



**[6450-01-P]**

**DEPARTMENT OF ENERGY**

**[Case No. CR-007]**

**Energy Conservation Program: Decision and Order Granting a Waiver to ITW Food Equipment Group, LLC from the Department of Energy Commercial Refrigeration Equipment Test Procedure**

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

**ACTION:** Notice of decision and order.

**SUMMARY:** The U.S. Department of Energy (DOE) gives notice of a Decision and Order (Case No. CR-007) that grants to ITW Food Equipment Group, LLC (ITW) a waiver from specified portions of the DOE test procedure for determining the energy consumption of commercial refrigerators, freezers, and refrigerator-freezers (collectively, “commercial refrigeration equipment”). Under the Decision and Order, ITW is required to test and rate specified basic models of its commercial refrigeration equipment in accordance with a specified method.

**DATES:** The Decision and Order is effective on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The Decision and Order will terminate in conjunction with any future updates to the test procedure for commercial refrigeration equipment located in 10 CFR part 431, subpart C, appendix B. At such time, ITW must use the relevant test procedure for this equipment for any testing to demonstrate compliance with standards, and any other representations of energy use.

**FOR FURTHER INFORMATION CONTACT:**

Ms. Lucy deButts, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 287-1604. E-mail: *AS\_Waiver\_Requests@ee.doe.gov*.

Ms. Jennifer Tiedeman, U.S. Department of Energy, Office of the General Counsel, Mail Stop GC-33, Forrestal Building, 1000 Independence Avenue SW., Washington, DC 20585-0103. Telephone: (202)287-6111. Email: *Jennifer.Tiedeman@hq.doe.gov*.

**SUPPLEMENTARY INFORMATION:** In accordance with Title 10 of the Code of Federal Regulations (10 CFR 431.401(f)(2)), DOE gives notice of the issuance of its Decision and Order as set forth below. The Decision and Order grants ITW a waiver from the applicable test procedure in 10 CFR part 431, subpart C, appendix B for specified basic models of commercial refrigeration equipment, provided that ITW tests and rates such equipment using the alternate test procedure specified in the Decision and Order. ITW's representations concerning the energy consumption of the specified basic models must be based on testing consistent with the provisions and restrictions in the alternate test procedure set forth in the Decision and Order, and the representations must fairly disclose the test results. Distributors, retailers, and private labelers are held to the same requirements when making representations regarding the energy consumption of this equipment. 42 U.S.C. 6314(d).

Consistent with 10 CFR 431.401(j), not later than [**INSERT DATE 60 DAYS AFTER PUBLICATION IN THE *FEDERAL REGISTER***], any manufacturer currently distributing in commerce in the United States equipment employing a technology or characteristic that results in the same need for a waiver from the applicable test procedure must submit a petition for waiver. Manufacturers not currently distributing such equipment in commerce in the United States must petition for and be granted a waiver prior to the distribution in commerce of that equipment in the

United States. Manufacturers may also submit a request for interim waiver pursuant to the requirements of 10 CFR 431.401.

Signed in Washington, DC, on September 6, 2018.

**Annamaria Garcia,**

*Director of Weatherization and Intergovernmental Programs,*

*Energy Efficiency and Renewable Energy.*

**Case #CR-007**  
**Decision and Order**

I. *Background and Authority*

The Energy Policy and Conservation Act of 1975 (EPCA),<sup>1</sup> Public Law 94-163 (42 U.S.C. 6291–6317, as codified), among other things, authorizes DOE to regulate the energy efficiency of a number of consumer products and industrial equipment. Title III, Part C<sup>2</sup> of EPCA established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency for certain types of industrial equipment. This equipment includes commercial refrigeration equipment, the focus of this document. (42 U.S.C. 6311(a)(1)(E))

Under EPCA, DOE’s energy conservation program consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of the Act include definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

The Federal 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 pursuant to EPCA (42 U.S.C. 6316(a); 42 U.S.C. 6295(s)), and (2) making representations about the efficiency of that equipment (42 U.S.C. 6314(d)).

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<sup>1</sup> All references to EPCA in this document refer to the statute as amended through EPS Improvement Act of 2017, Public Law 115–115 (January 12, 2018).

<sup>2</sup> For editorial reasons, upon codification in the U.S. Code, Part C was redesignated as Part A-1.

