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[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 431

[Docket No. EERE-2013-BT-TP-0025]

RIN: 1904-AC99

Energy Conservation Program: Test Procedure for Commercial Refrigeration Equipment

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

ACTION: Final rule.

SUMMARY: In this final rule, the U.S. Department of Energy (DOE) revises and reorganizes its test procedure for commercial refrigeration equipment (CRE) to clarify certain terms, procedures, and compliance dates to improve the repeatability and remove ambiguity from the CRE test procedure. In this final rule, DOE also addresses a number of test procedure clarifications that arose as a result of the negotiated rulemaking process for certification of commercial heating, ventilation, air conditioning, refrigeration, and water heating equipment.

DATES: The effective date of this rule is **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

The incorporation by reference of certain publications listed in this final rule is approved by the Director of the Office of the Federal Register as of **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION 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](http://www.regulations.gov). All documents in the docket are listed in the [regulations.gov](http://www.regulations.gov) index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

A link to the docket webpage can be found at:

http://www1.eere.energy.gov/buildings/appliance_standards/rulemaking.aspx?ruleid=80. This webpage will contain a link to the docket for this rulemaking on the [regulations.gov](http://www.regulations.gov) site. The [regulations.gov](http://www.regulations.gov) webpage 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 following industry standards:

- (1) ANSI/ASHRAE 72-2005, (“ASHRAE 72-2005”), “Method of Testing Commercial Refrigerators and Freezers,” Copyright 2005.
- (2) ASTM E 1084-86 (Reapproved 2009), “Standard Test Method for Solar Transmittance (Terrestrial) of Sheet Materials Using Sunlight,” approved April 1, 2009.

Copies of ASHRAE standards may be purchased from the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 1715 Tullie Circle, NE., Atlanta, GA 30329, or at www.ashrae.org/.

Copies of ASTM standards may be purchased from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428, (877) 909-2786, or at www.astm.org/.

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I. Authority and Background

A. Authority

Title III, Part C of the Energy Policy and Conservation Act of 1975 (EPCA), Pub. L. 94-163 (42 U.S.C. 6311-6317, as codified), added by Pub. L. 95-619, Title IV, Sec. 441(a), established the Energy Conservation Program for Certain Industrial Equipment, a program covering certain industrial equipment, which includes the commercial refrigeration equipment that is the focus of this final rule.¹ All references to EPCA refer to the statute as amended through the American Energy Manufacturing Technical Corrections Act (AEMTCA), Pub. L. 112-210 (Dec. 18, 2012).

¹For editorial reasons, upon codification in the U.S. Code, Part C was re-designated Part A-1.

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 testing requirements consist of test procedures that manufacturers of covered equipment must use as the basis for (1) certifying to DOE that their equipment complies with the applicable energy conservation standards adopted under EPCA, (42 U.S.C. 6316(e)(1)), and (2) making representations about the efficiency of that equipment. (42 U.S.C. 6314(d)) Similarly, DOE must use these test procedures to determine whether the equipment complies with relevant standards promulgated under EPCA. (42 U.S.C. 6316(e)(1))

General Test Procedure Rulemaking Process

Under 42 U.S.C. 6314, EPCA sets forth the criteria and procedures DOE must follow when prescribing or amending test procedures for covered equipment. EPCA provides, in relevant part, that any test procedures prescribed or amended under this section shall be reasonably designed to produce test results that reflect energy efficiency, energy use and estimated annual operating costs 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. 6314(a)(2))

In addition, if DOE determines that a test procedure amendment is warranted, it must publish proposed test procedures and offer the public an opportunity to present oral and written comments on them. (42 U.S.C. 6314(c)(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 or equipment² as determined under the existing test procedure. If DOE determines that the amended test procedure would alter the measured efficiency of a covered product, DOE must amend the applicable energy conservation standard accordingly. (42 U.S.C. 6314(a)(6)(D))

Under 42 U.S.C. 6314(c)(1), no later than 3 years after the date of prescribing a test procedure pursuant to 42 U.S.C. 6314, and from time to time thereafter, DOE is required to conduct a reevaluation and determine whether to amend the test procedure. If DOE determines a test procedure should be amended, it shall promptly publish in the Federal Register proposed test procedures, incorporating such amendments and affording interested persons an opportunity to present oral and written data, views, and arguments. (42 U.S.C. 6314(c)(2))

In February 2012, DOE published a final rule (2012 test procedure final rule) prescribing new amendments to the test procedure for commercial refrigeration equipment. 77 FR 10291, 10318–21 (Feb. 21, 2012). Pursuant to EPCA’s requirement in 42 U.S.C. 6314(c), DOE has reevaluated the CRE test procedure and concluded that it should be amended to clarify a number of provisions regarding how aspects of the test are conducted, to more explicitly define some terms, and to more clearly specify the compliance dates for various provisions. DOE’s adopted amendments to the test procedure are presented in this final rule.

B. Background

² The term “covered product” broadly refers to all types of appliances and equipment regulated by DOE regardless of whether they are consumer products or commercial and industrial equipment.

EPCA mandates that the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 117-2002, “Method of Testing Closed Refrigerators,” shall be the initial test procedure for the types of equipment to which standards are applicable under 42 U.S.C. 6313(c)(2)–(3). (42 U.S.C. 6314(a)(6)(A)(ii)) EPCA requires DOE to address whether to amend its test procedures if ASHRAE amends this standard. (42 U.S.C. 6314(a)(6)(E)–(F)) In 2005, ASHRAE combined Standard 72-1998, “Method of Testing Open Refrigerators,” and Standard 117-2002 and published the test method as ASHRAE Standard 72-2005 (ASHRAE 72-2005), “Method of Testing Commercial Refrigerators and Freezers,” which was approved by the American National Standards Institute (ANSI) on July 29, 2005. Consistent with EPCA’s requirement in 42 U.S.C. 6314(a)(6)(E), DOE reviewed ASHRAE 72-2005, as well as American Refrigeration Institute (ARI) Standard 1200-2006 (ARI 1200-2006), which was approved by ANSI on August 28, 2006. DOE determined that ARI 1200-2006 included by reference the test procedures in ASHRAE 72-2005 and the rating temperatures prescribed in EPCA. (42 U.S.C. 6314(a)(6)(B)) As a result, DOE published a final rule in December 2006 (2006 test procedure final rule) that adopted ARI 1200-2006 as the DOE test procedure for commercial refrigeration equipment. 71 FR 71340, 71357 (Dec. 8, 2006). The 2006 test procedure final rule specified rating temperatures of 38 °F (± 2 °F) for commercial refrigerators and refrigerator compartments, 0 °F (± 2 °F) for commercial freezers and freezer compartments, and -15 °F (± 2 °F) for commercial ice-cream freezers. 71 FR at 71370 (Dec. 8, 2006). DOE also adopted Association of Home Appliance Manufacturers (AHAM) Standard HRF-1-2004, “Energy, Performance and Capacity of Household Refrigerators, Refrigerator-Freezers and Freezers,” for measuring compartment volumes for equipment covered under the 2006 test procedure final rule. 71 FR at 71358 (Dec. 8, 2006). The test procedure established in

the 2006 final rule became effective on January 8, 2007 (71 FR at 71340), and its use has been required to demonstrate compliance with the current energy conservation standards.

More recently, on February 21, 2012, DOE published the aforementioned 2012 test procedure final rule, in which it adopts several amendments to the DOE test procedure for commercial refrigeration equipment. These amendments include updating the standard incorporated by reference in the DOE test procedure in response to the relevant industry organizations issuing updated versions. Specifically, DOE updated the incorporation by reference of Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 1200 (I-P)-2010 (AHRI 1200-2010), “Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets,” as the DOE test procedure for this equipment. 77 FR at 10318–09 (Feb. 21, 2012). The 2012 test procedure final rule also includes an amendment to incorporate by reference the updated ANSI/AHAM Standard HRF-1-2008 (AHAM HRF-1-2008), “Energy, Performance, and Capacity of Household Refrigerators, Refrigerator-Freezers, and Freezers,” for determining compartment volumes for this equipment. 77 FR at 10318 and 10321 (Feb. 21, 2012). These updates were primarily editorial in nature and aligned the AHRI test procedure with the nomenclature and methodology used in DOE’s 2009 standards rulemaking on commercial refrigeration equipment. The updated AHRI 1200-2010 also references the most recent version of the AHAM standard, AHAM HRF-1-2008.

In addition, the 2012 test procedure final rule includes several amendments designed to address certain energy efficiency features that were not accounted for by the previous DOE test

procedure, including provisions for measuring the impact of night curtains,³ lighting occupancy sensors, and scheduled controls. 77 FR at 10296–98 and 10319–20 (Feb. 21, 2012). In the 2012 test procedure final rule, DOE also adopts amendments to allow testing of commercial refrigeration equipment that cannot operate at the rating temperature specified in the DOE test procedure. Specifically, the 2012 test procedure final rule allows testing of commercial refrigeration equipment at its lowest application product temperature (LAPT), for equipment that is physically incapable of reaching the prescribed rating temperature. 77 FR at 10320 (Feb. 21, 2012). The 2012 test procedure final rule also allows manufacturers to test and certify equipment at the more-stringent rating temperatures and ambient conditions required by NSF⁴ for food safety testing. 77 FR at 10320–21 (Feb. 21, 2012).

The test procedure amendments established in the 2012 test procedure final rule became effective on March 22, 2012. 77 FR at 10292 (Feb. 21, 2012). The amendments are required to be used in conjunction with the amended standards established in DOE’s recently published energy conservation standards final rule (March 2014 energy conservation standards final rule) beginning on March 28, 2017. 79 FR 17726, 17727 (Mar. 28, 2014).

Since publication of the 2012 test procedure final rule, DOE has received a number of inquiries from interested parties regarding DOE regulations for commercial refrigeration equipment, including how different types of equipment fit into DOE’s definitions of commercial refrigeration equipment at 10 CFR 431.62, and questions involving certain provisions of the

³ Night curtains are devices made of an insulating material, typically insulated aluminum fabric, designed to be pulled down over the open front of the case to decrease infiltration and heat transfer into the case when the merchandizing establishment is closed.

⁴ Founded in 1944 as the National Sanitation Foundation, the organization is now referred to simply as NSF.

DOE test procedure at 10 CFR 431.64. More specifically, DOE has received inquiries and questions regarding the applicability of DOE's test procedure and Federal energy conservation standards to particular models of commercial refrigeration equipment, the proper configuration and use of certain components and features of commercial refrigeration equipment for purposes of testing according to the DOE test procedure, and the compliance date of the amendments specified in the 2012 test procedure final rule. On October 28, 2013, the U.S. Department of Energy (DOE) issued a notice of proposed rulemaking (hereafter referred to as the October 2013 test procedure NOPR) to amend the test procedure for commercial refrigeration equipment (CRE) appearing at 10 CFR 431.64. 78 FR 64296 (Oct. 28, 2013). In the October 2013 test procedure NOPR, DOE presented proposed amendments to address the questions presented by interested parties and, where appropriate, proposed edits to the regulatory language to clarify DOE's existing regulations. 78 FR at 64296 (Oct. 28, 2013).

On February 26, 2013, members of the Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) unanimously decided to form a working group to negotiate rulemaking on certification for commercial heating, ventilation, and air-conditioning (HVAC); commercial water heating (WH); and commercial refrigeration equipment. A notice of intent to form the Commercial Certification Working Group was published in the Federal Register on March 12, 2013 (Docket No. EERE-2013-BT-NOC-0023). 78 FR 15653 (Mar. 12, 2013). DOE received 35 nominations for the Working Group. On April 16, 2013, DOE published a notice of open meeting that announced the first meeting and listed the 22 nominees that were selected to serve as members of the Working Group, in addition to two members from ASRAC, and one DOE representative. 78 FR 22431 (Apr. 16, 2013). The members of the Working Group were

selected to ensure a broad and balanced array of stakeholder interests and expertise, and include efficiency advocates, manufacturers, a utility representative, and third party laboratory representatives. As part of that rulemaking process, DOE conducted a number of regulatory negotiation sessions over the course of the summer of 2013 involving major stakeholders in the CRE market.⁵ One outcome of these meetings was an agreement on the need to clarify aspects of the DOE test procedure with respect to the treatment of specific features of commercial refrigeration equipment. On August 30, 2013, the Working Group submitted a report to ASRAC containing recommendations on the certification requirements for HVAC, WH, and refrigeration equipment (Docket No. EERE-2013-BT-NOC-0023, No. 51) and ASRAC voted unanimously to accept these recommendations (Docket No. EERE-2013-BT-NOC-0005, No. 13). In the October 2013 test procedure NOPR, DOE also proposed clarifications of the treatment of those features by the DOE test procedure. 78 FR at 64306–08 (Oct. 28, 2013).

On December 5, 2013, DOE held a public meeting (December 2013 NOPR public meeting) to present the test procedure amendments proposed in the October 2013 test procedure NOPR and accept comments from interested parties. Interested parties submitted comments on the ambient test conditions and the burden of testing and certification of commercial refrigeration equipment. DOE analyzed all of the comments received in response to the October 2013 test procedure NOPR and incorporated recommendations, where appropriate, into this test procedure final rule.

⁵ All of the details of the negotiation sessions can be found in the public meeting transcripts that are posted to the docket for the Working Group (www.regulations.gov/#!docketDetail;D=EERE-2013-BT-NOC-0023).

II. Summary of the Final Rule

In this final rule, DOE adopts amendments to clarify DOE's test procedure provisions, definitions, the treatment of specific accessories when testing under the DOE test procedure, and the applicability of the existing test procedure and standards to different types of commercial refrigeration equipment. Specifically, DOE is adopting edits to definitions currently incorporated into the existing DOE test procedure and including additional definitions to be incorporated into the existing test procedure (reorganized into appendix A to subpart C of 10 CFR part 431). DOE is also adopting edits to definitions and including additional definitions to be incorporated into the test procedure used to determine compliance with the amended energy conservation standards adopted for commercial refrigeration equipment on March 28, 2014 (reorganized into appendix B to subpart C of 10 CFR part 431). 79 FR 17726. DOE does not believe that the test procedure clarifications adopted in this final rule will affect the measured energy use of any covered commercial refrigeration equipment as they relate to the applicable energy conservation standards. Rather, the additional definitions and amendments to the DOE test procedure for commercial refrigeration equipment would serve only to clarify existing nomenclature, testing provisions, compliance dates, and requirements for certain features and types of commercial refrigeration equipment; they would not establish new requirements with regard to testing commercial refrigeration equipment.

DOE notes that certification is not currently required for commercial refrigeration equipment. On December 31, 2013, DOE published a final rule adopting amended regulations governing alternative energy determination methods (AEDMs), basic model definition, and the compliance dates for certification of commercial HVAC, refrigeration, and WH (2013 AEDM

final rule). 78 FR 79579, 79590. The 2013 AEDM Final Rule adopted a certification date of December 31, 2014, for self-contained, closed solid, and closed transparent commercial refrigeration equipment and a certification date of July 1, 2015, for all other commercial refrigeration equipment. *Id.* DOE also recently published a NOPR proposing, among other things, to revise and expand the certification requirements for commercial refrigeration equipment. 79 FR 8886, 8899-900 (Feb. 14, 2014). The specific proposals discussed in the NOPR were developed as a result of the negotiations and recommendations of the Working Group for commercial HVAC, WH, and refrigeration equipment (Docket No. EERE-2013-BT-NOC-0023).

III. Discussion

Section III.A presents all of the revisions to the DOE test procedure found at 10 CFR part 431, subpart C, “Uniform test method for measuring the energy consumption of commercial refrigerators, freezers, and refrigerator-freezers,” incorporated in this final rule, and discusses the comments received on these topics during the December 2013 NOPR public meeting and the associated comment period. The changes adopted as a result of today’s final rule include revisions addressing the following:

1. the applicability of the test procedure and related energy conservation standards to certain types of equipment;
2. the definitions of “hybrid commercial refrigeration equipment,” “commercial refrigeration equipment with drawers,” and “commercial refrigeration equipment with solid and/or transparent doors”;

3. the relationship among the rating temperature, operating temperature, and integrated average temperature (IAT);
4. the proper configuration and use of energy management systems, lighting controls, and test packages in the DOE test procedure for commercial refrigeration equipment;
5. the treatment of various features and components;
6. the rounding requirements for test results and certified ratings;
7. the provision adopted in the 2012 test procedure final rule to allow testing at the LAPT for equipment that cannot operate at the prescribed rating temperature for its equipment class;
8. clarifications raised by AHRI's Interpretations 1, 2, 3, 4, and 5 of AHRI 1200-2010;
9. the methodology used to determine total display area (TDA); and
10. the compliance date of certain amendments established in the 2012 test procedure final rule.

In response to the October 2013 test procedure NOPR, DOE received several comments from stakeholders that did not pertain to a specific test procedure amendment. In section III.B, DOE provides responses to comments pertaining to (1) the ambient test temperatures required in the DOE test procedure and (2) the burden of testing and certifying equipment as compliant with DOE's energy conservation standards.

A. Amendments to the Test Procedure

Today's final rule incorporates the following changes to the test procedure for commercial refrigeration equipment in 10 CFR part 431, subpart C.

1. Scope of Coverage

On October 18, 2005, DOE published a final rule adopting EPCA's definition of commercial refrigeration equipment. This definition includes seven provisions pertaining to the operational, functional, and design characteristics of the equipment that must be met for a piece of equipment to qualify as commercial refrigeration equipment. 70 FR 60407, 60414 (Oct. 18, 2005). This definition forms the basis of the scope of coverage of DOE's regulations for commercial refrigeration equipment. While the definition of commercial refrigeration equipment encompasses a broad cross-section of commercial refrigeration equipment types, DOE has only established energy conservation standards for certain types of covered commercial refrigeration equipment specified at 10 CFR 431.66, and these standards apply to all new equipment distributed into U.S. commerce. 76 FR at 12426 and 12437 (March 7, 2011). There are also several types of equipment that meet the definition of commercial refrigeration equipment for which DOE has not yet set energy conservation standards. These include, for example, buffet tables, salad bars, prep tables, and griddle stands.

EPCA and DOE regulations require manufacturers of commercial refrigeration equipment to use the DOE test procedure for commercial refrigeration equipment to evaluate compliance with any applicable energy conservation standards and to support any representations as to the energy use. The DOE test procedure for commercial refrigeration equipment is set forth at 10 CFR 431.64.

In the October 2013 test procedure NOPR, DOE proposed clarifications regarding the applicability of the current DOE energy conservation standards and test procedure to specific equipment categories, including the following:

- i. salad bars, buffet tables, and other refrigerated holding and serving equipment;
- ii. chef bases and griddle stands;
- iii. existing cases undergoing refurbishments or retrofits; and
- iv. cases with doors shipped as after-market accessories.

78 FR at 64299–300 (Oct. 28, 2013).

a. Salad Bars, Buffet Tables, and Other Refrigerated Holding and Serving Equipment

Salad bars, buffet tables, and other refrigerated holding and serving equipment are types of commercial refrigeration equipment that store and display perishable items temporarily during food preparation or service. As DOE stated in the October 2013 test procedure NOPR, these units typically have specific design attributes, such as easily accessible or open bins that allow convenient and unimpeded access to the refrigerated products, which make them unique from commercial refrigeration equipment designed for storage or retailing. 78 FR at 64299–300 (Oct. 28, 2013). In this final rule, DOE maintains that while salad bars, buffet tables, and other refrigerated holding and serving equipment are covered equipment types because they meet the definition of commercial refrigeration equipment in EPCA, the DOE test procedure and current Federal standards do not apply due to their unique operation. Should DOE decide to consider test procedures or energy conservation standards for salad bars, buffet tables, and other refrigerated holding and serving equipment, it would do so in a future rulemaking.

b. Chef Bases and Griddle Stands

Chef bases and griddle stands are designed to be placed directly under cooking equipment, such as a commercial grill. Chef bases and griddle stands are also designed to provide food-safe temperatures in extremely hot environments, and thus are designed with uniquely robust refrigeration systems. These refrigeration systems require larger compressors to provide more cooling capacity for the storage volume than equipment with compressors that are appropriately sized for more typical ambient temperatures. As a result, this equipment consumes more energy than similarly sized, standard CRE models.

In the October 2013 test procedure NOPR, DOE stated that chef bases and griddle stands are considered commercial refrigeration equipment according to DOE's definition at 10 CFR 431.62 and stated that it believes that chef bases and griddle stands can be tested using the DOE test procedure for commercial refrigeration equipment. DOE also noted that current energy conservation standards do not apply to these types of equipment and DOE did not consider standards for this equipment in its recent revision of energy conservation standards for commercial refrigeration equipment. 79 FR 17726 (Mar. 28, 2014). DOE further proposed additions to 10 CFR § 431.66 to make clear that the current energy conservation standards for commercial refrigeration equipment do not apply to chef bases and griddle stands. 78 FR at 64300 (Oct. 28, 2013). To clearly differentiate "chef bases" and "griddle stands" from conventional types of commercial refrigeration equipment that are currently covered by energy conservation standards, DOE proposed to establish a definition for "chef base" and/or "griddle stand" based on the unique operation of chef bases and griddle stands, which are designed to

provide food-safe temperatures in extremely warm environments in excess of 200 °F, and thus are designed with uniquely robust refrigeration systems.

In response to the October 2013 test procedure NOPR, interested parties provided comments on DOE’s proposed definition and coverage of chef bases and griddle stands. Continental agreed with DOE’s proposed definition of “chef base or griddle stand,” stating that it corresponds with industry practice regarding types of units designed and marketed for harsh applications that should be given special consideration for energy consumption limits. (Continental, No. 14 at p. 1)⁶ Traulsen suggested that DOE replace the term “cooking equipment” with “cooking appliance,” but stated that otherwise found the definition of “chef base or griddle stand” to be acceptable. (Traulsen, No. 17 at p. 1)

Hill Phoenix agreed with DOE that chef bases and griddle stands do not yet have energy conservation standards associated with them and requested that other, similar equipment designed to be placed or mounted directly under equipment that is designed to hold food at an elevated temperature be considered in this category. (Hill Phoenix, No. 13 at p. 1) Similarly, Southern Store Fixtures requested clarification on the exact definition of chef bases, specifically, whether this covered refrigeration units with food warming equipment on top. (Southern Store Fixtures, Public Meeting Transcript, No. 7 at p. 25) True commented that while some consumers may place food-warming equipment on top of a refrigeration unit, a majority of consumers will place high-temperature cooking equipment atop the unit, and manufacturers will almost always

⁶ A notation in this form provides a reference for information that is in the docket of DOE’s rulemaking to develop test procedures for commercial refrigeration equipment (Docket No. EERE-2013-BT-TP-0025, which is maintained at www.regulations.gov). This particular notation refers to a comment: (1) submitted by Continental; (2) appearing in document number 14 of the docket; and (3) appearing on page 1 of that document.

design equipment for the harsh case. (True, Public Meeting Transcript, No. 7 at p. 26) Hill Phoenix also noted that NSF Type II equipment is designed to operate at elevated temperatures and similarly would use more energy if tested using the current CRE test procedure (than Type I equipment) and, as such, suggested that NSF Type II equipment also should fall into the category of equipment for which standards have not yet been set. (Hill Phoenix, No. 13 at pp. 1-2)

DOE appreciates the agreement of interested parties with DOE's proposed definition. With regard to replacing the term "cooking equipment" with "cooking appliance," as suggested by interested parties, DOE's appliance standards and commercial equipment program generally refers to equipment as something designed and primarily found in commercial applications, while the term "appliance" refers to a primarily residential application. DOE finds that chef bases and griddle stands, and the associated cooking apparatus placed above these equipment, are typically used in commercial kitchens. As such, DOE believes the term "cooking equipment" is more appropriate than "cooking appliance" for use in the definition of "chef bases" and "griddle stands," as it is consistent with DOE's designation of equipment as designed for commercial applications.

Regarding the inclusion of additional equipment designed for use directly under equipment that is designed to hold food at an elevated temperature as suggested by several commenters, DOE believes that this equipment can be adequately represented in the current CRE equipment categories and does not find sufficient justification to exclude them with the exclusion of "chef bases" and "griddle stands." The categorization of griddle stands was meant to accommodate equipment that experienced temperatures in excess of 200 °F, which requires

significant modification of the refrigeration system to maintain cooling in such a high temperature environment. DOE does not find that temperatures required for short-term holding of food are significantly different from the temperatures observed in restaurants or other closed cooking environments in which conventional commercial refrigeration equipment is placed. DOE does not believe that maintenance of refrigeration performance in these environments requires significantly different equipment design, as is the case of “chef bases” and “griddle stands.” In addition, DOE has not observed specific marketing or identification of commercial refrigeration equipment designed for use under food-warming and holding equipment. Thus, based on DOE’s assessment, the refrigeration system and design of this equipment is not significantly different from other types of commercial refrigeration equipment, and DOE believes that the existing DOE test procedure is sufficiently representative of field use, and application of the existing energy conservation standard appropriate for this equipment.

In response to Hill Phoenix’s comment regarding NSF Type II equipment, DOE believes that NSF Type II equipment can be effectively characterized by the existing DOE test procedure and effectively meet the existing energy conservation standards. DOE previously considered NSF Type II equipment in the 2012 test procedure final rule and found that the compressor systems can effectively operate at test temperatures. In the 2012 test procedure final rule, DOE agreed with interested parties that testing cases at an ambient temperature of 80 °F, rather than the currently specified 75 °F, will not have a significant impact on energy consumption for cases with doors and recognized that the impact on open cases may be greater than on closed cases, but did not believe that equipment will have operation or performance issues if tested at the temperatures prescribed by the DOE test procedure. 77 FR at 10305–07 (Feb. 21, 2012). DOE

maintains that the energy consumption of a case should scale with ambient temperature and does not believe these issues will prevent units from being tested using the DOE-prescribed test temperatures or complying with DOE energy conservation standards. DOE researched the equipment available on the market and requested specific data regarding the existence of cases that cannot meet the standard or the characteristics of their operation. DOE did not encounter any data arising from this search that would conflict with its current treatment of these equipment types, and no commenters provided any additional data to support the contention that these equipment types cannot meet the DOE standards. In addition, NSF Type II equipment is typically placed outdoors and may see a wide variety of temperatures in the field; thus, DOE finds the current rating conditions of 75 °F and 45 percent relative humidity appropriately representative for this equipment.

c. Existing Cases Undergoing Refurbishments or Retrofits

Energy conservation standards apply only to new equipment manufactured after the effective date of the applicable standard, and not to equipment undergoing retrofits or refurbishments. DOE stated in its certification, compliance, and enforcement (CCE) final rule, published on March 7, 2011, that manufacturers must certify to DOE that each basic model of covered equipment meets the applicable standard before distributing that equipment into U.S. commerce. 76 FR at 12426 and 12437. In the October 2013 test procedure NOPR, DOE clarified that its authority covers only newly manufactured equipment and does not extend to rebuilt and refurbished equipment. 78 FR at 64300 (Oct. 28, 2013).

