[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 431

[Docket No. EERE-2013-BT-TP-0045]

RIN: 1904-AD07

Energy Conservation Program: Test Procedure for Refrigerated Bottled or Canned Beverage Vending Machines

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

ACTION: Final rule.

SUMMARY: On August 11, 2014, the U.S. Department of Energy (DOE) issued a notice of proposed rulemaking (NOPR) to amend the test procedure for refrigerated bottled or canned beverage vending machines (beverage vending machines or BVMs). That proposed rulemaking serves as the basis for the final rule. In this final rule, DOE is reorganizing its test procedure for beverage vending machines into an Appendix A, which will be mandatory for equipment testing beginning 180 days after the final rule is published in the Federal Register, and an Appendix B, which will be mandatory for equipment testing to demonstrate compliance with any amended energy conservation standards arising out of DOE's ongoing BVM energy conservation standards rulemaking. Specifically, Appendix A includes amendments that update the referenced test method to ANSI/ASHRAE Standard 32.1-2010, eliminate the requirement to test at the 90 °F

ambient test condition, establish a provision for testing at the lowest application product temperature, and adopt several amendments and clarifications to the DOE test procedure to improve the repeatability and remove ambiguity from the current BVM test procedure, as established by DOE in the 2006 BVM test procedure final rule. Appendix B contains all the amendments included in Appendix A and, in addition, incorporates provisions to account for the impact of low power modes on measured daily energy consumption (DEC). Finally, DOE is adopting in this final rule several clarifications regarding the certification and reporting requirements for beverage vending machines.

DATES: The effective date of this rule is **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].** Compliance with Appendix A will be mandatory for representations made on or after **[INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].** Compliance with Appendix B will be mandatory for representations made on or after the compliance date of any amended energy conservation standards. (Docket No. EERE-2013-BT-STD-0022). The incorporation by reference of certain publications listed in this rule was approved by the Director of the Federal Register as of [**INSERT DATE 30 DAYS AFTER DATE OF PUBICATION IN THE FEDERAL REGISTER**].

ADDRESSES: The docket, which includes Federal Register notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at regulations.gov. All documents in the docket are listed in the 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.

A link to the docket web page can be found at: http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/24. This web page will contain a link to the docket for this notice on the regulations.gov site. The regulations.gov web page will contain simple instructions on how to access all documents, including public comments, in the docket.

For further information on how to review the docket, contact Ms. Brenda Edwards at (202) 586-2945 or by email: Brenda.Edwards@ee.doe.gov.

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SUPPLEMENTARY INFORMATION:

This final rule incorporates by reference into 10 CFR part 431 the testing methods contained in the following commercial standards:

(1) ANSI/ASHRAE Standard 32.1-2010, "Methods of Testing for Rating Vending Machines for Sealed Beverages," approved July 23, 2010.

Copies of ASHRAE standards may be purchased from the American Society of Heating, Refrigerating and Air-Conditioning Engineers; 1791 Tullie Circle, N.E. Atlanta, GA 30329, 404-636-8400, or www.ashrae.org.

See section IV.N. for additional information on this standard.

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I. Authority and Background

A. Authority

Title III, Part B[1] of the Energy Policy and Conservation Act of 1975 ("EPCA" or "the Act"), Pub. L. 94-163 (42 U.S.C. 6291–6309, as codified) established the "Energy Conservation Program for Consumer Products Other Than Automobiles."[2] These include refrigerated bottled or canned beverage vending machines ("beverage vending machines" or BVMs), the subject of this document. (42 U.S.C. 6295(v))[3]

[1] For editorial reasons, upon codification in the U.S. Code, Part B was redesignated Part A.
[2] All references to EPCA in this document refer to the statute as amended through the Energy Efficiency Improvement Act of 2015, Pub. L. 114-11 (Apr. 30, 2015)..
[3] Because Congress included beverage vending machines in Part A of Title III of EPCA, the consumer product provisions of Part A (not the industrial equipment provisions of Part A-1) apply to beverage vending machines. DOE placed the regulatory requirements specific to beverage vending machines in Title 10 of the Code of Federal Regulations (CFR), part 431, "Energy Efficiency Program for Certain Commercial and Industrial Equipment" as a matter of administrative convenience based on their type and will refer to beverage vending machines as "equipment" throughout this document because of their

Under EPCA, the energy conservation program consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. The Secretary or the Federal Trade Commission, as appropriate, may prescribe labeling requirements for beverage vending machines. (42 U.S.C. 6294(a)(5)(A)) The 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 under EPCA, and (2) making representations about the efficiency of those products. Similarly, DOE must use these test procedures to determine whether the products comply with any relevant standards promulgated under EPCA.

EPCA requires the test procedure for beverage vending machines to be based on ANSI/ASHRAE Standard 32.1-2004. (42 U.S.C. 6293(b)(15)) In addition, under 42 U.S.C. 6293, EPCA sets forth the criteria and procedures DOE must follow when prescribing or amending test procedures for covered products. EPCA provides that any test procedures prescribed or amended under this section shall be reasonably designed to produce test results that measure energy efficiency, energy use, or estimated annual

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placement in 10 CFR part 431. Despite the placement of beverage vending machines in 10 CFR part 431, the relevant provisions of Title A of EPCA and 10 CFR part 430, which are applicable to all product types specified in Title A of EPCA, are applicable to beverage vending machines. See 74 FR 44914, 44917 (Aug. 31, 2009). In this test procedure final rule, DOE is clarifying the relevant authority for beverage vending machines by modifying 10 CFR 431.291 to specify that the regulatory provisions of 10 CFR 430.33 and 430.34 and subparts D and E of 10 CFR part 430 are applicable to beverage vending machines. DOE notes that because the procedures in Parts 430 and 431 for petitioning DOE for obtaining a test procedure waiver are substantively the same (79 FR 26591, 26601(May 9, 2014)), the regulations for applying for a test procedure waiver for beverage vending machines are those found at 10 CFR 431.401 rather than those found at 430.27.

operating cost of a covered product during a representative average use cycle or period of use and shall not be unduly burdensome to conduct. (42 U.S.C. 6293(b)(3)) EPCA also provides that the Secretary of Energy (Secretary) shall review test procedures for all covered products at least once every 7 years, and either amend the test procedures (if the Secretary determines that amended test procedures would more accurately or fully comply with the requirements of 42 U.S.C. 6293(b)(3)) or publish a determination in the Federal Register not to amend them. (42 U.S.C. 6293(b)(1)(A))

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

Pursuant to DOE's obligations under EPCA, DOE reviewed the BVM test procedure at 10 CFR 431.294 and determined that the test procedure could be amended to improve the accuracy of the test procedure for beverage vending machines and to incorporate new technology features. As such, on August 11, 2014, DOE published a notice of proposed rulemaking (NOPR) proposing amendments to its test procedure (2014 BVM test procedure NOPR). 79 FR 46908. These proposed amendments were presented at the BVM test procedure NOPR public meeting held on September 16, 2014. DOE received written and verbal comments in response to the 2014 BVM test procedure

NOPR at the NOPR public meeting as well as throughout the comment period. The amendments adopted in this final rule respond to and reflect upon those comments.

This final rule also fulfills DOE's obligation to periodically review its test procedures under 42 U.S.C. 6293(b)(1)(A). DOE anticipates that its next evaluation of this test procedure will occur in a manner consistent with the timeline set out in this provision.

DOE also reviewed the adopted amendments to determine whether they would have an impact on the measured energy consumption of covered beverage vending machines. DOE has determined that the test procedure amendments incorporating provisions to account for low power modes will change the measured energy use of beverage vending machines when compared to the current BVM test procedure, as established by DOE in the 2006 BVM test procedure final rule (subsequent references to DOE's "current test procedure" for beverage vending machines in this document refer to the test procedure established by DOE in the 2006 BVM test procedure final rule as it existed at 10 CFR 431.294 in the edition of 10 CFR parts 200 to 499 revised as of January 1, 2015). Therefore, DOE is considering the impacts of these changes as part of its standards rulemaking for beverage vending machines ("BVM energy conservation standards rulemaking," Docket No. EERE-2013-BT-STD-0022) and will not require use of these test procedure provisions (contained in Appendix B) until the compliance date of any amended standards set as a result of that rulemaking.

B. Background

EPCA requires the test procedure for beverage vending machines to be based on American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 32.1-2004 (ANSI/ASHRAE Standard 32.1-2004), "Methods of Testing for Rating Vending Machines for Bottled, Canned or Other Sealed Beverages." (42 U.S.C. 6293(b)(15)) In December 2006, DOE published a final rule establishing a test procedure for beverage vending machines, among other products and equipment (the 2006 BVM test procedure final rule). 71 FR 71340, 71355 (Dec. 8, 2006). In that final rule, consistent with 42 U.S.C. 6293(b)(15), DOE adopted ANSI/ASHRAE Standard 32.1-2004 as the DOE test procedure, except that DOE modified ANSI/ASHRAE Standard 32.1-2004 to require parties to test equipment with dual nameplate voltages at the lower of the two voltages only. 71 FR at 71355.

ANSI/ASHRAE Standard 32.1-2004 specifies a method for determining the capacity of vending machines, referred to as "vendible capacity," which is essentially the maximum number of standard sealed beverages a vending machine can hold for sale. In the 2006 BVM test procedure final rule, however, DOE adopted the "refrigerated volume" measure in section 5.2, "Refrigerated Volume Calculation," of ANSI/Association of Home Appliance Manufacturers (AHAM) HRF-1-2004 (ANSI/AHAM HRF-1-2004) in addition to the "vendible capacity" measure, as referred to in ANSI/ASHRAE Standard 32.1-2004. 71 FR at 71355. DOE adopted "refrigerated volume" as the primary measure of capacity for beverage vending machines because of

the variety of dispensing mechanisms and storage arrangements among similar machines that may lead to potentially different refrigerated volumes for different machines with the same vendible capacity. In addition, EPCA has historically used upper limits on energy use as a function of volume for the purposes of establishing energy conservation standards for refrigeration equipment. Id.

In the 2006 BVM test procedure final rule, DOE determined that section 5.2 of ANSI/AHAM HRF-1-2004, which addresses the measurement of refrigerated volume in household freezers, is also applicable to beverage vending machines and is more appropriate than the language for measurement of volume in household refrigerators of section 4.2 of ANSI/AHAM HRF-1-2004. Specifically, section 5.2 of ANSI/ASHRAE Standard 32.1-2004 includes provisions for specific compartments and features that are typically found in beverage vending machines, which are similar to compartments and features found in freezers. Therefore, DOE adopted "refrigerated volume" in lieu of "vendible capacity" as the dimensional metric for beverage vending machines in the 2006 BVM test procedure final rule. Id.

Since the publication of the 2006 BVM test procedure final rule, ASHRAE and AHAM have both published updated test standards. The most recent edition of the ASHRAE 32.1 test method is ANSI/ASHRAE Standard 32.1-2010, which includes changes that align ANSI/ASHRAE Standard 32.1-2010 with the nomenclature and methodology used in the 2006 BVM test procedure final rule (71 FR at 71355) and the 2009 BVM energy conservation standards final rule (74 FR 44914 (Aug. 31, 2009)). The

most recent version of the AHAM HRF-1 test standard, AHAM HRF-1-2008, changes and reorganizes some sections for simplicity and usability, including the section relevant to measuring refrigerated volume of beverage vending machines.

DOE reviewed these updated industry standards and proposed in the 2014 BVM test procedure NOPR to, among other things, incorporate by reference ANSI/ASHRAE 32.1-2010, with minor modifications, as the DOE test procedure for beverage vending machines, for both determining daily energy consumption (DEC) and refrigerated volume. Specifically, DOE proposed to adopt Appendix C of ANSI/ASHRAE Standard 32.1-2010 for determining refrigerated volume and proposed to remove ANSI/AHAM HRF-1-2004 from the documents incorporated by reference in 10 CFR 431.293. 79 FR 46908, 46911–46912 (Aug. 11, 2014). In addition to updating the BVM test procedure to incorporate by reference the latest industry standards, DOE also proposed a number of other amendments to clarify DOE's BVM regulations, remove ambiguity from the BVM test procedure, and adopt provisions to account for low power modes in the measured DEC. 79 FR 46908.

II. Synopsis of the Final Rule

This final rule amends the DOE test procedure for beverage vending machines to clarify and remove ambiguity from the procedure, as well as incorporate several amendments that account for updated industry test methods and new equipment features. This final rule also reorganizes the DOE test procedure for beverage vending machines

into an Appendix A to subpart Q of 10 CFR part 431, which will be mandatory for representations made starting 180 days after the final rule is published in the Federal Register, and an Appendix B, that will be mandatory for equipment testing to demonstrate compliance with any amended energy conservation standards adopted as a result of the BVM energy conservation standards rulemaking. (Docket No. EERE-2013-BT-STD-0022)

Appendix A includes amendments that (1) update the referenced test method to ANSI/ASHRAE Standard 32.1-2010, (2) incorporate amendments to clarify several ambiguities in the ANSI/ASHRAE Standard 32.1-2010, (3) eliminate the requirement to test at the 90 °F ambient test condition, (4) clarify the test procedure for combination vending machines, (5) clarify the requirements for loading of BVM units under the DOE test procedure, (6) specify the characteristics of a standard test package, (7) clarify the average next-to-vend beverage temperature test condition, (8) specify placement of thermocouples during the DOE test procedure, (9) establish provisions for testing at the lowest application product temperature, (10) clarify the treatment of certain accessories during the DOE test procedure, and (11) clarify the certification and reporting requirements for covered beverage vending machines. DOE has concluded that these amendments will serve to clarify the test procedure. As such, and as noted above, these clarifications and amendments are mandatory for representations made starting 180 days after the final rule is published in the Federal Register, and manufacturers will be required to use Appendix A to demonstrate compliance with existing energy conservation standards for beverage vending machines after that date. If desired, manufacturers may

elect to begin using Appendix A on the effective date of this final rule, 30 days after publication in the Federal Register, instead of the existing BVM test procedure requirements in 10 CFR 431.294 as it appeared in the 10 CFR parts 200 to 499 edition revised as of January 1, 2015.

Appendix B includes all provisions of Appendix A, as well as provisions to account for the impact of low power modes on the measured DEC of beverage vending machines. Appendix B is intended to be used to demonstrate compliance with any amended energy conservation standards for beverage vending machines established as part of the parallel BVM energy conservation standards rulemaking. (Docket No. EERE-2013-BT-STD-0022) Manufacturers will be required to use the test procedure adopted in Appendix B to demonstrate compliance with any future DOE energy conservation standards for beverage vending machines, as well as for labeling or other representations as to the energy use of refrigerated beverage vending machines, beginning on the compliance date of any final rule establishing amended energy conservation standards for beverage vending machines.

Prior to the compliance date of any such amended energy conservation standards, manufacturers must continue to use the test procedure found in Appendix A to demonstrate compliance with existing DOE energy conservation standards and for representations concerning the energy use of refrigerated beverage vending machines. However, manufacturers may elect to use the amended test procedure in Appendix B established as a result of this rulemaking to demonstrate compliance with any future,

amended standards prior to the compliance date of such standards. Manufacturers who choose to use the amended test procedure in Appendix B early must ensure that their equipment satisfies any applicable amended energy conservation standards established as a result of the BVM energy conservation standards rulemaking. In other words, a manufacturer may elect to use the test procedure in Appendix B prior to the established compliance date of any amended energy conservation standards to make representations with respect to the energy use of a basic model only if it also elects to certify compliance with the amended energy conservation standards.

Finally, DOE is amending 10 CFR 429.52(b) with regard to reporting requirements for beverage vending machines, including a clarifying amendment that the reported energy consumption value for beverage vending machines is based on the DEC measured in accordance with the test procedure. Similarly, DOE is amending the introductory language found in 10 CFR 431.296 to clarify the applicability of the DEC to the energy conservation standards listed in that section.

III. Discussion

In this BVM final rule, DOE is adopting several amendments to subpart Q of 10 CFR part 431 to (1) clarify the scope of DOE's BVM regulations, (2) incorporate several new definitions relevant to testing beverage vending machines, (3) update the industry test methods incorporated by reference into the DOE test procedure, (4) update and clarify DOE's test procedure for beverage vending machines, and (5) clarify the language

describing the energy conservation standards for beverage vending machines for the purposes of reporting the DEC determined in accordance with the test procedure. DOE is also clarifying how the DEC measured in accordance with the test procedure is reported to DOE in accordance with 10 CFR 429.52(b). The amendments adopted in this final rule are summarized in Table III.1 and discussed in more detail in the subsequent sections of this final rule, as noted in the table.

Table III.1 Summary of Amendments Adopted in this Final Rule, their Location within the Code of Federal Regulations (CFR), and the Applicable Preamble Discussion

CFR Location	Topic	Summary of Amendments	Applicable Preamble Discussion
10 CFR 429.52(b)	Reporting Requirements	Amend reporting requirements to reflect amendments incorporated in Appendices A and B	Section III.C.2
10 CFR 431.291	Scope	Clarify applicability of 10 CFR 430.33 and 430.34 and subparts D and E of 10 CFR part 430 to beverage vending machines	Section III.C.1
10 CFR 431.292	Definitions	Incorporate new definitions pertinent to testing beverage vending machines	Section III.A.7 and III.A.10
10 CFR 431.293	Incorporation by Reference	Update industry standards incorporated by reference in the DOE test procedure to reflect the latest versions	Section III.A.1
10 CFR 431.294	Test Procedure	Reorganize BVM test procedure into Appendices A and B (see below)	N/A
Appendix A to Subpart Q of Part 431	Test Procedure Applicable to Energy Conservation Standards for which Compliance was Required as of August 31, 2012	Incorporate several minor amendments and clarifications to improve the accuracy and remove ambiguity	Section III.A
Appendix B to Subpart Q of Part 431	Test Procedure Applicable to Amended Energy Conservation Standards Being Considered in a Related Rulemaking	Incorporate amendments included in Appendix A and provisions for measuring low power modes	Section III.B
10 CFR 431.466	Energy Conservation Standards	Clarify the applicability of the DEC measured in accordance with the test procedure to the energy conservation standards listed in this section	Section III.C.2

The amendments discussed in the subsequent sections and adopted in this final rule also respond to and reflect comments by interested parties in response to the proposed amendments presented in the 2014 BVM test procedure NOPR. 79 FR 46908 (Aug. 11, 2014).

A. Appendix A: Clarifications and Amendments to the DOE Test Procedure

In order to clarify and remove ambiguity from the test procedure for beverage vending machines, DOE is amending subpart Q of 10 CFR part 431 by moving most of the existing test procedure for beverage vending machines from 10 CFR 431.294 to a new Appendix A to subpart Q of 10 CFR part 431. In Appendix A, DOE is also incorporating amendments to clarify and update the current DOE test procedure for beverage vending machines in the following ways:

1) updating the referenced test method to ANSI/ASHRAE Standard 32.1-2010,
2) incorporating several additional amendments to clarify ambiguities in the ANSI/ASHRAE 32.1-2010 test method,
3) eliminating testing at the 90 °F ambient test condition,
4) clarifying the test procedure for combination vending machines,
5) clarifying the requirements for loading BVM models under the DOE test procedure,
6) clarifying the specifications of the standard product,
7) clarifying the next-to-vend beverage temperature test condition,
8) specifying placement of thermocouples during the DOE test procedure,

9) establishing testing provisions at the lowest application product temperature, and

10) clarifying the treatment of certain accessories when conducting the DOE test procedure.

In the 2014 BVM test procedure NOPR, DOE also proposed a new definition and optional test method for "fully cooled." 79 FR 46908, 46915-17 (Aug. 11, 2014). DOE discusses this issue in section III.A.8 of this final rule. However, due to the complexity and scope of the comments received on this issue, DOE is electing to address the differentiation of Class A and Class B equipment, including the definition of fully cooled, in the ongoing BVM energy conservation standard rulemaking instead of this test procedure final rule. (Docket No. EERE-2013-BT-STD-0022).

The subsequent sections III.A.1 through III.A.11 of this final rule discuss the specific test procedure provisions that required clarification, any comments received on these topics in response to the 2014 BVM test procedure NOPR, DOE's response to those comments, and any final amendments DOE is adopting in this final rule.

1. Updating the Referenced Test Method

The current DOE test procedure for beverage vending machines incorporates by reference two industry test procedures, ANSI/ASHRAE Standard 32.1-2004 and ANSI/AHAM HRF-1-2004, which establish a test method for beverage vending machines and a method for determining refrigerated volume, respectively. Each of these industry test procedures has been updated since the publication of the DOE test procedure

in 2006. The most current versions are ANSI/ASHRAE Standard 32.1-2010 and AHAM HRF-1-2008.

ANSI/ASHRAE Standard 32.1-2010 was amended from the 2004 version to include new definitions and nomenclature established by DOE in the 2009 BVM final rule. These changes include removing references to specific sealed-bottle package designs such as "bottled" or "canned," revising the scope, and incorporating a new Appendix C, "Measurement of Volume," which consists of certain portions of ANSI/AHAM HRF-1-2004 for measuring the refrigerated volume. Specifically, ANSI/ASHRAE Standard 32.1-2004 incorporated the portions of ANSI/AHAM HRF-1-2004 currently referenced in the DOE test procedure, section 5.2 (excluding subsections 5.2.2.2 through 5.2.2.4), which describes the method for determining refrigerated volume for residential freezers, as well as section 5.1, which describes the purpose of the section. These new amendments make the ANSI/ASHRAE Standard 32.1-2010 test procedure identical to the DOE test procedure established in the 2006 BVM test procedure final rule. As the amendments to ANSI/ASHRAE Standard 32.1-2010 are primarily editorial, they do not affect the tested DEC. In the 2014 BVM test procedure NOPR, DOE proposed to update the industry test method incorporated by reference to ANSI/ASHRAE Standard 32.1-2010 for the measurement of DEC and vendible capacity. 79 FR 46908, 46911–46912 (Aug. 11, 2014).

Since DOE published the 2006 BVM test procedure final rule, AHAM has released a new version of the AHAM HRF-1 test method, which reorganizes and

simplifies the test method as presented in ANSI/AHAM HRF-1-2004. The revised AHAM HRF-1 test method, ANSI/AHAM HRF-1-2008, combines sections 4, 5, and 6, which relate to measuring the refrigerated volume of refrigerators and freezers, into one section describing methods for determining the refrigerated volume of refrigerators, refrigerator-freezers, wine chillers, and freezers. This unified and simplified method includes several changes regarding the inclusion or exclusion of certain special features from the determination of refrigerated volume, such that DOE believes AHAM HRF-1-2008 has the potential to yield refrigerated volume values that differ slightly from those measured and calculated using the method in the current DOE test procedure. As such, in the 2014 BVM test procedure NOPR, DOE proposed to adopt Appendix C of ANSI/ASHRAE Standard 32.1-2010 as the volume measurement methodology in its amended BVM test procedure. In the NOPR, DOE stated that adopting Appendix C of ANSI/ASHRAE Standard 32.1-2010 would simplify testing for manufacturers because it would allow them to reference a single document containing all information needed to conduct the DOE test procedure. DOE also stated that it did not believe that the updated AHAM HRF-1-2008 test procedure has sufficient additional merit, compared to the volume calculation method included in ANSI/ASHRAE Standard 32.1-2010, to justify the additional burden on manufacturers. 79 FR at 46912. Commensurate with this proposal, DOE also proposed to remove ANSI/AHAM HRF-1-2004 from the documents incorporated by reference in 10 CFR 431.293. Id.

In response to these proposals, DOE received several comments from interested parties regarding which industry test methods DOE should incorporate by reference and

the impacts of updating the industry test methods incorporated by reference in the DOE test procedure. Automated Merchandising Systems, Inc. (AMS), Sanden Vendo America Inc. (SVA), and Coca-Cola generally supported DOE's proposal to update its test procedure reference to ANSI/ASHRAE 32.1-2010 (AMS, No. 0007 at p. 1;[4] SVA, No. 0008 at p. 1; Coca-Cola, No. 0010 at p. 2). Coca-Cola and ASHRAE's Standard Project Committee (SPC) 32.1 recommended that DOE wait for ASHRAE 32.1 revisions before adopting a new version of 32.1. The California investor-owned utilities (CA IOUs), including Pacific Gas & Electric, Southern California Gas Company, Southern California Edison, and San Diego Gas and Electric, commented that DOE should align new test procedure development with ANSI/ASHRAE 32.1-2010 and track the efforts of the ASHRAE Standard Project Committee 32.1 (ASHRAE SPC 32.1) to incorporate changes into Appendix B before publication of the final rule (Coca-Cola, No. 0010 at p. 2; CA IOUs, No. 0005 at p. 2; ASHRAE SPC 32.1, No. 0011 at p. 1–2).

DOE appreciates comments from interested parties and agrees that alignment with the most recent version of the industry test method, ANSI/ASHRAE 32.1, is advisable and will make testing beverage vending machines more consistent with the latest industry methods. DOE is aware that ASHRAE SPC 32.1 was convened in January 2014 and has been meeting monthly to discuss potential updates to the ASHRAE 32.1 standard.[5] DOE

[4] A notation in this form provides a reference for information that is in the docket of DOE's rulemaking to develop test procedures for beverage vending machines (Docket No. EERE-2013-BT-TP-0045, which is maintained at www.regulations.gov). This particular notation refers to a comment: (1) submitted by Automated Merchandising Systems, Inc. (AMS); (2) appearing in document number 0007 of the docket; and (3) appearing on page 1 of that document.

[5] The meeting minutes for ASHRAE SPC 32.1 are available at: http://spc321.ashraepcs.org/. DOE notes that, as of April 10, 2015, the website was last updated June 10, 2014 and, as such, only meeting minutes through May 2014 were available, although the committee has continued to meet since that time.

has been participating in these meetings to stay abreast of the changes ASHRAE SPC 32.1 is considering. To the extent possible, DOE has sought to align this final rule with those discussions and proposed updates. However, DOE notes that the discussions of the committee are not final until such amendments are approved as a new version of the ASHRAE 32.1 standard. At this time, DOE is not aware of ASHRAE's specific timeline for making such an updated version available. DOE also notes that DOE must also consider its obligations under 42 U.S.C. 6293(b)(1)(A) to review test procedures every 7 years, as well as the relationship between the BVM test procedure rulemaking and the ongoing BVM energy conservation standards rulemaking, when determining timelines. As such, DOE is compelled to move forward with finalizing the BVM test procedure amendments, as presented in this final rule, to satisfy its EPCA requirements and not adversely impact the BVM energy conservation standards rulemaking schedule.

Regarding DOE's proposal to update the test method for determining refrigerated volume, Coca-Cola expressed support for the method described in HRF-1-2008 for determining refrigerated volume but emphasized that measurements resulting from these proposed clarifications would render different results than existing procedure, as opposed to DOE's proposed adoption of Appendix C of ANSI/ASHRAE 32.1-2010. (Coca-Cola, No. 0010 at p. 2) ASHRAE SPC 32.1 and AMS objected to DOE's proposal to update the referenced method of test for the measurement of refrigerated volume in its test procedure from section 5 of ANSI/AHAM HRF-1-2004 to Appendix C of ANSI/ASHRAE 32.1-2010. (ASHRAE SPC 32.1, No. 0011 at p. 1–2; AMS, No. 0007 at pp. 1–2) In particular, ASHRAE SPC 32.1 stated that they are considering updating

Appendix C of ANSI/ASHRAE 32.1-2010 to reference section 4 of AHAM HRF-1-2008 to simplify the refrigerated volume measurement process that would result in minimal differences in the measurement of refrigerated volume. (ASHRAE SPC 32.1, No. 0011 at p. 1–2) AMS commented that the new calculations would affect the Maximum Daily Energy Consumption (MDEC) of their machines. (AMS, No. 0007 at pp. 1–2)

In response to comments regarding the proposed test method for determining refrigerated volume, DOE analyzed ANSI/AHAM HRF-1-2004, AHAM HRF-1-2008, and Appendix C of ANSI/ASHRAE 32.1-2010 and compared the relevant methods. DOE believes AHAM HRF-1-2008 has the potential to yield refrigerated volume values that differ slightly from those calculated using ANSI/AHAM HRF-1-2004, which was the method incorporated by reference in the 2006 BVM test procedure final rule, as ASHRAE SPC 32.1 acknowledged during the NOPR public meeting. DOE does not believe that the updated method for computing refrigerated volume from section 4 of the AHAM HRF-1-2008 test method has sufficient additional merit when compared to the volume calculation method included in Appendix C of the ANSI/ASHRAE Standard 32.1-2010, which adopts section 5.2 (excluding subsections 5.2.2.2 through 5.2.2.4) of ANSI/AHAM HRF-1-2004. Therefore, DOE is adopting provisions to continue referencing ANSI/AHAM HRF-1-2004, as incorporated into Appendix C of ANSI/ASHRAE 32.1-2010.

