[6450-01-P]

DEPARTMENT OF ENERGY

[Case Number 2018-002; EERE-2018-BT-WAV-002]

Energy Conservation Program: Decision and Order Granting a Waiver Store It Cold from the Department of Energy Walk-in Cooler Refrigeration System 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 Number 2018-002) that grants Store It Cold a waiver from specified portions of the DOE test procedure for determining the energy efficiency of specified walk-in refrigeration system models. Store It Cold is required to test and rate specified basic models of its walk-in cooler refrigeration system in accordance with the alternate test procedure specified.

DATES: The Decision and Order is effective on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. The Decision and Order will terminate upon the compliance date of any future amendment to the test procedure for walk-in cooler refrigeration systems located at 10 CFR part 431, subpart R, appendix C that addresses the issues presented in this waiver. At such time, Store It Cold must use the relevant test procedure for this equipment for any testing to demonstrate compliance with the applicable standards, and any other representations of energy use.

FOR FURTHER INFORMATION CONTACT:

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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 Store It Cold a waiver from the applicable test procedure at 10 CFR part 431, subpart R, appendix C for specified basic models of walk-in cooler refrigeration systems provided that Store It Cold tests and rates such equipment using the alternate test procedure specified in the Decision and Order. Store It Cold's representations concerning the energy efficiency of the specified basic models must be based on testing according to 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 efficiency of this equipment. (42 U.S.C. 6314(d))

Consistent with 10 CFR 431.401(j), not later than [**INSERT DATE 60 DAYS AFTER DATE OF 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 July 30, 2019.

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

I. Background and Authority

The Energy Policy and Conservation Act of 1975, as amended ("EPCA"),[1] authorizes the U.S. Department of Energy ("DOE") to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) Title III, Part C[2] of EPCA established the Energy Conservation Program for Consumer Products Other Than Automobiles, which sets forth a variety of provisions designed to improve energy efficiency for certain types of consumer products. These products include walk-in cooler refrigeration systems, the focus of this document. (42 U.S.C. 6311(1)(G))

The energy conservation program under EPCA consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA 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

[1] All references to EPCA in this document refer to the statute as amended through America's Water Infrastructure Act of 2018, Public Law 115-270 (October 23, 2018).
[2] For editorial reasons, upon codification in the U.S. Code, Part C was redesignated as Part A-1.

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)). 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 and requires that test procedures not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(2)) The test procedure for walk-in cooler refrigeration systems is contained in the Code of Federal Regulations ("CFR") at 10 CFR part 431, subpart R, appendix C, – "Uniform Test Method for the Measurement of Net Capacity and AWEF of Walk-In Cooler and Walk-In Freezer Refrigeration Systems" ("Appendix C").

Under 10 CFR 431.401, any interested person may submit a petition for waiver from DOE's test procedure requirements for commercial and industrial equipment. DOE will grant a waiver from the test procedure requirements if DOE determines either that the basic model for which the waiver was requested contains a design characteristic that prevents testing of the basic model according to the prescribed test procedures, or that the prescribed test procedures evaluate the basic model in a manner so unrepresentative of its true energy consumption characteristics as

to provide materially inaccurate comparative data. 10 CFR 431.401(f)(2). DOE may grant the waiver subject to conditions, including adherence to an alternate test procedure. *Id*.

II. Store It Cold's Petition for Waiver: Assertions and Determinations

By letter dated March 9, 2018, Store It Cold filed a petition for waiver and petition for interim waiver from the test procedure for walk-in refrigeration systems set forth in Appendix C, and in response to DOE requests for technical clarification, Store It Cold submitted a revised petition for waiver and petition for interim waiver on May 16, 2018.[3] In the petition, Store It Cold requested relief for the following walk-in cooler refrigeration system basic models: CBLW08, CBLW10, CBLW12, CBLW15, CBLW18, CBLW25. Store It Cold identified these models as single-package dedicated refrigeration systems comprised of a controller (*i.e.,* the °CoolBot® controller) and a room air conditioner ("RAC"), which are combined to form a walk-in refrigeration system. Store It Cold stated in its petition that the resulting walk-in refrigeration systems are designated for both indoor and outdoor use. According to Store It Cold's petition, the CoolBot's technology controls a window air conditioner that maintains desired temperatures, as opposed to a much larger traditional walk-in cooler refrigeration system that would utilize large compressors, large surface area coils, multiple fans, and large volumes of refrigerant to do the same. Store It Cold asserted in its petition that, for the basic models listed in its petition, the refrigerant enthalpy method (referred to as the "'refrigerant-side' gross capacity" method by Store It Cold) yields inconsistent refrigerant mass flow rates and lower than expected capacities. Store It Cold explained in its petition that the installation of the refrigerant mass flow meters