DOE did not receive any negative comments in response to this clarification and continues to maintain that its energy conservation standards and test procedures apply to only new equipment and not existing equipment undergoing refurbishments or retrofits.

d. Case Doors Shipped as After-Market Additions

A basic model of commercial refrigeration equipment is tested, rated, and subject to specific standards based on the equipment class(es) to which that basic model belongs. For commercial refrigeration equipment, one of the features that distinguishes the current equipment classes for the purposes of applying standards is the presence of doors (i.e., open or closed). In the October 2013 test procedure NOPR, DOE proposed that when a model of commercial refrigeration equipment is offered for sale with doors as an optional accessory, regardless of how the unit is shipped, such unit must be tested and certified as equivalent to a basic model shipped with doors pre-installed. DOE also requested comment on whether, if this same model is offered for sale as a model without doors, it should be tested and rated with no doors installed and meet the corresponding energy conservation standards for open case equipment.

In response to the October 2013 test procedure NOPR, the Northwest Energy Efficiency Alliance (NEEA) commented that it believed equipment that can optionally be sold with doors or without should be tested and certified in each configuration. (NEEA, No. 16 at p. 1) DOE did not receive any negative comments on this proposal.

DOE agrees with NEEA that commercial refrigeration equipment that can optionally be sold with doors or without doors should be treated as separate basic models in separate

equipment classes and should be tested both with doors and without doors. This is consistent with the definition of basic models, which is based on features that affect the energy use of a covered piece of equipment as established in DOE's CCE final rule, and requires individual models that would fall into different equipment classes to be certified separately. 76 FR at 12429 (March 7, 2011) (see 10 C.F.R. 431.62).

2. Definitions Pertinent to Commercial Refrigeration Equipment

DOE currently categorizes commercial refrigeration equipment by equipment classes based on several general characteristics of a given basic model. 10 CFR 431.62 provides definitions that assist manufacturers in determining which equipment class and associated energy conservation standard applies to a given basic model of commercial refrigeration equipment. However, 10 CFR 431.62 does not provide explicit guidance on how to classify commercial refrigeration equipment with drawers or how to differentiate between a unit with transparent doors and a unit with solid doors. In the October 2013 test procedure NOPR, DOE proposed definitions and clarifications regarding the treatment of commercial refrigeration equipment with drawers and commercial refrigeration equipment with transparent and/or solid doors. 78 FR at 64300-03 (Oct. 28, 2013). DOE also proposed clarification with regard to the definitions for and categorization of hybrid equipment and commercial refrigerator freezers. 78 FR at 64303 (Oct. 28, 2013). These proposals, comments submitted by interested parties, and DOE's response to submitted comments are presented in the subsequent sections.

a. Commercial Refrigeration Equipment with Drawers

DOE's definition of commercial refrigerator, freezer, and refrigerator-freezer specified at 10 CFR 431.62 includes a requirement that the equipment "[h]as transparent or solid doors, sliding or hinged doors, a combination of hinged, sliding, transparent, or solid doors, or no doors." Based on this definition, DOE interprets the term "door" to mean any movable component of the CRE unit that:

1. when closed, separates the interior refrigerated space from the ambient air; and
2. when opened, provides access to the refrigerated products inside the CRE unit.

Based on this definition, in the October 2013 test procedure NOPR, DOE presented its view that drawers are treated as equivalent to doors for purposes of DOE's regulatory program, including compliance with DOE's energy conservation standards. Likewise, DOE believes drawers are treated as doors when conducting the DOE test procedure. 78 FR at 64300-01 (Oct. 28, 2013).

To demonstrate the comparable operation of models of commercial refrigeration equipment with drawers as compared to similar models with traditional doors, in the October 2013 test procedure NOPR, DOE presented the test results for several CRE units with drawers from multiple manufacturers using the current DOE test procedure and compared their performance to nearly identical units with hinged doors (belonging to the vertical closed solid, or VCS, equipment family) from the same manufacturer product lines. As a result of the testing, DOE found that the units with drawers performed similarly to the hinged-door units to which they were compared. DOE also presented the effect of drawer-opening distances for CRE units with drawers and found minimal variation in measured total daily energy consumption (TDEC) at different drawer opening distances. 78 FR at 64301 (Oct. 28, 2013). DOE believes these test

results confirm that the door-opening requirements in the DOE test procedure apply to basic models of commercial refrigeration equipment with drawers, just as they do for CRE units with other types of hinged or sliding doors, and that the current energy conservation standards prescribed for commercial refrigeration equipment are equally applicable to CRE units with drawers.

To clarify how DOE's regulatory scheme applies to basic models of CRE units with drawers, in the October 2013 test procedure NOPR, DOE proposed to add language to the definition section at 10 CFR 431.62, defining doors as being inclusive of drawers, and requested comment on its proposed definition. 78 FR at 64301 (Oct. 28, 2013).

Several interested parties commented on DOE's proposed definition of door to include drawers, the applicability of the DOE test procedure to units with drawers, and DOE's coverage of units with drawers in general. DOE presents the comments received by interested parties and DOE's response in the following sections.

Definition of Door

In the October 2013 test procedure NOPR, DOE defined door as follows:

Door means a movable panel that

- (1) separates the interior volume of a unit of commercial refrigeration equipment from the ambient environment,
- (2) is designed to facilitate access to the refrigerated space for the purpose of loading and unloading product, and

(3) is affixed such that it is not removable without the use of tools.

This includes hinged doors, sliding doors, and drawers.

78 FR at 64301 (Oct. 28, 2013).

DOE received several comments and suggestions from interested parties regarding its proposed definition for doors. Continental commented that DOE's definition of "door" should not include drawers. Continental stated that it is counter-intuitive to define a "drawer" as a subset of a "door" and this would result in confusion and misinterpretation and suggested that, instead, DOE change the usage of the term "door" in applicable procedures to "door or drawer." (Continental, No. 14 at p. 1) AHRI did not agree with DOE's proposed definition of "door" to be inclusive of drawers and instead suggested that DOE create separate definition for drawers or amending the current definition for "doors" by replacing "door" with the term "door/drawer." (AHRI, No. 15 at p. 3)

NEEA, AHRI, Southern Store Fixtures, and True commented that DOE's definition of doors would include night curtains and recommended that DOE include a specific exclusion of night curtains in the definition of doors. (NEEA, No. 16 at p. 2; AHRI, No. 15 at p. 4; Southern Store Fixtures, Public Meeting Transcript, No. 7 at p. 32; True, Public Meeting Transcript, No. 7 at p. 37) Several interested parties, including NEEA, Traulsen, True, Southern Store Fixtures, and Unified Brands, recommended that DOE remove the "use of tools" clause from the definition, as most drawers and some doors are intended to be removed without the use of tools. (NEEA, No. 16 at p. 2; Traulsen, No. 17 at p. 2; True, Public Meeting Transcript, No. 7 at p. 37; Southern Store Fixtures, Public Meeting Transcript, No. 7 at p. 37; Unified Brands, No. 9 at p. 1)

DOE appreciates the suggestions of interested parties regarding changes and improvements to DOE's proposed definition for door. DOE agrees with interested parties that a night curtain would have met the definition of "door" proposed in the October 2013 test procedure NOPR. This was not DOE's intent, as night curtains are intended to be treated as an energy-saving feature for open cases. DOE also adopted a specific definition for night curtain in the 2012 test procedure final rule. 77 FR at 10318 (Feb. 21, 2012). To clarify that night curtains are not to be treated as doors for the purposes of testing using the DOE test procedure or complying with DOE's energy conservation standards, in this final rule DOE is adding language to the definition of "door" to exclude night curtains.

DOE also acknowledges comments submitted by interested parties regarding the requirement that a door be "affixed such that it is not removable without the use of tools." DOE's intent with the proposed clause was to exclude temporary insulating panels or other devices that are not doors, but may be placed on open cases periodically to limit energy consumption when the case is not in use for merchandizing. DOE agrees with commenters that some doors and drawers are intended to be removable without the use of tools for the ease of cleaning, product loading, or other utility features, and that these cases should still be treated as closed cases with doors. Therefore, in the definition of "door" adopted in today's final rule, DOE is removing the "use of tools" provision. Upon further consideration, DOE found the statement to be superfluous. This does not include night curtains or other panels that are not in place when the case is being used for merchandising.

Regarding the inclusion of drawers in DOE's definition of "door," DOE acknowledges the concerns of interested parties that referring to drawers as doors in the test procedure for commercial refrigeration equipment may be confusing and non-intuitive. However, DOE's test procedure for commercial refrigeration equipment only addresses the treatment of "doors" and does not explicitly reference the treatment of "drawers." This terminology is established in ASHRAE Standard 72-2005, the method of test referenced in AHRI 1200-2010, the test procedure incorporated by reference as the foundation of DOE's test procedure for commercial refrigeration equipment. Given that the nomenclature in these referenced test standards is not the sole purview of DOE, DOE believes the most straightforward method for clarifying that the treatment of drawers should be identical to the treatment of doors for the purposes of conducting the DOE test procedure and compliance with DOE's energy conservation standards is to continue to define door as inclusive of drawers, as proposed in the October 2013 test procedure NOPR. 78 FR at 64301 (Oct. 28, 2013). However, if the ASHRAE Standard Project Committee were to revise ASHRAE Standard 72-2005 to include drawers specifically, DOE could review and incorporate the revised test standard, if appropriate, to further eliminate confusion. DOE understands that this may occur in a forthcoming version of ASHRAE Standard 72, anticipated to be published in 2014. Until such a revised test standard is available, DOE will also incorporate language into the test procedure at 10 CFR 431.64 to specify that drawers are to be treated as identical to doors when conducting the DOE test procedure.

Applicability of the DOE Test Procedure to Commercial Refrigeration Equipment with Drawers

Several interested parties commented that the current DOE test procedure for commercial refrigeration equipment does not provide sufficient clarity regarding how to test units with drawers. Specifically, commenters identified (1) the type and configuration of drawer pans, (2) the location and number of simulators and test packages in the drawers, (3) how to determine interior refrigerated volume of a drawered unit, and (4) how far a drawer should be opened during testing as areas of ambiguity when applying the existing DOE test procedure to CRE models with drawers. (Unified Brands, No. 9 at p. 2; Traulsen, No. 17 at p. 2; National, Public Meeting Transcript, No. 7 at p. 42) Unified Brands and Traulsen commented that, depending on the design of the drawer unit, moving the test simulators in and out of the refrigerated compartment may cause variation in the integrated average temperature (IAT), which could drive increased energy consumption, and added that testing of commercial refrigeration equipment with doors does not require test simulators to be removed from the refrigerated compartment. (Unified Brands, No. 9 at p. 2; Traulsen, No. 17 at p. 2) Specifically, National opined that when calculating total volume of a drawered unit, there should be considerations for drawer pan capacity. Additionally, National urged DOE to center the definition of a unit's volume on the amount of product that the unit can hold. (National, Public Meeting Transcript, No. 7 at p. 42)

Unified Brands commented that it is inappropriate for a drawer to be included as equivalent to a door for the purposes of testing and compliance with the DOE test procedure and energy conservation standards because when a drawer is opened, the entire contents of the drawer are removed from the interior volume of the cabinet and exposed to the ambient conditions. In addition, Unified Brands stated that it manufactures drawer units in which the drawer is fully insulated refrigerated space and the cabinet is mostly structural. Unified Brands

further commented that drawer units are often designed with additional refrigeration capacity beyond that of a similarly sized door unit due to the unique air flow and refrigeration challenges that drawers provide. (Unified Brands, No. 9 at pp. 1–2)

Lastly, Unified Brands commented that current CRE models may require as many as 12 separate drawer openings, requiring 12 door-opening apparatus, the electronic capability to control all of the openers, and a significant amount of space. Unified Brands added that testing equipment with drawers also increases burden by increasing the complexity of the test and increasing the risk associated with managing thermocouple wires to prevent thermocouple displacement and breakage. (Unified Brands, No. 9 at pp. 2–3) Unified Brands was also concerned that multiple thermocouple wires may prevent the drawer gaskets from sealing properly, resulting in increased energy use. (Unified Brands, No. 9 at p. 2)

Based on comments received by interested parties, DOE reviewed its test procedure for commercial refrigeration equipment with regards to specific requirements necessary to accommodate or clarify the application of the CRE test procedure to equipment with drawers. The DOE test procedure for commercial refrigeration equipment adopts specific sections of the Association of Home Appliance Manufacturers Standard for Energy, Performance and Capacity of Household Refrigerators, Refrigerator-Freezers and Freezers (AHAM HRF-1-2004) as the protocol for determining refrigerated compartment volume for compliance with the current standards and specific sections of AHAM HRF-1-2008 for measuring refrigerated compartment volume to determine compliance with the amended standards adopted in the March 2014 energy conservation standard final rule. 79 FR 17726 (Mar. 28, 2014). DOE reviewed these methods for

determining refrigerated compartment volume and finds them sufficient for determining internal refrigerated volume for commercial refrigeration equipment with drawers.

With regard to the comment from Unified Brands about a model of commercial refrigeration equipment in which the drawers are insulated and the outer case acts more as a support, DOE researched this type of commercial refrigeration equipment and reviewed the applicable methods for calculating refrigerated or frozen compartment volume. DOE specifically references section 3.21, “Volume,” of AHAM HRF 1-2004 and section 3.30, “Volume,” of AHAM HRF 1-2008. Both of these sections contain definitions for “fresh food compartment volume” and “freezer compartment volume,” which are defined as the portion of the total refrigerated volume above or below 32 °F, respectively. The total refrigerated volume is a combination of these two compartment volumes. Based on these definitions, DOE believes that only the volume that is purposefully refrigerated for food display or storage is to be included in the refrigerated volume calculation. Thus, in the case of a drawered CRE model in which only the drawers are insulated and directly cooled, only the interior volume of the drawers would be included in the calculation of refrigerated volume, not the entire volume of the cabinet housing. DOE believes that this is clear in the existing protocol specified in AHAM HRF 1-2004 and AHAM HRF 1-2008 and further clarification is not necessary on this matter.

Regarding test simulator locations, filler package placement, and pan configuration for CRE models with drawers, DOE reviewed the ASHRAE Standard 72-2005, which is the industry standard referenced by the DOE test procedure, to determine the sufficiency of existing guidance for placing test simulators and filler packages in commercial refrigeration equipment with

drawers. ASHRAE Standard 72-2005 specifically addresses CRE models with shelves and without shelves and, in general, specifies that test simulators shall be placed at the right end, front and back, and the left end, front and back. Test simulators are also to be placed intermittently across the face of CRE model at shelf standard breaks or with specific spacing in the case of CRE models without shelving. Since CRE models with drawers typically do not have shelves, these models will be treated as CRE models without shelves. Therefore, applying the requirements for CRE models without shelves to CRE models with drawers, it is logical that test simulators should be placed in the front and back corners of the drawer and, depending on the width of the drawer, 36- to 48-inch intervals across the width of the drawer in the front and back, as is the case for commercial refrigeration equipment without shelves. DOE does not see a problem applying the requirements for a CRE model without shelves in ASHRAE Standard 72-2005 to a CRE model with drawers, which qualifies as a CRE model without shelves, and believes placing test simulators in this manner will accurately and representatively capture the internal temperature of the equipment.

With regard to filler package placement, ASHRAE Standard 72-2005 specifies that the remaining usable space where test simulators are not required shall be loaded with filler packages or filler material so as to occupy between 70 and 90 percent of the refrigerated volume and to uniformly occupy the space from the front to the rear. Again, DOE does not anticipate issues in applying these requirements to CRE models with drawers just as they are applied to CRE models with doors. In the case of CRE models with drawers, each drawer should be filled with filled packages or filler material up to the load limit. DOE acknowledges that it is theoretically possible that the drawers could hold less than 70 percent of the net refrigerated

volume if the entire cabinet was refrigerated. However, DOE notes that this would be an inefficient design choice and DOE does not see a significant utility associated with having significant amounts of unusable refrigerated volume. Therefore, DOE does not believe accommodation is necessary for such situations. If a manufacturer produces a case that cannot meet the requirements of 70 percent packing, that manufacturer must apply for a test procedure waiver.

As to the pan configuration necessary for testing CRE models with drawers, DOE understands that CRE with drawers often consist of a sliding frame that accommodates the placement of standard size pans typically used by the food service industry for holding food. DOE acknowledges that theoretically many configurations of pans could be placed in a commercial refrigerator or freezer with drawers. DOE's test procedure requires that the model be configured with a pan configuration that allows for the maximum packing of filler packages as specified by the test procedure, but not exceeding 90 percent of the refrigerated volume. To clarify this requirement, DOE is adopting language to specify that commercial refrigeration equipment with drawers should be configured with the drawer pans that allow for the maximum packing of test simulators and filler packages without exceeding 90 percent of the refrigerated volume.

In response to the Unified Brands comment regarding the burden of conducting the test procedure for commercial refrigeration equipment on equipment with drawers, DOE does not believe that the requirements are significantly more complex than those for testing commercial refrigeration equipment with doors. Numerous door-opening apparatus are also required for

multi-compartment doored cases, and thermocouples must also be configured so as to measure test simulators in the internal refrigerated volume. DOE acknowledges that incrementally more thermocouple wire may need to be attached to thermocouples placed in test simulators in drawers, to ensure sufficient slack is available for the drawer to fully open and fully close without disturbing the thermocouple placement within the test simulator. However, DOE does not believe that providing this additional length of thermocouple wire is a significant additional burden, given many test simulators may already be equipped with excess thermocouple wire.

General Treatment of Drawers as Equivalent to Doors

In response to the October 2013 test procedure NOPR, DOE also received several comments from interested parties regarding the appropriateness of treating drawers as equivalent to doors for the purposes of testing under DOE's test procedure for commercial refrigeration equipment and compliance with DOE's energy conservation standards in general. DOE presents these comments and DOE's response in this section.

Traulsen commented that units with drawers typically hold less product by mass and volume than an identical unit with doors only and questioned how this will affect the IAT and the infiltration of air during the door/drawer opening period. (Traulsen, No. 17 at p. 2) According to Unified Brands, many drawer units are specifically designed for drawers and do not have a door unit of similar construction for comparison and, prior to assuming similarity between door and drawer units, a statistically significant sample of product designs should be tested and validated. (Unified Brands, No. 9 at pp. 1-2)

DOE's test data, presented in the October 2013 test procedure NOPR, does not suggest that drawers are significantly different from doors in terms of applying the DOE test procedure or the thermodynamic requirements. 78 FR at 64301 (Oct. 28, 2013). Lacking additional data contradicting DOE's test data, DOE is maintaining its position that drawers are to be treated as equivalent to doors for the purposes of conducting the DOE test procedure and complying with DOE's energy conservation standards.

b. Transparent and Solid Doors

In reviewing the CRE test procedure, DOE identified opportunities for clarification within the definitions and classifications of commercial refrigeration equipment with solid doors versus those with transparent doors. In the October 2013 test procedure NOPR, DOE proposed several new definitions for transparent, closed solid, and closed transparent to clarify the test procedure requirements at 10 CFR 431.64 to ensure appropriate equipment categorization. 78 FR at 64301-03 (Oct. 28, 2013).

Definition of Transparent

The DOE test procedure for commercial refrigeration equipment, as amended by the 2012 test procedure final rule, incorporates by reference AHRI 1200-2010. 77 FR at 10318 (Feb. 21, 2012). AHRI 1200-2010 defines total display area (TDA) as "the sum of the projected area(s) for visible product expressed in [square feet]" and provides procedures for calculating the TDA of commercial refrigeration equipment with panels, end enclosures, doors, or other envelope components that have some transparent area(s). Appendix D of AHRI 1200-2010 provides further guidance and examples to clarify the calculation of TDA. The appendix also defines a

transparent material as that which allows at least 65 percent light transmittance. Therefore, based on AHRI 1200-2010, a transparent door would be one partially or entirely composed of a material that allows greater than or equal to 65 percent light transmittance.

In the October 2013 test procedure NOPR, DOE proposed a definition for “transparent” based on an unambiguous measurement of the light transmission properties of a material in accordance with ASTM Standard E 1084-86 (Reapproved 2009), “Standard Test Method for Solar Transmittance (Terrestrial) of Sheet Materials Using Sunlight,” at normal incidence. 78 FR at 64301-02 (Oct. 28, 2013).

In response to DOE’s proposed definition of “transparent,” several interested parties provided comments and suggestions for adopting an appropriate definition for commercial refrigeration equipment applications. Continental stated that DOE’s proposed definition of “transparent” introduces unnecessary complexity and suggested that a simple dictionary-type definition as “able to [be] seen through” would be sufficient for nearly all applications for covered commercial refrigeration equipment. Continental added that DOE has the right and obligation to challenge a manufacturer’s claim if DOE believes it does not meet a basic definition of the terminology or the intent of the standard. (Continental, No. 14 at p. 1) NEEA, True, and Hussmann were concerned that DOE’s proposed threshold of 65 percent light transmittance might inadvertently exclude some types of Low-E, high performance glass, which can have visible transmittance as low as 45 percent. (NEEA, No. 16 at p. 2; True, Public Meeting Transcript, No. 7 at p. 53; Hussmann, No. 11 at p. 1) NEEA and Hussmann recommended DOE consider lowering the threshold for determining whether a material is transparent or not, and

suggested that DOE possibly refer to the WINDOWS 5 model, developed by Lawrence Berkeley National Laboratory,⁷ that was used in the engineering analysis. (NEEA, No. 16 at p. 2; Hussmann, No. 11 at p. 1)

True and Southern Store Fixtures noted that self-serve counter display cases may be fitted with see-through mirror-finish, or glass reflective panels, which would affect the transparency of the doors depending on the measurement angle and direction. (Southern Store Fixtures, Public Meeting Transcript, No. 7 at p. 53; True, Public Meeting Transcript, No. 7 at p. 55)

True also noted that the majority of losses through transparent doors were a result of the difference in insulation capacities between the glass door and the solid door, and that only a small portion of the losses were due to light entering through transparent doors. True therefore opined that treating a glass door as solid, irrespective of its transparency, was inaccurate. (True, Public Meeting Transcript, No. 7 at p. 51)

DOE appreciates the suggestions by commenters. In response to Continental's concern regarding the potential complexity of a quantitative method for determining a transparent material, rather than a definition based on the intent or application of the material, DOE notes that the method to determine transparency of a material is not mandatory for equipment classification or testing. In the October 2013 test procedure NOPR, DOE noted that determination of the light transmittance of a transparent material is not required in all cases to classify a basic model of commercial refrigeration equipment as equipment with transparent

⁷ <http://windows.lbl.gov/software/window/window.html>

doors and clarified that manufacturers may continue to specify equipment as belonging to a transparent equipment class (e.g., vertical closed transparent or horizontal closed transparent) or a solid without testing because, in most cases, it will be obvious whether a material is transparent or not; therefore, testing would not be necessary to verify the classification of a material as transparent or not. 78 FR at 64302 (Oct. 28, 2013). Thus, incorporation of a quantitative test procedure is not anticipated to add to the complexity and burden of conducting the DOE test procedure for most models of commercial refrigeration equipment.

DOE agrees with Continental that DOE has the obligation and the right to challenge the classification of certain materials as transparent. However, there may be cases in which the material is not obviously transparent or solid, such as basic models with special decals or opaque glass. DOE prefers to use a quantitative, objective method to determine transparency of a material and subsequent equipment classification, which will also provide certainty to the regulated industry. Therefore, DOE is adopting in this final rule a definition of “transparent” based on the evaluation of that material in accordance with ASTM Standard E 1084-86 (Reapproved 2009).

In response to the comments from NEEA, True, and Hussmann expressing concern about the inclusion of Low-E and high-performance glass as a “transparent” material when such fenestration products may have visible transmittance values as low as 45 percent, DOE researched available high-performance glass door products for commercial refrigeration equipment to determine an appropriate threshold for light transmittance. While some Low-E glass with reflective coatings designed for extremely sunny environments can have visible

transmittance values as low as 0.2 (meaning 20 percent transparent), DOE finds that it is unlikely commercial refrigeration equipment would incorporate such material since this equipment is not typically installed in extremely sunny environments. In addition, such a low visible transmittance value would significantly diminish the ability of consumers to see through the glass to the contents inside the unit, which is the intent of including transparent material in a given CRE design. Therefore, DOE is adopting a threshold for determining a transparent material of 45 percent light transmittance as determined in accordance with ASTM Standard E 1084-86 (Reapproved 2009).

Regarding comments by True and Southern Store Fixtures, DOE acknowledges that some glass may be available with a mirrored finish to prevent viewing or light transmittance when viewed from one side of the glass, but not the other. DOE does not intend to treat such glass as solid, as it provides the function of transparent material (i.e., being able to see through to the internal contents of the case) when viewed from one side of the glass. In the equipment described by commenters, this would be when viewed at an angle of incidence normal (90 degrees) to the plane of the case and from the exterior. DOE believes that reflective glass would fully meet the definition of “transparent” when tested at normal incidence and in the intended direction of viewing. Therefore, to clarify the orientation of glass when testing using ASTM Standard E 1084-86 (Reapproved 2009), DOE is incorporating language into the definition of “transparent” to specify that the material is to be tested at normal incidence and in the intended direction of viewing.

