were to publish an amended test procedure for clothes dryers, EPCA provides an allowance for individual manufacturers to petition DOE for an extension of the 180-day period if the manufacturer may experience undue hardship in meeting the 180-day deadline. (42 U.S.C. 6293(c)(3)) To receive such an extension, petitions must be filed with DOE no later than 60 days before the end of the 180-day period and must detail how the manufacturer will experience undue hardship. (*Id.*)

In addition, DOE proposes to amend the introductory note in both appendix D1 and appendix D2 to remove reference to the optional early use of the test procedures before the compliance date of the current clothes dryer energy conservation standards, which was January 1, 2015. DOE proposes to specify that manufacturers may use either appendix D1 or appendix D2 to determine compliance with energy conservation standards for clothes dryers.

#### N. Test Procedure Costs, Harmonization, and Other Topics

##### 1. Test Procedure Costs and Impact

EPCA requires that test procedures proposed by DOE not be unduly burdensome to conduct. In this NOPR, DOE proposes a number of amendments to both appendix D1

and appendix D2. As described previously in this document, the use of appendix D2 is optional. The current energy conservation standards for clothes dryers were developed based on results obtained using appendix D1. In the analysis that follows, DOE considers only the impacts to testing under appendix D1. Although DOE has initially determined that the proposed amendments to appendix D2 would not impact costs, if adopted, DOE would consider any such impacts at such time that appendix D2 becomes required for use, such as for demonstrating compliance with an amended energy conservation standard that is based on test results generated using appendix D2, should such an amendment be adopted.

None of the proposed amendments to appendix D1 would impact the scope of the test procedure (*i.e.*, the proposal would not require manufacturers to test clothes dryers that are not already required to be tested). Additionally, DOE has initially determined that none of the proposed amendments would require manufacturers to re-test or re-certify any existing models on the market that have been tested and certified using appendix D1.

Based on the discussion that follows, DOE has tentatively determined that these proposed amendments to the clothes dryer test procedures would not be unduly burdensome for manufacturers to conduct.

DOE requests comment on its initial determination that there would be no impact or costs to clothes dryer manufacturers under the proposed amendments to appendix D1 and appendix D2.

a. Maintaining Hourly Btu Rating for Gas Clothes Dryers

DOE proposes to specify the order of adjustment, from least burdensome to most burdensome, for the three types of adjustments that can be made to maintain the required heat input rate for natural gas and propane clothes dryers. As described, this proposed amendment is generally consistent with industry practice. To the extent that any deviations from this order may occur in practice, the additional direction provided by the proposed amendments would not require any manufacturers to retest or re-certify any basic models currently on the market, because the net result of maintaining the hourly Btu rating within  $\pm 5$  percent of the rated value would not change; therefore, drying performance would not be impacted in comparison to results obtained under the current test procedures.

b. Final RMC Requirement

DOE proposes to explicitly specify that any second test run using the highest dryness level setting must result in a final RMC of 2 percent or less for the test to be considered valid. This amendment impacts only appendix D2, and therefore would have no impact on testing under appendix D1. As described, this amendment reflects the current practice of manufacturers and test laboratories, and therefore would not impact the cost of testing.

c. Additional Amendments

DOE has initially determined that the remainder of the amendments proposed in this NOPR would not impact test costs.

DOE proposes to provide additional direction on the dryness level setting for clothes dryers that provide an even number of discrete dryness settings. This amendment

impacts only appendix D2, and therefore would have no impact on testing under appendix D1.

DOE proposes revisions regarding the measurement and accounting of standby mode and off mode power. DOE has initially determined that these proposed revisions would potentially reduce testing costs for third-party laboratories, as the proposal would not require any disassembly of a clothes dryer to determine the appropriate application of the test procedure. However, DOE has not quantified the potential reduction in testing cost.

DOE proposes a variety of formatting and typographical corrections to both appendix D1 and appendix D2. These edits would remove confusion that may result from the errors and improve the readability of the test procedures.

DOE proposes amendments to 10 CFR 430.23(d) to include instructions for calculating estimated annual operating cost, CEF, and other useful metrics using appendix D2. These metrics are based on calculations using results generated under testing according to appendix D2, so no additional testing would be required. DOE estimates that the total cost of these calculations would be negligible for manufacturers.

Manufacturers would be able to rely on data generated under the current test procedure, should any of these additional proposed amendments be finalized.

## 2. Harmonization with Industry Standards

The test procedures for clothes dryers in appendix D1 and appendix D2 incorporate by reference AHAM HLD-1-2009, “Household Tumble Type Clothes Dryers,” (which was later certified as ANSI/AHAM HLD-1-2010) and IEC Standard 62301. Specifically, both appendices reference an exhaust simulator specified in AHAM

HLD-1-2009 in their test setup instructions, and incorporate IEC Standard 62301, which provides test conditions, testing equipment, and methods for measuring standby mode and off mode power consumption. Appendices D1 and D2 also require the use of AHAM Standard Test Detergent Formula 3 for the procedure for preconditioning the test cloths. DOE has initially determined that the proposed revisions to the standby and off mode power provisions would not change the existing references to industry standards.

Industry standards address cycle selection differently from the DOE test procedure. ANSI/AHAM HLD-1-2010 specifies that the test cycle be run using the maximum temperature setting without allowing the clothes dryer to advance into the cool down period. If the required final moisture content (6 percent) cannot be met using this setting, a new test run must be conducted using a different user-selected setting that will achieve the target final moisture content. IEC Standard 61121 requires that the test cycle for a given load composition be run using the cycle program and settings specified in the manufacturer's instructions to achieve a target final moisture content, which is based on the test load composition. In the absence of any instructions from the manufacturer, or if the specified cycle program and settings do not achieve the required final moisture content, then the test shall be run using a user-selected combination of cycle program and settings that will achieve the required final moisture content.

Because each test method described above specifies a different set of cycle settings and test parameters, the measured efficiency of a clothes dryer may differ depending on which test method is used. As a result, the efficiency measured using these industry test standards may not be directly comparable to the efficiency measured using DOE's test procedure, on which the energy conservation standards are based.

DOE requests comment on the benefits and burdens of adopting any industry/voluntary consensus-based or other appropriate test procedure, without modification.

### 3. Other Test Procedure Topics

In addition to the issues identified earlier in this document, DOE welcomes comment on any other aspect of the existing test procedure for clothes dryers not already addressed by the specific areas identified in this document. DOE particularly seeks information that would ensure that the test procedure measures the energy use of the clothes dryer during a representative use cycle or period of use, as well as information that would help DOE create a procedure that is not unduly burdensome to conduct. Comments regarding repeatability and reproducibility are also welcome.

DOE also requests information that would help DOE create procedures that would limit manufacturer test burden through streamlining or simplifying testing requirements. In particular, DOE notes that under Executive Order 13771, “Reducing Regulation and Controlling Regulatory Costs,” Executive Branch agencies such as DOE must manage the costs associated with the imposition of expenditures required to comply with Federal regulations. See 82 FR 9339 (Feb. 3, 2017) (Executive Order 13771 “Reducing Regulation and Controlling Regulatory Costs”). Consistent with that Executive Order, DOE encourages the public to provide input on measures DOE could take to lower the cost of its regulations applicable to clothes dryers consistent with the requirements of EPCA.