In addition, adopting Appendix C of ANSI/ASHRAE Standard 32.1-2010 will allow manufacturers to reference a single industry standard containing all information

needed to conduct the DOE test procedure for beverage vending machines and will also limit manufacturer testing burden since they will only have to purchase one industry standard to complete the DOE test procedure. For these reasons, DOE is updating the industry test method incorporated by reference to ANSI/ASHRAE Standard 32.1-2010 for the measurement of refrigerated volume and removing the incorporation by reference of ANSI/AHAM HRF-1-2004 from the DOE test procedure. Accordingly, DOE is also amending the definition for refrigerated volume at §431.292 to reference the appropriate standard.

2. Other Minor Clarifications and Amendments to ASHRAE 32.1-2010

In reviewing ANSI/ASHRAE 32.1-2010, and in light of the comments received from interested parties suggesting that DOE follow the work of ASHRAE SPC 32.1 to update the ASHRAE 32.1 test method, DOE is adopting several additional clarifications in this final rule. Specifically, DOE is clarifying: (1) the ambient temperature and relative humidity tolerances, (2) the voltage tolerances for equipment with dual nameplate voltages, (3) the requirements for sampling and recording of specific test data, and (4) how to calculate DEC based on tested values determined in the ASHRAE 32.1 test method.

DOE is incorporating these amendments in response to comments that DOE should align updates to the DOE test procedure for beverage vending machines with the updates being considered by ASHRAE SPC 32.1. DOE has determined that these

amendments will improve the clarity and repeatability of the DOE test procedure and is incorporating these amendments in Appendices A and B of the BVM test procedure.

a. Ambient Temperature and Relative Humidity Tolerance.

In written comments, AMS suggested that DOE clarify permissible temperature limits during testing (AMS, No. 0007 at p. 3). DOE appreciates the comment, and wishes to clarify that ambient temperature and humidity shall be maintained within the ranges specified in Table 1, "Standard Test Conditions," of ANSI/ASHRAE 32.1-2010 for each recorded measurement for the duration of the test, including stabilization. The ambient temperature and relative humidity requirements from Table 1 of ANSI/ASHRAE 32.1-2010 that are pertinent to the DOE test procedure are shown in Table III.2. To clarify that the tolerance on relative humidity is in fact in the units of "percent relative humidity (percent RH)" and not a percentage of the measured value, the acceptable range is also provided in Table III.2.

Table III.2 Ambient Temperature and Relative Humidity Specified Value and Tolerance

Test and Pretest Condition	Value	Tolerance	Acceptable Range
Ambient Temperature	75 °F	±2 °F	73–77 °F
Relative Humidity	45 percent RH	±5 percent RH	40–50 percent RH

In this final rule, DOE is adopting a similar table in section 2.1 of Appendix A and B to clearly specify the appropriate test conditions and applicable tolerances for, among other things, the ambient temperature and relative humidity.

DOE's amendments specifying the ambient temperature and relative humidity tolerances in Table 1 of ANSI/ASHRAE 32.1-2010 as an instantaneous tolerance to be

applied to each measurement are consistent with the updates ASHRAE SPC 32.1 is considering in their revisions of the ASHRAE 32.1 standard. In addition, such treatment is consistent with the specification of ambient conditions in the DOE test procedure for similar equipment, including commercial refrigeration equipment (10 CFR 431.64) and automatic commercial ice makers (10 CFR 431.134). DOE also notes, however, that such treatment is different than the tolerance applied to the integrated average temperature (as described in section III.A.7 of this final rule), which is a single tolerance applied to that one average value and is not applicable to each temperature measurement in that case.

In addition, when reviewing the ANSI/ASHRAE 32.1-2010 test method in conjunction with ASHRAE SPC 32.1, DOE determined that the accuracy requirements for the equipment used to measure relative humidity are not clearly specified. As the relative humidity is required to be maintained within ±5 percent RH of the specified value, the precision of the measurement equipment must be of higher resolution than the allowed tolerance in order to ensure that the relative humidity is in fact maintained within such a range. As such, and in accordance with the changes being considered by ASHRAE SPC 32.1, DOE is adopting provisions in section 1.1 of Appendices A and B that relative humidity shall be measured with a calibrated instrument accurate to ±2 percent RH at the ambient conditions specified in Table 1 of ANSI/ASHRAE 32.1-2010. That is, the instrument must have a measured accuracy of ±2 percent RH at 45 percent RH, or 4.4 percent of the measured value.

b. Voltage and Frequency Tolerances

Following publication of the NOPR, DOE learned that ASHRAE SPC 32.1 was considering changes to ANSI/ASHRAE 32.1-2010 concerning BVM nameplate voltages. Specifically, DOE became aware that ASHRAE SPC 32.1 was considering a change such that the same tolerances on nameplate voltage and frequency that apply to equipment with single nameplate voltages, namely ±2 percent and ±1 percent, respectively, should also apply to the tested voltage for equipment with dual nameplate voltages. Consistent with the changes being considered by ASHRAE SPC 32.1, DOE determined that the tolerances on voltage and frequency listed in paragraph (a) of section 6.2, "Voltage and Frequency," of ANSI/ASHRAE 32.1-2010 (which addresses beverage vending machines with single nameplate voltages) are not equivalently applied to equipment with dual nameplate voltages in paragraph (b) of section 6.2 of ANSI/ASHRAE 32.1-2010. As such, DOE is adopting, in this final rule, provisions in section 2.1 of Appendices A and B that beverage vending machines with dual nameplate voltages must be conducted at the lower of the two voltages ±2 percent and at the rated frequency ±1 percent.

c. Data Collection

In section 7.2.2.3, ANSI/ASHRAE 32.1-2010 currently specifies that the following data shall be recorded for 24 consecutive hours after stabilization has been achieved: ambient temperature, relative humidity, average beverage temperature, energy consumption, input voltage, and time. However, ANSI/ASHRAE 32.1-2010 does not provide specific requirements regarding how frequently such data should be sampled.

In response to the 2014 BVM test procedure NOPR, AMS recommended that DOE clearly state at what interval each reading is taken, and suggested that readings should be recorded at a minimum frequency of once per minute. (AMS, No. 0007 at p. 3)

DOE agrees with AMS that the sampling interval for data collection should be clearly specified, as collecting data at different sampling intervals can affect the energy consumption results. As such, DOE is clarifying in section 2.2.4 of Appendix A and 2.2.6 of Appendix B that the sampling interval must be at least 1 minute; that is, each measured data variable should be recorded at least every 1 minute. DOE notes that this requirement is also consistent with the changes being considered by ASHRAE SPC 32.1 for future revisions of the ASHRAE 32.1 standard.

In addition, DOE notes that, as part of this final rule, DOE is also adopting amendments to the BVM test procedure that change the terms that are used to refer to the "average beverage temperature," as described more fully in section III.A.7 and III.B.3 of this final rule. Specifically, instead of the "average beverage temperature," as referenced in ANSI/ASHRAE 32.1-2010, DOE's test procedure for beverage vending machines as adopted in this final rule refers to the "instantaneous average next-to-vend beverage temperature" and the "integrated average temperature." As such, DOE is clarifying in section 2.2.4 of Appendix A and 2.2.6 of Appendix B that, in section 7.2.2.3 of ANSI/ASHRAE 32.1-2010, the "average beverage temperature" refers to the "instantaneous average next-to-vend beverage temperature."

d. Calculation of Daily Energy Consumption.

Section 7.2.3, "Energy Consumption Calculations," of ANSI/ASHRAE 32.1-2010 specifies that the daily rated energy consumption of each basic model of a vending machine shall be determined as:

$$\underline{E_D} = (\underline{E_T} / \underline{t_T}) \times 24$$

Where:

$\underline{E_D}$ = primary rated energy consumption per day, kWh,

$\underline{E_T}$ = energy consumed during the test, kWh,

$\underline{t_T}$ = duration of the test, h, and

24 = the number of hours per day.

In reviewing ANSI/ASHRAE 32.1-2010, DOE realized that there may be confusion regarding the terminology used in this section and how these values are to be used when determining the DEC result for a given tested unit for the purposes of rating equipment in accordance with the DOE test procedure. Specifically, the variable $\underline{E_D}$ is referred to as both the "daily rated energy consumption" in the introductory paragraph and the "primary rated energy consumption per day" in the variable definitions below the stated equation In section 2.3 of Appendices A and B, DOE is referring to the variable $\underline{E_D}$ using only the term "primary rated energy consumption per day" to describe how to use this value when determining the DEC of each tested beverage vending machine.[6]

[6] DOE notes that additional calculations may be required to determine the "daily energy consumption" in accordance with the DOE BVM test procedure adopted in this final rule to address payment mechanisms, depending on the configuration in which the beverage vending machine is tested. See section III.A.11.a for more information.

DOE also notes that ANSI/ASHRAE 32.1-2010 currently does not specify how to treat measured values when calculating the DEC values in accordance with section 7.2.3, "Energy Consumption Calculations," of ANSI/ASHRAE 32.1-2010. In this final rule, DOE is also adopting specifications in section 2.3.1 of Appendix A and 2.3.3 of Appendix B that the primary rated energy consumption per day (E_D) must be calculated with raw measured values and rounded to units of 0.01 kWh/day.

3. Eliminating Testing at the 90 °F Ambient Test Condition

Both ANSI/ASHRAE Standard 32.1-2004, the test method incorporated by reference in the DOE test procedure adopted in the 2006 BVM test procedure final rule, and ANSI/ASHRAE Standard 32.1-2010, the test method DOE is incorporating by reference in the amended test procedure as discussed in section III.A.1 of this final rule, specify two tests: one at an ambient condition of 75 °F ± 2 °F and 45 percent ± 5 percent relative humidity ("the 75 °F ambient test condition") and the other at an ambient condition of 90 °F ± 2 °F and 65 percent ± 5 percent relative humidity ("the 90 °F ambient test condition"). By incorporating by reference ANSI/ASHRAE Standard 32.1-2004, DOE's current test procedure for beverage vending machines requires testing at both the 75 °F ambient test condition and 90 °F ambient test condition. In the energy conservation standards rulemaking that culminated in the 2009 BVM final rule, however, DOE decided that only the measured DEC determined at the 75 °F ambient test condition would be used for the purposes of demonstrating compliance with applicable energy conservation standards. The data taken at the 90 °F ambient test condition were not used by DOE in setting the standards established in the 2009 BVM final rule and are not used

to demonstrate compliance with those standards. 74 FR 44914, 44920 (Aug. 31, 2009) and 10 CFR 429.52. However, the 2009 BVM final rule did not similarly amend the DOE test procedure to remove the requirement to test at the 90 °F ambient test condition and, as such, the requirement to test covered BVM models at both the 75 °F and 90 °F ambient test conditions established in the 2006 BVM test procedure final rule remained in place until being reevaluated in this test procedure rulemaking.

In the 2014 BVM test procedure NOPR, DOE proposed to amend its test procedure to eliminate the requirement to perform a test at the 90 °F ambient test condition as described in ANSI/ASHRAE Standard 32.1-2004 and ANSI/ASHRAE Standard 32.1-2010. 79 FR 46908, 46912–46913 (Aug. 11, 2014). DOE understands that the 90 °F test is used primarily to represent and evaluate the performance of some units that may be installed outdoors, especially in hot-humid locations; however, as mentioned above, the performance of a beverage vending machine at the 90 °F ambient test condition is not currently used for DOE regulatory purposes. Therefore, DOE does not see a need to maintain the 90 °F test condition as part of the DOE test procedure.

DOE believes that removing the 90 °F ambient test condition test requirement will also reduce manufacturer burden associated with its test procedure by eliminating testing that does not significantly increase the accuracy or representativeness of the DOE test procedure and is unnecessary for demonstrating compliance with DOE's energy conservation standards.

In the 2014 BVM test procedure NOPR, DOE requested comment on its proposal to eliminate the requirement to conduct testing at the 90 °F ambient test condition. 79 FR at 46913. AMS, SVA, and ASHRAE SPC 32.1 supported the elimination of testing at the 90 °F test condition. (AMS, No. 0007 at p. 2; SVA, No. 0008 at p. 1; ASHRAE SPC 32.1, No. 0011 at p. 2) Natural Resources Canada (NRCan) asked why DOE would not test their machines according to worst case conditions. (NRCan, Public Meeting Transcript, No. 0004 at p. 25) Coca-Cola also agreed with DOE that there should be a single set of conditions for testing and rating purposes. Coca-Cola, however, stated that some machines are designed for higher ambient temperatures, and asked DOE to factor this into the application of test results, even if the machine is not tested at 90 °F. (Coca-Cola, No. 0010 at p. 2)

DOE appreciates the comments from AMS, SVA, and ASHRAE SPC 32.1 supporting the elimination of the 90 °F ambient test condition and Coca-Cola's comment to have a single set of conditions for testing and rating purposes. In response to the comment from NRCan, DOE notes that it is required to create test procedures that are representative of the performance of the equipment under an average cycle of use. (42 U.S.C. 6293(b)(3)) DOE believes that the test conditions required by the test procedure, namely 75 °F and 45 percent relative humidity, are reasonably representative of the average operating conditions of most beverage vending machines. In particular, DOE notes that the majority of beverage vending machines are installed indoors (see chapter 7 of the BVM energy conservation standard preliminary analysis technical support document; Docket No. EERE-2013-BT-STD-0022) and that such indoor environments

are normally kept close to the average temperature used for the DOE test. As such, DOE believes that the DEC values measured at the current test conditions are an accurate reflection of field energy use and does not believe a test condition of 90 °F would be representative of field energy use for the majority of equipment. In response to Coca-Cola's comment regarding the application of test results on machines designed for higher ambient temperatures, DOE understands that some beverage vending machines are placed in locations that experience ambient temperature and relative humidity conditions that differ from those required in the test procedure, including environments that are often warmer and have higher relative humidity than specified by ASHRAE 32.1-2010. However, it is not feasible or realistic to test BVM models at all the different ambient temperature conditions they may experience in the field. First, doing so would be extremely burdensome. Second, it is difficult to determine which BVM models will be placed in different ambient conditions (e.g., tropical conditions), as often the same BVM model may be placed indoors or outdoors. In the BVM energy conservation standards preliminary analysis, DOE estimated that 18 percent of Class B and Combination B[7] beverage vending machines were located outdoors, and all Class A and Combination A[7] equipment is located indoors (see chapter 7 of the BVM energy conservation standard preliminary analysis technical support document (TSD)). DOE believes that the required test condition of 75 °F is representative of the indoor environments in which the majority of BVM units are placed. Therefore, DOE believes the 75 °F ambient test condition

[7] In the DOE energy conservation standard preliminary analysis, DOE discussed dividing the "combination vending machine" equipment class into "Combination A" equipment that was fully cooled and "Combination B" equipment that was not fully cooled, similar to the Class A and Class B distinction. See chapter 2 of the BVM energy conservation standard preliminary analysis TSD. Additionally, DOE is proposing language to address equipment class distinctions as part of the energy conservation standards rulemaking.

provides a reasonable and comparable representation of energy performance for all BVM models and testing at alternative test conditions is not necessary. DOE is accounting for the variable energy performance of beverage vending machines that are placed outdoors as part of the energy use analysis associated with the BVM energy conservation standard rulemaking. However, DOE is not considering different or alternative energy conservation standards for such equipment based on the fact that most BVM models can be placed indoors or outdoors and that, as a result, a standard based on analysis at the 75 °F test procedure ambient condition would be applicable. (See Docket No. EERE-2013-BT-STD-0022 for more information.)

Thus, in this final rule, DOE is removing the requirement to conduct testing at the 90 °F ambient test condition as part of the DOE test procedure. DOE is clarifying the ambient test conditions necessary for testing in accordance with the DOE test procedure in a new Table A.1 in Appendix A and Table B.1 in Appendix B in section 2.1 of both Appendices A and B. DOE notes that ASHRAE SPC 32.1 is also currently considering updating ASHRAE 32.1 to remove the 90 °F ambient test condition.

4. Test Procedure for Combination Vending Machines

"Combination vending machine" is currently defined as a refrigerated bottled or canned beverage vending machine that also has non-refrigerated volumes for the purpose of vending other, non-"sealed beverage" merchandise. 10 CFR 431.292. Based on this definition, any machine (a) that upon payment dispenses beverages in sealed containers

and (b) in which the entire internal storage volume is refrigerated is not a combination vending machine.

In the 2009 BVM final rule, DOE elected to define "combination vending machine," but refrained from setting standards for combination vending machines due to a lack of data regarding their energy performance. Id. However, DOE is currently considering standards for combination vending machines in a parallel energy conservation standards rulemaking. (Docket No. EERE-2013-BT-STD-0022)

While combination vending machines are not currently required to comply with energy conservation standards, any representations with regard to the DEC of such equipment must still be made in accordance with the DOE BVM test procedure. DOE's current test procedure is appropriate for the evaluation of the refrigerated volume, vendible capacity, and energy use of combination vending machines. DOE notes, however, that the application of the BVM test procedure may require clarification as to how it is applied to combination vending machines. Accordingly, in the 2014 BVM test procedure NOPR, DOE proposed to clarify the test procedure for combination vending machines. 79 FR 46908, 46913–46914 (Aug. 11, 2014). In the 2014 BVM test procedure NOPR, DOE proposed that only the refrigerated compartment would be considered in the refrigerated volume calculation, while both refrigerated and non-refrigerated compartments would be considered in the vendible capacity calculation. Similarly, DOE proposed that standard test packages be placed in the next-to-vend product location only in the refrigerated portion of the refrigerated beverage vending

machine, and only the refrigerated portion of the combination vending machine be required to be fully loaded to capacity. 79 FR at 46914.

With regard to the measurement of DEC for combination vending machines, DOE also proposed that any lighting or other energy-consuming features in the non-refrigerated compartment be fully energized during the test procedure and operated in the same manner as any lighting or features in the refrigerated compartment. DOE also proposed that the total energy use of the machine measured during the 24-hour test would comprise the DEC, as measured in accordance with ANSI/ASHRAE Standard 32.1-2010. Id.

In the 2014 BVM test procedure NOPR, DOE proposed the addition of these clarifications to the DOE test procedure at 10 CFR 431.294 for combination vending machines and requested comment on the applicability of the existing test procedure, as clarified, to combination vending machines. In response, SVA and ASHRAE SPC 32.1 commented that they believe the test procedure is applicable to combination vending machines. (SVA, No. 0008 at p. 1; ASHRAE SPC 32.1, No. 0011 at p. 2) Coca-Cola commented that the test was applicable to combination vending machines that have more than half of the machine capacity refrigerated. (Coca-Cola, No. 0010 at p. 3) AMS noted that the test procedure does not specify how or what products would be required to be loaded in the non-refrigerated product compartment during the test, and stated this could affect the energy consumption of combination vending machines that do not provide 100 percent thermal isolation between zones. (AMS, No. 0007 at p. 2) AMS commented that

the insulation between refrigerated and non-refrigerated zones does not completely separate the two zones and hence should not be excluded from the MDEC calculation. (AMS, No. 0007 at p. 4)

DOE appreciates the comments from SVA and ASHRAE SPC 32.1 confirming DOE's position that the DOE test procedure is applicable to combination vending machines. However, DOE disagrees with Coca-Cola's comment that they believe the test is only applicable to combination vending machines that have more than half of the machine capacity refrigerated. The DOE test procedure for beverage vending machines is applicable to all equipment that meets the definition of a "refrigerated bottled or canned beverage vending machine," as defined at 10 CFR 431.292, including Class A, Class B, and combination vending machines. As noted above, DOE currently defines "combination vending machine" as a refrigerated bottled or canned beverage vending machine that also has non-refrigerated volumes for the purpose of vending other, non-"sealed beverage" merchandise. 10 CFR 431.292. DOE notes that its regulations do not restrict the applicability of the definition based on the relative volumes of the refrigerated and non-refrigerated volumes. As stated previously, any equipment that is capable of vending bottled or canned beverages upon payment from a refrigerated compartment contained within the unit, and also has non-refrigerated compartments for the purpose of vending other, non-"sealed beverage" merchandise, meets the definition of a combination vending machine regardless of the relative volume of the refrigerated and non-refrigerated compartments.

In considering the applicability of the combination vending machine definition, DOE wishes to clarify that combination vending machines must include compartments that are physically separated. However, DOE acknowledges that some combination equipment designs employ a common product delivery chute between the refrigerated and non-refrigerated compartments. As such, DOE also wishes to clarify that such physically separate compartments in a combination vending machine may or may not share a common product delivery chute for the purposes of delivering vendible merchandise to the customer. To permit additional consideration of these issues and to provide more opportunity for comment, DOE will further address the definition of combination vending machine in the standards rulemaking (Docket EERE-2013-BT-STD-0022). DOE notes that any changes to the definition adopted in the standards rulemaking would be to provide more clarity of the distinctions between the various product classes and would not change the appropriate classifications.

With regard to the determination of refrigerated volume and vendible capacity for combination vending machines, ASHRAE SPC 32.1 is also considering specifying that both the refrigerated volume and vendible capacity measurements refer only to the deliberately refrigerated compartment(s). In consideration of these changes suggested by ASHRAE SPC 32.1, DOE is also adopting wording changes in Appendices A and B to help clarify testing of refrigerated and non-refrigerated compartments. Section 3.2 of each appendix specifies that the vendible capacity to be measured includes only the capacity of the refrigerated compartment; this is a change from DOE's proposed approach in the BVM test procedure NOPR, where DOE had proposed to include the

entire volume from which the product may be vended, whether or not that volume is refrigerated. In this final rule, DOE is also clarifying in section 3.1 of each appendix that the refrigerated volume measurement only includes the refrigerated compartment, and, in section 2.2.1.3 of each appendix, that only this compartment shall be fully loaded to capacity with standard product and test packages. These clarifications are consistent with the changes being considered by ASHRAE SPC 32.1 to the ASHRAE 32.1 standard. DOE will continue to consider how to delineate more clearly the distinction between refrigerated and non-refrigerated compartments as it addresses the definition of combination vending machine in the standards rulemaking (Docket EERE-2013-BT-STD-0022). Because the goal is to ensure the regulatory text is clear and consistent between the test procedure, the definitions and the standards, DOE may make, as part of the standards rulemaking, conforming changes to these sections to reflect any final changes to the definition of combination vending machine.

DOE agrees with AMS that the loading of non-refrigerated compartments for the purposes of testing combination vending machines requires clarification. The thermal mass of any items loaded into the volumes that are not refrigerated may affect the measured DEC of equipment and, as such, it is important that the loading of these compartments be done consistently to ensure repeatable and comparable results. DOE also notes that there is significant variability in the thermal mass of the different "non-sealed beverage merchandise" that might be loaded into the volumes that are not refrigerated. As such, as mentioned previously, in this final rule, DOE is clarifying in section 2.2.1.3 of Appendices A and B to Subpart Q of Part 431 that, during conduct of

the test procedure, the non-refrigerated compartments of combination vending machines must not be loaded with any standard products or other vendible merchandise. In response to AMS's comment suggesting that the refrigerated and non-refrigerated zones may not be completely separated and, thus, should be considered in the calculation of the standard level for combination equipment, DOE agrees with AMS that some combination vending machines may be designed such that the refrigerated and non-refrigerated compartments are not completely thermally isolated, such as from air leakage through a shared product delivery chute. However, DOE notes that a refrigerated compartment that has a thermal gradient is considered to be zone-cooled. As noted above, DOE is continuing to consider how best to clarify the distinction between refrigerated and non-refrigerated compartments in a combination vending machine as part of the standards rulemaking. Regarding the standard level for such combination equipment, DOE notes that combination vending machines are not currently subject to standards but that DOE is considering new standards for such equipment in the ongoing BVM energy conservation standard rulemaking. (Docket No. EERE-2013-BT-STD-0022) DOE acknowledges that the fact that there may be some heat transfer between the non-refrigerated and refrigerated volumes may affect the appropriate energy conservation standard level, and DOE will consider such in the setting of an appropriate standard level for this equipment.

5. Loading of BVM Models When Conducting the DOE Test Procedure

In the 2014 BVM test procedure NOPR, DOE proposed to add language to the BVM test procedure to clarify the loading requirements for beverage vending machines that are offered in a variety of configurations and may be capable of vending other

refrigerated merchandise from their refrigerated volumes. 79 FR 46908, 46914 (Aug. 11, 2014). Specifically, DOE proposed to amend the regulatory text to clarify that, for beverage vending machines that are available with a variety of product storage configurations, the refrigerated compartment(s) should be configured, for purposes of testing, to hold the maximum number of sealed beverages that it is capable of accommodating per manufacturer specifications. Id. For example, if some areas of the refrigerated volume can be configured either to vend sealed beverages or to vend other refrigerated merchandise, the equipment should be configured and loaded with the maximum number of sealed beverages in the refrigerated compartment(s) for testing.

DOE understands that tests conducted with other configurations may produce different results because of the decrease in thermal mass in the refrigerated space. Various configurations that differ in placement and type of shelving only may be placed in the same basic model with the performance at the maximum beverage configuration used to represent the performance of all of the configurations in the basic model. Alternatively, if a manufacturer wishes to make different representations regarding the energy consumption of a beverage vending machine in various shelving configurations, the manufacturer may elect to test and certify each unique shelving configuration as a separate basic model.[8] In that case, the unique shelving configuration for that BVM model would comprise the "maximum beverage configuration" for that model.

[8] For purposes of beverage vending machines, basic model means all units of a refrigerated bottled or canned beverage vending machine (or class thereof) manufactured by one manufacturer, having the same primary energy source, and which have essentially identical electrical, physical, and functional characteristics that affect energy consumption or energy efficiency. See 10 CFR 431.292. If differing shelving configurations affect the energy consumption, these differing configurations should be considered

In response to DOE's proposed language regarding the loading requirements for BVM models subject to the DOE test procedure, ASHRAE SPC 32.1 expressed support for DOE's proposal to add language to the DOE test procedure in Appendices A and B to clarify the loading requirements for covered BVM models. (ASHRAE SPC 32.1, No. 0011 at p. 2) DOE did not receive any negative comments on this proposal. As such, in this final rule, DOE has added language to the DOE test procedure in section 2.2.1 of Appendices A and B to clarify the loading requirements for the refrigerated compartment(s) of BVM models. As noted in section III.A.4 of this final rule, DOE is also clarifying that non-refrigerated compartments should be left empty and not loaded with any vendible products or merchandise.

6. Specifying the Characteristics of the Standard Product

When testing a BVM model in accordance with the DOE test procedure established in the 2006 BVM test procedure final rule, the equipment is to be loaded with the maximum quantity of standard products and with standard test packages in each next-to-be-vended position for each selection, as required by section 7.2.2.1 and 7.2.2.2 of ANSI/ASHRAE Standard 32.1-2004. Section 5 of ANSI/ASHRAE Standard 32.1-2004 further requires that the standard product shall be 12-ounce cans for machines that are capable of dispensing 12-ounce cans. For all other machines, the standard product shall be the product specified by the manufacturer as the standard product.

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different basic models, unless manufacturers elect to group BVM units that vary in shelving configuration only into the same BVM basic model and rate such model based on the performance of the shelving configuration that holds the maximum number of sealed beverages.

The DOE test procedure established in the 2006 BVM test procedure final rule does not provide any further specificity regarding the characteristics of the standard product when conducting the DOE test procedure or the manufacture of standard test packages. DOE understands that there may be variability among manufacturers and testing laboratories with regard to the characteristics of standard products and standard test packages. DOE believes that such variability may result in minor inconsistencies in test results. As such, in the 2014 BVM test procedure NOPR, DOE proposed to clarify the characteristics of the standard product and standard test package to ensure test results are as consistent and repeatable as possible. 79 FR 46908, 46914–46915 (Aug. 11, 2014). Specifically, in the 2014 BVM test procedure NOPR, DOE proposed to add text to the BVM test procedure in Appendices A and B, specifying that the standard product shall be:

- standard 12-ounce aluminum beverage cans filled with a liquid with a density of 1.0 grams per milliliter (g/mL) ± 0.1 g/mL at 36 °F for beverage vending machines that are capable of vending cans,
- 20-ounce plastic bottles filled with a liquid with a density of 1.0 g/mL ± 0.1 g/mL at 36 °F for beverage vending machines that are not capable of vending 12-ounce cans, but are capable of vending 20-ounce bottles, and
- the product specified by the manufacturer as the standard product for beverage vending machines that are not capable of vending 12-ounce cans or 20-ounce bottles.

Id.