Similarly, DOE must use these test procedures to determine whether the equipment complies with relevant standards promulgated under EPCA. (42 U.S.C. 6316(a); 42 U.S.C. 6295(s))

Under 42 U.S.C. 6314, EPCA sets forth the criteria and procedures DOE is required to follow when prescribing or amending test procedures for covered equipment. EPCA requires that any test procedures prescribed or amended under this section must be reasonably designed to produce test results which reflect energy efficiency, energy use or estimated annual operating cost of covered equipment during a representative average use cycle or period of use and requires that test procedures not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(2)) The test procedure for commercial refrigeration equipment is contained in the Code of Federal Regulations (CFR) at 10 CFR part 431, subpart C, appendix B, “*Amended Uniform Test Method for the Measurement of Energy Consumption of Commercial Refrigerators, Freezers, and Refrigerator-Freezers.*”

Under 10 CFR 431.401, any interested person may submit a petition for waiver from DOE’s test procedure requirements. DOE will grant a waiver from the test procedure requirements if DOE determines either that the basic models for which the waiver was requested contain a design characteristic that prevents testing of the basic models according to the prescribed test procedures, or that the prescribed test procedures evaluate the basic models in a manner so unrepresentative of their true energy or water consumption characteristics as to provide materially inaccurate comparative data. 10 CFR 431.401(a)(1). DOE may grant the waiver, subject to conditions, including adherence to alternate test procedures. 10 CFR 431.401(f)(2).

## *II. ITW’s Petition for Waiver: Assertions and Determinations*

By letter dated December 20, 2016 (and supplemented on May 3, 2017), ITW submitted a petition for waiver and application for interim waiver for certain basic models of commercial refrigeration equipment that are required to be tested according to DOE's test procedure at 10 CFR part 431, subpart C, appendix B. Specifically, ITW requested a waiver for certain Innopod temperature-controlled grocery and general merchandise system (Innopod) basic models of commercial refrigeration equipment. On July 19, 2017, DOE published a notice that announced receipt of ITW's petition for waiver (hereafter "notice of petition for waiver"), and granted an interim waiver to ITW. 82 FR 33081.

DOE's current test procedure references Air-Conditioning and Refrigeration Institute (ARI) Standard 1200-2006 and Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 1200 (I-P)-2010, which further references American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ANSI/ASHRAE) Standard 72 (incorporated by reference at 10 CFR 431.63(c) and (d)). ITW asserted that the current test procedures do not account for the unique operating characteristics of its Innopod basic models, including floating suction temperatures for individual compartments, different typical door-opening cycles, and a high-temperature "ambient" compartment. ITW asserted that its petition meets both conditions of 10 CFR 431.401(f)(2) for granting waivers, namely that (1) the basic models contain one or more design characteristics that prevent testing according to the prescribed test procedures; and (2) the prescribed test procedures evaluate the basic models in a manner so unrepresentative of its true energy consumption as to provide materially inaccurate comparative data. ITW submitted to DOE an alternate test procedure that it stated allows for testing its specified Innopod basic models.

ITW's petition recommended an alternate test using an "inverse refrigeration load" test, various calculations to account for refrigeration system and component energy consumption, and adjustments to the door opening requirements based on typical use in the field to accommodate for the basic models' multiple thermally separated, temperature controlled compartments supplied with refrigerant from a single condensing unit. ITW's recommended refrigeration system calculations rely on the current calculations and assumptions used for testing remote condensing commercial refrigeration equipment in accordance with the DOE test procedure.

As noted in the notice of petition for waiver, DOE granted ITW an interim waiver and required that ITW test and rate the specified basic models according to an alternate procedure. The alternate procedure granted by DOE was similar to that requested by ITW, but with minor modifications. Those modifications included clarifications of how ITW should determine the basic models and adjust certain aspects of the requested alternate test procedure regarding ambient test conditions, reference to the current version of the AHRI 1200 industry standard, and clarifications to certain calculations. 82 FR 33081, 33083-33084. DOE received no comments in response to the notice of petition for waiver.

DOE understands that absent a waiver, the basic models identified by ITW in its petition cannot be tested and rated for energy consumption on a basis representative of their true energy consumption characteristics. DOE has reviewed the recommended procedure suggested by ITW and concludes that it will allow for the accurate measurement of the energy use of the equipment, while alleviating the testing problems associated with ITW's implementation of DOE's applicable commercial refrigeration equipment test procedure for the specified Innopod basic models. However, as in the interim test procedure waiver, DOE has clarified how ITW should determine basic models, as discussed in this

notice, and adjusted certain aspects of the requested alternate test procedure regarding ambient test conditions, referenced industry standards, and calculations.