[3] The docket, including Store It Cold's submissions is located at: *https://www.regulations.gov/docket?D=EERE-2018-BT-WAV-0002*.

used under this method significantly increased the refrigerant circuit's internal volume, requiring the system to be charged with approximately twice the amount of refrigerant as was present from the factory. Store It Cold requested that it be allowed to test its models using an alternate "'air-side' gross capacity" method, in which the capacity would be determined by measuring the enthalpy change and mass flow rate of the air passing through both the evaporator side and condenser side, resulting in two capacity measurements that would have to match within a designated tolerance for the test to be considered valid. Store It Cold also requested an interim waiver for this equipment.

After reviewing Store It Cold's application, the alternate test procedure requested by Store It Cold, the company's testing and performance data, product characteristics, and product specification sheets published online by Store It Cold, DOE published a notice that announced its receipt of the petition for waiver and granted Store It Cold an interim waiver. 84 FR 11944 (March 29, 2019) ("Notice of Petition for Waiver"). In the Notice of Petition for Waiver, DOE presented Store it Cold's claim that the results from testing the specified basic models according to "refrigerant-side" measurements provide results unrepresentative of the °CoolBot® walk-in cooler refrigeration system's actual energy consumption characteristics and that such testing would provide materially inaccurate comparative data. A test photo provided by Store It Cold shows that the refrigerant tubing exiting the unit has multiple bends in it without any extended straight sections upstream and downstream of the refrigerant mass flow meters, which could very well have affected the accuracy of the mass flow measurements. Additionally, Store It Cold stated the refrigerant tubing as configured increased the refrigerant circuit's internal volume,

requiring the system to be charged with approximately twice the amount of refrigerant as was present from the factory.

DOE stated in the Notice of Petition for Waiver that for refrigeration systems in general, it is expected that the capacity of the system would monotonically increase as the condenser air temperature decreases (until further increases are limited by refrigerant mass flow restriction of the expansion device for the lower condensing pressures that would occur for lower condenser air temperatures). 84 FR 11944, 11946. This is because the cooler condenser air temperature can further cool the refrigerant such that it leaves the condenser at lower temperature and enthalpy, and similarly enters the evaporator at lower enthalpy. This increases the amount of heat the refrigerant absorbs from the refrigerated space as it flows through the evaporator coil, increasing the capacity of the evaporator. DOE noted that the "refrigerant-side" method test data in Store It Cold's petition do not follow this trend, and that the inconsistent results suggest that the capacity measurements are not accurate. *Id.* DOE also stated the data from testing using the "air side" method follows the expected trend, showing increasing refrigeration capacity as condenser air temperature decreases for both tested units, giving much greater confidence that the measurements are accurate. *Id.*

DOE granted Store It Cold an interim waiver requiring testing of the specified walk-in cooler refrigeration systems using the alternate "air-side" test procedure as requested by Store It Cold. Under the "air-side" method, the refrigeration capacity is determined by measuring the enthalpy change and mass flow rate of the air passing through the evaporator side (*i.e.*, Indoor Air Enthalpy Method) and condenser side (*i.e.*, Outdoor Air Enthalpy Method). The condenser

side measurement is adjusted by subtracting the system input power to determine refrigeration capacity.

In the Notice of Petition for Waiver, DOE also solicited comments from interested parties on all aspects of the petition and the specified alternate test procedure *Id*. DOE received comments from three commenters: (1) a group of utilities including Pacific Gas and Electric Company ("PG&E"), San Diego Gas and Electric ("SDG&E"), and Southern California Edison ("SCE") (hereinafter the "California IOUs"), (2) the Air-Conditioning, Heating, and Refrigeration Institute ("AHRI"), and (3) BMIL Technologies, LLC.[4]

The California IOUs recommended that DOE deny the current version of the petition for waiver and instead recommended DOE require that Store It Cold determine the refrigeration capacity of the specified equipment using a "dual Calibrated Box" approach, as is prescribed by DOE for RACs, with appropriate modifications. (California IOUs, No. 0017 at p. 1) The California IOUs stated that the air-side enthalpy methods proposed in the petition for waiver is not used for the DOE capacity rating test procedure of either WICF or RAC. (California IOUs, No. 0017 at p. 2) The CA IOUs stated that the test procedure suggested by Store It Cold is widely used for testing ducted unit air-conditioners and heat pumps, and not appropriate for non-ducted equipment, such as the Store It Cold models. The California IOUs also stated that the equipment for which the waiver is sought is an RAC with a modified controller to make it a WICF, rather than a piece of unitary air-conditioning equipment with ducts, and thus the RAC