DOE selected a density range of 1.0 g/mL ± 0.1 g/mL, as it is inclusive of most test fluids used today. For example, this density range includes water, diet and regular soda, fruit juices, and propylene glycol/water mixtures up to 50/50 percent by volume. In addition, Fischer-Nickel conducted research in 2004 that compared the temperature measurements of standard test packages constructed in the manner specified by ANSI/ASHRAE Standard 32.1 to the test packages described in ASHRAE Standard 117-2002, "Method of Testing Closed Refrigerators and Freezers," which are 1-pint plastic test packages filled with a 50/50 mixture of water and propylene glycol; little variation was found in measured temperatures when comparing different test package materials and fluids.[9]

Section 3 of ASHRAE 32.1-2004 and 2010 defines the standard test package as a beverage container of the size and shape for which the vending machine is designed, altered to include a temperature-measuring instrument at its center of mass. DOE finds the requirements in ANSI/ASHRAE Standard 32.1-2004 and 2010 to be fairly clear and concise when paired with the clarification above regarding the standard product. Therefore, DOE did not propose additional clarifications regarding the construction of standard test packages beyond the proposed clarification that the standard product shall be 12-ounce cans or 20-ounce bottles for BVM models that are capable of vending cans

[9] Cowen, D. and Zabrowski, D. 2004. "Application and Evaluation of ASHRAE 117-2002 and ASHRAE 32.1-1997." FSTC Report # 5011.04.01. Fischer-Nickel, Inc. Available at: http://www.fishnick.com/publications/appliancereports/refrigeration/Application_of_ASHRAE_117_and_32.1.pdf

or bottles, respectively, filled with a liquid with a density of 1.0 g/mL ± 0.1 g/mL at 36 °F. Id.

In response to DOE's proposals in the 2014 BVM test procedure NOPR, DOE received several comments from interested parties supporting DOE's proposed clarifications. AMS expressed their approval of DOE's proposed definition of a standard test package. (AMS, No. 0007 at p. 3) Specifically, Coca-Cola and ASHRAE SPC 32.1 agreed with DOE's assertion that the most common standard products were 12-ounce cans or 20-ounce bottles. (Coca-Cola, No. 0010 at p. 3; ASHRAE SPC 32.1, No. 0011 at p. 2)

DOE also received several comments suggesting improvements or requesting further clarification to the proposed standard product specifications. Coca-Cola noted that beverage vending machines that dispense 330 ml "slimline" cans (which have a higher ratio of height to diameter than standard 12-ounce cans) also exist. (Coca-Cola, No. 0010 at p. 3) AMS requested DOE clarify the standard products for helix driven machines, noting that they typically do not dispense 12-ounce cans. (AMS, No. 0007 at pp. 2–3) SVA supported clarity in what a standard product was, and noted that flexibility was required for machines designed to vend milk cartons, aseptic packs, pouches, and energy drinks. (SVA, No. 0008 at p. 1)

DOE appreciates the comment from AMS in support of the definition of a standard test package. DOE also appreciates the comments from ASHRAE SPC 32.1 and

Coca-Cola acknowledging that 12-ounce cans or 20-ounce bottles are the most common standard products and supporting DOE's clarification of the standard product definition. In response to the comments from Coca-Cola, SVA, and AMS regarding equipment that is designed to vend non-standard products, such as "slimline" cans, milk cartons, aseptic packs, pouches, and energy drinks, DOE agrees with commenters that flexibility in the specification of the standard product is required for beverage vending machines that are not capable of vending 12-ounce cans or 20-ounce bottles. DOE appreciates the specific examples of such products provided by commenters where such provision would be required. For such beverage vending machines, the product specified by the manufacturer as the standard product shall continue to be used in testing. DOE will determine the appropriate standard product for use in testing by consulting manufacturer product literature. DOE notes, however, that manufacturers may only test equipment with products other than 12-ounce cans or 20-ounce bottles if the machine is not capable of vending either of these product types.

In light of these comments, DOE is not altering the clarification regarding the standard product proposed in the 2014 BVM test procedure NOPR. Therefore, in this final rule, DOE is adding a clarification in section 2.2.1.4 of Appendices A and B that the standard product shall be 12-ounce cans or 20-ounce bottles for BVM models that are capable of vending 12-ounce cans or 20-ounce bottles, respectively, filled with a liquid with a density of 1.0 g/mL ± 0.1 g/mL at 36 °F, or the product specified by the manufacturer as the standard product for beverage vending machines that are not capable of vending 12-ounce cans or 20-ounce bottles.

7. Clarifying the Next-to-Vend Beverage Temperature Test Condition

ANSI/ASHRAE Standard 32.1-2004, the test method incorporated by reference in the DOE test procedure adopted in the 2006 BVM test procedure final rule, states, "the beverage temperature shall be measured in standard test packages in each next-to-be-vended position for each selection." ANSI/ASHRAE Standard 32.1-2004 specifies an average next-to-vend temperature of 36 °F ± 1 °F "throughout test." The beverage temperature requirements of the ANSI/ASHRAE Standard 32.1-2010 test method, which DOE proposed to incorporate by reference in the DOE BVM test procedure as part of the 2014 BVM test procedure NOPR (79 FR 46908, 46911–46912 (Aug. 11, 2014)), are identical to those of ANSI/ASHRAE Standard 32.1-2004. However, DOE became aware of a need to clarify whether the next-to-vend temperature specification of 36 °F ± 1 °F "throughout test" refers to a condition in which the average next-to-vend temperature is maintained at 36 °F ± 1 °F constantly for the duration of the test, or one in which the temperature of next-to-vend beverages is averaged across all selections and over the entire length of the test, resulting in a single value of 36 °F ± 1 °F.

In the 2014 BVM test procedure NOPR, DOE proposed to clarify its test procedure by explicitly stating that the temperature of next-to-vend beverages shall be averaged across all next-to-vend beverages and over the entire time of the test, resulting in a single value of 36 °F ± 1 °F. Specifically, to clarify this requirement, DOE proposed to incorporate a definition of integrated average temperature and define this term as the average of all standard test package measurements in the next-to-vend beverage positions

taken during the test, expressed in degrees Fahrenheit (°F). 79 FR at 46915. That is, the integrated average temperature is calculated as follows:

$$T_{IAT} = \frac{\sum_{x=1}^{d} \sum_{i=1}^{n} T_{xi}}{d \times n}$$

Where:

$\underline{T_{IAT}}$ = integrated average temperature, °F (°C),

$\underline{T_{xi}}$ = measured beverage temperature for next-to vend test package x at interval i,

$\underline{d}$ = total number of recorded intervals, and

$\underline{n}$ = total number of next-to-vend test packages.

In response to DOE's proposed definition of integrated average temperature, SVA and ASHRAE SPC 32.1 commented that they support DOE's definition of integrated average temperature. (SVA, No. 0008 at p. 1; ASHRAE SPC 32.1, No. 0011 at p. 3) ASHRAE SPC 32.1, Southern California Edison (SCE), and AMS added that maintaining each individual thermocouple within 1 °F of 36 °F was unnecessarily rigorous and not possible in many machine designs. (ASHRAE SPC 32.1, No. 0011 at pp. 2–3; SCE, Public Meeting Transcript, No. 0004 at p. 43; AMS, No. 0007 at p. 3) Coca-Cola also stated their understanding that 36 °F ± 1 °F should be applied over the entire testing period and cannot be maintained for every individual data measurement because of programmed defrost cycles. (Coca-Cola, No. 0010 at p. 3–4)

DOE appreciates the comments from SVA and ASHRAE SPC 32.1 supporting DOE's definition of integrated average temperature. In response to comments from

ASHRAE SPC 32.1, SCE, and AMS, DOE recognizes that it is not possible to maintain individual standard test packages in the next-to-vend beverage positions within 36 °F ± 1 °F for some equipment designs due to spatial variability within the unit. In addition, DOE agrees with Coca-Cola's remarks that even an instantaneous spatial average of all standard test packages in the next-to-vend beverage locations may not be feasible to maintain throughout the entire test period due to temporal temperature variability resulting from defrost cycles or other compressor cycling behavior. DOE notes that these comments are consistent with DOE's proposed treatment of the "average beverage temperature" condition and the definition of integrated average temperature proposed in the 2014 BVM test procedure NOPR.

Therefore, in section 1.2 of Appendices A and B, DOE is adopting the definition of integrated average temperature proposed in the 2014 BVM test procedure NOPR. DOE is also specifying, in section 2.1.1 of Appendices A and B, that the integrated average temperature must be 36 °F ± 1 °F, or the lowest application product temperature as discussed in section III.A.10 of this final rule, for the purposes of testing equipment in accordance with the DOE test procedure. 79 FR at 49615.

DOE notes that, while the integrated average temperature is the measurement that must be used to comply with DOE's requirements regarding the average beverage temperature of beverage vending machines during the test period (excluding the stabilization period), the instantaneous spatial average temperature of all standard test packages in the next-to-vend beverage positions is still a relevant measurement for the

purposes of determining the presence of a refrigeration low power mode (see section III.B.3 of this final rule) and for determining temperature stabilization prior to initiating the test period Specifically, section 7.2.2.2 of ANSI/ASHRAE 32.1-2010 specifies that temperature stabilization is considered to be achieved 24 hours after the "average beverage temperature" reaches 36 °F ±1 °F (and measured energy consumption is within 2 percent for two successive 6-hr periods). In this case, the "average beverage temperature" specified in ANSI/ASHRAE 32.1-2010 refers to the "instantaneous average next-to-vend beverage temperature" and not a temporal average (i.e., the integrated average temperature). Therefore, in this final rule, DOE is also adopting in section 1.2 of Appendices A and B a new definition of instantaneous average next-to-vend beverage temperature, which means the spatial average temperature of all standard test packages in the next-to-vend beverage positions at a given time. To clarify, using the previously discussed nomenclature, the instantaneous average next-to-vend beverage temperature is calculated as follows:

$$T_i = \frac{\sum_{i=1}^{n} T_{xi}}{n}$$

Where:

T_i = average beverage temperature at interval i, °F (°C),

T_{xi} = measured beverage temperature for next-to-vend test package x at interval i, and

n = total number of next-to-vend test packages.

To clarify the applicability of the instantaneous average next-to-vend beverage temperature to the temperature stabilization requirements in the test procedure, DOE is also clarifying in section 2.1.1.1, that temperature stabilization is considered to be achieved 24 hours after the instantaneous average next-to-vend beverage temperature reaches 36 °F ±1 °F.

Regarding the measurement of the integrated average temperature, AMS and SVA requested that some means be provided by which the number of thermocouples could be reduced. (AMS, No. 0007 at p. 3; SVA, No. 0008 at p. 1) AMS further suggested that, as there are many different BVM geometries and configurations, manufacturers be allowed some flexibility in how this was accomplished, provided it could be demonstrated that the method used would generate equivalent DEC results to testing with a thermocouple in each next-to-vend beverage location. (AMS, No. 0007 at p. 3) Coca-Cola agreed with AMS and SVA and stated that added temperatures sensors introduce additional points of air infiltration into the machine and thus may upset the integrity of the test. (Coca-Cola, No. 0010 at p. 4).

In response to the comments from AMS, SVA, and Coca-Cola regarding reduction in the number of standard test packages required for testing beverage vending machines, DOE agrees with commenters that there is potential to reduce burden associated with testing beverage vending machines with horizontal product configurations, which may have a large number of next-to-vend beverage locations, by reducing the number of standard test packages that are required to be loaded in the next-

to-vend beverage positions. Furthermore, DOE believes that provided the standard test packages are spatially distributed across the face of the beverage vending machine, the measured integrated average temperature should not be significantly different than that determined with a standard test package in each next-to-vend location. This is particularly true for fully-cooled, Class A beverage vending machines (which are the category of beverage vending machine that most commonly has a horizontal product arrangement), since the temperature distribution across the standard test packages should be reasonably consistent. DOE also notes that ASHRAE SPC 32.1 is, similarly, considering changing the requirements for loading standard test packages in equipment with horizontal product arrangement to reduce the required number of standard test packages.

Therefore, consistent with the submitted comments from interested parties and the potential changes ASHRAE SPC 32.1 is considering, DOE is amending the requirements for placement of standard test packages for beverage vending machines with products arranged horizontally in this final rule. In particular, DOE is specifying in section 2.2.1 of Appendices A and B that, for refrigerated bottled or canned beverage vending machines with products arranged horizontally (e.g., on shelves or in product spirals), standard test packages must be placed in the refrigerated compartment(s) in the following locations, as shown in Figure III.1:

1) For odd-number shelves, when counting starting from the bottom shelf, standard test packages shall be placed at:

a) the left-most next-to-vend product location,

b) the right-most next-to-vend product location, and

c) for equipment with greater than or equal to five product locations on each shelf, the next-to-vend product location in the center of the shelf (i.e., equidistant from the left-most and right-most next-to-vend product locations) if there are an odd number of next-to-vend products on the shelf or the next-to-vend product location immediately to the right and to the left of the center position if there are an even number of next-to-vend products on the shelf.

2) For even-numbered shelves, when counting from the bottom shelf, standard test packages shall be placed at either:

a) for equipment with less than or equal to six next-to-vend product locations on each shelf, the next-to-vend product location(s)[10] (1) one location towards the center from the left-most next-to-vend product location and (2) one location towards the center from the right-most next-to-vend product location, or

b) for equipment with greater than six next-to-vend product locations on each shelf, the next-to-vend product locations (1) two locations towards the center from the left-most next-to-vend product location and (2) two locations toward the center from the right-most next-to-vend product location.

[10] For equipment with three next-to-vend product locations on each shelf, the next-to-vend product location one location towards the center from the left-most next-to-vend product location is the same position as the next-to-vend product location one location towards the center from the right-most next-to-vend product location.

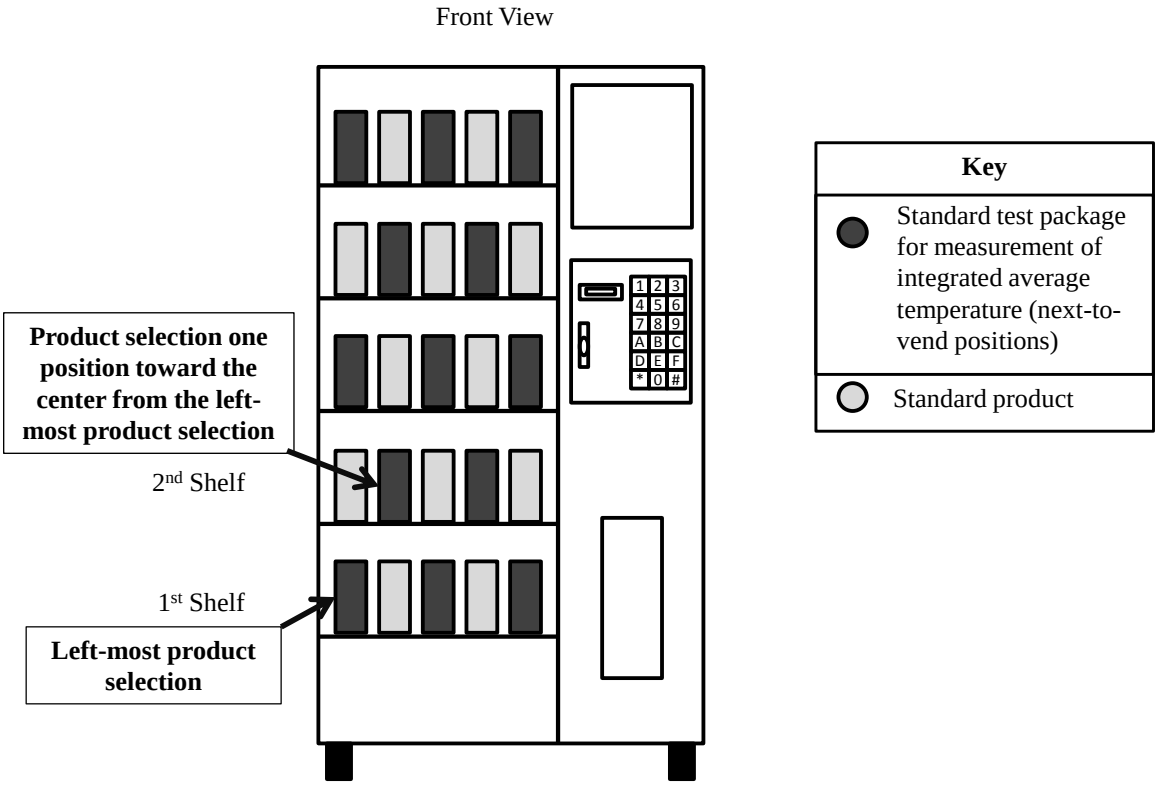

Figure III.1 Location of Standard Test Packages for Beverage Vending Machines with Products Arranged Horizontally and Five Next-to-Vend Product Locations on Each Shelf.

As beverage vending machines with products arranged vertically, in stacks, typically have far fewer next-to-vend beverage locations, DOE has determined that such a sampling procedure is not necessary for this equipment.

8. Defining "Fully Cooled"

The 2009 BVM final rule established DOE energy conservation standards for beverage vending machines in two equipment classes: Class A and Class B refrigerated beverage vending machines. 74 FR 44914, 44968 (Aug. 31, 2009). The distinguishing criterion between these two equipment classes is whether the equipment is fully cooled. 10 CFR 431.292.

DOE regulations, however, have never defined the term "fully cooled." In the 2014 BVM test procedure NOPR, DOE proposed to define "fully cooled" as a condition in which the refrigeration system of a beverage vending machine cools products throughout the entire refrigerated volume of a machine instead of being directed at a fraction (or zone) of the refrigerated volume as measured by the average temperature of the standard test packages in the furthest from the next-to-vend product locations, which would be required to be no more than 10 °F above the integrated average temperature of the standard test packages in the next-to-vend product locations. 79 FR 46908, 46916 (Aug. 11, 2014).

The proposed definition was predicated upon the different methods of cooling used in Class A and Class B machines and the customer utility provided by fully cooling the refrigerated space. Maintaining all refrigerated beverages within 10 °F of the next-to-vend beverage temperature typically allows customers to select from more beverages and ensures that the customer will receive a properly cooled product, regardless of the product's vertical location in the machine. 79 FR at 46915–46917. DOE selected a temperature range of 10 °F, based on feedback from manufacturers, as a reasonable temperature bound to differentiate fully cooled beverage vending machines. DOE also verified this proposed temperature range based on limited testing of beverage vending machines currently available on the market to determine the typical temperature variability observed between the next-to-vend and furthest from next-to-vend beverages in Class A and Class B equipment, respectively. Id.

To accompany DOE's proposed definition of fully cooled, the 2014 BVM test procedure NOPR also proposed to adopt an optional test method that could be used to quantitatively differentiate between Class A and Class B equipment. To confirm whether a given BVM model is fully cooled, DOE proposed that temperature measurements be taken at the next-to-vend and furthest from next-to-vend temperature positions to confirm the proposed 10 °F temperature differential. For beverage vending machines with horizontal product rows, or spirals, DOE's proposed test procedure required a standard test package at the back of the horizontal product rows in the four corners of the machine (e.g., bottom right, bottom left, top right, and top left). For beverage vending machines with standard products configured in a vertical stack, the proposal included an additional standard test package at the top of each stack. To determine if a given beverage vending machine is fully cooled, manufacturers would calculate the average temperature of the standard test packages in the furthest from the next-to-vend product location over the entire test period and compare that value to the integrated average temperature of standard test packages in the next-to-vend beverage positions. If the difference between these two values was less than or equal to 10 °F, the tested unit would be considered fully cooled. 79 FR at 46917.

In the 2014 BVM test procedure NOPR, DOE noted that this test method would not be required to certify equipment, but would be the method used by DOE to determine the appropriate equipment class for enforcement purposes. Therefore, DOE noted that its proposed definition and test method would not require manufacturers to take any

additional temperature measurements beyond what is currently specified in ANSI/ASHRAE Standard 32.1-2010 and, as such, would not increase the burden associated with conducting the DOE BVM test procedure. Id.

In the 2014 BVM test procedure NOPR, DOE requested comments on its proposed definition of "fully cooled" and the proposed fully cooled validation test method. DOE was particularly interested in whether the proposed definition aligns with the classifications of Class A and Class B equipment currently used in industry. Id.

ASHRAE SPC 32.1 stated they are considering the removal of product class definitions from the new ASHRAE test method. (ASHRAE SPC 32.1, No. 0011 at p. 3) Coca-Cola commented that configurations such as "zone cooled" and "fully cooled" did not apply to the test method, but to how the machine was rated. (Coca-Cola, No. 0010 at p.4) Similarly, SVA commented that two classifications for beverage vending machines were not needed. (SVA, No. 0008 at p. 2) SVA also suggested that DOE use the same test procedure for both classes. (SVA, Public Meeting Transcript, No. 0004 at pp. 50–55)

In response to the definition of "fully cooled" proposed in the BVM test procedure NOPR, several interested parties recommended that DOE consider an alternate differentiation between equipment types to better capture differences in energy consumption, and suggested the presence of a transparent or opaque front and the arrangement of products within the machine as potential differentiating criteria that are more appropriate and consistent with the differentiation between equipment

configurations applied in industry. (CA IOUs, No. 0005 at p. 1; Sanden Vendo America Inc., Public Meeting Transcript, No. 0004 at p. 52). Many interested parties also commented regarding the difficulty of establishing a quantitative temperature threshold to differentiate fully cooled equipment from non-fully cooled equipment that would be applicable across all BVM models. (AMS, Public Meeting Transcript, No. 0004 at p. 54; SVA, No. 0008 at p. 2; NEEA, No. 0009 at p. 1). Coca-Cola and SVA also noted the potential for additional burden associated with the fully cooled verification test procedure. (Coca-Cola, No. 0010 at p. 4; SVA, No. 0008 at p. 2)

DOE considered all the comments received regarding the classification of beverage vending machines based on the definition of "fully cooled." In light of the extent and scope of the comments received in response to the amendments proposed in the 2014 BVM test procedure NOPR regarding the proposed definition of fully cooled, alternative criteria for differentiating Class A and Class B equipment, and the optional fully cooled verification test protocol, DOE wishes to further consider potential classification options and criteria suggested by interested parties. As such, DOE will respond to these comments raised by interested parties and propose an alternative approach as a part of the associated ongoing energy conservation standards rulemaking. (Docket No. EERE-2013-BT-STD-0022)). This approach will provide interested parties an additional opportunity to provide DOE with feedback and suggestions regarding the appropriate classification criteria and definitions for Class A and Class B beverage vending machines.

9. Placement of Thermocouples During Testing

The DOE test procedure established by the 2006 BVM test procedure final rule does not specify how to position thermocouple wires during testing. In the 2014 BVM test procedure NOPR, DOE proposed to clarify that, in order to avoid compromising the thermal integrity of the vending machine, thermocouple wires should not be run through the dispensing door. Instead, the wires should be fed through the door gasket, as it will mold around them and maintain a better thermal seal for the cooled compartment. DOE proposed to add text to the BVM test procedure in Appendices A and B specifying that sensors shall be installed in a manner that does not affect energy performance. Specifically, DOE proposed to amend the regulatory text to require that thermocouple wires be run through the door gasket and not through the dispensing door of the beverage vending machine such that the sensor pathway is sealed to prohibit airflow between the interior refrigerated volume and the ambient room air. 79 FR 46908, 46917–46918 (Aug.11, 2014).

In response to DOE's proposal regarding the routing of temperature sensors and associated wiring, AMS, SVA, Royal Vendors, and Crane Merchandising Systems (CMS) commented at the NOPR public meeting they should be able to route thermocouples using whatever method was best for their machine, including destructive methods such as drilling holes. (AMS, No. 0004 at pp. 59–62; SVA, No. 0004 at pp. 62–63; Royal Vendors, No. 0004 at pp. 63–64; CMS, No. 0004 at p. 65) Royal Vendors emphasized that the routing method used by other manufactures would not work for their machines and noted that they route thermocouple wire through a removable panel in the

base of the machine where the refrigerant lines enter the machine. (Royal Vendors, No. 0004 at pp. 63–64) CMS suggested that DOE did not need to provide specificity as to the placement of thermocouples for testing beyond requiring that they be routed in a manner to reduce airflow and not run through the dispensing door. (CMS, No. 0004 at p. 65) AMS suggested that manufacturers could provide documentation with their certification reports regarding the method that was used to route thermocouples when testing the beverage vending machine to establish the certified rating. AMS also recommended that DOE use the same method used by manufacturers when conducting enforcement testing to ensure consistent results. (AMS, No. 0004 at pp. 59-61) SVA also recommended DOE consider the reduction of thermocouple placements in Class A "shelf style" beverage vending machines in order to reduce the effects of airflow caused by thermocouple wire routing. (SVA, No. 0008 at p. 1)

DOE considered all the comments received regarding the placement of thermocouples during testing. Manufacturers commented that many methods may be used to route thermocouples and DOE should not limit the allowable methods, since some methods are more feasible than the others based on the specific equipment design. However, DOE acknowledges that without specific, verifiable requirements, it is difficult to ensure testing is conducted in accordance with any such test procedure requirement. This is an issue both for certification testing, and for ensuring repeatability of test results in DOE assessment and enforcement testing.

As such, in this final rule, DOE maintains that the thermocouple wires should not be run through dispensing doors compromising the thermal integrity of the equipment, but instead should be run through the door gasket or other alternate routes that would not affect the performance of the machine. DOE is adopting requirements regarding routing of thermocouples and other sensor wires in section 2.2.2 of Appendices A and B.

DOE does not intend to limit the manner in which manufacturers could route thermocouple wire when conducting certification testing and will continue to allow manufacturers to use whatever method they deem appropriate, including drilling holes in the side of the beverage vending machine through which the thermocouple wire can be routed and caulked in place to limit airflow. However, DOE notes that, even with precise documentation, it may be difficult to repeat exactly what was done by manufacturers during certification testing. Further, DOE does not typically employ methods that require physical destruction or permanent modification of the unit when conducting assessment or enforcement testing. Therefore, when testing a BVM model during assessment or enforcement testing, DOE will route thermocouple wire through the door gasket such that the malleable gasket material is compressed around the thermocouple wire to ensure a good seal and prohibiting airflow between the interior refrigerated volume and the ambient test chamber air. If a manufacturer uses a specific method for routing of the thermocouple wires during their own certification testing, it must document these specific steps as part of the test data records maintained by the manufacturer in accordance with 10 CFR 429.71.

10. Establishing Testing Provisions at the Lowest Application Product Temperature

The DOE test procedure for beverage vending machines requires that an average next-to-vend temperature of 36 °F ± 1 °F be maintained throughout the test, as discussed in section III.A.7 of this final rule. While DOE recognizes that the majority of covered beverage vending machines can be tested at the established rating temperature of 36 °F, DOE is aware of some unique BVM models that are designed to operate much higher than 36 °F and cannot operate at 36 °F, and thus cannot be tested in accordance with the DOE test procedure. Manufacturers of such equipment currently must request a test procedure waiver to comply with DOE's energy conservation standards in accordance with 10 CFR 431.401.[11]

Therefore, in the 2014 BVM test procedure NOPR, DOE proposed amendments to its test procedure for beverage vending machines to allow covered beverage vending machines that cannot achieve an average next-to-vend temperature of 36 °F ± 1 °F to instead be tested at their lowest application product temperature. 79 FR 46908, 46418 (Aug. 11, 2014).

DOE proposed that the lowest application product temperature would describe the lowest temperature at which a beverage vending machine model is capable of maintaining next-to-vend beverages and could correspond to the lowest setting on a unit's thermostat. For beverage vending machines that cannot maintain an average next-to-

[11] DOE issued a final rule amending its regulations governing petitions for waiver and interim waiver from DOE test procedures for consumer products and commercial and industrial equipment. 79 FR 26591 (May 9, 2014). This final rule was effective on June 9, 2014.

vend temperature of 36 °F ± 1 °F, the lowest application product temperature provision would specify a revised average beverage temperature for beverages in the next-to-vend product location, but would not modify any other requirements of the DOE test procedure. Equipment tested and certified using the lowest application product temperature would be required to meet the standard applicable for its equipment class and refrigerated volume, and the manufacturer would be required to maintain records of the lowest application product temperature at which a given model was rated. Id.

In the 2014 BVM test procedure NOPR, DOE requested comments on its proposal to adopt a lowest application product temperature provision for covered beverage vending machines that cannot be tested at the specified average next-to-vend temperature of 36 °F ± 1 °F.