In this Decision and Order, DOE requires that ITW test and rate specific basic models of commercial refrigeration equipment according to the alternate test procedure specified in this Decision and Order, which is identical to that provided by DOE in the interim waiver.

In its petition, ITW sought a test procedure waiver for certain basic models. This Decision and Order is applicable only to the basic models listed and does not extend to any other basic models. ITW may request that the scope of this waiver be extended to include additional basic models that employ the same technology as those listed in this waiver. 10 CFR 431.401(g). ITW may also submit another petition for waiver from the test procedure for additional basic models that employ a different technology and meet the criteria for test procedure waivers. 10 CFR 431.401(a)(1).

DOE notes that it may modify the waiver at any time upon DOE's determination that the factual basis underlying the petition for waiver is incorrect, or upon a determination that the results from the alternate test procedure are unrepresentative of the basic models' true energy consumption characteristics. 10 CFR 431.401(k)(1). Likewise, ITW may request that DOE rescind or modify the waiver if the company discovers an error in the information provided to DOE as part of its petition, determines that the waiver is no longer needed, or for other appropriate reasons. 10 CFR 431.401(k)(2). As set forth above, the test procedure specified in this Decision and Order is not the same as the test procedure offered by ITW. If ITW believes that the alternate test method it suggested provides representative results and is less burdensome than the test method required by this Decision and Order,

ITW may submit a request for modification under 10 CFR 431.401(k)(2) that addresses the concerns that DOE has specified with that procedure. ITW may also submit another less burdensome alternative test procedure not expressly considered in this notice under the same provision.

### *III. Order*

After careful consideration of all the material submitted by ITW in this matter, it is **ORDERED** that:

(1) ITW must, as of the date of publication of this Order in the Federal Register, test and rate the following ITW basic models as set forth in paragraph (2) below:

30-XX-X5-AAAAR, 30-XX-X5-AAARA, 30-XX-X5-AAARR, 30-XX-X5-AAAF A, 30-XX-X5-AAAFR, 30-XX-X5-AARAA, 30-XX-X5-AARAR, 30-XX-X5-AARRA, 30-XX-X5-AARRR, 30-XX-X5-AARFA, 30-XX-X5-AARFR, 30-XX-X5-AAFAA, 30-XX-X5-AAFAR, 30-XX-X5-AAFRA, 30-XX-X5-AAFRR, 30-XX-X5-AAFFA, 30-XX-X5-AAFFR, 30-XX-X5-ARAAA, 30-XX-X5-ARAAR, 30-XX-X5-ARARA, 30-XX-X5-ARARR, 30-XX-X5-ARAF A, 30-XX-X5-ARAFR, 30-XX-X5-ARRAA, 30-XX-X5-ARRAR, 30-XX-X5-ARRRA, 30-XX-X5-ARRRR, 30-XX-X5-ARRFA, 30-XX-X5-ARRFR, 30-XX-X5-ARFAA, 30-XX-X5-ARFAR, 30-XX-X5-ARFRA, 30-XX-X5-ARFRR, 30-XX-X5-ARFFA, 30-XX-X5-ARFFR, 30-XX-X5-AFAAA, 30-XX-X5-AFAAR, 30-XX-X5-AFARA, 30-XX-X5-AFARR, 30-XX-X5-AFAFA, 30-XX-X5-AFAFR, 30-XX-X5-AFRAA, 30-XX-X5-AFRAR, 30-XX-X5-AFRRA, 30-XX-X5-AFRRR, 30-XX-X5-AFRFA, 30-XX-X5-AFRFR, 30-XX-X5-AFFAA, 30-XX-X5-AFFAR, 30-XX-X5-AFFRA, 30-XX-X5-AFFRR, 30-XX-X5-RAAAA, 30-XX-X5-RAAAR, 30-XX-X5-RAARA, 30-XX-X5-RAARR, 30-XX-X5-RAAF A, 30-XX-X5-