[4] All comments are in the docket located at: *https://www.regulations.gov/docket?D=EERE-2018-BT-WAV-0002*.

capacity test is more appropriate for evaluating the application. (California IOUs, No. 0017 at p. 3) They further stated that a dual Calibrated Box approach would allow the airflows to freely circulate in both the hot side and cold side enclosures, reflecting the actual application of the models in question. (California IOUs, No. 0017 at p. 3) Alternatively, they suggested that DOE at a minimum require testing under both the air-side enthalpy and dual calibrated box methods and submit the resulting data as confirmation of the air-side enthalpy measurements. [5](California IOUs, No. 0017 at p. 4)

The California IOUs also expressed concern that if the alternate test procedure changes the rated capacity and creates a lower bar to meet the WICF standards (especially for a low-cost off-the-shelf product) it could significantly shift segments of the market away from compliant efficient equipment towards equipment that would not be compliant if tested using the consensus test method prescribed by DOE. (California IOUs, No. 0017 at p. 2) The California IOUs also expressed concern that, being based on RACs that were not designed for walk-in applications, the Store It Cold models may not meet safety and consumer protection standards and may have reduced life as compared with the 10.5 years estimated by DOE for medium temperature refrigeration systems. (California IOUs, No. 0017 at pp. 4-5)

As noted in the Notice of Petition for Wavier, the equipment for which Store It Cold has requested a waiver are walk-in cooler refrigeration systems that are comprised, in part, of a RAC. 84 FR 11944, 11946. DOE recognizes that Store It Cold also separately distributes in commerce

[5] The California IOUs comment is available in the docket at*: https://www.regulations.gov/docket?D=EERE-2018-BT-WAV-0002*.

the °CoolBot® controller, i.e., not as part of a walk-in cooler refrigeration system, and reiterates that the grant of a waiver only applies to the walk-in cooler refrigeration system basic models identified by Store It Cold, i.e., the specific models listed in the Waiver order, which contain °CoolBot® controllers integrated by Store It Cold with the specified RAC models.

As explained in the Notice of Petition for Waiver, the test procedure for determining the rated capacity under the WICF test procedure provides results that are unrepresentative of the specified models' true performance capabilities. The test data provided by Store It Cold indicated that the air-side enthalpy test suggested by Store It Cold yields more accurate results for the basic models listed in its petition. Additionally, multiple organizations have established test procedures for determining the capacity of single-package air-conditioners and refrigeration systems using the psychrometric approach, which uses the indoor air enthalpy method and/or the outdoor air enthalpy method. Examples include the following:

- ANSI/ASHRAE 58-1986 (RA 1999), "Method of Testing for Rating Room Air Conditioner and Packaged Terminal Air Condition Heating Capacity" prescribes the use of the air enthalpy test method to measure heating capacity of room air conditioners and packaged terminal air conditioners with reverse-cycle operation to allow heating.
- ANSI/ASHRAE 16 (2016), "Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners", the updated version of ASHRAE 16-1983 (RA 2009), allows both calorimetric methods similar to ASHRAE 16-1983 (RA 2009) as well as the psychrometric approach using the air enthalpy method.

- DOE's test procedure for packaged terminal air conditioners and heat pumps (10 CFR 431.96), allows use of both calorimetric and psychrometric test methods to determine cooling capacity.
- AHRI has published for comment a draft revision of AHRI 1250, "Standard for Performance Rating of Walk-In Coolers and Freezers", which allows use of air enthalpy methods for measurement of refrigeration capacity for single-package walk-in refrigeration systems. (AHRI 1250 Draft, NO. 18 at p. 60)

Regarding the California IOUs suggestion that the indoor air enthalpy method is suitable only for capacity measurement for ducted systems, DOE notes that many non-ducted systems are tested using this test method, for example Central Air Conditioners and Heat Pumps, Variable Refrigerant Flow units, and Packaged Terminal Air Conditioners. In addition to the systems noted above, non-ducted systems such as mini-split air conditioners multi-split air conditioners also are tested using the indoor air enthalpy method. See 10 CFR part 430 subpart B appendix M.

