DEPARTMENT OF ENERGY

10 CFR Parts 429 and 430

[EERE–2019–BT–TP–0026]

RIN 1904–AE60

Energy Conservation Program: Test Procedure for Dehumidifiers

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 procedure for dehumidifiers. The proposed amendments would reference the current version of an applicable industry standard; allow the rating test period to be 2 or 6 hours; permit the use of a sampling tree in conjunction with an aspirating psychrometer for testing a dehumidifier with a single process air intake grille; and specify for dehumidifiers with network capabilities that all network functions must be disabled throughout testing. DOE is seeking comment from interested parties on the proposal.

DATES:

Comments: DOE will accept comments, data, and information regarding this proposal no later than August 8, 2022. See section V, ''Public Participation,'' for details.

Meeting: DOE will hold a webinar on Tuesday, July 12, 2022, from 1:00 p.m. to 4:00 p.m. See section V, ''Public Participation,'' for webinar registration information, participant instructions, and information about the capabilities available to webinar participants.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *www.regulations.gov,* under docket number EERE–2019–BT–TP–0026. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments by email to *Dehumidifier2019TP0026@ee.doe.gov.* Include docket number EERE–2019–BT–TP–0026 in the subject line of the message. No telefacsimiles (''faxes'') will be accepted. For detailed instructions on submitting comments and additional information on this process, see section V of this document.

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including postal mail and hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing coronavirus 2019 (''COVID–19'') pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. If a commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 287–1445 to discuss the need for alternative arrangements. Once the COVID–19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

Docket: The docket, which includes **Federal Register** notices, public meeting attendee lists and transcripts (if a public meeting is held), comments, and other supporting documents/materials, is available for review at *www.regulations.gov.* All documents in the docket are listed in the *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 *www.regulations.gov/docket?D=EERE-2019-BT-TP-0026.* The docket web page contains instructions on how to access all documents, including public comments, in the docket. See section V for information on how to submit comments through *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. Email *ApplianceStandardsQuestions@ee.doe.gov.*

Mr. Pete Cochran, U.S. Department of Energy, Office of the General Counsel, GC–33, 1000 Independence Avenue SW, Washington, DC 20585–0121. Telephone: (202) 586–9496. Email: *Peter.Cochran@hq.doe.gov.*

For further information on how to submit a comment, review other public comments and the docket, or participate in a public meeting, contact the Appliance and Equipment Standards Program staff at (202) 287–1445 or by email: *ApplianceStandardsQuestions@ee.doe.gov.*

SUPPLEMENTARY INFORMATION: DOE proposes to maintain previously approved incorporations by reference for ANSI/AMCA 210, ANSI/ASHRAE 41.1 and IEC 62301, and incorporate by reference the following industry standard into part 430:

Association of Home Appliance Manufacturers (''AHAM'') Standard DH–1–2017, ''Dehumidifiers,'' (''AHAM DH–1–2017'').

Copies of AHAM DH–1–2017 can be obtained from the Association of Home Appliance Manufacturers at *www.aham.org/ht/d/Store/.*

For a further discussion of these standards, see section IV.M of this document.

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I. Authority and Background

The Energy Policy and Conservation Act, as amended ("EPCA"),[1] authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) These products include dehumidifiers, the subject of this notice. DOE's energy conservation standards and test procedures for dehumidifiers are currently prescribed at title 10 of the Code of Federal Regulations ("CFR") 430.32(v); and 10 CFR part 430 subpart B appendix X1 ("appendix X1"), respectively. The following sections discuss DOE's authority to establish test procedures for dehumidifiers and relevant background information regarding DOE's consideration of test procedures for this product.

A. Authority

Title III, Part B[2] 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 dehumidifiers, the subject of this document. (42 U.S.C. 6291(34); 42 U.S.C. 6293(b)(13); 42 U.S.C. 6295(cc))

The energy conservation program under EPCA 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), test procedures (42 U.S.C. 6293), labeling provisions (42 U.S.C. 6294), energy conservation standards (42 U.S.C. 6295), and the authority to require information and reports from manufacturers (42 U.S.C. 6296).

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 other 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))

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

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))

EPCA also requires that, at least once every 7 years, DOE evaluate test procedures for each type of covered product, including dehumidifiers, 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 her 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 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. (42 U.S.C. 6293(b)(1)(A)(ii))

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. (42 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[3] and IEC Standard 62087[4] as applicable. (42 U.S.C. 6295(gg)(2)(A))

DOE is publishing this notice of proposed rulemaking ("NOPR") in satisfaction of the 7-year review requirement specified in EPCA. (42 U.S.C. 6293(b)(1)(A))

B. Background

DOE last amended the test procedure for dehumidifiers on July 31, 2015 ("July 2015 Final Rule"), to provide technical clarifications and improve repeatability of the test procedure. 80 FR 45801. The July 2015 Final Rule also established a new test procedure for dehumidifiers at appendix X1 that, among other things, established separate provisions for testing whole-home dehumidifiers. *Id.* Manufacturers were not required to use appendix X1 until the compliance date of a subsequent amendment to the energy conservation standards for dehumidifiers. On June 13, 2016, DOE published a final rule establishing amended energy conservation standards for dehumidifiers, for which compliance was required beginning June 13, 2019. 81 FR 38337.

On June 30, 2021, DOE published in the **Federal Register** an early assessment review request for information ("RFI") ("June 2021 TP RFI") in which it sought data and information regarding issues pertinent to whether an amended test procedure would more accurately or fully comply with the requirement that the test procedure produces results that measure energy use during a representative average use cycle for the product without being unduly burdensome to conduct. 86 FR 34640.

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[1] All references to EPCA in this document refer to the statute as amended through the Infrastructure Investment and Jobs Act, Public Law 117–58 (Nov. 15, 2021).

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

[3] IEC 62301, *Household electrical appliances—Measurement of standby power* (Edition 2.0, 2011–01).

[4] IEC 62087, *Audio, video and related equipment—Methods of measurement for power consumption* (Edition 1.0, Parts 1–6: 2015, Part 7: 2018).

DOE also requested comments on specific topics relevant to the dehumidifier test procedure, including updates to industry test standards, variable-speed dehumidifiers, psychrometer setup, network functions, and ventilation air for whole-home dehumidifiers. *Id.*

DOE received comments in response to the June 2021 TP RFI from the interested parties listed in Table I.1.

TABLE I.1—LIST OF COMMENTERS WITH WRITTEN SUBMISSIONS IN RESPONSE TO THE JUNE 2021 TP RFI

Commenter(s)	Docket document No.	Reference in this NOPR	Commenter type
Association of Home Appliance Manufacturers	3	AHAM	Trade Association.
Aprilaire, a division of Research Products Corporation (''RPC'') [5]	4	Aprilaire	Manufacturer.
Appliance Standards Awareness Project, American Council for an Energy-Efficiency Economy, and Natural Resources Defense Council.	5	Joint Commenters	Efficiency Organizations.
Madison Indoor Air Quality	6	MIAQ	Manufacturer.
Pacific Gas and Electric Company, Southern California Gas Company, Southern California Edison, and San Diego Gas and Electric Company (collectively, the California Investor-Owned Utilities (''IOUs'')).	7	California IOUs	Utility.

A parenthetical reference at the end of a comment quotation or paraphrase provides the location of the item in the public record.[6]

C. Deviation From Appendix A

In accordance with section 3(a) of 10 CFR part 430, subpart C, appendix A (''appendix A''), DOE notes that it is deviating from the provision in appendix A regarding the pre-NOPR stages for a test procedure rulemaking. Section 8(b) of appendix A states that if DOE determines that it is appropriate to continue the test procedure rulemaking after the early assessment process, it will provide further opportunities for early public input through **Federal Register** documents, including notices of data availability and/or RFIs. DOE is opting to deviate from this provision by publishing a NOPR following the early assessment review RFI because, as discussed previously, DOE requested comment on a number of specific topics in the June 2021 TP RFI, and comments received in response to the June 2021 TP RFI informed the proposals included in this NOPR.

II. Synopsis of the Notice of Proposed Rulemaking

In this NOPR, DOE proposes to remove appendix X to subpart B of 10 CFR part 430 ''Uniform Test Method for Measuring the Energy Consumption of Dehumidifiers.'' DOE proposes three changes to accomplish this: (1) amend 10 CFR 429.36 ''Dehumidifiers,'' by removing reporting requirements for dehumidifiers tested using appendix X; (2) amend 10 CFR 430.3 ''Materials incorporated by reference,'' by removing reference to the ENERGY STAR program requirements for dehumidifiers testing using appendix X; (3) amend 10 CFR 430.23 ''Test procedures for the measurement of energy and water consumption,'' by removing instructions for using appendix X in paragraph (z).

In this NOPR, DOE also proposes to amend appendix X1 as follows:

(1) Incorporate by reference the most recent version of the relevant industry test procedure, AHAM DH–1–2017, ''Dehumidifiers;''

(2) Amend the definitions for ''portable dehumidifier'' and ''whole-home dehumidifier'' to reference the manufacturer instructions available to a consumer as they relate to the ducting configuration and installation;

(3) Allow the rating test period in sections 4.1.1, 4.1.2, and 5.4 to be 2 or 6 hours;

(4) Add a provision in section 3.1.1.3 allowing for the use of a sampling tree in conjunction with an aspirating psychrometer for a dehumidifier with a single process air intake grille; and

(5) Add a requirement in section 3.1.2.3 that dehumidifiers with network functions be tested with the network functions in the ''off'' position if it can be disabled by the end-user; otherwise test in the factory default setting.

DOE's proposed actions are summarized in Table II.1 and Table II.2 compared to the current test procedure, as well as the reason for the proposed change.

TABLE II.1—SUMMARY OF CHANGES IN PROPOSED 10 CFR 429.36, 10 CFR 430.3, AND 10 CFR PART 430 SUBPART B RELATIVE TO CURRENT 10 CFR 429.36, 10 CFR 430.3, AND 10 CFR PART 430 SUBPART B

Current 10 CFR 429.36, 10 CFR 430.3, and 10 CFR part 430 subpart B	Proposed 10 CFR 429.36, 10 CFR 430.3, and 10 CFR part 430 subpart B	Attribution
10 CFR 429.36 requires manufacturers to provide the energy factor as public product-specific information for dehumidifiers tested in accordance with appendix X and the integrated energy factor for dehumidifiers tested according to appendix X1.	10 CFR 429.36 provides public product-specific information requirements for dehumidifiers tested in accordance with appendix X1 only.	Improve clarity of certification requirements.
10 CFR 430.3(m)(2) incorporates the ENERGY STAR Program Requirements by reference for appendix X.	10 CFR 430.3(m) omits reference to appendix X	Improve clarity of IBR section.
10 CFR 430.23(z) provides instructions for determining capacity and efficiency using appendix X or appendix X1.	10 CFR 430.23(z) provides instructions for determining capacity and efficiency using appendix X1 only.	Improve clarity of test procedure.
Subpart B contains appendix X and appendix X1	Subpart B contains appendix X1 only	Improve clarity of test procedure.

[5] DOE also received a request from Aprilaire to extend the comment period of the June 2021 TP RFI. (Docket No. EERE–2019–BT–TP–0026–0002) DOE declined to extend the comment period because the June 2021 TP RFI was a preliminary assessment and if DOE determined to initiate a rulemaking, DOE would provide additional opportunity for comment.

[6] The parenthetical reference provides a reference for information located in the docket of DOE's rulemaking to develop test procedures for dehumidifiers. (Docket No. EERE–2019–BT–TP–0026, which is maintained at *www.regulations.gov*). The references are arranged as follows: (commenter name, comment docket ID number, page of that document). The *regulations.gov* site appends the docket ID number at the end of a field labeled ID. For example, EERE–2019–BT–TP–0026–0002 has a docket ID of 2.

TABLE II.2—SUMMARY OF CHANGES IN PROPOSED TEST PROCEDURE RELATIVE TO CURRENT TEST PROCEDURE

Current DOE test procedure	Proposed test procedure	Attribution
Incorporates by reference American National Standards Institute (''ANSI'')/AHAM DH–1–2008.	Incorporates by reference AHAM DH–1–2017	Updated industry test method.
Defines ''portable dehumidifier'' and ''whole-home dehumidifier'' based on their designed purpose.	Defines ''portable dehumidifier'' and ''whole-home dehumidifier'' by reference to the manufacturer instruction as they relate to the ducting configuration and installation.	Improve clarity of definitions.
Does not allow for the use of a sampling tree for a dehumidifier with a single process air intake grille.	Adds provision to allow for the use of a sampling tree in conjunction with an aspirating psychrometer for a dehumidifier with a single process air intake grille.	Improve test procedure repeatability and reproducibility.
Requires a dehumidification mode rating test period of 6 hours ..	Allows two options for the length of dehumidification mode rating test period: 2 or 6 hours.	Reduce test burden while maintaining representativeness.
Does not explicitly address dehumidifiers with network functions	Adds a requirement to test dehumidifiers that offer network functions with the network functions in the ''off'' position if it can be disabled by the end-user; otherwise test in the factory default setting.	Ensure test procedure reproducibility.

DOE has tentatively determined that the proposed amendments described in section III of this NOPR would not alter the measured efficiency of dehumidifiers, or require retesting or recertification solely as a result of DOE's adoption of the proposed amendments to the test procedures, if made final. Additionally, DOE has tentatively determined that the proposed amendments, if made final, would not increase the cost of testing. Discussion of DOE's proposed actions are addressed in detail in section III of this NOPR.

III. Discussion

In the following sections, DOE proposes certain amendments to its test procedures for dehumidifiers. For each proposed amendment, DOE provides relevant background information, explains why the amendment merits consideration, discusses relevant public comments, and proposes a potential approach.

A. General Comments

In response to the June 2021 TP RFI, DOE received comments from AHAM and MIAQ regarding the timing of the rulemaking process, specifically the importance of completing the test procedure rulemaking before the standards rulemaking begins. (AHAM, No. 3 at p. 3; MIAQ, No. 6 at p. 9) AHAM further stated that when DOE does not finish a test procedure rulemaking before the relevant standards rulemaking begins in earnest, DOE and stakeholders' time and efforts are wasted, the rulemaking process is complicated, and the overall rulemaking process is slowed. (AHAM, No. 3 at p. 3) MIAQ stated that this order is essential, as it lends to a more thorough review of the minimum levels via full understanding of the test procedure. (MIAQ, No. 6 at p. 9)

On June 4, 2021, DOE published an early assessment RFI to determine whether to amend applicable energy conservation standards for dehumidifiers. 86 FR 29964. (''June 2021 Standards RFI'') DOE requested data and information to help determine whether DOE should propose a ''no-new-standard'' determination. In particular, DOE asked for information showing a more stringent standard (a) would not result in a significant savings of energy, (b) is not technologically feasible, (c) is not economically justified, or any combination of the above. 86 FR 29964. DOE continues to evaluate the comments received and whether to propose amended energy conservation standards. As discussed later in this NOPR, DOE has tentatively determined that the changes proposed in this document would not impact the measured efficiency of a dehumidifier, were DOE to finalize the amendments as proposed.

In response to the June 2021 TP RFI, MIAQ also reiterated its comment to the June 2021 Standards RFI regarding its concern about any reduction in test requirements or energy conservation standards for smaller capacity dehumidifiers. MIAQ expressed its understanding that units they have identified as consumer product dehumidifiers are typically less expensive products purchased through retailers, and that homeowners may opt to purchase multiple portable dehumidifiers to meet their latent load requirements instead of a single whole-home or crawlspace dehumidifier. MIAQ stated that this may lead to significant increases in energy consumption. MIAQ further stated that a balanced requirement for efficiency and testing procedures could reduce this waste. (MIAQ, No. No 6 at p. 9)

DOE notes that issues regarding minimum efficiency requirements would be addressed in an energy conservation standards rulemaking for dehumidifiers, were DOE to publish such proposal. As for reduced test requirements, DOE notes that, as required in 42 U.S.C. 6293(b)(3), any new or amended test procedure shall be reasonably designed to measure energy use during a representative average use cycle and shall not be unduly burdensome to conduct. DOE also notes that the July 2015 Final Rule discusses the representativeness and test burden considerations associated with the current test procedure for portable and whole-home dehumidifiers. 80 FR 45801, 45810–45812.

B. Scope of Applicability and Definitions

EPCA defines a dehumidifier as a self-contained, electrically operated, and mechanically encased assembly consisting of (1) a refrigerated surface (evaporator) that condenses moisture from the atmosphere; (2) a refrigerating system, including an electric motor; (3) an air-circulating fan; and (4) a means for collecting or disposing of the condensate. (42 U.S.C. 6291(34)) In the July 2015 Final Rule, DOE codified a regulatory definition of ''dehumidifier'' that clarified the definition by excluding products that may provide condensate removal or latent heat removal as a secondary function. 80 FR 45801, 45805. DOE therefore adopted a definition that explicitly excludes portable air conditioners, room air conditioners, and packaged terminal air conditioners, because these are products that may provide condensate removal or latent heat removal as a secondary function. As codified at 10 CFR 430.2, DOE defines ''dehumidifier'' as:

A product, other than a portable air conditioner, room air conditioner, or packaged terminal air conditioner, that is a self-contained, electrically operated, and mechanically encased assembly consisting of—

(1) A refrigerated surface (evaporator) that condenses moisture from the atmosphere;

(2) A refrigerating system, including an electric motor;

(3) An air-circulating fan; and

(4) A means for collecting or disposing of the condensate.

Consumer products meeting this definition are subject to DOE's regulations for testing, certifying, and complying with energy conservation standards.

In the July 2015 Final Rule, DOE established definitions for two groups of dehumidifiers: ''portable dehumidifiers'' and ''whole-home dehumidifiers.'' 80 FR 45801, 45805. A ''portable dehumidifier'' is a dehumidifier designed to operate within the dehumidified space without ducting (although means may be provided for optional duct attachment). 10 CFR 430.2. A ''whole-home dehumidifier'' is a dehumidifier designed to be installed with ducting to deliver return process air to its inlet and dehumidified process air to one or more locations in the dehumidified space. *Id.* The July 2015 Final Rule also established a definition for ''refrigerant-desiccant dehumidifier'' to mean a whole-home dehumidifier that removes moisture from the process air by means of a desiccant material in addition to a refrigeration system. *Id.*

In the June 2021 TP RFI, DOE sought comment on whether (1) the current definitions of ''dehumidifier,'' ''portable dehumidifier,'' and ''whole-home dehumidifier'' require amendment, and if so, how the terms should be defined; and (2) the existing product definitions in 10 CFR 430.2 for dehumidifiers require amendments to distinguish further between portable and whole-home units. If so, DOE also sought information on what identifying characteristics may be included in potential amended definitions to differentiate better between the two configurations. 86 FR 34640, 34641–34642.

In response to the June 2021 TP RFI, MIAQ stated that the current definitions of ''dehumidifier,'' ''portable dehumidifier,'' and ''whole-home dehumidifier'' should be amended to refine the classification of these units. MIAQ further stated that, without proper classification, it is difficult for the dehumidifier and heating, ventilation, and air-conditioning (''HVAC'') industry and associated regulatory entities to determine which regulations apply to their products and that additional clarity in the definitions of different dehumidification products would allow test conditions and regulations to be refined for each product type.