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

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

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

##### **B. Review Under Executive Order 13771 and 13777**

On January 30, 2017, the President issued Executive Order (“E.O.”) 13771, “Reducing Regulation and Controlling Regulatory Costs.” E.O. 13771 stated the policy of the executive branch is to be prudent and financially responsible in the expenditure of funds, from both public and private sources. E.O. 13771 stated it is essential to manage the costs associated with the governmental imposition of private expenditures required to comply with Federal regulations.

Additionally, on February 24, 2017, the President issued E.O. 13777, “Enforcing the Regulatory Reform Agenda.” E.O. 13777 required the head of each agency designate an agency official as its Regulatory Reform Officer (“RRO”). Each RRO oversees the implementation of regulatory reform initiatives and policies to ensure that agencies effectively carry out regulatory reforms, consistent with applicable law. Further, E.O. 13777 requires the establishment of a regulatory task force at each agency. The regulatory task force is required to make recommendations to the agency head regarding the repeal, replacement, or modification of existing regulations, consistent with

applicable law. At a minimum, each regulatory reform task force must attempt to identify regulations that:

- (i) Eliminate jobs, or inhibit job creation;
- (ii) Are outdated, unnecessary, or ineffective;
- (iii) Impose costs that exceed benefits;
- (iv) Create a serious inconsistency or otherwise interfere with regulatory reform initiatives and policies;

(v) Are inconsistent with the requirements of Information Quality Act, or the guidance issued pursuant to that Act, in particular those regulations that rely in whole or in part on data, information, or methods that are not publicly available or that are insufficiently transparent to meet the standard for reproducibility; or

(vi) Derive from or implement Executive Orders or other Presidential directives that have been subsequently rescinded or substantially modified.

DOE initially concludes that this rulemaking, as described in Sections II and III of the preamble, is consistent with the directives set forth in these executive orders. DOE has initially determined that the proposed rule would not yield any costs or costs savings. Therefore, if finalized as proposed, this rule is expected to be an E.O. 13771 other action.

#### C. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis (“IRFA”) for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, “Proper Consideration of Small Entities in Agency

Rulemaking,” 67 FR 53461 (Aug. 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the DOE rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel’s website: <http://energy.gov/gc/office-general-counsel>.

DOE reviewed this proposed rule under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. DOE has tentatively concluded that this proposed rule will not have a significant impact on a substantial number of small entities. The factual basis for this determination is as follows:

The Small Business Administration (“SBA”) considers a business entity to be a small business, if, together with its affiliates, it employs less than a threshold number of workers or earns less than the average annual receipts specified in 13 CFR part 121. The threshold values set forth in these regulations use size standards and codes established by the North American Industry Classification System (“NAICS”) that are available at: <https://www.sba.gov/document/support--table-size-standards>. The threshold number for NAICS classification code 335220, major household appliance manufacturing, which includes clothes dryer manufacturers, is 1,500 employees.

Most of the manufacturers supplying clothes dryers are large multinational corporations. DOE collected data from DOE’s compliance certification database<sup>41</sup> and surveyed the AHAM member directory to identify manufacturers of clothes dryers. DOE then consulted publicly-available data, purchased company reports from vendors such as

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<sup>41</sup> <http://www.regulations.doe.gov/certification-data> (Last accessed February 2, 2019).

Dun and Bradstreet, and contacted manufacturers, where needed, to determine if they meet the SBA's definition of a "small business manufacturing facility" and have their manufacturing facilities located within the United States. Based on this analysis, DOE did not identify any small businesses that manufacture clothes dryers covered by the proposed test procedure amendments.

Additionally, as described in section III.N.1 of this document, the amendments proposed in this test procedure would not increase costs to clothes dryer manufacturers. Therefore, DOE tentatively concludes that the impacts of the test procedure amendments proposed in this NOPR would not have a "significant economic impact on a substantial number of small entities," and that the preparation of an IRFA is not warranted. DOE will transmit the certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the Small Business Administration for review under 5 U.S.C. 605(b).

DOE requests comment on its findings that there are no small businesses that manufacture clothes dryers in the United States, and on DOE's conclusion that the rule would not increase costs to clothes dryer manufacturers.

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

Manufacturers of clothes dryers must certify to DOE that their products comply with any applicable energy conservation standards. To certify compliance, manufacturers must first obtain test data for their products according to the DOE test procedures, including any amendments adopted for those test procedures. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including clothes dryers. (See generally 10 CFR

part 429.) The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (“PRA”). This requirement has been approved by OMB under OMB control number 1910-1400. Public reporting burden for the certification is estimated to average 35 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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

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

DOE is analyzing this proposed regulation in accordance with the National Environmental Policy Act of 1969 (NEPA) and DOE’s NEPA implementing regulations (10 CFR part 1021). DOE’s regulations include a categorical exclusion for rulemakings interpreting or amending an existing rule or regulation that does not change the environmental effect of the rule or regulation being amended. 10 CFR part 1021, Subpart D, Appendix A5. DOE anticipates that this rulemaking qualifies for categorical exclusion A5 because it is an interpretive rulemaking that does not change the environmental effect of the rule and otherwise meets the requirements for application of a categorical exclusion. See 10 CFR 1021.410. DOE will complete its NEPA review before issuing the final rule.

#### F. Review Under Executive Order 13132

Executive Order 13132, “Federalism,” 64 FR 43255 (Aug. 4, 1999) imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this proposed rule and has determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the products that are the subject of this proposed rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297(d)) No further action is required by Executive Order 13132.

#### G. Review Under Executive Order 12988

Regarding the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, “Civil Justice Reform,” 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following

requirements: (1) eliminate drafting errors and ambiguity, (2) write regulations to minimize litigation, (3) provide a clear legal standard for affected conduct rather than a general standard, and (4) promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation (1) clearly specifies the preemptive effect, if any, (2) clearly specifies any effect on existing Federal law or regulation, (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction, (4) specifies the retroactive effect, if any, (5) adequately defines key terms, and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, the proposed rule meets the relevant standards of Executive Order 12988.

#### H. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (“UMRA”) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of \$100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the

resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed “significant intergovernmental mandate,” and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820; also available at <http://energy.gov/gc/office-general-counsel>. DOE examined this proposed rule according to UMRA and its statement of policy and determined that the rule contains neither an intergovernmental mandate, nor a mandate that may result in the expenditure of \$100 million or more in any year, so these requirements do not apply.

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

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

#### J. Review Under Executive Order 12630

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

#### K. Review Under Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed this proposed rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

#### L. Review Under Executive Order 13211

Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OMB, a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

The proposed regulatory action to amend the test procedure for measuring the energy efficiency of clothes dryers is not a significant regulatory action under Executive

Order 12866. Moreover, it would not have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as a significant energy action by the Administrator of OIRA. Therefore, it is not a significant energy action, and, accordingly, DOE has not prepared a Statement of Energy Effects.