Definition of Equipment with Transparent Doors versus Solid Doors

In the energy conservation standards specified at 10 CFR 431.66, DOE refers to equipment families using the terms “closed solid” and “closed transparent” (for example, vertical closed solid (VCS) and vertical closed transparent (VCT)). In the October 2013 test procedure NOPR, DOE proposed definitions for “closed transparent” and “closed solid” to clarify what factors differentiate a CRE basic model as a transparent-door model or a solid-door model. DOE based its proposed definitions on a percentage of outer surface area of all doors that are transparent. Specifically, DOE proposed that if 75 percent or more of the outer surface area of all doors on a CRE unit is transparent, that unit would be considered closed transparent. Conversely, DOE proposed that “closed solid” would refer to CRE equipment with doors, and in which more than 75 percent of the outer surface area of all doors is not transparent. 78 FR at 64318 (Oct. 28, 2013). As DOE presented at the December 2013 test procedure NOPR public meeting, DOE intended for the definition of “closed solid” to include equipment in which more than 25 percent of the outer surface area of all doors on a unit are not transparent, and notes that the inclusion of the 75 percent figure in the October 2013 test procedure NOPR was a typographical error.

DOE received several comments from interested parties in response to the categorization of closed transparent versus closed solid equipment families proposed in the October 2013 test procedure NOPR. Hill Phoenix, AHRI, and Hussmann commented that a case that has a transparent door on the front and a solid door on the side or back, where approximately 50 percent of the door surface area is transparent and approximately 50 percent of the door surface area is solid, was not adequately addressed by DOE’s proposed definitions. Hill Phoenix, AHRI, and Hussmann further suggested that a CRE model where 25 percent or more of the outer surface area of all doors on the unit are transparent should be treated as a transparent case and that any

case that has more than 75 percent of the door area as solid should be subject to the closed solid energy conservation standards. (Hill Phoenix, No. 13 at p. 2; AHRI, No. 15 at p. 4; Hussmann, No. 11 at p. 2)

Continental commented that DOE's proposed definitions do not correlate with the way commercial refrigeration systems are typically designed for units with transparent doors. Continental further commented that if more than 25 percent of the doors on a unit are transparent, the refrigeration systems are commonly "upsized" to provide the increased cooling capacity required. Thus, Continental suggested that DOE's definition should align with industry practice and adopt a 25 percent threshold or, at most, a 32 percent level. (Continental, No. 14 at p. 2)

Traulsen recommended that the definition of "closed transparent" refer to CRE models in which 75 percent or more of the transparent area of the doors on the customer side of the pass-through or the operator/customer side of the reach-in⁸ style unit is transparent, and "closed solid" be defined as equipment in which more than 75 percent of the outer surface area of all the doors on each side of the unit is not transparent. Traulsen added that transparent doors and the design and operation of closed transparent equipment carry a higher energy penalty and DOE should be cautious of creating definitions that classify equipment with transparent doors as closed solid equipment. Traulsen further recommended ignoring other doors on the backside of the unit when classifying closed transparent equipment, similar to the treatment of pass-through-type

⁸ The comment submitted by Traulsen referenced "read-in" style units. DOE believes Traulsen meant to reference "reach-in" style units and has amended the submitted comment to reflect this.

equipment in ASHRAE Standard 72-2005, where only doors on the one side of the pass-through should be operated during the test. (Traulsen, No. 17 at p. 2)

Hussmann suggested that DOE further clarify what “the outer surface area of the door” is and whether it includes mullions and door frames. (Hussmann, No. 11 at p. 2)

Alternatively, Zero Zone offered that the ENERGY STAR^{®9} program uses definitions that describes a number of additional details about glass door equipment and recommended that DOE should consider these definitions. For example, Zero Zone stated that it manufactures a CRE model with transparent doors on the front and solid doors on the back, and that the ENERGY STAR definitions would classify such a case as a glass door cabinet and DOE’s proposed definitions would qualify such as case as a solid door cabinet. In addition, Zero Zone suggested that DOE perform an engineering analysis to assess the impact and feasibility of reduced energy conservation standard levels for closed transparent equipment with a small percent of transparent area. (Zero Zone, No. 18 at pp. 1–2)

In response to comments regarding the fraction of transparent surface area of all outer doors on a given CRE model that differentiates closed transparent equipment from closed solid equipment, DOE acknowledges comments from interested parties regarding the increased energy use associated with closed transparent equipment due to the increased thermal conductance of glass as compared to insulated case walls and other design and operation features. In determining

⁹ 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.

the fraction of transparent door surface area to qualify a basic model of commercial refrigeration equipment as equipment with transparent doors, DOE proposed a transparent surface area higher than 50 percent to ensure that only doors with a majority of transparent surface area were considered transparent doors. 78 FR at 64302 (Oct. 28, 2013). However, DOE finds the suggestions of Traulsen, Hill Phoenix, AHRI, and Hussmann - that equipment with transparent doors on one side of the cabinet and solid doors on another be treated as transparent equipment - reasonable and consistent with DOE's intended application of closed transparent equipment. That is, equipment with only one transparent door and the remaining sides consisting of solid insulated case wall and similar equipment with two doors, one that is transparent and one on another side that is solid, should be treated equivalently for the purposes of testing and compliance with DOE energy conservation standards. However, DOE finds the suggestion of Traulsen to address only the customer-side of a CRE model to be inconsistent and impractical to implement given the variety of door configurations that could be present on other sides of the CRE unit. DOE believes it is most appropriate to address the outer surface area of all the doors that may be present on any of the sides of a CRE model when determining whether the equipment belongs in the closed solid or closed transparent equipment family.

Regarding Hussmann's request that DOE provide additional clarity as to the definition of "outer surface area," DOE used the term "outer surface area" to refer to the surface area on only one side of a door. DOE acknowledges that solid and transparent doors installed on commercial refrigeration equipment are physically three-dimensional objects, with surface area measurements on each of six sides: four edges and two faces. DOE used the term "outer surface area" to refer to the side of the door facing out of, rather than into, the cabinet. In response to

Hussmann’s comment inquiring whether the outer surface area of the door included mullions and door frames, DOE is clarifying that the outer surface area to be accounted for is that of the door itself, as defined in section III.A.2.a, as a unique component of the CRE model. In this case, the door consists of the door frame and any transparent area that represents the “moveable panel” that “facilitates access to the refrigerated space.” This would not include mullions, which are fixed portions of the CRE model’s envelope on which the doors are mounted. DOE has specified how to determine the applicability of transparent equipment families to a given model in section 1.2 of each appendix.

In response to Zero Zone’s suggestion that DOE consider the ENERGY STAR[®] definitions for solid door cabinet, glass door cabinet, and mixed solid/glass door cabinet, DOE reviewed the definitions in the ENERGY STAR “Version 2.1 Program Requirements for Commercial Refrigerators and Freezers”¹⁰ (Version 2.1 Program Requirements), as well as associated stakeholder comments received during the development of the ENERGY STAR Version 2.1 Program Requirements in developing the proposed definitions for closed solid and closed transparent.¹¹ The primary difference between the ENERGY STAR classification scheme

¹⁰ U.S. Environmental Protection Agency. ENERGY STAR[®] Program Requirements for Commercial Refrigerators and Freezers: Eligibility Criteria; Version 2.1. Effective January 1, 2010. (Last accessed August 15, 2013.) http://www.energystar.gov/ia/partners/product_specs/program_reqs/Commercial_Refrigerator_and_Freezer_Program_Requirements.pdf?dae6-ef7c.

¹¹ See Continental Refrigerator, Comments on Specification for Commercial Refrigerators and Freezers, Version 2.0 Draft 3. Dated January 7, 2009. Available at: https://www.energystar.gov/ia/partners/prod_development/revisions/downloads/refrig/Continental_Comments.pdf?f45c-2369.

Beverage-Air Corporation, Beverage-Air Comments re: ENERGY VERSION 2.0 – DRAFT 3, Dated January 8, 2009. Available at: https://www.energystar.gov/ia/partners/prod_development/revisions/downloads/refrig/Beverage-Air_Comments.pdf?f45c-2369.

Anonymous, Comments on Draft 2. Dated September 15, 2008. Available at: https://www.energystar.gov/ia/partners/prod_development/revisions/downloads/refrig/Anonymous_Comments.pdf?f

and that proposed by DOE is the treatment of CRE models with mixed solid and transparent doors on at least one side of the unit. In DOE's proposal, cases with mixed solid and transparent doors would be treated as either solid or transparent cases, based on the outer surface area of the doors, whereas ENERGY STAR treats this equipment in a separate equipment category.

DOE believes the definitions proposed in the October 2013 test procedure NOPR are straightforward and would unambiguously address equipment categorization. 78 FR at 64318 (Oct. 28, 2013). In addition, setting the threshold for transparent surface area of all outer doors at greater than 25 percent makes it unlikely that equipment with substantial amounts of transparent area will be categorized in the closed solid equipment family. For example, equipment that has one door that is half-transparent and half-solid would be treated as "closed transparent" and would have to meet the energy conservation standard for the appropriate equipment class based on its volume or TDA. As a result, DOE does not anticipate issues associated with equipment with small transparent areas that cannot meet the applicable energy conservation standard. Also, these definitions are consistent with the equipment categorization methodology DOE uses to establish standards for covered equipment. As such, DOE believes defining terms that are used directly in the description and determination of equipment classes for commercial refrigeration equipment is the most clear, unambiguous method for defining and categorizing equipment as closed transparent or closed solid, and DOE does not see a need to establish a unique equipment category for mixed solid/transparent equipment.

[45c-2369](#).

True Manufacturing, Comments on Draft 2. Dated September 17, 2008. Available at:

https://www.energystar.gov/ia/partners/prod_development/revisions/downloads/refrig/True_Comments.pdf?f45c-2369.

Traulsen, Comments on Draft 1. Dated April 18, 2008. Available at:

https://www.energystar.gov/ia/partners/prod_development/revisions/downloads/refrig/Traulsen_Comments.pdf?f45c-2369.

c. Hybrid Equipment and Commercial Refrigerator-Freezers

At 10 CFR 431.62, DOE defines a commercial hybrid refrigerator, freezer, or refrigerator-freezer as having two or more chilled and/or frozen compartments that are in two or more different equipment families, contained in one cabinet, and sold as a single unit. In the October 2013 test procedure NOPR, DOE proposed to replace the definition of “commercial hybrid refrigerator, freezer, and refrigerator-freezer” with a definition of “commercial hybrid,” and introduce a new definition of “commercial refrigerator-freezer” to clarify DOE’s definitions and equipment categories. 78 FR at 64303–04, 64318 (Oct. 28, 2013).

In response to the definitions proposed in the October 2013 test procedure NOPR, DOE received comments from interested parties regarding DOE’s definition for commercial hybrid and the applicability of the definition of commercial hybrid to certain equipment. Continental commented that the proposed definition of “commercial hybrid” should specify that the “two compartments” are separated by an insulated partition to isolate them for different storage applications, as this would limit confusion with multiple section cabinets, which may have non-insulated partitions or ducting between them purely for air distribution, shared throughout the entire unit. (Continental, No. 14 at p. 2)

True noted that DOE’s definition did not explicitly state that dual temperature units were separated by a vertical partition, and therefore might include solid-shelf units. (True, Public Meeting Transcript, No. 7 at p. 71) Similarly, National expressed confusion over the application of the DOE rule in cases where two sections of a unit were at different temperatures, but

potentially use the same evaporator coil or share air between the two spaces. (National, Public Meeting Transcript, No. 7 at p. 75) National commented that some two-door units are built with airflow down the middle and panels with louvers to distribute air. (National, Public Meeting Transcript, No. 7 at p. 79)

Hussmann agreed with DOE's proposed definitions of commercial hybrid and commercial refrigerator-freezer, but requested clarification on how to classify or handle a piece of equipment that contains at least one section or compartment that is not covered by the DOE test procedure (e.g., salad bars and buffet tables). (Hussmann, No. 11 at p. 2) Royston noted that in many hybrid units such as salad bars, it was unclear what percentage of the unit would be considered refrigerated. (Royston, Public Meeting Transcript, No. 7 at p. 82)

In response to Continental's suggestion that DOE consider specifying that the compartments in a commercial hybrid refrigerator, freezer, or refrigerator freezer be separated by an insulated partition or be thermally isolated from one another, DOE agrees that the intent of the commercial hybrid equipment provisions is to address equipment with thermally distinct compartments from different equipment families (e.g., vertical closed transparent and vertically closed solid). As such, DOE is adopting language to specify that commercial hybrid equipment is equipment consisting of two or more thermally separated refrigerated compartments that are in two or more different equipment families that is sold as a single unit.

In regard to clarification on how to classify or handle a piece of equipment that contains at least one section or compartment that is not covered by the DOE test procedure (e.g., salad

bars and buffet tables), DOE clarifies that this type of equipment is not hybrid equipment because it does not consist of two or more different equipment families. Only the compartment(s) of the piece of commercial refrigeration equipment that is covered by one of DOE's existing equipment classes is included in DOE's equipment family definitions. The compartment that is not covered by DOE's existing standards for commercial refrigeration equipment is not included in DOE's equipment family definitions and, thus, such a unit would not meet the definition of commercial hybrid. Using the example presented in Hussmann's comment, consider a commercial refrigerator that contains one compartment that falls into the vertical closed solid equipment family and a thermally separate compartment that offers accessible refrigerated bins for the purposes of preparing sandwiches or holding buffet items. As presented in section III.A.1.a, sandwich prep tables and buffet tables are not currently regulated under DOE's existing energy conservation standards or subject to DOE's test procedure for commercial refrigeration equipment. As such, this CRE model would be covered under DOE's existing energy conservation standards as a commercial refrigerator in the vertical closed solid equipment family based on the refrigerated volume of only the refrigerated compartment comprising the vertical closed solid commercial refrigerator. This CRE model would be tested under the DOE test procedure for commercial refrigeration equipment as a commercial refrigerator, and the compartment containing the sandwich prep or buffet table bins would be disabled and not included in the determination of energy consumption for that equipment. If the same refrigeration system serves both compartments and the refrigeration of the sandwich/buffet compartment cannot be disabled, manufacturers may apply for a test procedure waiver for such equipment if the measured energy use would not be representative of the commercial refrigerator, freezer, or refrigerator-freezer portion of the CRE basic model.

3. Relationship among Rating Temperature, Operating Temperature, and Integrated Average Temperature

Currently, the table at 10 CFR 431.66(d)(1) describing the energy conservation standards for equipment other than hybrid equipment, refrigerator-freezers, and wedge cases refers to the “rating temperature” and “operating temperature” of equipment, and the table describing the applicable test procedure for covered equipment at 10 CFR 431.64(b)(3) refers to the term “integrated average temperature.” DOE defines “integrated average temperature” as “the average temperature of all the test package measurements taken during the test.” 10 CFR 431.62.

In the October 2013 test procedure NOPR, DOE proposed explicit definitions for “rating temperature” as the IAT at which a model of commercial refrigeration equipment should be evaluated in accordance with the DOE test procedure, and “operating temperature” as the range of IATs at which the unit of commercial refrigeration equipment is capable of operating. In addition, DOE noted that while the operating temperature range of equipment is used to establish the appropriate equipment class for CRE basic models based on the standards table at 10 CFR 431.66(d)(1), only the definition of “ice-cream freezer” explicitly identifies the appropriate operating range (*i.e.*, at or below -5 °F). 10 CFR 431.62 Therefore, DOE also proposed definitions of “commercial refrigerator” and “commercial freezer” that reference the operating temperature range of each category of equipment. 78 FR at 64303–04, 64318 (Oct. 28, 2013).

In response to DOE’s proposed definitions for commercial refrigerator, commercial freezer, and commercial refrigerator-freezer, Continental commented that the use of the term

“capable of” introduced confusion and does not accurately reflect industry practices. Continental offered the example of a piece of equipment that is designed and marketed as a refrigerator, but includes an oversized refrigeration system that may be necessary to hold products at temperatures near 32 °F that would allow the refrigerator to be capable of operating below 32 °F in some applications, although it is not intended to be operated that way. As such, Continental suggested that DOE define the commercial refrigerator operating range as “all refrigerated compartments in the unit are designed, marketed or intended for operating at or above 32 °F.” (Continental, No. 14 at p. 2) Similarly, Hussmann suggested DOE replace “capable of operating” with “designed, marketed, or intended to be operated by the manufacturer.” (Hussmann, No. 11 at p. 2)

DOE acknowledges comments from interested parties, but notes that DOE prefers to have an objective method for determining coverage of equipment under DOE’s equipment classes. DOE believes that relying on how a piece of equipment is “designed, marketed, or intended to be used” provides too much flexibility for manufacturers to specify how a CRE basic model is “intended to be used,” without consideration of how the equipment actually can be used. As such, DOE maintains that, for self-contained equipment and remote equipment with thermostats, DOE will establish the operating range of equipment based on the operating temperatures the commercial refrigeration equipment is capable of maintaining. DOE will determine the operating range of covered equipment based on the maximum and minimum thermostat set points. However, DOE acknowledges that, for equipment with an operating temperature range that is primarily in, for example, the commercial refrigerator operating temperature range (i.e., at or above 32 °F), but has a minimum operating temperature in the commercial freezer range slightly

below 32 °F (e.g., 30 °F), it may not be appropriate to require such equipment to be certified as both a commercial refrigerator and a commercial freezer. DOE believes that equipment should be categorized in the equipment class most representative of the operating temperature range of that equipment. As such, DOE is adopting a tolerance on the minimum and maximum IAT that categorizes equipment as a commercial refrigerator, commercial freezer, or commercial ice cream freezer. DOE believes a tolerance of ± 2 °F would allow sufficient flexibility that equipment with an operating temperature range that is substantially representative of one equipment class, but with a minimum or maximum operating temperature that extends slightly into the operating temperature range of another equipment class, is not required to be certified in both equipment classes. This tolerance is also consistent with the tolerance on the rating temperatures for the relevant equipment classes. Therefore, in this final rule, DOE will establish in 10 CFR 431.66 operating temperature ranges of greater than or equal to 32 °F (± 2 °F) for commercial refrigerators, less than 32 °F (± 2 °F) for commercial freezers, and less than or equal to -5 °F (± 2 °F) for ice cream freezers.

DOE acknowledges that for remote equipment the operating range of equipment could be much broader, as it is based on the operating parameters of the compressor system much more than the case design. Manufacturers may design a case that could optimize performance for operation as a freezer, but customers would be able to adjust the compressor operating characteristics to operate the case at refrigerator temperatures, even though it is not intended to be used that way. As such, in this test procedure final rule DOE adopts additional language to clarify that for remote condensing equipment, the operating temperature range is based on the range of IATs at which a piece of commercial refrigeration equipment is marketed, designed, or

intended to be used. DOE does not see the need to establish such a definition for self-contained equipment with thermostats and will maintain the definition of “operating temperature” proposed in the NOPR based on the IATs at which a piece of commercial refrigeration equipment is capable of operating.

Traulsen recommended changing all referenced temperature thresholds from 32 °F to 25 °F, since some equipment, including meat refrigerators, is intended to be operated as low as 25 °F. (Traulsen, No. 17 at p. 3)

In response to Traulsen’s recommendation regarding establishing equipment categories based on operating ranges of greater than or equal to 25 °F for commercial refrigerators, below 25 °F for commercial freezers, and a combination of the two for commercial refrigerator-freezers, DOE believes that 32 °F is a more appropriate temperature threshold for differentiating chilled from frozen food storage equipment. Equipment that can operate at 25 °F is functionally a freezer, since food is primarily composed of liquid water and water freezes at 32 °F. In addition, an operating temperature threshold of 32 °F was determined in the 2009 CRE energy conservation standards final rule and has been in place historically for the purposes of compliance with those standards since January 1, 2012. 74 FR 1092, 1099–1100 (Jan. 9, 2009). DOE notes that the equipment mentioned by Traulsen, which operates both at or above 32 °F and below 32 °F, would qualify as both a commercial refrigerator and a commercial freezer and would have to be certified in both equipment categories. To the extent that the equipment was not able to reach the rating temperature for commercial freezers of 0 °F, the equipment would be tested at its LAPT for certification as a freezer.

In the October 2013 test procedure NOPR, DOE recognized that some basic models may have operating characteristics that include an operating temperature range that spans multiple equipment classes, and proposed language to clarify that equipment meeting the definition of multiple equipment classes when operated as intended by the manufacturer would have to be tested and certified as each of these equipment classes to demonstrate compliance with DOE's energy conservation standards. 78 FR at 64304 (Oct. 28, 2013).

Zero Zone and AHRI disagreed with DOE's proposal that the equipment capable of operating in two or more operating temperature ranges be tested and certified as complying with both equipment classes. Zero Zone and AHRI suggested that these cases be tested and certified at their lowest published operating temperature, which would be reflective of the highest energy use mode. (Zero Zone, No. 18 at p. 2; AHRI, No. 15 at p. 4) Zero Zone added that if DOE requires equipment to be tested at all the published operating temperature ranges, more-complex controls may be required to reduce energy so the equipment can meet the energy conservation standards for both equipment categories, and suggested that DOE consider the increased cost of these controls compared to the benefits to consumers. Zero Zone added that, in general, remote freezers can be operated inefficiently as a refrigerator by customer settings on the remote condensing unit, but added that it does not condone such operation. As such, Zero Zone suggested DOE use the term "marketed operating temperature" to avoid having equipment potentially tested at two different temperature classes because it can be operated at two or more temperature class operating ranges even though it is not designed for use in these operating temperature ranges. (Zero Zone, No. 18 at p. 2)

In contrast, NEEA supported DOE's proposal that equipment intended to operate in multiple equipment classes be tested and certified in each equipment class to demonstrate compliance with DOE's energy conservation standards because NEEA believed it will allow a level playing field for manufacturers to produce energy compliant refrigeration equipment. (NEEA, No. 16 at p. 2)

DOE considered comments submitted by interested parties regarding the potential for commercial refrigeration equipment classified into two equipment categories. Zero Zone and AHRI both suggested that equipment instead be deemed compliant based on testing and certification in the more-stringent configuration or most energy-consuming mode. Zero Zone also discussed the example of a dual temperature unit that can operate as a commercial refrigerator or a commercial freezer. DOE notes that, while the freezer configuration would represent the most energy-consuming mode, determining the more-stringent standard level is less straightforward. Although the freezer configuration may use more energy, the energy conservation standard level for the refrigerator configuration may in fact be more stringent. This would especially be true if the operating range of the case was such that the CRE model could not be tested at the rating temperature of 0 °F for freezers. For example, in the case of a piece of commercial refrigeration equipment that has an operating temperature range of 10 to 50 °F, the unit can operate as a refrigerator, at or above 32 °F, or be converted to operate as a freezer, but only down to 10 °F. Thus, the unit cannot operate at the rating temperature for freezers of 0 °F and would be certified at the equipment's LAPT of 10 °F. However, the equipment, when tested

at the LAPT, would still be subject to the same energy conservation standard and, as such, the freezer energy conservation standard would be much easier to meet.

In addition, rating the equipment as a freezer may or may not accurately represent the use of the equipment in the field. That is, dual temperature equipment may spend considerable operating hours as a refrigerator and less significant operating hours as a freezer. This may be the case in a commercial kitchen, for example, where freezer space is necessary at the beginning of the week when new product arrives, but is converted to refrigerator space over the course of the week as food is prepared and stored for more immediate use. DOE does not find it tenable that dual temperature equipment operating inefficiently as a refrigerator most of the time could be compliant with DOE's energy conservation standards due to its certification as a commercial freezer only.

DOE acknowledges *Zero Zone*'s concern that equipment that can operate as a refrigerator or a freezer may require more-complex controls to meet DOE's energy conservation standards as both a refrigerator and a freezer. However, based on the difficulty in determining the "more-stringent" standard and the potential for certification of otherwise non-compliant equipment, DOE believes that this incremental burden is justified to ensure compliance with DOE's energy conservation standards. Further, DOE notes that equipment that can operate as both a refrigerator and a freezer competes directly with equipment in both categories and, as such, must be certified to meet the energy conservation standard for both equipment categories to provide a fair and level playing field when selling this equipment in the market.

In this test procedure final rule, DOE continues to require that self-contained equipment or remote condensing equipment with thermostats capable of operating at IATs that span multiple equipment categories be certified and comply with DOE's regulations for each applicable equipment category. Similarly, DOE adopts requirements for remote condensing equipment without a thermostat that specify that if a given basic model of CRE is marketed, designed, or intended to operate at IATs spanning multiple equipment categories, the CRE basic model must be certified and comply with the relevant energy conservation standards for all applicable equipment categories.

4. Proper Configuration and Use of Components or Features in the DOE Test Procedure

In response to several inquiries from interested parties regarding the proper configuration and use of certain components or features specified in the DOE test procedure, DOE proposed specific provisions in the October 2013 test procedure NOPR for the treatment of energy management systems and case lighting when conducting the DOE test procedure. 78 FR at 64304-06 (Oct. 28, 2013). In addition, DOE also addressed and clarified the appropriate temperatures of test packages when loaded into the test unit. 78 FR at 64306 (Oct. 28, 2013). These proposals, comments received by interested parties, and DOE's responses are summarized in the subsequent sections.

a. Energy Management Systems

The DOE test procedure specifies that all devices that would normally be used in the field must be installed and operated in the same manner during the test unless such installation and

operation is inconsistent with any requirement of the test procedure.¹² Such devices include energy management systems. In the October 2013 test procedure NOPR, DOE presented its interpretation of energy management systems as electronic devices that control specific systems in commercial refrigeration equipment to save energy, for example, automatic controls that are capable of turning off cabinet lights on a predetermined schedule or in response to an external variable, increasing the temperature setting of the thermostat (in refrigerators that store non-perishable items) during non-merchandizing hours, or activating and deactivating anti-sweat heaters, pan heaters, or defrost heaters. 78 FR at 64304 (Oct. 28, 2013).

In the October 2013 test procedure NOPR, DOE further proposed that, if normal field installation or operation of any device would be inconsistent with any test procedure requirement, then the specific function of that device that causes inconsistency with the DOE test procedure provisions must be disabled for the duration of the test. In addition, if the device is designed for multiple functions, only those functions of the device that cause inconsistency with the DOE test procedure requirements must be disabled. 78 FR at 64321 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of energy management systems during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

b. Lighting

¹² ASHRAE 72-2005, section 6.1.1, “Accessories,” as incorporated by reference into the DOE test procedure at 10 CFR 431.64.