MIAQ recommended amending the definition of ''dehumidifier'' by specifying in the introductory paragraph that a dehumidifier is ''designed primarily for the purpose of removing moisture from the air.'' (MIAQ, No. 6 at p. 2)

MIAQ asserted that a packaged (unitary) air conditioner is a unit that meets enumerated criteria in the definition, (1)–(4), but is built for the purpose of cooling the air, not primarily removing moisture. MIAQ also asked that DOE consider a definition that includes dehumidifiers with external heat rejection, which MIAQ described as units that provide cool, dry air like an air conditioner, except the focus is on obtaining the proper level of dehumidification first and cooling is a by-product of the process. (MIAQ, No. 6 at p. 3)

As stated in the July 2015 Final Rule, the primary function of an air conditioner is to provide cooling by removing both sensible and latent heat, whereas a dehumidifier is intended to remove only latent heat. 80 FR 45801, 45804. Accordingly, DOE explicitly excluded from the definition portable air conditioners, room air conditioners, and packaged terminal air conditioners. These explicit exclusions include the unitary air conditioning products of concern to MIAQ. Any other non-dehumidifier product on the market that would meet the definition of ''dehumidifier'' is already explicitly excluded. Accordingly, DOE tentatively finds that the explicit exclusions in the regulatory definition of dehumidifier already address MIAQ's concern. Therefore, DOE is not proposing to add exclusions to the dehumidifier definition.

DOE requests comment on (1) its preliminary determination that the explicit exclusions from the definition of ''dehumidifier'' sufficiently distinguish dehumidifiers from consumer products that provide cooling by removing both sensible and latent heat, and (2) whether there are products on the market that are not explicitly excluded from the ''dehumidifier'' definition but should be.

MIAQ also suggested that the definition of ''refrigerant-desiccant dehumidifier'' be expanded to include units that do not include a refrigeration system and specify that such units may include a combustion process or electric resistance heat to regenerate the desiccant. MIAQ recommended replacing the term ''refrigerant-desiccant dehumidifier'' with ''desiccant dehumidifier''.

MIAQ stated that, with the increase of individuals with severe allergies, there is an increased demand for the use of desiccant dehumidifiers like those used in the industrial markets to reduce the relative humidity of dwellings to 40 percent or less. (MIAQ, No. 6 at p. 3)

DOE notes that desiccant dehumidifiers without refrigerant systems are outside of the scope of dehumidifiers as defined by EPCA. As described above, the statutory definition of dehumidifier is limited to units with a refrigerating system. (42 U.S.C. 6291(34)) Therefore, DOE is not proposing to expand the definition of refrigerant-desiccant dehumidifier as suggested by MIAQ. Units that may include a combustion process or electric resistance heat to regenerate the desiccant are covered products if they meet the definition of ''dehumidifier'' or any other covered product or equipment.

MIAQ further suggested replacing the existing term ''portable dehumidifier'' with ''consumer product dehumidifier,'' adding the term ''crawl space dehumidifier,'' and amending the definition of ''whole-home dehumidifier.'' MIAQ recommended defining ''consumer product dehumidifier'' as a dehumidifier that can be purchased by the end-user through retail channels for individual use, is used as a free-standing appliance without the option for ducting; and is not subject to code inspection prior to operation and is controlled by an on-board sensor. MIAQ recommended defining ''crawlspace dehumidifier'' as a dehumidifier designed to operate within the dehumidified space without the attachment of additional ducting, although means may be provided for optional duct attachment; is used in typically unoccupied areas such as a crawlspace or unfinished basement; and is controlled by an on-board sensor or sensor placed in the same space as the dehumidifier. MIAQ recommended amending the definition of ''whole-home dehumidifier'' to mean a dehumidifier designed to be installed with ducting set up to provide process air to the unit's inlet that originates from the dwelling, from outside for ventilation purposes, or a combination of both; the unit is then ducted to supply dehumidified process air from its outlet to one or more locations in the dehumidified space; and the unit will have the capability of being controlled using a remote humidity sensor. (MIAQ, No. 6 at p. 3)

MIAQ asserted that its recommended changes to terminology and definitions would avoid confusion with the use of ''dehumidifier'' or ''residential dehumidifier'' by state and federal regulatory agencies (*e.g.,* U.S. Environmental Protection Agency (''EPA''), California Air Resource Board, State of Washington) when referring to either what MIAQ has recommended to define as ''consumer product dehumidifiers,'' or all dehumidifiers used for residential dwellings. MIAQ further asserted that its suggested terms and definitions would avoid confusion with commercial, industrial, and agricultural dehumidifiers, and would allow a better separation of test conditions applicable to each product's intended use. (MIAQ, No. 6 at pp. 3–4)

The California IOUs encouraged DOE to clarify how the current dehumidifier definitions apply to non-residential dehumidifiers, such as horticultural dehumidifiers. (California IOUs, No. 7 at pp. 1–2)

DOE does not agree with MIAQ's suggested terminology changes. Renaming portable dehumidifiers as ''consumer product dehumidifiers'' as suggested by MIAQ may give the incorrect impression that the other defined dehumidifiers are not consumer products. Further, the justification for delineating ''crawlspace dehumidifiers'' from the other categories of dehumidifiers is unclear. DOE is not aware of any units within the suggested definition of ''crawlspace dehumidifier'' that have physical features that would distinguish such units from ''portable dehumidifiers.'' Moreover, regarding MIAQ's suggestion to base the ''whole-home dehumidifier'' definition on the intended installation location for installing the unit, intent suggests subjectivity. This approach would not only reduce regulatory transparency but also create challenges for enforcement. DOE has previously rejected such an approach in a test procedure final rule for commercial prerinse spray valves published by DOE in the **Federal Register** on March 11, 2022. 87 FR 13901, 13904. Additionally, the test conditions suggested by MIAQ for ''crawlspace dehumidifiers'' are the same as for portable dehumidifiers in appendix X1.

With respect to horticultural dehumidifiers and other dehumidifiers marketed for non-residential applications, DOE notes that dehumidifiers are ''consumer products.'' (*See generally* 42 U.S.C. 6291(2); 42 U.S.C. 6295(a)(1); 42 U.S.C. 6295(cc)) EPCA defines a ''consumer product'' as any article (other than an automobile, as defined in section 32901(a)(3) of title 49) of a type (A) which in operation consumes, or is designed to consume, energy or, with respect to showerheads, faucets, water closets, and urinals, water; and (B) which, to any significant extent, is distributed in commerce for personal use or consumption by individuals; without regard to whether such article of such type is in fact distributed in commerce for personal use or consumption by an individual. (42 U.S.C. 6291(1)) Accordingly, to the extent that a dehumidifier model is of a type distributed in commerce for personal use or use by an individual, it would be within the scope of the dehumidifier test procedure, regardless of how it is marketed and whether the model is distributed for personal or individual use. DOE has published guidance on making ''of a type'' determinations at *www.energy.gov/gc/enforcement-policies-and-statements,* ''Guidance Concerning Consumer/Commercial Distinction''.

A manufacturer may submit a petition to waive any appendix X1 requirements if it believes that its dehumidifier contains one or more design characteristics which either prevent testing of the basic model according to appendix X1 or that appendix X1 evaluates the dehumidifier in a manner so unrepresentative of its true energy and/or water consumption characteristics as to provide materially inaccurate comparative data. 10 CFR 430.27(a). The petition should suggest an alternative method for testing the basic models identified in the waiver. 10 CFR 430.27(b)(1)(iii).

The California IOUs encouraged DOE to clarify how dehumidifiers are categorized by product class and suggested using the distinction between ducted and ductless units to better differentiate the range of products that are available. The California IOUs also requested that DOE clarify the applicability of the appendix X1 test procedure to larger units, commenting that the test procedure in appendix X1 does not limit scope by capacity, but that ANSI/AHAM Standard DH–1–2008, ''Dehumidifiers,'' (''ANSI/AHAM DH–1–2008'') has a capacity limit of 185 pints/day. The California IOUs also recommended that DOE consider addressing steam cabinets, which they described as an emerging product that deodorizes, sanitizes, and dries clothes using heat pump technology and that operates like a portable dehumidifier. (California IOUs, No. 7 at pp. 1–3)

DOE notes that the current definitions for portable and whole-home dehumidifiers already address whether a unit is designed to be installed or operated with or without ducting. As described, a whole-home dehumidifier is defined as a dehumidifier designed to be *installed with ducting* (emphasis added) to deliver return process air to its inlet and to supply dehumidified process air from its outlet to one or more locations in the dehumidified space. By contrast, a portable dehumidifier is defined as a dehumidifier designed to operate within the dehumidified space *without the attachment of additional ducting* (emphasis added), although a means may be provided for optional duct attachment. However, DOE understands that the ''designed to'' wording in these definitions may imply that DOE makes subjective determinations about how a dehumidifier is categorized and may lead to confusion. Therefore, in this NOPR, DOE proposes to change the portable dehumidifier and whole-home dehumidifier definitions to reference manufacturer instructions available to a consumer as they relate to the ducting configuration and installation. DOE proposes to define a portable dehumidifier as a dehumidifier that, in accordance with any manufacturer instructions available to a consumer, operates within the dehumidified space without the attachment of additional ducting, although means may be provided for optional duct attachment. DOE proposes to define a whole-home dehumidifier as a dehumidifier that, in accordance with any manufacturer instructions available to a consumer, operates with ducting to deliver return process air to its inlet and to supply dehumidified process air from its outlet to one or more locations in the dehumidified space.

DOE requests comment on the proposed amended definitions for portable dehumidifier and whole-home dehumidifier.

The applicability of the Federal test procedure is not limited by capacity. DOE acknowledges that ANSI/AHAM DH–1–2008 specifies a capacity limit. While certain provisions of ANSI/AHAM DH–1–2008 have been adopted as part of the Federal test procedure, section 1 of appendix X1 specifies the Federal test procedure must be used to measure the energy performance of dehumidifiers regardless of capacity.

With regard to steam cabinets, these products may use heat pump technology to remove moisture from clothing in an enclosed cabinet, and in some cases, are advertised as capable of removing moisture from the room. To the extent that a steam cabinet, or any product, meets the definition of a dehumidifier, and, in particular, condenses moisture from the atmosphere, DOE would consider it to be a dehumidifier and subject to energy conservation standards. Furthermore, DOE tentatively concludes that steam cabinets that remove moisture from the room can be tested in accordance with the proposed dehumidifier test procedure. If a manufacturer believes that its dehumidifier's performance is not accurately reflected by the test procedure, it is encouraged to provide comment in response to this document and to submit a waiver request containing an alternate test procedure for consideration.

C. Test Procedure

Dehumidifiers are tested in accordance with appendix X1, which adopts certain text provisions from ANSI/AHAM DH–1–2008, with modification. In part, the DOE test procedure specifies a different dry-bulb temperature (65 degrees Fahrenheit (''°F'') for portable dehumidifiers and 73 °F for whole-home dehumidifiers) than ANSI/AHAM DH–1–2008, while still maintaining the relative humidity specified by ANSI/AHAM DH–1–2008, and specifies provisions for inactive, off-cycle, and off mode testing. *See* Sections 4.1.1 and 3.2 of appendix X1. Appendix X1 also includes instructions regarding instrumentation, condensate collection, control settings, setup, and ducting for whole-home dehumidifiers. *See* Sections 3.1.2.2; 3.1.1.4; 3.1.1.5; 3.1.1.1; and 3.1.3 of appendix X1.

Under the current test procedure, a unit's capacity is the volume of water, in pints, the unit removes from the ambient air per day, normalized to a standard ambient temperature and relative humidity. *See* Section 2.14 of appendix X1. The Integrated Energy Factor (''IEF''), representing the efficiency of the unit expressed in liters per kilowatt-hour, is the ratio between the capacity and the combined amount of energy consumed by the unit in dehumidification mode and standby and/or off mode(s), adjusted for the representative number of hours per year spent in each mode. *See* Section 5.4 of appendix X1.

1. Updates to Industry Standards

As discussed, the dehumidifier test procedure at appendix X1 references ANSI/AHAM DH–1–2008, an industry test procedure for dehumidifiers, with modification. In 2017, AHAM published a revision to AHAM DH–1, AHAM DH–1–2017, which established provisions for testing dehumidifier energy use in off-cycle, inactive, and off modes, and for including energy consumption in those modes in efficiency calculations. AHAM DH–1–2017 also added guidance for instrumentation setup, multiple air-intakes, and control settings; lowered a temperature; and tightened tolerances. It lowered the standard dry-bulb temperature condition for dehumidifiers from 80 °F (as in ANSI/AHAM DH–1–2008) to 65 °F (with the required wet-bulb temperature changing accordingly to maintain the same relative humidity) and tightened the maximum allowed variation for dry-bulb and wet-bulb temperature readings from 2.0 °F to 1.0 °F and from 1.0 °F to 0.5 °F, respectively.

In the June 2021 TP RFI, DOE requested comment and information on (1) whether the references to ANSI/AHAM DH–1–2008 at appendix X1 should be updated to the current version, AHAM DH–1–2017; (2) how updating the references in appendix X1 to AHAM DH–1–2017 would impact the measured energy efficiency of dehumidifiers tested under the current DOE test procedure; (3) the reduction of the maximum-allowed temperature variation in AHAM DH–1–2017, the potential test burden increase from this change, and any effects on reliability or reproducibility of results; and (4) whether any modifications to AHAM DH–1–2017, other than modifications consistent with those made to ANSI/AHAM DH–1–2008 in the current DOE test procedure, would be needed to ensure that DOE's test procedure produces results that are representative of an average use cycle and is not unduly burdensome to conduct. 86 FR 34640, 34642.

AHAM stated that it convened a task force to review and evaluate possible revisions to its 2017 test procedure, AHAM DH–1–2017. AHAM further stated that, working with DOE and its contractors, it expects to conduct investigative testing on any changes to the test procedure to ensure that revisions to AHAM DH–1–2017 are supported by test data. AHAM stated that its goal was to have all investigative testing complete and a revised test procedure to share officially with DOE by December 22, 2021, which would be publicly available on AHAM's website. AHAM further stated that it expects the task force will then conduct round robin testing and validation testing to examine repeatability, reproducibility, accuracy, and impact of changes on measured efficiency, which will be used as a basis for finalizing the test procedure in 2022. AHAM encouraged DOE to participate in the process and allow its completion before considering any independent activity on test procedure development, stating that the goal of the process is to create an updated version of AHAM DH–1 that DOE can adopt as the energy test for dehumidifiers. (AHAM, No. 3 at p. 2)

Aprilaire and MIAQ commented in support of the incorporation by reference of AHAM DH–1–2017. (Aprilaire, No. 4 at p. 1; MIAQ, No. 6 at p. 4)

DOE appreciates the efforts underway by AHAM and the task force group members to further consider improvements to the DH–1 test procedure, and to then conduct round-robin and validation testing. DOE notes that on March 30, 2022, the task force released a publicly available draft version of the updated standard, AHAM DH–1–2022,[7] but has not yet finalized the standard. DOE has reviewed the changes to AHAM DH–1–2017 made in the draft and in this NOPR has either proposed to adopt the changes or raised them for comment. If the updated DH–1 is finalized during the course of this rulemaking, DOE would consider adopting that updated version to the extent it is consistent with the discussions presented in this document.

DOE received no comments on the impacts to energy efficiency measured by appendix X1 resulting from the adoption of AHAM DH–1–2017. DOE notes that the modified dry-bulb temperature in AHAM DH–1–2017 aligns the industry test procedure with the dry-bulb temperature already required by appendix X1. DOE tentatively concludes that referencing AHAM DH–1–2017 would not impact the energy efficiency measured by appendix X1. Where applicable, specifically in section 4.2 of appendix X1, DOE also proposes to reference section 9.3.2 of AHAM DH–1–2017 for off-cycle mode test requirements/instructions as AHAM DH–1–2017 reflects the language of appendix X1. *See* section 4.2 of appendix X1.

MIAQ and Aprilaire stated that there would not be an appreciable change in test burden resulting from the tightening of the tolerances required for testing purposes, and Aprilaire further commented that it has not had difficulty achieving these conditions while testing. (MIAQ, No. 6 at pp. 4–6, Aprilaire, No. 4 at p. 1) MIAQ also stated that it believes currently available instrumentation can easily provide the level of accuracy required in AHAM DH–1–2017 and that such a requirement provides performance data at an improved accuracy. (MIAQ, No. 6 at pp. 4–6)

MIAQ suggested changing the wet-bulb temperature measurements and requirements to dewpoint temperature to match the readout of modern instrumentation. MIAQ further stated that this change would capture the variable of greater interest to the dehumidification industry. (MIAQ, No. 6 at p. 6)

DOE is not proposing to amend the test conditions in appendix X1 from

[7] AHAM DH–1–2022 (Dehumidifiers)—DRAFT is available for free on AHAM's website: *www.aham.org/ItemDetail?iProductCode=12022&Category=MADSTD.*

wet-bulb temperature to dewpoint temperature. DOE notes that the latest version of the industry test method, AHAM DH–1–2017, uses wet-bulb temperature. DOE understands the use of wet-bulb temperature in AHAM DH–1–2017 reflects the general consensus of the industry at this time.

DOE requests comment on the proposal to incorporate AHAM DH–1–2017 by reference. DOE requests comment on the proposal not to change specifying ambient conditions based on wet-bulb temperature, as currently specified, as opposed to (or in addition to) dewpoint temperature.

2. Variable-Speed Dehumidifiers

a. Variable-Speed Compressors

In the June 2021 TP RFI, DOE stated that it is aware that dehumidifiers are available on the U.S. market that incorporate variable-speed compressors; *i.e.,* ''variable-speed dehumidifiers.'' 86 FR 34640, 34642. The current test procedure does not specifically account for this technology. A variable-speed compressor can operate at a variety of speeds rather than just the single speed achievable by conventional compressors. A single-speed compressor cycles on and off during operation, which can introduce inefficiencies in performance often referred to as ''cycling losses.'' Whereas, a variable-speed compressor is able to adjust its speed up or down during operation, thereby reducing or eliminating cycling losses. Variable-speed units may avoid condensate re-evaporation into the ambient room air, which can occur when a dehumidifier cycles off its compressor but not its fan during off-cycle mode. The current test procedure in appendix X1 does not capture any ''cycling losses'' for single-speed dehumidifiers (and avoidance of such losses for variable-speed dehumidifiers) because the test unit operates at full capacity throughout the test.

In the July 2015 Final Rule, DOE considered a load-based test for dehumidifiers, which would capture cycling behavior in dehumidifiers with single-speed compressors or speed modulation for variable-speed dehumidifiers. The load-based test would involve adding moisture to the test chamber at a fixed rate and allowing the control system of the dehumidifier to respond to changing moisture levels in the room. 80 FR 45801, 45809. DOE elected not to adopt a load-based test for the dehumidifier test procedure in the July 2015 Final Rule, due to concerns about the potential increase in test burden. *Id.* at 80 FR 45810. Section III.C.2.c of this document discusses load-based testing in greater detail.

In the June 2021 TP RFI, DOE sought data on single-speed dehumidifiers as follows: (a) their energy use when cycling on and off due to varying relative humidity in the room, (b) the extent of re-evaporation when operating in off-cycle mode, and (c) the effect of re-evaporation on dehumidification mode efficiency. DOE also sought feedback and data related to load-based testing, in particular, any alternative test methods that may produce results that are more representative of variable-speed dehumidifier energy consumption, including, but not limited to, a load-based test approach and information about the nature and extent of the test burden associated with a load-based test for dehumidifiers. 86 FR 34640, 34642.