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

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91; 42 U.S.C. 7101), DOE must comply with section 32 of the Federal Energy Administration Act of 1974, as amended by the Federal Energy Administration Authorization Act of 1977. (15 U.S.C. 788; FEAA) Section 32 essentially provides in relevant part that, where a proposed rule authorizes or requires use of commercial standards, the notice of proposed rulemaking must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Attorney General and the Chairman of the Federal Trade Commission (“FTC”) concerning the impact of the commercial or industry standards on competition.

DOE is not proposing to require the use of any new commercial standards in this NOPR, so these requirements do not apply.

### **V. Public Participation**

#### A. Participation in the Webinar

The time and date of the webinar are listed in the **DATES** section at the beginning of this document. If no participants register for the webinar then it will be cancelled. Webinar registration information, participant instructions, and information about the capabilities available to webinar participants will be published on DOE’s website:  
*[https://www1.eere.energy.gov/buildings/appliance\\_standards/standards.aspx?productid](https://www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid)*

=50&action=viewlive. Participants are responsible for ensuring their systems are compatible with the webinar software.

Additionally, you may request an in-person meeting to be held prior to the close of the request period provided in the **DATES** section of this document. Requests for an in-person meeting may be made by contacting Appliance and Equipment Standards Program staff at (202) 287-1445 or by email:

*Appliance\_Standards\_Public\_Meetings@ee.doe.gov.*

#### B. Submission of Comments

DOE invites all interested parties to submit in writing by **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**, comments and information on matters addressed in this notice and on other matters relevant to DOE's consideration of amended test procedures for clothes dryers.

Submitting comments via *http://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.

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

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

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

address. The cover letter will not be publicly viewable as long as it does not include any comments.

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

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

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

Confidential Business Information. According to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery/courier two well-marked copies: one copy of the document marked confidential including all the information believed to be confidential, and one copy of the document marked non-confidential with the information believed to be confidential deleted. Submit these documents via email to *ResClothesDryer2014TP0034@ee.doe.gov* 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).

DOE considers public participation to be a very important part of the process for developing test procedures and energy conservation standards. DOE actively encourages the participation and interaction of the public during the comment period in each stage of this process. Interactions with and between members of the public provide a balanced discussion of the issues and assist DOE in the process. Anyone who wishes to be added to the DOE mailing list to receive future notices and information about this process should contact Appliance and Equipment Standards Program staff at (202) 287-1445 or via e-mail at *ApplianceStandardsQuestions@ee.doe.gov*.

### C. Issues on Which DOE Seeks Comment

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

- 1) To ensure that the test procedure measures energy use during a representative average use cycle or period of use, DOE continues to seek consumer usage data (*e.g.*, load composition and sizes, cycle selections, RMC, cycles per year) that are representative of the entire United States over the course of a year. DOE requests data on how frequently consumers select different cycle programs, temperature settings, dryness settings, and other settings that could impact energy use (*e.g.*, “eco mode”). DOE seeks data on representative load compositions (materials, fabric, weave, *etc.*) and sizes, as well as the corresponding cycle selections chosen by consumers for each particular load. DOE also seeks consumer usage data on initial RMC and consumer-acceptable final RMC levels for varying load compositions/sizes and cycle selections.
- 2) DOE seeks comment on whether requiring the drying temperature setting to be set to the maximum, if it can be chosen independently of the program, is representative of the energy use of the clothes dryer during a representative use cycle or period of use, or whether a lower temperature setting would meet this statutory criterion. DOE also seeks comment on whether a 2-percent final RMC under DOE test conditions is representative of the energy use during an average use cycle or period of use for clothes dryers with automatic

termination controls, or whether a different RMC meets this statutory criterion; and on whether any other test conditions should be revised so that the test procedure meets the applicable EPCA requirements.

- 3) DOE seeks comment on the proposal to specify that units with network capabilities be tested with the network-connected functions in the “off” position and on the issues presented in the September 2018 RFI as they may be applicable to clothes dryers.
- 4) DOE requests feedback on its characterization of connected clothes dryers currently on the market. Specifically, DOE requests input on the types of features or functionality enabled by connected clothes dryers that exist on the market or that are under development.
- 5) DOE requests data on the percentage of users purchasing connected clothes dryers, and, for those users, the percentage of the time when the connected functionality of the clothes dryer is used.
- 6) DOE requests feedback on the types of impacts that should be included in any future assessments of features associated with connected clothes dryers.
- 7) DOE requests data on the amount of additional or reduced energy use of connected clothes dryers.
- 8) DOE requests data on the pattern of additional or reduced energy use of connected clothes dryers; for example, whether it is constant, periodic, or triggered by the user.

- 9) DOE requests information on any existing testing protocols that account for connected features of clothes dryers, as well as any testing protocols that may be under development within the industry.
- 10) DOE requests comment on its proposal to specify that the order of adjustment for maintaining the hourly Btu rating within specification is as follows: (first) adjust the supply gas pressure, (second) adjust the pressure regulator setpoint, or (third) modify the orifice as necessary.
- 11) DOE requests comments on whether the order of sections within the test procedure reflects the order in which test laboratories perform the test. Specifically, DOE requests comments on whether performing the standby mode and off mode testing after the active mode testing reflects current practice by test laboratories.
- 12) DOE requests comments on its proposal to amend the methods for measuring inactive mode and off mode power consumption of clothes dryers.
- 13) DOE requests comments on its proposal to specify explicitly that any second test run using the highest dryness level setting must result in a final RMC of 2 percent or less for the test to be considered valid, and its proposal to amend the nomenclature of sections 4.1 through 4.4 of appendix D2 to clarify that the measured energy consumption represented by  $E_{ce}$ ,  $E_{ge}$ ,  $E_{gg}$ , and  $E_{cg}$ , respectively, reflects the energy required to achieve a final RMC of 2 percent or less. DOE also requests comment on whether a different final RMC would more appropriately represent the consumer-acceptable end point of an average use cycle.

- 14) DOE requests comment on its proposal to specify the dryness setting for clothes dryers that provide an even number of discrete dryness settings that can be chosen independently of the program.
- 15) DOE requests comment on its proposal to allow for calculating each useful measure of energy consumption in 10 CFR 430.23(d) using appendix D2, to accommodate clothes dryers that are optionally tested using appendix D2. DOE also requests comment on its proposal to include a new method for calculating estimated annual energy use of a clothes dryer.
- 16) DOE requests comment on the appropriateness of its proposed rounding requirements of all numeric reported values and estimated annual operating cost for clothes dryers.
- 17) DOE requests comment on any potential unintended consequences of its proposals regarding minor typographical corrections and formatting modifications.
- 18) DOE requests comment on its proposal to remove appendix D and all associated references throughout 10 CFR 429.21 and 10 CFR 430.23(d).
- 19) DOE requests comment on its initial determination that there would be no impact or costs to clothes dryer manufacturers under the proposed amendments to appendix D1 and appendix D2.
- 20) DOE requests comment on the benefits and burdens of adopting any industry/voluntary consensus-based or other appropriate test procedure, without modification.