The DOE test procedure specifies that all devices that would normally be used in the field must be installed and operated in the same manner during the test. 10 CFR 431.64 Specifically, due to language and provisions in ARI 1200-2006 (as incorporated by reference in the 2006 test procedure final rule) and AHRI 1200-2010 (as incorporated by reference in the 2012 test procedure final rule and this test procedure update) regarding case lighting, DOE believes that the energy consumption associated with lights installed on a model of commercial refrigeration equipment are intended to be captured during testing. In addition, the DOE test procedure requires that all standard components, such as shelves, end enclosures, lights, anti-condensate heaters, racks, and similar items that would normally be used during shopping or working periods, shall be installed and used as recommended by the manufacturer, which DOE interprets to mean that if lighting is installed on the case, the lighting should be operated as intended to be used in the field. However, due to the variety of types of lighting controls and schemes available on the market, the existing provisions for “accessories” may prove insufficient to yield consistent results during testing. Therefore, in the 2012 test procedure final rule, DOE established specific periods in the test during which these variable lights may be turned off or dimmed to account for energy savings due to installed occupancy sensors or scheduled lighting controls. 77 FR at 10319–20 (Feb. 21, 2012).

In the October 2013 test procedure NOPR, to clarify the treatment of lighting under DOE’s test procedure, DOE proposed to specify in Appendix A to Subpart C that all lighting must be energized to the maximum illumination level for the duration of testing for commercial refrigeration equipment except for closed solid models of commercial refrigeration equipment that include automatic controls that disable case lighting when the door is closed, the use of

which is specified by the manufacturer instructions. DOE also proposed to specify in Appendix B to Subpart C, which will be required for equipment testing on or after the compliance date of any amended energy conservation standards, that case lighting shall be energized to its maximum illumination level except for when a model of commercial refrigeration equipment is equipped with lighting occupancy sensors and/or scheduled controls, or when the a model is outfitted with other permanently installed, automatic energy management systems that control case lighting. 78 FR at 64305-06 (Oct. 28, 2013).

Zero Zone commented that they agree with DOE's proposed exception for solid door models that utilize an automatic control to disable case lighting when the door is closed. However, Zero Zone did not believe DOE's treatment of manual case lighting adjustment, such as light switches, is consistent with its treatment of manually deployable night curtains for open cases. (Zero Zone, No. 18 at p. 3) In addition, Zero Zone was concerned that an open case model with several lighting options would be tested with all lights installed for the test procedure, but the customer may choose to have a select amount of the lights on in the operation of the installed case. Zero Zone inquired if each lighting scheme in the open case model would be considered a base model and tested separately. (Zero Zone, Public Meeting Transcript, No. 7 at pp. 153-154) True commented that certain occupancy sensors with a learning curve built into them would not be able to be accurately tested since there is no activity near the unit during testing. True added that they can be programmed to override the sensor if needed. (True, Public Meeting Transcript, No. 7 at pp. 155-156)

DOE acknowledges Zero Zone's comment regarding the consistency of the DOE test procedure as it relates to the treatment of manual lighting controls and manual night curtains. DOE addressed this issue in the 2012 test procedure final rule, in which DOE stated that night curtains represent an incremental cost and explicit energy management feature that must be uniquely specified on commercial refrigeration equipment, making it unlikely that customers would purchase a case with night curtains and not employ them. By contrast, manual light switches may be installed for a variety of energy- or utility-related reasons and typically come standard on a baseline unit of commercial refrigeration equipment. As such, DOE finds it less likely that customers will employ manual light switches to adjust case lighting during unoccupied periods with any regularity. 77 FR at 10299–300 (Feb. 21, 2012). DOE continues to maintain that the incremental cost of night curtains and dedicated use as an energy-efficiency feature make them unique from manual light switches and justify different treatment in the DOE test procedure.

In response to Zero Zone's comment regarding the variety of lighting options available for installation on a given model of commercial refrigeration equipment, DOE notes that these different lighting schemes will have an impact on the measured daily energy consumption of the case. As such, each light option could be treated as an individual basic model and be tested and certified as such. However, to the extent that manufacturers do not wish to account for the reduced energy consumption associated with reduced lighting configurations, all lighting configurations may be grouped into a CRE basic model. In this case, the CRE basic model would be tested and certified based on the lighting configuration with the maximum lighting energy usage and all individual models certified under that basic model would receive that rating.

In response to True's comment regarding lighting controls that are triggered by occupancy sensors, these lighting controls should currently be tested with all the controlled lighting turned on to the maximum illumination level and the occupancy sensor disabled to determine whether the model complies with existing energy conservation standards, as reflected in Appendix A. Beginning on the compliance date of any amended energy conservation standards for commercial refrigeration equipment, manufacturers shall use the prescribed test provisions for cases with lighting occupancy sensors included in Appendix B.

c. Test Package Temperatures

The ASHRAE 72-2005 method of test, as referenced by ARI 1200-2006 and AHRI 1200-2010, and thus incorporated by the DOE test procedure at 10 CFR 431.64, provides specific instruction at section 6.2 as to the loading of test simulators and filler packages. ASHRAE 72-2005 also requires temperature stabilization before the formal test period begins, as detailed in section 7.4. After steady-state operation is reached, the unit must then operate for another period of 12 hours without any adjustment to the controls before it is deemed to be stabilized and the testing can begin. These established stabilization requirements are designed to ensure that the product simulators and test packages are cooled to the test temperature prior to initiation of the test period and data collection, and the unit of commercial refrigeration equipment under test is not operating in a pull-down application during any part of the DOE test procedure.

In response to inquiries received by interested parties, DOE presented clarification of these stabilization requirements in the October 2013 test procedure NOPR, but did not find that

the test procedure required more explicit clarification. 78 FR at 64306 (Oct. 28, 2013). DOE did not receive any comments from interested parties on its proposal regarding treatment of test package temperatures during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

5. Treatment of Other Specific Equipment Features and Accessories during Testing

During the negotiated rulemaking for certification of commercial heating, ventilation, air conditioning, refrigeration, and water heating equipment, stakeholders raised a number of issues regarding the treatment during the DOE test procedure of specific features, components, and accessories that may be in place on certain basic models of commercial refrigeration equipment. In the October 2013 test procedure NOPR, DOE presented proposals that resulted from the negotiations regarding the treatment of specific features, components, and accessories. 78 FR at 64306–08 (Oct. 28, 2013). The specific proposals and the resultant amendments adopted in this final rule are discussed in the following sections.

a. Customer Display Signs/Lights

Manufacturers stated that some customers, when ordering commercial refrigeration equipment, may wish to add additional exterior signage, outside of the body of the refrigerated cabinet, to certain units of a given model to advertise the product inside. This lighting and signage is optional and is not integral to the cabinet. Further, this auxiliary signage does not illuminate product inside the body of the cabinet. During the negotiations, stakeholders inquired regarding how this lighting or signage should be treated during testing.

In the October 2013 test procedure NOPR, DOE proposed that under the DOE test procedure, all lighting that is integral to the refrigerated cabinet or illuminates the product contained within must be operational during the test, and DOE proposed to add clarifying language in the regulatory text to address customer display signs/lights. Under DOE's proposal, supplemental lighting that exists solely for the purposes of advertising or drawing attention to the case and is not integral to the case would not be operated during testing under the DOE test procedure. 78 FR at 64306 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of customer display signs/lights during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

b. Condensate Pan Heaters and Pumps

Commercial refrigeration equipment captures 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 commercial refrigeration equipment 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 send meltwater to an external drain.

In the October 2013 test procedure NOPR, DOE proposed that, during the DOE test procedure, these electric resistance heaters and condensate pumps must be installed and operational during the entire test (as per section 6.1.1, “Accessories,” of ASHRAE 72-2005) and clarified that the “entire test” includes stabilization (including pull-down), steady-state, and performance testing periods. Prior to the start of the stabilization period, as defined by ASHRAE 72-2005, the condensate pan should be dry, and during the entire 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, with no manual removal of water at any time during the entire test. DOE proposed that if a manufacturer offers a given basic model for sale with an available condensate pan heater or pump, the manufacturer must make representations of the performance of the basic model as tested with the feature in place, and DOE proposed clarifying language in the regulatory text to address condensate pan heaters and pumps. 78 FR at 64306 (Oct. 28, 2013).

In response to DOE’s proposal in the October 2013 test procedure NOPR, AHRI, Hussmann, and Zero Zone commented that condensate pan heaters should not be required to be tested for remote equipment, since they are not accounted for in the energy conservation standard engineering analysis. (AHRI, No. 15 at p. 3; Hussmann, No. 11 at p. 4; Zero Zone, No. 18 at p. 2) AHRI commented that condensate pan heaters or pumps are usually added in the field to fulfill specific needs of commercial customers and are typically installed on less than 5 percent of the total remote cases sold within the U.S. AHRI further commented that it is unreasonable to require manufacturers to test potentially all remote equipment with condensate pan heaters to certify its basic models to DOE, if those models may be sold with condensate pan heaters in

some specific applications. (AHRI, No. 15 at p. 3) Hussmann corroborated that remote equipment shipped with condensate pan heaters represents less than 1 percent of case volume for Hussmann and stated its belief that the discussions during the negotiated rulemaking (Docket No. EERE-2013-BT-NOC-0023) were primarily surrounding self-contained equipment. (Hussmann, No. 11 at p. 4)

Zero Zone added that if case manufacturers are deterred from supplying condensate pan heaters, end users will work around this by buying condensate pans from third parties that typically are not Underwriters Laboratories (UL) Recognized or UL Listed and do not come with protective covers. (Zero Zone, No. 18 at pp. 2-3)

DOE acknowledges the opinions of interested parties and agrees that condensate pan heaters and pumps are not common on remote equipment. As such, DOE agrees that determination of daily energy consumption for remote cases with condensate pan heaters may not be the most representative configuration. Thus, DOE is adopting language in this final rule applying the requirements for testing with condensate pan heaters and pumps in place for self-contained equipment only.

DOE notes that whether or not condensate pan heaters were included in DOE's engineering analysis and energy modeling to support standard development is not dispositive as to what features are included and accounted for when testing a given basic model of commercial refrigeration equipment. DOE models a representative model for each equipment class, but manufacturers may deviate from that assumed representative model in any number of ways,

including the addition of features and accessories that improve the utility of cases in specific applications, such as condensate pan heaters and pumps.

c. Anti-Sweat Door Heaters

Many transparent-door cases come equipped with anti-sweat electric resistance heaters that serve to evaporate any water that condenses on the transparent surface of the door during operation. In some instances, manufacturers may equip their cases with higher-powered anti-sweat heaters in anticipation of potential adverse operating conditions.

In the October 2013 test procedure NOPR, DOE proposed that anti-sweat heaters should be operational during testing under the DOE test procedure and proposed adding clarifying language in the regulatory text to address anti-sweat door heaters. Models with a user-selectable setting must be tested with the anti-sweat heaters turned on and set to the maximum usage position and models featuring an automatic, non-user adjustable controller that turns on or off based on environmental conditions must be tested with the controller operating in the automatic state. Additionally, DOE proposed that, if a unit is not shipped with a controller from the point of manufacture, and is intended to be used with a controller, the manufacturer must make representations of the basic model based on the rated performance of that basic model as tested when equipped with a controller intended by the manufacturer for use with the unit. 78 FR at 64306–07 (Oct. 28, 2013).

NEEA stated that it supports DOE’s proposal that anti-sweat heaters be in operation during testing unless controls are shipped with the unit and can be turned off by these controls

during testing. (NEEA, No. 16 at pp. 2–3) DOE did not receive any negative comments from interested parties on its proposal regarding treatment anti-sweat door heater in the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

d. Ultraviolet Lights

Some manufacturers equip certain models of commercial refrigeration equipment with ultraviolet lights, which can be operated by end users to neutralize pathogens and ensure case cleanliness. Manufacturers inquired as to how these will be addressed by the DOE test procedure. In the October 2013 test procedure NOPR, DOE proposed that ultraviolet lights should not be turned on during the test procedure and proposed adding regulatory text to clarify this position. 78 FR at 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of ultraviolet lights during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

e. Illuminated Temperature Displays and Alarms

Manufacturers may equip some commercial refrigeration equipment models with illuminated displays that provide visual information to the equipment operator regarding, for example, the temperature inside the refrigerated case or if the case temperature falls outside of a specified range. DOE understands these items to be features integral to the design of the given model and proposed that they should be enabled during the test as they would be during normal

field operation. In the October 2013 test procedure NOPR, DOE proposed to add clarifying language in the regulatory text to address illuminated temperature displays and alarms. 78 FR at 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of illuminated temperature displays and alarms during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

f. Condenser Filters

Manufacturers may offer models equipped with non-permanent filters over a model's condenser coil to prevent particulates such as flour from blocking the condenser coil and reducing airflow. In the October 2013 test procedure NOPR, DOE proposed that these filters should be removed during the DOE test procedure and proposed to add clarifying language as part of the regulatory text. 78 FR at 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of condensate filters during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

g. Refrigeration System Security Covers

Manufacturers may offer for sale with a basic model an option to include straps or other devices to secure the condensing unit and prevent theft or tampering. In the October 2013 test

procedure NOPR, DOE proposed that these security devices should be removed during testing under the DOE test procedure and proposed to add clarifying language as part of the regulatory text to clarify this provision. 78 FR 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of refrigeration system security covers during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

h. Night Curtains and Covers

Night curtains and night covers are defined at 10 CFR 431.62 as a device that is deployed temporarily to decrease air exchange and heat transfer between the refrigerated case and the surrounding environment. In the October 2013 test procedure NOPR, DOE stated that the proper treatment of these components during the DOE test procedure is discussed in the current text of the DOE test procedure, 10 CFR 431.64, as amended by the 2012 DOE test procedure final rule. DOE also added these provisions at section 1.2.10 in Appendix B and proposed adding language to clarify that night curtains may not be used when testing under Appendix A. 78 FR at 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties regarding treatment of night curtains and covers during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

i. Grill Options

Manufacturers may offer for sale with a basic model optional grills that are used to direct airflow in unique applications, such as when a unit is mounted close to a rear wall and the airflow needs to be directed upwards. In the October 2013 test procedure NOPR, DOE proposed that, if present, non-standard grills should be removed during testing under the DOE test procedure and proposed to add clarifying language as part of the regulatory text. 78 FR at 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of grill options during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

j. 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 through environmental contact. In the October 2013 test procedure NOPR, DOE presented its belief that the existing DOE test procedure accurately accounts for the performance of all types of coils, including those with coatings, and that no additional accommodations or clarifications are needed in the test procedure. Commercial refrigeration equipment with coated coils shall be tested in accordance with the DOE test procedure, as specified at appendices A and B to subpart C of 10 CFR part 431. 78 FR at 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties regarding treatment of coated coils during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

k. Internal Secondary Coolant Circuits

The use of internal, secondary, working fluid that is cooled by a remote condensing unit is a proprietary design that purportedly allows for greater control of unit temperature, and may present other attributes desirable to a customer. In the October 2013 test procedure NOPR, DOE stated that it found no evidence indicating that this design could not be tested using the DOE test procedure as written, as the operation of equipment with internal secondary coolant circuits would be effectively the same as that of a standard remote condensing case from the perspective of the test procedure. 78 FR at 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties regarding treatment of internal secondary coolant circuits during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

l. Wedge Cases

Wedge cases are models of commercial refrigeration equipment that fit between two other cases to fill a gap (such as in a corner) in a continuous case lineup. They may require air spillover from adjacent cases to meet the manufacturer's design temperatures. During the negotiation proceedings, manufacturers inquired as to how wedge cases should be treated under the DOE test procedure.

DOE considered the coverage and testing of wedge cases in the 2009 energy conservation standards final rule. 74 FR 1092, 1102–3 (Dec. 9, 2009). Based on that assessment, DOE understands that wedge cases meet the definition of commercial refrigeration equipment and fall into existing CRE equipment classes. In the October 2013 test procedure NOPR, DOE stated that it is unaware of any technical attributes that prevent wedge cases from being tested using the DOE test procedure, or that the DOE test procedure is not representative of the energy use of a given basic model of wedge case. 78 FR at 64307 (Oct. 28, 2013).

DOE did not receive any comments from interested parties regarding treatment of wedge cases during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

m. Misting or Humidification Systems

Manufacturers may offer for sale with a basic model optional misting or humidification systems, which dispense a water mist used to maintain the optimal quality of products. These are commonly used with cases containing, for example, fresh produce, meat, or seafood. In the October 2013 test procedure NOPR, DOE proposed that, if present, these systems should be inactive during testing under the DOE test procedure and proposed to add clarifying language as part of the regulatory text. 78 FR at 64307–8 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of misting or humidification systems during the DOE test procedure and, as such, is

adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

n. Air Purifiers

Manufacturers may offer for sale purifying systems to remove contaminants from air recirculated within the interior of a refrigerated case. In the October 2013 test procedure NOPR, DOE proposed that air purifiers should be inactive during testing under the DOE test procedure and proposed to add clarifying language as part of the regulatory text. 78 FR at 64308 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of air purifiers during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

o. General Purpose Outlets

Some commercial refrigeration equipment may be offered for sale with integrated general purpose electrical outlets, which may be used to power additional equipment such as scales or slicers. In the October 2013 test procedure NOPR, DOE proposed that, during testing under the DOE test procedure, no external load should be connected to the general purpose outlets contained within a unit and proposed to add clarifying language as part of the regulatory text. 78 FR at 64308 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of general purpose outlets during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

p. Crankcase Heaters

Some models of self-contained commercial refrigeration equipment feature electric resistance heaters designed to keep the compressor warm in order to maintain the refrigerant contained within at optimal conditions when the unit is operating at low ambient temperatures. In the October 2013 test procedure NOPR, DOE proposed that, if present, crankcase heaters should be operational during the test. Under this proposal, if a control system, such as a thermostat or electronic controller, is used to modulate the operation of the crankcase heater, it should be used as intended per the manufacturer's instructions. DOE proposed to add clarifying language regarding testing units with crankcase heaters. 78 FR at 64308 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of crankcase heaters during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

q. Interior/Exterior Liners

Manufacturers may offer for sale a variety of different interior or exterior liner materials with a given CRE basic model. These liners, by virtue of differences in thickness, composition, and other physical attributes, could change the insulative properties of the case walls and thus alter the energy consumption of the case. The test procedure estimates the heat loss from the

refrigerated space to the surroundings by measuring the amount of energy needed to maintain the refrigerated space at the given rating temperature. In the October 2013 test procedure NOPR, DOE presented its belief that the DOE test procedure adequately accounts for variability in the energy consumption of models with different liner types just as it accounts for the energy performance of models with varying levels of insulation. Therefore, DOE did not propose any additional measures to accommodate these equipment features. 78 FR at 64308 (Oct. 28, 2013).

DOE did not receive any comments from interested parties on its proposal regarding treatment of interior/exterior liners during the DOE test procedure and, as such, is adopting the proposal presented in the October 2013 test procedure NOPR with no modifications.

r. Crankcase Pressure Regulators

During the 2013 Working Group meetings, stakeholders mentioned that they sometimes equip the compressors of self-contained commercial refrigeration units with devices called crankcase pressure regulators. The function of these devices is to maintain optimal gas pressure within the compressor crankcase in instances where the voltage input to the compressor may not be uniform. This often is the case, for example, in rural locations where the transmission system may experience interruptions or fluctuations resulting in line voltage drops. Working Group members agreed unanimously that manufacturers should offer an identical model without this feature for the purposes of testing. DOE plans to address this through guidance.

s. Other Comments Received from Interested Parties

In response to the October 2013 test procedure NOPR, DOE received several additional comments pertaining to its treatment of accessories generally. Zero Zone agreed with DOE's accommodations of some specific accessories and features proposed in the October 2013 test procedure NOPR. However, Zero Zone questioned why DOE did not make allowances for customers with high ambient humidities and allow the use of higher anti-sweat heat for those applications. Zero Zone recommended that, to be consistent, DOE should require testing with the options it plans to exclude in this rulemaking, and if the equipment can't pass the energy standard with these options installed, customers need to modify their stores to avoid the need for the equipment modifications. (Zero Zone, No. 18 at p. 3)

The government of the People's Republic of China (China) recommended that all non-core energy-consuming accessories, such as lighting associated with short-term opening and closing of the refrigerator door, networking and standby, or operation of the deodorizing system, should be left out and not included in the measurement of daily energy consumption. (China, No. 10 at p. 2) In addition, China recommended that, if a manufacturer included in their product literature information that the operation of some functions was auxiliary to the effective operation of the refrigeration equipment, their energy consumption would account for a small proportion of total energy consumption and could be excluded from the calculation of total or combined daily energy consumption. (China, No. 10 at p. 4)

In response to Zero Zone's comment regarding accounting for the use of anti-sweat heaters at high humidities in the DOE test procedure, DOE notes that its test procedure is meant to represent an average cycle of use. The ambient temperatures required in the DOE test

procedure are 75 °F and 45 percent relative humidity. These ambient conditions apply to all equipment and are meant to be representative of the typical installation conditions for most commercial refrigeration equipment. DOE does not believe that the additional complexity and burden associated with testing at additional or different ambient temperature conditions for some equipment is justified to capture additional use of anti-sweat heaters. DOE notes that, as presented in section III.A.5.c, this final rule establishes provisions that anti-sweat door heaters that do not have automatic controls should be energized when testing in accordance with the DOE test procedure and that energy use due to anti-sweat door heaters that have automatic controls will be captured based on the control algorithm associated with the automatic control scheme.

In response to China’s comment regarding the treatment of non-core or auxiliary accessories, DOE believes that, to a large extent, the provisions adopted in this section address the appropriate treatment of specific non-core and auxiliary accessories. DOE notes that, to ensure consistent and repeatable testing, it is beneficial to adopt specific test provisions for the treatment of specific accessories. The proposals adopted in this test procedure final rule address specific accessories agreed upon as a result of negotiations between DOE and interested parties. DOE does not believe adopting more-general provisions for the treatment of “non-core” accessories, as suggested by China, is necessary. In addition, DOE believes such ambiguous provisions may result in misinterpretation and lack of consistency in implementation of the test procedure. Therefore, DOE is not adopting provisions for testing of accessories other than those proposed in the October 2013 test procedure NOPR. 78 FR at 64306–08 (Oct. 28, 2013).

6. Rounding of Test Results and Certified Ratings

The current DOE test procedure, which incorporates by reference provisions from ARI 1200-2006 and AHRI 1200-2010, requires that the calculated daily energy consumption (CDEC), for remote condensing equipment, and the total daily energy consumption (TDEC), for self-contained refrigeration equipment, be expressed in terms of kilowatt-hours (kWh) per day and must be stated in increments of 0.01 kWh per day. This is consistent with the number of significant figures expressed in the energy conservation standards listed at 10 CFR 431.66.

DOE's requirements for calculating test results and certified ratings for covered commercial refrigeration equipment are found at 10 CFR 431.64 and 10 CFR 429.42, respectively. The DOE test procedure currently requires that results for CDEC or TDEC resulting from testing a single unit be rounded to 0.01 kWh per day. In the case where the reported value is derived from testing, at least two or more units should be tested pursuant to 429.42 and the appropriate sampling statistics must be applied in order to develop the represented value. DOE is adopting in this final rule provisions to clarify that the represented value should also be rounded to the nearest 0.01 kWh per day after application of the sampling statistics. For commercial refrigeration equipment rated using an AEDM, the certified rating must be derived pursuant to 429.70 and rounded to 0.01 kWh per day.

In the October 2013 test procedure NOPR, DOE proposed to clarify 10 CFR 431.64 by specifying that all calculations in the DOE test procedure must be carried out using raw, measured values, and the results from the testing of a single unit of a given basic model should be expressed in 0.01 kWh per day. DOE also proposed to update the language at 10 CFR 429.42

to reflect the same rounding requirements, namely that certified ratings be expressed in 0.01 kWh per day increments. 78 FR at 64308 (Oct. 28, 2013).

In response to this proposal, Traulsen suggested that, in lieu of leaving an ambiguous rounding factor that may result in inconsistencies between manufacturers or reporting entities, DOE require all calculations to be carried out to the third decimal point and rounding to the second decimal point for the purposes of certification and compliance with DOE's energy conservation standards. (Traulsen, No. 17 at p. 3) Southern Store Fixtures commented that the rounding of test results and the raw data, per ASHRAE Standard 72, is carried to one decimal point and should be consistent with this test procedure. (Southern Store Fixtures, Public Meeting Transcript, No. 7 at p. 165)

In response to Southern Store Fixtures' comment regarding values in ASHRAE 72-2005 that are carried to the first decimal point, DOE notes that pressure and temperature measurements are specified to the first decimal point and reporting these values to the third decimal point may be inappropriate. However, these values are not used directly in the calculation of TDEC or CDEC, and the number of significant digits past the decimal is not relevant. For these quantities, the number of significant digits to be carried through calculations is dictated by the number of significant digits in the value as a whole, and at least three significant digits are expected for all these quantities.

In today's final rule, DOE is not modifying the proposal presented in the October 2013 test procedure NOPR, and is adopting in this test procedure final rule language that all

calculations in the DOE test procedure must be carried out using raw, measured values and the results from the testing of a single unit of a given basic model should be expressed in 0.01 kWh per day.