DOE received several comments on the applicability of establishing testing provisions at the lowest application product temperature. AMS and SVA noted that all their machines can meet the 36 °F requirement. (CMS, Public Meeting Transcript, No. 0004 at pp. 75-76; SVA, Public Meeting Transcript, No. 0004 at pp. 71-72) However, AMS commented that they have machines where the lowest temperature setting is 40 °F and special software is required to set the system at 36°F. (AMS, Public Meeting Transcript, No. 0004 at p. 71)

DOE received several comments in support of the proposed lowest application product temperature provision. Specifically, Coca-Cola agreed with DOE that the lowest

application temperature should be used only when the average next-to-vend temperature of 36 °F ± 1 °F could not be achieved; in cases where 36 °F could not be achieved, the "lowest application temperature" should be the average temperature for which a ±1 °F tolerance is maintained for steady state operation. However, Coca-Cola added that the lowest application product temperature should not be based on the thermostat set point, but instead should be based on the lowest temperature the case is designed to operate at as specified by the manufacturer. Coca-Cola further commented that lowest application product temperature should only be applicable to cases that cannot operate as cold as 36 °F ± 1 °F; it should not be applicable to machines designed to vend frozen products such as ice or ice cream. (Coca-Cola, No. 0010 at p. 5) ASHRAE SPC 32.1 also supported DOE's proposal to adopt a lowest application product temperature provision for covered beverage vending machines that cannot be tested at the specified average next-to-vend temperature of 36 °F ± 1 °F, but recommends that the scope be limited to beverage vending machines only, and not machines designed exclusively to vend snacks or other perishable products. (ASHRAE SPC 32.1, No. 0011 at p. 3)

CA IOUs also expressed their support of the alternative lowest application product temperature provision for beverage vending machines that cannot be tested at 36 °F, but suggested that the test procedure include a requirement for the manufacturer to indicate the temperature at which the beverage vending machine was tested. (CA IOUs, No. 0005 at p. 2)

SVA disagreed with DOE's proposal to test units at the lowest application temperature, but noted that if allowed, the product should be identified within a different classification, and the temperature must be clearly labeled on the machine and identified in the DOE listing. (SVA, No. 0008 at p. 2) CMS also suggested that a new class of equipment be introduced for models that cannot meet the 36 °F requirement to help people differentiate energy efficient models from those that are not tested at the 36 °F requirement. (CMS, Public Meeting Transcript, No. 0004 at pp. 77-80) NEEA commented that beverage vending machines that do not go down to 36 °F may pass the DOE test but be "energy hogs." (NEEA, Public Meeting Transcript, No. 0004 at p. 72-75) Coca-Cola commented that refrigerated vending machines which had their lowest applicable product temperature substantially higher than 36 °F were likely not beverage vending machines and that they should therefore not be included in this test procedure, but instead receive some alternative treatment. (Coca-Cola, No. 0010 at p. 5)

Regarding how to determine the lowest application product temperature for applicable equipment, AMS recommended that the lowest application product temperature be determined by actual measurement when the machine is operating at its lowest temperature. (AMS, No. 0007 at p. 4) ASHRAE SPC 32.1 stated that the lowest thermostat setting would be a reasonable approach for most equipment, but emphasized that the reported lowest application product temperature should be the integrated average temperature measurement, not the thermostat set point. (ASHRAE SPC 32.1, No. 0011 at p. 3) NEEA suggested that a proportional method of scaling the allowable energy consumption based on the change in temperature could be used for equipment that cannot

reach the 36 °F requirement. (NEEA, Public Meeting Transcript, No. 0004 at pp. 82-83) SVA commented that determining energy use can be more complicated than just proportional scaling. (SVA, No. 0004-1 at p. 84)

Coca-Cola commented that testing a beverage vending machine by the proposed clarifications of Appendix A would render different test results from the current test method due to changes in temperatures and the treatment of accessories. (Coca-Cola, No. 0010 at p. 1)

DOE considered all comments submitted by interested parties regarding testing at the lowest application product temperature. Commenters generally agreed with DOE's proposal to test equipment that cannot be operated at an integrated average temperature of 36 °F ± 1 °F at the lowest application product temperature, and stated that the manufacturer should be required to record the integrated average temperature at which the machine is rated. Thus, in this final rule, DOE is adopting provisions in section 2.1.3 of Appendices A and B to test beverage vending machines that cannot be operated at an average next-to-vend temperature of 36 °F ± 1 °F to instead be tested at their lowest application product temperature, as proposed in the 2014 BVM test procedure NOPR.

Some commenters also mentioned that machines tested at the lowest application product temperature should be identified in a different classification, and that the temperature should be identified on the label and in the DOE listing. DOE notes that DOE's proposal regarding the lowest application product temperature test provisions

included a requirement to report the lowest application product temperature of a BVM basic model to DOE in the BVM basic model's certification report. In this final rule, DOE is also specifying that equipment tested and certified using the lowest application product temperature will be required to meet the standard applicable for its equipment class and refrigerated volume. DOE acknowledges that it will be easier for such equipment to meet the applicable energy conservation standard, as the energy use of beverage vending machines is a function of the temperature differential between the refrigerated temperature and the ambient conditions. Since the lowest application product temperature test provisions require a higher integrated average temperature, the measured DEC would be lower than a similar case tested at 36 °F ± 1 °F. DOE reiterates that the lowest application product temperature test provisions are only applicable to equipment that cannot be operated at 36 °F ± 1 °F and, as such, believes such test provisions will only be applicable to a small number of models. Therefore, DOE does not believe separate standards for such equipment are justified. In response to NEEA's proposal to scale the applicable MDEC based on the temperature differential between the tested lowest application product temperature and the specified rating temperature of 36 °F, DOE agrees with SVA that determining the appropriate energy conservation standard level can be more complicated than just proportional scaling. For example, fixed energy consuming components, such as lighting and display signage, will not scale based on the temperature differential between the refrigerated compartment and the ambient air. However, DOE will monitor the number of models certifying under the lowest application product temperature provisions and, if a significant portion or increase in

BVM models using such provisions is observed, take any necessary corrective action at that time.

DOE agrees with Coca-Cola and ASHRAE SPC 32.1's comment that the lowest application product temperature provisions should be limited to refrigerated beverage vending machines that operate warmer than 36 °F ± 1 °F and not freezers or other categories of equipment that are not intended to vend sealed beverages, since beverage vending machines are limited to commercial refrigerators. DOE notes that this test procedure and the lowest application product temperature provisions are only applicable to equipment that meets DOE's definition of refrigerated bottled or canned beverage vending machine; namely equipment that (1) is a commercial refrigerator, (2) refrigerates sealed beverages and (3) dispenses such sealed beverages on payment. 10 CFR 431.292. In the 2014 commercial refrigeration equipment test procedure final rule, DOE adopted a new definition of commercial refrigerator, defined as a unit of commercial refrigeration equipment in which all refrigerated compartments in the unit are capable of operating at or above 32 °F ± 2 °F. 79 FR 22278, 22307-22308 (April 21, 2014). DOE has determined that this definition is also applicable to beverage vending machines. As such, to clarify that DOE's BVM test procedure and energy conservation standards only apply to refrigerated equipment and not freezers that operate below 32 °F, in this final rule, DOE is amending the definition of refrigerated bottled or canned beverage vending machine to explicitly reference the definition of commercial refrigerator located at 10 CFR 431.62. DOE notes that amending the definition of a refrigerated bottled or canned beverage vending machine is necessary since the term "commercial refrigerator" is

referenced in the existing definition, but the definition did not explicitly establish that the term "commercial refrigerator" refers to that defined under subpart C to part 431 of title 10 of the CFR, which pertains to commercial refrigeration equipment. DOE believes this effectively responds to Coca-Cola and ASHRAE SPC 32.1's comments as, in DOE's view, it is extremely unlikely that a beverage vending machine would be unable to operate at 36 °F ± 1 °F and still be able to operate at or above 32 °F ± 2 °F. A beverage vending machine that operates only between 32 and 34 °F, however unlikely, would meet DOE's definition of refrigerated bottled or canned beverage vending machine. In such a case, the beverage vending machine could be rated under the lowest application product temperature provision, as adopted, and the lowest application product temperature provision would be 34 °F.

DOE acknowledges ASHRAE SPC 32.1's affirmation of DOE's proposal that the lowest application product temperature should be determined for equipment with thermostats by the lowest thermostat setting. In response to Coca-Cola's comment that the lowest application product temperature should not be based on the thermostat set point, but instead should be based on the lowest temperature the case is designed to operate at as specified by the manufacturer, DOE notes that such a requirement may be difficult to enforce and could create a loophole whereby equipment could advertise temperatures above 38 °F, but be able to operate as cold as 36 °F in the field. Therefore, in this final rule, DOE is electing to maintain the specification that, for equipment with a thermostat, the reported lowest application product temperature is the actual measured integrated average temperature when the thermostat is set at its lowest setting and not the

reading on the thermostat, as suggested by ASHRAE and AMS. As DOE did not receive any comments on the specification of the lowest application product temperature for equipment without thermostats, DOE is not including any additional specificity in determining the lowest application product temperature for such equipment at this time. However, DOE notes that documentation supporting the determination of the LAPT should be included as part of the test data records maintained by the manufacturer in accordance with 10 CFR 429.71underlying certification.

Regarding Coca-Cola's comment that testing using the lowest application product temperature may have an impact on the measured DEC, DOE acknowledges that changes in the integrated average temperature of the interior refrigerated volume will alter the measured DEC of BVM models. However, as stated earlier, DOE notes that such a provision is only applicable to equipment that cannot operate at 36 °F ± 1 °F and DOE believes this represents very few models. Also, under the BVM test procedure adopted in the 2006 BVM test procedure final rule, such equipment would be required to apply for a waiver, since it currently cannot be tested. To date, DOE has not received any waiver requests regarding BVM models that cannot operate at the appropriate rating temperature.

With respect to the comment from AMS that some models may be produced such that the lowest temperature setting is greater than the test temperature specified by the DOE test procedure and special software is required to set the system at 36 °F, DOE notes that all beverage vending machines must be tested and certified as shipped and designed for use in the field. Therefore the use of specific controls designed solely for

use when testing the equipment that are not available to a purchaser or operator of the equipment would not be allowed in the DOE test procedure. If the machine, as distributed in commerce, is unable to meet the temperature requirements of the DOE test procedure, then the machine would be tested using its lowest application product temperature as discussed in section III.A.10 of this final rule.

11. Treatment of Certain Accessories During Testing

In reviewing the DOE test procedure for beverage vending machines, DOE recognized that the existing test procedure does not clearly specify the appropriate operation of some components and accessories when conducting the test procedure. DOE understands that there is room for various interpretations of the requirements for equipment configuration where the DOE test procedure is currently ambiguous or silent. In the 2014 BVM test procedure NOPR, DOE proposed to clarify the proper configuration and operation of several specific components and accessories in the DOE test procedure to remove this ambiguity and improve the repeatability of the DOE test procedure. 79 FR 46908, 46919–46922 (Aug. 11, 2014).

In the 2014 BVM test procedure NOPR, DOE proposed to clarify that, in general, any accessory or component that is integral to the intended operation of the beverage vending machine must be operational during the test. In this context, DOE interpreted "integral" to mean necessary for operation of the BVM model in a manner that meets the DOE definition of beverage vending machine—i.e., necessary for the BVM model to cool bottled or canned beverages and/or dispense bottled or canned beverages on

payment. In addition, DOE proposed to clarify that any manually controllable energy-consuming accessories that are integral to the performance of the BVM refrigeration system must be in place during testing if offered for sale with that basic model and must be tested at the most energy-consuming setting. DOE also proposed that accessories that are controlled by automatic controls and are not configurable by the BVM operator must be tested in the automatic state. Id. In the 2014 BVM test procedure NOPR, DOE proposed to clarify these requirements by adding language in Appendices A and B regarding the appropriate treatment of components and accessories during testing. 79 FR at 46935, 46937.

In addition to these general requirements, DOE believed it would be clearer and more precise to specify, to the extent possible, the appropriate treatment of several common components and accessories that might typically be found on beverage vending machines. Therefore, in the 2014 BVM test procedure NOPR, DOE also proposed to include provisions regarding the treatment of 11 specific components, including 1) payment mechanisms; 2) interior lighting; 3) external customer display signs, lights, or digital screens; 4) anti-sweat and other electric resistance heaters; 5) condensate pan heaters; 6) illuminated temperature displays; 7) condensate filters; 8) security covers; 9) coated coils; 10) general purpose outlets; and 11) crankcase heaters and electric resistance heaters for cold weather. 79 FR at 46919–46922, 46935–46938.

In the 2014 BVM test procedure NOPR, DOE also emphasized that the proposed clarifications served only to unambiguously clarify the intent of the current DOE test

procedure and, as such, would be required for equipment testing as of 180 days after publication of this final rule.

In response to DOE's proposed treatment of accessories in general, DOE received multiple comments regarding the treatment of accessories not discussed explicitly in section III.A.11 of the 2014 BVM test procedure NOPR and their configuration during testing. ASHRAE SPC 32.1, Coca-Cola, and California IOUs agreed with DOE that the test procedure should include components required to maintain the primary operation of the machine to represent field performance, including components used for maintaining product temperatures, accepting payment, allowing user selection of product, and vending product during testing. (ASHRAE SPC 32.1, No. 0011 at p. 4; Coca-Cola, No. 0010 at p. 7; CA IOUs, No. 0005 at p.2) ASHRAE SPC 32.1 listed the following as potential accessories that could be included on a beverage vending machine: payment devices (e.g., coin mechanisms, bill validators, credit card readers, and mobile phone payment), ADA accessibility equipment, screens (e.g., product selection touchscreens and pure advertisement screens), computers that interface with screens, Wi-Fi routers, trash compactors, and cold weather heating elements. (ASHRAE SPC 32.1, No. 0011 at pp. 3–4)

AMS, SVA, and Coca-Cola also supported DOE's proposal in Appendix A to de-energize accessories non-essential to the vending process and unnecessary to the machine's basic operation and they agreed that such systems should be on if required for product selection or vending. However, they commented that secondary systems,

including secondary payment systems, should not be required during testing. (AMS, No. 0007 at pp. 4–7; SVA, No. 0008 at p. 2; Coca-Cola, No. 0010 at p. 7) Specifically, Coca-Cola noted that new beverage vending machines are being developed that incorporate new capabilities, utilize additional transformative technologies, and are more innovative, and they acknowledged that these additional services will add to the energy consumption of the beverage vending machine in the field. (Coca-Cola, No. 0010 at p. 8) Coca-Cola provided the following list of potential accessories that could be included on a beverage vending machine: reverse vending systems for waste management, message displays and interactive video walls not necessary for product selection, television monitors, routers, and communication systems such as modems and blue-tooth devices, consumer award management systems (that may receive caps or coupons), and additional secondary payment systems (e.g., card readers, key-fob readers). (Coca-Cola, No. 0010 at p. 6) However, Coca-Cola recommended that these features not be considered when establishing a basic rating for the equipment as a beverage vending machine. Coca-Cola further recommended that, if such energy consumption were to be considered, the equipment be subject to different standards that account for the additional functionality the machines provide. (Coca-Cola, No. 0010 at p. 8)

AMS noted that they had encountered beverage vending machines with a wide variety of accessories, including cell phone/laptop battery chargers, Wi-Fi hotspots, reverse vending equipment (trash compactors), and power assist features for handicapped consumers, in addition to the accessories outlined in the 2014 BVM test procedure NOPR. AMS agreed with DOE's proposal that such accessories be de-energized or set to

their lowest energy consuming state during testing under Appendix A. However, in Appendix B, AMS recommended that such accessories only be de-energized or set to their lowest energy consuming state if the BVM controls would cause the accessories to automatically enter such states under the conditions of the test. AMS clarified that, if such accessories can be configured to operate at all times, they should be left energized and operating during the test to capture the representative field performance of the unit. (AMS, No. 0007 at pp. 6–7)

California IOUs agreed with AMS that the energy consumption of such features should be captured, and they recommended that the new test procedure have provisions for including new but prevalent accessories like networking capabilities and large displays while testing. (CA IOUs, No. 0005 at p.2)

DOE agrees with the comments received from ASHRAE SPC 32.1, Coca-Cola, California IOUs, SVA, and AMS suggesting that the operation of components necessary to provide the "primary functionality" of the beverage vending machine as it would be installed in the field should be operational during testing. DOE interprets "components necessary for primary functionality" to mean the components necessary to cool products and vend products on payment. However, as discussed further in section III.A.11.a, in response to comments from SVA, AMS, and Coca-Cola, DOE is also allowing for flexibility regarding the treatment of payment mechanisms to accommodate typical equipment testing practices in the industry.

DOE is adopting clarifying language in Appendices A and B specifying that the rated beverage vending machine must only include sufficient functionality necessary for cooling and vending sealed beverages (except for payment mechanisms) during testing, including functionality necessary for temperature management, product inventory, product merchandising, product selection, and product transport and delivery. Appendices A and B will further specify that any accessories not fundamental to the primary operation of the equipment be de-energized during testing, or placed in the lowest energy consuming state if the component cannot be de-energized without affecting the fundamental functionality of the beverage vending machine. That is, if the accessory or component is required for the BVM model to cool bottled or canned beverages and/or dispense bottled or canned beverages on payment, then the accessory is required to be in place and operational during testing. Accessories such as reverse vending for waste management, wireless portals, and other systems that do not impact the performance of the machine must be de-energized during testing, or placed in the lowest energy consuming state. DOE notes that this language and approach is consistent with that being considered by ASHRAE SPC 32.1.

DOE believes that testing with only those devices and accessories necessary for primary functionality of the beverage vending machine for its fundamental purpose of cooling and vending refrigerated beverages provides a representative and consistent basis for comparing the energy performance of beverage vending machines. DOE acknowledges the concerns of interested parties that additional accessories may increase the energy consumption of beverage vending machines in the field. However, as noted

by Coca-Cola, these functions are secondary and tangential to the functionality of the equipment as a beverage vending machine. DOE also agrees with commenters that, given the number and variety of such potential accessories, it is more consistent and straightforward to test equipment with any such auxiliary features de-energized or placed in the lowest energy consuming state.

In response to AMS's comment that only those devices that are automatically placed in their lowest energy consuming state when installed and energized be allowed to enter such a state during testing, DOE believes that its adopted approach provides the most representative, repeatable, and comparable performance for tested BVM equipment. However, DOE notes that under Appendix A, any components or accessories that are controlled by automatic controls that are permanently operational and cannot be adjusted by the machine operator must be operated in the automatic state, in accordance with ANSI/ASHRAE 23.1-2010. In Appendix B, DOE is adopting more specific treatment for automatic controls, including both those that can be adjusted by the machine operator and those that cannot. DOE's provisions for these "accessory low power mode" controls are described further in section III.B.2.

Coca-Cola also commented that testing a beverage vending machine using the proposed clarifications of Appendix A would render different test results from the current test method due to changes in temperatures and treatment of accessories. (Coca-Cola, No. 0010 at p. 1)

In response to Coca-Cola's comment that the amendments in Appendix A will affect the measured energy consumption of refrigerated beverage vending machines, DOE reiterates that the measured energy consumption under the DOE test procedure is not affected; the amendments and clarifications included in Appendix A serve only to clarify the provisions of the existing BVM test procedure and ensure equipment are tested consistently among manufacturers and test labs.

The following sections III.A.11.a through III.A.11.k discuss the proposed treatment of 11 specific features, components, and accessories under the DOE test procedure, as well as any comments received and the specific amendments DOE is adopting in this final rule for those 11 specific components.

a. Payment Mechanisms

In the 2014 BVM test procedure NOPR, DOE stated its belief that payment mechanisms are integral to the vending function of the beverage vending machine and, accordingly, should be in place and functional during testing. Specifically, DOE proposed that when testing a vending machine, the most energy-consuming combination of payment mechanisms should be used. 79 FR 46908, 46919 (Aug. 11, 2014). DOE also noted that all other BVM models equipped with less energy-consumptive combinations of payment mechanisms may be listed as different individual models covered under that basic model or as unique basic models, if manufacturers wish to certify and make representations regarding the energy use of each combination of money processing equipment. Id.

In response to DOE's proposal, AMS objected to the inclusion of any money processing accessories as part of Appendix A or Appendix B during testing based on the fact that beverage vending machines usually are not shipped with these accessories and that most, if not all, of the BVM manufacturers currently omit these accessories while testing. (AMS, No. 0007 at pp. 4–5) SVA urged DOE to not consider payment mechanisms during testing because of the large number of variations involved, keeping the baseline more consistent across models and manufacturers. (SVA, No. 0008 at p. 2) AMS and SVA also noted that including payment mechanisms would make the testing process burdensome, as there are a large number of different models and manufacturers of these money processing accessories. (AMS, Public Meeting Transcript, No. 0004 at pp. 120–121; SVA, Public Meeting Transcript, No. 0004 at pp. 121–122 and SVA, No. 0008 at p. 2) Coca-Cola commented that machines are typically sold without payment systems and disagreed with DOE's analysis that the most energy-consuming combination of payment mechanisms be used for the test. Additionally, Coca-Cola noted that manufacturers had standard payment systems for machines, and recommended that the standard payment systems be used for the test. (Coca-Cola, No. 0010 at p. 7) Conversely, NEEA commented that the test procedure should include payment mechanisms, as this reflects field conditions. (NEEA, No. 0009 at p. 2) During the public meeting, SVA and NEEA suggested that payment mechanisms should be included as part of Appendix B only. (SVA, No. 0004 at pp. 121–122; NEEA, No. 0004 at pp. 122–123)

DOE considered all comments received regarding the treatment of payment mechanisms in developing the provisions adopted in this final rule. DOE agrees with the comment from NEEA that payment mechanisms should be included in the test procedure to reflect field conditions. However, DOE understands that due to the wide variety of available payment mechanism combinations, determining and testing with the most energy-consuming combination of payment mechanisms may be burdensome for manufacturers. DOE realizes that, as beverage vending machines are often sold or shipped without payment mechanisms in place, BVM manufacturers may not have control or knowledge of the payment mechanism that may be installed in the field and, as such, selecting the most energy-consuming combination, as originally proposed by DOE, may not be feasible.

Based on the comments submitted by interested parties, DOE considered several options to account for the energy use of payment the mechanisms. Given that payment mechanisms are variable and are not always included in the machine at the time of sale, DOE understands that it is difficult to unambiguously specify a "representative" payment mechanism or device combination that would be applicable to all BVM basic models and consistent across all units of each model. With this in mind, DOE believes that conducting physical testing of beverage vending machines with no payment mechanisms installed, as opposed to testing with the payment mechanisms in place, is the most straightforward, repeatable, and unambiguous approach. DOE notes that ASHRAE SPC 32.1 is also currently considering updating ASHRAE 32.1 to specify that testing be performed without payment mechanisms installed.

However, DOE maintains that payment mechanisms are integral to the vending function of the beverage vending machine and, therefore, represent part of the primary functionality of the beverage vending machine, as discussed in III.A.11. Accordingly, DOE believes that it is important for the energy consumption of a payment mechanism to be captured in the DEC of a beverage vending machine. To provide a standardized and consistent method of accounting for payment mechanism energy consumption when a BVM model is being tested without such a device or devices installed, DOE is specifying a default energy consumption value for payment mechanisms that will be added to the tested primary rated energy consumption per day ($\underline{E}_D$) shown in section 7.2.3.1 of ANSI/ASHRAE 32.1-2010 to determine the DEC of tested equipment.

To determine the default payment mechanism energy consumption value that would be representative of the typical energy consumption of such devices in the field, DOE conducted a search of available payment mechanisms for beverage vending machines and their respective published power or energy consumption values. Through this search, DOE found 25 different models of payment mechanisms: 11 coin mechanisms, 11 bill validators, and 3 credit card readers. DOE found that coin mechanisms have an average idle mode power consumption of 7.1W, while bill validators have an average idle mode power consumption of 6.8W and credit card readers have an average idle mode power consumption of 12W. DOE referenced the idle mode energy consumption of these devices because no vending occurs during the BVM test procedure.

DOE calculated the average daily energy consumption for each device category based on the average power consumption estimates for each of the three payment mechanism categories. DOE estimates that coin mechanisms consume approximately 0.17 kWh/day, bill validators consume approximately 0.16 kWh/day, and credit card readers consume approximately 0.29 kWh/day. DOE notes that these values are representative of the amount of energy such devices would consume if installed on a beverage vending machine tested in accordance with the DOE test procedure. After considering these representative energy consumption values and the variability in the payment mechanism available to the manufacturer to install in the machine, DOE weighted the average daily energy consumption of the three most comment payment mechanisms. Since credit card readers are often leased from a separate company, the energy consumption of coin mechanisms and bill validators were weighted more heavily than the energy consumption of credit card readers. After weighting the representative energy consumption values, DOE determined that a default daily energy consumption value of 0.20 kWh/day is an appropriate representative value for the energy consumption associated with payment mechanisms. This value is also representative of a worst-case coin mechanism or bill validator because it is higher than the average energy consumption of the coin mechanisms or bill validators. DOE acknowledges that any given BVM basic model may have a payment mechanism or combination of payment mechanisms that uses more or less energy than this default value when installed in the field. However, for the purposes of rating equipment based on testing conducted in accordance with the DOE test procedure, the beverage vending machine shall be tested

without any payment mechanism installed (or with any existing payment mechanisms de-energized or set to the lowest energy consuming state, if it cannot be de-energized) and the DEC rating shall be determined as the sum of the measured primary daily energy consumption per day and the default payment mechanism energy consumption value (0.20 kWh/day). Any representations regarding the energy consumption of equipment rated under this approach must be made based on this calculated DEC, regardless of the payment mechanism or combination of payment mechanisms with which any given BVM unit is actually sold.

Regarding the comment from Coca-Cola that manufacturers may wish to test with standard payment systems for the beverage vending machines they produce, DOE wishes to clarify that manufacturers must make representations regarding the energy consumption of beverage vending machines based on the testing and calculations performed under the DOE test procedure. DOE surveyed many BVM manufacturers and payment mechanism manufacturers regarding the existence of any default or "standard" payment mechanism device and was not able to identify one that was applicable to all BVM manufacturers and models. As such, DOE is instead adopting an approach whereby beverage vending machines that differ only based on number and type of payment mechanism may be certified under a single basic model listing based on the tested energy consumption of the BVM model with no payment mechanism installed (or the payment mechanism de-energized or set to the lowest energy consuming state, if it cannot be de-energized) plus the 0.20 kWh/day default energy consumption value for payment mechanisms.

In response to SVA and NEEA's suggestion that DOE include the energy consumption of payment mechanisms in Appendix B only, DOE reiterates its belief that money processing is an integral part of the primary functionality of the beverage vending machine, namely the vending function. DOE disagrees that the current test procedure does not include the energy consumption of the payment mechanisms. In fact, the current DOE test procedure for BVMs at 10 CFR 431.294(b) requires testing in accordance with the test procedures specified in section 4, "Instruments," section 5, "Vending Machine Capacity," section 6, "Test Conditions," and sections 7.1 through 7.2.3.2, under "Test Procedures," of ANSI/ASHRAE Standard 32.1-2004, "Methods of Testing for Rating Vending Machines for Bottled, Canned, and Other Sealed Beverages." (Incorporated by reference, see §431.293). More specifically, ANSI/ASHRAE Standard 32.1-2004 states that the machine shall be "installed in accordance with the manufacturer's instructions" and "operated with normal lighting and control settings, using only those energy management controls that are permanently operational and not capable of being adjusted by a machine operator" (7.1.1 (a) and (d), respectively). DOE has interpreted these provisions of the test procedure as requiring the BVM to be tested with the payment mechanism as it would be installed in the field. As such, DOE is continuing to require testing of beverage vending machines in a manner that accounts for the energy consumption of all features that contribute to the primary functionality of the beverage vending machine, including payment mechanisms, in both Appendix A and Appendix B. Given the comment we received in response to DOE's proposal in the NOPR, DOE believes that it is important to clarify and streamline the applicability of the current test

procedure provisions in Appendix A to reduce burden on manufacturers. Consequently, DOE is adopting a streamlined method of calculating and including the energy use with a typical payment system in sections 2.2.3.1 and 2.3 of Appendix A and sections 2.2.5.1 and 2.3 of Appendix B.

b. Interior Lighting

Beverage vending machines typically include lighting to illuminate the vendible products, in the case of Class A equipment, or illuminate display panels that are part of the physical walls of the beverage vending machine, in the case of Class B equipment. In both cases, these lights are internal to the physical walls of the beverage vending machine and, thus, are deemed integral to the operation of the equipment. Through incorporation of ANSI/ASHRAE Standard 32.1-2004, the DOE test procedure adopted in the 2006 BVM test procedure final rule currently requires beverage vending machines to be tested with "normal lighting and control settings." The revised ANSI/ASHRAE Standard 32.1-2010 includes the same requirement.