21) In addition to the issues identified earlier in this document, DOE welcomes comment on any other aspect of the existing test procedure for clothes dryers not already addressed by the specific areas identified in this document. DOE particularly seeks information that would ensure that the test procedure measures the energy use of the clothes dryer during a representative use cycle or period of use, as well as information that would help DOE create a procedure that is not unduly burdensome to conduct. Comments regarding repeatability and reproducibility are also welcome.

22) DOE also requests information that would help DOE create procedures that would limit manufacturer test burden through streamlining or simplifying testing requirements. In particular, DOE notes that under Executive Order 13771, “Reducing Regulation and Controlling Regulatory Costs,” Executive Branch agencies such as DOE must manage the costs associated with the imposition of expenditures required to comply with Federal regulations. See 82 FR 9339 (Feb. 3, 2017) (Executive Order 13771 “Reducing Regulation and Controlling Regulatory Costs”). Consistent with that Executive Order, DOE encourages the public to provide input on measures DOE could take to lower the cost of its regulations applicable to clothes dryers consistent with the requirements of EPCA.

23) DOE requests comment on its findings that there are no small businesses that manufacture clothes dryers in the United States, and on DOE’s conclusion that the rule would not increase costs to clothes dryer manufacturers.

## **VI. Approval of the Office of the Secretary**

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

### **List of Subjects**

#### **10 CFR Part 429**

Administrative practice and procedure, Confidential business information, Energy conservation, Household appliances, Reporting and recordkeeping requirements.

#### **10 CFR Part 430**

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

Signed in Washington, DC, on June 28, 2019.

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Alexander N. Fitzsimmons  
Acting Deputy Assistant Secretary for Energy  
Efficiency  
Energy Efficiency and Renewable Energy

For the reasons stated in the preamble, DOE is proposing to amend parts 429 and 430 of Chapter II of Title 10, Code of Federal Regulations as follows:

**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; 28 U.S.C. 2461 note.

2. Section 429.21 is amended by:
  - a. Revising paragraph (b)(2); and
  - b. Adding paragraph (c).

The revision and addition read as follows:

**§ 429.21 Residential clothes dryers.**

\* \* \* \* \*

(b) \* \* \*

(2) Pursuant to §429.12(b)(13), a certification report shall include the following public product-specific information: when using appendix D1, the combined energy factor in pounds per kilowatt hours (lb/kWh), the capacity in cubic feet (cu ft), the voltage in volts (V) (for electric dryers only), an indication if the dryer has automatic termination controls, and the hourly Btu rating of the burner (for gas dryers only); when using appendix D2, the combined energy factor in pounds per kilowatt hours (lb/kWh), the capacity in cubic feet (cu ft), the voltage in volts (V) (for electric dryers only), an indication if the dryer has automatic termination controls, the hourly Btu rating of the

burner (for gas dryers only), and a list of the cycle setting selections for the energy test cycle as recorded in section 3.4.7 of appendix D2 to subpart B of part 430.

(c) *Reported values.* Values reported pursuant to this section must be rounded as follows: CEF to the nearest 0.01 lb/kWh, capacity to the nearest 0.1 cu ft, voltage to the nearest V, and hourly Btu rating to the nearest Btu.

**PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS**

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

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

4. Section 430.23 is amended by revising paragraph (d) to read as follows:

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

\* \* \* \* \*

(d) *Clothes dryers.* (1) The estimated annual energy consumption for clothes dryers, expressed in kilowatt-hours per year, is the product of 283 cycles per year and the per-cycle combined total energy consumption in kilowatt-hours per cycle, determined according to section 4.6 of appendix D1 or section 4.6 of appendix D2 to this subpart, as appropriate.

(2) The estimated annual operating cost for clothes dryers shall be—

(i) For an electric clothes dryer, the product of the following three factors, with the resulting product then being rounded off to the nearest dollar per year:

(A) 283 cycles per year,

(B) The per-cycle combined total energy consumption in kilowatt-hours per cycle, determined according to section 4.6 of appendix D1 or section 4.6 of appendix D2 to this subpart, as appropriate, and

(C) The representative average unit cost of electrical energy in dollars per kilowatt-hour as provided by the Secretary; and

(ii) For a gas clothes dryer, the product of 283 cycles per year times the sum of the following three factors, with the resulting product then being rounded off to the nearest dollar per year:

(A) The product of the per-cycle gas dryer electric energy consumption in kilowatt-hours per cycle, determined according to section 4.2 of appendix D1 or section 4.2 of appendix D2 to this subpart, as appropriate, times the representative average unit cost of electrical energy in dollars per kilowatt-hour as provided by the Secretary, plus,

(B) The product of the per-cycle gas dryer gas energy consumption, in Btus per cycle, determined according to section 4.3 of appendix D1 or section 4.3 of appendix D2 to this subpart, as appropriate, times the representative average unit cost for natural gas or propane, as appropriate, in dollars per Btu as provided by the Secretary, plus,

(C) The product of the per-cycle standby mode and off mode energy consumption in kilowatt-hours per cycle, determined according to section 4.5 of appendix D1 or section 4.5 of appendix D2 to this subpart, as appropriate, times the representative average unit cost of electrical energy in dollars per kilowatt-hour as provided by the Secretary.

(3) The combined energy factor, expressed in pounds per kilowatt-hour is determined in accordance with section 4.7 of appendix D1 or section 4.7 of appendix D2

to this subpart, as appropriate, the result then being rounded off to the nearest hundredth (0.01).

(4) Other useful measures of energy consumption for clothes dryers shall be those measures of energy consumption for clothes dryers which the Secretary determines are likely to assist consumers in making purchasing decisions and which are derived from the application of appendix D1 or appendix D2 to this subpart, as appropriate.

\* \* \* \* \*

#### **Appendix D to Subpart B of Part 430—[Removed]**

5. Appendix D to subpart B of part 430 is removed.
6. Appendix D1 to subpart B of part 430 is amended by:
  - a. Revising the introductory note;
  - b. In section 1.5, removing the word “clothes” and adding in its place “cloths”;
  - c. Removing sections 1.7, 1.14, and 1.18;
  - d. Redesignating sections 1.8 through 1.13 as 1.7 through 1.12, sections 1.15 through 1.17 as 1.13 through 1.15, and section 1.19 as 1.17;
  - e. Adding new section 1.16;
  - f. Revising the first sentence of section 2.1.1;
  - g. Revising the first sentence of section 2.1.3;
  - h. Revising sections 2.1.2, 2.3.2.1, 2.3.2.2, 2.7.1, 2.7.2 and 2.8.1;
  - i. Adding new section 2.3.2.3;
  - j. Redesignating section 2.4.1 as 2.4.1.1;
  - k. Adding new section 2.4.1;
  - l. In section 2.6, removing the word “clothes” and adding in its place “cloths”;

m. In section 3.1, in the last sentence, adding the text “to the nearest 0.1 cubic foot” following “is calculated”;

n. Revising sections 3.3, 3.4.1, 3.4.2, 3.4.3, 3.6, 3.6.1 and 3.6.2;

o. Adding new sections 3.6.3 and 3.6.4;

p. Revising sections 4.1, 4.2, 4.3, and 4.5;

q. Removing section 4.7; and

r. Redesignating section 4.8 as 4.7.