In response to the June 2021 TP RFI, AHAM stated that variable-speed dehumidifiers do exist on the market, but that DOE should not assume that variable-speed compressors are a viable technology option for improving efficiency for dehumidifiers like they are for products such as room air conditioners. AHAM commented that, for dehumidifiers, a slowing compressor may prevent or inhibit the product reaching the dew point, thus making it difficult to determine how much energy would be saved through the use of a variable-speed compressor. AHAM suggested this may be why test procedure waivers have not been sought for dehumidifiers with variable-speed compressors—the existing test procedure correctly measures their efficiency. AHAM further stated that DOE should thoroughly investigate how this technology works in dehumidifiers before concluding that a variable-speed compressor is a design option to increase efficiency for portable dehumidifiers. AHAM stated that the task force will examine whether AHAM DH–1–2017 needs updating to take into account variable-speed compressors. (AHAM, No. 3 at pp. 2–3)

Aprilaire stated it does not produce household whole-home dehumidifiers with a variable-speed compressor and is unaware of any manufacturer that does. (Aprilaire, No. 4 at p. 1) MIAQ similarly stated it does not offer variable-speed compressors in any of its dehumidifiers. (MIAQ, No. 6 at p. 6)

MIAQ stated that variable-speed compressors are not used in the stand-alone dehumidifiers manufactured by its Therma-Stor brands for the commercial, industrial, agricultural, and restoration markets, and that variable-speed compressors are not used in the MIAQ product line except for its integrated HVAC products exceeding 20 tons of compressor capacity that focus on dehumidification for the agriculture industry. MIAQ stated, based on its experience, research and development, and market research, that variable-speed compressors in dehumidifiers offer little improvement in terms of efficiency and operational benefits over single-speed compressors, especially for residential dehumidifier applications, and do not result in a reasonable payback to the consumer. MIAQ stated that although variable-speed compressors are beneficial for residential air conditioners, the same is not the case for mechanical dehumidifiers because their operation is much different due to their function of removing water from the air—to properly function, the evaporator temperature must always be significantly lower than the dewpoint of the air. MIAQ further stated that when there is a call for dehumidification, the unit operates at full capacity to pull the moisture from the air until the setpoint is reached, meaning there is little opportunity for savings from slowing the compressor or increasing the evaporator temperature. (MIAQ, No. 6 at pp. 6–7)

Based on DOE's evaluation, and consistent with the points raised by commenters, given that dehumidifiers must maintain evaporator temperatures below the dew point to efficiently remove water from the air, variable-speed dehumidifiers may not be able to achieve significant efficiency gains over single-speed units. However, there could be some efficiency gains if the variable-speed compressor is inherently more efficient.

Variable-speed dehumidifiers may avoid significant condensate re-evaporation into the ambient room air, which can occur when a dehumidifier cycles off its compressor but not its fan during off-cycle mode to defrost the heat exchanger. Although it is possible that variable-speed dehumidifiers could reduce the number of defrost cycles or avoid them altogether by reducing compressor speed to raise the evaporator temperature while still dehumidifying the room, DOE is not aware of any data showing this. DOE has not observed any defrost cycles in its current market-representative sample of units when testing in accordance with the appendix X1 test, conducted at a dry-bulb temperature of 65 °F, which is representative of typical dehumidifier operation (see section III.B.3 of this document). At operating temperatures at or below 55 °F, defrost cycles are possible, and for some units likely. However, those temperatures are far less likely to occur with a level of humidity high enough to lead to operating a dehumidifier than at the current operating test conditions in appendix X1 (*i.e.,* 65 °F), as discussed in the following section.

DOE requests information and data regarding any efficiency and performance benefits associated with variable-speed dehumidifiers, both generally and relative to those with single-speed dehumidifiers.

b. Multiple Test Conditions

The current test procedure specified in appendix X1 requires one test condition for each category of dehumidifier: a dry-bulb temperature of 65 °F for portable dehumidifiers and 73 °F for whole-home dehumidifiers. *See* Section 4.1.1 of appendix X1.

In response to the June 2021 TP RFI, DOE received comments from the Joint Commenters and MIAQ advocating for multiple test conditions rather than the current single test condition. (Joint Commenters, No. 5 at p. 2; MIAQ, No. 6 at pp. 4–6) The Joint Commenters stated that dehumidifiers are likely to encounter frost conditions in the field, but that the current DOE test procedure at appendix X1 may not capture defrost performance because manufacturers would likely adjust a unit's controls or refrigeration system operation to avoid triggering defrost at 65 °F. *See* Section 4.1.1 of appendix X1. The Joint Commenters referred to their comments on the dehumidifiers test procedure NOPR published by DOE in the last rulemaking on May 21, 2014 (79 FR 29271, ''May 2014 NOPR''), in which they encouraged DOE to consider requiring a test at a dry-bulb temperature of less than 65 °F (*e.g.,* 55 °F) to capture defrost performance in addition to testing at 65 °F. The Joint Commenters asserted that capturing defrost performance would encourage improved defrost methods and controls. They stated that in the July 2015 Final Rule, DOE recognized the value of testing at additional temperatures but determined that soil temperatures [8] below 55 °F would be limited during the dehumidification season (*citing* 80 FR 45801, 45808). They encouraged DOE to reevaluate the use of soil temperatures as a proxy for basement and other sub-ground level location temperatures, reexamine whether there are significant operating hours below 65 °F, and investigate at what temperature defrost is typically activated. (Joint Commenters, No. 5 at p. 2)

MIAQ also recommended requiring an additional test condition to provide additional information to homeowners and HVAC professionals to aid in their selection of a dehumidifier for their application. MIAQ stated that such additional testing would not create an unnecessary burden. MIAQ specifically recommended separating products that they suggested defining as ''consumer product dehumidifiers'' into three product classes (25 pints/day or less, 25.01 to 50 pints/day, and greater than 50 pints/day) and two different test conditions (65 °F dry-bulb and 73 °F dry-bulb, both with 60-percent relative humidity and 0 inches of water column (''in. w.c.'') external static pressure (''ESP'')). MIAQ asserted that the products they suggested defining as ''consumer product dehumidifiers'' are typically used, unducted, in the basement of a dwelling or in the living space. MIAQ also asserted that the suggested test conditions represent a unit placed in the basement (*i.e.,* 65 °F dry-bulb) and a unit placed in the living space (*i.e.,* 73 °F dry-bulb). Additionally, MIAQ suggested that DOE define certain products as ''crawlspace dehumidifiers,'' create three product classes (50 pints/day or less, 50.01 to 75 pints/day, and greater than 75 pints/day), and adopt one test condition (65 °F dry-bulb, 60-percent relative humidity, and 0 in. w.c. of ESP). MIAQ asserted that these products are typically used, unducted, in the crawlspace below a dwelling or in the primarily unoccupied basement and that the suggested test conditions represent a unit placed in the crawlspace or unoccupied basement. MIAQ stated that providing data at these expanded conditions would not be an undue burden on manufacturers and that HVAC professionals often request unit performance at these conditions and many others. (MIAQ, No. 6 at pp. 4–6)

As noted, the current DOE test procedure at appendix X1 measures portable dehumidifier performance and efficiency during operation at 65 °F. As discussed in the May 2014 NOPR, before proposing the 65 °F test condition, DOE conducted research regarding the typical ambient air conditions and soil conditions under which residential portable and whole-home dehumidifiers operate. 79 FR 29271, 29277–29278. DOE conducted its analysis based on regions with reported dehumidifier ownership per available data at the time of the analysis. DOE limited its analysis to times of expected dehumidifier use: the months industry identifies for dehumidifier usage (April–October) and hours of those months above 60-percent relative humidity, which is the typical setpoint for a dehumidifier. DOE found the weighted-average air temperature was 64.1 °F and weighted-average soil temperature was 65.2 °F. These closely match the current single test condition of 65 °F. *Id.* Based on these analyses described in the May 2014 NOPR, DOE confirmed in the July 2015 Final Rule that the 65 °F dry-bulb temperature is representative of the majority of conditions during periods of dehumidifier use. 80 FR 45801, 45808–45809.

As discussed previously and in the July 2015 Final Rule, DOE understands that measuring portable dehumidifier performance at 55 °F may be desirable to capture defrost performance, and, for variable-speed dehumidifiers, potential defrost cycle avoidance or mitigation. 80 FR 45801, 45808. In the July 2015 Final Rule, DOE stated that the usefulness of determining performance at extreme conditions did not warrant the additional test burden associated with testing at 80 °F or 55 °F, or any other test condition. 80 FR 45801, 45808–45809. For this NOPR, DOE reevaluated the relative benefits and burdens that would result from requiring testing at additional test conditions, including a 55 °F condition. As part of this analysis, DOE reviewed 2015 hourly air temperature, soil temperature, and ambient relative humidity data from the National Climatic Data Center (''NCDC'') of the National Oceanic and Atmospheric Administration (''NOAA''),[9] collected at weather stations in each state and region for which dehumidifier ownership data were available. DOE used the Energy Information Administration's Residential Energy Consumption Survey (''RECS'') from 2015 (''RECS 2015''),[10] the most recent version of the full dataset available at the time of this analysis, to weight the temperature data based on dehumidifier ownership. Figure 1 shows this weighted-average soil temperature and ambient air temperature data throughout the dehumidification season (*i.e.,* between April and October, and corresponding with hours of ambient air relative humidity at or above 60 percent, at which dehumidifier operation is expected).[11]

[8] In the July 2015 Final Rule, DOE used soil temperature data as a proxy for basement air temperatures. This approach is also discussed further.

[9] NCDC of NOAA hourly temperature and relative humidity data are available at *www.ncdc.noaa.gov/cdo-web* (Last accessed January 31, 2022).

[10] 2015 RECS survey data are available at *www.eia.gov/consumption/residential/data/2015/* (Last accessed January 31, 2022).

[11] As discussed in the May 2014 NOPR, 60-percent relative humidity represents an upper bound for an ambient humidity condition that consumers would find acceptable and is therefore

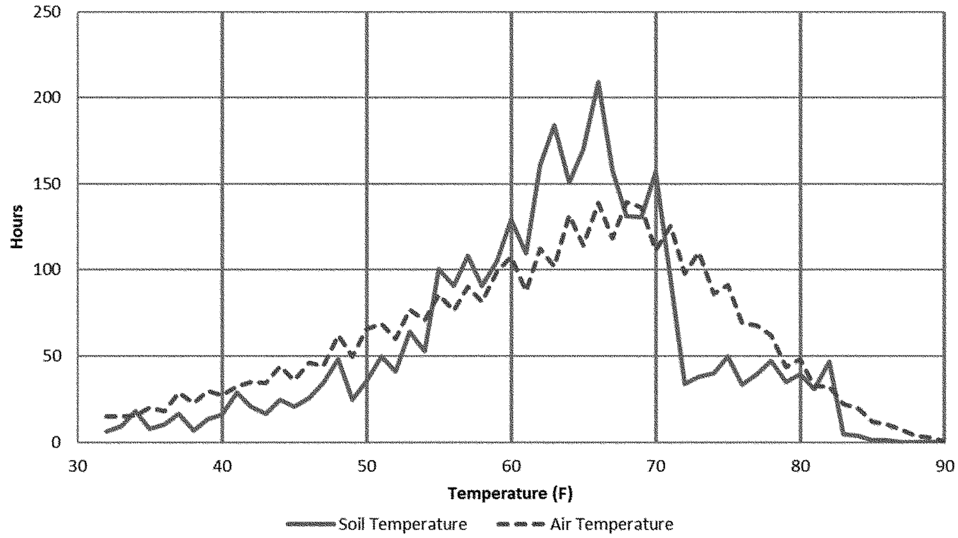

Figure 1: Weighted-Average Air and Soil Temperature during Dehumidification Season (April – October)

Both the soil and ambient air temperature data indicate that the temperature follows a roughly normal distribution centered around a mean of approximately 65 °F. As discussed, the current test procedure represents this distribution as a single test point at 65 °F. To consider further potential modifications to the test procedure to represent variable-speed dehumidifier operation, DOE considered the possibility of a multiple-temperature test in which, instead of a single test condition at the approximate peak of the normal distribution, three test conditions would represent the distribution of air and soil temperatures. The three test conditions would span a range both below and above the ''peak'' of the normal distribution. DOE investigated a three-temperature test, with tests at 55 °F, 65 °F, and 80 °F,[12] all with the same 60-percent relative humidity. These temperatures would capture as wide of a temperature range as possible while remaining representative of the peak of the temperature distribution curves. Performance at more extreme temperatures (*i.e.,* below 55 °F and above 80 °F) are encountered much less frequently by comparison, as shown by the data in Figure 1.

DOE conducted investigative testing of a variable-speed dehumidifier and a single-speed dehumidifier with similar capacity from the same manufacturer to understand two points. First, DOE sought to assess the potential for efficiency improvements from variable-speed dehumidifiers. Second, DOE examined the extent to which any such improvements would be captured by the current single test condition and by a multiple-condition test. Figure 2 shows the results from testing both dehumidifiers at the three different dry-bulb temperature conditions of 55 °F, 65 °F (the test condition specified in appendix X1), and 80 °F (the test condition specified in appendix X). To better show the dehumidification mode performance that would be affected by the changing operating conditions, DOE is presenting the values on the graph in Figure 2 using efficiency factor (''EF''), which addresses only dehumidification mode energy use, rather than the IEF, which includes standby/inactive mode and off-cycle mode energy use. The operating temperature is unlikely to affect the energy use in standby/inactive mode and off-cycle mode.

the threshold above which DOE expects dehumidifier operation. 79 FR 29271, 29276–29282.

[12] Commenters suggested a highest temperature condition of 75 °F. DOE performed its evaluation using 80 °F instead because the DOE test procedure required for use prior to the compliance date of the current energy conservation standards (*i.e.,* appendix X) specified a test condition of 80 °F.

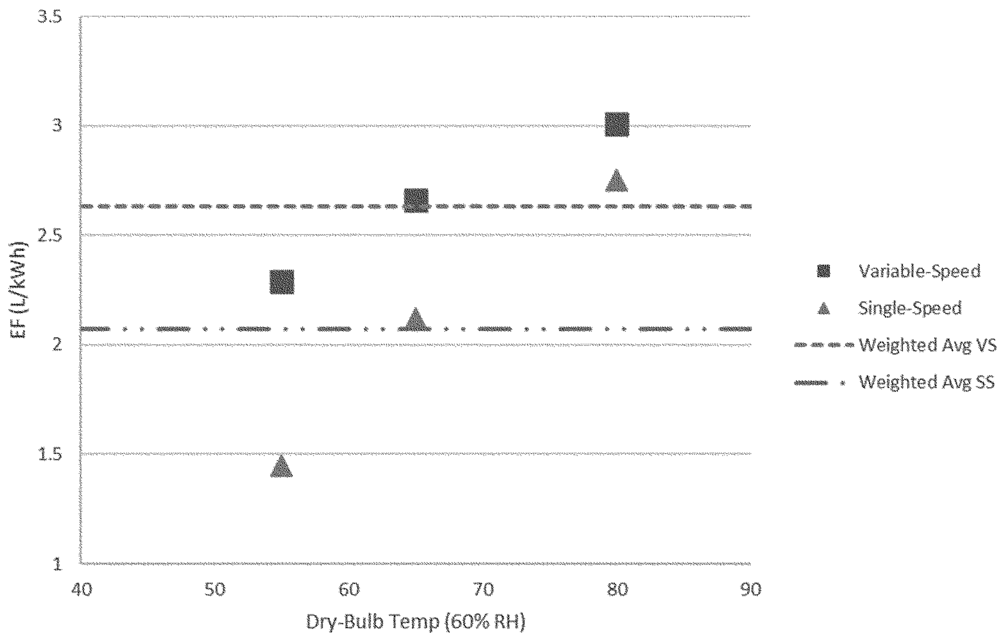

Figure 2: Single-Speed vs. Variable-Speed Dehumidifier Performance at Three Test Conditions

The results from this testing show that, for the tested units, there are significant differences in the performance and efficiency of variable-speed and single-speed dehumidifiers when operating at different test conditions. As shown in Figure 2, at the current 65 °F rating condition, the single-speed unit performed at 2.12 EF, and 25 percent less at the 55 °F rating condition, with a 1.45 EF. At the current 65 °F rating condition, the variable-speed unit performed at 2.66 EF, with a smaller decrease of 14 percent at the 55 °F rating condition, with a 2.29 EF.

Conversely, at the 80 °F rating condition, the single-speed unit performed at 2.75 EF, an increase of 24 percent relative to the current 65 °F rating condition. At the 80 °F rating condition, the variable-speed unit performed at 3.01 EF, a smaller increase of 13 percent relative to the current 65 °F rating condition.

DOE excluded time spent at outlier temperatures below 50 °F or above 80 °F. For each unit, DOE combined the remaining results from all three test conditions using weighting factors based on the percentage of dehumidifier operating hours spent within 5 °F of each test condition. The resulting weighting factors were 26 percent for the 55 °F test condition, 54 percent for the 65 °F test condition, and 20 percent for the 75 °F test condition.[13]

Although single-speed and variable-speed units may perform differently at individual test conditions either lower or higher than the current test condition, combining the results from all three test conditions into a single weighted average shows no significant difference in measured efficiency compared to the current single 65 °F rating condition, for both single-speed and variable-speed units. Using this weighted-average approach, the single-speed unit's weighted-average performance was 2.1 EF, a difference of only 2 percent from the performance measured at the current 65 °F rating condition. Similarly, the variable-speed unit's weighted-average performance was 2.6 EF, a difference of only 1 percent from the performance measured at the current 65 °F rating condition.

As discussed, DOE is proposing in this NOPR to allow the required test time to be 2 or 6 hours to give the option of reducing overall test burden when testing at the current single 65 °F rating condition. Including a half-hour stabilization period, this would result in a total test time of 2.5 hours for the current single test condition.

DOE is also considering specifying three test conditions. In considering two additional test conditions for portable dehumidifiers, DOE must also consider the additional test burden such a change would present to manufacturers. (42 U.S.C. 6293(b)(3)) DOE estimates that the current test procedure requires approximately 6.5 hours to conduct, representing a half-hour stabilization period followed by a 6-hour rating test period. If DOE were to proceed using the current test requirements (*i.e.,* a 6-hour rating test period), the time required for testing would increase from 6.5 hours to 21.5 hours. Each additional test condition would require at least 1 hour to change the conditions within the chamber, a half hour to allow the unit to stabilize within the chamber, and then 6 hours to conduct each additional test, totaling 15 additional test hours for the two additional test conditions described previously.

If DOE were to adopt a 2-hour test period, as proposed for the single test condition below, for each of the two additional test condition scenarios, the total time required for testing would increase to about 9.5 hours, adding at least 7 test hours to the manufacturer test burden (*i.e.,* 5 additional total hours for stabilization and testing, and 2 total

[13] As discussed above, while testing was conducted at a rating test condition of 80 °F, DOE considered the weighting of a potential future rating test condition of 75 °F, as suggested by commenters and to more evenly represent operating conditions between 50 °F and 80 °F.

hours to adjust the chamber conditions between tests). For comparison, the current test procedure requires 6.5 hours of testing, and the proposed revised test procedure requires 2.5 hours of testing, or 6.5 hours if the six-hour test is chosen.