RAAFR, 30-XX-X5-RARAA, 30-XX-X5-RARAR, 30-XX-X5-RARRA, 30-XX-X5-RARRR, 30-XX-X5-RARFA, 30-XX-X5-RARFR, 30-XX-X5-RAFAA, 30-XX-X5-RAFAR, 30-XX-X5-RAFRA, 30-XX-X5-RAFRR, 30-XX-X5-RAFFA, 30-XX-X5-RAFFR, 30-XX-X5-RRAAA, 30-XX-X5-RRAAR, 30-XX-X5-RRARA, 30-XX-X5-RRARR, 30-XX-X5-RRAFA, 30-XX-X5-RRAFR, 30-XX-X5-RRRAA, 30-XX-X5-RRRAR, 30-XX-X5-RRRRA, 30-XX-X5-RRRFA, 30-XX-X5-RRFAA, 30-XX-X5-RRFAR, 30-XX-X5-RRFRA, 30-XX-X5-RRFFA, 30-XX-X5-RFAAA, 30-XX-X5-RFAAR, 30-XX-X5-RFARA, 30-XX-X5-RFARR, 30-XX-X5-RFAFA, 30-XX-X5-RFAFR, 30-XX-X5-RFRAA, 30-XX-X5-RFRAR, 30-XX-X5-RFRRA, 30-XX-X5-RFRFA, 30-XX-X5-RFFAA, 30-XX-X5-RFFAR, 30-XX-X5-RFFRA, 30-XX-X5-FAAAA, 30-XX-X5-FAAAR, 30-XX-X5-FAARA, 30-XX-X5-FAARR, 30-XX-X5-FAAFA, 30-XX-X5-FAAFR, 30-XX-X5-FARAA, 30-XX-X5-FARAR, 30-XX-X5-FARRA, 30-XX-X5-FARRR, 30-XX-X5-FARFA, 30-XX-X5-FARFR, 30-XX-X5-FAFAA, 30-XX-X5-FAFAR, 30-XX-X5-FAFRA, 30-XX-X5-FAFRR, 30-XX-X5-FRAAA, 30-XX-X5-FRAAR, 30-XX-X5-FRARA, 30-XX-X5-FRARR, 30-XX-X5-FRAFA, 30-XX-X5-FRAFR, 30-XX-X5-FRRAA, 30-XX-X5-FRRAR, 30-XX-X5-FRRRA, 30-XX-X5-FRRFA, 30-XX-X5-FRFAA, 30-XX-X5-FRFAR, 30-XX-X5-FRFRA, 30-XX-X5-FFAAA, 30-XX-X5-FFAAR, 30-XX-X5-FFARA, 30-XX-X5-FFARR, 30-XX-X5-FFRAA, 30-XX-X5-FFRAR, 30-XX-X5-FFRRA, 30-XX-X4A-AAAR, 30-XX-X4A-AARA, 30-XX-X4A-AARR, 30-XX-X4A-ARAA, 30-XX-X4A-ARAR, 30-XX-X4A-ARRA, 30-XX-X4A-ARRR, 30-XX-X4A-AFAA, 30-XX-X4A-AFAR, 30-XX-X4A-AFRA, 30-XX-X4A-AFRR, 30-XX-X4A-RAAA, 30-XX-X4A-RAAR, 30-XX-X4A-RARA, 30-XX-X4A-RARR, 30-XX-X4A-RRAA, 30-XX-X4A-RRAR, 30-XX-X4A-RRRA, 30-XX-X4A-RFAA, 30-XX-X4A-RFAR, 30-XX-X4A-RFRA, 30-XX-X4A-FAAA, 30-XX-X4A-FAAR, 30-XX-X4A-FARA, 30-XX-X4A-FARR, 30-XX-X4A-FRAA, 30-XX-X4A-FRAR, 30-XX-X4A-FRRA, 30-XX-X4A-FFAA, 30-XX-X4A-FFAR, 30-XX-X4A-FFRA, 30-XX-X4B-AAAR, 30-XX-X4B-AARA, 30-XX-X4B-AARR,

30-XX-X4B-AAFA, 30-XX-X4B-AAFR, 30-XX-X4B-ARAA, 30-XX-X4B-ARAR, 30-XX-X4B-ARRA, 30-XX-X4B-ARRR, 30-XX-X4B-ARFA, 30-XX-X4B-ARFR, 30-XX-X4B-AFAA, 30-XX-X4B-AFAR, 30-XX-X4B-AFRA, 30-XX-X4B-AFRR, 30-XX-X4B-AFFA, 30-XX-X4B-AFFR, 30-XX-X4B-RAAA, 30-XX-X4B-RAAR, 30-XX-X4B-RARA, 30-XX-X4B-RARR, 30-XX-X4B-RAFA, 30-XX-X4B-RAFR, 30-XX-X4B-RRAA, 30-XX-X4B-RRAR, 30-XX-X4B-RRRA, 30-XX-X4B-RRFA, 30-XX-X4B-RFAA, 30-XX-X4B-RFAR, 30-XX-X4B-RFRA, 30-XX-X4B-RFFA, 30-XX-XX-3-AAR, 30-XX-XX-3-ARA, 30-XX-XX-3-ARR, 30-XX-XX-3-RAA, 30-XX-XX-3-RAR, and 30-XX-XX-3-RRA.