In the 2014 BVM test procedure NOPR, DOE recognized that this requirement could be interpreted differently in various circumstances and, as such, proposed to amend the regulatory text to clarify the treatment of internal lighting when conducting the DOE test procedure. Specifically, DOE proposed an amendment to the regulatory text stating that lighting that is contained within, or is part of the physical boundary of, the beverage vending machine established by the top, bottom, and side panels of the equipment be placed in its maximum energy consuming state, as DOE believes that the maximum

energy consuming state is consistent with the "normal" setting and is the operation most commonly employed in the field. 79 FR at 46921.

In response to DOE's proposal in the 2014 BVM test procedure NOPR, AMS, SVA, Coca-Cola, and ASHRAE SPC 32.1 supported DOE's proposal to specify that internal lighting operation must be operated in the maximum energy-consuming state during testing. (AMS, No. 0007 at p. 6; SVA, No. 0008 at p. 2; Coca-Cola, No. 0010 at p. 6; ASHRAE SPC 32.1, No. 0011 at p. 3) SVA and AMS supported DOE's proposal to include such clarifications in both Appendices A and B, and noted that they both currently test equipment with the interior lighting in the maximum energy consuming state. (AMS, No. 0007 at p. 6; SVA, No. 0008 at p. 2) SVA further noted that software modes that shut off the lighting system when not in use were probably unlawful if used to influence the outcome of the energy consumption test. (SVA, No. 0008 at p. 2) Coca-Cola added that many of their machines employ energy management routines that have an impact on the lighting of the machine. (Coca-Cola, No. 0010 at p. 6) However, ASHRAE SPC 32.1 and Coca-Cola cautioned that machines may have been tested differently in the past, and the new test procedure could significantly change energy consumption values previously reported. (ASHRAE SPC 32.1, No. 0011 at p. 3; Coca-Cola, No. 0010 at p. 6)

DOE appreciates comments from AMS, SVA, Coca-Cola, and ASHRAE SPC 32.1 supporting DOE's proposal. Receiving no negative comments, in this final rule, DOE is clarifying that interior lighting that is contained within, or is part of the physical

boundary of the beverage vending machine established by the top, bottom, and side panels of the equipment, shall be placed in its maximum energy consuming state for testing.

In response to the comments submitted by Coca-Cola and ASHRAE SPC 32.1 noting that previous tests may have been conducted using methods not consistent with the provisions DOE is adopting in this final rule, DOE reiterates that because the DOE test procedure was previously silent or ambiguous on the specific treatment of some components, it is possible that some BVM manufacturers misinterpreted DOE's test procedure and, thus, some BVM models were tested inconsistently. DOE acknowledges that some BVM models may require recertification based on these new clarifications. However, DOE continues to maintain that the clarified treatment of interior lighting serves only to unambiguously clarify the intent of the DOE test procedure. Therefore, DOE is adding this clarifying language to section 2.2.3.2 of Appendix A and section 2.2.5.2 of Appendix B for certifying equipment in accordance with existing and any amended energy conservation standards, respectively.

c. External Customer Display Signs, Lights, or Digital Screens

In addition to interior lighting, discussed in section III.A.11.b, DOE recognizes that some beverage vending machines may incorporate additional external customer display signs, lights, and/or digital screens outside of the body of the refrigerated BVM cabinet. In this case, such external customer display signs, lights, and/or digital screens are optional and are not integral to the cabinet, but external customer display signs, lights,

may significantly increase the energy use of beverage vending machines that include those features. However, such external customer display signs, lights, or digital screens are not explicitly addressed in the DOE test procedure, as adopted in the 2006 BVM test procedure final rule, or in ANSI/ASHRAE Standard 32.1-2004 and ANSI/ASHRAE Standard 32.1-2010. In the 2014 BVM test procedure NOPR, DOE proposed to clarify that customer display signs, lighting, and digital screens external to the beverage vending machine and not integral to the operation of the primary refrigeration or vending functions (e.g., digital screens that are not necessary for consumers to make a product selection) may be disabled, disconnected, or otherwise de-energized. 79 FR at 46920–46921. However, in the case that the customer display signs, lighting, or digital screens are integral to the functionality of the beverage vending machine, in that it cannot perform the primary refrigeration and vending functions if such equipment is disabled or removed, DOE clarified that the integral customer display signs, lighting, or digital screens should be put in the lowest energy-consuming state that maintains primary functionality of the beverage vending machine. For example, if a digital screen performs the vending or money processing function, that screen would be placed in its lowest energy-consuming state that still allows the money processing feature to function; this would provide equitable treatment with other payment mechanisms that must be energized, as specified in section III.A.11.a. Id.

DOE proposed to include this clarification in Appendix A, to be used when certifying equipment under existing standards, based on the fact that such external customer display signs, lights, or digital screens are not mentioned in the existing DOE

test procedure, as adopted in the 2006 BVM test procedure final rule, and are peripheral to the primary functionality of a beverage vending machine, as discussed in section III.A.11. DOE also noted that such treatment is consistent with interpretation to ANSI/ASHRAE Standard 32.1-2010, which states that "the Standard (32.1) addresses the refrigerated/delivery system portion of the machine. Thus, any peripheral devices, not necessary for the basic function of the vending machine are not addressed by Standard 32.1." Id.

In the 2014 BVM test procedure NOPR, DOE proposed similar treatment for Appendix B, but also proposed to define a new term, "standby mode" to more unambiguously specify the state in which external customer display signs, lights, and digital screens would be placed if they cannot be de-energized without affecting the primary functionality of the beverage vending machine under test. DOE proposed to define standby mode as the mode of operation in which any external, integral customer display signs, lighting, or digital screens are connected to main power, do not produce the intended illumination, display, or interaction functionality, and can be switched into another mode automatically with only a remote user-generated or an internal signal. DOE proposed to clarify that, in Appendix B, that if the external, integral customer display signs, lighting, or digital screens do not have a standby mode, the integral customer display signs, lighting, or digital screens would be placed in the lowest energy-consuming state, and, if a digital screen performs the vending or money processing function, that screen should be placed in its lowest energy-consuming state that still allows the money processing feature to function, similar to Appendix A. Id.

In response to DOE's proposed treatment of external customer display signs, lights, or digital screens in the 2014 BVM test procedure NOPR, AMS, SVA, and Coca-Cola supported DOE's proposal to de-energize accessories non-essential to the vending process and unnecessary to the machine's basic operation, and agreed that such systems should be on if required for product selection or vending. The commenters supported such a proposal for both Appendices A and B. (AMS, No. 0007 at pp. 6–7; SVA, No. 0008 at p. 2; Coca-Cola, No. 0010 at p. 7) NEEA commented that capturing the standby energy usage of integral signage might drive manufacturers to move to external signage and discourage integral smart controls to reduce energy usage of integral signage. (NEEA, No. 0009 at p. 2)

DOE appreciates comments from AMS, SVA, and Coca-Cola supporting DOE's proposed treatment of external customer display signs, lighting, and digital screens. DOE acknowledges NEEA's comment regarding the potential for manufacturers to move to external signage to avoid accounting for the standby energy usage of internal signage, but believes that there is a limited capacity for them to do so, since any interior lighting used to illuminate product or equipment side panels will inherently be integral to the unit and, thus, must be operated in the maximum energy consumption state, as specified in earlier in this section. The one example where interior lighting that must be energized under the DOE test procedure might have opportunity to be replaced by an external display screen that does not have to be energized under the DOE test procedure may be on beverage vending machines that currently incorporate illuminated side panels to serve a marketing

and advertising function. The illuminated side panels could, theoretically, be replaced by external digital screens. However, DOE notes that, based on DOE's review of existing Class B equipment, the illuminated side panels currently available on the market are typically quite large, covering the entire side of the beverage vending machine, and any replacement illuminated sign or digital screen would likely be equivalently large. DOE believes that such large display screens or individually manufactured external illuminated signage would be significantly more expensive than the current equipment design with interior lighting and, as such, DOE believes the likelihood that manufacturers will migrate to external signage solely to decrease the measured energy consumption of their equipment is very low.

Regarding the proposed definition of "standby mode" in Appendix B, AMS supported DOE's proposed definition, but stated that the list of accessories should be expanded from external, integral display signs, lighting, or digital screens to all accessories that might be applied to beverage vending machines. (AMS, No. 0007 at pp. 6–7) NRCan suggested renaming the standby mode to "external accessory standby mode" for clarity. (NRCan, Public Meeting Transcript, No. 0004 at p. 116) Coca-Cola suggested an alternative definition. (Coca-Cola, No. 0010 at p. 8) Specifically, Coca-Cola suggested the following definition for standby mode for beverage vending machines: "Standby mode is the state that the vending machine is in when it does not have to deliver product, is not intended to deliver product, or cannot be used to select and purchase a product. In this mode of operation any powered element can be in a different state than when the machine is in normal operation delivering product to a consumer.

Standby mode can be activated automatically by programming or by sensory devices monitoring internal functions or external conditions and activity." (Coca-Cola, No. 0010 at p. 8)

DOE appreciates the comment from AMS supporting the definition of the standby mode for external customer display signs, lights, or digital screens. In response to expanding the applicability of the standby mode definition, to DOE's knowledge there are not any other accessories that the definition would impact in a way that is not already accounted for in the test procedure as adopted in this final rule. DOE considered the modifications in the comments from NRCan and Coca-Cola regarding the name and definition of standby mode as it applies to external customer display signs, lights, or digital screens. DOE agrees with NRCan's proposal to rename the definition of standby mode to be more specific to the accessories to which it is applied, and is incorporating such a change in this final rule. In response to Coca-Cola's suggested changes to the definition of standby mode, DOE believes the changes in fact alter the applicability and intent of the definition. Coca-Cola's suggested changes appear to apply to the beverage vending machine as a whole, rather than just the external customer display signs, lights, or digital screens. Consistent with NRCan's suggestion, DOE's standby mode definition is applicable to external customer display signs, lights, or digital screens and, as such, DOE believes that Coca-Cola's proposed edits are not applicable in this case.

Additionally, in light of consideration of the stakeholder comments after publication of the 2014 BVM test procedure NOPR, DOE reviewed many styles of

external customer display signs, lights, and digital screens and determined that the previously-proposed clarifications for Appendices A and B are materially the same. Specifically, both appendices clarify that customer display signs, lighting, and digital screens must be:

(1) disabled, disconnected, or otherwise de-energized, if possible and if doing so does not interfere with the primary functionality of the beverage vending machine, or

(2) placed in its lowest energy consuming state or standby mode (in Appendix B) if the equipment cannot be de-energized, or

(3) placed in the lowest energy consuming state that maintains primary functionality of the beverage vending machine. As Table III.3 illustrates, the only difference between the proposed Appendices A and B methodologies is the incorporation of "standby mode" as the preferred operational state if the equipment cannot be de-energized or disconnected.

Table III.3 Summary of Proposed Operational State for External Display Signs, Lights, or Digital Screens in Appendix A and Appendix B in the 2014 BVM TP NOPR

External Customer Display Sign, Lights, or Digital Screen Characteristics	Operational State	
	Appendix A	Appendix B
Can be de-energized and do not participate in primary functionality of the beverage vending machine	Disabled, disconnected, or otherwise de-energized	Disabled, disconnected, or otherwise de-energized
Cannot be de-energized	Place in lowest energy consuming state	Placed in "standby mode," if available, or lowest energy consuming state
Necessary for primary functionality of beverage vending machine	Placed in lowest energy consuming state that maintains primary functionality of the beverage vending machine	Placed in lowest energy consuming state that maintains primary functionality of the beverage vending machine

This difference between the proposed language for the two appendices would only result in a material difference in the test procedure if there is a difference between

"standby mode" and the "lowest energy consuming state" for external customer display signs, lights, or digital screens that cannot be de-energized. However, for external customer display signs, lights, or digital screens DOE reviewed, the "standby mode" defined in Appendix B is the same as the "lowest energy consuming state" for equipment that cannot be de-energized and does not participate in the vending function of the beverage vending machine. Therefore, for the sake of clarity and consistency, in this final rule, DOE is aligning the treatment of external customer display signs, lights, and digital screens in Appendices A and B. In these final rule amendments, the definition of external accessory standby mode and the proposed treatment in Appendix B will be applicable to both appendices. Specifically, DOE is establishing provisions in section 2.2.3.3 of Appendix A and section 2.2.5.3 of Appendix B to clarify that all external display signs, lights, and digital screens should be de-energized or, if they cannot be de-energized without impacting the primary functionality of the equipment, placed in the external accessory standby mode (if available) or the lowest energy consuming state (if no external accessory standby mode is available) that maintains such functionality. DOE also is establishing a definition of external accessory standby mode. DOE proposed in the 2014 BVM test procedure NOPR to define "standby mode" as the mode of operation in which the external, integral customer display signs, lighting, or digital screens are connected to the main power; do not produce the intended illumination, display, or interaction functionality; and can be switched into another mode automatically with only a remote user-generated or an internal signal. DOE is now incorporating this definition into section 1.2 of both Appendices A and B as the definition for "external accessory standby mode." As discussed previously, DOE believes that keeping the language

consistent across the two appendices will ensure continuity and minimize unnecessary confusion.

d. Anti-Sweat and Other Electric Resistance Heaters

Some beverage vending machines may come equipped with anti-sweat electric resistance heaters that serve to evaporate any water that condenses on the surface of the door or walls during operation.

In the 2014 BVM test procedure NOPR, DOE proposed to amend the test procedure to clarify that anti-sweat and other electric resistance heaters should be operational during testing under the DOE test procedure. DOE also proposed to clarify that models with a user-selectable setting must be turned on and set to the maximum usage position, and that models featuring an automatic, non-user-adjustable controller that turns on or off based on environmental conditions must be operating in the automatic state. Additionally, DOE proposed to amend the regulatory text to clarify that, if a unit is not shipped with a controller from the point of manufacture, but is intended to be used with a controller, the manufacturer must make representations of the basic model based upon the rated performance of that basic model as tested when equipped with an appropriate controller. 79 FR at 46921.

DOE did not receive any comments in response to the amendments proposed in the 2014 BVM test procedure NOPR regarding anti-sweat and other electric resistance heaters. Therefore, in this final rule, DOE is incorporating the clarifying provisions into

section 2.2.3.4 of Appendix A and 2.2.5.4 of Appendix B regarding the treatment of anti-sweat and other electric resistance heaters as proposed in the 2014 BVM test procedure NOPR.

e. Condensate Pan Heaters and Pumps

Beverage vending machines capture water from the air entering the cabinet during operation by causing the water to condense and then freeze on the evaporator coil of the equipment. During a defrost cycle, this frost is melted, and the meltwater produced must be removed from the unit. In many types of equipment, this meltwater is collected in a pan beneath the unit. Some models of beverage vending machines come equipped with electric resistance heaters that evaporate this water out of the pan and into the ambient air. Other models may come equipped with pumps that pump meltwater to an external drain.

In the 2014 BVM test procedure NOPR, DOE proposed to add clarifying language to the DOE test procedure in Appendices A and B requiring that these electric resistance heaters and condensate pumps be installed and operational during testing pursuant to the DOE test procedure as they would be used in the field during the entire test. DOE proposed to clarify that prior to the start of the24 hour period used to determine temperature stabilization prior to the start of the test period (hereafter referred to as "stabilization period"), the condensate pan should be dry and that, during the entirety of the period of the test following the start of the stabilization period, any condensate moisture generated should be allowed to accumulate in the pan as it would

during normal operation. DOE proposed to require that, if the condensate heater or pump was equipped with controls to initiate the operation of the heater or pump based on water level or ambient conditions, these controls be enabled and the heater or pump be operated in the automatic setting, but that water should not be manually added to or removed from the condensate pan at any time during the entire test. 79 FR at 46921–46922. Because manufacturers may offer condensate pan heaters and pumps that are shipped separately from the specific beverage vending machine unit with which they would be used in normal operation, DOE also proposed to clarify that any beverage vending machines distributed in commerce with an available condensate pan heater or pump must be tested with the feature in place. Id.

DOE did not receive any comments in response to the amendment proposed in the 2014 BVM test procedure NOPR regarding condensate pan heaters and pumps. Therefore, in this final rule, DOE is adopting the clarifications proposed in the 2014 BVM test procedure NOPR with no modifications as sections 2.2.3.5 and 2.2.5.5 of Appendix A and Appendix B, respectively.

f. Illuminated Temperature Displays

Manufacturers may equip some beverage vending machine models with illuminated displays that provide visual information to the equipment operator regarding, for example, the temperature of the refrigerated volume of the unit. DOE understands this feature to be integral to the design of the given model and, as such, in the 2014 BVM test procedure NOPR, proposed to amend the test procedure to clarify that any

illuminated temperature displays should be enabled during testing as they would be during normal field operation. 79 FR at 46922.

DOE did not receive any comments in response to the amendment proposed in the 2014 BVM test procedure NOPR regarding illuminated temperature displays. Therefore, in this final rule, DOE is adopting clarifying language in section 2.2.3.6 of Appendix A and section 2.2.5.6 of Appendix B to specify that illuminated temperature displays must be enabled during the test as they would be during normal field operation, consistent with what was proposed in the 2014 BVM test procedure NOPR.

g. Condenser Filters

Manufacturers may offer models equipped with nonpermanent filters over a model's condenser coil to prevent particulates from blocking the condenser coil and reducing airflow. In the 2014 BVM test procedure NOPR, DOE proposed adding clarifying language requiring that these filters be removed during testing pursuant to the DOE test procedure, as such accessories are optional and are not required for operation of the beverage vending machine. 79 FR at 46922.

In response to DOE's proposed treatment of condenser filters in the 2014 BVM test procedure NOPR, CMS commented that if a beverage vending machine is equipped with a condenser filter, it should be tested with one installed, as it can increase the energy consumption of the unit. (CMS, Public Meeting Transcript, No. 0004 at p. 100) DOE did not receive any additional comments on this topic.

DOE acknowledges CMS's comment regarding condenser filters, but while condenser filters may impact long-term energy consumption of beverage vending machines in the field, these optional condenser filters are not expected to significantly impact energy use over the relatively short duration of the DOE test procedure. DOE further notes that many options of condenser filter styles or manufacturers may be available, complicating and adding burden to the DOE test procedure. As condenser filters are more important for the long-term reliability of the equipment in the field than the tested energy consumption, DOE does not believe the additional burden associated with requiring the testing and certification of a number of different BVM models based on small variations in condenser filter manufacturers or styles is justified. Therefore, in this final rule, DOE is adopting the clarifying language proposed in the 2014 BVM test procedure NOPR and requiring that any optional condenser filters be removed during testing into sections 2.2.3.7 of Appendix A and 2.2.5.7 of Appendix B.

h. Security Covers

Manufacturers may offer for sale, with a basic model, optional straps or other devices to secure the beverage vending machine and prevent theft or tampering. Because such security devices are not anticipated to affect the measured energy consumption of refrigerated beverage vending machines and will likely significantly complicate the loading and testing of BVM models, in the 2014 BVM test procedure NOPR, DOE proposed to clarify that these security devices should be removed during testing under the DOE test procedure. 79 FR at 46922.

DOE did not receive any comments in response to the amendments proposed in the 2014 BVM test procedure NOPR regarding security covers. Therefore, in this final rule, DOE is adopting the proposed clarifying language in Appendices A and B with no modification into sections 2.2.3.8 and 2.2.5.8 of Appendix A and B, respectively.

i. Coated Coils

Coated coils, generally specified for use in units that will be subjected to environments in which acids or oxidizers are present, are treated with an additional coating (such as a layer of epoxy or polymer) as a barrier to protect the bare metal of the coil from deterioration and corrosion. DOE believes the existing DOE test procedure accurately accounts for the performance of all types of coils, including those with coatings, and that no additional clarifications are needed in the test procedure.

DOE did not receive any comments in response to the discussion in the 2014 BVM test procedure NOPR regarding coated coils. Therefore, in this final rule, DOE is not adding any clarifying language to the test procedure regarding the treatment of coated coils.

j. General Purpose Outlets

Some beverage vending machines may be offered for sale with integrated general purpose electrical outlets, which may be used to power additional equipment. In the 2014 BVM test procedure NOPR, DOE proposed adding clarifying language to Appendices A

and BB specifying that no external load should be connected to the general purpose outlets contained on a unit during testing. 79 FR at 46922.

DOE received one comment during the NOPR public meeting regarding the treatment of general purpose outlets on beverage vending machines. NEEA suggested fully energizing the electrical outlet to the full amount that the circuit is able to handle instead of de-energizing them to the lowest energy consumption since they are regulated by National Electric Code. (NEEA, Public Meeting Transcript, No. 0004 at p. 96) In response to the comment from NEEA, DOE notes that energizing the general purpose outlet to the maximum energy consumption may give an estimation of the maximum energy consumption of the beverage vending machine, but fully energizing the general purpose outlet is not necessarily representative of the energy consumption of any such beverage vending machine in the field. Due to the lack of information regarding the extent to which general purpose outlets on beverage vending machines are used in the field and their representative incremental energy consumption on beverage vending machines equipped with such devices, DOE is unable to determine a representative test procedure or load profile for general purpose outlets. Therefore, DOE is clarifying in sections 2.2.3.9 of Appendix A and 2.2.5.9 of Appendix B that no external load should be connected to the general purpose outlets contained on a unit in this final rule, as proposed in the 2014 BVM test procedure NOPR.

k. Crankcase Heaters and Electric Resistance Heaters for Cold Weather

Some BVM models feature crankcase heaters or electric resistance heaters designed to keep the compressor warm in order to maintain the refrigerant at optimal conditions or to prevent freezing of beverages contained in the unit when the unit is operating at extremely low ambient temperatures. In the 2014 BVM test procedure NOPR, DOE proposed to clarify that, if present, crankcase heaters and other electric resistance heaters for cold weather should be operational during the test. DOE also proposed that, if a control system, such as a thermostat or electronic controller, is used to modulate the operation of the heater, it should be used as intended per the manufacturer's instructions. 79 FR at 46922.

DOE did not receive any comments in response to the proposed clarification that crankcase heaters and electric resistance heaters for cold weather, if present, should be operational during the test and, if controlled, should be controlled in accordance with the manufacturer's instructions. Therefore, in this final rule, DOE is adopting the clarifying provisions as sections 2.2.3.10 and 2.2.5.10 of Appendix A and B, respectively, as proposed in the 2014 BVM test procedure NOPR.

B. Appendix B: Summary of the Test Procedure Revisions to Account for Low Power Modes

In this final rule, DOE is also updating the DOE test procedure for beverage vending machines, to include in a new Appendix B to 10 CFR part 431, subpart Q, which is to be used to demonstrate compliance with any new or amended standards established

as a result of the associated ongoing energy conservation standards rulemaking. (Docket No. EERE-2013-BT-STD-0022) This new Appendix B includes all of the amendments in Appendix A and, in addition, provisions for testing low power modes.

Many beverage vending machines are equipped with low power modes designed to be used during periods when demand for refrigerated beverages is low and there is opportunity to reduce equipment energy use without greatly affecting consumer utility. The features of these modes may include (but are not limited to) dimming or switching off lights, and raising the temperature set point (to which the unit cools the product) to a value higher than the temperature set point associated with the unit's vending mode.

BVM low power modes are typically activated during periods when customer traffic is known or anticipated to be minimal or nonexistent (such as at night or when a facility is closed), though they may also be activated based on short-term historical vend patterns or after a specified length of inactivity. Some low power modes may operate on fixed schedules, while others may operate based on sensor input such as that from a motion sensor or customer interface on the machine. Individual machines may have multiple low power modes, such as a schedule-based low power mode allowing the refrigeration system to shut off during periods when customers are not available and an activity-based low power mode during vending periods that dims the lights when customer activity is not detected after a certain length of time.

ANSI/ASHRAE Standard 32.1-2004, the test method incorporated by reference in the 2006 BVM test procedure final rule, and ANSI/ASHRAE Standard 32.1-2010, the test method DOE is incorporating by reference in this final rule, both require that the vending machine be "operated with normal lighting and control settings, using only those energy management controls that are permanently operational and not capable of being adjusted by a machine operator." (ANSI/ASHRAE Standard 32.1-2004 7.1.1(d)) These test methods do not capture the widely available user-adjustable low power modes of operation in a representative manner, and manufacturers that offer this functionality are not able to reflect the increased efficiency of their units under either of these test methods. Additionally, these test methods do not specify how to test equipment that has permanently operational controls (meaning those that cannot be disabled).)

In the 2014 BVM test procedure NOPR, DOE proposed amendments to the BVM test procedure to provide clear and consistent provisions for testing beverage vending machines equipped with low power modes as well as to indicate what settings would be required to be used for the testing of machines with energy management controls that are permanently operational (meaning those that cannot be disabled), but can be adjusted by the operator. 79 FR 46908, 46923–46927 (Aug. 11, 2014). DOE received comments on those proposals in the 2014 NOPR public meeting and during the written comment period following publication of the 2014 BVM test procedure NOPR in the Federal Register. Id.

This section summarizes DOE's specific proposals regarding the treatment of low power modes in the BVM test procedure, any comments received regarding those

proposals, DOE's response to comments received, and the revisions to the test procedure related to low power modes that are included in sections 2.2.3, 2.2.4, 2.3.1, and 2.3.2 of Appendix B. Specifically, sections III.B.1, III.B.2, and III.B.3 discuss definitions related to the low power mode test procedure, DOE's adopted test method for accounting for low power modes of operation, and the refrigeration low power mode verification test, respectively.

1. Definitions Related to the Low Power Mode Test Procedure

In the 2014 BVM test procedure NOPR, DOE proposed to allow manufacturers of equipment with a low power mode to enable features associated with that mode during a fixed period of time during the BVM test procedure. DOE defined "low power mode" as a state in which a BVM's lighting, refrigeration, and/or other energy-using systems are automatically adjusted (without user intervention) such that they consume less energy than they consume in an active vending environment when the beverage vending machine is capable of dispensing sealed beverages at the intended vending temperature (typically 36 °F ± 1 °F). 79 FR at 46924.

In the 2014 BVM test procedure NOPR, DOE also noted that it might be beneficial to differentiate between low power modes that affect the refrigeration system and allow the cabinet temperature to increase during a specified period and those that affect other energy-consuming accessories, such as lighting, display signage, or vending equipment. As such, DOE proposed to separately define "refrigeration low power mode" and "accessory low power mode." DOE proposed to define refrigeration system low

power mode as a state in which a beverage vending machine's refrigeration system is in low power mode and the average next-to-vend temperature is automatically (without user intervention) increased to 40 °F or higher for at least 1 hour. DOE proposed to define "accessory low power mode" as a state in which a beverage vending machine's lighting and/or other non-refrigeration energy using systems are in low power mode, which may include, but is not limited to, dimming or turning off lights or display signage, but which does not include adjustment of the refrigeration system. Id.

NEEA and SVA supported DOE's proposed definition of low power mode. (NEEA, Public Meeting Transcript, No. 0004 at pp. 147–148; SVA, No. 0008 at p. 3) Regarding DOE's proposed definition of "refrigeration low power mode," SVA noted that refrigeration low power modes can vary, and therefore need to be broadly included in DOE's definition, specifically objecting to the clause "without user intervention," if such was intended to include the initial programming of software parameters that allow the refrigeration low power mode to be enabled. SVA offered that various methods can be used to achieve the same outcome of reduced energy consumption resulting from variations in refrigeration system operation (SVA, No. 0008 at p. 3) Coca-Cola commented that the refrigeration low power mode should not be micromanaged and that refrigeration low power modes could include cycling the evaporator fan or temporarily defeating the defrost cycles. (Coca-Cola, No. 0010 at p. 9)

In response to DOE's request for comment on the proposed definition of "standby," (see section III.A.11.c), Coca-Cola commented that DOE should consider an

alternative definition that DOE believes is applicable to DOE's proposed definition of low power mode. (Coca-Cola, No. 0010 at p. 8) Specifically, Coca-Cola suggested the following definition for standby mode for beverage vending machines: "Standby mode is the state that the vending machine is in when it does not have to deliver product, is not intended to deliver product, or cannot be used to select and purchase a product. In this mode of operation any powered element can be in a different state than when the machine is in normal operation delivering product to a consumer. Standby mode can be activated automatically by programming or by sensory devices monitoring internal functions or external conditions and activity." (Coca-Cola, No. 0010 at p. 8) While DOE's standby mode definition is only applicable to external customer display signs, lights, and digital screens, DOE believes Coca-Cola's comments are also pertinent to how DOE defines low power mode for beverage vending machines. As such, DOE also considered these comments with respect to the "low power mode" definition proposed in the 2014 BVM test procedure NOPR.