However, in considering a three-condition test, performance at the lower temperatures during a 2-hour period could be less consistent with performance during a 6-hour period because defrost occurs. Thus, it is not clear when testing at 55 °F whether a 2-hour test is equivalent to a 6-hour test. If DOE chose to adopt a three-condition test and 2-hour test period with the exception of a 6-hour test at the 55 °F test condition, the total test burden would be 13.5 hours.

As indicated previously, DOE investigative testing suggests that a single temperature condition provides test results that are representative of an average period of use of a dehumidifier. As discussed, DOE is also considering testing of three possible temperature conditions although as discussed, investigative testing indicated no substantive improvement in representativeness over the current test procedure. Without an improvement in the representativeness of measuring dehumidifier performance at a range of temperatures, the increase in test burden associated with requiring multiple test conditions would not be justified.

DOE requests data regarding whether a three-test condition test is more representative of an average period of use for a dehumidifier and the applicability of a 2-hour test, or other reduced test length between 2 and 6 hours, to a three-condition test, specifically when testing at 55 °F.

DOE requests comment on maintaining a single-test condition approach for portable dehumidifiers, and further requests comment on potential benefits and burden associated with a three-test condition approach for all portable dehumidifiers.

c. Load-Based Test

Under the current test procedure, temperature and humidity conditions are held constant throughout the test (*i.e.,* a steady-state test). As such, the test unit operates at full capacity throughout the duration of the test.

In the July 2015 Final Rule, DOE considered a load-based test, in which the humidity level in the test chamber would be allowed to vary in response to the operation of the dehumidifier.[14] This, in turn, would allow the control system of the dehumidifier to respond to changing moisture levels in the room, as it would during real-world usage. As a result, a load-based test would induce cycling behavior in single-speed dehumidifiers or speed modulation in variable-speed dehumidifiers. 80 FR 45802, 45809. In the July 2015 Final Rule, DOE elected not to adopt a load-based test for the dehumidifier test procedure due to concerns about the potential increase in test burden. *Id.* at 80 FR 45810.

In the June 2021 TP RFI, DOE sought (1) feedback and data regarding any alternative test methods that may produce results that are more representative of variable-speed dehumidifier energy consumption, including, but not limited to, a load-based test approach; and (2) information about the nature and extent of the test burden associated with a load-based test for dehumidifiers. 86 FR 34640, 34642.

The Joint Commenters, MIAQ, and California IOUs supported the further investigation and development of a load-based test. (Joint Commenters, No. 5 at p. 1; MIAQ, No. 6 at p. 7; California IOUs, No. 7 at p. 2) The Joint Commenters stated that the current test procedure for dehumidifiers does not capture the impact of cycling losses, including moisture re-evaporation. They stated that, in dehumidifiers that continue to operate the fan after the compressor cycles off, some moisture that has been removed by the dehumidifier can be re-evaporated, which results in wasted energy. They cited a part-load performance test of two portable dehumidifiers conducted by the National Renewable Energy Laboratory in 2014.[15] They explained that in that study, the models operated the fan for 3 minutes after the compressor shut off; when compressor run times ranged from 3 to 6 minutes, 17–42 percent of the removed moisture was returned to the space. They further stated that the current test procedure measures the fan power consumed in fan-only mode, but it does not capture this additional efficiency impact from moisture re-evaporation. The Joint Commenters asserted that, for variable-speed units, load-based testing would: (1) evaluate the effectiveness of the unit's controls in adjusting compressor and fan speeds to optimize efficiency; and (2) enable variable-speed technology to compete on a fair basis, which the Joint Commenters asserted would likely increase the adoption of this feature. They further stated that, for single-speed units, load-based testing would capture the impact of cycling losses and wasted energy from re-evaporation. They therefore encouraged DOE to consider a load-based test, which would ensure that the test procedure reflects the real-world operation of dehumidifiers. (Joint Commenters, No. 5 at p. 1)

MIAQ supported a load-based test for both single-speed and variable-speed dehumidifier operation, as it asserted that such a test would provide the means to obtain true performance data of all dehumidifiers over a range of operating conditions, potentially resulting in a single number representing multiple test conditions, similar to the seasonal energy efficiency rating used in central air conditioners. (MIAQ, No. 6 at p. 7)

The California IOUs commented that there are new variable-speed dehumidifiers coming into the market that may require a revised test to account for part-load performance. (California IOUs, No. 7 at p. 2)

Aprilaire stated that it has considered the part-load test method previously described by DOE and asserted that this test would require a costly retrofit to facilities to implement and may be difficult to ensure consistent repeatability and reproducibility of the results. (Aprilaire, No. 4 at p. 1)

DOE agrees that a load-based test may better capture energy use resulting from either of two different circumstances. First, the rate of dehumidification could exceed the rate of moisture introduced to the room, leading to the compressor cycling off. Second, moisture could build up in the room, such as when the dehumidifier cycles off and only operates its fan to defrost the evaporator. Load-based testing may also be able to measure energy lost due to re-evaporation, as suggested by commenters. However, DOE continues to have the same concerns stated in the July 2015 Final Rule. First, a load-based test would significantly increase test burden. It is DOE's understanding that load-based testing is not possible to conduct in a psychrometer chamber designed to be compliant with requirements of appendix X1, without substantive changes to the control systems and potential changes to the reconditioning setup within the chamber. Second, as discussed below, due to the complexities of operating a test chamber in a load-based configuration, repeatability and reproducibility could decrease.

[14] In a load-based test, moisture would be added to the test chamber at a fixed rate (*i.e.,* a fixed load) throughout the duration of the test, simulating a real-world usage scenario.

[15] ''Measured Performance of Residential Dehumidifiers Under Cyclic Operation'' J. Winkler *et al.,* National Renewable Energy Laboratory, January 2014.

DOE continues to recognize the challenges associated with implementing load-based testing in the dehumidifier test procedure. As discussed in the recent room air conditioner test procedure final rule published by DOE in the **Federal Register** on March 29, 2021, and in the June 2021 TP RFI, DOE expects that a load-based test would reduce repeatability and reproducibility due to current limitations in current test chamber capabilities—namely, equipment is not designed for a load-based tests. 86 FR 16446, 16466 (March 29, 2021); 86 FR 34640, 34642 (June 30, 2021). Thus, although they may technically be capable of doing so, the controls and other systems are not capable of maintaining a specific load as needed, which would reduce the representativeness of the results and potentially be unduly burdensome. Additionally, the psychrometer chambers used to test dehumidifiers present additional challenges. The equipment and controls systems in these chambers are designed to maintain specified temperature and humidity conditions, not to add a steady amount of moisture in the same way that a calorimeter could.

Despite the challenges with load-based testing described previously, DOE conducted limited investigative testing of a load-based testing approach to assess differences in measured performance between a single-speed and variable-speed dehumidifier under such a test. At the time of testing, there was only one variable-speed dehumidifier model on the market. The variable-speed unit and the single-speed unit tested were from the same manufacturer, had similar designs, and had similar rated dehumidification capacities. Although the sample was limited, the data are informative, align with the theoretical limitations of variable-speed technology for dehumidifiers, and generally support the assertion from commenters that variable-speed is not a viable technology to improve efficiency.

DOE tested two dehumidifiers with comparable capacities from the same manufacturer, one with a variable-speed compressor and one with a single-speed compressor. DOE conducted multiple rounds of testing using different moisture introduction rates for each test. The moisture introduction rates represented 25 percent, 50 percent, 75 percent, and 100 percent of the full-load dehumidification capacity of each tested unit. The ''100-percent'' moisture introduction rate test is equivalent to the current appendix X1 test.

Figure 3 shows how the two units performed in dehumidification mode under each tested moisture load. As discussed previously, measured EF is presented instead of IEF to focus on the dehumidification mode efficiency; *i.e.,* the portion of IEF that would change due to a change to the test conditions.

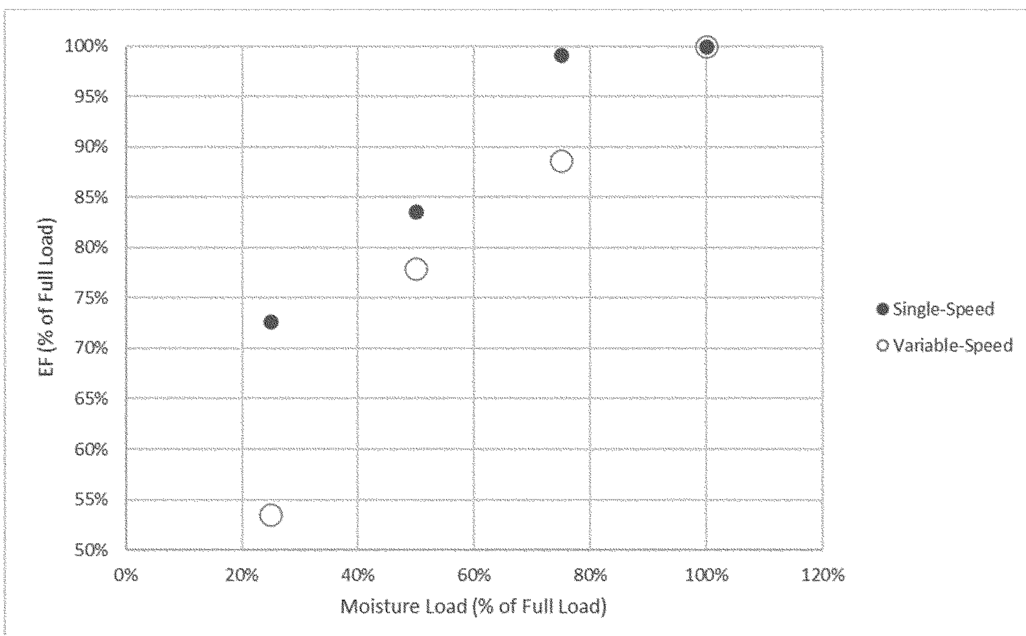

Figure 3: Measured EF vs. Moisture Load under Load-Based Testing Approach

As shown in Figure 3, at each reduced moisture load test, the single-speed unit performed more efficiently than the variable-speed unit, relative to each unit's measured efficiency at full load (*i.e.,* 100-percent load). For example, at the 75-percent load, the efficiency of the single-speed unit was 99 percent of full-load efficiency, whereas the efficiency of the variable-speed unit was 89 percent of full-load efficiency. At the 25-percent load, the efficiency of the single-speed unit was 73 percent of full-load efficiency, compared to only 54 percent for the variable-speed unit.

The relatively less efficient performance of the variable-speed unit at reduced loads runs counter to the general trends observed for other HVAC products such as room air conditioners, in which variable-speed units generally perform relatively more efficiently than single-speed units at reduced loads. The following paragraphs describe some notable observations made by DOE during testing; however, as discussed, DOE is unable to draw conclusions at this time as to why the variable-speed unit tested performed relatively less efficiently than the single-speed unit at reduced loads. During each load-based test, the single-speed unit cycled on and off, as expected, in response to the humidity level in the room being reduced and reaching the setpoint on the dehumidifier controls. DOE observed that the variable-speed unit also cycled on and off at the 25-percent moisture load condition. In addition to cycling at the 25-percent load condition, the variable-speed unit also fluctuated between two different compressor speeds at the 75-percent moisture load condition. The reason for the compressor behavior at the 75-percent moisture load condition is unclear but may be related to the control scheme programmed by the manufacturer when the unit senses certain ambient or operating conditions.

DOE was unable to draw conclusions at this time as to why the tested variable-speed unit performed relatively less efficiently than the single-speed unit at reduced moisture loads. DOE would not expect either the cycling at the 25-percent condition or the fluctuation in compressor speeds at the 75-percent condition to result in relatively lower efficiency performance for the variable-speed unit relative to the single-speed unit, since the single-speed unit also exhibited cycling at each of the reduced moisture loads. DOE also has no information to suggest whether the observed trends in performance are unique to the variable-speed model tested, or whether the same trends in performance would be observed more generally for other variable-speed models. DOE notes, however, that the findings of this investigative testing would appear to support AHAM's comment in response to the June 2021 RFI that DOE should not assume that variable-speed compressors are a viable technology option for improving efficiency for dehumidifiers like they are for products such as room air conditioners, as discussed previously in section III.C.2.a of this document.

DOE's investigative testing does not support use of a load-based test to differentiate single-speed dehumidifiers from variable-speed dehumidifiers at this time. Therefore, DOE is not proposing a load-based test in this NOPR.

DOE requests comment on load-based testing for dehumidifiers, including (1) whether DOE's variable-speed dehumidifier test results are typical of the expected performance under a load-based test, (2) whether there are other aspects of performance beyond cycling that may have contributed to the performance observed during these tests, (3) the feasibility of conducting load-based tests in a typical lab setup, (4) the relative benefits and burdens of a load-based test, and (5) the tentative determination not to prescribe a load-based test in appendix X1.

d. Test Duration

Appendix X1 requires a test duration of 6 hours for the dehumidification mode test, after a 30-minute stabilization period. *See* Section 5.4 of appendix X1. DOE and AHAM's DH–1 working group have identified an opportunity to reduce this test duration, thereby reducing test burden. To identify a potential shorter test duration that could be considered, DOE conducted investigative testing on 13 portable dehumidifiers of varying capacities, one of which was variable-speed, at the 65 °F dry-bulb temperature, in accordance with appendix X1. DOE used the gravity drain condensate collection approach in appendix X1 and recorded the weight of the condensate collected every 30 seconds. *See* Section 3.1.1.4 of appendix X1. DOE was therefore able to calculate energy consumption and collected condensate at any of the 30-second intervals throughout the 6-hour test and did so at each hour of testing. Figure 4 and Figure 5 show the percent change in capacity and efficiency (IEF), respectively, at each hour relative to the results of the 6-hour test for the 13 tested units, as well as the average of all 13 units. (By definition, all data points would be plotted at 0-percent difference on the sixth hour).

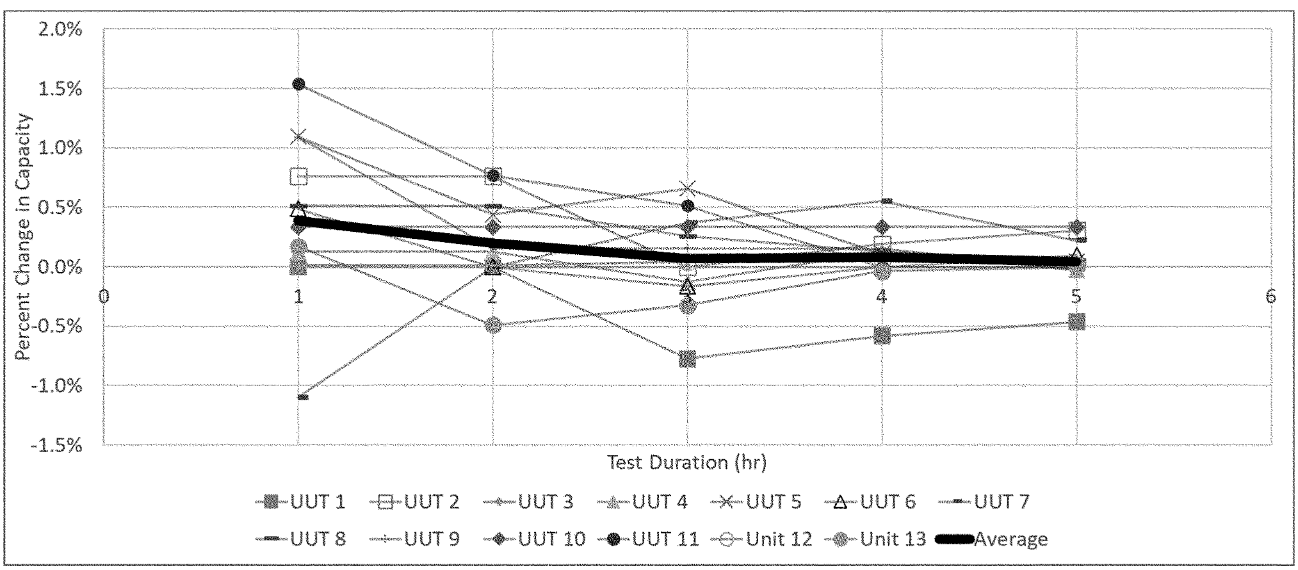

Figure 4: Percent Change in Capacity from 6-Hour Test Results

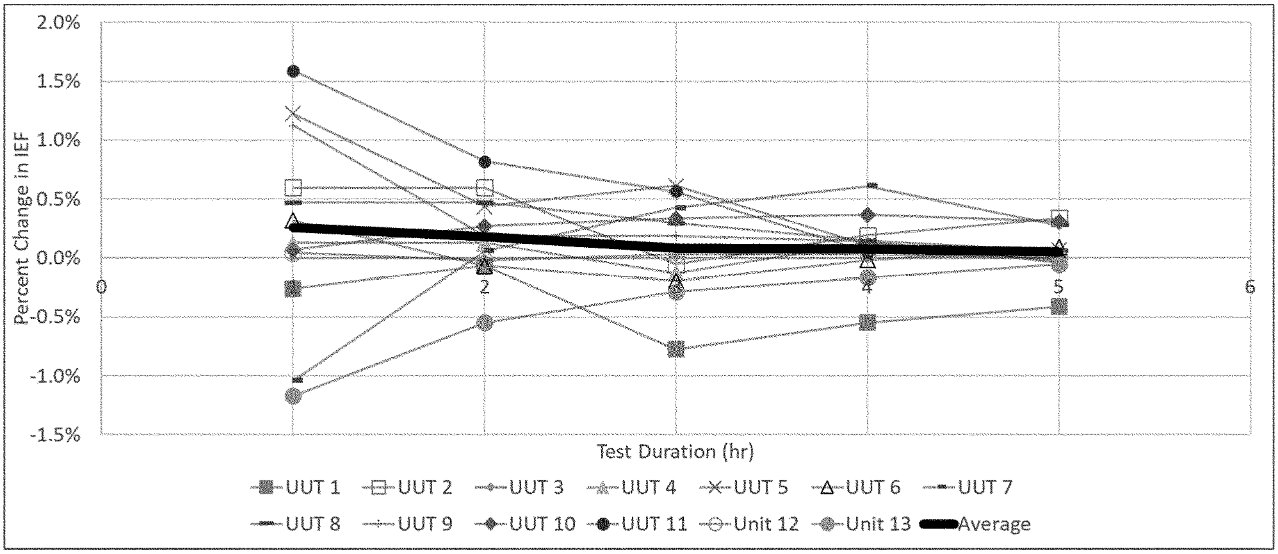

Figure 5: Percent Change in IEF from 6-Hour Test Results

As demonstrated in Figure 4 and Figure 5, capacity and efficiency vary only slightly from the 6-hour test results with a test duration reduced to 1 hour. Specifically, at 1 hour, capacity and efficiency differ from the 6-hour test results on average by 0.4 percent, and both data sets in combination show a minimum change of −1.2 percent and maximum change of 1.6 percent at the 1-hour point. At 2 hours, the percent change in capacity and efficiency for all 13 units is within a range of 1.4 percent. This investigative testing suggests that a 6-hour dehumidification mode test duration for portable dehumidifiers may be unnecessary, as the data show there is minimal difference in measured efficiency between the 2-hour and 6-hour test durations.