The revisions and additions read as follows:

**APPENDIX D1 to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Clothes Dryers**

Note: The procedures in either appendix D1 or appendix D2 may be used to determine compliance with energy conservation standards for clothes dryers. Manufacturers must use a single appendix for all representations, including certifications of compliance, and may not use appendix D1 for certain representations and appendix D2 for other representations.

\* \* \* \* \*

1.16 “Vented clothes dryer” means a clothes dryer that exhausts the evaporated moisture from the cabinet.

\* \* \* \* \*

2.1.1 *All clothes dryers.* For both vented clothes dryers and ventless clothes dryers, install the clothes dryer in accordance with manufacturer's instructions as shipped with the unit.\* \* \*

2.1.2 *Vented clothes dryers.* For vented clothes dryers, the dryer exhaust shall be restricted by adding the AHAM exhaust simulator described in section 3.3.5.1 of AHAM HLD-1 (incorporated by reference; see §430.3).

2.1.3 *Ventless clothes dryers.* For ventless clothes dryers, the dryer shall be tested without the AHAM exhaust simulator.       \*       \*       \*

\*       \*       \*       \*       \*

2.3.2.1 *Natural gas supply.* Maintain the gas supply to the clothes dryer immediately ahead of all controls at a pressure of 7 to 10 inches of water column. The natural gas supplied should have a heating value of approximately 1,025 Btus per standard cubic foot. The actual heating value,  $H_n$ , in Btus per standard cubic foot, for the natural gas to be used in the test shall be obtained either from measurements using a standard continuous flow calorimeter as described in section 2.4.6 of this appendix or by the purchase of bottled natural gas whose Btu rating is certified to be at least as accurate a rating as could be obtained from measurements with a standard continuous flow calorimeter as described in section 2.4.6 of this appendix.

2.3.2.2. *Propane gas supply.* Maintain the gas supply to the clothes dryer immediately ahead of all controls at a pressure of 11 to 13 inches of water column. The propane gas supplied should have a heating value of approximately 2,500 Btus per standard cubic foot. The actual heating value,  $H_p$ , in Btus per standard cubic foot, for the propane gas to be used in the test shall be obtained either from measurements using a standard continuous flow calorimeter as described in section 2.4.6 of this appendix or by the purchase of bottled gas whose Btu rating is certified to be at least as accurate a rating as

could be obtained from measurement with a standard continuous calorimeter as described in section 2.4.6 of this appendix.

2.3.2.3. *Hourly Btu Rating.* Maintain the hourly Btu rating of the burner within  $\pm 5$  percent of the rating specified by the manufacturer. If the hourly Btu rating of the burner cannot be maintained within  $\pm 5$  percent of the rating specified by the manufacturer, make adjustments in the following order until an hourly Btu rating of the burner within  $\pm 5$  percent of the rating specified by the manufacturer is achieved:

- (1) Modify the gas inlet supply pressure within the allowable range specified in section 2.3.2.1 or 2.3.2.2 of this appendix, as applicable;
- (2) If the clothes dryer is equipped with a gas pressure regulator, modify the outlet pressure of the gas pressure regulator within  $\pm 10$  percent of the value recommended by the manufacturer in the installation manual, on the nameplate sticker, or wherever the manufacturer makes such a recommendation for the basic model; and
- (3) Modify the orifice as necessary to achieve the required hourly Btu rating.

\* \* \* \* \*

#### 2.4.1 *Weighing scales.*

\* \* \* \* \*

2.7.1 *Load size.* Determine the load size for the unit under test, according to Table 1.

**Table 1—Test Loads**

Unit Under Test	Test Load (Bone Dry Weight)
Standard size clothes dryer	8.45 pounds $\pm$ .085 pounds
Compact size clothes dryer	3.00 pounds $\pm$ .03 pounds

Each test load must consist of energy test cloths and no more than five energy stuffer

cloths.

2.7.2 *Test load preparation.* Dampen the load by agitating it in water whose temperature is  $60\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$  and consists of 0 to 17 parts per million hardness for approximately 2 minutes in order to saturate the fabric. Then, extract water from the wet test load by spinning the load until the moisture content of the load is between 54.0-61.0 percent of the bone-dry weight of the test load.

\* \* \* \* \*

2.8.1 *Vented clothes dryers.* For vented clothes dryers, before any test cycle, operate the dryer without a test load in the non-heat mode for 15 minutes or until the discharge air temperature is varying less than  $1\text{ }^{\circ}\text{F}$  for 10 minutes—whichever is longer—in the test installation location with the ambient conditions within the specified test condition tolerances of section 2.2 of this appendix.

\* \* \* \* \*

3.3 *Test cycle.* Operate the clothes dryer at the maximum temperature setting and, if equipped with a timer, at the maximum time setting. Any other optional cycle settings that do not affect the temperature or time settings shall be tested in the as-shipped position, except that if the clothes dryer has network capabilities, the network settings must be disabled throughout testing. If the clothes dryer does not have a separate temperature setting selection on the control panel, the maximum time setting should be used for the drying test cycle. Dry the load until the moisture content of the test load is between 2.5 and 5.0 percent of the bone-dry weight of the test load, at which point the test cycle is stopped, but do not permit the dryer to advance into cool down. If required, reset the timer to increase the length of the drying cycle. After stopping the test cycle,

remove and weigh the test load. The clothes dryer shall not be stopped intermittently in the middle of the test cycle for any reason. Record the data specified by section 3.4 of this appendix. If the dryer automatically stops during a cycle because the condensation box is full of water, the test is stopped, and the test run is invalid, in which case the condensation box shall be emptied and the test re-run from the beginning. For ventless clothes dryers, during the time between two cycles, the door of the dryer shall be closed except for loading and unloading.

\* \* \* \* \*

3.4.1 Bone-dry weight of the test load,  $W_{\text{bonedry}}$ , as described in section 2.7.1 of this appendix.

3.4.2 Moisture content of the wet test load before the test,  $MC_w$ , as described in section 2.7.2 of this appendix.

3.4.3 Moisture content of the dry test load obtained after the test,  $MC_d$ , as described in section 3.3 of this appendix.

\* \* \* \* \*

3.6 *Standby mode and off mode power.* Connect the clothes dryer to a watt meter as specified in section 2.4.7 of this appendix. Establish the testing conditions set forth in section 2 of this appendix.

3.6.1 Perform standby mode and off mode testing after completion of an active mode drying cycle included as part of the test cycle; after removing the test load; without changing the control panel settings used for the active mode drying cycle; with the door closed; and without disconnecting the electrical energy supply to the clothes dryer between completion of the active mode drying cycle and the start of standby mode and

off mode testing.