Finally, with respect to the potential food safety and product life implications raised by the California IOUs, DOE notes that the waiver process addresses instances in which a basic model contains one or more design characteristics that prevent testing of the basic model according to the DOE prescribed test procedures or cause the prescribed test procedures to evaluate the basic model in a manner so unrepresentative of its true energy consumption characteristics as to provide materially inaccurate comparative data. 10 CFR 431.401(a)(1). Accordingly, these particular concerns raised by the California IOUs lie beyond the much more

limited scope of the waiver process. We also note that, while DOE takes no position as to the safety performance or longevity of the subject basic models, the relevant portions of the test procedure that Store It Cold must follow as part of this waiver order require that the equipment's interior box maintain a temperature of 35ºF, which would fall within the recommended food storage temperature range. (NSF/ANSI 7- 2009, at p. 13 (specifying that refrigeration equipment must be capable of maintaining air temperature of 40°F (4°C) or lower in all refrigerated compartment interiors).

AHRI stated that the models for which the waiver is requested appear to meet the legal definition of a walk-in cooler, and that its primary component—the RAC—is also a DOE-covered product that can be tested pursuant to air-conditioning methods of test. AHRI further explained that, although its members have raised generalized concerns about whether the waiver seeks to sanction what its members view as the misapplication of a RAC as a walk-in cooler, they do not object to the waiver, as long as it is consistent with relevant industry-standard performance tests for equipment. Specifically, AHRI requested that the waiver stipulate a 75°F wet bulb condition be applied. (AHRI, No. 0016 at p. 1) AHRI asserted that, similar to a room air conditioner, the °CoolBot® system would reject condensate to the outdoor coil, using it to enhance outdoor coil cooling. AHRI further states that variations in outdoor air wet bulb temperature would lead to inconsistent test results when compared to the performance of a typical evaporative condensing unit. (AHRI, No. 0016 at pp. 1-2) Specifically, AHRI suggested that the Note 1 of Tables 3 and 4 in the Store It Cold waiver be updated to read "Required only

for evaporative Dedicated Condensing Units or Single-Package Dedicated Systems that reject the condensate to the outdoor coil."[6] (AHRI, No. 0016 at p. 2)

DOE agrees that maintaining a 75°F wet bulb condition for the outdoor air would be important for evaporative condensers and units that reject condensate to the outdoor coil. However, DOE notes that the test procedure for walk-in refrigeration systems requires maintaining the evaporator-side inlet air at a low-humidity condition such that frost would not form on the evaporator. Consequently, at steady-state operating conditions, there would be no moisture collecting on the °CoolBot® system evaporator. Further, since the system would have to stop operation and undergo defrost for the moisture to melt and turn into condensate that can be transferred to the condenser coil, the possibility for enhancing condenser cooling using condensate collected at the evaporator is even less likely.

DOE acknowledges that it is possible that some moisture could be present—for example, the °CoolBot® system could be used prior to a test to help cool the test chamber down to 35 ºF. In this case, moisture present in the room before cooldown could collect on the evaporator. This moisture could possibly drain off the evaporator before the evaporator surface is cold enough to freeze it, or the system's operation could be interrupted briefly before a test is conducted, either of which would lead to drainage of the moisture and transfer to the condenser side. DOE is concerned that the quantity of this moisture collection would be highly dependent on the uncontrolled circumstances occurring before the test measurement begins (e.g., whether the unit

[6] AHRI comment is available in the docket at*: https://www.regulations.gov/docket?D=EERE-2018-BT-WAV-0002*

was used to help cool down the test chamber, whether or not the test was conducted during humid summer conditions when a higher level of moisture could have been in the chamber prior to cooldown, whether the unit operation was stopped to allow defrost before conducting the test), and hence, even if the outdoor side wet bulb temperature is maintained at 75 ºF, as recommended by AHRI, the amount of condenser cooling enhancement could vary. DOE concludes that a better approach to address AHRI's concern about the variability is to ensure that there is no moisture in the condensate pan on the condenser side during the test. In this case, the outdoor wet bulb temperature would not affect the test result, because there would be no evaporative cooling—thus the outdoor wet bulb temperature would not have to be controlled, other than to prevent it from exceeding the maximum limits specified for single-package units. Ensuring that there is no moisture in the condenser-side condensate pan could be done in different ways, for example, drilling a small hole in the bottom of the pan to let the moisture drain out, running the unit for a long time to evaporate any collected moisture, or preventing the collection of moisture in the first place by drying out the indoor room prior to starting operation of the test unit. The alternate test procedure in this Order has been modified from the procedure in the interim waiver, to include this requirement to make sure that there is no moisture in the condenser-side condensate pan during performance measurement test periods. It does not specify how to ensure that the condensate pan is dry in order to retain flexibility in test approach.