DOE also conducted investigative testing on three whole-home dehumidifier units at the 73 °F dry-bulb temperature, using the 6-hour dehumidification mode test duration as specified by appendix X1. *See* Section 5.4 of appendix X1. Each of the tested whole-home units operated the compressor continuously at steady state for the entirety of the 6-hour test duration, without any cycling due to frost accumulation. DOE also did not observe any cycling due to frost accumulation in the previously mentioned investigative testing of portable dehumidifiers at the 65 °F dry-bulb temperature. Thus, DOE does not expect cycling due to frost accumulation to occur for whole-home dehumidifiers or portable dehumidifiers at or above 65 °F dry-bulb temperature. Because both whole-home and portable units operate steadily at the rating conditions, one would expect that, like portable units, for whole-home units the 2-hour and 6-hour results also are equivalent within a very small percentage. A 2-hour test duration would therefore provide substantively equivalent measures of capacity and efficiency to a 6-hour test duration for whole-home units, but with a significantly shorter test. Based on this evaluation, DOE has tentatively determined that a 2-hour test duration is appropriate for both whole-home dehumidifiers and portable dehumidifiers and would provide representative results with minimized test burden. DOE also recognizes, however, that removing the requirement for a 6-hour test duration would require recertification for units previously certified under a test duration of 6 hours. Therefore, in this NOPR, DOE is proposing that the dehumidification mode test duration of either 2 or 6 hours for both portable and whole-home dehumidifiers.

As discussed previously, investigative testing indicates that a test length between 2 and 6 hours would likely be suitable to maintain test procedure repeatability and reproducibility. As such DOE is proposing an alternative test duration of 2 hours to provide consistent test procedure times, avoid unnecessary test burden, and avoid forcing manufacturers to retest. However, DOE continues to consider additional test durations of periods between 2 and 6 hours. DOE is aware that industry stakeholders are considering alternate test procedure lengths, including a 4-hour test with an extension to 6 hours should the unit enter defrost.

DOE requests comment on (1) the proposal to allow the dehumidification mode test duration to be 2 or 6 hours for both portable and whole-home dehumidifiers, (2) whether the proposed approach sufficiently represents capacity and efficiency for dehumidifiers, and (3) the efficacy of alternate test durations, including those being considered by industry stakeholders.

3. Psychrometer Setup

Appendix X1, through reference to Section 4 ''Instrumentation'' of ANSI/AHAM DH–1–2008, requires dehumidifiers with a single air intake to be monitored with an aspirating-type psychrometer[16] perpendicular to, and 1 foot in front of, the unit; and, in the case of multiple air intakes, to be monitored with a separate sampling tree. *See* Sections 3.1.1, 3.1.1.2, 3.1.1.3 of appendix X1.

In the July 2015 Final Rule, DOE considered whether certain psychrometer configuration issues, such as variable levels of residual heat from the psychrometer fan and variable air velocity influencing the accuracy of temperature sensors, were detrimental to test repeatability. 80 FR 45802, 45812–45813. As discussed in the July 2015 Final Rule, DOE was unable to determine whether any repeatability improvements are associated with adjusting the fan location in relation to

[16] In an aspirating-type psychrometer, a wet-bulb and a dry-bulb thermometer are mounted inside a case that also contains a fan. The fan draws air across both thermometers, and the resulting wet-bulb and dry-bulb temperatures are used to determine the percent relative humidity.

the dry-bulb and wet-bulb temperature sensors, or with tightening the air velocity requirements through the psychrometer. DOE also did not have sufficient data to quantify the burdens associated with such requirements. *Id.* at 80 FR 45813.

In the July 2015 Final Rule, DOE also considered a proposal to require sampling trees for testing all dehumidifiers, regardless of the number of air intakes, for consistency and repeatability. However, based on then-available data, DOE was unable to conclude that the use of a sampling tree would be more reliable than the psychrometer-only approach. 80 FR 45802, 45812–45813.

Since publication of the July 2015 Final Rule, DOE has received feedback from a testing laboratory that use of a sampling tree ducted to an aspirating psychrometer is a common configuration for testing of other refrigerant-based products, and that placing the psychrometer itself in front of the test unit may impede the instrument's ability to effectively monitor the inlet air conditions.

In the June 2021 TP RFI, DOE requested (1) data on the effect of residual heat from the psychrometer fan and the effects of psychrometer air velocity on temperature measurement repeatability when using a psychrometer, rather than a humidity sensor, under the current (appendix X1) test procedure; (2) data and other information on measures that can be employed to minimize any such effects when using a psychrometer, as well as information regarding the repeatability of measurements from tests using such measures; (3) comment on any potential test burden increases associated with additional requirements regarding psychrometer fan placement and orientation relative to the temperature sensors, and any burden associated with reducing the acceptable psychrometer air velocity range; and (4) comment on whether it would be appropriate to require, or to allow, sampling trees to be used with aspirating psychrometers regardless of the number of air intakes for a given model, including any data confirming repeatability and especially repeatability relative to using an aspirating psychrometer without a sampling tree. 86 FR 34640, 34642–34643.

In response to the June 2021 TP RFI, MIAQ stated that it uses a thin-film capacitive humidity measurement sensor that is accurate to within ±1 percent relative humidity, which eliminates the need for a psychrometer and its added heat. MIAQ asserted that psychrometers are inaccurate, difficult to maintain, and burdensome to set up. MIAQ also stated that sampling trees would not be required if inlet and outlet air flows are not allowed to affect the humidity sensor. According to MIAQ, the humidity sensor can be affected if the warm and dry dehumidifier exhaust is allowed to mix near the dehumidifier inlet where the humidity sensor is located, or if the mixing of the room air is not sufficient to disperse the warm and dry exhaust from the inlet. MIAQ recommended permitting devices other than an aspirating type psychrometer air sampler. They also recommended specifying that the humidity measuring device used must be able to achieve ±1 percent relative humidity, noting that the allowable range in dry bulb (±0.5 °F) and wet bulb (±0.3 °F) provide the same ±1 percent relative humidity range. (MIAQ, No. 6 at pp. 7–8)

AHAM commented that the current test procedure allows for two possible laboratory setups: a single-point measurement or a sampling tree. AHAM stated that allowing these different test setups may result in different test outcomes and thus lower reproducibility between test laboratories. AHAM did not have any specific recommendations on psychrometer setup. (AHAM, No. 3 at p. 3)

DOE conducted investigative testing to determine whether and to what extent there are differences between the relative humidity measurements obtained when using a relative humidity sensor instead of a psychrometer. To compare the measured relative humidity throughout the test period, DOE tested six portable dehumidifiers in accordance with appendix X1, each instrumented with two relative humidity sensors and an aspirating psychrometer, with all instrumentation placed 1 foot in front of the inlet grille. Figure 6 shows the results of this testing, indicating the average percentage difference in relative humidity as measured by the two relative humidity sensors compared to the relative humidity measured with the aspirating psychrometer.

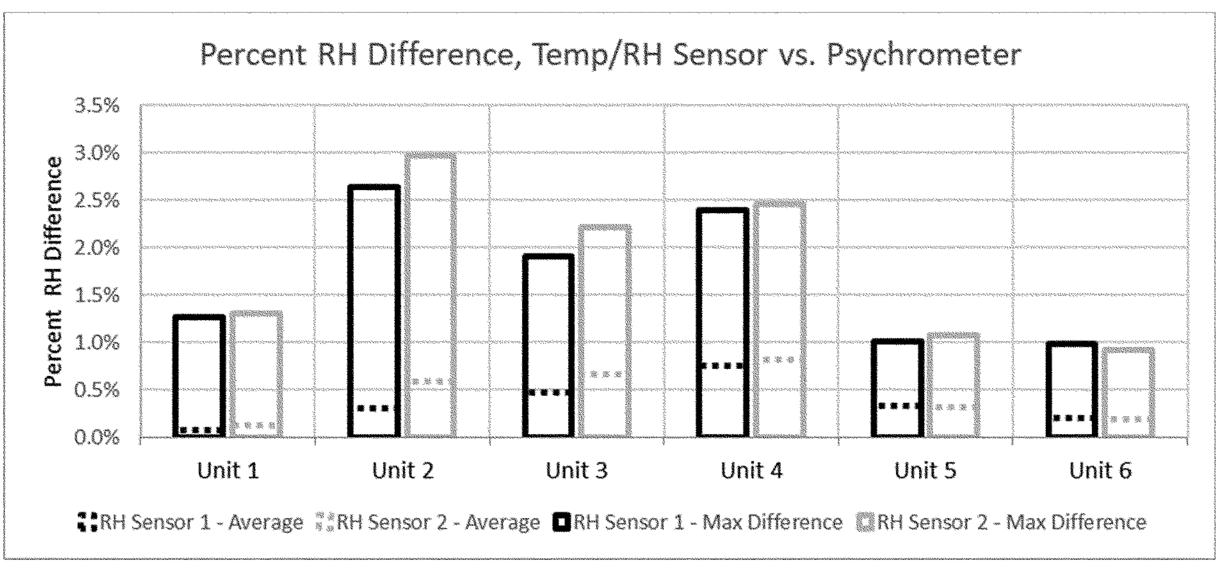

Figure 6: Average and Maximum Difference in Relative Humidity Measured by Humidity Sensors Compared to Aspirating Psychrometer Measurements

As shown in Figure 6, the average difference observed between relative humidity sensor and aspirating psychrometer measurements for a given test unit ranged from less than 0.1 percent to 0.8 percent relative humidity. The largest difference that DOE observed in testing (*i.e.,* from the smallest measured value for the aspirating psychrometer to the largest measured value for either of the relative humidity sensors) for any of the units was 3.0 percent relative humidity, and the average among all six test units of each unit's maximum difference was 1.8 percent relative humidity. DOE considers this level of variation to be comparable to the existing accuracy and tolerance requirements for relative humidity sensors in appendix X1 (*see* Sections 3.1.1.2 and 3.1.2.2.2 of appendix X1). DOE therefore tentatively concludes that the repeatability of the dehumidifier test procedure is similar regardless of whether a relative humidity sensor or aspirating psychrometer is used. Therefore, DOE proposes to maintain the options currently offered in appendix X1 regarding the permitted relative humidity measurement apparatuses.

The test procedure at appendix X1 does not currently permit the use of a sampling tree in conjunction with an aspirating psychrometer to measure relative humidity for portable dehumidifiers with a single air inlet. In the July 2015 Final Rule, DOE was unable to conclude whether using a psychrometer-only or using a psychrometer in conjunction with a sampling tree would produce the most repeatable results. 80 FR 45802. DOE required using the psychrometer-only approach in the July 2015 Final Rule to minimize test burden. However, DOE is aware that using a sampling tree with an aspirating psychrometer is standard practice for many test laboratories when conducing psychrometric testing. Although DOE is not aware of any data comparing relative humidity measurements using an aspirating psychrometer with and without a sampling tree, the widespread industry acceptance of sampling trees used with aspirating psychrometers and DOE's technical understanding of the validity of measurements obtained when using sampling trees suggest that allowing the use of sampling trees in appendix X1 would not substantively impact the repeatability or reproducibility of the test procedure, or the representativeness of the measured results. Additionally, allowing sampling trees would likely reduce the test burden for certain test laboratories that would otherwise be required to change their aspirating psychrometer configuration to remove the sampling tree and reposition the psychrometer within the test chamber. Therefore, when measuring relative humidity using an aspirating psychrometer for all portable and whole-home dehumidifiers with a single air inlet, DOE is proposing to permit the use of sampling trees in appendix X1.

DOE requests comment on the proposal to allow relative humidity measurements taken using an aspirating psychrometer with a sampling tree in appendix X1 for dehumidifiers with a single air inlet.

In addition to the proposal to allow sampling trees in conjunction with aspirated psychrometer testing, DOE is aware that industry stakeholders are considering shielding and positioning requirements for aspirated psychrometer construction and setup to improve the accuracy of the results. DOE believes that these requirements would improve the repeatability and reproducibility of the test procedure. Based on input from industry, DOE expects that there would be minimal test burden increase associated with these requirements, as these practices are already generally accepted by industry. Therefore, DOE proposes to require that the sensing elements within the psychrometer box be shielded or positioned to minimize radiation effects from the fan motor, that there be line of sight separation between any fans and sensing elements within the test fixture, and at least 3 feet of separation, along the path of airflow, between any fans and sensing elements within the test fixture.

DOE requests comment on the proposal to require that the psychrometer box contain shielding or be configured to minimize radiation effects on the sensing elements, that there be line of sight separation between any fans and sensing elements within the test fixture, and at least 3 feet of separation, along the path of airflow, between any fans and sensing elements within the test fixture.

4. Whole-Home Dehumidifiers

a. Air Velocity

In the July 2015 Final Rule, DOE established a test procedure for whole-home dehumidifiers in appendix X1. 80 FR 45802, 45810–45811. Whole-home dehumidifiers differ from portable dehumidifiers as they are installed in a ducted configuration in a home. The whole-home dehumidifier test procedure specifies a ducted test setup with instructions for measuring and maintaining the air flow through these ducts. *See* section 3.1.3 of appendix X1. Section 5.2 of AHAM DH–1–2017 requires that ''the air flow approaching the test unit shall be uniform in temperature, humidity and velocity. The air velocity shall not exceed 50 feet per minute (''ft/min'') (0.25 meters per second (''m/s'')) within 3 ft (0.91 m) of the dehumidifier with the unit not operating.''

MIAQ expressed concern with the air velocity requirements in section 5.2 of AHAM DH–1–2017. MIAQ agreed there is a need to properly mix the air during testing but stated that for the larger whole-home dehumidifiers, a maximum air velocity of 50 ft/min requires a test chamber of an excessive size. MIAQ suggested working with DOE to identify a higher velocity that can be used with larger units. (MIAQ, No. 6 at pp. 7–8)

As reflected in AHAM DH–1–2017, the 50 ft/min maximum air velocity requirement ensures that the test chamber is sufficiently equipped and sized to maintain uniform temperature, humidity, and velocity for the dehumidifier inlet air. However, when testing high-capacity portable and whole-home dehumidifiers, DOE understands that this requirement, in conjunction with the requirement that test chambers must exchange air within the chamber at a rate no less than two times the airflow of the dehumidifier under test, may represent a challenge. Because larger dehumidifiers have a significantly higher airflow than smaller portable dehumidifiers, they may require the use of test chambers that are significantly larger than a typical laboratory's. Commenters have suggested that this specification in AHAM DH–1–2017 may represent an undue burden on manufacturers of large-capacity portable dehumidifiers and whole-home dehumidifiers.

DOE is considering alternate air velocity specifications. However, DOE is not aware of any data that quantify the impact on repeatability and reproducibility of raising the maximum air velocity requirement to a less stringent level. Based on anecdotal evidence and information received from laboratory technicians, an increased air velocity when testing larger-capacity dehumidifiers in standard chambers (*i.e.,* above 50 ft/min) does not negatively impact the repeatability or reproducibility of the test procedure. Based on the previous information, DOE is considering raising the maximum air flow requirement by an amount appropriate to the increased air flow of the largest units on the market, *e.g.,* to 100 ft/min.

DOE requests comment regarding the maximum air velocity requirement generally, the current 50 ft/min requirement as specified in AHAM DH–1–2017, and the consideration to raise the maximum air velocity within 3 ft of the dehumidifier with the unit not operating, when properly configuring the test chamber. Were DOE to obtain information or data indicating that a higher permitted air velocity would not negatively impact the measured results, DOE would consider adopting an increased air velocity requirement.

Aprilaire commented that appendix X1 currently lists a pitot traverse method of determining velocity pressures and ultimately airflow through reference to Section 7.3.1 of ANSI/Air Movement and Control Association (''AMCA'') 210–07. Aprilaire stated that there is a very limited number of test facilities that still use this technology. Aprilaire suggested that DOE adopt the alternative method of using airflow nozzles to measure airflow detailed in Section 7.3.2 of ANSI/AMCA 210–07. Aprilaire stated that most laboratories are using the nozzle method in ANSI/AMCA 210–07 for measuring airflow and that this method is listed by American Society of Heating, Refrigerating, and Air Conditioning Engineers (''ASHRAE'') Standard 37 as the method to use for HVAC Equipment. (Aprilaire, No. 4 at pp. 1–2)

DOE inquired with a number of laboratories and is aware that there is a limited number of test laboratories that use pitot-tube traverses when conducting testing in accordance with ANSI/AMCA 210–07 (*see* Sections 4.2.2, 4.3.1 and 7.3.1 of ANSI/AMCA 210–07), as referenced by appendix X1 for testing whole-home dehumidifiers. DOE is aware that test laboratories typically use the alternate calibrated nozzle approach detailed in Sections 4.2.3, 4.3.2 and 7.3.2 of ANSI/AMCA 210–07 when conducting testing in accordance with ANSI/AMCA 210–07 for products other than dehumidifiers, which is not currently permitted in appendix X1. Based on feedback from test laboratories and comments received in response to the June 2021 TP RFI, DOE understands that pitot-tube traverses are complex to fabricate and that measuring static pressure using them may require greater expertise, be more costly, and be more error-prone than the alternative calibrated nozzle approach. DOE has conducted limited investigative testing of two whole-home dehumidifiers to compare the IEF measured using pitot-tube traverses to the calibrated nozzle approach. The results show an average difference between the two approaches of 1 percent. Based on the industry-accepted standard, ANSI/AMCA 210–07, the understanding that the two approaches are substantively similar, and feedback from test laboratories that use of the calibrated nozzle approach can reduce the test burden as compared to use of the pitot-tube traverses, DOE is proposing to allow the calibrated nozzle approach in addition to the pitot-tube traverse approach in appendix X1 when testing whole-home dehumidifiers, in accordance with the requirements of Sections 4.2.3, 4.3.2, and 7.3.2 of ANSI/AMCA 210–07.