7. Testing at the Lowest Application Product Temperature

In the 2012 test procedure final rule, DOE establishes provisions for testing equipment that is not capable of achieving the prescribed rating temperature for its respective equipment class: 38 °F (± 2 °F) for commercial refrigerators, 0 °F (± 2 °F) for commercial freezers, and -15 °F (± 2 °F) for ice-cream freezers. 77 FR at 10320 (Feb. 21, 2012). This equipment includes, for example, floral cases and ice storage cases, which do not have operating temperatures that are low enough to meet their respective rating temperature requirements. The 2012 test procedure amendments specify that such equipment must be tested at its LAPT, instead of the specified rating temperature for its given equipment class. 77 FR at 10320 (Feb. 21, 2012). DOE regulations at 10 CFR 431.62 define LAPT as the integrated average temperature closest to the specified rating temperature for a given piece of equipment achievable and repeatable such that the IAT of a given unit is within ± 2 °F of the average of all IAT values for that basic model. For cases with thermostats, this will be the lowest thermostat set point.

a. Definition of Lowest Application Product Temperature

In the October 2013 test procedure NOPR, DOE clarified the definition and intent of the LAPT for equipment that cannot maintain the prescribed rating temperature. 78 FR at 64308-09 (Oct. 28, 2013). That is, DOE specified the LAPT is the lowest temperature at which a given basic model is capable of operating, and equipment rated under the LAPT provisions must be

tested in accordance with all the requirements of the DOE test procedure, except that the rating temperature for this equipment will be the LAPT and the IAT measured during the test will be within ± 2 °F of the LAPT instead of within ± 2 °F of the prescribed rating temperature for that equipment class. DOE acknowledged that the lowest operating temperature for a given unit may vary slightly for specific units tested under a given basic model due to manufacturing tolerances, refrigerant charge, or other minor differences among units of a given CRE basic model. However, the LAPT should be specified such that, if DOE were to select a representative unit of this model randomly to test for compliance purposes, DOE would be able to test the unit by setting the unit to operate as cold as possible and achieve an integrated average temperature that is ± 2 °F of the LAPT. 78 FR 64308–09 (Oct. 28, 2013).

In response to DOE’s proposed clarification of LAPT in the October 2013 NOPR, interested parties had several suggestions regarding the definition of LAPT. Traulsen recommended the following clarification to the LAPT definition: The term “LAPT” is attained by adjusting the unit thermostat to the lowest operating temperature where the “IAT” is maintained at a condition of ± 2 °F over the duration of the test procedure. The LAPT value is equal to or greater than the rating temperature based on refrigeration system capacity or lowest possible thermostat set point. (Traulsen, No. 15 at p. 3) Hussmann recommended that DOE change the definition of LAPT for remote equipment without a thermostat from “adjusted dew point” to “dew point,” since that is what is controlled in a test environment. Hussmann also stated that it believed the LAPT should not be below the manufacturer’s lowest specified operating temperature and that testing of the LAPT as the “temperature achieved with the adjusted dew point temperature (as defined in AHRI Standard 1200 (I-P)-2010) set to 5 degrees

colder than that required to maintain the manufacturers lowest specified operating temperature” will only result in an unsuccessful, unrepeatable, non-steady state test due to excessive ice build-up on the evaporator coil. (Hussmann, No. 11 at p. 3)

DOE appreciates the recommendations submitted by interested parties regarding the definition and specification of LAPT. Specifically, DOE believes that Traulsen’s recommended language is generally incorporated into the existing definition and procedure proposed in the October 2013 test procedure NOPR. Further, DOE notes that the term “LAPT” should be defined so as to describe the characteristics and specification of the lowest IAT a CRE basic model is capable of achieving, rather than the procedure for determining LAPT, which is described in the relevant section of 10 CFR 431.64. DOE also notes that the LAPT for a given CRE basic model does not have to be “maintained” throughout the test procedure, but rather the IAT resulting from conducting the test procedure should be within ± 2 °F of the specified LAPT.

In addition, in response to Hussmann’s recommendation regarding the LAPT provisions for remote equipment that does not have a thermostat, DOE agrees with Hussmann that it may be more appropriate to specify the dew point, as opposed to the adjusted dew point for remote equipment. AHRI 1200-2010 defines the dew point as the refrigerant vapor saturation temperature at a specified pressure. This corresponds typically to the temperature in the evaporator. Conversely, the adjusted dew point is defined in AHRI 1200-2010 as a temperature lower than the actual dew point to account for suction line pressure losses and represents the saturated suction temperature at the compressor. This is more representative of the refrigerant temperature entering the compressor and is the value used to specify compressor performance for

the purposes of determining the CDEC for remote cases in AHRI 1200-2010. AHRI 1200-2010 further specifies the adjusted dew point as 2 °F lower than the evaporator dew point for commercial refrigerators and 3 °F lower than the evaporator dew point for commercial freezers, when applying standardized assumptions regarding condensing rack performance (see Table 1 in section 5, “Rating Requirements for Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets,” of AHRI 1200-2010). While the dew point and the adjusted dew point are dependent on one another, DOE acknowledges that the dew point controls the internal refrigerated temperature directly and is what is directly controlled in a test environment. DOE notes that specifying the dew point, rather than the adjusted dew point, as 5 degrees below that required to maintain the manufacturer’s lowest specified operating temperature will not change the resultant LAPT value for remote equipment, as the two values are dependent on one another. Specifically, the adjusted dew point is specified as 3 °F lower than the dew point for commercial freezers and ice-cream freezers and 2 °F lower than the dew point for commercial refrigerators.

In response to Hussmann’s comment that specifying the adjusted dew point as 5 degrees colder than that required to maintain the manufacturer’s lowest specified operating temperature will result in internal refrigerated temperatures that may be lower than the manufacturer’s lowest specified operating temperature, which could lead to ice buildup on the evaporator coil, DOE acknowledges that this may be a concern but notes that this may be an issue for only a small number of basic models. If a model is not able to operate consistently at a temperature 5 degrees below the dew point required to maintain the manufacturer’s lowest specified operating temperature, a manufacturer must request a test procedure waiver.

DOE notes that it adopted such language in the 2012 test procedure final rule to ensure that the achieved LAPT represented a conservative rating for remote equipment. DOE believed this was necessary because the internal refrigerated temperature for remote equipment is so variable and dependent on the remote condensing rack capacity and operation. 77 FR at 10305 (Feb. 21, 2012). DOE is reluctant to revise the LAPT for remote equipment without a thermostat as the dew point required to achieve the necessary integrated average temperature inside the case for that basic model. As recommended by Hussmann, this approach would allow manufacturers to specify virtually any temperature as the LAPT for a given CRE basic model, including a temperature not representative of the lowest temperature the CRE model can achieve. As such, DOE is adopting language that continues to establish the LAPT for remote equipment without a thermostat based on specifying the dew point as 5 degrees below the temperature required to maintain the lowest specified operating temperature of that equipment.

b. Incorporation by Reference of ASHRAE 72-2005

Although ASHRAE 72-2005 is currently evoked as the DOE method of test through DOE's incorporation by reference of ARI 1200-2006 and AHRI 1200-2010 as the test procedure for commercial refrigeration equipment, DOE has never specifically incorporated by reference ASHRAE 72-2005. Due to the explicit reference of ASHRAE 72-2005 in the proposed definition of LAPT in the October 2013 test procedure NOPR, DOE proposed to incorporate by reference ASHRAE 72-2005 at 10 CFR 431.63. 78 FR at 64309 (Oct. 28, 2013).

In response to DOE's proposal to incorporate by reference ASHRAE 72-2005, ASHRAE recommended that DOE update the reference of ANSI/ASHRAE 72-2005 to the 2013 edition of

this standard. (ASHRAE, No. 8 at p. 1) DOE notes that, at this time, a new edition of ASHRAE 72 is not available. DOE is aware that ASHRAE 72 is intended to be published soon, but DOE is not electing to delay publication of this final rule to accommodate ASHRAE's publication timeline. When a new edition of ASHRAE 72 is available, DOE will review the revised test protocol and consider amending DOE's test procedure to reference the updated ASHRAE 72 version, as appropriate.

8. Clarifications in Response to Interpretations to AHRI 1200-2010

The 2012 test procedure final rule amends the DOE test procedure for commercial refrigeration equipment to reference AHRI 1200-2010 as the method of test to be used as of the compliance date of the amended standards established published in the March 2014 energy conservation standards final rule. 77 FR at 10295-6 (Feb. 21, 2012); 79 FR 17726, 17734 (Mar. 28, 2014).

In the October 2013 test procedure NOPR, DOE discussed five interpretations to AHRI 1200-2010 that AHRI had recently published. AHRI issued interpretations 1 through 4 to AHRI 1200-2010 to clarify the method for calculation of TDA. Interpretation 5 to AHRI 1200-2010 clarifies the approach for testing commercial refrigeration equipment with two independent refrigeration sections. 78 FR at 64309-10 (Oct. 28, 2013). In the October 2013 test procedure NOPR, DOE presented its belief that the TDA should be measured as the "projected visible area" and discussed how Interpretations 1, 3, and 4 were consistent with this method. Specifically, Interpretation 1 specifies that TDA should not include any transparent areas where the view is blocked by solid features, Interpretation 3 describes how to treat silk screens and other semi-

transparent coverings on transparent doors or panels, and Interpretation 4 provides guidance to determine the area and length of commercial refrigeration equipment with curved fronts. DOE did not propose further clarification of the DOE test procedure beyond the definition of “transparent” proposed in section III.B.2.a of the October 2013 test procedure NOPR, believing that the existing test instructions contained in ARI 1200-2006, AHRI 1200-2010, and the DOE test procedure were sufficient to specify clearly how to calculate TDA for cases with solid features covering portions of projected area or for cases with non-rectangular geometries. 78 FR at 64310 (Oct. 28, 2013). However, DOE found Interpretation 2, which includes solid features in the calculation of TDA such as door frames and mullions, to be inconsistent with DOE’s method of calculating TDA. DOE’s proposed method, comments received by interested parties, and DOE’s responses are laid out in more detail in section III.A.9.

DOE also reviewed Interpretation 5, which clarifies the method for evaluating commercial refrigeration equipment with more than one refrigerated section, and found that AHRI’s Interpretation 5 is consistent with the DOE test procedure for these systems, as specified at 10 CFR 431.66(d)(2)(i), which explains how to test commercial refrigeration equipment with more than one refrigerated compartment or section. 78 FR at 64310 (Oct. 28, 2013).

In response to DOE’s discussion of the AHRI interpretations in the October 2013 test procedure NOPR, China recommended adding clarifying language to specify how to calculate the TDA for curved front cases and suggested that the TDA for these cases be based on the effective projected area. (China, No. 10 at p. 3)

DOE acknowledges China's suggestion that the DOE test procedure provide more-explicit guidance for how to calculate TDA for cases with unique, non-rectangular geometries. DOE notes that AHRI Interpretation 4 lays out clearly the approach for doing so. DOE discussed this approach in the October 2013 test procedure NOPR and determined that it was consistent with the DOE test procedure and did not need clarification. 78 FR at 64310 (Oct. 28, 2013). However, based on China's request, DOE notes that some interested parties may find additional clarification useful. As such, DOE is adopting additional clarification in the DOE test procedure for cases with curved front geometries.

DOE notes that, on October 1, 2013, ANSI approved a revised edition of the AHRI 1200 test procedure, AHRI 1200-2013, which incorporates a new graphic to Appendix D describing the measurement of TDA for cases with curved-fronts and adds language clarifying the calculation of the height dimension (D_h). Specifically, AHRI 1200-2013 specifies that the dimension L shall be taken as the arc length of the curves section of visible product area. AHRI 1200-2013 also adopted language to Appendix D that reads "when measuring D_h , only the visible dimension shall be considered. Opaque door frames, light shades, non-transparent silk screens, and the like that impede visibility shall be excluded from the measurement." AHRI 1200-2013 did not make any other changes to the methods, nomenclature, or layout of AHRI 1200, and is otherwise consistent with ARI 1200-2006 and AHRI 1200-2010, the test procedures currently incorporated by reference into the DOE test procedure.

In the 2012 test procedure final rule, DOE incorporated by reference AHRI 1200-2010 as the test procedure for commercial refrigeration equipment manufactured on or after the

compliance date of the amended energy conservation standards adopted in the March 2014 energy conservation standards final rule.¹³ 77 FR at 10295, 10308–09, 10318–21 (Feb. 21, 2012); 79 FR 17726, 17734 (Mar. 28, 2014). DOE also maintained the incorporation by reference of ARI 1200-2006 for equipment certified prior to March 28, 2017. 77 FR at 10318-20 (Feb. 21, 2012). In the 2012 test procedure final rule, DOE discussed the changes made between ARI 1200-2006 and AHRI 1200-2010 as including both editorial and technical changes to (1) the equipment class nomenclature used within the test procedure; (2) the integrated average rating temperature for ice-cream freezers; and (3) the method of normalizing and reporting units for equipment energy consumption. 77 FR at 10296 (Feb. 21, 2012). AHRI 1200-2013 differs from AHRI 1200-2010 in adopting (1) a new definition of “transparent surface,” which is a surface with a minimum of 65 percent light transmission or 65 percent clear surface; (2) a new statement in Appendix D specifying that when calculating D_h only the visible dimension shall be considered; and (3) an additional figure, Figure D18, providing clarification regarding the calculation of TDA for radius cases with transparent sides.

DOE finds the amendments adopted in AHRI 1200-2013 to be generally consistent with the DOE test procedure for commercial refrigeration equipment, except DOE finds the need for additional clarity surrounding the description of how TDA is to be calculated for radius cases the definition of “transparent surface. For radius cases, DOE maintains that TDA shall be calculated as the projection of visible product, as described in section III.A.9. To clarify the method for

¹³ In the 2012 test procedure final rule, DOE adopted a specific date (January 1, 2016), which was the anticipated compliance date for any standards amended as a result of the ongoing CRE energy conservation standards rulemaking (Docket No. EERE-2010-BT-STD-0003). However, DOE discussed in the preamble to the 2012 test procedure final rule that the intent was to require compliance with the test procedure amendments adopted in that final rule consistent with the compliance of any new or amended standards. 77 FR 10292, 10295, 10308–9, 10318–21 (Feb. 21, 2012).

calculating TDA for equipment with curved-front geometries, DOE is adopting a new figure specifying the dimensions D_h , L , and area A_e are to be determined as planar projections of the area of visible product when viewed at an angle normal to the transparent area for radius cases. Regarding the definition of “transparent surface,” as discussed in section III.A.2.b, DOE adopts a definition of “transparent” based on a light transmittance of 45 percent when measured in accordance with ASTM Standard E 1084-86 (Reapproved 2009).

9. Clarification of Methodology for Measuring Total Display Area

DOE uses TDA to determine the applicable performance standard for remote condensing commercial refrigeration equipment with transparent doors or no doors. Appendix D of ARI 1200-2006 and AHRI 1200-2010, as incorporated by reference by DOE at 10 CFR 431.63, provides a definition and instructions on determining TDA. AHRI 1200-2013 provides the same definition and instructions, and specifies that when calculating D_h , only the visible dimension shall be considered, an additional figure, Figure D18, provides clarification regarding the calculation of TDA for radius cases with transparent sides. Appendix D of ARI 1200-2006, AHRI 1200-2010, and AHRI 1200-2013 defines TDA as follows:

“Total Display Area (TDA) is the sum of the projected area(s) for visible product.”

Moreover, Appendix D provides a general equation for calculating the “projected area(s),” in the form of:

$$TDA = D_h * L + A_e,$$

Where:

A_e = Projected area from visible product through end walls

D_h = Dimension of projected visible product

L = Length of Commercial Refrigerated Display Merchandiser

Figures D1 through D16 of Appendix D of ARI 1200-2006, AHRI 1200-2010, and AHRI 1200-2013 provide instructions on the measurement of D_h , L , and A_e for various geometries of commercial refrigerated display merchandisers. These figures show that TDA includes only those areas through which displayed product is visible for the A_e and D_h dimension, irrespective of the presence of other transparent areas through which product cannot be viewed. As Interpretations 1, 3, and 4 of AHRI 1200-2010 and the amendments adopted in AHRI 1200-2013 make clear, the converse is also true—areas of the product zone that cannot be viewed as part of a direct projection through a transparent area are not to be included in any measurement of D_h . The term “direct projection” refers to the view at an angle perpendicular to the plane of product presentation (facing area). ARI 1200-2006, AHRI 1200-2010, and AHRI 1200-2013 all define the third variable, “ L ”, as the “length of commercial refrigerated display merchandiser.” However, Appendix D contains no figures or illustrations instructing a user how to perform this measurement.

In the October 2013 test procedure NOPR, DOE discussed the calculation of TDA for various CRE models and, at the public meeting presented figures, to illustrate the concept that

the measurement of TDA in practice should be consistent with its definition as the “dimension of projected visible product.” (DOE, No. 3 at pp. 68-71) DOE clarified that this included the dimension L, which corresponds to the total length of the transparent area of the merchandiser through which product can be seen; areas of opaque material that overhang the product zone and well as areas of transparent material that do not project upon a zone occupied by product, should not be included in this length. To clarify the calculation of TDA, DOE proposed to add clarifying text and figures to the test procedure explaining that the measurement of TDA should be representative of the “dimension of projected visible product” and that no opaque materials or areas of transparent material through which product cannot be viewed should be included in the calculation of TDA. 78 FR at 64310–12 (Oct. 28, 2013).

In response to DOE’s proposal to clarify the method of calculating TDA, DOE received several comments from interested parties objecting to DOE’s interpretation and offering suggestions for other methods of calculating the dimension L when determining TDA of a CRE basic model with transparent doors or no doors. AHRI, Hill Phoenix, Hussmann, and Zero Zone disagreed with DOE’s definition of the length of a commercial refrigerated display merchandiser and stated that industry has always treated the length “L” as the “length of the commercial refrigerated display merchandiser” from inside wall to inside wall, disregarding the presence of non-transparent mullions and door frames. AHRI, Hill Phoenix, Hussmann, and Zero Zone further believed, and provided quantitative justification to support, that DOE must have used case length in the engineering analysis for the 2009 and the current rulemaking. (Docket No. EERE-2012-BT-STD-0003) The commenters stated it is impossible to have a typical 30-inch by 67-inch door have 13 square feet of TDA without including the mullions and door frames and

provided analysis to support this viewpoint. The commenters added that using TDA as DOE described in the October 2013 test procedure NOPR instead of case length would reduce the standard level by 10 to 12.5 percent. (AHRI, No. 15 at pp. 1–3; Hill Phoenix, No. 13 at pp. 2–6; Hussmann, No. 11 at pp. 3–4; Zero Zone, No. 18 at pp. 3–4) Hussmann expressed concern that changing the method for calculating TDA without changing the standards would unfairly penalize manufacturers. (Hussmann, Public Meeting Transcript, No. 7 at p. 190)

Arneg and Zero Zone commented that the TDA is dependent on the distance the observer is located from the door and their orientation of viewing. (Arneg, Public Meeting Transcript, No. 7 at p. 196; Zero Zone, Public Meeting Transcript, No. 7 at pp. 196–198)

To be consistent with current industry practice and DOE’s energy conservation standard rulemaking analysis (Docket No. EERE-2010-BT-STD-0003), AHRI, Hill Phoenix, and Hussmann suggested that DOE use the interior refrigerated length, calculated from inside wall to inside wall, except for when a case has greater than 5 inches of non-transparent area. For CRE models with more than 5 inches of non-transparent length in the dimension L, the commenters recommended that DOE use total length of transparent area plus 5 inches. (AHRI, No. 15 at pp. 1–3; Hill Phoenix, No. 13 at pp. 2–6; Hussmann, No. 11 at p. 4)

Zero Zone recommended that DOE adjust the energy conservation standard to account for the reduction in TDA associated with not including the door frames and mullions in the calculation of TDA. If DOE elects not to adjust the energy conservation standard commensurate with the change in calculation of TDA, Zero Zone recommended that DOE not alter the

calculation of TDA from that assumed in the engineering analysis for the ongoing energy conservation standard rulemaking (Docket No. EERE-2010-BT-STD-0003) and noted that the market place will sort out the value and utility of equipment that has more or less visible product. (Zero Zone, No. 18 at p. 4) Zero Zone suggested that DOE incorporate a TDA-dependent component in the formula for energy, and another component considering non-TDA space or volume, noting that this is a unique design, although something similar has been done for ice cases. (Zero Zone, Public Meeting Transcript, No. 7 at pp. 206–207) Traulsen suggested using volume to calculate energy consumption for glass door remotes, effectively bypassing the TDA discussion, or suggested leaving TDA as a square-footage calculated wall-to-wall, top to bottom while ignoring the depth dimension. (Traulsen, Public Meeting Transcript, No. 7 at pp. 209–211)

Southern Store Fixtures expressed concern that setting the precedent of eliminating mullions could result in the elimination from the calculation of TDA of other components in the refrigerated space that occupy space not containing merchandise. Southern Store Fixtures asserted that this could eventually cause the calculation to become complicated and burdensome for manufacturers. (Southern Store Fixtures, Public Meeting Transcript, No. 7 at pp. 207–208)

Hussmann, True, and Zero Zone agreed that, for the majority of cases observed in the field, calculating L using the length of the interior refrigerated volume or the continuous length of the transparent doors (including mullions and doorframes) would be the same. (Hussmann, Public Meeting Transcript, No. 7 at pp. 217–218; True, Public Meeting Transcript, No. 7 at p. 218; Zero Zone, Public Meeting Transcript, No. 7 at pp. 219–220)

In response to the suggestions offered by interested parties, DOE finds that calculating TDA to include portions of non-transparent area is inconsistent with the stated definition of TDA. However, DOE acknowledges that defining TDA as strictly the total length of transparent area may be inconsistent with the method used by industry to calculate TDA today. As a compromise, DOE is adopting in today's final rule, a method for calculating the TDA of CRE basic models that is representative of the dimension through which product can be viewed, but which accommodates small non-transparent areas that are part of the doors themselves and are typically included in the calculation of TDA by manufacturers today. With regards to the calculation of TDA for the vertical closed transparent case modeled in DOE's engineering analysis supporting the March 2014 energy conservation standards final rule, DOE notes that the case modeled represents a typical multi-deck refrigerated merchandiser with five doors of 13 square feet each, for a TDA of 65 square feet (see appendix 5A of the technical support document for March 2014 energy conservation standards rulemaking final rule, Docket No. EERE-2010-BT-STD-0003). DOE based its calculation of representative door TDA upon the continuous length of transparent area of the CRE model, which included mullions and door frames, but excluded any additional case wall present on the front face of the unit. In other words, DOE included the entire length of the transparent doors, including minor non-transparent areas, in its calculation of case TDA. DOE notes that, for the case modeled, the interior length of the refrigerated volume would be the same as the continuous length of transparent area when measured from door edge to door edge. DOE emphasizes that the model is meant to be representative of the energy use of a given type of commercial refrigeration equipment, and not to represent all the different design options available for any given model within an equipment category.

DOE agrees with interested parties that if the dimension L were determined strictly as the length of transparent area, not including any non-transparent mullions or door frames, the difference may be on the order of 10 percent. However, to respond to the concerns of interested parties, DOE is not adopting such a strict definition of L, but rather a “continuous” length of transparent area to be consistent with the continuous dimension of D_h . DOE believes that, to be consistent with the definition and intent of TDA, the dimension L should represent the continuous length of transparent area, as proposed in the October 2013 test procedure NOPR. 78 FR at 64321 (Oct. 28, 2013). However, DOE acknowledges that some unique case designs may feature large sections of case wall or other non-transparent area between sections of transparent area and agrees with interested parties that some threshold is necessary to ensure only materials with a significant majority of transparent area are included in the dimension L (e.g., transparent doors with thin door mullions or other non-transparent hardware). DOE has reviewed the suggestion, submitted by interested parties that 5-inches or less of non-transparent length be allowed in the measurement of L. DOE finds that a threshold of 5-inches or less is not sufficient to accommodate the non-transparent lengths for a large number of transparent-door CRE models with more than 3 doors. In addition, DOE notes that a fixed threshold of 5-inches for cases, regardless of the size of the case and the length of the dimension “L” does not treat all cases equivalently. However, DOE acknowledges that the concept of a threshold for non-transparent area, as suggested by interested parties, prevents cases with significant portions of non-transparent area between transparent doors or cases with transparent doors significantly inset from the case end walls from calculating an unrepresentatively high TDA, as would be the case if only interior refrigerated case length was used. As such, DOE believes a more consistent

approach would be to apply a threshold of non-transparent area that may be included in the dimension “L” based on a percentage of the interior refrigerated case length that is not transparent. DOE is adopting in this final rule a threshold of 10 percent of non-transparent area that may be included in the dimension L. DOE believes this will more equitably treat the variety of case designs available on the market. DOE also notes that the 10 percent threshold is less stringent than the 5-inch threshold recommended by manufacturers. That is, a threshold of 10 percent accommodates greater amounts of non-transparent area in the dimension “L” for a majority of CRE models. In addition, a threshold of 10 percent is consistent with the modeling performed in the CRE energy conservation standard rulemaking (Docket No. EERE-2010-BT-STD-0003).

For those cases with greater than 10 percent of non-transparent area in the interior refrigerated length of the CRE model, DOE agrees with the general approach recommended by interested parties that the dimension L should be determined as the total length, along the axis of the merchandiser, of portions through which product can be viewed from an angle normal to the transparent area (i.e., the projected linear dimension(s) of visible product) plus 10 percent, to provide equitable treatment of cases with different door configurations.

Therefore, in today’s final rule, DOE adopts instructions for calculating TDA that define L as the interior length of the CRE model, provided no more than 10 percent of that length consists of non-transparent material. For those cases with greater than 10 percent of non-transparent area, L shall be determined as the projected linear dimension(s) of visible product plus 10 percent of non-transparent area.

DOE believes this instruction is consistent with and clarifies current industry practice and the existing provisions of the DOE test procedure and, as such, believes that this amendment should not change the measured energy consumption of covered equipment. Therefore, DOE is adopting these amendments in both Appendix A, which is the test procedure required for equipment testing to demonstrate compliance with current energy conservation standards, and Appendix B, which will be required for testing on March 28, 2017, consistent with the compliance date of the amended energy conservation standards established in the March 2014 energy conservation standards final rule. 79 FR 17726, 17727 (Mar. 28, 2014).

10. Compliance Date of Test Procedure Amendments

In this final rule, DOE also reorganizes the test procedure requirements at 10 CFR 431.64 so that they are easier to understand, and updates the compliance date to be consistent with the compliance date of the amended standards established in the March 2014 energy conservation standards final rule. 79 FR 17726, 17727 (Mar. 28, 2014).