(2) The applicable method of test for the ITW basic models listed in paragraph (1) is the test procedure for commercial refrigeration equipment prescribed by DOE at 10 CFR part 431, subpart C, appendix B, with the following modifications:

For the purpose of testing and rating, the Ambient (75 °F) compartment is treated as a Medium (Refrigerator at 75 °F) compartment. All volume and energy consumption calculations will be included within the Medium (Refrigerator 38 °F) category and summed with other Medium (Refrigerator 38 °F) compartment(s) calculations. Compartments that are convertible between ambient and refrigerator temperature ranges shall be tested at the refrigerator temperature (38 °F). Compartments that are convertible between refrigerator and freezer (0 °F) temperature ranges shall be tested at both temperatures.

Test Condition/s or Calculation/s	Alternate Innopod Test Procedure
Test Method	<p data-bbox="545 1751 834 1776">“Inverse Refrigeration Load” test</p> <p data-bbox="545 1776 1289 1822">Allows energy (Heat) loss at a rate and delta-T equivalent to energy gains of a standard refrigerated cabinet.</p>
Ambient	<p data-bbox="545 1822 769 1848">Dry Bulb: 75.2 °F ±1.8 °F</p> <p data-bbox="545 1848 769 1873">Wet Bulb: 64.4 °F±1.8 °F</p>