DOE appreciates the interested parties' support regarding the inclusion of definitions of "low power mode," "accessory low power mode," and "refrigeration low power mode" in the test procedure. In response to Coca-Cola and SVA's comments regarding the definition of "refrigeration low power mode," DOE acknowledges that theoretically, there are many mechanisms and control approaches to adjusting the refrigeration system to achieve energy savings during extended periods of inactivity. However, DOE must balance the desire for flexibility in the "refrigeration low power mode" definition with the need to have any such "refrigeration low power mode" be

verifiable. As such, DOE has designed the "refrigeration low power mode" definition to, as much as possible, be focused on what a "refrigeration low power mode" is intended to achieve, namely, energy savings resulting from the elevation of the refrigerated cabinet temperature when the beverage vending machine is not in an active vending environment. Therefore, the "refrigeration low power mode" definition is intended to be broadly applicable to any type of control that achieves the desired effect. However, DOE must be able to quantifiably confirm the presence of any refrigeration low power mode to prevent manufacturers from being able to claim the energy savings associated with the existence of a refrigeration low power mode when the beverage vending machine does not, in fact, include such a feature. Thus, DOE defined the refrigeration low power mode to reference a quantifiable temperature threshold and time interval, to ensure that the existence of a refrigeration low power mode could be quantifiably determined through a test. See section III.B.3 for a more in-depth discussion of DOE's specific refrigeration low power mode verification test method. As mentioned above, DOE acknowledges that there may be some types of refrigeration low power mode controls that are not effectively captured by DOE's proposed refrigeration low power mode verification test and, in such a case, the manufacturer of such equipment should submit a petition for a test procedure waiver in accordance with the provisions in 10 CFR 431.401.[12]

In response to Coca-Cola's comment regarding cycling the evaporator fan or temporarily defeating the defrost cycles as a type of refrigeration low power mode, DOE

[12] DOE issued a final rule amending its regulations governing petitions for waiver and interim waiver from DOE test procedures for consumer products and commercial and industrial equipment. 79 FR 26591 (May 9, 2014). This final rule became effective on June 9, 2014.

notes that such controls are only low power modes to the extent that they are activated when the beverage vending machine is not intended to be actively vending, which is consistent with DOE's definition of low power mode. If a beverage vending machine contains controls on the evaporator fan or other systems that do not meet the definition of low power mode and are not adjustable by the machine operator, such controls can be employed for the duration of the test procedure, provided their operation maintains the primary functionality of the beverage vending machine and is not inconsistent with the specifications of section III.A.11. If such controls do meet the definition of a low power mode, they would be treated as an accessory low power mode, and could be enabled and tested during the low power mode period. Although evaporator and condenser fan motor controls and defrost controls do affect the refrigeration system, they are not treated as refrigeration system low power modes unless they adjust cabinet temperature. To clarify this, DOE is modifying the definition of refrigeration low power mode to more specifically explain that a refrigeration low power mode is any state in which a beverage vending machine's refrigeration system is in low power mode by raising the cabinet temperature. Additionally, DOE is modifying the definition of accessory low power mode to clarify that any control system that meets the definition of a low power mode and is not a refrigeration low power mode qualifies as an accessory low power mode.

In response to Coca-Cola's comments regarding the definition of "standby mode," which DOE determined were potentially also applicable to DOE's definition of "low power mode," DOE believes that Coca-Cola's suggestions are consistent with DOE's definition of "low power mode" for beverage vending machines. Specifically, DOE

believes that Coca-Cola's suggested language—"any powered element can be in a different state than when the machine is in normal operation delivering product to a consumer"—is consistent with DOE's definition, which specifies that, in low power mode, a beverage vending machine's lighting, refrigeration, and/or other energy-using systems are automatically adjusted (without user intervention) such that they consume less energy than they consume in an active vending environment. Coca-Cola's more specific language regarding how such modes may be activated provides useful examples of control methods, all of which are recognized under DOE's "low power mode" definition. However, DOE believes that the proposed definition is more flexible and more broadly applicable, since it does not prescribe specific control methods or specific features that must be disabled. As Coca-Cola's suggestions are not substantively different than DOE's proposed definition for "low power mode," DOE is adopting the proposed definition without modification.

DOE also notes that "low power mode" as defined in this final rule is different from EPCA's definition of "standby mode." Regarding the applicability of "standby mode" to beverage vending machines in general, DOE reviewed the operating modes available for beverage vending machines and determined that this equipment does not have operating modes that meet the definition of standby mode or off mode, as established at 42 U.S.C. 6295(gg)(3). Specifically, beverage vending machines are typically providing at least one main function—refrigeration. (42 U.S.C. 6295(gg)(1)(A)) DOE recognizes that in a unique equipment design, the low power mode includes disabling the refrigeration system, while for other equipment the low

power mode controls only elevate the thermostat set point. Because low power modes still include some amount of refrigeration for the vast majority of equipment, DOE believes that such a mode does not constitute a "standby mode," as defined by EPCA, for beverage vending machines.

2. Low Power Mode Test Method

In the 2014 BVM test procedure NOPR, DOE proposed to establish a physical test that consists of a 6-hour low power mode test period that allows accessory low power modes to be enabled, and a separate calculation approach to account for refrigeration low power modes. DOE proposed a calculation-based approach to account for refrigeration low power modes because DOE believed it was the best method to provide consistent and equitable treatment among BMV models, and to ensure the accuracy and repeatability of the test method, without making the test method unduly burdensome to conduct. 79 FR at 46924–46926.

Under DOE's proposed method, equipment with a low power mode would stabilize and operate under normal test procedure conditions, with all equipment and accessories energized as they would be when the equipment is capable of actively refrigerating and vending sealed beverages (as specified in section III.A.11), for the first 18 hours of the test period. During this "active vending" test period, DOE proposed that any low power modes be disabled and, unless specified otherwise by another portion of the test procedure, that all low power mode control features that cannot be disabled but can be adjusted would be required to be adjusted such that the DEC is maximized, to best

represent the likely performance of the equipment in the field while in active vending mode. Similarly, DOE proposed adopting a modification to ANSI/ASHRAE Standard 32.1, requiring that any party performing the test procedure provide, if necessary, any physical stimuli or other input to the machine that may be needed to prevent automatic activation of low power modes during the vending state test period. Id.

Then, for equipment with an accessory low power mode, DOE proposed that the accessory low power mode may be enabled for the final 6 hours of the test, or from hour 18 to hour 24 of the 24- hour test. 79 FR at 46926. For equipment with multiple accessory low power modes or multiple energy use states, DOE clarified that equipment should be configured with the lowest energy-consuming lighting and control settings during the accessory low power mode test period. 79 FR at 46927. Equipment without an accessory low power mode would continue to operate normally and in accordance with specifications in the DOE test procedure. DOE proposed 6 -hours as a representative length of time for the low power mode test period, based on the fact that it is intended to represent off hours between periods of vending when the facility may be closed or have low occupancy. While DOE recognizes that there is a wide range of types of low power mode controls and time periods for which these controls are enabled, DOE believes a timeframe of 6 hours is a reasonable representation of average field use. 79 FR at 46926.

To account for the energy savings associated with the presence of any refrigeration low power modes, DOE proposed using a calculation- based energy credit

equal to 3 percent of the measured DEC of any unit equipped with a refrigeration low power mode. Id. DOE developed the 3 percent value based upon test data evaluating the low power mode energy savings for a variety of different BVM models available on the market. DOE developed the credit to represent the approximate energy savings that would have been achieved through a 6-hour time period during which the refrigeration low power mode of the tested unit was enabled, including any time and energy consumption necessary to return the case to appropriate vending temperature within the 6-hour period. The method DOE used to develop this value is described in detail in the BVM test procedure NOPR. 79 FR at 46925–46926.

In response to DOE's proposed low power mode test provisions, DOE received a number of comments from interested parties. AMS supported DOE's proposed low power mode test method, but noted that characteristics of the low power mode were account driven and depended on what customers wanted. (AMS, No. 0007 at pp. 7–8) Coca-Cola agreed with AMS that the low power mode is dependent on many factors and is primarily account-driven and they noted that a test -procedure should not define or limit how energy savings are achieved. (Coca-Cola, No. 0010 at p. 9) ASHRAE SPC 32.1 and SVA supported DOE's view regarding the responsibility of the testing entity to provide the necessary stimuli to prevent automatic activation of low power modes during the vending state test procedure. (ASHRAE SPC 32.1, No. 0011 at p. 4; SVA, No. 0008 at p. 3) However, SVA stated that the inclusion of low power modes in the test procedure would be overly burdensome to manufacturers and would make it difficult to compare results. SVA added that these features are present on most, if not all, beverage

vending machines and SVA did not support giving manufacturers an option to reduce the publicized DEC value without actually changing anything of substance. (SVA, No. 0008 at p. 3)

Regarding DOE's proposed calculation-based method to account for refrigeration low power modes, NEEA and SVA supported DOE's proposal to provide a percentage credit to machines with a refrigeration low power mode. (NEEA, No. 0009 at p.2; SVA, No. 0008 at p. 3) Conversely, ASHRAE SPC 32.1, Coca-Cola, California IOUs, and AMS commented that a physical test would be the most accurate method to account for low power mode operation and expressed concern about the 3 percent savings credit for refrigeration data low power mode. (ASHRAE SPC 32.1, No. 0011 at p. 4; Coca-Cola, No. 0010 at p. 10; CA IOUs, No. 0005 at p. 2; AMS, No. 0007 at pp. 7–8) ASHRAE SPC 32.1 stated that the committee is currently working to specify a physical refrigeration low power mode test protocol that would be applicable to all BVM operating schemes. (ASHRAE SPC 32.1, No. 0011 at p. 4) Coca-Cola submitted that it was acceptable to separate low power mode for refrigeration systems from low power mode for other machine functions, since the former is tied to food safety. (Coca-Cola, No. 0010 at p. 9)

Regarding the length of the low power mode test period, Coca-Cola supported DOE's proposal of a 6-hour low power mode test period. (Coca-Cola, No. 0010 at p. 9) ASHRAE SPC 32.1 noted that the committee was considering alternative time periods for the low power mode test period, and was in the process of researching available field

data to determine what would be most appropriate and representative. (ASHRAE SPC 32.1, No. 0011 at p. 4)

DOE appreciates comments from interested parties expressing support for DOE's low power mode test method. DOE agrees with interested parties that there are a wide variety of low power mode controls and approaches. DOE has attempted to define "low power mode," "accessory low power mode," "refrigeration low power mode," and the associated test methods to be technology-neutral, to the extent possible. Specifically, DOE designed the definitions of "low power mode," "accessory low power mode," and "refrigeration low power mode" to focus on the intended outcome of the low power mode, namely energy savings during periods of inactivity, rather than the specific mechanism by which such energy savings are accomplished, as discussed in section III.B.1. DOE also notes that employing a physical accessory low power mode test allows any control that meets DOE's definition of accessory low power mode to be enabled during the 6-hour low power mode test period, and the energy savings from any such accessory low power mode to be objectively determined. Because DOE did not employ a physical test, when defining "refrigeration low power mode," DOE had to be more cognizant of the specific characteristics that constituted a refrigeration low power mode to ensure that the 3 percent credit would be applicable and to ensure that the presence of a low power mode was verifiable, as discussed further in section III.B.3.

In response to SVA's comment regarding the additional burden associated with accounting for the impact of low power modes in the DOE test procedure, DOE believes

that including a method to quantify the energy impact of low power modes is important to ensure that the test is representative of the energy consumption of the equipment, since, as SVA notes, low power modes are a common feature on many beverage vending machines. In addition, DOE considered repeatability and the burden of testing when developing the low power mode test method, and believes the proposed test method represents very little additional burden while providing a fair and accurate comparison of BVM performance. Specifically, DOE is adopting a calculation-based approach to account for the impact of any refrigeration low power mode because it is the least burdensome and most repeatable approach.

However, as noted in the 2014 BVM test procedure NOPR, non-refrigeration based accessory low power modes are more straightforward to evaluate based on a physical test. Therefore, as a physical test will more accurately capture the energy impact of any accessory low power modes, DOE believes that a physical test is warranted in this case. Physical testing of accessory low power modes will also allow for differentiation and performance comparisons among different BVM models equipped with different accessory low power modes, whereas a calculation-based approach may not. DOE notes that the accessory low power mode test will not add to the length of the test, and only requires the interaction of test personnel to program the low power mode controls, which DOE believes will not significantly impact the burden associated with conducting the DOE test procedure. DOE specifically quantifies the burden associated with the low power mode test provisions, as well as all the test procedure amendments adopted in this final rule, in section IV.B.

Regarding the repeatability of the accessory low power mode test method, DOE acknowledges comments from interested parties that accessory low power modes may employ a variety of different control strategies and control a variety of different components. While DOE believes that it is important to preserve flexibility to accommodate various types of accessory low power mode controls in the DOE test procedure, DOE understands that this could impact the repeatability of the test if it is not clear which control settings should be employed for testing. Therefore, as proposed in the 2014 BVM test procedure NOPR, DOE is adopting provisions in this final rule that beverage vending machines with multiple accessory low power modes must be placed in the accessory low power mode that results in the maximum energy savings.

DOE appreciates the comments from ASHRAE SPC 32.1, Coca-Cola, California IOUs, and AMS regarding a desire for a physical test for the refrigeration low power mode. DOE agrees with commenters that a physical test would be more accurate for a specific tested BVM unit and would allow for better differentiation of the performance of different types of refrigeration low power mode controls. However, as noted in the 2014 BVM test procedure NOPR, DOE understands that refrigeration low power modes are extremely variable in terms of their control strategies and operation and, in addition, may require specific instructions from the manufacturer to precisely modify or adjust the control systems to accommodate the specific provisions of the DOE test procedure. 79 FR at 46924–46925. DOE believes that this would reduce the consistency and repeatability of such a physical test method and would make the method impractical to

implement. Therefore, due to the difficulty of accounting for the wide variety of refrigeration low power modes in a consistent, fair, and reasonable manner, DOE is electing to adopt a calculation-based refrigeration low power mode credit, as proposed in the 2014 BVM test procedure NOPR. The refrigeration low power mode credit was calculated based on the physical testing of several BVM units, with and without the refrigeration low power mode employed, and including the energy consumption of the refrigeration system and all lights and accessories available on the tested units. Based on these test data, DOE determined the average reduction in measured DEC resulting from use of the refrigeration low power mode only. DOE notes that, with regard to the calculation-based provisions for determining the DEC when testing is conducted without a payment mechanism, the refrigeration low power mode credit would be applied to the calculated DEC, determined as the sum of the tested primary energy consumption and the default payment mechanism energy consumption value. Whether using the testing-based or calculation-based provisions for determining the DEC (with or without a payment mechanism installed, respectively), the refrigeration low power mode credit is applied to the total energy consumption of the machine, including all accessories and refrigeration system components.

DOE also appreciates the comments of ASHRAE SPC 32.1 regarding their work on developing a physical testing-based refrigeration low power mode test method that would be universally applicable to all systems. However, DOE notes that ASHRAE SPC 32.1 did not provide any additional information regarding the specific test provisions they are considering. DOE also notes that DOE has been following the work of ASHRAE

SPC 32.1 and is not aware of any discussions proposing or finalizing a refrigeration low power mode test method at this time. While the work of ASHRAE SPC 32.1 is ongoing, to DOE's knowledge, a repeatable and consistent physical refrigeration low power mode test is not available at this time and, as such, DOE is adopting the refrigeration low power mode credit proposed in the 2014 BVM test procedure NOPR.

With regard to the comments from interested parties regarding the 3-percent credit for beverage vending machines with refrigeration low power mode capability, DOE acknowledges the concerns of some commenters that 3 percent may not accurately describe the specific energy savings from a unique instance of a refrigeration low power mode. However, DOE's estimate of 3 percent energy savings due to the operation of low power modes is based on the data available and known to DOE, and DOE notes that interested parties did not submit additional data to inform this estimate. DOE understands that the control strategies employed by various refrigeration low power modes could result in variation in the achieved energy savings, even assuming they are evaluated according to a consistent test method. However, DOE reiterates that the proposed 3-percent credit is determined based on low power mode test results of BVM models with different low power modes [13] and, as such, DOE believes 3-percent is representative of the common types of refrigeration low power modes DOE has observed in the market place. Therefore, DOE is maintaining the 3-percent energy savings credit proposed in the 2014 BVM test procedure NOPR for beverage vending machines with a refrigeration low power mode.

[13] DOE described the method for determining the 3 percent credit in detail in the 2014 BVM test procedure NOPR. 79 FR 46908, 46925–46926 (Aug. 11, 2014).

With regard to the length of the low power mode test period, DOE appreciates Coca-Cola's support of the 6-hour low power mode test duration. DOE also appreciates ASHRAE SPC 32.1's comment that they were considering alternative time periods for the low power mode test period and were in the process of researching available field data to determine what would be most appropriate and representative. However, DOE notes that ASHRAE SPC 32.1 did not submit any additional data regarding BVM low power mode usage profiles or durations. Lacking any additional data or more specific recommendations, DOE is maintaining the low power mode test duration at 6 hours as proposed in the 2014 BVM test procedure NOPR.

DOE believes the accessory and refrigeration low power mode test provisions are applicable to most forms of low power modes available in the marketplace. However, DOE is aware of some forms of "learning-based" energy management controls that cannot be accurately or consistently captured by the DOE test procedure for beverage vending machines. Such energy management controls save energy by, over time, using historic sales and traffic data and embedded algorithms to profile and predict typical times of high and low traffic and sales based on the sales history of the machine. However, it is extremely difficult to develop a repeatable procedure to evaluate the energy savings from such controls over a 24-hour test in a testing laboratory. As such, DOE acknowledges that such energy management controls would not be effectively captured over the course of the DOE test procedure and, as such, should be disabled

during the test, if possible. If such "learning-based" controls also have a "schedule-based" or programmable mode, the energy management controls can be operated in the programmed mode in accordance with the accessory low power mode provisions. If the controls do not have a programmable mode and cannot be disabled during the test, or the energy management control provisions are otherwise inapplicable, the manufacturer of that equipment should submit a petition for request a waiver in accordance with the provisions in 10 CFR 431.401.[14]

3. Refrigeration Low Power Mode Verification Test Protocol

DOE recognizes that a calculated energy credit will not account for differences in performance or efficacy among different types of refrigeration low power modes and will not objectively verify the performance or existence of a refrigerated low power mode. Therefore, a procedure to verify the existence of a refrigeration low power mode, as defined, is required to ensure BVM manufacturers do not apply the 3-percent refrigeration low power mode credit to basic models that have a refrigeration low power mode that will not result in energy savings in the field.

In the 2014 BVM test procedure NOPR, DOE proposed a refrigeration low power mode verification test method, which included initiating the refrigeration low power mode after completion of the 24-hour BVM test period and recording the average temperature of the standard test packages in the next-to-vend beverage positions for the

[14] DOE issued a final rule amending its regulations governing petitions for waiver and interim waiver from DOE test procedures for consumer products and commercial and industrial equipment. 79 FR 26591 (May 9, 2014). This final rule became effective on June 9, 2014.

next 2 hours. Under DOE's proposal, over the course of this 2-hour period, the instantaneous average next-to-vend beverage temperatures (i.e., the spatial average of all next-to-vend beverages) would be required to increase above 40 °F and remain above 40 °F for at least 1 hour. DOE also proposed that the beverage vending machine would be required to be capable of automatically returning itself to its normal operating conditions, including the specified integrated average temperature, at the conclusion of the refrigeration low power mode. To limit unnecessary burden, DOE also proposed that this validation test would not be required to determine the DEC of BVM models, but would be employed by DOE for enforcement purposes to verify the existence of a refrigeration low power mode.

In response to DOE's proposed refrigeration low power mode, SVA commented that 1 hour might not be a sufficient time span to raise the temperature of all the next-to-vend packages above 40 °F. SVA reasoned that this depended on multiple factors, including insulation effectiveness. (SVA, No. 0008 at p. 3) Coca-Cola drew DOE's attention to the FDA Food Code, which recommends that in a refrigerated vending machine, the air temperature may not exceed 5 °C for more than 30 minutes immediately after the machine is filled, serviced, or re-stocked. Because of this, Coca-Cola suggested that it would be impractical to have a test where a product is maintained over 40 °F for 1 hour, and that should such a test be conducted, it should be for information only. (Coca-Cola, No. 0010 at p. 10)

DOE appreciates the comments submitted by SVA that the duration of the refrigeration low power mode verification test may not be long enough to reach 40 °F and agrees that the time it takes the refrigerated cabinet to reach such a temperature will be dependent on a number of things, including the insulation effectiveness. DOE based is original proposed duration of 2 hours on available test data from a range of BVM models employing low power mode. Based on the BVM models for which DOE had data, all BVM units had reached a temperature of at least 40 °F within 2 hours. However, DOE does not wish to disincentivize BVM manufacturers from increasing the energy efficiency of equipment by increasing the insulation level on the refrigerated compartment, if doing so would prevent the case from being able to meet the refrigeration low power mode verification test. Therefore, DOE is changing the refrigeration low power mode verification test duration to 6 hours. That is, in this final rule, DOE is adopting the following provisions for the refrigeration low power mode test. In order for a manufacturer to apply the refrigeration low power mode credit to a particular BVM unit, the BVM unit must either:

A. Satisfy the following three requirements:
    1) The instantaneous average next-to-vend beverage temperature must reach at least 4 °F above the integrated average temperature or lowest application product temperature, as applicable, within 6 hours;
    2) The instantaneous average next-to-vend beverage temperature must be maintained at least 4 °F above the integrated average temperature or

lowest application product temperature, as applicable, for at least 1 hour; and

3) After the instantaneous average next-to-vend beverage temperature is maintained at or above 4 °F above the integrated average temperature or lowest application product temperature, as applicable, for at least 1 hour, the refrigerated beverage vending machine must return to the specified integrated average temperature or lowest application product temperature, as applicable, automatically without direct physical intervention; or

B. Not activate the compressor for the entire 6 hour period, in which case the instantaneous average beverage temperature does not have to reach 4 °F above the integrated average temperature or lowest application product temperature, as applicable, but, the equipment must still automatically return to the integrated average temperature or lowest application product temperature, as applicable, after the 6 hour period without direct physical intervention.

DOE notes that the temperature threshold of at least 4 °F above the integrated average temperature, or 40 °F for most equipment, was selected based on the U.S. Environmental Protection Agency's ENERGY STAR®[15] Product Specification for Refrigeration Beverage Vending Machines, Version 3.1,[16] which requires that qualified

[15] ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and DOE that establishes a voluntary rating, certification, and labeling program for highly energy efficient consumer products and commercial equipment. Information on the program is available at www.energystar.gov/index.cfm?c=home.index.

[16] U.S. Environmental Protection Agency. ENERGY STAR Program Requirements for Refrigerated Beverage Vending Machines – Eligibility Criteria: Version 3.1. Revised December 2013. https://www.energystar.gov/sites/default/files/specs//private/Vending%20Machines%20Program%20Requirements%20Version%203%201.pdf.

beverage vending machines include either a lighting low power state, refrigeration low power state, or whole machine low power state. ENERGY STAR further defines refrigeration low power state as a state in which the average beverage temperature is allowed to rise to 40 °F or higher for an extended period of time. Given its use in other industry standards, DOE believes it is consistent to reference a similar temperature threshold when defining refrigeration low power mode in the DOE test procedure.

In response to Coca-Cola's comment regarding refrigerated beverage vending machines designed to vend perishable products, DOE notes that if a beverage vending machine is not equipped with a refrigeration low power mode because it is designed to vend perishable products, then it will not be eligible for the refrigeration low power mode credit. As such, this optional test procedure to verify the existence of a refrigeration low power mode would not be applicable to such refrigerated beverage vending machines. The provisions for testing refrigerated beverage vending machines equipped with a refrigeration low power mode do not require BVM models to be sold with such a feature or preclude BVM models from being sold without a refrigeration low power mode.

Additionally, DOE wishes to mention that, as previously discussed in the context of operating temperatures, manufacturers should test and rate their basic models for the purposes of certification using only those controls with which units of the given basic model is are distributed in commerce and intended to be used in the field. Moreover, the use of any control schemes designed solely for the purposes of conducting the DOE test that are not available on the beverage vending machine as it is distributed in commerce

cannot be used during the test. If a manufacturer produces a design which it believes should be qualified for the refrigeration low power mode credit but which cannot meet the verification requirements as outlined above, the manufacturer should apply submit a petition for a test procedure waiver for that basic model in accordance with the provisions in 10 CFR 431.401, as noted above in section III.B.2.

C. Other Amendments and Clarifications

DOE is also amending 10 CFR 429.52(b) to clarify the reporting requirements at 10 CFR 429.52(b). Similarly, DOE is amending the introductory language found in 10 CFR 431.296 to clarify the applicability of the DEC measured in accordance with the test procedure to the energy conservation standards listed in that section.

In this section, DOE discusses DOE's proposed amendments regarding the certification and reporting requirements for beverage vending machines, comments DOE received on these issues, DOE's response to any comments received, and the final amendments being adopted as part of this final rule. In section III.C.1, DOE also discusses comments received that are not related to any of the specific test procedure amendments.

1. Clarifications to the Scope of the BVM Regulations

In written comments received in response to the 2014 BVM test procedure NOPR, AMS stated that vending machines that do not dispense beverages should be completely excluded from the scope of this rulemaking. (AMS, No. 0007 at p. 4)

In response to AMS's comment, DOE notes that all equipment meeting the definition of refrigerated bottled or canned beverage vending machine established by EPCA are subject to DOE's regulations, including the DOE test procedure and applicable energy conservation standards. Refrigerated bottled or canned beverage vending machine is defined as "a commercial refrigerator that cools bottled or canned beverages and dispenses the bottled or canned beverages on payment." 10 CFR 431.292 To explicitly include any beverage vending machines that may vend cooled beverages that are in unusual containers, DOE also defines "bottled or canned beverage" as "a beverage in a sealed container." Therefore, as noted by AMS, vending machines that do not cool or dispense beverages in sealed containers do not meet the definition of a refrigerated bottled or canned beverage vending machine and, as such, are not subject to DOE's regulations for refrigerated bottled or canned beverage vending machines.

2. Clarifications to Certification and Reporting Requirements

DOE notes that 10 CFR 429.52(b)(2) contains requirements for certification reports for covered beverage vending machines. Specifically, DOE requires reporting of "maximum average daily energy consumption." However, the outcome of the DOE test procedure is the measured "daily energy consumption" for a given model of beverage vending machine. To be consistent, DOE proposed in the 2014 BVM test procedure NOPR to update the reporting requirements at 10 CFR 429.52(b)(2) to require certification reports to include "daily energy consumption" rather than "maximum average daily energy consumption." 79 FR at 46927.

The "daily energy consumption" of a given BVM basic model measured using the DOE test procedure and reported in accordance with 10 CFR 429.52(b)(2) should be compared to the "maximum daily energy consumption" for the basic model's respective equipment class in the standard table in 10 CFR 431.296 to determine whether the basic model complies with the relevant standard. To clarify the relationship between these terms, DOE also proposed to update the language at 10 CFR 431.296 to specify that the "daily energy consumption" (rather than the "maximum daily energy consumption") of each basic model of refrigerated bottled or canned beverage vending machine must not exceed the "maximum daily energy consumption" specified in the energy conservation standard table. Id.

DOE did not receive any comments on the proposed amendments to 10 CFR 429.52(b) with regards to reporting requirements for beverage vending machines, or the introductory language found in 10 CFR 431.296 to clarify the applicability of the DEC measured in accordance with the test procedure to the energy conservation standards listed in that section. Therefore, DOE is adopting the proposed clarifications discussed in the 2014 BVM test procedure NOPR with no modifications.

IV. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

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

B. Review under the Regulatory Flexibility Act

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

DOE reviewed the proposed rule, which would amend the test procedure for beverage vending machines, under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. In the 2014 BVM test procedure NOPR, DOE certified that the proposed rule, if adopted, would not result in a

significant impact on a substantial number of small entities. DOE did not receive comments on the economic impacts of the test procedure. Therefore, DOE continues to certify that the test procedure amendments set forth in this final rule will not have a significant impact on a substantial number of small entities. The factual basis for this certification is set forth below.