DOE requests comment on the proposal to allow calibrated nozzle testing according to the requirements of Sections 4.2.3, 4.3.2, and 7.3.2 of ANSI/AMCA 210–07 for whole-home dehumidifiers in appendix X1.

b. Ventilation Air

Appendix X1 requires capping and sealing any fresh-air inlet on a whole-home dehumidifier during testing. Section 3.1.3 of appendix X1. In the July 2015 Final Rule, DOE determined that, while sealing the fresh-air inlet on dehumidifiers designed to operate with the fresh-air intake open may negatively impact capacity and efficiency, those effects are not significant enough to warrant the added test burden of providing separate fresh-air inflow. 80 FR 45802, 45811. In the June 2021 TP RFI, DOE noted the lack of data regarding representative consumer use of fresh-air inlet ducts for whole-home dehumidifiers. 86 FR 34640, 34643. DOE subsequently requested (1) data about the prevalence of fresh-air inlet use among whole-home dehumidifier consumers, and (2) feedback on the test burden increases associated with adding another air stream in the testing configuration to account for the fresh-air inlet on those whole-home dehumidifiers equipped with such a feature. *Id.*

Aprilaire and MIAQ stated that capping the fresh-air intake should not appreciably impact the total airflow through the unit and subsequently should have little effect on the efficiency. (Aprilaire, No. 4 at p. 2; MIAQ, No. 6 at p. 9) Aprilaire further stated that alternatives such as requiring an alternate airflow would provide a serious and substantial burden and would require substantial retrofits to existing dehumidification test chambers. (Aprilaire, No. 4 at p. 2) MIAQ stated that nearly all whole-home dehumidifiers it offers include the option of a fresh-air inlet, and that its units are tested with this inlet subject to the same ESP as the dehumidifier's return air inlet. MIAQ asserted that developing a test procedure that requires the dehumidifier's return air inlet to be subject to one value of ESP and the fresh-air inlet to a different ESP would be an excessive burden that would provide little value. MIAQ suggested consideration of alternatives, for example, a third test condition for whole-home dehumidifiers at a higher temperature and an ESP of 0.2 in. w.c. to simulate a blending of return air and outside air at two different temperatures and ESPs. MIAQ added that another possible approach is to develop a single metric representing multiple test conditions, as provided in their comments, that includes a test condition or two representing a fresh-air inlet combined with return air from the dwelling. (MIAQ, No. 6 at p. 9)

DOE is not aware of publicly available data, nor has DOE received information from commenters, regarding the prevalence of fresh-air inlet use among whole-home dehumidifier consumers. Comments received on this issue are consistent with DOE's prior determination that the burden of adding an additional air stream in the testing configuration to account for fresh-air inlet on those whole-home dehumidifiers equipped with such a feature would outweigh the benefits. Doing so would substantively increase cost, require substantial retrofits to existing dehumidification test chambers, and provide little value. Therefore, DOE proposes to retain the requirement to cap and seal the fresh-air inlet during testing of a whole-home dehumidifier.

DOE requests comment on the tentative determination to continue to require capping and sealing any fresh-air inlet on a whole-home dehumidifier during testing in appendix X1.

c. External Static Pressure

The DOE test procedure at appendix X1 requires that the ESP, the difference in process air outlet static pressure minus the process air inlet static pressure, be 0.2 in. w.c. for the duration of the test when conducting whole-home dehumidifier testing. *See* section 3.1.2.2.3.1 of appendix X1.

MIAQ stated that whole-home dehumidifiers are typically integrated into the dwelling's HVAC system's ductwork. MIAQ stated that the unit could (1) draw air from the furnace/air handler's return and send dehumidified air back to the return (*i.e.,* return-return installation), or (2) draw from the furnace/air handler's supply and return dehumidified air to the same supply (*i.e.,* supply-supply installation). MIAQ stated that in either setup, the ESP experienced by the dehumidifier would be nearly 0 in. w.c. MIAQ stated that whole-home dehumidifiers could also draw from the furnace/air handler's return and send the dehumidified air to the furnace/air handler's supply ductwork, in which case the ESP would be the same as that seen by the furnace/air handler's fan, which is typically 0.25 in. w.c. to 0.5 in. w.c. MIAQ further stated the dehumidifier could also receive a portion of its intake air from outside for the purpose of meeting ventilation requirements.

For whole-home dehumidifiers, MIAQ suggested that DOE adopt two product classes (75 pints/day or less and greater than 75 pints/day) and two test conditions (73 °F dry-bulb and 60 percent relative humidity for both test conditions, one at 0 in. w.c. of ESP and the other at 0.4 in. w.c. of ESP).

MIAQ stated that the first suggested test condition represents a unit ducted in a furnace return-return or supply-supply arrangement with 0 in. w.c. of ESP and the second suggested test condition represents a unit drawing air from the furnace's return air duct and/or outside air and supplying the air to the furnace's supply air duct with 0.4 in. w.c. of ESP. (MIAQ, No. 6 at pp. 4–6)

Regarding distinguishing between whole-home dehumidifiers based on capacity, MIAQ did not provide, and DOE does not have, information or data to indicate that such a distinction is warranted for the test procedure. If DOE proposes amendments to the energy conservation standards, DOE will consider whether to create additional whole-home dehumidifier product classes consistent with the authority at 42 U.S.C. 6295(q).

In this NOPR, DOE is not proposing to amend the test conditions and test setups for whole-home dehumidifiers, as suggested by MIAQ. MIAQ did not provide support regarding the representativeness of this setup. In addition, DOE previously considered and rejected it in a previous rulemaking based on a field study and other information. While DOE understands that installation configurations and environmental factors vary for whole-home dehumidifiers, DOE tentatively concludes that testing whole-home dehumidifiers twice, once with 0 in. w.c. ESP and once with 0.4 in. w.c. ESP, would not be sufficiently more representative as to justify the increased test burden. The 0.2 in. w.c. ESP specification for the existing single whole-home dehumidifier test was based on real-world operating data from a field study conducted in 2014.[17] This field study and manufacturer comments addressed in the supplemental notice of proposed rulemaking (''SNOPR'') during the last dehumidifier test procedure rulemaking (''February 2015 SNOPR'') supported that whole-home dehumidifiers are typically installed in configurations resulting in 0.2 in. w.c. ESP. 80 FR 5994 (Feb. 4, 2015). Manufacturer feedback discussed in the February 2015 SNOPR indicated that using an ESP of 0.5 in. w.c. would be an ''extreme and unrealistic condition for whole-home dehumidifiers'' and that whole-home dehumidifiers are typically installed at much lower ESP than 0.5 in. w.c. 80 FR 5994, 5997.

Adding additional whole-home dehumidifier tests would increase test burden on manufacturers by a minimum of 2 or 6 hours for each test. In addition to the increased test chamber time, each test with a new ESP would require additional time to adjust or refabricate duct installation setups between tests.

DOE is not proposing to add additional tests to the whole-home dehumidifier test procedure at appendix X1. DOE tentatively determined that the current test procedure sufficiently represents typical whole-home installation configurations and any marginal increase in representativeness from additional test conditions would not justify the substantial test burden increase associated with those additional tests.

DOE requests comment on maintaining a single test approach for whole-home dehumidifiers. DOE also requests comment on potential improvements in representativeness and the additional test burden associated with the testing whole-home dehumidifiers twice, once each with an external static pressure of 0 in. w.c. ESP and 0.4 in. w.c.

5. Network Functions

In the June 2021 TP RFI, DOE noted that many types of consumer products (*e.g.,* refrigerators, clothes dryers, room air conditioners) are now equipped with ''network functions,'' such as mobile alerts/messages, remote control, and energy information and demand response capabilities to support future smart grid interconnection. 86 FR 34640, 34643. DOE noted that certain manufacturers have also incorporated some of these features, such as WiFi capability, into dehumidifiers. *Id.* In a previously published RFI, DOE sought comment to better understand market trends and issues in the emerging market for products and equipment that incorporate smart technology to ensure that DOE did not inadvertently impede such innovation when setting efficiency standards. 83 FR 46886. (Sept. 17, 2018) In the June 2021 TP RFI, DOE requested (1) data on the prevalence of network functions in dehumidifiers currently on the market in the United States and (2) information on whether the current test procedures for dehumidifiers impede providing smart technology operations on dehumidifiers. 86 FR 34640, 34643.

In response to the June 2021 TP RFI, the Joint Commenters, MIAQ, and the California IOUs supported further investigation of network functions in dehumidifiers. (Joint Commenters, No. 5 at pp. 1–2; MIAQ, No. 6 at p. 8; California IOUs, No. 7 at p. 2) The Joint Commenters stated that, while units with network functions can provide benefits by facilitating integration with the smart grid, network functions may consume additional standby power in all operating modes. They further stated the test procedure should capture any power consumption associated with network functions to encourage manufacturers to provide network functions with low power consumption. (Joint Commenters, No. 5 at pp. 1–2)

MIAQ stated it is not aware of any product with significant residential market impact that uses network functions. MIAQ further stated that it is aware of commercial dehumidifiers that offer this technology and of efforts to develop this for the residential market. MIAQ stated that if network functions were integrated into dehumidification products, the method of test would need to be re-evaluated; if the units included faster response or predictive operation, there may be more time spent in a ''standby'' mode or more rapid cycling of the unit. (MIAQ, No. 6 at p. 8)

The California IOUs asserted that dehumidifiers are strong candidates for load shifting due to their typical operation based on humidity, rather than on consumer preferences. They indicated that network functions and load shifting are priorities in California and that dehumidifiers with network functions are already on the market. The California IOUs also commented that EPA has indicated an intent to include network functions in future revisions of the ENERGY STAR Criteria. (California IOUs, No. 7 at p. 2)

AHAM stated that enabling network functions results in a negligible increase in current draw when compared to the current draw of a dehumidifier's main function. AHAM additionally stated that the percentage of dehumidifiers with network functions (as per the ENERGY STAR definition) is 0.4 percent of total shipments. AHAM stated that further discussion on these aspects of the test procedure will take place on the AHAM DH–1 task force. (AHAM, No. 3 at p. 3)

[17] T. Burke, *et al.,* Whole-Home Dehumidifiers: Field-Monitoring Study, Lawrence Berkeley National Laboratory, Report No. LBNL–6777E (September 2014). Available at *https://www.osti.gov/servlets/purl/1164163.*

Based on testing and information from industry regarding network functions in consumer products, DOE expects that the power consumption attributable to network functions is expected to be on the order of 1 watt (''W'') or less. The impact on IEF of power consumption of network functions is expected to be no more than 1 percent, based on DOE's testing that indicated an average impact on IEF of less than 0.75 percent for the units in DOE's test sample. DOE is aware there are dehumidifiers on the market with varying implementations of network functions. However, DOE is not aware of any data available, nor did interested parties provide any data, regarding the consumer use of network functions. Without these data, DOE is unable to establish a representative test configuration to assess the energy consumption of network functions for dehumidifiers. Therefore, DOE proposes to specify that, if a dehumidifier has network functions, all network functions must be disabled throughout testing using means available to the end user pursuant to instructions provided in the product's user manual. DOE further proposes to specify that, if network functions cannot be disabled by the consumer or the manufacturer's user manual does not provide instruction for disabling the function, the energy consumption of the enabled network function must be included, as it is more representative than excluding the energy consumption associated with the network function.

DOE requests comment on the proposal to specify in appendix X1 that, for units with network functions, (1) the network functions must be disabled throughout testing if such settings can be disabled by the end-user and the product's user manual provides instructions on how to do so; and (2) if network functions cannot be disabled by the end-user, or the product's user manual does not provide instruction for disabling network functions, then the unit must be tested with the network functions in the factory default configuration for the test period.

6. Removal of Appendix X

Appendix X to subpart B of 10 CFR part 430 is unnecessary for dehumidifiers manufactured on or after January 27, 2016. Use of appendix X1 to subpart B of 10 CFR part 430 is currently required for any representations of energy use or efficiency of portable and whole-home dehumidifiers, including demonstrating compliance with the currently applicable energy conservation standards. As discussed in this document, DOE is proposing to maintain the current appendix X1, with amendments. That updated version of appendix X1 would be used for the evaluation and issuance of any updated efficiency standards, and for determining compliance with those standards. Therefore, in this NOPR DOE proposes to remove appendix X to subpart B of 10 CFR part 430, along with all references to appendix X in 10 CFR parts 429 and 430.

DOE requested comment on its proposal to remove appendix X to subpart B of 10 CFR part 430 along with all references to appendix X in 10 CFR parts 429 and 430.

D. Reporting

Manufacturers, including importers, must use product-specific certification templates to certify compliance to DOE. For dehumidifiers, the certification template reflects the general certification requirements at 10 CFR 429.12 and the product-specific requirements at 10 CFR 429.36.

The California IOUs suggested that DOE incorporate reporting of refrigerant type and charge quantity for dehumidifiers into the test procedure. They stated that this would not increase testing burden as this information is already being collected to comply with other industry test procedures and would be useful for compliance with new refrigerant regulations. (California IOUs, No. 7 at p. 3)

The collection of refrigerant type and charge quantity for dehumidifiers is not necessary for compliance or to support the DOE program. For this reason, DOE is not proposing to amend the product-specific certification requirements for dehumidifiers to require reporting of refrigerant type or charge quantity.

E. Test Procedure Costs and Harmonization

1. Test Procedure Costs and Impact

In this NOPR, DOE proposes to amend the existing test procedure for dehumidifiers by amending appendix X1 to incorporate the current version of the applicable industry standard, specify dehumidification mode rating test period options of 2 or 6 hours, permit the use of a sampling tree in conjunction with an aspirating psychrometer for a dehumidifier with a single process air intake grille, and specify requirements for testing dehumidifiers with network functions. If the network functions can be disabled by the end-user and instructions to disable are in the manual, test with those functions disabled; otherwise, test in the factory default setting. DOE has tentatively determined that these proposed amendments would not increase testing costs. As discussed in the following paragraphs, DOE has also tentatively determined that two proposals would likely reduce testing costs: shortening the test duration and permitting use of a sampling tree.

a. Reduced Test Period

DOE proposes to amend appendix X1 to specify dehumidification mode rating test period options of 2 or 6 hours for portable and whole-home dehumidifiers. As discussed in section III.B.3 of this document, DOE expects this proposal would decrease test cost for dehumidifier manufacturers due to reduced test chamber time, assuming they choose the 2-hour option. Reducing the test period by 4 hours would yield an estimated cost savings per test of $750.

DOE has initially determined that the proposed amendments would not affect the representations of dehumidifier energy efficiency/energy use, as discussed in section III.B.4 of this document. If DOE adopts the proposed amendments, DOE expects that manufacturers would be able to rely on data generated under the current test procedure. As such, retesting of dehumidifiers would not be required solely as a result of DOE's adoption of the proposed amendments to the test procedure. Recertification would also not be required as a result of this amendment: the proposal includes retaining the 6-hour option, meaning existing test data would continue to support certification.

DOE requests comment on the impact and associated costs of the proposal to specify dehumidification mode rating test period options of 2 or 6 hours for portable and whole-home dehumidifiers.

b. Sampling Tree

DOE proposes in appendix X1 to allow relative humidity measurements using an aspirating psychrometer with a sampling tree for dehumidifiers with a single air inlet. As discussed in section III.B.4 of this document, DOE expects this proposal would not substantively impact repeatability or reproducibility of the test procedure or the representativeness of the measured energy efficiency. The proposal, if made final, would not result in a change of the measured energy efficiency of any currently certified dehumidifiers because the proposed use of a sampling tree would be an alternate test set-up to the current test set-up. The proposal, if made final, would also likely reduce the test burden for certain test laboratories that would otherwise be required to change their aspirating psychrometer configuration to remove the sampling tree and reposition the psychrometer within the test chamber. There is no cost attributable to this amendment.

DOE has tentatively determined that the proposed amendments would not impact the measured energy use or representations of dehumidifier energy efficiency/energy use. DOE has tentatively determined that manufacturers would be able to rely on data generated under the current test procedure if DOE adopts the proposed amendments. As such, DOE does not expect retesting of any dehumidifier would be required solely as a result of DOE's adoption of the proposed amendments to the test procedure.

DOE requests comment on the impact and associated costs of the proposal to allow relative humidity measurements to be made using an aspirating psychrometer with a sampling tree in appendix X1 for dehumidifiers with a single air inlet.

c. Other Amendments

DOE has tentatively determined that the proposed amendments to incorporate the updated version of the relevant industry testing standard and to provide additional direction regarding units with network functions would not change the measured energy efficiency as compared to the current test procedure and would not change the test costs. Based on review of AHAM DH–1–2017, DOE expects that the proposed test procedure for measuring IEF would not increase testing costs per unit compared to the current DOE test procedure. DOE also does not expect that the proposed direction to disable network functions during testing, if made final, would impact test cost or the measured energy efficiency, as network function does not represent a significant portion of the overall energy efficiency, as discussed previously.

2. Harmonization With Industry Standards

DOE's established practice is to adopt relevant industry standards as DOE test procedures unless such methodology would be unduly burdensome to conduct or would not produce test results that reflect the energy efficiency, energy use, water use (as specified in EPCA) or estimated operating costs of that product during a representative average use cycle or period of use. 10 CFR part 430 subpart C, appendix A, section 8(c). If the industry standard does not meet EPCA statutory criteria for test procedures, DOE will, through the rulemaking process, adopt modifications to these standards.

The test procedures for dehumidifiers at part 430, subpart B, appendix X1 incorporates by reference AHAM DH–1–2017, ANSI/AMCA 210, ANSI/ASHRAE 41.1, and IEC 62301. Appendix X1 incorporates sections of (1) AHAM DH–1–2017 for definitions, instrumentation, and test procedure requirements, (2) ANSI/AMCA 210 to describe required instrumentation and measurements of ESP, pressure losses, and velocity pressures for refrigerant-desiccant whole-home dehumidifiers testing, (3) ANSI/ASHRAE 41.1 to determine the number and locations of temperature sensors within the ducts for refrigerant-desiccant whole-home dehumidifiers, and (4) IEC 62301 for requirements for inactive and off mode testing. The industry standards DOE proposes to incorporate by reference via amendments described in this proposed rule are discussed in further detail in section IV.M of this document.

DOE has tentatively determined that the proposed amendments in this proposed rule are not unduly burdensome. DOE requests comments on the benefits and burdens of the proposed updates and additions to industry test standards referenced in the test procedure for dehumidifiers.

F. Compliance Date

EPCA prescribes that, if DOE amends a test procedure, all representations of energy efficiency and energy use, including those made on marketing materials and product labels, must be made in accordance with that amended test procedure, beginning 180 days after publication of that test procedure final rule in the **Federal Register**. (42 U.S.C. 6293(c)(2))

If DOE were to publish an amended test procedure and an individual manufacturer may experience undue hardship in meeting the deadline, EPCA provides an allowance for those manufacturers to petition DOE for an extension of the 180-day period. (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.*)

IV. Procedural Issues and Regulatory Review

A. Review Under Executive Orders 12866 and 13563

Executive Order (''E.O.'') 12866, ''Regulatory Planning and Review,'' as supplemented and reaffirmed by E.O. 13563, ''Improving Regulation and Regulatory Review, 76 FR 3821 (Jan. 21, 2011), requires agencies, to the extent permitted by law, to (1) propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs (recognizing that some benefits and costs are difficult to quantify); (2) tailor regulations to impose the least burden on society, consistent with obtaining regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations; (3) select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity); (4) to the extent feasible, specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt; and (5) identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public. DOE emphasizes as well that E.O. 13563 requires agencies to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. In its guidance, the Office of Information and Regulatory Affairs (''OIRA'') in the Office of Management and Budget (''OMB'') has emphasized that such techniques may include identifying changing future compliance costs that might result from technological innovation or anticipated behavioral changes. For the reasons stated in the preamble, this proposed regulatory action is consistent with these principles.