3.6.2 For clothes dryers that take some time to automatically enter a stable inactive mode or off mode 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 clothes dryer to automatically reach the default inactive/off mode state before proceeding with the test measurement.

3.6.3 Once the stable inactive/off mode state has been reached, measure and record the default inactive/off mode power,  $P_{\text{default}}$ , in watts, following the test procedure for the sampling method specified in Section 5, Paragraph 5.3.2 of IEC 62301 (Second Edition) (incorporated by reference; see §430.3).

3.6.4 For a clothes dryer with a switch (or other means) that can be optionally selected by the end user to achieve a lower-power inactive/off mode state than the default inactive/off mode state measured in section 3.6.3 of this appendix, after performing the measurement in section 3.6.3 of this appendix, activate the switch (or other means) to the position resulting in the lowest power consumption and repeat the measurement procedure described in section 3.6.3 of this appendix. Measure and record the lowest inactive/off mode power,  $P_{\text{lowest}}$ , in watts.

\* \* \* \* \*

4.1 *Total per-cycle electric dryer energy consumption.* Calculate the total electric dryer energy consumption per cycle,  $E_{\text{ce}}$ , expressed in kilowatt-hours per cycle and defined as:

$$E_{\text{ce}} = [53.5 / (\text{MC}_w - \text{MC}_d)] \times E_t \times \text{field use},$$

Where:

$E_t$  = the energy recorded in section 3.4.5 of this appendix.

53.5 = an experimentally established value for the percent reduction in the moisture content of the test load during a laboratory test cycle expressed as a percent.

field use = field use factor,

= 1.18 for clothes dryers with time termination control systems only without any automatic termination control functions.

= 1.04 for clothes dryers with automatic control systems that meet the requirements of the definition for automatic termination control in section 1.4 of this appendix, including those that also have a supplementary timer control, or that may also be manually controlled.

$MC_w$  = the moisture content of the wet test load as recorded in section 3.4.2 of this appendix.

$MC_d$  = the moisture content of the dry test load as recorded in section 3.4.3 of this appendix.

*4.2 Per-cycle gas dryer electrical energy consumption.* Calculate the gas dryer electrical energy consumption per cycle,  $E_{ge}$ , expressed in kilowatt-hours per cycle and defined as:

$$E_{ge} = [53.5/(MC_w - MC_d)] \times E_{te} \times \text{field use},$$

Where:

$E_{te}$  = the energy recorded in section 3.4.6.1 of this appendix.

field use, 53.5,  $MC_w$ , and  $MC_d$  as defined in section 4.1 of this appendix.

*4.3 Per-cycle gas dryer gas energy consumption.* Calculate the gas dryer gas energy consumption per cycle,  $E_{gg}$ , expressed in Btus per cycle and defined as:

$$E_{gg} = [53.5/(MC_w - MC_d)] \times E_{tg} \times \text{field use} \times \text{GEF}$$

Where:

$E_{tg}$  = the energy recorded in section 3.4.6.2 of this appendix.

GEF = corrected gas heat value (Btu per cubic feet) as defined in section 3.4.6.3 of this appendix.

field use, 53.5,  $MC_w$ , and  $MC_d$  as defined in section 4.1 of this appendix.

\* \* \* \* \*

4.5 *Per-cycle standby mode and off mode energy consumption.* Calculate the clothes dryer per-cycle standby mode and off mode energy consumption,  $E_{TSO}$ , expressed in kilowatt-hours per cycle and defined as:

$$E_{TSO} = [(P_{\text{default}} \times S_{\text{default}}) + (P_{\text{lowest}} \times S_{\text{lowest}})] \times K/283$$

Where:

$P_{\text{default}}$  = Default inactive/off mode power, in watts, as measured in section 3.6.3 of this appendix.

$P_{\text{lowest}}$  = Lowest inactive/off mode power, in watts, as measured in section 3.6.4 of this appendix for clothes dryer with a switch (or other means) that can be optionally selected by the end user to achieve a lower-power inactive/off mode than the default inactive/off mode; otherwise,  $P_{\text{lowest}}=0$ .

$S_{\text{default}}$  = Annual hours in default inactive/off mode, defined as 8,620 if no optional lowest-power inactive/off mode is available; otherwise 4,310.

$S_{\text{lowest}}$  = Annual hours in lowest-power inactive/off mode, defined as 0 if no optional lowest-power inactive/off mode is available; otherwise 4,310.

K = Conversion factor of watt-hours to kilowatt-hours = 0.001.

283 = Representative average number of clothes dryer cycles in a year.

8,620 = Combined annual hours for inactive and off mode.

4,310 = One-half of the combined annual hours for inactive and off mode.

\* \* \* \* \*

7. Appendix D2 to subpart B of part 430 is amended by:

- a. Revising the introductory note;
- b. In section 1.6, removing the word “clothes” and adding in its place “cloths”;
- c. Removing sections 1.8, 1.15, and 1.19;
- d. Redesignating sections 1.9 through 1.14 as 1.8 through 1.13, sections 1.16 through 1.18 as 1.14 through 1.16, section 1.20 as 1.17, and section 1.21 as 1.19;
- e. Adding new section 1.18;
- f. In newly redesignated section 1.14, removing the word “clasification” and adding in its place “classification”;
- g. Revising the first sentence of section 2.1.1;
- h. Revising the first sentence of section 2.1.3;
- i. Revising sections 2.1.2, 2.3.2.1, 2.3.2.2, 2.7.1, 2.7.2, and 2.8.1;
- j. Adding new section 2.3.2.3;
- k. Redesignating, section 2.4.1 as 2.4.1.1;
- l. Adding new section 2.4.1;
- m. In section 3.1, in the last sentence, adding the text “to the nearest 0.1 cubic foot” following “is calculated”;
- n. Revising sections 3.3.1, 3.3.2, and 3.4.1, 3.4.2 and 3.4.3;
- o. Removing section 3.5;
- p. Redesignating sections 3.6, 3.6.1, and 3.6.2 as 3.5, 3.5.1, and 3.5.2,

respectively;

- q. Revising newly redesignated sections 3.5, 3.5.1, 3.5.2;
- r. Adding new sections 3.5.3 and 3.5.4;
- s. Revising sections 4.1, 4.2, 4.3, 4.4 and 4.5;
- t. Removing section 4.7; and
- u. Redesignating section 4.8 as 4.7.

The revisions and additions read as follows:

**APPENDIX D2 to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Clothes Dryer**

Note: The procedures in either appendix D1 or appendix D2 may be used to determine compliance with energy conservation standards for clothes dryers. Manufacturers must use a single appendix for all representations, including certifications of compliance, and may not use appendix D1 for certain representations and appendix D2 for other representations.

\* \* \* \* \*

1.18 “Vented clothes dryer” means a clothes dryer that exhausts the evaporated moisture from the cabinet.