For the BVM manufacturing industry, the Small Business Administration (SBA) has set a size threshold, which defines those entities classified as "small businesses" for the purpose of the statute. DOE used the SBA's size standards to determine whether any small entities would be required to comply with the rule. The size standards are codified at 13 CFR part 121. The size standards are listed by the North American Industry Classification System (NAICS) code and industry description, and are available at www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf. In the 2007 version of the NAICS codes, BVM manufacturers were classified under NAICS 333311, "Automatic Vending Machine Manufacturing." The SBA set a threshold of 500 employees or less for an entity to be considered as a small business for this category. The 2011 Certification, Compliance, & Enforcement final rule (herein referred to as 2011 CC&E final rule) indicates that the NAICS code associated with beverage vending machines was 333311 and the small business threshold was 500 employees as of the date of that final rule 76 FR 12422, 12448 (March 7, 2011). In 2012, NAICS published an updated set of codes that contained some significant changes in the classification of various manufacturing industries from those established in 2007 and referenced in the CC&E final rule, including consolidating manufacturers that were previously classified

under 333311 to NAICS code 333318. 77 FR 49991, 50000 (Aug. 20, 2012). As prescribed by the 2012 NAICS code updates, in this final rule (as well as in the 2014 BVM test procedure NOPR) DOE has referenced the 2012 NAICS code 333318, "Other Commercial and Service Industry Machinery Manufacturing," as applicable to BVM manufacturers. The SBA sets a threshold of 1,000 employees or less for an entity to be considered as a small business for this category.

DOE conducted a market survey of manufacturers of equipment covered by this rulemaking using all available public information. DOE's research involved the review of individual company websites and marketing research tools (e.g., Dun and Bradstreet reports, Manta) to create a list of companies that manufacture or sell beverage vending machines covered by this rulemaking. Using these sources, DOE identified eight manufacturers of beverage vending machines.

DOE then reviewed the data to determine whether the entities met the SBA's definition of a small business manufacturer of beverage vending machines and screened out companies that do not offer equipment covered by this rulemaking, do not meet the definition of a "small business," or are foreign owned and operated. Based on this review, DOE has identified four companies that would be considered small manufacturers; this represents 50 percent of the national BVM manufacturers.

Table IV.1 groups the small businesses according to their number of employees. The smallest company has 2 employees and the largest company has 375 employees.

According to DOE's analysis, total annual revenues associated with these small manufacturers were estimated at $108.5 million ($27.1 million average annual revenue per small manufacturer).

Table IV.1 Small Business Size by Number of Employees

Number of Employees	Number of Small Businesses	Percentage of Small Businesses	Cumulative Percentage
1–50	1	25.0%	25.0%
51–100	1	25.0%	50.0%
101–1000	2	50.0%	100.0%
Total	4		

* The total annual revenue for all small business is calculated as the average annual revenue per small business in each employee size bin multiplied by the number of small businesses in that bin. Note, the value in the total value may not correspond directly to the average data due to rounding.

This final rule updates and incorporates several additional amendments to clarify ambiguities in the industry test procedure incorporated by reference into the DOE test procedure for beverage vending machines. In addition, DOE is incorporating revisions to the DOE test procedure that:

1) eliminate testing at the 90 °F ambient test condition,
2) clarify the test procedure for combination vending machines,
3) clarify the requirements for loading BVM models under the DOE test procedure,
4) clarify the specifications of the test package,
5) clarify the next-to-vend beverage temperature test condition,
6) specify placement of thermocouples during the DOE test procedure,
7) establish testing provisions at the lowest application product temperature,
8) clarify the treatment of certain accessories when conducting the DOE test procedure, and

9) add a method to account for energy impacts of low power modes.

Manufacturers are currently required to test Class A and Class B beverage vending machines using the DOE test procedure established in the 2006 BVM test procedure final rule (71 FR 71340; Dec. 8, 2006) to show compliance with existing energy conservation standards established in the 2009 BVM energy conservation standard final rule (74 FR 44914; Aug. 31, 2009). That test procedure incorporates by reference ANSI/ASHRAE Standard 32.1-2004 and ANSI/AHAM HRF-1-2004, and consists of one 24-hour test at standard rating conditions to determine the DEC of covered beverage vending machines during a representative cycle of use. 71 FR 71340, 71355 (Dec. 8, 2006). DOE estimates the cost of conducting the DOE current test procedure to be $5,000 for each BVM unit for the 24-hour test.

Six of the amendments in this test procedure final rule will not change the testing burden for refrigerated beverage vending machines. These amendments serve only to establish new definitions and provide clarification to DOE's existing test procedure requirements. As discussed in section III.A.1 of this final rule, updating the reference to an industry test procedure and other minor clarifications of the referenced industry test procedure will not change the test procedure burden because it will not change the technical requirements of the test procedure. Other amendments that do not change the testing burden for refrigerated beverage vending machines include the amendments regarding the test procedure for combination vending machines, loading the vending machines when conducting the test procedure, specifying the characteristics of the test

package, clarifying the next-to-vend temperature test condition, and specifying the placement of thermocouples during testing.

The remaining amendments in this test procedure rule may affect the test procedure burden and the expected incremental increases or decreases in cost for conducting the test procedure are discussed in the following paragraphs.

DOE estimated the cost of labor using an average hourly salary of $42.65 for an engineer.[17] Including fringe benefits, which are estimated to be 30 percent of total compensation, the total hourly cost to an employer is estimated to be $55.45.[18]

Eliminating testing at the 90 °F ambient test condition will substantially lessen the testing burden on manufacturers, as it decreases the testing requirements from two tests to one test per BVM unit. DOE estimates this decrease in burden to be 10 hours of labor and 60 hours of facility use, which reduces the testing cost for each BVM unit by roughly $2,500, or half the cost of conducting the existing test procedure.

Establishing testing provisions at the lowest application product temperature affects only a very small percentage of equipment on the market, estimated to be less than 2 percent of shipments. Manufacturers who make equipment affected by this provision

[17] U.S. Department of Labor, Bureau of Labor Statistics. 2014. National Occupational Employment and Wage Estimates. Washington, D.C. Available at www.bls.gov/oes/current/oes_nat.htm#17-0000.
[18] U.S. Department of Labor, Bureau of Labor Statistics. 2014. Employer Costs for Employee Compensation - Management, Professional, and Related Employees. Washington, D.C. Available at: http://www.bls.gov/news.release/pdf/ecec.pdf.

should experience a decrease in burden because they will no longer have to seek waivers for equipment that cannot maintain the 36 °F ± 1 °F average next-to-vend temperature for the duration of the test. For these manufacturers, DOE estimates this will save 4 hours of labor to develop an alternate test procedure and submit the waiver application for each beverage vending machine basic model, or $221.80 for each beverage vending machine basic model.

Clarifying the treatment of various components and accessories in the DOE test procedure should not alter the technical requirements of the DOE test procedure, because these additional specifications are meant to clarify existing requirements. However, DOE understands that the treatment of some of these accessories and components may have been inconsistent due to the lack of clarity or misinterpretation of the DOE test procedure. Therefore, DOE is accounting for the incremental burden associated with properly configuring BVM models for testing in accordance with these clarified component specifications. The specific clarifications pertain to money processing devices, interior lighting, external displays and screens, anti-sweat heaters, condensate pan heaters and pumps, illuminated temperature displays, condenser filters, security covers, coated coils, general purpose outlets, and crankcase heaters and electric resistance heaters for cold weather. The adjustments to these accessories will require additional attention by the engineers conducting the test. DOE estimates the additional cost to be $110.90 for each model tested based on 1 hour of an engineer's time to make all the applicable adjustments to the components and accessories prior to testing and 1 hour of

an engineer's time to attend to the components and accessories of the model during testing.

Amendments in this final rule that expand the testing methodology to incorporate lighting and control settings to account for low power modes will require additional attention by test personnel. Regarding the accessory low power test, DOE estimates it will require 1 hour to make any necessary adjustments to begin low power mode operation at that time. During the active vending mode test procedure, DOE estimates that it will take a maximum of 10 additional hours of an engineer's time to periodically monitor the operation of the tested unit and interact with the unit, if necessary to ensure that the unit does not re-enter a low power mode state. DOE does not believe that multiplying the DEC by 0.97 to account for refrigeration low power mode will increase the burden associated with conducting the DOE test procedure. However, DOE is also proposing an optional refrigeration low power mode verification test that manufacturers may elect to perform to ensure their equipment meets the requirements of a refrigeration low power mode, which would increase the test burden. DOE estimates that this test would require an additional 4 hours of test time, 2 hours to allow the refrigeration low power mode to initiate and maintain the adjusted refrigeration state, and an assumed 2 hours to return to 36 °F ± 1 °F to verify that the BVM model can automatically return to vending conditions. DOE estimates the incremental costs associated with conducting the low power mode test as $609.95 for each model tested, based on the assumption that it would take an engineer an additional 11 hours to attend to the tested model. Including

the optional refrigeration low power mode verification test method, the incremental cost of the low power mode test procedure amendments is $831.75.

All of the amendments and clarifications in this final rule, taken together, will result in an overall reduction in burden for small manufacturers conducting the DOE test procedure, primarily due to the removal of the requirement to test at the 90 °F ambient condition. On average, the cost of testing covered beverage vending machines would be reduced by approximately $1,650 per basic model, or by 34 percent per small manufacturer, not including the optional tests that are not required for certification of BVM models. Table IV.2 summarizes the amendments in this final rule that impact manufacturer burden. However, note that different test procedure provisions are applicable to different BVM models and configurations and, as such, the sum of these provisions does not represent the "total incremental change in burden" for each tested BVM model under the test procedure amendments adopted in this final rule.

Table IV.2 Summary of Amendments that Impact Manufacturer Burden

Provision	Change in Burden (per model tested)	Explanation
Eliminate 90 °F ambient test condition	-$2,500	Reduces half the cost of the 2006 BVM test procedure
Lowest application product temperature testing (for certain models)	-$221.80	4 hours of engineer's time
Treatment of accessories	$110.90	2 hours of engineer's time
Low power mode test	$609.95	11 hours of engineer's time
	$831.75 (with optional refrigeration low power mode test)	15 hours of engineer's time

Based on the criteria outlined above, DOE certifies that the test procedure amendments would not have a "significant economic impact on a substantial number of

small entities." DOE has transmitted the certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the SBA for review under 5 U.S.C. 605(b).

C. Review Under the Paperwork Reduction Act of 1995

Manufacturers of beverage vending machines must certify to DOE that their products comply with any applicable energy conservation standards. In certifying compliance, manufacturers must test their products according to the DOE test procedure for beverage vending machines, including any amendments adopted for the test procedure. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including beverage vending machines. (76 FR 12422 (March 7, 2011). DOE recently revised its estimated certification and record keeping requirements to an average of 30 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. 80 FR 5099 (Jan. 30, 2015). 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 updated certification requirement has been approved by OMB under OMB control number 1910-1400. Id.

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

E. Review Under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (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 at 13735. DOE examined this final rule and determined that it will 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 final 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, this final rule meets the relevant standards of Executive Order 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. No. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a regulatory action resulting 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 at 12820; also available at http://energy.gov/gc/office-general-counsel. DOE examined this final 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 final rule will not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

DOE has determined, under Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 53 FR 8859 (March 18, 1988), that this regulation will 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). DOE has

reviewed this final 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 at 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OMB, a Statement of Energy Effects for any 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 significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use if the regulation is implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

This regulatory action 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.

This rule incorporates testing methods contained in ANSI/ASHRAE Standard 32.1-2010, "Methods of Testing for Rating Vending Machines for Sealed Beverages." DOE has evaluated this standard and is unable to conclude whether it fully complies with the requirements of section 32(b) of the Federal Energy Administration Act (i.e., whether they were developed in a manner that fully provides for public participation, comment, and review).

DOE has consulted with both the Attorney General and the Chairman of the FTC about the impact on competition of using the methods contained in this standard and has received no comments objecting to their use.

M. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of this rule before its effective date. The report will state that it has been determined that the rule is not a "major rule" as defined by 5 U.S.C. 804(2).

N. Description of Standards Incorporated by Reference

In this final rule, DOE is incorporating by reference a method of test published by ASHRAE and ANSI, titled "Methods of Testing for Rating Vending Machines for Sealed Beverages," ANSI/ASHRAE Standard 32.1-2010. ANSI/ASHRAE Standard 32.1-2010 is an industry-accepted standard used to specify methods of testing for rating the capacity and efficiency of self-contained, mechanically refrigerated vending machines for sealed beverages. The DOE test procedure codified by this final rule references ANSI/ASHRAE Standard 32.1-2010. Copies of ASHRAE standards may be purchased from the American Society of Heating, Refrigerating and Air-Conditioning Engineers; 1791 Tullie Circle, N.E. Atlanta, GA 30329, 404-636-8400, or www.ashrae.org.

V. Approval of the Office of the Secretary

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

List of Subjects

10 CFR Part 429

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

10 CFR Part 431

Administrative practice and procedure, Confidential business information, Energy conservation, Incorporation by reference, Reporting and recordkeeping requirements.

Issued in Washington, DC, on July 15, 2015.

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

For the reasons stated in the preamble, DOE amends parts 429 and 431 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.

2. Section 429.52 is amended by revising paragraph (b)(2) to read as follows:

§ 429.52 Refrigerated bottled or canned beverage vending machines.

* * * * *

(b) * * *

(2) Pursuant to §429.12(b)(13), a certification report must include the following additional public, equipment-specific information:

(i) When using appendix A of subpart Q of part 431of this title, the daily energy consumption in kilowatt hours per day (kWh/day), the refrigerated volume (V) in cubic feet (ft^3), whether testing was conducted with payment mechanism in place and operational, and, if applicable, the lowest application product temperature in degrees Fahrenheit (°F), if applicable.

(ii) When using appendix B of subpart Q of part 431of this title, the daily energy consumption in kilowatt hours per day (kWh/day), the refrigerated volume (V) in cubic feet (ft^3), whether testing was conducted with payment mechanism in place and operational, whether testing was conducted using an accessory low power mode, whether rating was based on the presence of a refrigeration low power mode, and, if applicable, the lowest application product temperature in degrees Fahrenheit (°F).

PART 431 – ENERGY EFFICIENCY PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT

3. The authority citation for part 431 continues to read as follows:

Authority: 42 U.S.C. 6291–6317.

4. Section 431.291 is revised to read as follows:

§ 431.291 Scope.

This subpart specifies test procedures and energy conservation standards for certain commercial refrigerated bottled or canned beverage vending machines, pursuant to part A of Title III of the Energy Policy and Conservation Act, as amended, 42 U.S.C. 6291–6309. The regulatory provisions of §§ 430.33 and 430.34 and subparts D and E of part 430 of this chapter are applicable to refrigerated bottled or canned beverage vending machines.

5. Section 431.292 is amended by revising the definition of "Refrigerated bottled or canned beverage vending machine" and "V" to read as follows:

§ 431.292 Definitions concerning refrigerated bottled or canned beverage vending machines.

* * * * *

Refrigerated bottled or canned beverage vending machine means a commercial refrigerator (as defined at §431.62) that cools bottled or canned beverages and dispenses the bottled or canned beverages on payment.

* * * * *

V means the refrigerated volume (ft^3) of the refrigerated bottled or canned beverage vending machine, as measured by Appendix C of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293).

6. Section 431.293 is amended by revising paragraph (b) to read as follows:

§ 431.293 Materials incorporated by reference.

* * * * *

(b) ASHRAE. American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1791 Tullie Circle, N.E. Atlanta, GA 30329, 404-636-8400, or www.ashrae.org

(1) ANSI/ASHRAE Standard 32.1-2010, ("ANSI/ASHRAE 32.1"), "Methods of Testing for Rating Vending Machines for Sealed Beverages," approved July 23, 2010, IBR approved for §431.292 and appendices A and B to subpart Q.

(2) [Reserved].

7. Section 431.294 is amended by revising paragraph (b) to read as follows:

§431.294 Uniform test method for the measurement of energy consumption of refrigerated bottled or canned beverage vending machines.

* * * * *

(b) Testing and Calculations. Determine the daily energy consumption of each covered refrigerated bottled or canned beverage vending machine by conducting the appropriate test procedure set forth in appendix A or B to this subpart.

§431.296 [Amended]

8. Section 431.296 is amended by removing the word "maximum" after "shall have a" in the introductory text.

9. Subpart Q of part 431 is amended by adding appendices A and B to read as follows:

APPENDIX A TO SUBPART Q OF PART 431 -- UNIFORM TEST METHOD FOR THE MEASUREMENT OF ENERGY CONSUMPTION OF REFRIGERATED BOTTLED OR CANNED BEVERAGE VENDING MACHINES.

Note: Prior to [**INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**], manufacturers must make any representations with respect to the energy use or efficiency of refrigerated bottled or

canned beverage vending machines in accordance with the results of testing pursuant to this Appendix A or the procedures in 10 CFR 431.294 as it appeared in the edition of 10 CFR parts 200 to 499 revised as of January 1, 2015. Any representations made with respect to the energy use or efficiency of such refrigerated beverage vending machines must be in accordance with whichever version is selected. On or after [**INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**], manufacturers must make any representations with respect to energy use or efficiency in accordance with the results of testing pursuant to this Appendix A to demonstrate compliance with the energy conservation standards at 10 CFR 431.296, for which compliance was required as of August 31, 2012.

1. General. Section 3, "Definitions"; section 4, "Instruments"; section 5, "Vendible Capacity"; section 6, "Test Conditions"; section 7.1, "Test Procedures – General Requirements"; and section 7.2, "Energy Consumption Test" of ANSI/ASHRAE 32.1 (incorporated by reference; see §431.293) apply to this appendix except as noted throughout this appendix. In cases where there is a conflict, the language of the test procedure in this appendix takes precedence over ANSI/ASHRAE 32.1.

1.1. Instruments. In addition to the instrument accuracy requirements in section 4, "Instruments," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293), humidity shall be measured with a calibrated instrument accurate to ±2 percent RH at the specified ambient relative humidity condition specified in section 2.1.2 of this appendix.

1.2. Definitions. In addition to the definitions specified in section 3, "Definitions," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293), the following definition is also applicable to this appendix.

External accessory standby mode means the mode of operation in which any external, integral customer display signs, lighting, or digital screens (1) are connected to mains power; (2) do not produce the intended illumination, display, or interaction functionality; and (3) can be switched into another mode automatically with only a remote user-generated or an internal signal.

Instantaneous average next-to-vend beverage temperature means the spatial average of all standard test packages in the next-to-vend beverages positions at a given time.

Integrated average temperature means the average temperature of all standard test package measurements in the next-to-vend beverage positions taken over the duration of the test, expressed in degrees Fahrenheit (°F).

Lowest application product temperature means the lowest integrated average temperature a given basic model is capable of maintaining so as to comply with the temperature stabilization requirements specified in section 7.2.2.2 of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293).

2. Test Procedure.

2.1. Test Conditions. The test conditions specified in section 6, "Test Conditions," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293) apply to this appendix except that in section 6.1, "Voltage and Frequency," of ANSI/ASHRAE 32.1, the voltage and frequency tolerances specified in section 6.1.a of ANSI/ASHRAE 32.1 also apply equivalently to section 6.1.b of ANSI/ASHRAE 32.1 for equipment with dual nameplate voltages.

2.1.1. Average Beverage Temperature. The integrated average temperature measured during the test must be within ±1 °F of the value specified in Table A.1 of this appendix or the lowest application product temperature for models tested in accordance with paragraph 2.1.3 of this appendix. The measurement of integrated average temperature must begin after temperature stabilization has been achieved and continue for the following 24 consecutive hours. All references to "Table 1" in ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293) shall instead be interpreted as references to Table A.1 of this appendix and all references to "average beverage temperature" in ANSI/ASHRAE 32.1 shall instead be interpreted as references to the integrated average temperature as defined in section 1.2 of this appendix of this subpart, except as noted in section 2.1.1.1 of this appendix.

2.1.1.1. Temperature Stabilization. Temperature stabilization shall be determined in accordance with section 7.2.2.2 of ANSI/ASHRAE 32.1 (incorporated by reference

§431.293), except that the reference to "average beverage temperature" shall instead refer to the "instantaneous average next-to-vend beverage temperature," as defined in section 1.2 of this appendix, and the reference to "Table 1" shall instead refer to Table A.1 of this appendix. That is, temperature stabilization is considered to be achieved 24 hours after the instantaneous average next-to-vend beverage temperature reaches the specified value (see Table A.1) and energy consumption for two successive 6 hour periods are within 2 percent of each other.

2.1.2. Ambient Test Conditions. The refrigerated bottled or canned beverage vending machine must be tested at the test conditions and tolerances specified in the following Table A.1 of this appendix. The specified ambient temperature and humidity conditions shall be maintained within the ranges specified for each recorded measurement. All references to "Table 1" in ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293) shall instead be interpreted as references to Table A.1 of this appendix. In contrast to the requirements of section 6.1 and Table 1 of ANSI/ASHRAE 32.1, conduct testing only one time at the conditions referenced in Table A.1 of this appendix. Testing at alternate ambient conditions is not required or permitted.

Table A.1. Ambient Temperature and Relative Humidity Specified Value and Tolerance

Test and Pretest Condition	**Value**	**Tolerance**	**Acceptable Range** (based on value and tolerance)
Instantaneous Average Next-to-Vend Temperature	36 °F	±1 °F	35-37 °F
Integrated Average Temperature	36 °F	±1 °F	N/A (value is averaged throughout test)
Ambient Temperature	75 °F	±2 °F	73–77 °F
Relative Humidity	45 percent RH	±5 percent RH	40–50 percent RH

2.1.3. Lowest Application Product Temperature. If a refrigerated bottled or canned beverage vending machine is not capable of maintaining an integrated average temperature of 36 °F (±1 °F) during the 24 hour test period, the unit must be tested at the lowest application product temperature, as defined in section 1.2 of this appendix. For refrigerated bottled or canned beverage vending machines equipped with a thermostat, the lowest application product temperature is the integrated average temperature achieved at the lowest thermostat setting.

2.2. Equipment Installation and Test Set Up. Except as provided in this appendix, the test procedure for energy consumption of refrigerated bottled or canned beverage vending machines shall be conducted in accordance with the methods specified in sections 7.1 through 7.2.2.3 under "Test Procedures" of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293).

2.2.1. Equipment Loading. Configure refrigerated bottled or canned beverage vending machines to hold the maximum number of standard products in the refrigerated compartment(s) and place standard test packages as specified in section 2.2.1.1 or 2.2.1.2 of this appendix.

2.2.1.1. Placement of Standard Test Packages for Equipment with Products Arranged Horizontally. For refrigerated bottled or canned beverage vending machines with products arranged horizontally (e.g., on shelves or in product spirals), place standard

test packages in the refrigerated compartment(s) in the following locations, as shown in Figure A.1:

(a) For odd-number shelves, when counting starting from the bottom shelf, standard test packages shall be placed at:

(1) The left-most next-to-vend product location,

(2) The right-most next-to-vend product location, and

(3) For equipment with greater than or equal to five next-to-vend product locations on each shelf, either: (A) the next-to-vend product location in the center of the shelf (i.e., equidistant from the left-most and right-most next-to-vend product locations) if there are an odd number of next-to-vend products on the shelf or (B) the next-to-vend product location immediately to the right and the left of the center position if there are an even number of next-to-vend products on the shelf.

(b) For even-numbered shelves, when counting from the bottom shelf, standard test packages shall be places at either:

(1) For equipment with less than or equal to six next-to-vend product locations on each shelf, the next-to-vend product location(s) (A) one location towards the center from the left-most next-to-vend product location and (B) one location towards to the center from the right-most next-to-vend product location, or

(2) For equipment with greater than six next-to-vend product locations on each shelf, the next-to-vend product locations (A) two locations towards the center from the left-most next-to-vend product location and (B) two locations towards to the center from the right-most next-to-vend product location.

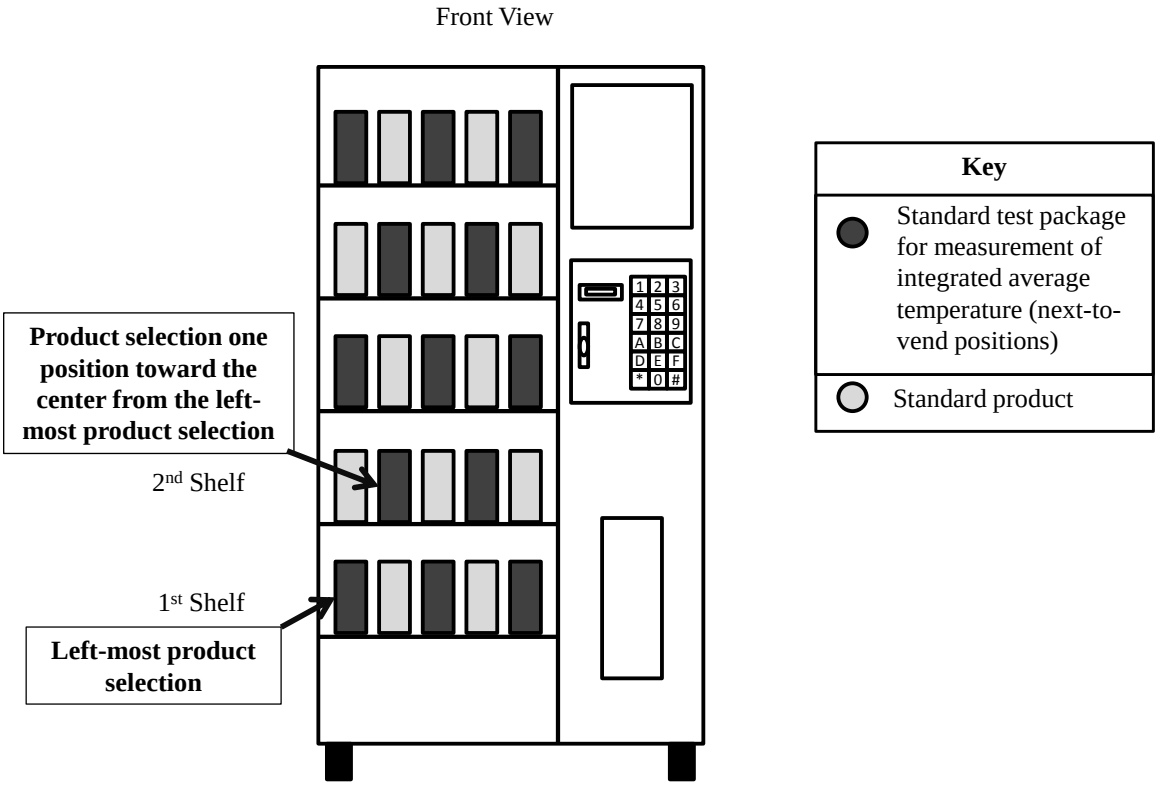

Figure A.1. Location of Standard Test Packages for Refrigerated Bottled or Canned Beverage Vending Machines with Products Arranged Horizontally and Five Next-to-Vend Product Locations on Each Shelf.

2.2.1.2. Placement of Standard Test Packages for Equipment with Products Arranged Vertically. For refrigerated bottled or canned beverage vending machines with products arranged vertically (e.g., in stacks), place standard test packages in the refrigerated compartment(s) in each next-to-vend product location.

2.2.1.3. Loading of Combination Vending Machines. For combination vending machines, the non-refrigerated compartment(s)must not be loaded with any standard products, test packages, or other vendible merchandise.

2.2.1.4. Standard Products. The standard product shall be standard 12-ounce aluminum beverage cans filled with a liquid with a density of 1.0 grams per milliliter (g/mL) ± 0.1 g/mL at 36 °F. For product storage racks that are not capable of vending 12-ounce cans, but are capable of vending 20-ounce bottles, the standard product shall be 20-ounce plastic bottles filled with a liquid with a density of 1.0 g/mL ± 0.1 g/mL at 36 °F. For product storage racks that are not capable of vending 12-ounce cans or 20-ounce bottles, the standard product shall be the packaging and contents specified by the manufacturer in product literature as the standard product (i.e., the specific merchandise the refrigerated bottled or canned beverage vending machine is designed to vend).

2.2.1.5. Standard Test Packages. A standard test package is a standard product, as specified in 2.2.1.4 of this appendix, altered to include a temperature-measuring instrument at its center of mass.

2.2.2. Sensor Placement. The integrated average temperature of next-to-vend beverages shall be measured in standard test packages in the next-to-vend product locations specified in section 2.2.1.1 of this appendix. Do not run the thermocouple wire and other measurement apparatus through the dispensing door; the thermocouple wire and other measurement apparatus must be configured and sealed so as to minimize air flow between the interior refrigerated volume and the ambient room air. If a manufacturer chooses to employ a method other than routing thermocouple and sensor wires through the door gasket and ensuring the gasket is compressed around the wire to ensure a good

seal, then it must maintain a record of the method used in the data underlying that basic model's certification pursuant to 10 CFR 429.71.

2.2.3. Accessories. All standard components that would be used during normal operation of the model in the field and are necessary to provide sufficient functionality for cooling and vending products in field installations (i.e., product inventory, temperature management, product merchandising (including, e.g., lighting or signage), product selection, and product transport and delivery) shall be in place during testing and shall be set to the maximum energy-consuming setting if manually adjustable, except that the specific components and accessories listed in the subsequent sections shall be operated as stated. Components not necessary for the inventory, temperature management, product merchandising (e.g., lighting or signage), product selection, and or product transport and delivery shall be de-energized. If systems not required for the primary functionality of the machine as stated in this section cannot be de-energized without preventing the operation of the machine, then they shall be placed in the lowest energy consuming state.