Section 6(a) of E.O. 12866 also requires agencies to submit ''significant regulatory actions'' to OIRA for review. OIRA has determined that this proposed regulatory action does not constitute a ''significant regulatory action'' under section 3(f) of E.O. 12866. Accordingly, this action was not submitted to OIRA for review under E.O. 12866.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis (''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: *www.energy.gov/gc/office-general-counsel.*

1. Description of Reasons Why Action Is Being Considered

The Energy Policy and Conservation Act, as amended (''EPCA'') [18] requires that, at least once every 7 years, DOE evaluate test procedures for each type of covered product, including dehumidifiers, 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)) DOE is publishing this NOPR in satisfaction of the 7-year review requirement specified in EPCA. (42 U.S.C. 6293(b)(1)(A))

2. Objectives of, and Legal Basis for, Rule

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))

EPCA requires that, at least once every 7 years, DOE evaluate test procedures for each type of covered product, including dehumidifiers, to determine whether amended test procedures would more accurately or fully comply with the requirements for the test procedures to 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 and not be unduly burdensome to conduct. (42 U.S.C. 6293(b)(1)(A))

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. (42 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 [19] and IEC Standard 62087 [20] as applicable. (42 U.S.C. 6295(gg)(2)(A))

DOE is publishing this NOPR in satisfaction of the 7-year review requirement specified in EPCA. (42 U.S.C. 6293(b)(1)(A))

3. Description and Estimate of Small Entities Regulated

For manufacturers of dehumidifiers, the Small Business Administration (''SBA'') considers a business entity to be small business, if, together with its affiliates, it employs less than a threshold number of workers specified in 13 CFR part 121. DOE used SBA's small business size standards to determine whether any small entities would be subject to the requirements of the rule. These size standards and codes are established by the North American Industry Classification System (''NAICS'') and are available at *www.sba.gov/document/support--table-size-standards.* Manufacturing of portable dehumidifiers is classified under NAICS 335210, ''Small Electrical Appliance Manufacturing,'' whereas the manufacturing of whole-home dehumidifiers is classified under NAICS 333415, ''Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing.'' The SBA sets a threshold of 1,500 employees or fewer and 1,250 employees or fewer for an entity to be considered as a small business in these industry categories, respectively. For manufacturers of both portable and whole-home dehumidifiers, DOE used the higher (or more conservative) threshold of 1,500 employees or fewer.

DOE used its Compliance Certification Database (''CCD''),[21] California Energy Commission's Modernized Appliance Efficiency Database System (''MAEDbS''),[22] and ENERGY STAR's Product Finder dataset [23] to create a list of companies that sell the products covered by this rulemaking in the United States. DOE consulted publicly available data, such as manufacturer websites, manufacturer specifications and product literature, import/export logs, and basic model numbers, to identify original equipment manufacturers (''OEMs'') of the products covered by this rulemaking. DOE relied on public data and subscription-based market research tools (*e.g.,* Dun & Bradstreet reports [24]) to determine company location, headcount, and annual revenue. DOE screened out companies that do not offer products covered by this proposed rulemaking, do not meet the SBA's definition of a ''small business,'' or are foreign-owned and operated.

DOE initially identified 15 OEMs of dehumidifiers for the U.S. market. DOE estimates that 12 are OEMs of portable dehumidifiers, two are OEMs of whole-home dehumidifiers, and one is an OEM of both portable and whole-home dehumidifiers. Of the 15 total OEMs identified, one qualifies as a ''small business'' and is not foreign-owned or operated.

4. Description and Estimate of Compliance Requirements

In this NOPR, DOE proposes to amend appendix X1 to subpart B of part 430—Uniform Test Method for Measuring the Energy Consumption of Dehumidifiers, as follows:

(1) Incorporate by reference parts of AHAM DH–1–2017;

(2) Allow the rating test period in sections 4.1.1, 4.1.2, and 5.4 to be 2 or 6 hours;

(3) Add a provision in section 3.1.1.3 allowing for the use of a sampling tree in conjunction with an aspirating

[18] All references to EPCA in this document refer to the statute as amended through the Infrastructure Investment and Jobs Act, Public Law 117–58 (Nov. 15, 2021).

[19] IEC 62301, *Household electrical appliances—Measurement of standby power* (Edition 2.0, 2011–01).

[20] IEC 62087, Audio, video and related equipment—Methods of measurement for power consumption (Edition 1.0, Parts 1–6: 2015, Part 7: 2018).

[21] DOE's CCD is available at *www.regulations.doe.gov/certification-data* (Last accessed January 24, 2022).

[22] California Energy Commission's MAEDbS is available at *cacertappliances.energy.ca.gov/Pages/Search/AdvancedSearch.aspx* (Last accessed January 24, 2022).

[23] ENERGY STAR's Product Finder dataset is available at *www.energystar.gov/productfinder/product/certified-dehumidifiers/results* (Last accessed January 24, 2022).

[24] The Dun & Bradstreet Hoovers subscription login is available online at *app.dnbhoovers.com/.*

psychrometer for a dehumidifier with a single process air intake grille; and

(4) Add a requirement in section 3.1.2.3 that dehumidifiers with network functions shall be tested with the network functions in the ''off'' position if it can be disabled by the end-user; otherwise test in the factory default setting.

DOE has tentatively determined that these proposed amendments would not increase testing costs, and would likely reduce the testing costs, as discussed in the following paragraphs.

DOE proposes to amend appendix X1 to allow the dehumidification mode test duration to be 2 or 6 hours for both portable and whole-home dehumidifiers. DOE expects that this proposal would decrease testing costs and test burden for dehumidifier manufacturers due to reduced test chamber time, assuming they choose the 2-hour option. Considering a reduction of the test period by 4 hours, if the option is taken, and the subsequent time for test setup and stabilization, the estimated cost savings per test would be $750. Additionally, DOE has initially determined that the proposed amendments would not affect the representations of dehumidifier energy efficiency/energy use. If DOE adopts the proposed amendments, DOE expects that manufacturers would be able to rely on data generated under the current test procedure should the proposed amendments be finalized. Therefore, retesting would not be required solely as a result of DOE's adoption of the proposed amendments to the test procedure.

DOE proposes to allow relative humidity measurements to be made using an aspirating psychrometer with a sampling tree in appendix X1 for dehumidifiers with a single air inlet. DOE expects this proposal would not substantively impact repeatability or reproducibility of the test procedure and would likely reduce the test burden for certain test labs that would otherwise be required to change their aspirating psychrometer configuration to remove the sampling tree and reposition the psychrometer within the test chamber. There is no cost attributable to this amendment. DOE has tentatively determined that the proposed amendments would not impact the representations of dehumidifier energy efficiency/energy use, and that manufacturers would be able to rely on data generated under the current test procedure if DOE adopts the proposed amendments. As such, DOE does not expect retesting of any dehumidifier would be required solely due to DOE's adoption of the proposed amendments to the test procedure.

DOE does not anticipate the proposed test procedure amendments to result in increased testing costs for manufacturers, including small manufacturers. Thus, DOE tentatively concludes that the proposed rule would not have a significant impact on a substantial number of small entities.

DOE requests comment on its initial conclusion that the NOPR would not have a significant impact on a substantial number of small entities.

5. Identification of Duplication, Overlap, and Conflict With Other Rules and Regulations

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

6. A Description of Significant Alternatives to the Rule

DOE considered alternative test methods and modifications to the test procedure for portable and whole-home dehumidifiers, and the Department has initially determined that there are no better alternatives than the modifications and test procedures proposed in this Notice, in terms of both meeting the agency's objectives and reducing burden. As previously discussed, DOE expects that these proposed amendments would not increase testing costs and would likely reduce the testing costs for dehumidifier manufacturers. Specifically, DOE proposes to allow test duration to be 2 or 6 hours for the dehumidification mode test, thereby reducing test burden, assuming they choose the 2-hour option.

Additionally, manufacturers subject to DOE's energy efficiency standards may apply to DOE's Office of Hearings and Appeals for exception relief under certain circumstances. Manufacturers should refer to 10 CFR part 430, subpart E, and 10 CFR part 1003 for additional details.

C. Review Under the Paperwork Reduction Act of 1995

Manufacturers of dehumidifiers 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 dehumidifiers. (*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.

DOE is not proposing to amend the certification or reporting requirements for dehumidifiers in this NOPR.

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

D. Review Under the National Environmental Policy Act of 1969

In this NOPR, DOE proposes test procedure amendments that it expects will be used to develop and implement future energy conservation standards for dehumidifiers. DOE has determined that this proposed rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*) and DOE's implementing regulations at 10 CFR part 1021. Specifically, DOE has determined that adopting test procedures for measuring energy efficiency of consumer products and industrial equipment is consistent with activities identified in 10 CFR part 1021, appendix A to subpart D, A5 and A6. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

E. Review Under Executive Order 13132

Executive Order 13132, ''Federalism,'' 64 FR 43255 (Aug. 4, 1999) imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. The Executive order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined 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.

F. Review Under Executive Order 12988

Regarding the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, ''Civil Justice Reform,'' 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity, (2) write regulations to minimize litigation, (3) provide a clear legal standard for affected conduct rather than a general standard, and (4) promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that executive agencies make every reasonable effort to ensure that the regulation (1) clearly specifies the preemptive effect, if any, (2) clearly specifies any effect on existing Federal law or regulation, (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction, (4) specifies the retroactive effect, if any, (5) adequately defines key terms, and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, the proposed rule meets the relevant standards of Executive Order 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (''UMRA'') requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Public Law 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 *www.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.

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

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

I. Review Under Executive Order 12630

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

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

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for 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). Pursuant to OMB Memorandum M–19–15, Improving Implementation of the Information Quality Act (April 24, 2019), DOE published updated guidelines which are available at *www.energy.gov/sites/prod/files/2019/12/f70/DOE%20Final%20Updated%20IQA%20Guidelines%20Dec%202019.pdf.* 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.

K. Review Under Executive Order 13211

Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,'' 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to 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 dehumidifiers 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.

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

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91; 42 U.S.C. 7101), 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.

The proposed modifications to the test procedure for dehumidifiers in appendix X1 would incorporate testing methods contained in certain sections of the following commercial standards: AHAM DH–1–2017, ANSI/AMCA 210, ANSI/ASHRAE 41.1, and IEC 62301. DOE has previously evaluated three of these standards (ANSI/AMCA 210, ANSI/ASHRAE 41.1, and IEC 62301) and was unable to conclude whether they fully comply with the requirements of section 32(b) of the FEAA (*i.e.,* whether they were developed in a manner that fully provides for public participation, comment, and review. DOE consulted with the Attorney General and the Chairman of the FTC concerning the impact of these test procedures on competition, and they did not object to the use of those standards. 80 FR 45801, 45823.

DOE has evaluated AHAM DH–1–2017 and is unable to conclude whether it fully complies with the requirements of section 32(b) of the FEAA (*i.e.,* whether it was developed in a manner that fully provides for public participation, comment, and review.) DOE will consult with both the Attorney General and the Chairman of the FTC concerning the impact of AHAM DH–1–2017 on competition, prior to prescribing a final rule.

M. Description of Materials Incorporated by Reference

In this NOPR, DOE proposes to incorporate by reference in appendix X1 the test standard published by AHAM, titled ''AHAM DH–1–2017.'' AHAM DH–1–2017 is an industry-accepted test procedure that measures the capacity and energy input of portable dehumidifiers under specified test conditions. AHAM DH–1–2017 includes provisions for testing dehumidifier energy use in off-cycle, inactive, and off modes, and for including energy consumption in those modes in efficiency calculations. Appendix X1 references sections of AHAM DH–1–2017 for definitions, instrumentation, and test procedure requirements.

Copies of AHAM DH–1–2017 may be purchased from The Association of Home Appliance Manufacturers at 1111 19th Street NW, Suite 402, Washington, DC 20036, or by going to *www.aham.org/ht/d/Store/.*

In this NOPR, DOE also proposes to maintain the incorporation by reference to the ANSI and AMCA test standard ANSI/AMCA 210, titled ''Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating,'' (ANSI Approved). ANSI/AMCA 210 is an industry-accepted test procedure that defines uniform methods for conducting laboratory tests on housed fans to determine airflow rate, pressure, power and efficiency, at a given speed of rotation. Appendix X1 references ANSI/AMCA 210 to describe required instrumentation required and measurements of ESP, pressure losses, and velocity pressures for refrigerant-desiccant whole-home dehumidifiers testing.

Copies of ANSI/AMCA 210 can be obtained from the Air Movement and Control Association International, Inc., at AMCA International, 30 West University Drive, Arlington Heights, IL 60004, or by going to *www.amca.org.*

In this NOPR, DOE also proposes to maintain the incorporation by reference to the ANSI and ASHRAE test standard ANSI/ASHRAE 41.1, titled ''Standard Method for Temperature Measurement,'' (ANSI Approved). ANSI/ASHRAE 41.1 is an industry-accepted standard that describes temperature measurement methods intended for use in heating, refrigerating, and air conditioning equipment and components. Appendix X1 references ANSI/ASHRAE 41.1 to determine the number and locations of temperature sensors within the ducts for refrigerant-desiccant whole-home dehumidifiers.

Copies of ANSI/ASHRAE 41.1 can be obtained from the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., at 1791 Tullie Circle NE, Atlanta, GA 30329, or by going to *www.ashrae.org.*

In this NOPR, DOE also proposes to maintain the incorporation by reference to the IEC test standard IEC 62301, titled ''Household electrical appliances—Measurement of standby power, Edition 2.0, 2011–01.'' IEC 62301 specifies methods of measurement of electrical power consumption in standby mode(s) and other low power modes, such as off mode and network mode, as applicable. Appendix X1 references sections of IEC 62301 for requirements for inactive and off mode testing.

Copies of IEC Standard 62301 can be obtained from the International Electrotechnical Commission at 3 rue de Varembé, P.O. Box 131, CH–1211, Geneva 20, Switzerland, or by going to *webstore.iec.ch/* and *www.webstore.ansi.org.*

The Director of the Federal Register previously approved ANSI/ASHRAE 41.1, ANSI/AMCA 210, and IEC 62301 (Edition 2.0, 2011–01) for incorporation by reference in the locations in which they appear in this proposed rule's regulatory text for 10 CFR part 430.

V. Public Participation

A. Participation in the Webinar

The time and date the webinar meeting are listed in the **DATES** section at the beginning of this document. Webinar registration information, participant instructions, and information about the capabilities available to webinar participants will be published on DOE's website: *www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=24&action=viewcurrent.* Participants are responsible for ensuring their systems are compatible with the webinar software.

B. Procedure for Submitting Prepared General Statements for Distribution

Any person who has an interest in the topics addressed in this proposed rule, or who is representative of a group or class of persons that has an interest in these issues, may request an opportunity to make an oral presentation at the webinar. Such persons may submit to *ApplianceStandardsQuestions@ee.doe.gov.* Persons who wish to speak should include with their request a computer file in WordPerfect, Microsoft Word, PDF, or text (ASCII) file format that briefly describes the nature of their interest in this proposed rulemaking and the topics they wish to discuss. Such persons should also provide a daytime telephone number where they can be reached.

C. Conduct of the Webinar

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

The webinar will be conducted in an informal, conference style. DOE will present a general overview of the topics addressed in this proposed rulemaking, allow time for prepared general statements by participants, and encourage all interested parties to share their views on issues affecting this rulemaking. Each participant will be allowed to make a general statement (within time limits determined by DOE), before the discussion of specific topics. DOE will permit, as time permits, other participants to comment briefly on any general statements.

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

A transcript of the webinar will be included in the docket, which can be viewed as described in the *Docket* section at the beginning of this document. In addition, any person may buy a copy of the transcript from the transcribing reporter.

D. Submission of Comments

DOE will accept comments, data, and information regarding this proposed rule no later than the date provided in the **DATES** section at the beginning of this document.[25] Interested parties may submit comments using any of the methods described in the **ADDRESSES** section at the beginning of this document.

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

However, your contact information will be publicly viewable if you include it in the comment 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 *www.regulations.gov* information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (''CBI'')). Comments submitted through *www.regulations.gov* cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

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

Submitting comments via email. Comments and documents submitted via email also will be posted to *www.regulations.gov.* If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information 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. No 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. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email to *Dehumidifier2019TP0026@ee.doe.gov;* 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. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

It is DOE's policy that all comments may be included in the public docket,

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[25] DOE has historically provided a 75-day comment period for test procedure NOPRs pursuant to the North American Free Trade Agreement, U.S.-Canada-Mexico (''NAFTA''), Dec. 17, 1992, 32 I.L.M. 289 (1993); the North American Free Trade Agreement Implementation Act, Public Law 103–182, 107 Stat. 2057 (1993) (codified as amended at 10 U.S.C.A. 2576) (1993) (''NAFTA Implementation Act''); and Executive Order 12889, ''Implementation of the North American Free Trade Agreement,'' 58 FR 69681 (Dec. 30, 1993). However, on July 1, 2020, the Agreement between the United States of America, the United Mexican States, and the United Canadian States (''USMCA''), Nov. 30, 2018, 134 Stat. 11 (*i.e.,* the successor to NAFTA), went into effect, and Congress's action in replacing NAFTA through the USMCA Implementation Act, 19 U.S.C. 4501 *et seq.* (2020), implies the repeal of E.O. 12889 and its 75-day comment period requirement for technical regulations. Thus, the controlling laws are EPCA and the USMCA Implementation Act. Consistent with EPCA's public comment period requirements for consumer products, the USMCA only requires a minimum comment period of 60 days. Consequently, DOE now provides a 60-day public comment period for test procedure NOPRs.

without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

E. Issues on Which DOE Seeks Comment

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

(1) DOE requests comment on (1) its preliminary determination that the explicit exclusions from the definition of ''dehumidifier'' sufficiently distinguish dehumidifiers from consumer products that provide cooling by removing both sensible and latent heat, and (2) whether there are products on the market that are not explicitly excluded from the ''dehumidifier'' definition but should be.

(2) DOE requests comment on the proposed amended definitions for portable dehumidifier and whole-home dehumidifier.

(3) DOE requests comment on the proposal to incorporate AHAM DH–1–2017 by reference. DOE requests comment on the proposal not to change specifying ambient conditions based on wet-bulb temperature, as currently specified, as opposed to (or in addition to) dewpoint temperature.

(4) DOE requests information and data regarding any efficiency and performance benefits associated with variable-speed dehumidifiers, both generally and relative to those with single-speed dehumidifiers.

(5) DOE requests comment on maintaining a single-test condition approach for portable dehumidifiers, and further requests comment on potential benefits and burden associated with a three-test condition approach for all portable dehumidifiers.

(6) DOE requests comment on load-based testing for dehumidifiers, including (1) whether DOE's variable-speed dehumidifier test results are typical of the expected performance under a load-based test, (2) whether there are other aspects of performance beyond cycling that may have contributed to the performance observed during these tests, (3) the feasibility of conducting load-based tests in a typical lab setup, (4) the relative benefits and burdens of a load-based test, and (5) the tentative determination not to prescribe a load-based test in appendix X1.

(7) DOE requests comment on (1) the proposal to allow the dehumidification mode test duration to be 2 or 6 hours for both portable and whole-home dehumidifiers, (2) whether the proposed approach sufficiently represents capacity and efficiency for dehumidifiers, and (3) the efficacy of alternate test durations, including those being considered by industry stakeholders.

(8) DOE requests comment on the proposal to allow relative humidity measurements taken using an aspirating psychrometer with a sampling tree in appendix X1 for dehumidifiers with a single air inlet.

(9) DOE requests comment on the proposal to require that the psychrometer box be shielded or positioned to minimize radiation effects on the sensing elements, that there be line of sight separation between any fans and sensing elements within the test fixture, and at least 3 feet of separation, along the path of airflow, between any fans and sensing elements within the test fixture.

(10) DOE requests comment regarding the maximum air velocity requirement generally, the current 50 ft/min requirement as specified in AHAM DH–1–2017, and the consideration to raise the maximum air velocity within 3 ft of the dehumidifier with the unit not operating, when properly configuring the test chamber. Were DOE to obtain information or data indicating that a higher permitted air velocity would not negatively impact the measured results, DOE would consider adopting an increased air velocity requirement.