\* \* \* \* \*

2.1.1 *All clothes dryers.* For both vented clothes dryers and ventless clothes dryers, install the clothes dryer in accordance with manufacturer's instructions as shipped with the unit.

\* \* \*

2.1.2 *Vented clothes dryers.* For vented clothes dryers, the dryer exhaust shall be restricted by adding the AHAM exhaust simulator described in section 3.3.5.1 of AHAM HLD-1 (incorporated by reference; see §430.3).

2.1.3 *Ventless clothes dryers.* For ventless clothes dryers, the dryer shall be tested without the AHAM exhaust simulator.\* \* \*

\* \* \* \* \*

2.3.2.1 *Natural gas supply.* Maintain the gas supply to the clothes dryer immediately ahead of all controls at a pressure of 7 to 10 inches of water column. The natural gas supplied should have a heating value of approximately 1,025 Btus per standard cubic foot. The actual heating value,  $H_n$ , in Btus per standard cubic foot, for the natural gas to be used in the test shall be obtained either from measurements using a standard continuous flow calorimeter as described in section 2.4.6 of this appendix or by the purchase of bottled natural gas whose Btu rating is certified to be at least as accurate a rating as could be obtained from measurements with a standard continuous flow calorimeter as described in section 2.4.6 of this appendix.

2.3.2.2. *Propane gas supply.* Maintain the gas supply to the clothes dryer immediately ahead of all controls at a pressure of 11 to 13 inches of water column. The propane gas supplied should have a heating value of approximately 2,500 Btus per standard cubic foot. The actual heating value,  $H_p$ , in Btus per standard cubic foot, for the propane gas to be used in the test shall be obtained either from measurements using a standard continuous flow calorimeter as described in section 2.4.6 of this appendix or by the purchase of bottled gas whose Btu rating is certified to be at least as accurate a rating as

could be obtained from measurement with a standard continuous calorimeter as described in section 2.4.6 of this appendix.

2.3.2.3. *Hourly Btu Rating.* Maintain the hourly Btu rating of the burner within  $\pm 5$  percent of the rating specified by the manufacturer. If the hourly Btu rating of the burner cannot be maintained within  $\pm 5$  percent of the rating specified by the manufacturer, make adjustments in the following order until an hourly Btu rating of the burner within  $\pm 5$  percent of the rating specified by the manufacturer is achieved:

- (1) Modify the gas inlet supply pressure within the allowable range specified in section 2.3.2.1 or 2.3.2.2 of this appendix, as applicable;
- (2) If the clothes dryer is equipped with a gas pressure regulator, modify the outlet pressure of the gas pressure regulator within  $\pm 10$  percent of the value recommended by the manufacturer in the installation manual, on the nameplate sticker, or wherever the manufacturer makes such a recommendation for the basic model; and
- (3) Modify the orifice as necessary to achieve the required hourly Btu rating.

\* \* \* \* \*

2.4.1 *Weighing scales.*

\* \* \* \* \*

2.7.1 *Load size.* Determine the load size for the unit under test, according to Table 1.

**Table 1—Test Loads**

Unit under Test	Test Load (bone dry weight)
Standard size clothes dryer	8.45 pounds $\pm$ .085 pounds
Compact size clothes dryer	3.00 pounds $\pm$ .03 pounds

Each test load must consist of energy test cloths and no more than five energy stuffer cloths.

2.7.2 *Test load preparation.* Dampen the load by agitating it in water whose temperature is  $60\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$  and consists of 0 to 17 parts per million hardness for approximately 2 minutes to saturate the fabric. Then, extract water from the wet test load by spinning the load until the moisture content of the load is between 52.5 and 57.5 percent of the bone-dry weight of the test load. Make a final mass adjustment, such that the moisture content is 57.5 percent  $\pm 0.33$  percent by adding water uniformly distributed among all of the test cloths in a very fine spray using a spray bottle.

\* \* \* \* \*

2.8.1 *Vented clothes dryers.* For vented clothes dryers, before any test cycle, operate the dryer without a test load in the non-heat mode for 15 minutes or until the discharge air temperature is varying less than  $1\text{ }^{\circ}\text{F}$  for 10 minutes—whichever is longer—in the test installation location with the ambient conditions within the specified test condition tolerances of section 2.2 of this appendix.

\* \* \* \* \*

3.3.1 *Timer dryers.* For timer dryers, operate the clothes dryer at the maximum temperature setting and, if equipped with a timer, at the maximum time setting. Any other optional cycle settings that do not affect the temperature or time settings shall be tested in the as-shipped position, except that if the clothes dryer has network capabilities, the network settings must be disabled throughout testing. If the clothes dryer does not have a separate temperature setting selection on the control panel, the maximum time setting should be used for the drying test cycle. Dry the load until the moisture content of the test

load is between 1 and 2.5 percent of the bone-dry weight of the test load, at which point the test cycle is stopped, but do not permit the dryer to advance into cool down. If required, reset the timer to increase the length of the drying cycle. After stopping the test cycle, remove and weigh the test load. The clothes dryer shall not be stopped intermittently in the middle of the test cycle for any reason. Record the data specified by section 3.4 of this appendix. If the dryer automatically stops during a cycle because the condensation box is full of water, the test is stopped, and the test run is invalid, in which case the condensation box shall be emptied and the test re-run from the beginning. For ventless clothes dryers, during the time between two cycles, the door of the dryer shall be closed except for loading and unloading.

*3.3.2 Automatic termination control dryers.* For automatic termination control dryers, a “normal” program shall be selected for the test cycle. For dryers that do not have a “normal” program, the cycle recommended by the manufacturer for drying cotton or linen clothes shall be selected. Where the drying temperature setting can be chosen independently of the program, it shall be set to the maximum. Where the dryness level setting can be chosen independently of the program, it shall be set to the “normal” or “medium” dryness level setting. If such designation is not provided, then the dryness level shall be set at the mid-point between the minimum and maximum settings. If an even number of discrete settings are provided, use the next-highest setting above the midpoint, in the direction of the maximum dryness setting [or lowest setting below the midpoint, in the direction of the minimum dryness setting]. Any other optional cycle settings that do not affect the program, temperature or dryness settings shall be tested in

the as-shipped position, except that if the clothes dryer has network capabilities, the network settings must be disabled throughout testing.

Operate the clothes dryer until the completion of the programmed cycle, including the cool down period. The cycle shall be considered complete when the dryer indicates to the user that the cycle has finished (by means of a display, indicator light, audible signal, or other signal) and the heater and drum/fan motor shuts off for the final time. If the clothes dryer is equipped with a wrinkle prevention mode (*i.e.*, that continuously or intermittently tumbles the clothes dryer drum after the clothes dryer indicates to the user that the cycle has finished) that is activated by default in the as-shipped position or if manufacturers' instructions specify that the feature is recommended to be activated for normal use, the cycle shall be considered complete after the end of the wrinkle prevention mode. After the completion of the test cycle, remove and weigh the test load. Record the data specified in section 3.4 of this appendix. If the final moisture content is greater than 2 percent, the results from the test are invalid and a second run must be conducted. Conduct the second run of the test on the unit using the highest dryness level setting. If, on this second run, the dryer does not achieve a final moisture content of 2 percent or lower, the dryer has not sufficiently dried the clothes and the test results may not be used for certification of compliance with energy conservation standards. If the dryer automatically stops during a cycle because the condensation box is full of water, the test is stopped, and the test run is invalid, in which case the condensation box shall be emptied and the test re-run from the beginning. For ventless clothes dryers, during the time between two cycles, the door of the dryer shall be closed except for loading and unloading.