BMIL Technologies, LLC questioned the granting of a waiver that would enable testing the application of air conditioning units within an operating range that the manufacturer does not rate, *i.e.,* refrigeration.[7] (BMIL Technologies, LLC, No. 0014 at p. 1)

DOE acknowledges that an RAC is not routinely considered to be a refrigeration system used for commercial or industrial cooling applications. However, in the circumstances presented here, where a manufacturer's own materials and statements assert that the pairing of its refrigeration controls (i.e., °CoolBot® controller) with a specified off-the-shelf RAC satisfies the relevant walk-in regulatory definitions and refrigerates at a 35 ºF walk-in temperature, DOE accepts the manufacturer's submissions in its request for a waiver, absent evidence to the contrary. Accordingly, when faced with the current set of facts, Store It Cold's equipment is subject to the test procedures and energy conservation standards established for WICF at 10 CFR part 431, subpart R. The fact that one of the components used in each of the specified Store It Cold basic models can also operate as a RAC at warmer temperatures is not relevant under the facts at hand to the question of whether the alternate test procedure is appropriate for measuring the system capacity of these models.

For the reasons explained here and in the Notice of Petition for Waiver, absent a waiver the basic models identified by Store It Cold 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 Store It Cold and concludes that it will allow

[7] BMIL Technologies, LLC comment is available in the docket at*: https://www.regulations.gov/docket?D=EERE-2018-BT-WAV-0002.*

for the accurate measurement of the energy use of the equipment, subject to the modification discussed in the prior paragraphs, while alleviating the testing problems associated with Store It Cold's implementation of DOE's applicable walk-in cooler refrigeration system test procedure for the specified basic models.

Thus, DOE is requiring that Store It Cold test and rate the identified walk-in cooler refrigeration system basic models according to the alternate test procedure specified in this Decision and Order. The alternate test procedure in this Order is a modified version of the procedure in the interim waiver.

This Decision and Order is applicable only to the basic models listed in the Order and does not extend to any other basic models. Store It Cold 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). Store It Cold 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 or rescind 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 430.401(k)(1). Likewise, Store It Cold 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 430.401(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 Store It Cold. If Store It Cold 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, Store It Cold may submit a request for modification under 10 CFR 431.401(k)(2) that addresses the concerns that DOE has specified with that procedure. Store It Cold 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 that was submitted by Store It Cold, product specification sheets published online by Store It Cold, and comments received in this matter, it is **ORDERED** that:

(1) Store It Cold must, as of the date of publication of this Order in the *Federal Register*, test and rate the following walk-in cooler refrigeration system basic models with the alternate test procedure as set forth in paragraph (2):

Brand	Basic Model Number
CoolBot	CBLW08
CoolBot	CBLW10
CoolBot	CBLW12
CoolBot	CBLW15

CoolBot	CBLW18
CoolBot	CBLW25

(2) The alternate test procedure for the Store It Cold basic models listed in paragraph (1) of this Order is the test procedure for walk-in cooler refrigeration systems prescribed by DOE at 10 CFR part 431, subpart R, appendix C,[8] except as detailed below. All other requirements of 10 CFR part 431, subpart R, appendix C, and DOE's regulations remain applicable, with the following modifications:

In 10 CFR part 431, subpart R, appendix C, section 3.1. *General modifications: Test Conditions and Tolerances*, revise sections 3.1.1. and 3.1.4., and add instructions in a new section 3.1.6. regarding Tables 3 and 4 of AHRI 1250-2009, to read:

3.1.1. In Table 1, Instrumentation Accuracy, refrigerant temperature measurements shall have a tolerance of ±0.5 F for unit cooler in/out. Temperature measurements used to determine water vapor content of the air shall be accurate to within ±0.4 F, ±1.0 F for all other temperature measurements.

3.1.4. In Tables 2 through 14, the Test Condition Outdoor Wet Bulb Temperature requirement and its associated tolerance apply only to units with evaporative cooling and single-packaged dedicated systems. The condenser-side condensate pan must be dry during performance measurement test periods.

3.1.6. Tables 3 and 4 shall be modified to read as follows:

[8] AHRI Standard 1250P (I-P)-2009 ("AHRI 1250-2009") titled "Standard for Performance Rating of Walk-in Coolers and Freezers" is incorporated by reference in the federal test procedure at 10 CFR 431.303(b)(2). The alternate test procedure provides amendments to 10 CFR part 431, subpart R, appendix C that include required modifications to AHRI 1250-2009.