Instead of testing pursuant to section 7.2.2.4 of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293), provide, if necessary, any physical stimuli or other input to the machine needed to prevent automatic activation of energy management systems that can be adjusted by the machine operator during the test period. Automatic energy management systems that cannot be adjusted by the machine operator may be enabled, as specified by section 7.2.1 of ANSI/ASHRAE 32.1.

2.2.3.1. Payment Mechanisms. Refrigerated bottled or canned beverage vending machines shall be tested with no payment mechanism in place, the payment mechanism in place but de-energized,, or the payment mechanism in place but set to the lowest energy consuming state, if it cannot be de-energized. A default payment mechanism energy consumption value of 0.20 kWh/day shall be added to the primary rated energy consumption per day, as required in section 2.3 of this appendix.

2.2.3.2. Internal Lighting. All lighting that is contained within or is part of the internal physical boundary of the refrigerated bottled or canned beverage vending machine, as established by the top, bottom, and side panels of the equipment, shall be placed in its maximum energy consuming state.

2.2.3.3. External Customer Display Signs, Lights, and Digital Screens. All external customer display signs, lights, and digital screens that are independent from the refrigeration or vending performance of the refrigerated bottled or canned beverage vending machine must be disconnected, disabled, or otherwise de-energized for the duration of testing. Customer display signs, lighting, and digital screens that are integrated into the beverage vending machine cabinet or controls such that they cannot be de-energized without disabling the refrigeration or vending functions of the refrigerated bottled or canned beverage vending machine or modifying the circuitry must be placed in external accessory standby mode, if available, or their lowest energy-consuming state. Digital displays that also serve a vending or money processing function must be placed in

the lowest energy-consuming state that still allows the money processing feature to function.

2.2.3.4. Anti-sweat and Other Electric Resistance Heaters. Anti-sweat and other electric resistance heaters must be operational during the entirety of the test procedure. Units with a user-selectable setting must have the heaters energized and set to the most energy-consumptive position. Units featuring an automatic, non-user-adjustable controller that turns on or off based on environmental conditions must be operating in the automatic state. Units that are not shipped with a controller from the point of manufacture, but are intended to be used with a controller, must be equipped with an appropriate controller when tested.

2.2.3.5. Condensate Pan Heaters and Pumps. All electric resistance condensate heaters and condensate pumps must be installed and operational during the test. Prior to the start of the test, including the 24 hour period used to determine temperature stabilization, as described in ANSI/ASHRAE 32.1 section 7.2.2.2 (incorporated by reference, see §431.293), the condensate pan must be dry. For the duration of the test, including the 24 hour time period necessary for temperature stabilization, allow any condensate moisture generated to accumulate in the pan. Do not manually add or remove water from the condensate pan at any time during the test.

2.2.3.6. Illuminated Temperature Displays. All illuminated temperature displays must be energized and operated during the test the same way they would be energized

and operated during normal field operation, as recommended in manufacturer product literature, including manuals.

2.2.3.7. Condenser Filters. Remove any nonpermanent filters provided to prevent particulates from blocking a model's condenser coil.

2.2.3.8. Security Covers. Remove any devices used to secure the model from theft or tampering.

2.2.3.9. General Purpose Outlets. During the test, do not connect any external load to any general purpose outlets available on a unit.

2.2.3.10. Crankcase Heaters and Other Electric Resistance Heaters for Cold Weather. Crankcase heaters and other electric resistance heaters for cold weather must be operational during the test. If a control system, such as a thermostat or electronic controller, is used to modulate the operation of the heater, it must be activated during the test and operated in accordance with the manufacturer's instructions.

2.2.4. Sampling and Recording of Data. Record the data listed in section 7.2.2.3 of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293)at least every 1 minute. For the purpose of this subsection, "average beverage temperature," listed in section 7.2.2.3 of ANSI/ASHRAE 32.1, means "instantaneous average next-to-vend beverage temperature."

2.3. Determination of Daily Energy Consumption. Determine the daily energy consumption of each tested refrigerated bottled or canned beverage vending machine as the sum of:

(a) The default payment mechanism energy consumption value from section 2.2.3.1 of this appendix and

(b) The primary rated energy consumption per day (E_D), in kWh, and determined in accordance with the calculation procedure in section 7.2.3.1, "Calculation of Daily Energy Consumption," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293).

2.3.1. Calculations and Rounding. In all cases, the primary rated energy consumption per day (E_D) must be calculated with raw measured values and rounded to units of 0.01 kWh/day.

3. Determination of Refrigerated Volume, Vendible Capacity, and Surface Area.

3.1. Refrigerated Volume. Determine the "refrigerated volume" of refrigerated bottled or canned beverage vending machines in accordance with appendix C, "Measurement of Volume," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293). For combination vending machines, the "refrigerated volume" does not include any non-refrigerated compartments.

3.2. Vendible Capacity. Determine the "vendible capacity" of refrigerated bottled or canned beverage vending machines in accordance with the first paragraph of section 5, "Vending Machine Capacity," of ANSI/ASHRAE 32.1, (incorporated by reference, see §431.293). For combination vending machines, the "vendible capacity" includes only the capacity of any portion of the refrigerated bottled or canned beverage vending machine that is refrigerated and does not include the capacity of the non-refrigerated compartment(s).

APPENDIX B TO SUBPART Q OF PART 431 –UNIFORM TEST METHOD FOR THE MEASUREMENT OF ENERGY CONSUMPTION OF REFRIGERATED BOTTLED OR CANNED BEVERAGE VENDING MACHINES.

Note: After [**INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**], manufacturers must make any representations with respect to energy use or efficiency in accordance with the results of testing pursuant to appendix A of this subpart to demonstrate compliance with the energy conservation standards at 10 CFR 431.296, for which compliance was required as of August 31, 2012.

Alternatively, manufacturers may make representations based on testing in accordance with this appendix prior to the compliance date of any amended energy conservation standards, provided that such representations demonstrate compliance with such amended energy conservation standards. Any representations made on or after the compliance date of any amended energy conservation standards, must be made in accordance with the results of testing pursuant to this appendix. Any representations

made with respect to the energy use or efficiency of such refrigerated beverage vending machines must be in accordance with whichever version is selected.

1. General. Section 3, "Definitions"; section 4, "Instruments"; section 5, "Vendible Capacity"; section 6, "Test Conditions"; section 7.1, "Test Procedures – General Requirements"; and section 7.2, "Energy Consumption Test" of ANSI/ASHRAE 32.1 (incorporated by reference; see §431.293) apply to this appendix except as noted throughout this appendix. In cases where there is a conflict, the language of the test procedure in this appendix takes precedence over ANSI/ASHRAE 32.1.

1.1. Instruments. In addition to the instrument accuracy requirements in section 3, "Instruments," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293), humidity shall be measured with a calibrated instrument accurate to ±2 percent RH at the specified ambient relative humidity condition specified in section 2.1.3 of this appendix.

1.2. Definitions. In addition to the definitions specified in section 3, "Definitions," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293) the following definitions are also applicable to this appendix.

Accessory low power mode means a state in which a beverage vending machine's lighting and/or other energy-using systems are in low power mode, but that is not a refrigeration low power mode. Functions that may constitute an accessory low power mode may include, for example, dimming or turning off lights, but does not include

adjustment of the refrigeration system to elevate the temperature of the refrigerated compartment(s).

External accessory standby mode means the mode of operation in which any external, integral customer display signs, lighting, or digital screens are connected to mains power; do not produce the intended illumination, display, or interaction functionality; and can be switched into another mode automatically with only a remote user-generated or an internal signal.

Instantaneous average next-to-vend beverage temperature means the spatial average of all standard test packages in the next-to-vend beverages positions at a given time.

Integrated average temperature means the average temperature of all standard test package measurements in the next-to-vend beverage positions taken over the duration of the test, expressed in degrees Fahrenheit (°F).

Low power mode means a state in which a beverage vending machine's lighting, refrigeration, and/or other energy-using systems are automatically adjusted (without user intervention) such that they consume less energy than they consume in an active vending environment.

Lowest application product temperature means the lowest integrated average temperature a given basic model is capable of maintaining so as to comply with the temperature stabilization requirements specified in section 7.2.2.2 of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293).

Refrigeration low power mode means a state in which a beverage vending machine's refrigeration system is in low power mode because of elevation of the temperature of the refrigerated compartment(s). To qualify as low power mode, the unit must satisfy the requirements described in section 2.3.2.1 of this appendix.

2. Test Procedure.

2.1. Test Conditions. The test conditions specified in section 6, "Test Conditions" of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293) apply to this appendix except that in section 6.1, "Voltage and Frequency," of ANSI/ASHRAE 32.1, the voltage and frequency tolerances specified in section 6.1.a of ANSI/ASHRAE 32.1 also apply equivalently to section 6.1.b of ANSI/ASHRAE 32.1 for equipment with dual nameplate voltages.

2.1.1. Average Beverage Temperature. The integrated average temperature measured during the test must be within ±1 °F of the value specified in Table B.1 of this appendix or the lowest application product temperature for models tested in accordance with paragraph 2.1.3 of this appendix. The measurement of integrated average

temperature must begin after temperature stabilization has been achieve and continue for the following 24 consecutive hours. All references to "Table 1" in ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293) shall instead be interpreted as references to Table B.1 of this appendix and all references to "average beverage temperature" in ANSI/ASHRAE 32.1 shall instead be interpreted as references to the integrated average temperature as defined in section 1.2 of this appendix, except as noted in section 2.1.1.1 of this appendix.

2.1.1.1. Temperature Stabilization. Temperature stabilization shall be determined in accordance with section 7.2.2.2 of ANSI/ASHRAE 32.1 (incorporated by reference §431.293), except that the reference to "average beverage temperature" shall instead refer to the "instantaneous average next-to-vend beverage temperature," as defined in section 1.2 of this appendix, and the reference to "Table 1" shall instead refer to Table A.1 of this appendix. That is, temperature stabilization is considered to be achieved 24 hours after the instantaneous average next-to-vend beverage temperature reaches the specified value (see Table A.1) and energy consumption for two successive 6 hour periods are within 2 percent of each other.

2.1.2. Ambient Test Conditions. The refrigerated bottled or canned beverage vending machine must be tested at the test conditions and tolerances specified in the following Table B.1 of this appendix. The specified ambient temperature and humidity conditions shall be maintained within the ranges specified for each recorded measurement. All references to "Table 1" in ANSI/ASHRAE 32.1 (incorporated by

reference, see §431.293) shall instead be interpreted as references to Table B.1 of this appendix. In contrast to the requirements of section 6.1 and Table 1 of ANSI/ASHRAE 32.1, conduct testing only one time at the conditions referenced in Table B.1 of this appendix. Testing at alternate ambient conditions is not required or permitted.

Table B.1. Ambient Temperature and Relative Humidity Specified Value and Tolerance

Test and Pretest Condition	Value	Tolerance	Acceptable Range (based on value and tolerance)
Instantaneous Average Next-to-Vend Temperature	36 °F	±1 °F	35–37 °F
Integrated Average Temperature	36 °F	±1 °F	N/A (value is averaged throughout test)
Ambient Temperature	75 °F	±2 °F	73–77 °F
Relative Humidity	45 percent RH	±5 percent RH	40–50 percent RH

2.1.3. Lowest Application Product Temperature. If a refrigerated bottled or canned beverage vending machine is not capable of maintaining an integrated average temperature of 36 °F (±1 °F) during the 24 hour test period, the unit must be tested at the lowest application product temperature, as defined in section 1.2 of this appendix. For refrigerated bottled or canned beverage vending machines equipped with a thermostat, the lowest application product temperature is the integrated average temperature achieved at the lowest thermostat setting.

2.2. Equipment Installation and Test Set Up. Except as provided in this section 2.2 of appendix, the test procedure for energy consumption of refrigerated bottled or canned beverage vending machines shall be conducted in accordance with the methods specified in sections 7.1 through 7.2.2.3 under "Test Procedures" of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293).

2.2.1. Equipment Loading. Configure refrigerated bottled or canned beverage vending machines to hold the maximum number of standard products, and place standard test packages in the refrigerated compartment(s) as specified in section 2.2.1.1 or 2.2.1.2 of this appendix.

2.2.1.1. Placement of Standard Test Packages for Equipment with Products Arranged Horizontally. For refrigerated bottled or canned beverage vending machines with products arranged horizontally (e.g., on shelves or in product spirals), place standard test packages in the refrigerated compartment(s) in the following locations, as shown in Figure B.1:

(a) For odd-number shelves, when counting starting from the bottom shelf, standard test packages shall be placed at:

(1) The left-most next-to-vend product location;

(2) The right-most next-to-vend product location; and

(3) For equipment with greater than or equal to five product locations on each shelf, either:

(i) The next-to-vend product location in the center of the shelf (i.e., equidistant from the left-most and right-most next-to-vend product locations) if there are an odd number of next-to-vend products on the shelf or,

(ii) The next-to-vend product location immediately to the right and the left of the center position if there are an even number of next-to-vend products on the shelf.

(b) For even-numbered shelves, when counting from the bottom shelf, standard test packages shall be places at either:

(1) For equipment with less than or equal to six next-to-vend product locations on each shelf, the next-to-vend product location(s);

(i) One position towards the center from the left-most next-to-vend product location; and

(ii) One location towards to the center from the right-most next-to-vend product location; or

(2) For equipment with greater than six next-to-vend product locations on each shelf, the next-to-vend product locations:

(i) Two selections towards the center from the left-most next-to-vend product location; and

(ii) Two locations towards to the center from the right-most next-to-vend product location.

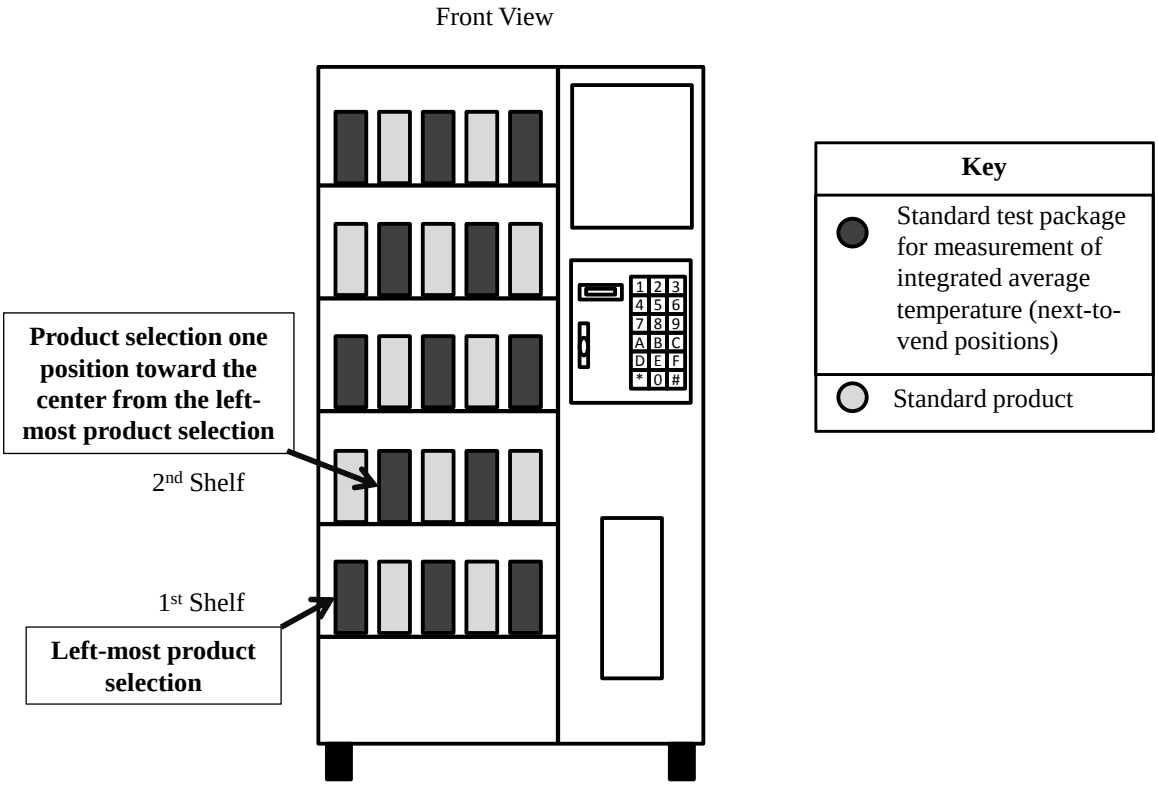

Figure B.1. Location of Standard Test Packages for Refrigerated Bottled or Canned Beverage Vending Machines with Products Arranged Horizontally and Five Next-to-Vend Product Locations on Each Shelf.

2.2.1.2. Placement of Standard Test Packages for Equipment with Products Arranged Vertically. For refrigerated bottled or canned beverage vending machines with products arranged vertically (e.g., in stacks), place standard test packages in the refrigerated compartment(s) in each next-to-vend product location.

2.2.1.3. Loading of Combination Vending Machines. For combination vending machines, the non-refrigerated compartment(s) must not be loaded with any standard products, test packages, or other vendible merchandise.

2.2.1.4. Standard Products. The standard product shall be standard 12-ounce aluminum beverage cans filled with a liquid with a density of 1.0 grams per milliliter (g/mL) ± 0.1 g/mL at 36 °F. For product storage racks that are not capable of vending 12-ounce cans, but are capable of vending 20-ounce bottles, the standard product shall be 20-ounce plastic bottles filled with a liquid with a density of 1.0 g/mL ± 0.1 g/mL at 36 °F. For product storage racks that are not capable of vending 12-ounce cans or 20-ounce bottles, the standard product shall be the packaging and contents specified by the manufacturer in product literature as the standard product (i.e., the specific merchandise the refrigerated bottled or canned beverage vending machine is designed to vend).

2.2.1.5. Standard Test Packages. A standard test package is a standard product, as specified in 2.2.1.4 of this appendix, altered to include a temperature-measuring instrument at its center of mass.

2.2.2. Sensor Placement. The integrated average temperature of next-to-vend beverages shall be measured in standard test packages in the next-to-vend product locations specified in section 2.2.1.1 of this appendix. Do not run the thermocouple wire and other measurement apparatus through the dispensing door; the thermocouple wire and other measurement apparatus must be configured and sealed so as to minimize air flow between the interior refrigerated volume and the ambient room air. If a manufacturer chooses to employ a method other than routing thermocouple and sensor wires through

the door gasket and ensuring the gasket is compressed around the wire to ensure a good seal, then it must maintain a record of the method used in the data underlying that basic model's certification pursuant to 10 CFR 429.71.

2.2.3. Vending Mode Test Period. The vending mode test period begins after temperature stabilization has been achieved, as described in ANSI/ASHRAE 32.1 section 7.2.2.2 (incorporated by reference, see §431.293) and continues for 18 hours for equipment with an accessory low power mode or for 24 hours for equipment without an accessory low power mode. For the vending mode test period, equipment that has energy-saving features that cannot be disabled shall have those features set to the most energy-consuming settings, except for as specified in section 2.2.4 of this appendix. In addition, all energy management systems shall be disabled. Instead of testing pursuant to sections 7.1.1(d) and 7.2.2.4 of ANSI/ASHRAE 32.1, provide, if necessary, any physical stimuli or other input to the machine needed to prevent automatic activation of low power modes during the vending mode test period.

2.2.4. Accessory Low Power Mode Test Period. For equipment with an accessory low power mode, the accessory low power mode may be engaged for 6 hours, beginning 18 hours after the temperature stabilization requirements established in section 7.2.2.2 of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293) have been achieved, and continuing until the end of the 24-hour test period. During the accessory low power mode test, operate the refrigerated bottled or canned beverage vending machine with the lowest energy-consuming lighting and control settings that constitute an accessory low power

mode. The specification and tolerances for integrated average temperature in Table B.1 of this appendix still apply, and any refrigeration low power mode must not be engaged. Instead of testing pursuant to sections 7.1.1(d) and 7.2.2.4 of ANSI/ASHRAE 32.1, provide, if necessary, any physical stimuli or other input to the machine needed to prevent automatic activation of refrigeration low power modes during the accessory low power mode test period.

2.2.5. Accessories. Unless specified otherwise in this appendix, all standard components that would be used during normal operation of the basic model in the field and are necessary to provide sufficient functionality for cooling and vending products in field installations (i.e., product inventory, temperature management, product merchandising(including, e.g., lighting or signage), product selection, and product transport and delivery) shall be in place during testing and shall be set to the maximum energy-consuming setting if manually adjustable. Components not necessary for the inventory, temperature management, product merchandising (e.g., lighting or signage), product selection, or product transport and delivery shall be de-energized. If systems not required for the primary functionality of the machine as stated in this section cannot be de-energized without preventing the operation of the machine, then they shall be placed in the lowest energy consuming state Components with controls that are permanently operational and cannot be adjusted by the machine operator shall be operated in their normal setting and consistent with the requirements of 2.2.3 and 2.2.4 of this appendix. The specific components and accessories listed in the subsequent sections shall be

operated as stated during the test, except when controlled as part of a low power mode during the low power mode test period.

2.2.5.1 Payment Mechanisms. Refrigerated bottled or canned beverage vending machines shall be tested with no payment mechanism in place, the payment mechanism in-place but de-energized, or the payment mechanism in place but set to the lowest energy consuming state, if it cannot be de-energized. A default payment mechanism energy consumption value of 0.20 kWh/day shall be added to the primary rated energy consumption per day, as noted in section 2.3 of this appendix.

2.2.5.2. Internal Lighting. All lighting that is contained within or is part of the internal physical boundary of the refrigerated bottled or canned beverage vending machine, as established by the top, bottom, and side panels of the equipment, shall be placed in its maximum energy consuming state.

2.2.5.3. External Customer Display Signs, Lights, and Digital Screens. All external customer display signs, lights, and digital screens that are independent from the refrigeration or vending performance of the refrigerated bottled or canned beverage vending machine must be disconnected, disabled, or otherwise de-energized for the duration of testing. Customer display signs, lighting, and digital screens that are integrated into the beverage vending machine cabinet or controls such that they cannot be de-energized without disabling the refrigeration or vending functions of the refrigerated bottled or canned beverage vending machine or modifying the circuitry must be placed in

external accessory standby mode, if available, or their lowest energy-consuming state. Digital displays that also serve a vending or money processing function must be placed in the lowest energy-consuming state that still allows the money processing feature to function.

2.2.5.4. Anti-sweat or Other Electric Resistance Heaters. Anti-sweat or other electric resistance heaters must be operational during the entirety of the test procedure. Units with a user-selectable setting must have the heaters energized and set to the most energy-consumptive position. Units featuring an automatic, non-user-adjustable controller that turns on or off based on environmental conditions must be operating in the automatic state. Units that are not shipped with a controller from the point of manufacture, but are intended to be used with a controller, must be equipped with an appropriate controller when tested.

2.2.5.5. Condensate Pan Heaters and Pumps. All electric resistance condensate heaters and condensate pumps must be installed and operational during the test. Prior to the start of the test, including the 24 hour period used to determine temperature stabilization prior to the start of the test period, as described in ANSI/ASHRAE 32.1 section 7.2.2.2 (incorporated by reference, see §431.293), the condensate pan must be dry. For the duration of the test, including the 24 hour time period necessary for temperature stabilization, allow any condensate moisture generated to accumulate in the pan. Do not manually add or remove water from the condensate pan at any time during the test. Any automatic controls that initiate the operation of the condensate pan heater or

pump based on water level or ambient conditions must be enabled and operated in the automatic setting.

2.2.5.6. Illuminated Temperature Displays. All illuminated temperature displays must be energized and operated during the test the same way they would be energized and operated during normal field operation, as recommended in manufacturer product literature, including manuals.

2.2.5.7. Condenser Filters. Remove any nonpermanent filters provided to prevent particulates from blocking a model's condenser coil.

2.2.5.8. Security Covers. Remove any devices used to secure the model from theft or tampering.

2.2.5.9. General Purpose Outlets. During the test, do not connect any external load to any general purpose outlets available on a unit.

2.2.5.10. Crankcase Heaters and Other Electric Resistance Heaters for Cold Weather. Crankcase heaters and other electric resistance heaters for cold weather must be operational during the test. If a control system, such as a thermostat or electronic controller, is used to modulate the operation of the heater, it must be activated during the test and operated in accordance with the manufacturer's instructions.

2.2.6. Sampling and Recording of Data. Record the data listed in section 7.2.2.3 of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293), at least every 1 minute. For the purpose of this section, "average beverage temperature," listed in section 7.2.2.3 of ANSI/ASHRAE 32.1, means "instantaneous average next-to-vend beverage temperature."

2.3. Determination of Daily Energy Consumption. In section 7.2.3.1 of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293), the primary rated energy consumption per day (E_D) shall be the energy measured during the vending mode test period and accessory low power mode test period, as specified in sections 2.2.3 and 2.2.4 of this appendix, as applicable.

2.3.1 Energy Consumption of Payment Mechanisms. Calculate the sum of:

(a) The default payment mechanism energy consumption value from section 2.2.5.1 and

(b) The primary rated energy consumption per day (E_D), in kWh, and determined in accordance with the calculation procedure in section 7.2.3.1, "Calculation of Daily Energy Consumption," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293).

2.3.2. Refrigeration Low Power Mode. For refrigerated bottled or canned beverage vending machines with a refrigeration low power mode, multiply the value determined in section 2.3.1 of this appendix by 0.97 to determine the daily energy

consumption of the unit tested. For refrigerated bottled or canned beverage vending machines without a refrigeration low power mode, the value determined in section 2.3.1 is the daily energy consumption of the unit tested.

2.3.2.1. Refrigeration Low Power Mode Validation Test Method. This test method is not required for the certification of refrigerated bottled or canned beverage vending machines. To verify the existence of a refrigeration low power mode, initiate the refrigeration low power mode in accordance with manufacturer instructions contained in product literature and manuals, after completion of the 6-hour low power mode test period. Continue recording all the data specified in section 2.2.6 of this appendix until existence of a refrigeration low power mode has been confirmed or denied. The refrigerated bottled or canned beverage vending machine shall be deemed to have a refrigeration low power mode if either:

(a) The following three requirements have been satisfied:

(1) The instantaneous average next-to-vend beverage temperature must reach at least 4 °F above the integrated average temperature or lowest application product temperature, as applicable, within 6 hours.

(2) The instantaneous average next-to-vend beverage temperature must be maintained at least 4 °F above the integrated average temperature or lowest application product temperature, as applicable, for at least 1 hour.

(3) After the instantaneous average next-to-vend beverage temperature is maintained at or above 4 °F above the integrated average temperature or lowest

application product temperature, as applicable, for at least 1 hour, the refrigerated beverage vending machine must return to the specified integrated average temperature or lowest application product temperature, as applicable, automatically without direct physical intervention.

(b) Or, the compressor does not cycle on for the entire 6 hour period, in which case the instantaneous average beverage temperature does not have to reach 4 °F above the integrated average temperature or lowest application product temperature, as applicable, but, the equipment must still automatically return to the integrated average temperature or lowest application product temperature, as applicable, after the 6 hour period without direct physical intervention.

2.3.3. Calculations and Rounding. In all cases, the primary rated energy consumption per day (E_D) must be calculated with raw measured values and the final result rounded to units of 0.01 kWh/day.

3. Determination of Refrigeration Volume, Vendible Capacity, and Surface Area.

3.1. Refrigerated Volume. Determine the "refrigerated volume" of refrigerated bottled or canned beverage vending machines in accordance with Appendix C, "Measurement of Volume," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293). For combination vending machines, the "refrigerated volume" does not include any non-refrigerated compartment(s).

3.2. Vendible Capacity. Determine the "vendible capacity" of refrigerated bottled or canned beverage vending machines in accordance with the first paragraph of section 5, "Vending Machine Capacity," of ANSI/ASHRAE 32.1 (incorporated by reference, see §431.293). For combination vending machines, the "vendible capacity" includes only the capacity of any portion of the refrigerated bottled or canned beverage vending machine that is refrigerated and does not include the capacity of the non-refrigerated compartment(s).

3.3. Determination of Surface Area. Note: This section is not required for the certification of refrigerated bottled or canned beverage vending machines. Determine the surface area of each beverage vending machine as the length multiplied by the height of outermost surface of the beverage vending machine cabinet, measured from edge to edge excluding any legs or other protrusions that extend beyond the dimensions of the primary cabinet. Determine the transparent and non-transparent areas on each side of a beverage vending machine as the total surface area of material that is transparent or is not transparent, respectively.