\* \* \* \* \*

3.4.1 Bone-dry weight of the test load,  $W_{\text{bonedry}}$ , as described in section 2.7.1 of this appendix.

3.4.2 Moisture content of the wet test load before the test,  $MC_w$ , as described in section 2.7.2 of this appendix.

3.4.3 Moisture content of the dry test load obtained after the test,  $MC_d$ , as described in section 3.3 of this appendix.

\* \* \* \* \*

3.5 *Standby mode and off mode power.* Connect the clothes dryer to a watt meter as specified in section 2.4.7 of this appendix. Establish the testing conditions set forth in section 2 of this appendix.

3.5.1 Perform standby mode and off mode testing after completion of an active mode drying cycle included as part of the test cycle; after removing the test load; without changing the control panel settings used for the active mode drying cycle; with the door closed; and without disconnecting the electrical energy supply to the clothes dryer between completion of the active mode drying cycle and the start of standby mode and off mode testing.

3.5.2 For clothes dryers that take some time to automatically enter a stable inactive mode or off mode 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 clothes dryer to automatically reach the default inactive/off mode state before proceeding with the test measurement.

3.5.3 Once the stable inactive/off mode state has been reached, measure and record the default inactive/off mode power,  $P_{\text{default}}$ , in watts, following the test procedure for the

sampling method specified in Section 5, Paragraph 5.3.2 of IEC 62301 (Second Edition) (incorporated by reference; see §430.3).

3.5.4 For a clothes dryer with a switch (or other means) that can be optionally selected by the end user to achieve a lower-power inactive/off mode state than the default inactive/off mode state measured in section 3.5.3 of this appendix, after performing the measurement in section 3.5.3 of this appendix, activate the switch (or other means) to the position resulting in the lowest power consumption and repeat the measurement procedure described in section 3.5.3 of this appendix. Measure and record the lowest inactive/off mode power,  $P_{\text{lowest}}$ , in watts.

\* \* \* \* \*

4.1 *Total per-cycle electric dryer energy consumption.* Calculate the total per-cycle electric dryer energy consumption required to achieve a final moisture content of 2 percent or less,  $E_{\text{ce}}$ , expressed in kilowatt-hours per cycle and defined as:

$$E_{\text{ce}} = E_{\text{t}},$$

for automatic termination control dryers, and,

$$E_{\text{ce}} = [55.5 / (\text{MC}_{\text{w}} - \text{MC}_{\text{d}})] \times E_{\text{t}} \times \text{field use},$$

for timer dryers

*Where:*

55.5 = an experimentally established value for the percent reduction in the moisture content of the test load during a laboratory test cycle expressed as a percent.

$E_{\text{t}}$  = the energy recorded in section 3.4.5 of this appendix.

field use = 1.18, the field use factor for clothes dryers with time termination control systems only without any automatic termination control functions.

$MC_w$  = the moisture content of the wet test load as recorded in section 3.4.2 of this appendix.

$MC_d$  = the moisture content of the dry test load as recorded in section 3.4.3 of this appendix.

4.2 *Per-cycle gas dryer electrical energy consumption.* Calculate the per-cycle gas dryer electrical energy consumption required to achieve a final moisture content of 2 percent or less,  $E_{ge}$ , expressed in kilowatt-hours per cycle and defined as:

$$E_{ge} = E_{te},$$

for automatic termination control dryers, and,

$$E_{ge} = [55.5/(MC_w - MC_d)] \times E_{te} \times \text{field use},$$

for timer dryers

Where:

$E_{te}$  = the energy recorded in section 3.4.6.1 of this appendix.

field use, 55.5,  $MC_w$ , and  $MC_d$  as defined in section 4.1 of this appendix.

4.3 *Per-cycle gas dryer gas energy consumption.* Calculate the per-cycle gas dryer gas energy consumption required to achieve a final moisture content of 2 percent or less,  $E_{gg}$ , expressed in Btus per cycle and defined as:

$$E_{gg} = E_{tg} \times \text{GEF}$$

for automatic termination control dryers, and,

$$E_{gg} = [55.5/(MC_w - MC_d)] \times E_{tg} \times \text{field use} \times \text{GEF}$$

for timer dryers

Where:

$E_{tg}$  = the energy recorded in section 3.4.6.2 of this appendix.

GEF = corrected gas heat value (Btu per cubic foot) as defined in section 3.4.6.3 of this appendix,

field use,  $55.5$ ,  $MC_w$ , and  $MC_d$  as defined in section 4.1 of this appendix.

*4.4 Total per-cycle gas dryer energy consumption expressed in kilowatt-hours.* Calculate the total per-cycle gas dryer energy consumption required to achieve a final moisture content of 2 percent or less,  $E_{cg}$ , expressed in kilowatt-hours per cycle and defined as:

$$E_{cg} = E_{ge} + (E_{gg}/3412 \text{ Btu/kWh})$$

Where:

$E_{ge}$  = the energy calculated in section 4.2 of this appendix

$E_{gg}$  = the energy calculated in section 4.3 of this appendix

*4.5 Per-cycle standby mode and off mode energy consumption.* Calculate the clothes dryer per-cycle standby mode and off mode energy consumption,  $E_{TSO}$ , expressed in kilowatt-hours per cycle and defined as:

$$E_{TSO} = [(P_{\text{default}} \times S_{\text{default}}) + (P_{\text{lowest}} \times S_{\text{lowest}})] \times K/283$$

Where:

$P_{\text{default}}$  = Default inactive/off mode power, in watts, as measured in section 3.5.3 of this appendix.

$P_{\text{lowest}}$  = Lowest inactive/off mode power, in watts, as measured in section 3.5.4 of this appendix for clothes dryer with a switch (or other means) that can be optionally selected by the end user to achieve a lower-power inactive/off mode than the default inactive/off mode; otherwise,  $P_{\text{lowest}}=0$ .

$S_{\text{default}}$  = Annual hours in default inactive/off mode, defined as 8,620 if no optional lowest-power inactive/off mode is available; otherwise 4,310.

$S_{\text{lowest}}$  = Annual hours in lowest-power inactive/off mode, defined as 0 if no optional lowest-power inactive/off mode is available; otherwise 4,310.

K = Conversion factor of watt-hours to kilowatt-hours = 0.001.

283 = Representative average number of clothes dryer cycles in a year.

8,620 = Combined annual hours for inactive and off mode.

4,310 = One-half of the combined annual hours for inactive and off mode.

\* \* \* \* \*

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