EPCA prescribes that if any rulemaking amends a test procedure, DOE must determine to what extent, if any, the proposed test procedure would alter the measured energy efficiency of any covered equipment as determined under the existing test procedure. (42 U.S.C. 6314(a)(6)) Further, if DOE determines that the amended test procedure would alter the measured efficiency of covered equipment, DOE must amend the applicable energy conservation standard accordingly. (42 U.S.C. 6314(a)(6))

In the 2012 test procedure final rule, DOE stated that some test procedure amendments will change the measured energy consumption of some covered equipment. 77 FR at 10295 and 10309 (Feb. 21, 2012). Specifically, DOE determined the provisions to accommodate testing of night curtains and lighting occupancy sensors and controls altered the measured energy consumption of covered equipment. 77 FR at 10309 (Feb. 21, 2012). As such, DOE established in the 2012 test procedure final rule that use of the amended test procedure for compliance with DOE energy conservation standards or representations with respect to energy consumption of commercial refrigeration equipment would be required on the compliance date of the revised energy conservation standards established in the March 2014 energy conservation standards final rule. 77 FR at 10309 (Feb. 21, 2012); 79 FR 17726, 17727 (Mar. 28, 2014).

To improve clarity, in the October 2013 test procedure NOPR, DOE proposed to reorganize the language at 10 CFR 431.64 into Appendices A and B. In the October 2013 test procedure NOPR, Appendix A contained the test procedure for commercial refrigeration equipment established in the 2006 test procedure final rule and Appendix B included the amended test procedure established in the 2012 test procedure final rule that will be required to be used on March 28, 2014, consistent with the compliance date of the amended standards established in the March 2014 energy conservation standards final rule. 78 FR at 64318-64325 (Oct. 28, 2013); 79 FR 17726, 17727 (Mar. 28, 2014).

In response to DOE's proposal, Hussmann stated that is does not understand why DOE cannot allow energy-saving features adopted in the 2012 test procedure final rule to demonstrate compliance with current energy conservation standards. (Hussmann, No. 11 at p. 3) Hussmann

further stated that it believes that the provision allowing manufacturers to rate equipment conservatively that were tested at a temperature lower than the required 38 ± 2 °F provided the basic model still meets the applicable energy conservation standard should be included in Appendix A (effective 30 days after publication of a final rule in the Federal Register) as well as Appendix B. Hussmann added that this will reduce testing burden for manufacturers without sacrificing efficiency. (Hussmann, No. 11 at p. 3) Zero Zone commented that it agreed with DOE's proposed approach to test remote cases under the LAPT and suggested that the test method should be included as part of Appendix A and immediately become part of DOE's test procedure. (Zero Zone, No. 18 at p. 3)

With regard to permitting early use of the test procedure amendments established in the 2012 test procedure final rule, DOE acknowledges Hussmann's request and notes that DOE has published guidance establishing that, while manufacturers need not comply with a new or amended test procedure prior to the compliance date established for that test procedure, manufacturers may voluntarily use amended test procedures to rate and certify their products prior to the compliance date if they also comply with energy conservation standards based on that test procedure. See http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/tp_faq_2012-06-29.pdf. DOE cannot permit amended test procedure provisions that affect the measured energy consumption to be used to demonstrate compliance with energy conservation standards that were not set based on that test procedure. Specifically, the provisions adopted in Appendix B in this final rule may be used prior to the compliance date established in this final rule as long as the equipment also demonstrates compliance with the amended standards established in the March 2014 energy

conservation standards final rule, which used that test procedure as a basis. 79 FR 17726, 17734 (Mar. 28, 2014). Manufacturers may not use the test procedure established in Appendix B to demonstrate compliance with existing energy conservation standards.

In response to Hussmann’s request to include allowances for conservatively rating commercial refrigerators at temperatures lower than the specified rating temperature of 38 ± 2 °F in Appendix A as well as Appendix B, DOE acknowledges that, in addition to testing and certification to comply with DOE’s energy conservation standards, commercial refrigeration equipment that is marketed to hold perishable food items must also be classified and certified by NSF/ANSI-7, “Commercial Refrigerators and Freezers” (hereafter referred to as NSF-7), a food safety standard issued by NSF.¹⁴ NSF-7 establishes two classes for commercial display cases: Type I, which is tested at ASHRAE Standard 72 standard ambient conditions (75 °F dry bulb and 64 °F wet bulb temperature), and Type II, which is tested at higher ambient conditions (80 °F dry bulb and 68 °F wet bulb temperature). These two test conditions are also reported in terms of dry bulb temperature and percentage relative humidity. Type I corresponds to 75 °F and 55 percent relative humidity, and Type II corresponds to 80 °F and 60 percent relative humidity. NSF-7 also requires Type I and Type II equipment to be tested such that the average temperature of each test package containing an individual temperature sensor does not exceed 41 °F and no single temperature sensor exceeds a reading of 43 °F at any time during the test. NSF-7 does not specify a required average temperature for all test sensors or the measurement of energy consumption during the test. On the other hand, DOE does require an integrated average test temperature of $38 \text{ °F} \pm 2 \text{ °F}$. However, manufacturers have reported that they test cases at lower

¹⁴NSF International. “NSF/ASNI 7 – 2009: Commercial Refrigerators and Freezers.” Ann Arbor, MI. http://www.nsf.org/business/food_equipment/standards.asp.

IATs than that specified by DOE to ensure the NSF-7 requirements are met. In the 2012 test procedure final rule, DOE establishes provisions that allow manufacturers to optionally test equipment at internal or ambient conditions more stringent than the prescribed DOE rating temperatures and conditions for that equipment class, to reduce the repetitive test burden of testing at both DOE and NSF-7 conditions. 77 FR at 10305–07 (Feb. 21, 2012).

DOE believes that accommodating Hussmann’s request and including the provisions regarding certification of equipment at conservative IATs in both Appendix A and Appendix B won’t affect the measured energy consumption of covered equipment or the stringency of the applicable energy conservation standard, as the provision is voluntary and thus is not required for equipment testing. In addition, DOE believes that allowing manufacturers to implement this conservative rating approach as of 30 days after publication of a final rule in the Federal Register will significantly reduce the burden associated with testing equipment that must be certified to both DOE’s energy conservation standards and NSF’s food safety standard. Therefore, DOE is adopting optional provisions to allow manufacturers to conservatively rate equipment at internal or ambient temperatures more stringent than the rating temperature or ambient conditions prescribed for their equipment class, provided the basic model still meets the applicable energy conservation standard, in both Appendix A and Appendix B. DOE notes that all other test procedure requirements must be satisfied to ensure a valid test; only the IAT and rating conditions may be adjusted.

In response to Zero Zone’s recommendation that DOE include the provisions for testing equipment that cannot be tested at the specified rating temperature at the LAPT in Appendix A in

addition to Appendix B, DOE is incorporating the LAPT provisions into both Appendix A and Appendix B as part of today's final rule.

B. Other Notice of Proposed Rulemaking Comments and DOE Responses

In response to the October 2013 test procedure NOPR, DOE received comments from interested parties regarding several issues that pertain to the CRE test procedure, but not to specific provisions or amendments. Specifically, DOE received comments on the ambient temperatures used for testing commercial refrigeration equipment at standard rating conditions and the burden of testing.

1. Ambient Test Temperatures

DOE's test procedure for commercial refrigeration equipment establishes standard rating conditions for testing covered equipment of 75 °F and 55 percent relative humidity. Commercial refrigeration equipment that is marketed to hold perishable food items is classified and certified by NSF/ANSI-7, "Commercial Refrigerators and Freezers" (hereafter referred to as NSF-7), a food safety standard issued by NSF. NSF-7 establishes two classes for commercial display cases: Type I, which is tested at ASHRAE Standard 72 standard ambient conditions (75 °F dry bulb and 64 °F wet bulb temperature), and Type II, which is tested at higher ambient conditions (80 °F dry bulb and 68 °F wet bulb temperature). These two test conditions are also reported in terms of dry bulb temperature and percentage relative humidity. Type I corresponds to 75 °F and 55 percent relative humidity, and Type II corresponds to 80 °F and 60 percent relative humidity. NSF-7 also requires Type I and Type II equipment to be tested such that the average temperature of each test package containing an individual temperature sensor does not exceed 41 °F and no single

temperature sensor exceeds a reading of 43 °F at any time during the test. NSF-7 does not specify a required average temperature for all test sensors or the measurement of energy consumption during the test. On the other hand, DOE does require an integrated average test temperature of 38 °F ± 2 °F. However, manufacturers have reported that they test cases at lower IATs than that specified by DOE to ensure the NSF-7 requirements are met.

Continental commented that commercial refrigeration equipment is designed primarily to keep food safe in harsh conditions and added that most commercial kitchens have multiple pieces of heat-generating cooking equipment near the refrigeration equipment and ambient temperatures much higher than 75 °F. Continental suggested that DOE utilize ambient test temperatures and allowable energy consumption levels cognizant of public health and safety. (Continental, No. 14 at p. 2)

In response to the comment from Continental, DOE believes that the existing test conditions specified within the ASHRAE 72 test procedure and accepted by industry are generally representative of field conditions. With respect to equipment designed to operate in harsher ambient conditions, DOE previously considered NSF Type II equipment in the 2012 test procedure final rule and found that the compressor systems can effectively operate at test temperatures. In the 2012 test procedure final rule, DOE agreed with interested parties that testing cases at an ambient temperature of 80 °F, rather than the currently specified 75 °F, will not have a significant impact on energy consumption for cases with doors and recognized that the impact on open cases may be greater than on closed cases, but did not believe that equipment will have operation or performance issues if tested at the temperatures prescribed by the DOE

test procedure. 77 FR at 10305-07 (Feb. 21, 2012). DOE maintains that the energy consumption of a case should scale with ambient temperature and does not believe these issues will prevent units from being tested using the DOE-prescribed test temperatures or complying with any existing or amended DOE energy conservation standards.

2. Burden of Testing

Felix Storch, Inc. (FSI) expressed concern that there would be an undue burden on small business to conduct the proposed test procedures. FSI's opinion was that DOE has not calculated the full extent to which the proposed test procedures revisions will affect small manufacturers. FSI further commented that small businesses have limited R&D budgets and expertise to understand and carry out the proposed test procedures effectively. (FSI, No. 12 at p. 1)

FSI recommended, to limit burden on small business, that: (1) small businesses be allowed to use a single test for each basic model; (2) DOE provide free consulting help to small businesses to interpret test procedures and be bound in enforcement cases by the interpretations it provides; (3) DOE, upon issuance of notices or rulemaking documents, be required to notify affected small businesses of new or revised regulations, and no enforcement be permitted against small business absent such notification; and (4) CCMS submission be optional, not required, for small businesses as this represents a large burden with little benefit to the consumer community. (FSI, No. 12 at p. 3) Finally, FSI stated that small businesses, such as FSI, serve small niche markets and increase customer choice by providing customizable solutions. (FSI, No. 12 at p. 3)

DOE understands that amending test procedures or including additional provisions in those test procedures could increase the burden on manufacturers to quantify the performance of their equipment. EPCA requires that the test procedures promulgated by DOE be reasonably designed to produce test results that reflect energy efficiency, energy use, and estimated operating costs of the covered equipment during a representative average use cycle. EPCA also requires that the test procedure not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(2))

DOE has analyzed the expected incremental cost of the test procedure amendments adopted in this final rule and its impact on manufacturers. All commercial refrigeration equipment covered by this rule is currently required to be tested using the DOE test procedure to show compliance with applicable energy conservation standards. The DOE test procedure, as amended by the 2012 test procedure final rule, consists of one 24-hour test at standard rating conditions to determine daily energy consumption.

In addition, the 2012 test procedure final rule amends the test procedure for commercial refrigeration equipment to update the referenced industry test procedures to their most current versions (AHRI 1200-2010 and AHAM HRF-1-2008); incorporates provisions for testing certain energy efficiency features, including night curtains and lighting occupancy sensor and scheduled controls; and provides a test procedure for specialty equipment that cannot be tested at the prescribed rating temperature. As part of that rulemaking, DOE considered the burden associated with the test procedure amendments and certified that the rule would not have a “significant economic impact on a substantial number of small entities,” and the preparation of a regulatory flexibility analysis was not warranted. 77 FR at 10314–16 (Feb. 21, 2012).

The test procedure amendments adopted in today's final rule only reorganize and clarify the existing requirements in the DOE test procedure, both those established in the 2006 test procedure final rule and those established in the 2012 test procedure final rule; they do not alter or affect any of the test procedure requirements or technical provisions in any way. DOE does not believe that the proposed test procedure amendments would affect the way in which any covered commercial refrigeration equipment is tested, nor would they impact the burden of conducting such a test.

In this test procedure final rule, DOE is also allowing manufacturers to test at the internal temperatures and/or ambient conditions required for NSF-7 testing within 30 days of publication of this final rule in the Federal Register. This will dramatically reduce the burden for manufacturers that produce equipment for food storage, as under the amended test procedure these two 24-hour tests can be combined. The NSF-7 test is similar in length and burden to the DOE test, but is performed at slightly different internal and external temperatures. Certification of equipment tested at NSF-7 test temperatures for the purposes of compliance with DOE energy conservation standards will only be possible for equipment that is able to meet the DOE energy conservation standard at the more stringent NSF-7 test conditions. However, DOE believes this provision can still potentially decrease the burden of test for some manufacturers.

The amendments to the test procedure for commercial refrigeration equipment were chosen to help minimize the impact of additional testing while clarifying and reorganizing the DOE test procedure to provide more accurate and repeatable test methods. Because none of these

amendments significantly increase the burden of a test, DOE believes that the test procedure finalized here will not be unduly burdensome to conduct.

In response to FSI's comments regarding this impact of DOE's test procedure for commercial refrigeration equipment on small businesses, DOE notes that the bulk of FSI's recommendations address CCE provisions that were established in a previous rulemaking (76 FR at 12446-49 (March 7, 2011)) and are not addressed in today's final rule. DOE provided a robust analysis of the estimated burden of the test procedure clarifications and amendments adopted in today's final rule and determined that these changes would not cause an undue burden on small manufacturers. This analysis is presented in section IV.B of today's final rule.

With regard to burden on small manufacturers associated with previously promulgated rulemakings, DOE is only analyzing the incremental burden associated with the amendments and provisions adopted as a result of today's final rule. However, DOE notes that previous rulemakings, such as those that accounted for the impact of CCE requirements on CRE manufacturers, including small businesses, have accounted for the incremental burden associated with these requirements and, in each case, found the burden to not have a significant impact on a substantial number of small entities. Specifically, with regard to an allowance for small businesses to use a single test for each basic model, DOE established a sample size of not less than two in the CCE final rule for all manufacturers regardless of size to ensure a suitable representation of model variability. 76 FR at 12453 (March 7, 2011). Regarding the availability of free consulting help for small businesses to interpret test procedures, DOE has established a guidance process whereby interested parties may submit questions to DOE at any time regarding

proper conduct of the DOE test procedure or compliance with relevant certification requirements. DOE also maintains a database of issues on which DOE has issued guidance for reference.¹⁵ When DOE issues notices or rulemaking documents, these documents are immediately available on DOE's website for Appliance and Commercial Equipment Standards¹⁶ and are publicly available via the Federal Register. DOE seeks to be as open as possible in conducting rulemakings and invites interested parties to participate openly. Regarding CCMS submission of certified ratings for small businesses, DOE has the same requirements for small businesses as for large entities and is under the same requirements to verify compliance with applicable energy conservation standards. Without certification reports, DOE has no record of compliance for applicable covered products. Further, DOE has attempted to design the CCMS templates to be as simple and straightforward as possible to minimize burden on manufacturers required to use these templates. Therefore, DOE continues to require certification of the TDEC or CDEC of covered basic models of commercial refrigeration equipment based on the testing of at least two unique units and the submittal of certification reports using DOE's CCMS templates.

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

¹⁵ U.S. Department of Energy Appliance & Commercial Equipment Standards Program Guidance and Frequently Asked Questions, available at: <http://www1.eere.energy.gov/guidance/default.aspx?pid=2&spid=1>.

¹⁶ http://energy.gov/node/773531/about_appliance_and_equipment.html

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 act analysis (IRFA) whenever an agency is required to publish a general notice of proposed rulemaking. When an agency promulgates a final rule after being required to publish a general notice of proposed rulemaking, the agency must prepare a final regulatory flexibility analysis. The requirement to prepare these analyses does not apply to any proposed or final rule if the agency certifies that the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities. If the agency makes such a certification, the agency must publish the certification in the Federal Register along with the factual basis for such certification.

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, so that the potential impacts of its rules on small entities are properly considered during the rulemaking process. 68 FR 7990 (Feb. 12, 2003). DOE has made its procedures and policies available on the Office of the General Counsel’s website at <http://energy.gov/gc/office-general-counsel>.

In the October 2013 test procedure NOPR, DOE reviewed the proposed rule to amend the test procedure for commercial refrigeration equipment, under the provisions of the Regulatory

Flexibility Act and the procedures and policies published on February 19, 2003. DOE certified that the proposed rule, if adopted, would not result in a significant impact on a substantial number of small entities. 78 FR at 64313 (October 28, 2013). DOE received comments on its certification and the economic impacts of the test procedure, and has responded to these comments in section III.B.2. After consideration of these comments, DOE certifies that the test procedure amendments set forth in today's 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 commercial refrigeration industry, the Small Business Association (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 standards are listed by North American Industry Classification System (NAICS) code and industry description and are available at

http://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf. Commercial refrigeration equipment manufacturing is classified under NAICS 333415, "Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing."

Small entities within this industry description are those with 750 employees or fewer.

DOE conducted a market survey to determine whether any small business manufacturers of equipment would be covered by this rulemaking. During its market survey, DOE used all available public information to identify potential small manufacturers. DOE's research involved the review of industry trade association membership directories (including AHRI), equipment

databases (e.g., Federal Trade Commission (FTC), the Thomas Register, California Energy Commission (CEC), and ENERGY STAR databases), individual company websites, and marketing research tools (e.g., Dunn and Bradstreet reports, Manta) to create a list of companies that manufacture or sell commercial refrigeration equipment covered by this rulemaking. DOE also referred to a list of small businesses that manufacture commercial refrigeration equipment, supplied by Traulsen in a written comment provided in response to the NOPR proposing amendments to the DOE test procedure for commercial refrigeration equipment published November 24, 2010 (Docket No. EERE-2010-BT-TP-0034, Traulsen, No. 9 at pp. 4–5). Using these sources, DOE identified 61 manufacturers of commercial refrigeration equipment.

DOE then reviewed this data to determine whether the entities met the SBA’s definition of a small business manufacturer of commercial refrigeration equipment 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 26 companies that would be considered small manufacturers and will be directly regulated by this rule, which represents 43 percent of national CRE manufacturers. Although 43 percent would be considered a substantial number of small entities, further analysis of incremental costs associated with this rulemaking determined no significant impact on these manufacturers. Specifically, the changes to the test procedure adopted in this final rule consist only of clarifications regarding:

1. the applicability of the test procedure and related energy conservation standards to certain types of equipment;

2. the definitions of “hybrid commercial refrigeration equipment,” “commercial refrigeration equipment with drawers,” and “commercial refrigeration equipment with solid and/or transparent doors”;
3. the relationship among the rating temperature, operating temperature, and integrated average temperature;
4. the proper configuration and use of energy management systems, lighting controls, and test packages in the DOE test procedure for commercial refrigeration equipment;
5. the treatment of various features, components, and accessories under the DOE test procedure;
6. the rounding requirements for test results and certified ratings;
7. the provision adopted in the 2012 test procedure final rule to allow testing at the lowest application product temperature for equipment that cannot operate at the prescribed rating temperature for its equipment class;
8. clarifications raised by Interpretations 1, 2, 3, 4, and 5 of AHRI 1200-2010;
9. the methodology used to determine total display area; and
10. the compliance date of certain amendments established in the 2012 test procedure final rule.

All commercial refrigeration equipment covered by this rule is currently required to be tested using the DOE test procedure to show compliance with established energy conservation standards. The DOE test procedure manufacturers must use to demonstrate compliance with existing standards is that established in the 2006 test procedure final rule, which references ARI

1200-2006 and AHAM HRF-1-2004. This test procedure consists of one 24-hour test at standard rating conditions to determine daily energy consumption.

The 2012 test procedure final rule amends the test procedure for commercial refrigeration equipment to update the referenced industry test procedures to their most current versions (AHRI 1200-2010 and AHAM HRF-1-2008); incorporates provisions for testing certain energy efficiency features, including night curtains and lighting occupancy sensor and scheduled controls; and provides a test procedure for specialty equipment that cannot be tested at the prescribed rating temperature. As part of that rulemaking, DOE considered the burden associated with the test procedure amendments and certified that the rule would not have a “significant economic impact on a substantial number of small entities,” and the preparation of a regulatory flexibility analysis was not warranted. 77 FR at 10314–16 (Feb. 21, 2012).

The test procedure amendments adopted in today’s final rule only reorganize and clarify the existing requirements in the DOE test procedure, both those established in the 2006 test procedure final rule and those established in the 2012 test procedure final rule; they do not alter or affect any of the test procedure requirements or provisions in any way. DOE does not believe that the proposed test procedure amendments would affect the way in which any covered commercial refrigeration equipment is tested, nor would they increase the burden of conducting such a test.

Rather, some of the provisions adopted in today’s final rule will reduce the burden associated with testing and certifying commercial refrigeration equipment. Specifically, this final

rule allows manufacturers to reduce burden by testing and certifying equipment and internal and ambient test conditions that satisfy both the DOE test procedure and the NSF-7 test procedure effective 30 days after publication of this final rule in the Federal Register. This may significantly decrease the amount of testing manufacturers must do to demonstrate compliance with both programs.

DOE also notes that the amendments regarding the treatment of various features, components, and accessories under the DOE test procedure were the result of a series of negotiations that occurred between DOE, manufacturers, and energy efficiency advocates and, thus, represent a mutually agreed upon approach for each of these features. DOE believes adoption of these clarifications will streamline testing and make DOE's test procedure easier and more straightforward to implement.

The negotiations also resulted in a recently published final rule adopting amended regulations governing AEDMs, basic model definition, and compliance for commercial HVAC, refrigeration, and WH equipment. The AEDM provisions allow an alternative method for determining compliance in lieu of conducting actual physical testing. 78 FR 79579, 79590. Commercial refrigeration equipment previously were required to test two units of each basic model, so the addition of an AEDM option reduces the number of units for which manufacturers will need to conduct this test procedure. The 2013 AEDM final rule also clarified its basic model definitions, which give manufacturers the flexibility to group individual models based on certain characteristics into an individual basic model for the purposes of demonstrating compliance with DOE's energy conservation standards. DOE notes that the AEDM and basic

model provisions adopted in the 2013 AEDM final rule will reduce the burden of demonstrating compliance with DOE's energy conservation standards in general, such that the burden estimates for testing discussed here represent a worse case. The specific reductions in burden accomplished in the 2013 AEDM final rule are discussed in more detail in that rule. 78 FR 79590-1 (Dec. 31, 2013).

Based on this factual basis, DOE continues to certify that this rule will not have a "significant economic impact on a substantial number of small entities," and the preparation of a regulatory flexibility analysis is not warranted. DOE has transmitted the certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the Small Business Administration for review under 5 U.S.C. 605(b).

C. Review Under the Paperwork Reduction Act of 1995

Manufacturers of commercial refrigeration equipment 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 commercial refrigeration equipment, including any amendments adopted for that test procedure. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including commercial refrigeration equipment. 76 FR 12422 (March 7, 2011). The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement has been approved by OMB under OMB Control Number 1910-1400. Public reporting burden for the certification is estimated to average 20 hours per response,

including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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 commercial refrigeration equipment. 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 (NEPA; 42 U.S.C. 4321 et seq.). The rule is covered by Categorical Exclusion A5, for rulemakings that interpret or amend an existing rule without changing the environmental effect, as set forth in DOE's NEPA regulations in appendix A to subpart D, 10 CFR part 1021. This rule will not affect the quality or distribution of energy usage and therefore will not result in any environmental impacts. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

E. Review Under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (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 (March 14, 2000). DOE has examined this final rule and has determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the products that are the subject of today's proposed rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297(d)) No further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

Regarding the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform," 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide a clear legal standard for affected conduct rather than a general standard; and (4) promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or

regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, the 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; Pub.104–4 sec. 201 (codified at 2 U.S.C. 1531) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. For proposed regulatory actions likely to result in a rule that may cause expenditures 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 estimates of the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a),(b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed “significant intergovernmental mandate” and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under

UMRA. 62 FR 12820. (This policy is also available at <http://energy.gov/gc/office-general-counsel>.) DOE reviewed today's final rule pursuant to UMRA and its 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. Today's final rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

DOE has determined, under Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 53 FR 8859 (March 15, 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. The OMB's guidelines were published in 67 FR 8452 (Feb. 22, 2002), and DOE's

guidelines were published in 67 FR 62446 (Oct. 7, 2002). DOE has reviewed today's 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 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OIRA, Office of Management and Budget, a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use. Today's regulatory action would not have a significant adverse effect on the supply, distribution, or use of energy and therefore it is not a significant energy action. 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), DOE must comply with section 32 of the Federal Energy Administration Act of 1974 (Pub. L.

93–275), as amended by the Federal Energy Administration Authorization Act of 1977. When a proposed rule contains or involves use of commercial standards, the rulemaking must inform the public of the use and background of such standards. (15 U.S.C. 788 Section 32)

This final rule incorporates testing methods contained in ASTM Standard E 1084-86 (Reapproved 2009), “Standard Test Method for Solar Transmittance (Terrestrial) of Sheet Materials Using Sunlight,” and ASHRAE 72-2005, “Method of Testing Commercial Refrigerators and Freezers.” DOE has evaluated these standards and is unable to conclude whether they fully comply with the requirements of section 323(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).

As required by section 32(c) of the Federal Energy Administration Act of 1974 as amended, DOE has consulted with the Attorney General and the Chairman of the Federal Trade Commission about the impact on competition of using the methods contained in these standards before prescribing a final rule.

M. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of today’s 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).