Table 3. Fixed Capacity Matched Refrigerator System and Single-Packaged Dedicated System, Condensing Unit Located Indoor

Test Description	Unit Cooler Air Entering Dry- bulb, ˚F	Unit Cooler Air Entering Relative Humidity, %	Condenser Air Entering Dry-bulb, ˚F	Condenser Air Entering Wet-bulb, ˚F	Compressor Capacity	Test Objective
Off-cycle Fan Power	35	<50	-	-	Compressor Off	Measure fan input wattage during compressor off cycle
Refrigeration Capacity	35	<50	90	75[1], 65[2]	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler, input power, and EER at Rating Condition

Note:

1. Required only for evaporative Dedicated Condensing Units.

2. Maximum allowable value for Single-Packaged Dedicated Systems that do not use evaporative Dedicated Condensing Units, where all or part of the equipment is located in the outdoor room.

Table 4. Fixed Capacity Matched Refrigerator System and Single-Packaged Dedicated System, Condensing Unit Located Outdoor

Test Description	Unit Cooler Air Entering Dry- bulb, ˚F	Unit Cooler Air Entering Relative Humidity, %	Condenser Air Entering Dry-bulb, ˚F	Condenser Air Entering Wet-bulb, ˚F	Compressor Capacity	Test Objective
Off Cycle Fan Power	35	<50	-	-	Compressor Off	Measure fan input wattage during compressor off cycle
Refrigeration Capacity A	35	<50	95	75[1], 68[2]	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler, input power, and EER at Rating Condition
Refrigeration Capacity B	35	<50	59	54[1], 46[2]	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler and system input power at moderate condition
Refrigeration Capacity C	35	<50	35	34[1], 29[2]	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler and system input power at cold condition

Note:

1. Required only for evaporative Dedicated Condensing Units.
2. Maximum allowable value for Single-Packaged Dedicated Systems that do not use evaporative Dedicated Condensing Units, where all or part of the equipment is located in the outdoor room.

In 10 CFR part 431, subpart R, appendix C, section 3.2. *General Modifications: Methods of Testing* add the following instructions regarding additional modifications to appendix C of AHRI 1250-2009:

3.2.6 In appendix C, section C1. reads: *Purpose.* The purpose of this appendix is to provide a method of testing for Matched-pair, single-packaged dedicated systems, as well as Unit coolers and Dedicated Condensing Units tested alone.

3.2.7 In appendix C, section C5. and C5.1 read as follows:

3.2.7.1 C5 reads: C5. *Methods of Testing for walk-in cooler and freezer systems that have matched unit coolers and condensing units*. The testing of the walk-in cooler and freezer systems include a steady state test, defrost test and off-cycle fan power test. For single-packaged dedicated systems, calculate the refrigeration capacity and power consumption using the Indoor Air Enthalpy test method and the Outdoor Air Enthalpy test method. The Indoor Air Enthalpy test method shall be considered the primary measurement and used to report capacity. The Outdoor Air Enthalpy test method shall be considered the secondary measurement and used to calculate the Refrigeration Capacity Heat Balance. See Section C10 of this appendix for complete details on each test method.

3.2.7.2 C5.1 reads: The Gross Total Refrigeration Capacity of Unit Coolers for matched-pairs (not including single-packaged dedicated systems) from steady state test shall be determined by either one of the following methods.

3.2.8 In appendix C, section C7.1 reads: Refer to the standard rating conditions for a particular application listed in Section 5 of this standard. Test acceptance criteria listed in Table 2 in section 4 of this standard apply to the Dual Instrumentation and

Calibrated Box methods of test. Single-packaged dedicated system test tolerances are listed in each applicable Method of Test outlined in section C10.

3.2.9 In appendix C, section C7.2 reads: Data that need to be recorded during the test are listed in Table C2. For single-packaged dedicated systems tested in accordance with ASHRAE 37-2009, data that need to be recorded during the test are listed in ASHRAE 37-2009.

3.2.10 In appendix C, section C6. *Test Chambers Requirements,* add C6.3 to read as follows:

C6.3 For all system constructions (Split systems, Single-packaged dedicated systems, Unit Cooler tested alone, and Dedicated Condensing Unit tested alone), the Unit Cooler under test may be used to aid in achieving the required test chamber ambient temperatures prior to beginning any Steady-state test. However, the unit under test must be free from frost before initiating any Steady-state testing.