(11) DOE requests comment on the proposal to allow calibrated nozzle testing according to the requirements of Section 7.3.2 of ANSI/AMCA 210–07 for whole-home dehumidifiers in appendix X1.

(12) DOE requests comment on the tentative determination to continue to require capping and sealing any fresh-air inlet on a whole-home dehumidifier during testing in appendix X1.

(13) DOE requests comment on maintaining a single test approach for whole-home dehumidifiers. DOE also requests comment on potential improvements in representativeness and the additional test burden associated with the testing whole-home dehumidifiers twice, once each with an external static pressure of 0 in. w.c. ESP and 0.4 in. w.c.

(14) DOE requests comment on the proposal to specify in appendix X1 that, for units with network functions, (1) the network functions must be disabled throughout testing if such settings can be disabled by the end-user and the product's user manual provides instructions on how to do so; and (2) if network functions cannot be disabled by the end-user, or the product's user manual does not provide instruction for disabling network functions, then the unit must be tested with the network functions in the factory default configuration for the test period.

(15) DOE requests comment on the impact and associated costs of the proposal to specify dehumidification mode rating test period options of 2 or 6 hours for portable and whole-home dehumidifiers.

(16) DOE requests comment on the impact and associated costs of the proposal to allow relative humidity measurements to be made using an aspirating psychrometer with a sampling tree in appendix X1 for dehumidifiers with a single air inlet.

(17) DOE has tentatively determined that the proposed amendments in this notice are not unduly burdensome. DOE requests comments on the benefits and burdens of the proposed updates and additions to industry test standards incorporated in the test procedure for dehumidifiers.

(18) DOE requests comment on its initial conclusion that the NOPR would not have a significant impact on a substantial number of small entities.

VI. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this notice of proposed rulemaking and announcement of public meeting.

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.

Signing Authority

This document of the Department of Energy was signed on May 27, 2022, by Kelly J. Speakes-Backman, Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the **Federal Register**.

Signed in Washington, DC, on May 31, 2022.

Treena V. Garrett,

Federal Register Liaison Officer, U.S. Department of 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 set forth below:

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

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

Authority: 42 U.S.C. 6291–6317; 28 U.S.C. 2461 note.

■ 2. Section 429.36 is amended by revising paragraph (b)(2) to read as follows:

§ 429.36 Dehumidifiers.

* * * * *

(b) * * *

(2) Pursuant to § 429.12(b)(13), include in each certification report the following product-specific information:

(i) The integrated energy factor in liters per kilowatt-hour (liters/kWh), capacity in pints per day; and

(ii) For whole-home dehumidifiers, case volume in cubic feet.

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 430.2 is amended by revising the definitions of ''Portable dehumidifier'' and ''Whole-home dehumidifier'' to read as follows:

§ 430.2 Definitions.

* * * * *

Portable dehumidifier means a dehumidifier that, in accordance with any manufacturer instructions available to a consumer, operates within the dehumidified space without the attachment of additional ducting, although means may be provided for optional duct attachment.

* * * * *

Whole-home dehumidifier means a dehumidifier that, in accordance with any manufacturer instructions available to a consumer, operates with ducting to deliver return process air to its inlet and to supply dehumidified process air from its outlet to one or more locations in the dehumidified space.

■ 5. Section 430.3 is amended by:

■ a. Revising paragraph (i)(1);

■ b. Removing paragraph (m)(2);

■ c. Redesignating paragraphs (m)(3) and (4) as paragraphs (m)(2) and (3), respectively; and

■ d. Revising paragraph (o)(6) by removing the wording ''X, '' in the sentence.

The revisions read as follows:

§ 430.3 Materials incorporated by reference.

* * * * *

(i) * * *

(1) AHAM DH–1–2017 (''AHAM DH–1''), Dehumidifiers, IBR approved for appendix X1 to subpart B.

* * * * *

■ 6. Section 430.23 is amended by revising paragraph (z) to read as follows:

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

* * * * *

(z) *Dehumidifiers.* (1) Determine the capacity, expressed in pints/day, according to section 5.2 of appendix X1 to this subpart.

(2) Determine the integrated energy factor, expressed in L/kWh, according to section 5.4 of appendix X1 to this subpart.

(3) Determine the case volume, expressed in cubic feet, for whole-home dehumidifiers in accordance with section 5.7 of appendix X1 of this subpart.

* * * * *

Appendix X [Removed and Reserved]

■ 7. Appendix X to subpart B of part 430 is removed and reserved.

■ 8. Appendix X1 to subpart B of part 430 is amended by:

■ a. Revising the introductory Note;

■ b. Adding section 0;

■ c. Revising sections 3.1.1, 3.1.1.2, 3.1.1.3, 3.1.2, 3.1.2.2.3.1, 3.1.2.2.3.2, 3.1.2.3, 3.2.2.1, 4.1.1, 4.1.2, 4.2 and 4.3;

■ d. Removing sections 2.1, 2.2, 2.3, 2.9, 4.3.1 and 4.3.2; and

■ e. Revising section 5.4.

The revisions and additions read as follows:

Appendix X1 to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Dehumidifiers

Note: After [date 180 days following publication of final rule], any representations made with respect to the energy efficiency of a dehumidifier must be made in accordance with the results of testing pursuant to this appendix. Manufacturers conducting tests of a dehumidifier prior to [date 180 days following publication of final rule], must conduct such test in accordance with either this appendix or the previous version of this appendix as it appeared in the Code of Federal Regulations on January 1, 2021. Any representations made with respect to the energy efficiency of such dehumidifier must be in accordance with whichever version is selected. Given that after [date 180 days following publication of final rule] representations with respect to the energy efficiency of dehumidifiers must be made in accordance with tests conducted pursuant to this appendix, manufacturers may wish to begin using this test procedure as soon as possible.

If there is a conflict between the language of the referenced industry standard and the language of this appendix, the language of this appendix takes precedence. Any subsequent amendment to a referenced document by the standard-setting organization will not affect the test procedure in this appendix, unless and until the test procedure is amended by DOE. Material is incorporated as it exists on the date of the approval, and a notice of any change in the incorporation will be published in the **Federal Register**.

0. Incorporation by Reference

DOE incorporated by reference in § 430.3, the entire standard for AHAM DH–1–2017, ANSI/AMCA 210, ANSI/ASHRAE 41.1, and IEC 62301; however, only enumerated provisions of those documents are applicable to this appendix, as follows: 0.1 AHAM DH–1–2017:

(a) Section 3 ''Definitions,'' as specified in section 3.1.1 of this appendix; and

(b) Section 4 ''Instrumentation,'' as specified in section 3.1.1 of this appendix; and

(c) Section 4.1 ''Temperature Measuring Instruments,'' as specified in section 3.1.1.2 of this appendix; and

(d) Section 4.2 ''Psychrometric Instruments'' as specified in section 3.1.1.3 of this appendix; and

(e) Section 4.3 ''Relative Humidity Instruments'' as specified in section 3.1.1.3 of this appendix; and

(f) Section 5 ''Test Procedure,'' as specified in section 3.1.1 of this appendix; and

(g) Section 8.3 ''Standard Test Voltage,'' as specified in section 3.2.2.1 of this appendix; and

(h) Section 8 ''Capacity Test,'' as specified in sections 4.1.1 and 4.1.2 of this appendix; and

(i) Section 8.7 ''Calculation of Test Results,'' as specified in section 4.1.2 of this appendix; and

(j) Section 9 ''Energy Consumption,'' as specified in sections 4.1.1 and 4.1.2 of this appendix.

0.2 ANSI/AMCA 210:

(a) Section 5.2.1.6 ''Airflow straightener,'' as specified in section 3.1.2.1 of this appendix; and

(b) Figure 6A ''Flow Straightener—Cell Type,'' as specified in section 3.1.2.1 of this appendix; and

(c) Section 4.2.2 ''Pitot-static tube,'' as specified in section 3.1.2.2.3.1 of this appendix; and

(d) Section 4.2.3 ''Static pressure tap,'' as specified in section 3.1.2.2.3.1 of this appendix; and

(e) Section 4.3.1 ''Pitot Traverse,'' as specified in section 3.1.2.2.3.1 of this appendix; and

(f) Section 4.3.2 ''Flow nozzle,'' as specified in section 3.1.2.2.3.1 of this appendix; and

(g) Section 7.5.2 ''Pressure Losses,'' as specified in section 3.1.2.2.3.1 of this appendix; and

(h) Section 7.3.1 ''Velocity Traverse,'' as specified in section 3.1.2.2.3.2 of this appendix; and

(i) Section 7.3.2 ''Nozzle,'' as specified in section 3.1.2.2.3.2 of this appendix; and

(j) Section 7.3 ''Fan airflow rate at test conditions,'' as specified in section 5.6 of this appendix.

0.3 ANSI/ASHRAE 41.1:

(a) Section 5.3.5 ''Centers of Segments—Grids,'' in section 3.1.2.2.1 of this appendix.

(b) [Reserved]

0.4 IEC 62301:

(a) Section 5.2 ''Preparation of product,'' in section 3.2.1 of this appendix; and

(b) Section 4.3.2 ''Supply voltage waveform,'' in section 3.2.2.2 of this appendix; and

(c) Section 4.4 ''Power measuring instruments,'' in section 3.2.3 of this appendix; and

(d) Section 4.2 ''Test room,'' in section 3.2.4 of this appendix; and

(e) Section 5.3.2 ''Sampling method,'' Note 1, in section 4.3 of this appendix; and

(f) Section 5.3.2 ''Sampling method,'' in section 4.3 of this appendix.

* * * * *

3.1 * * *

3.1.1 *Portable dehumidifiers and whole-home dehumidifiers other than refrigerant-desiccant dehumidifiers.* The test apparatus and instructions for testing in dehumidification mode and off-cycle mode must conform to the requirements specified in Section 3, ''Definitions,'' Section 4, ''Instrumentation,'' and Section 5, ''Test Set-Up,'' of AHAM DH–1, with the following exceptions. If a product is able to operate as either a portable or whole-home dehumidifier by means of removal or installation of an optional ducting kit, in accordance with any manufacturer instructions available to a consumer, test and rate both configurations.

* * * * *

3.1.1.2 *Relative humidity instrumentation.* A relative humidity sensor with an accuracy within 1 percent relative humidity may be used instead of an aspirating psychrometer. When using a relative humidity sensor for testing, disregard the wet-bulb test tolerances in Table I of AHAM DH–1. Instead, the average relative humidity over the test period must be within 2 percent of the relative humidity setpoint, and all individual relative humidity readings must be within 5 percent of the relative humidity setpoint. In addition, use a dry-bulb temperature sensor that meets the accuracy as required in Section 4.1 of AHAM DH–1.

3.1.1.3 *Instrumentation placement.* Place the aspirating psychrometer, sampling tree that is connected to a psychrometer using the shortest length of insulated ducting necessary, or relative humidity and dry-bulb temperature sensors, perpendicular to, and 1 ft. in front of, the center of the process air intake grille. When using an aspirating psychrometer, either shield the sensing elements or position them within the psychrometer box to minimize radiation effects from the fan motor. Ensure that there is line of sight separation between any fans and sensing elements within the test fixture and at least 3 feet of separation, along the path of airflow, between any fans and sensing elements within the test fixture. When using an aspirating psychrometer when testing a unit that has multiple process air intake grille(s), place a separate sampling tree perpendicular to, and 1 ft. in front of, the center of the single or each process air intake grille, with the samples combined and connected to a single psychrometer using the shortest length of insulated ducting necessary. During each test, use the psychrometer to monitor inlet conditions of only one unit under test. When using relative humidity and dry-bulb temperature sensors when testing a unit that has multiple process air intake grilles, place a relative humidity sensor and dry-bulb temperature sensor perpendicular to, and 1 ft. in front of, the center of each process air intake grille.

* * * * *

3.1.2 *Refrigerant-desiccant dehumidifiers.* The test apparatus and instructions for testing refrigerant-desiccant dehumidifiers in dehumidification mode must conform to the requirements specified in Section 3, ''Definitions,'' Section 4, ''Instrumentation,'' and Section 5, ''Test Set-Up,'' of AHAM DH–1, except as follows.

* * * * *

3.1.2.2.3.1 *External static pressure.* Measure static pressures in each duct using pitot-static tube traverses, a flow nozzle or a bank of flow nozzles. For pitot-static tube traverses, conform to the specifications in Section 4.3.1, ''Pitot Traverse,'' of ANSI/AMCA 210 and Section 4.2.2, ''Pitot-Static Tube,'' of ANSI/AMCA 210, except use only two intersecting and perpendicular rows of pitot-static tube traverses . For a flow nozzle or bank of flow nozzles, conform to the specifications in Section 4.3.2, ''Flow nozzle,'' of ANSI/AMCA 210 and Section 4.2.3, ''Static pressure tap'' of ANSI/AMCA 210. Record the static pressure within the test duct as follows. When using pitot-static tube traverses, record the pressure as measured at the pressure tap in the manifold of the traverses that averages the individual static pressures at each pitot-static tube. When using a flow nozzle or bank of nozzles, record the pressure or in accordance with Section 4.2.3.2, ''Averaging,'' of ANSI/AMCA 210 . Calculate duct pressure losses between the unit under test and the plane of each static pressure measurement in accordance with Section 7.5.2, ''Pressure Losses,'' of ANSI/AMCA 210. The external static pressure is the difference between the measured inlet and outlet static pressure measurements, minus the sum of the inlet and outlet duct pressure losses. For any port with no duct attached, use a static pressure of 0.00 in. w.c. with no duct pressure loss in the calculation of external static pressure. During dehumidification mode testing, the external static pressure must equal 0.20 in. w.c. ± 0.02 in. w.c.

3.1.2.2.3.2 *Velocity pressure.* Measure velocity pressures using the same pitot traverses or nozzles as used for measuring external static pressure, which are specified in section 3.1.2.2.3.1 of this appendix. When using pitot-static tube traverses, determine velocity pressures at each pitot-static tube in a traverse as the difference between the pressure at the impact pressure tap and the pressure at the static pressure tap and calculate volumetric flow rates in each duct in accordance with Section 7.3.1, ''Velocity Traverse,'' of ANSI/AMCA 210. When using a flow nozzle or a bank of flow nozzles, calculate the volumetric flow rates in each duct in accordance with Section 7.3.2, ''Nozzle,'' of ANSI/AMCA 210.

* * * * *

3.1.2.3 *Control settings.* If the dehumidifier has a control setting for continuous operation in dehumidification mode, select that control setting. Otherwise, set the controls to the lowest available relative humidity level, and if the dehumidifier has a user-adjustable fan speed, select the maximum fan speed setting. *Do not use any external controls for the dehumidifier settings.* If the dehumidifier has network functions, the network functions can be disabled by the end-user, and the product's user manual provides instructions on how to do so, disable the network functions throughout testing. If network functions cannot be disabled by the end-user, or the product's user manual does not provide instruction for disabling network functions, test the unit with the network functions in the factory default configuration for the test period.

* * * * *

3.2.2 * * *

3.2.2.1 *Electrical supply.* For the inactive mode and off mode testing, maintain the electrical supply voltage and frequency indicated in Section 8.3, ''Standard Test Voltage,'' of AHAM DH–1. The electrical supply frequency shall be maintained ±1 percent.

* * * * *

4.1 * * *

4.1.1 *Portable dehumidifiers and whole-home dehumidifiers other than refrigerant-desiccant dehumidifiers.* Measure the energy consumption in dehumidification mode, EDM, in kilowatt-hours (kWh), the average percent relative humidity, Ht, either as measured using a relative humidity sensor or using the tables provided below when using an aspirating psychrometer, and the product capacity, Ct, in pints per day (pints/day), in accordance with the test requirements specified in Section 8, ''Capacity Test,'' and Section 9, ''Energy Consumption,'' respectively, of AHAM DH–1, with two exceptions. First, the rating test period must be 2 or 6 hours. Second, maintain the standard test conditions as shown in Table 1.

TABLE 1—STANDARD TEST CONDITIONS FOR DEHUMIDIFIER TESTING

Configuration	Dry-bulb temperature (°F)	Aspirating psychrometer wet-bulb temperature (°F)	Relative humidity sensor relative humidity (%)
Portable dehumidifiers	65 ± 2.0	56.6 ± 1.0	60 ± 2
Whole-home dehumidifiers	73 ± 2.0	63.6 ± 1.0	60 ± 2

When using relative humidity and dry-bulb temperature sensors, for dehumidifiers with multiple process air intake grilles, average the measured relative humidities and average the measured dry-bulb temperatures to determine the overall intake air conditions.

* * * * *

4.1.2 *Refrigerant-desiccant dehumidifiers.* Establish the testing conditions set forth in section 3.1.2 of this appendix. Measure the energy consumption, EDM, in kWh, in accordance with the test requirements specified in Section 8, ''Capacity Test,'' and Section 9, ''Energy Consumption,'' respectively, of AHAM DH–1, with the following exceptions:

(1) Each measurement of the temperature and relative humidity of the air entering the process air inlet duct and the reactivation air inlet must be within 73 °F ± 2.0 °F dry-bulb temperature and 60 percent ± 5 percent relative humidity, and the arithmetic average of the inlet test conditions over the test period shall be within 73 °F ± 0.5 °F dry-bulb temperature and 60 percent ± 2 percent relative humidity;

(2) Disregard the instructions for psychrometer placement;

(3) Record dry-bulb temperatures, relative humidities, static pressures, velocity pressures in each duct, volumetric air flow rates, and the number of measurements in the test period;

(4) Disregard the requirement to weigh the condensate collected during the test; and

(5) The rating test period must be 2 or 6 hours. To perform the calculations in Section 9.4, ''Calculation of Test Results,'' of AHAM DH–1:

(i) Replace ''Condensate collected (lb)'' and ''mlb'', with the weight of condensate removed, W, as calculated in section 5.6 of this appendix; and

(ii) Use the recorded relative humidities, not the tables in section 4.1.1 of this appendix, to determine average relative humidity.

4.2 *Off-cycle mode.* Follow requirements for test measurement in off-cycle mode of operation in accordance with Section 9.3.2 of AHAM DH–1.

4.3 *Inactive and off mode.* Follow requirements for test measurement in inactive and off modes of operation in accordance with Section 9.3.1 of AHAM DH–1.

* * * * *

5. * * *

5.4 *Integrated energy factor.* Calculate the integrated energy factor, IEF, in L/kWh, rounded to two decimal places, according to the following:

$$IEF = \frac{\left(C_r \times \frac{t \times 1.04}{24}\right) \times 0.454}{\left[E_{DM} + \left(\left(\frac{E_{TLP}}{1095}\right) \times t\right)\right]}$$

Where:

C_r = corrected product capacity in pints per day, as determined in section 5.2 of this appendix;

t = dehumidification mode test duration in hours, either 2 or 6 hours;

E_{DM} = energy consumption during the 2- or 6-hour dehumidification mode test in kWh, as measured in section 4.1 of this appendix;

E_{TLP} = annual combined low-power mode energy consumption in kWh per year, as calculated in section 5.3 of this appendix;

1,095 = dehumidification mode annual hours, used to convert E_{TLP} to combined low-power mode energy consumption per hour of dehumidification mode;

1.04 = the density of water in pounds per pint;

0.454 = the liters of water per pound of water; and

24 = the number of hours per day.

* * * * *

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