V. Approval of the Office of the Secretary

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

List of Subjects

10 CFR 429

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

10 CFR Part 431

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

Issued in Washington, DC, on April 10, 2014.



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

For the reasons set forth in the preamble, DOE amends parts 429 and 431 of chapter II of title 10, of the Code of Federal Regulations, as set forth below:

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

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

Authority: 42 U.S.C. 6291–6317.

§429.42 [Amended]

2. Section 429.42 is amended by adding in paragraphs (b)(2)(i), (ii), and (iii), the words “increments of 0.01” before the phrase “kilowatt hours per day (kWh/day).”

**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 431.62 is amended by:

a. Removing the definition for “commercial hybrid refrigerator, freezer, and refrigerator-freezer”;

b. Adding in alphabetical order the definitions for “chef base or griddle stand,” “closed solid,” “closed transparent,” “commercial freezer,” “commercial hybrid,” “commercial

refrigerator,” “commercial refrigerator-freezer,” “door,” “operating temperature,” “rating temperature,” and “transparent”; and

c. Revising the definitions for “ice-cream freezer” and “lowest application product temperature.”

The additions and revision read as follows:

§ 431.62 Definitions concerning commercial refrigerators, freezers and refrigerator-freezers.

* * * * *

Chef base or griddle stand means commercial refrigeration equipment that is designed and marketed for the express purpose of having a griddle or other cooking appliance placed on top of it that is capable of reaching temperatures hot enough to cook food.

Closed solid means equipment with doors, and in which more than 75 percent of the outer surface area of all doors on a unit are not transparent.

Closed transparent means equipment with doors, and in which 25 percent or more of the outer surface area of all doors on the unit are transparent.

Commercial freezer means a unit of commercial refrigeration equipment in which all refrigerated compartments in the unit are capable of operating below 32 °F (±2 °F).

Commercial hybrid means a unit of commercial refrigeration equipment

(1) That consists of two or more thermally separated refrigerated compartments that are in two or more different equipment families, and

(2) That is sold as a single unit.

Commercial refrigerator means 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).

Commercial refrigerator-freezer means a unit of commercial refrigeration equipment consisting of two or more refrigerated compartments where at least one refrigerated compartment is capable of operating at or above 32 °F (± 2 °F) and at least one refrigerated compartment is capable of operating below 32 °F (± 2 °F).

* * * * *

Door means a movable panel that separates the interior volume of a unit of commercial refrigeration equipment from the ambient environment and is designed to facilitate access to the refrigerated space for the purpose of loading and unloading product. This includes hinged doors, sliding doors, and drawers. This does not include night curtains.

* * * * *

Ice-cream freezer means a commercial freezer that is designed to operate at or below -5 °F (± 2 °F) (-21 °C ± 1.1 °C) and that the manufacturer designs, markets, or intends for the storing, displaying, or dispensing of ice cream.

* * * * *

Lowest application product temperature means the lowest integrated average temperature at which a given basic model is capable of consistently operating (i.e., maintaining so as to comply with the steady-state stabilization requirements specified in ASHRAE 72-2005 (incorporated by reference, see §431.63) for the purposes of testing under the DOE test procedure).

* * * * *

Operating temperature means the range of integrated average temperatures at which a self-contained commercial refrigeration unit or remote-condensing commercial refrigeration unit with a thermostat is capable of operating or, in the case of a remote-condensing commercial refrigeration unit without a thermostat, the range of integrated average temperatures at which the unit is marketed, designed, or intended to operate.

* * * * *

Rating temperature means the integrated average temperature a unit must maintain during testing (i.e., either as listed in the table at § 431.66(d)(1) or the lowest application product temperature).

* * * * *

Transparent means greater than or equal to 45 percent light transmittance, as determined in accordance with the ASTM Standard E 1084-86 (Reapproved 2009), (incorporated by reference, see §431.63) at normal incidence and in the intended direction of viewing.

* * * * *

5. Section 431.63 is amended by:

- a. Removing “for §431.64” in paragraphs (b)(1) and (b)(2) and adding in its place, “for §431.64 and appendices A and B to subpart C to part 431.”;
- b. Removing “and 431.66” in paragraphs (c)(1) and (2) and adding in its place, “431.66, and appendices A and B to subpart C of part 431.”; and
- c. Adding paragraphs (d) and (e) to read as follows:

§ 431.63 Materials incorporated by reference.

* * * * *

(d) ASHRAE. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 1971 Tullie Circle, NE., Atlanta, GA 30329, or <http://www.ashrae.org/>.

(1) ANSI/ASHRAE Standard 72-2005, (ASHRAE 72-2005), “Method of Testing Commercial Refrigerators and Freezers,” Copyright 2005, IBR approved for §431.62, and appendices A and B to subpart C of part 431.(2) [Reserved]

(e) ASTM. ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428, (877)909-2786, or go to <http://www.astm.org/>.

(1) ASTM E 1084 (Reapproved 2009), “Standard Test Method for Solar Transmittance (Terrestrial) of Sheet Materials Using Sunlight,” approved April 1, 2009, IBR approved for §431.62.

(2) [Reserved]

6. Section 431.64 is amended by revising paragraph (b) to read as follows:

§ 431.64 Uniform test method for the measurement of energy consumption of commercial refrigerators, freezers, and refrigerator-freezers.

* * * * *

(b) Testing and calculations. Determine the daily energy consumption of each covered commercial refrigerator, freezer, or refrigerator-freezer by conducting the appropriate test procedure set forth below, in appendix A or B to this subpart. The daily energy consumption of commercial refrigeration equipment shall be calculated using raw measured values and the final test results shall be reported in increments of 0.01 kWh/day.

7. Section 431.66 is amended by:

a. In the table in paragraph (d)(1) removing every instance of “ ≥ 32 ” and adding in its place “ $\geq 32 \pm 2$ ”, removing every instance of “ < 32 ” and adding in its place “ $< 32 \pm 2$ ”, and removing “ $\leq -5^{**}$ ” and adding in its place “ $\leq -5 \pm 2^{**}$ ”

b. Adding paragraph (f) to read as follows:

§ 431.66 Energy conservation standards and their effective dates.

* * * * *

(f) Exclusions. The energy conservation standards in paragraphs (b) through (e) of this section do not apply to salad bars, buffet tables, and chef bases or griddle stands.

8. Add appendices A and B to subpart C of part 431 to read as follows:

APPENDIX A TO SUBPART C OF PART 431 – UNIFORM TEST METHOD FOR THE MEASUREMENT OF ENERGY CONSUMPTION OF COMMERCIAL REFRIGERATORS, FREEZERS, AND REFRIGERATOR-FREEZERS.

Note: After [INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] but before March 28, 2017, any representations made with respect to the energy use or efficiency of commercial refrigeration equipment must be made in accordance with the results of testing pursuant to this appendix.

Manufacturers conducting tests of commercial refrigeration equipment after **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and prior to **[INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, must conduct such test in accordance with either this appendix or §431.64 as it appeared at 10 CFR part 430, subpart B, in the 10 CFR parts 200 to 499 edition revised as of January 1, 2014. Any representations made with respect to the energy use or efficiency of such commercial refrigeration equipment must be in accordance with whichever version is selected. Given that after **[INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** representations with respect to the energy use or efficiency of commercial refrigeration equipment must be made in accordance with tests conducted pursuant to this appendix, manufacturers may wish to begin using this test procedure as soon as possible.

1. Test Procedure

1.1. Determination of Daily Energy Consumption. Determine the daily energy consumption of each covered commercial refrigerator, freezer, refrigerator-freezer or ice-cream freezer by conducting the test procedure set forth in the Air-Conditioning and Refrigeration Institute (ARI) Standard 1200-2006, “Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets,” section 3, “Definitions,” section 4, “Test Requirements,” and section 7, “Symbols and Subscripts” (incorporated by reference, see § 431.63). For each commercial refrigerator, freezer, or refrigerator-freezer with a self-contained condensing unit, also use ARI Standard 1200-2006, section 6, “Rating Requirements for Self-contained Commercial Refrigerated Display Merchandisers and Storage Cabinets.” For each commercial refrigerator, freezer, or refrigerator-freezer with a remote condensing unit, also use ARI Standard

1200-2006, section 5, “Rating Requirements for Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets.”

1.2. Methodology for Determining Applicability of Transparent Door Equipment Families

To determine if a door for a given model of commercial refrigeration equipment is transparent: (1) calculate the outer door surface area including frames and mullions; (2) calculate the transparent surface area within the outer door surface area excluding frames and mullions; (3) calculate the ratio of (2) to (1) for each of the outer doors; and (4) the ratio for the transparent surface area of all outer doors must be greater than 0.25 to qualify as a transparent equipment family.

1.3 Additional Specifications for Testing of Components and Accessories. Subject to the provisions regarding specific components and accessories listed below, all standard components that would be used during normal operation of the basic model in the field shall be installed and in operation during testing as recommended by the manufacturer and representative of their typical operation in the field unless such installation and operation is inconsistent with any requirement of the test procedure. The specific components and accessories listed in the subsequent sections shall be operated as stated during the test.

1.3.1. Energy Management Systems. Applicable energy management systems may be activated during the test procedure provided they are permanently installed on the case, configured as sold and in such a manner so as to operate automatically without the intervention of the operator, and do not conflict with any of other requirements for a valid test as specified in this appendix.

1.3.2. Lighting. Energize all lighting, except customer display signs/lights as described in section 1.3.3 and UV lighting as described in section 1.3.6 of this appendix, to the maximum illumination level for the duration of testing. However, if a closed solid unit of commercial refrigeration equipment includes an automatic lighting control system that can turn off internal case lighting when the door is closed, and the manufacturer recommends the use of this system in writing in the product literature delivered with the unit, then the lighting control should be operated in the automatic setting, even if the model has a manual switch that disables the automatic lighting control.

1.3.3. Customer display signs/lights. Do not energize supplemental lighting that exists solely for the purposes of advertising or drawing attention to the case and is not integral to the operation of the case.

1.3.4 Condensate pan heaters and pumps. For self-contained equipment only, all electric resistance condensate heaters and condensate pumps must be installed and operational during the test. This includes the stabilization period (including pull-down), steady-state, and performance testing periods. Prior to the start of the stabilization period as defined by ASHRAE 72-2005 (incorporated by reference, see §431.63), the condensate pan must be dry. Following the start of the stabilization period, 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.

1.3.5 Anti-sweat door heaters. Anti-sweat door heaters must be in operation during the entirety of the test procedure. Models with a user-selectable setting must have the heaters energized and set to the maximum usage position. Models featuring an automatic, non-user-adjustable controller that turns on or off based on environmental conditions must be operating in the automatic state. If a unit is not shipped with a controller from the point of manufacture and is

intended to be used with an automatic, non-user-adjustable controller, test the unit with a manufacturer-recommended controller that turns on or off based on environmental conditions.

1.3.6 Ultraviolet lights. Do not energize ultraviolet lights during the test.

1.3.7 Illuminated temperature displays and alarms. All illuminated temperature displays and alarms shall be energized and operated during the test as they would be during normal field operation.

1.3.8 Condenser filters. Remove any nonpermanent filters that are provided to prevent particulates from blocking a model's condenser coil.

1.3.9 Refrigeration system security covers. Remove any devices used to secure the condensing unit against unwanted removal.

1.3.10 Night curtains and covers. Do not deploy night curtains or covers.

1.3.11 Grill options. Remove any optional, non-standard grills used to direct airflow.

1.3.12 Misting or humidification systems. Misting or humidification systems must be inactive during the test.

1.3.13 Air purifiers. Air purifiers must be inactive during the test.

1.3.14 General purpose outlets. During the test, do not connect any external load to any general purpose outlets contained within a unit.

1.3.15 Crankcase heaters. Crankcase heaters 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 crankcase heater, it must be activated during the test.

1.3.16 Drawers. Drawers are to be treated as identical to doors when conducting the DOE test procedure. Commercial refrigeration equipment with drawers should be configured with the drawer pans that allow for the maximum packing of test simulators and filler packages without

the filler packages and test simulators exceeding 90 percent of the refrigerated volume. Packing of test simulators and filler packages shall be in accordance with the requirements for commercial refrigerators without shelves, as specified in section 6.2.3 of ASHRAE 72-2005 (incorporated by reference, see §431.63).

2. Test Conditions

2.1. Integrated Average Temperatures. Conduct the testing required in section 1 and 2 of this appendix A, and determine the daily energy consumption at the applicable integrated average temperature as found in the following table.

| Category | Test procedure | Integrated average temperature |
|--|-------------------------------------|--|
| (i) Refrigerator with Solid Door(s) | ARI Standard 1200–2006 ¹ | 38 °F (±2 °F). |
| (ii) Refrigerator with Transparent Door(s) | ARI Standard 1200–2006 ¹ | 38 °F (±2 °F). |
| (iii) Freezer with Solid Door(s) | ARI Standard 1200–2006 ¹ | 0 °F (±2 °F). |
| (iv) Freezer with Transparent Door(s) | ARI Standard 1200–2006 ¹ | 0 °F (±2 °F). |
| (v) Refrigerator-Freezer with Solid Door(s) | ARI Standard 1200–2006 ¹ | 38 °F (±2 °F) for refrigerator compartment. 0 °F (±2 °F) for freezer compartment. |
| (vi) Commercial Refrigerator with a Self-Contained Condensing Unit Designed for Pull-Down Temperature Applications and Transparent Doors | ARI Standard 1200–2006 ¹ | 38 °F (±2 °F). |
| (vii) Ice-Cream Freezer | ARI Standard 1200–2006 ¹ | -15.0 °F (±2 °F). |
| (viii) Commercial Refrigerator, Freezer, and Refrigerator-Freezer with a Self-Contained Condensing Unit and without Doors | ARI Standard 1200–2006 ¹ | (A) 0 °F (±2 °F) for low temperature applications. (B) 38 °F (±2 °F) for medium temperature applications. |
| (ix) Commercial Refrigerator, Freezer, and Refrigerator-Freezer with a Remote Condensing Unit | ARI Standard 1200–2006 ¹ | (A) 0 °F (±2 °F) for low temperature applications. (B) 38 °F (±2 °F) for medium temperature applications. |

¹Incorporated by reference, see §431.63.

2.2. Lowest Application Product Temperature. If a unit of commercial refrigeration equipment is not able to be operated at the integrated average temperature specified in the table in paragraph 2.1, test the unit at the lowest application product temperature (LAPT), as defined in §431.62. For units equipped with a thermostat, LAPT is the lowest thermostat setting. For remote condensing equipment without a thermostat or other means of controlling temperature at the case, the lowest application product temperature is the temperature achieved with the dew point temperature (as defined in AHRI Standard 1200 (I-P)-2010 (incorporated by reference see §431.63)) set to 5 degrees colder than that required to maintain the manufacturer's lowest specified operating temperature.

2.3. Testing at NSF Test Conditions. For commercial refrigeration equipment that is also tested in accordance with NSF test procedures (Type I and Type II), integrated average temperatures and ambient conditions used for NSF testing may be used in place of the DOE-prescribed integrated average temperatures and ambient conditions provided they result in a more stringent test. That is, the measured daily energy consumption of the same unit, when tested at the rating temperatures and/or ambient conditions specified in the DOE test procedure, must be lower than or equal to the measured daily energy consumption of the unit when tested with the rating temperatures or ambient conditions used for NSF testing. The integrated average temperature measured during the test may be lower than the range specified by the DOE applicable temperature specification provided in paragraph 2.1 of this appendix, but may not exceed the upper value of the specified range. Ambient temperatures and/or humidity values may be higher than those specified in the DOE test procedure.

3. Volume and Total Display Area

3.1. Determination of Volume. Determine the volume of a commercial refrigerator, freezer, refrigerator-freezer, or ice-cream freezer using the method set forth in the ANSI/AHAM HRF-1-2004, “Energy, Performance and Capacity of Household Refrigerators, Refrigerator-Freezers and Freezers” (incorporated by reference, see § 431.63), section 3.21, “Volume,” sections 4.1 through 4.3, “Method for Computing Total Refrigerated Volume and Total Shelf Area of Household Refrigerators and Household Wine Chillers,” and sections 5.1 through 5.3, “Method for Computing Total Refrigerated Volume and Total Shelf Area of Household Freezers.”

3.2 Determination of Total Display Area. Determine the total display area of a commercial refrigerator, freezer, refrigerator-freezer, or ice-cream freezer using the method set forth in ARI Standard 1200–2006 (incorporated by reference, see §431.63), but disregarding the specification that “transparent material ($\geq 65\%$ light transmittance) in Appendix D. Specifically, total display area shall be the sum of the projected area(s) of visible product, expressed in ft² (i.e., portions through which product can be viewed from an angle normal, or perpendicular, to the transparent area). Determine L as the interior length of the CRE model, provided no more than 10 percent of that length consists of non-transparent material. For those cases with greater than 10 percent of non-transparent area, L shall be determined as the projected linear dimension(s) of visible product plus 10 percent of non-transparent area.

See Figures A3.1, A3.2, A3.3, A3.4, and A3.5 as examples of how to calculate the dimensions associated with calculation of total display area. In the diagrams, D_h and L represent the dimensions of the projected visible product.

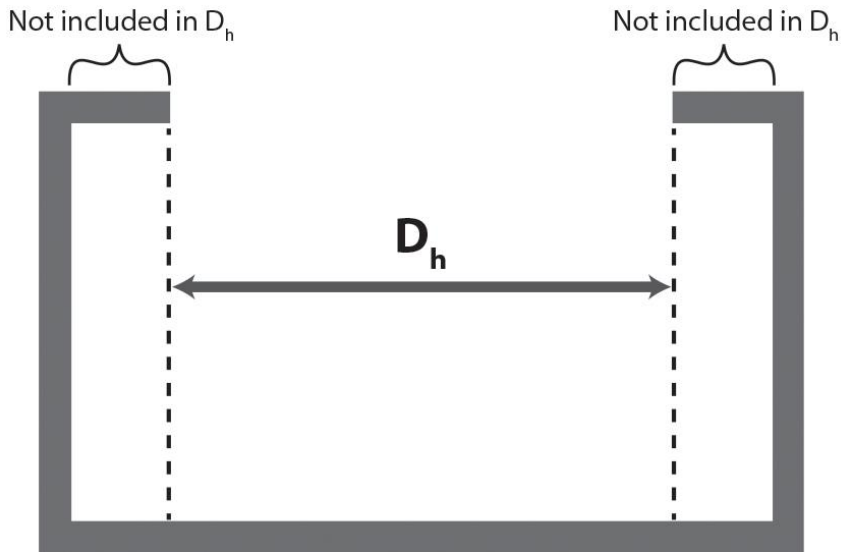


Figure A3.1 Horizontal open display case, where the distance “ D_h ” is the dimension of the projected visible product.

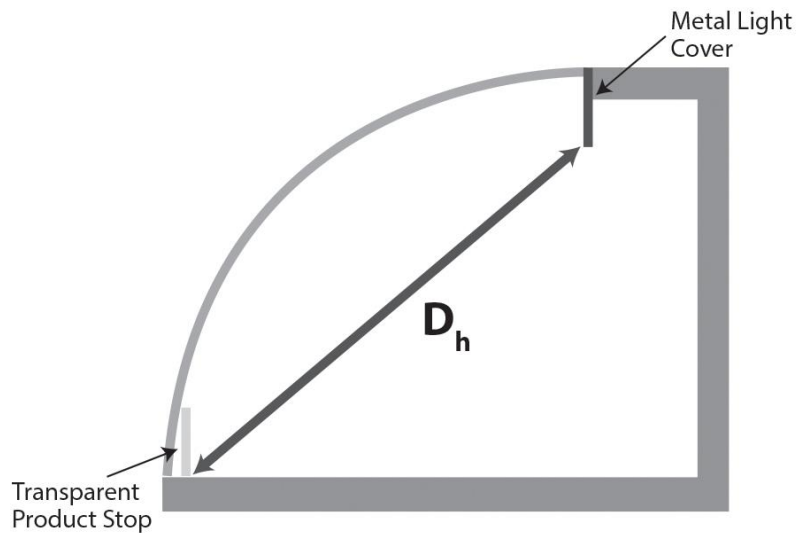


Figure A3.2 Service over counter display case, the distance “ D_h ” is the dimension of the projected visible product, that being the dimension transverse to the length of the case

through which product can be viewed, excluding areas of the product zone that cannot be viewed as part of a direct projection through the glass front.

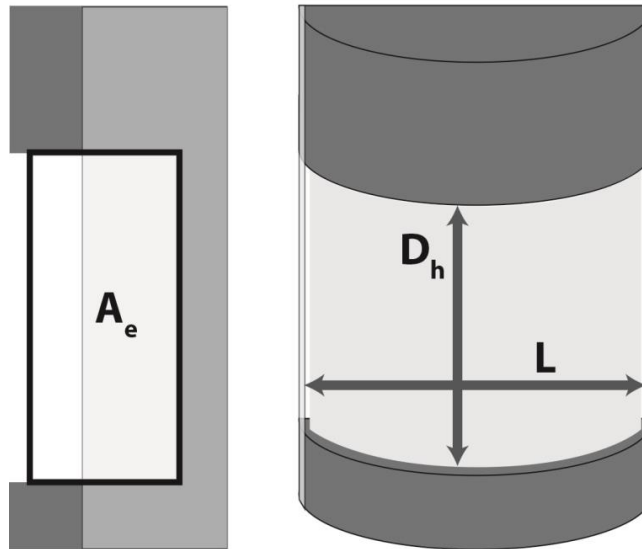


Figure A3.3 Radius case, where the distances “D_h” and “L,” and the area “A_e,” are representative of the planar projections of visible product when viewed at an angle normal to the transparent surface or opening.

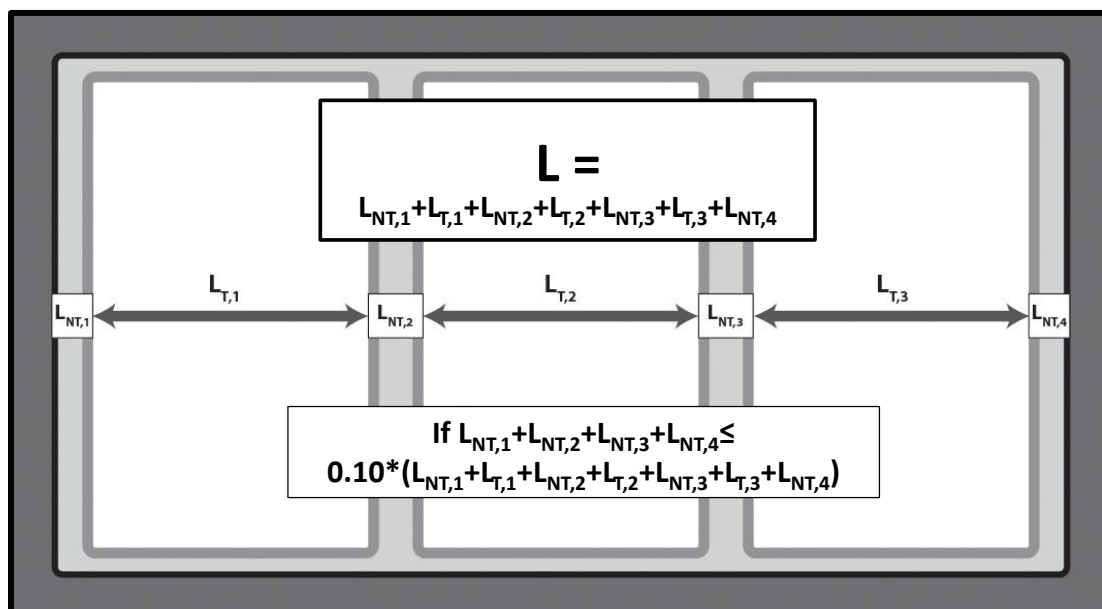


Figure A3.4 Three-door vertical closed transparent display case, where the distance “L” is the collective length of portions of the merchandiser through which product can be seen,

including the linear dimension of transparent ($L_{T,i}$) and non-transparent ($L_{NT,i}$) areas, provided the total linear dimension of non-transparent areas are less than 5 inches.

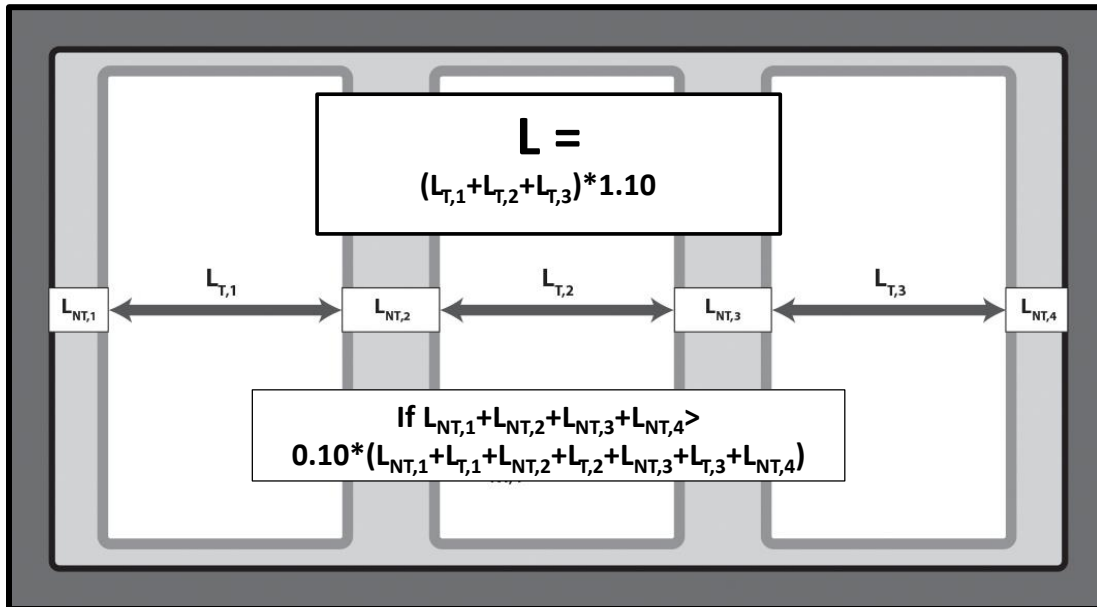


Figure A3.5 Three-door vertical closed transparent display case, where the distance “L” is the collective length of portions of the merchandiser through which product can be seen, including the linear dimension of transparent ($L_{T,i}$) and non-transparent ($L_{NT,i}$) areas, and the total linear dimension of non-transparent areas is greater than 5 inches.