For single-packaged dedicated systems, refer to the applicable methods of test for single-packaged dedicated systems listed in section C10 of this appendix.

In 10 CFR part 431, subpart R, appendix C, section 3.3. *Matched systems, single-packaged dedicated systems, and unit coolers tested alone,* revise the language to read:

3.3 *Matched systems, single-packaged dedicated systems, and unit coolers tested alone*: Use the test method in AHRI 1250-2009 (incorporated by reference; see §431.303), appendix C as the method of test for matched refrigeration systems, single-packaged dedicated systems, or unit coolers tested alone, with the modifications listed below in sections 3.3.1 through 3.3.7.2.:

In appendix C of AHRI 1250-2009, renumber the following sections and equations, and references to the following sections and equations, as follows:

Section C10 to C11;

Section C11 to C12;

Section C11.1 to C12.1;

Section C11.1.1 to C12.1.1;

Equation C11 to C12;

Equation C12 to C13;

Section C11.2 to C12.2;

Section C11.3 to C12.3;

Equation C13 to C14;

Equation C14 to C15;

Equation C15 to C16;

Equation C16 to C17;

Section C12 to C13; and

Section C13 to C14.

Insert the following as sections C10 through C10.2.3, and equation C11:

C10. *Single-packaged Test Methods and Allowable Refrigeration Capacity Heat Balance.*

C10.1 *Single-packaged Test Methods.*

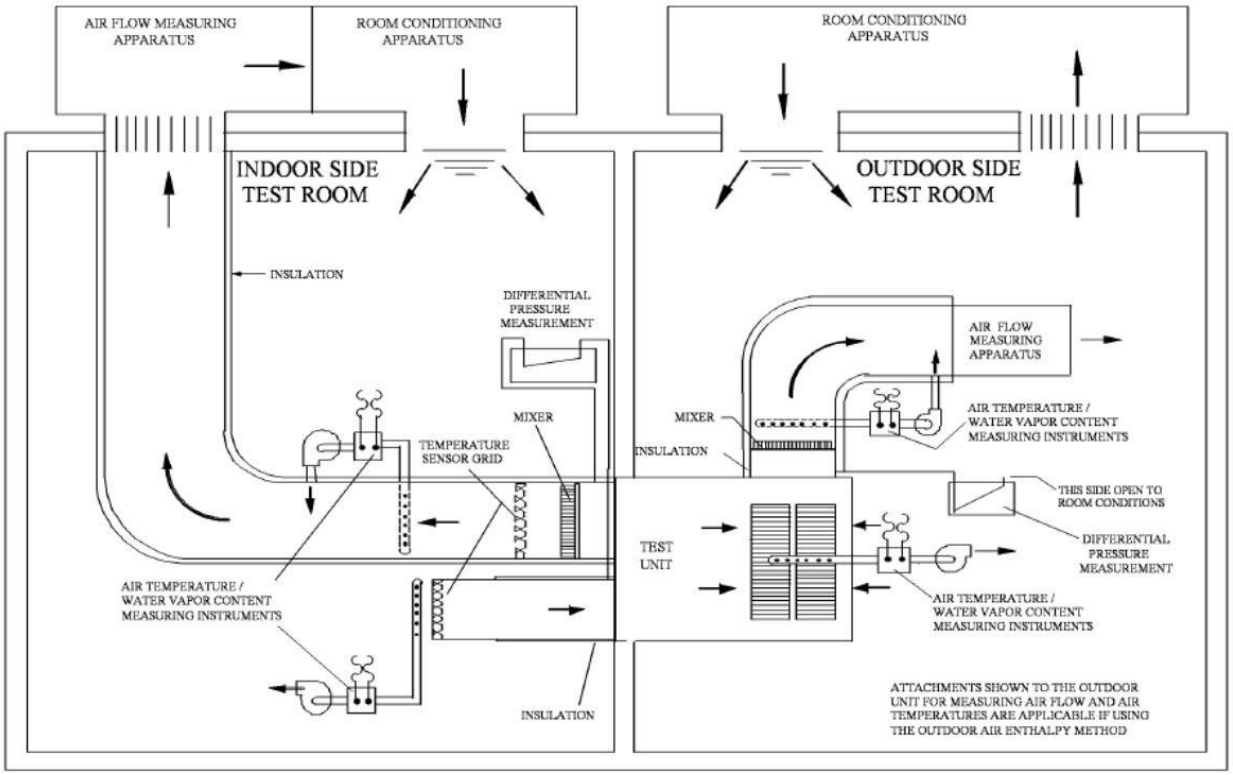

Figure C3 - Air Enthalpy Method

Also see the following website for Figure C3:

https://www.regulations.gov/document?D=EERE-2018-BT-WAV-0002-0009.