<p>Integrated Average Temperature (IAT) Simulated Product vs. Test Ambient Delta-T</p>	<p>Refrigerator: <math>(75.2\text{ }^{\circ}\text{F} + 75.2\text{ }^{\circ}\text{F} - 38\text{ }^{\circ}\text{F}) = 112.4\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}</math>  Freezer: <math>(75.2\text{ }^{\circ}\text{F} + 75.2\text{ }^{\circ}\text{F} - 0\text{ }^{\circ}\text{F}) = 150.4\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}</math>  Ambient: <math>(75.2\text{ }^{\circ}\text{F} + 75.2\text{ }^{\circ}\text{F} - 75\text{ }^{\circ}\text{F}) = 75.4\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}</math>  *To ensure compartment temperature stability, the average of all temperature measurements at the end of the test period must be no lower than the average of all temperature measurements at the start of the test period.</p> <table border="1" data-bbox="540 363 954 468"> <thead> <tr> <th></th> <th>Inside</th> <th>Outside</th> <th>Delta-T</th> </tr> </thead> <tbody> <tr> <td>Refrigerator:</td> <td>112.4 °F</td> <td>75.2 °F</td> <td>37.2 °F</td> </tr> <tr> <td>Freezer:</td> <td>150.4 °F</td> <td>75.2 °F</td> <td>75.2 °F</td> </tr> <tr> <td>Ambient:</td> <td>75.04 °F</td> <td>75.2 °F</td> <td>0.4 °F</td> </tr> </tbody> </table> <p>Heat – LOSS = Heat – GAIN as prescribed in the test procedure</p>		Inside	Outside	Delta-T	Refrigerator:	112.4 °F	75.2 °F	37.2 °F	Freezer:	150.4 °F	75.2 °F	75.2 °F	Ambient:	75.04 °F	75.2 °F	0.4 °F
	Inside	Outside	Delta-T														
Refrigerator:	112.4 °F	75.2 °F	37.2 °F														
Freezer:	150.4 °F	75.2 °F	75.2 °F														
Ambient:	75.04 °F	75.2 °F	0.4 °F														
<p>Door-Opening Requirement</p>	<p>Door openings shall start 3 hours after concluding stabilization period. Open each door for 8 seconds, every 2 hours, for 10 consecutive hours. (6 door cycles) (3 “load” and “unload” cycles) &gt; Stock (load) + Retrieve (un-load) = Cycle (turn)</p>																
<p>Calculation of Refrigeration Load</p>	<p>Total <u>energy added</u> divided by the total test time.  <u>“Inverse Refrigeration Load”</u></p> $Q = \frac{\text{Win (watt-hour)} \times 3.412 \text{ (BTU/watt-hour)}}{t \text{ (Hr.)}} = \text{(BTU/Hr.)}$ <p>Where:  Win = energy input measured over the test period for all energized components (heaters, controls, and fans) located in the refrigerated compartments. Anti-sweat heaters shall be de-energized for the test.  t = test duration (24 hours)</p> <p>Provides the “<u>energy removed</u>” by infiltration.</p>																
<p>Adjusted Dew Point &amp; EER AHRI 1200-2010 Table 1, EER</p>	<p>Dew Point (D.P.): Derived from standard industry design practices, “as the customary saturated vapor temperature of the refrigerant as it leaves the cabinet through the suction line.” The Energy Efficiency Ratio is then taken from this value using Table 1.</p> <p><u>EER</u>  A.D.P.: Med. Temp. = <math>(\text{D.P.: } +15\text{ }^{\circ}\text{F}) - 2\text{ }^{\circ}\text{F} = +13\text{ }^{\circ}\text{F}</math> EER = 11.22 Btu/Wh  A.D.P.: Low Temp. = <math>(\text{D.P.: } -20\text{ }^{\circ}\text{F}) - 3\text{ }^{\circ}\text{F} = -23\text{ }^{\circ}\text{F}</math> EER = 6.60 Btu/Wh</p>																
<p>Calculated Daily Energy Consumption AHRI 1200-2010</p>	<p><u>Part 1: REVISED. Calculation of CEC</u></p> $\text{CEC} = [(Q \times t) + \text{ML} + (\text{FEC} + \text{AEC} + \text{DEC}) \times 3.412] / (1000 \times \text{EER})$ <p>&gt;”Q” does NOT include waste heat from auxiliary components and moisture infiltration (must be <u>added</u> separately).  Where:  ML: Moisture load impacts (see below)  FEC: Evaporator Fan/s [measured fan power × runtime per day] (Wh/day)  AEC: Anti-Condensate Heater/s [measured heater power × runtime per day] (Wh/day)  DEC: Defrost Heater/s [measured heater power × runtime per day] (Wh/day)</p> <p>Moisture load impact calculations:  Total impact: Number of door openings times (Enthalpy Adjustment + Moisture/frost Accumulation): <math>\text{ML} = N_d \times (A_e + A_m)</math></p> <p>Where <math>N_d</math> = number of door openings during test  Enthalpy Adjustment: <math>A_e = [(H_a - H_c) - (H_t - H_c)] \times m_a</math>  Where:  <math>H_a</math> = ambient air enthalpy  <math>H_c</math> = compartment air enthalpy based on air conditions during cold operation:  0 °F dry bulb/-20 °F dew pt. for freezer compartment;  38 °F dry bulb/20 °F dew pt. for refrigerator compartment;  75 °F dry bulb/20 °F dew pt. for ambient compartment.  <math>H_t</math> = compartment air enthalpy during heat leak test based on dew point being equal to ambient air dew point  <math>m_a</math> = mass of compartment air exchanged (30% of total compartment volume) based density of air during cold operation.</p> <p>Moisture/frost Accumulation: <math>A_m = C_{p,\text{liner}} \times W_{\text{liner}} \times \Delta T_{\text{liner}}</math>  Where:  <math>C_{p,\text{liner}}</math> = specific heat of liner material  <math>W_{\text{liner}}</math> = weight of all liner parts  <math>\Delta T_{\text{liner}}</math> = maximum temperature rise of all liner parts (4.5 °F, 2.5 °F, and 1 °F for freezer, refrigerator, and ambient compartments, respectively)</p>																

(3) Representations. ITW may make representations about the energy use of the specified basic models of its commercial refrigeration equipment for compliance, marketing, or other purposes only to the extent that such equipment has been tested in accordance with the provisions above and such representations fairly disclose the results of such testing in accordance with 10 CFR part 429, subpart B.

(4) This waiver shall remain in effect consistent with the provisions of 10 CFR 431.401.

(5) This waiver is issued on the condition that the statements, representations, and documentation provided by the petitioner are valid. If ITW makes any modifications to the controls or configurations of these basic models, the waiver will no longer be valid and ITW will either be required to use the current Federal test method or submit a new application for a test procedure waiver. DOE may revoke or modify this waiver at any time if it determines the factual basis underlying the petition for waiver is incorrect, or the results from the alternate test procedure are unrepresentative of the basic models' true energy consumption characteristics. Likewise, ITW may request that DOE rescind or modify the waiver if ITW discovers an error in the information provided to DOE as part of its petition, determines that the waiver is no longer needed, or for other appropriate reasons.

(6) Granting of this waiver does not release a petitioner from the certification requirements set forth at 10 CFR part 429.

Signed in Washington, DC, on September 6, 2018.

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Annamaria Garcia  
Director of Weatherization and Intergovernmental Programs  
Energy Efficiency and Renewable Energy

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