APPENDIX B TO SUBPART C OF PART 431 – AMENDED UNIFORM TEST METHOD FOR THE MEASUREMENT OF ENERGY CONSUMPTION OF COMMERCIAL REFRIGERATORS, FREEZERS, AND REFRIGERATOR-FREEZERS.

Note: Any representations made on or after March 28, 2017, with respect to the energy use or efficiency of commercial refrigeration equipment must be made in accordance with the results of testing pursuant to this appendix.

1. Test Procedure

1.1. Determination of Daily Energy Consumption. Determine the daily energy consumption of each covered commercial refrigerator, freezer, refrigerator-freezer or ice-cream freezer by conducting the test procedure set forth in the AHRI Standard 1200 (I-P)-2010, section 3, “Definitions,” section 4, “Test Requirements,” and section 7, “Symbols and Subscripts” (incorporated by reference, see §431.63). For each commercial refrigerator, freezer, or refrigerator-freezer with a self-contained condensing unit, also use AHRI Standard 1200 (I-P)-2010, section 6, “Rating Requirements for Self-contained Commercial Refrigerated Display Merchandisers and Storage Cabinets.” For each commercial refrigerator, freezer, or refrigerator-freezer with a remote condensing unit, also use AHRI Standard 1200 (I-P)-2010, section 5, “Rating Requirements for Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets.”

1.2. Methodology for Determining Applicability of Transparent Door Equipment Families

To determine if a door for a given model of commercial refrigeration equipment is transparent: (1) calculate the outer door surface area including frames and mullions; (2) calculate the transparent surface area within the outer door surface area excluding frames and mullions; (3) calculate the ratio of (2) to (1) for each of the outer doors; and (4) the ratio for the transparent surface area of all outer doors must be greater than 0.25 to qualify as a transparent equipment family.

1.3. Additional Specifications for Testing of Components and Accessories. All standard components that would be used during normal operation of the basic model in the field shall be

installed and used during testing as recommended by the manufacturer and representative of their typical operation in the field unless such installation and operation is inconsistent with any requirement of the test procedure. The specific components and accessories listed in the subsequent sections shall be operated as stated during the test.

1.3.1. Energy Management Systems. Applicable energy management systems may be activated during the test procedure provided they are permanently installed on the case, configured and sold in such a manner so as to operate automatically without the intervention of the operator, and do not conflict with any of other requirements for a valid test as specified in this appendix.

1.3.2. Lighting. All lighting except for customer display signs/lights as described in section 1.3.3 and UV lighting as described in section 1.3.6 of this appendix shall be energized to the maximum illumination level for the duration of testing for commercial refrigeration equipment with lighting except when the unit is equipped with lighting occupancy sensors and controls. If the unit includes an automatic lighting control system, it should be enabled during test. If the unit is equipped with lighting occupancy sensors and controls in should be tested in accordance with section 1.3.2.1 of this appendix.

1.3.2.1. Lighting Occupancy Sensors and Controls. For units with lighting occupancy sensors and/or scheduled lighting controls installed on the unit, determine the effect of the controls/sensors on daily energy consumption by either a physical test or a calculation method and using the variables that are defined as:

CEC_A is the alternate compressor energy consumption (kilowatt-hours);

LEC_{sc} is the lighting energy consumption of internal case lights with lighting occupancy sensors and controls deployed (kilowatt-hours);

P_{li} is the rated power of lights when they are fully on (watts);

$P_{li(off)}$ is the power of lights when they are off (watts);

$P_{li(dim)}$ is the power of lights when they are dimmed (watts);

$TDEC_o$ is the total daily energy consumption with lights fully on, as measured by AHRI Standard 1200 (I-P)-2010 (kilowatt-hours);

t_{dim} is the time period during which the lights are dimmed due to the use of lighting occupancy sensors or scheduled lighting controls (hours);

$t_{dim,controls}$ is the time case lighting is dimmed due to the use of lighting controls (hours);

$t_{dim,sensors}$ is the time case lighting is dimmed due to the use of lighting occupancy sensors (hours);

t_l is the time period when lights would be on without lighting occupancy sensors and/or scheduled lighting controls (24 hours);

t_{off} is the time period during which the lights are off due to the use of lighting occupancy sensors and/or scheduled lighting controls (hours);

$t_{off,controls}$ is the time case lighting is off due to the use of scheduled lighting controls (hours);

$t_{off,sensors}$ is the time case lighting is off due to the use of lighting occupancy sensors (hours); and

t_{sc} is the time period when lighting is fully on with lighting occupancy sensors and scheduled lighting controls enabled (hours).

1.3.2.1.i. For both a physical test and a calculation method, determine the estimated time off or dimmed, t_{off} or t_{dim} , as the sum of contributions from lighting occupancy sensors and

scheduled lighting controls that dim or turn off lighting, respectively, as shown in the following equation:

$$t_{\text{off}} = t_{\text{off,sensors}} + t_{\text{off,controls}}$$

$$t_{\text{dim}} = t_{\text{dim,sensors}} + t_{\text{dim,controls}}$$

The sum of t_{sc} , t_{off} , and t_{dim} should equal 24 hours and the total time period during which the lights are off or dimmed shall not exceed 10.8 hours. For cases with scheduled lighting controls, the time the case lighting is off and/or dimmed due to scheduled lighting controls ($t_{\text{off,controls}}$ and/or $t_{\text{dim,controls}}$, as applicable) shall not exceed 8 hours. For cases with lighting occupancy sensors installed, the time the case lighting is off and/or dimmed due to lighting occupancy sensors ($t_{\text{off,sensors}}$ and/or $t_{\text{dim,sensors}}$, as applicable) shall not exceed 10.8 hours. For cases with lighting occupancy sensors and scheduled lighting controls installed, the time the case lighting is off and/or dimmed due to lighting occupancy sensors ($t_{\text{off,sensors}}$ and/or $t_{\text{dim,sensors}}$, as applicable) shall not exceed 2.8 hours and the time the case lighting is off and/or dimmed due to scheduled lighting controls ($t_{\text{off,controls}}$ and/or $t_{\text{dim,controls}}$, as applicable) shall not exceed 8 hours.

1.3.2.1.ii. If using a physical test to determine the daily energy consumption, turn off the lights for a time period equivalent to t_{off} and dim the lights for a time period equal to t_{dim} . If night curtains are also being tested on the case, the period of lights off and/or dimmed shall begin at the same time that the night curtain is being deployed and shall continue consecutively, in that order, for the appropriate number of hours.

1.3.2.1.iii. If using a calculation method to determine the daily energy consumption—

1.3.2.1.iii.A. Calculate the LEC_{sc} using the following equation:

$$\text{LEC}_{\text{sc}} = \frac{\left((P_{\text{li}} \times t_{\text{sc}}) + (P_{\text{li(off)}} \times t_{\text{off}}) + (P_{\text{li(dim)}} \times t_{\text{dim}}) \right)}{(1000)}$$

1.3.2.1.iii.B. Calculate the CEC_A using the following equation:

$$CEC_A = 0.75 \times \frac{3.4121 \times (LEC_{sc} - P_{li} \times t_l/1000)}{EER}$$

Where EER represents the energy efficiency ratio from Table 1 in AHRI Standard 1200 (I-P)-2010 (incorporated by reference, see §431.63) for remote condensing equipment or the values shown in the following table for self-contained equipment:

EER for Self-Contained Commercial Refrigerated Display Merchandisers and Storage Cabinets

| Operating Temperature Class | EER <u>Btu/W</u> |
|-----------------------------|---------------------|
| Medium | 11 |
| Low | 7 |
| Ice Cream | 5 |

1.3.2.1.iii.C. For remote condensing units, calculate the revised compressor energy consumption (CEC_R) by adding the CEC_A to the compressor energy consumption (CEC) measured in AHRI Standard 1200 (I-P)-2010 (incorporated by reference, see §431.63). The CDEC for the entire case is the sum of the CEC_R and LEC_{sc} (as calculated above) and the fan energy consumption (FEC), anti-condensate energy consumption (AEC), defrost energy consumption (DEC), and condensate evaporator pan energy consumption (PEC) (as measured in AHRI Standard 1200 (I-P)-2010).

1.3.2.1.iii.D. For self-contained units, the TDEC for the entire case is the sum of total daily energy consumption as measured by the AHRI Standard 1200 (I-P)-2010 (incorporated by reference, see §431.63) test with the lights fully on ($TDEC_o$) and CEC_A , less the decrease in

lighting energy use due to lighting occupancy sensors and scheduled lighting controls, as shown in following equation.

$$\text{TDEC} = \text{TDEC}_o + \text{CEC}_A - \left((\text{P}_{\text{li}} \times \text{t}_1) / 1000 - \text{LEC}_{\text{sc}} \right)$$

1.3.3. Customer display signs/lights. Do not energize supplemental lighting that exists solely for the purposes of advertising or drawing attention to the case and is not integral to the operation of the case.

1.3.4 Condensate pan heaters and pumps. For self-contained equipment only, all electric resistance condensate heaters and condensate pumps must be installed and in operation during the test. This includes the stabilization period (including pull-down), steady-state, and performance testing periods. Prior to the start of the stabilization period as defined by ASHRAE 72-2005 (incorporated by reference, see §431.63), the condensate pan must be dry. Following the start of the stabilization period, allow any condensate moisture generated to accumulate in the pan. Do not manually add or remove water to or from the condensate pan at any time during the test.

1.3.5 Anti-sweat door heaters. Anti-sweat door heaters must be operational during the entirety of the test procedure. Models with a user-selectable setting must have the heaters energized and set to the maximum usage position. Models featuring an automatic, non-user-adjustable controller that turns on or off based on environmental conditions must be operating in the automatic state. If a unit is not shipped with a controller from the point of manufacture and is intended to be used with an automatic, non-user-adjustable controller, test the unit with a manufacturer-recommended controller that turns on or off based on environmental conditions.

1.3.6 Ultraviolet lights. Do not energize ultraviolet lights during the test.

1.3.7 Illuminated temperature displays and alarms. All illuminated temperature displays and alarms shall be energized and operated during the test as they would be during normal field operation.

1.3.8 Condenser filters. Remove any nonpermanent filters that are provided to prevent particulates from blocking a model's condenser coil.

1.3.9 Refrigeration system security covers. Remove any devices used to secure the condensing unit against unwanted removal.

1.3.10 Night curtains and covers. For display cases sold with night curtains installed, the night curtain shall be employed for 6 hours; beginning 3 hours after the start of the first defrost period. Upon the completion of the 6-hour period, the night curtain shall be raised until the completion of the 24-hour test period.

1.3.11 Grill options. Remove any optional non-standard grills used to direct airflow.

1.3.12 Misting or humidification systems. Misting or humidification systems must be inactive during the test.

1.3.13 Air purifiers. Air purifiers must be inactive during the test.

1.3.14 General purpose outlets. During the test, do not connect any external load to any general purpose outlets contained within a unit.

1.3.15 Crankcase heaters. Crankcase heaters 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 crankcase heater, it must be utilized during the test.

1.3.16 Drawers. Drawers are to be treated as identical to doors when conducting the DOE test procedure. Commercial refrigeration equipment with drawers should be configured with the drawer pans that allow for the maximum packing of test simulators and filler packages without

the filler packages and test simulators exceeding 90 percent of the refrigerated volume. Packing of test simulators and filler packages shall be in accordance with the requirements for commercial refrigerators without shelves, as specified in section 6.2.3 of ASHRAE 72-2005 (incorporated by reference, see §431.63).

2. Test Conditions

2.1. Integrated Average Temperatures. Conduct the testing required in section 1 of this appendix B, and determine the daily energy consumption at the applicable integrated average temperature in the following table.

| Category | Test procedure | Integrated average temperature |
|---|--|--|
| (i) Refrigerator with Solid Door(s) | AHRI Standard 1200 (I-P)–2010 ¹ | 38 °F (±2 °F). |
| (ii) Refrigerator with Transparent Door(s) | AHRI Standard 1200 (I-P)–2010 ¹ | 38 °F (±2 °F). |
| (iii) Freezer with Solid Door(s) | AHRI Standard 1200 (I-P)–2010 ¹ | 0 °F (±2 °F). |
| (iv) Freezer with Transparent Door(s) | AHRI Standard 1200 (I-P)–2010 ¹ | 0 °F (±2 °F). |
| (v) Refrigerator-Freezer with Solid Door(s) | AHRI Standard 1200 (I-P)–2010 ¹ | 38 °F (±2 °F) for refrigerator compartment. 0 °F (±2 °F) for freezer compartment. |
| (vi) Commercial Refrigerator with a Self-Contained Condensing Unit Designed for Pull-Down Temperature | AHRI Standard 1200 (I-P)–2010 ¹ | 38 °F (±2 °F). |

| | | |
|---|--|--|
| Applications and Transparent Doors | | |
| (vii) Ice-Cream Freezer | AHRI Standard 1200 (I-P)–2010 ¹ | –15.0 °F (±2 °F). |
| (viii) Commercial Refrigerator, Freezer, and Refrigerator-Freezer with a Self-Contained Condensing Unit and without Doors | AHRI Standard 1200 (I-P)–2010 ¹ | (A) 0 °F (±2 °F) for low temperature applications. (B) 38.0 °F (±2 °F) for medium temperature applications. |
| (ix) Commercial Refrigerator, Freezer, and Refrigerator-Freezer with a Remote Condensing Unit | AHRI Standard 1200 (I-P)–2010 ¹ | (A) 0 °F (±2 °F) for low temperature applications. (B) 38.0 °F (±2 °F) for medium temperature applications. |

¹Incorporated by reference, see §431.63.

2.2. Lowest Application Product Temperature. If a unit of commercial refrigeration equipment is not able to be operated at the integrated average temperature specified in the table in paragraph 2.1 of this appendix, test the unit at the lowest application product temperature (LAPT), as defined in §431.62. For units equipped with a thermostat, LAPT is the lowest thermostat setting. For remote condensing equipment without a thermostat or other means of controlling temperature at the case, the lowest application product temperature is the temperature achieved with the dew point temperature (as defined in AHRI Standard 1200 (I-P)-2010 (incorporated by reference, see §431.63)) set to 5 degrees colder than that required to maintain the manufacturer’s lowest specified application temperature.

2.3. Testing at NSF Test Conditions. For commercial refrigeration equipment that is also tested in accordance with NSF test procedures (Type I and Type II), integrated average temperatures and ambient conditions used for NSF testing may be used in place of the DOE-prescribed integrated average temperatures and ambient conditions provided they result in a more stringent test. That is, the measured daily energy consumption of the same unit, when tested at the rating temperatures and/or ambient conditions specified in the DOE test procedure, must be lower than or equal to the measured daily energy consumption of the unit when tested with the rating temperatures or ambient conditions used for NSF testing. The integrated average temperature measured during the test may be lower than the range specified by the DOE applicable temperature specification provided in paragraph 2.1 of this appendix, but may not exceed the upper value of the specified range. Ambient temperatures and/or humidity values may be higher than those specified in the DOE test procedure.

3. Volume and Total Display Area

3.1. Determination of Volume. Determine the volume of a commercial refrigerator, freezer, refrigerator-freezer, or ice-cream freezer using the method set forth in the HRF-1-2008 (incorporated by reference, see §431.63), section 3.30, “Volume,” and sections 4.1 through 4.3, “Method for Computing Refrigerated Volume of Refrigerators, Refrigerator-Freezers, Wine Chillers and Freezers.”

3.2 Determination of Total Display Area. Determine the total display area of a commercial refrigerator, freezer, refrigerator-freezer, or ice-cream freezer using the method set forth in ARI Standard 1200–2006 (incorporated by reference, see §431.63), but disregarding the

specification that “transparent material ($\geq 65\%$ light transmittance) in Appendix D. Specifically, total display area shall be the sum of the projected area(s) of visible product, expressed in ft^2 (i.e., portions through which product can be viewed from an angle normal, or perpendicular, to the transparent area). Determine L as the interior length of the CRE model, provided no more than 5 inches of that length consists of non-transparent material. For those cases with greater than 5 inches of non-transparent area, L shall be determined as the projected linear dimension(s) of visible product plus 5 inches of non-transparent area.

See Figures A3.1, A3.2, and A3.3 as examples of how to calculate the dimensions associated with calculation of total display area. In the diagrams, D_h and L represent the dimensions of the projected visible product.

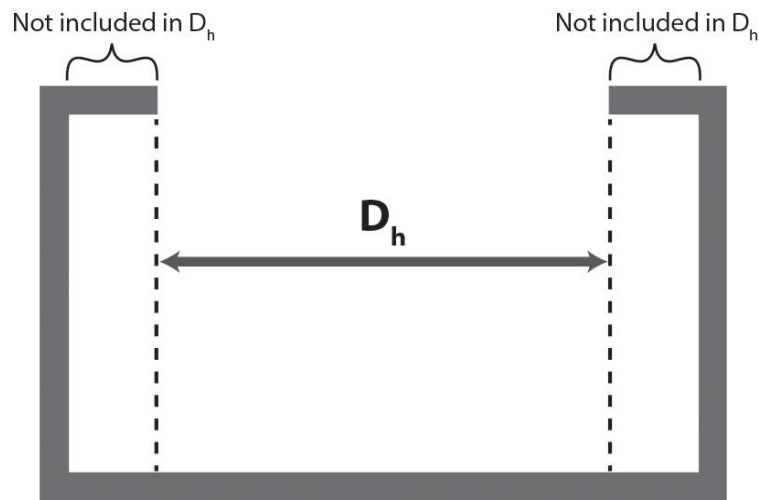


Figure A3.1 Horizontal open display case, where the distance “ D_h ” is the dimension of the projected visible product.

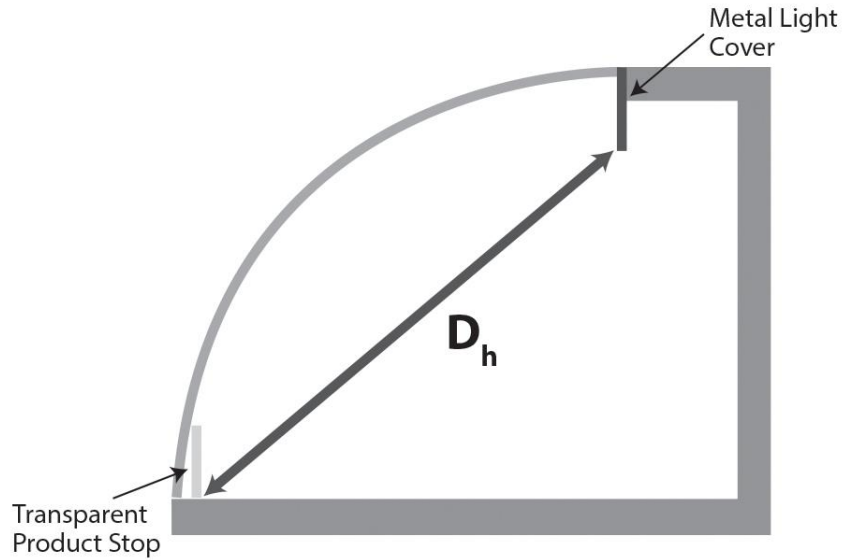


Figure A3.2 Service over counter display case, the distance “ D_h ” is the dimension of the projected visible product, that being the dimension transverse to the length of the case through which product can be viewed, excluding areas of the product zone that cannot be viewed as part of a direct projection through the glass front.

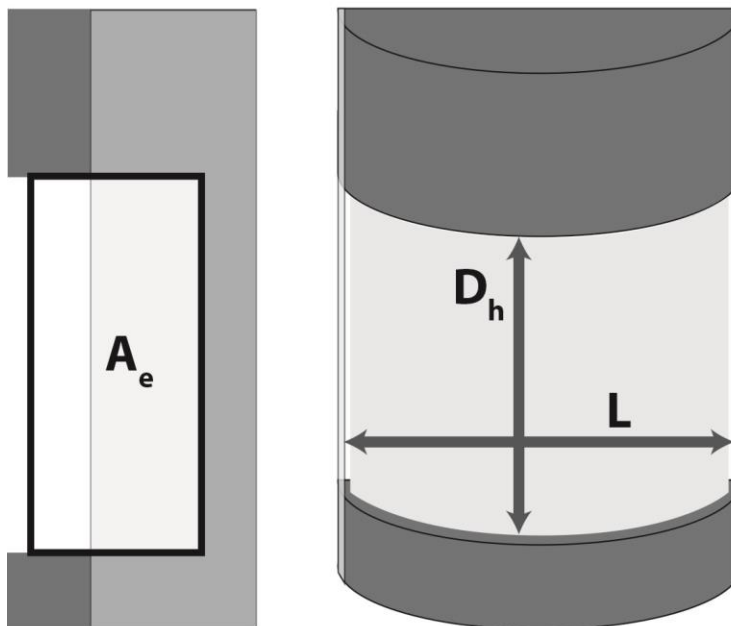


Figure A3.3 Radius case, where the distances “ D_h ” and “ L ,” and the area “ A_e ,” are representative of the planar projections of visible product when viewed at an angle normal to the transparent surface or opening.

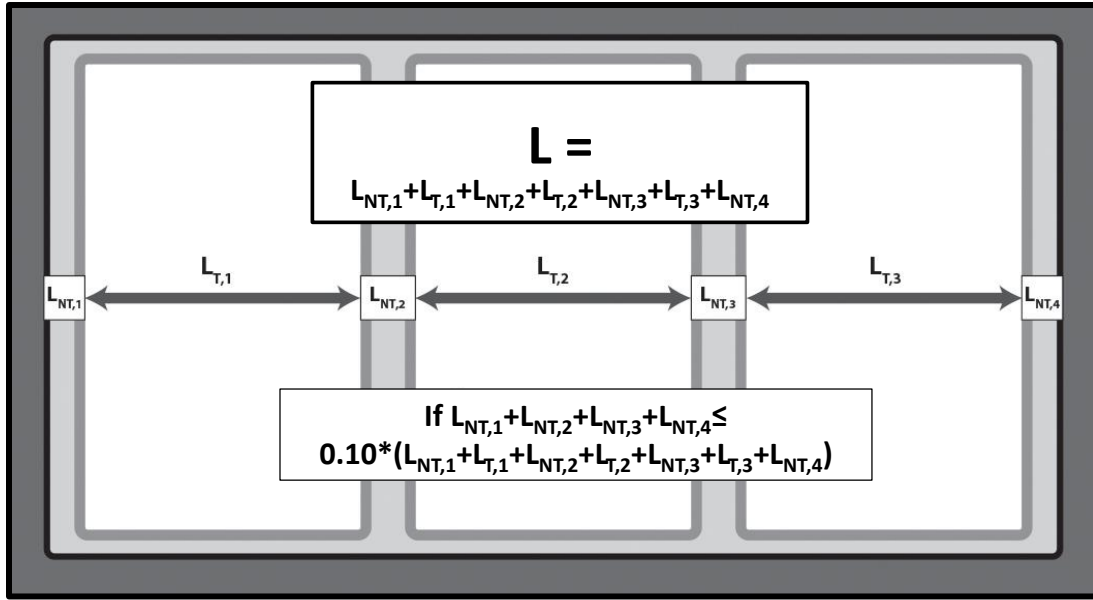


Figure A3.4 Three-door vertical closed transparent display case, where the distance “L” is the collective length of portions of the merchandiser through which product can be seen, including the linear dimension of transparent ($L_{T,i}$) and non-transparent ($L_{NT,i}$) areas, provided the total linear dimension of non-transparent areas are less than 5 inches.

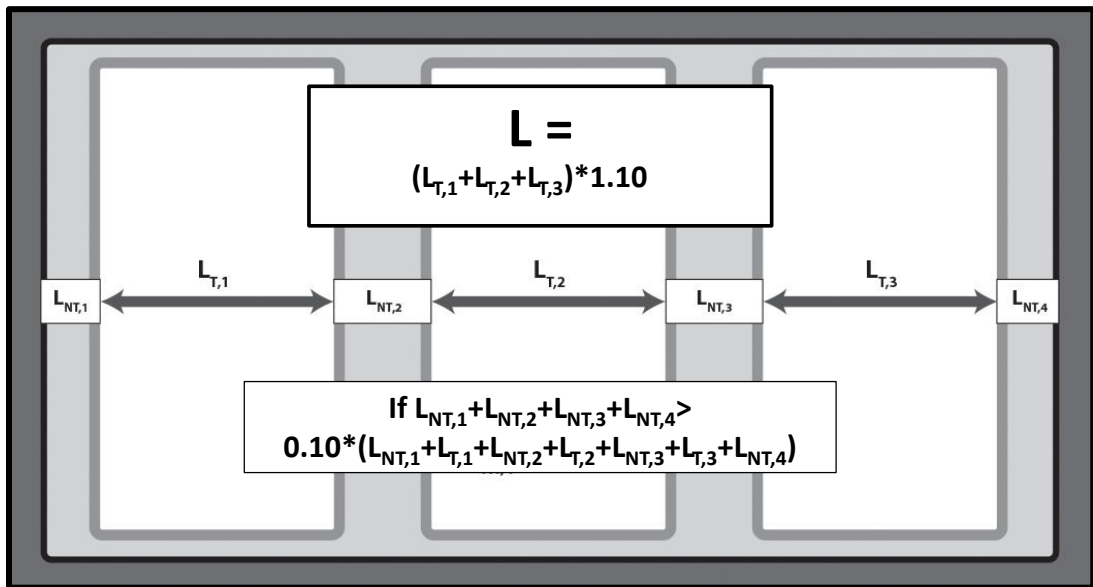


Figure A3.5 Three-door vertical closed transparent display case, where the distance “L” is the collective length of portions of the merchandiser through which product can be seen,

including the linear dimension of transparent ($L_{T,i}$) and non-transparent ($L_{NT,i}$) areas, and the total linear dimension of non-transparent areas is greater than 5 inches.