C10.1.1 *Indoor Air Enthalpy Method*. Determine Net Refrigeration Capacity of Unit Cooler and input power in accordance with ASHRAE 37-2009, Figure C3, and the following modifications.

C10.1.1.1 Space conditioning capacity is determined by measuring airflow rate and the dry-bub temperature and water vapor content of the air that enters and leaves the coil. Air

enthalpies shall be determined in accordance with ANSI ASHRAE 41.6. Entering air is to be sufficiently dry as to not produce frost on the Unit Cooler coil. Therefore, only sensible capacity measured by dry bulb change shall be used to calculate capacity.

C10.1.1.2 Test Setup for Non-Ducted Unit Coolers. A single outlet plenum box shall be constructed in a cubic arrangement. The length of the longest dimension of the Unit Cooler outlet shall be used to determine the dimension of the cube outlet plenum. Four static pressure taps shall be installed in the center of each face. A 6" inlet plenum skirt shall be installed with four static pressure taps at each center face as well. Airflow shall be adjusted by the exhaust fan on the airflow plenum to achieve 0.00"WC (± 0.02"WC).

C10.1.2 *Outdoor Air Enthalpy Method*. Determine Net Refrigeration Capacity of Unit Cooler and input power in accordance with ASHRAE 37-2009, Figure C3, and the following modifications.

C10.1.2.1 Outdoor Air Enthalpy is only applicable on Dedicated Condensing Units for which the leaving air can be fully captured. Space conditioning capacity is determined by measuring airflow rate and the dry-bub temperature and water vapor content of the air that enters and leaves the coil. Air enthalpies shall be determined in accordance with ANSI ASHRAE 41.6. Line loss adjustments in section 7.3.3.4 of ASHRAE 37-2009 are not applicable to package units.

C10.2 *Allowable Refrigeration Capacity Heat Balance*.

C10.2.1 Following the completion of the Steady-state capacity test, for each rating condition, the measured net capacities of the primary and secondary test methods must balance within 6%, per Equation C11[9]

$$-6\% \leq \frac{\dot{Q}_{net,primary} - \dot{Q}_{net,secondary}}{\dot{Q}_{net,primary}} \times 100\% \leq 6\% \qquad C11$$

C10.2.2 If measured net capacities do not balance per Equation C11, investigate all potential test facility leaks and/or non-conformances. If no leaks or non-conformances are detected, proceed to Section C10.2.3. If any leaks or non-conformances are detected, remedy the concerns and rerun the Steady-state test at all applicable rating condition(s). If the measured net capacities balance per Equation C11, then the test is considered valid and capacity and power measurements from the primary method of the second test will be used. If the measured net capacities still do not balance per Equation C11, proceed to Section C10.2.3

C10.2.3 To achieve a capacity heat balance, the test lab may modify the exterior of the unit under test to reduce leakage and surface losses. Specifically, the lab may add insulation to the outside surface of the single-packaged dedicated system and/or tape and seal sheet metal edges to minimize outdoor ambient air intrusion to the Unit Cooler. After the unit is insulated, rerun the Steady-state test at all applicable rating condition(s). If the

[9] The suggested alternate test procedure in Store It Cold's petition for waiver referenced equation C24. DOE understands this to be an error and that the appropriate equation to reference is C11.

measured net capacities balance per Equation C11, then the lab facility and instrumentation are verified as complying with the applicable method of test. However, capacity, power, and all downstream calculations will be based on the results of the primary method from the first test, which occurred before the unit was altered. If the measured net capacities still do not balance per Equation C11, then the lab facility and instrumentation are considered non-compliant, must be remedied, and all prior tests for the unit under test are considered invalid.

In 10 CFR part 431, subpart R, appendix C, sections 3.3 through 3.3.7.2 replace references to AHRI-1250-2009 sections C10, C11, C11.1, C11.1.1, C11.2, and C11.3, with C11, C12, C12.1, C12.1.1, C12.2, and C12.3, respectively; and replace references to AHRI-1250-2009 equations C13 and C14 with equations C14 and C15, respectively.

(3) *Representations*. Store It Cold may not make representations about the energy use, including the refrigeration capacity (in Btu/h), of a basic model listed in paragraph (1) of this Order for compliance, marketing, or other purposes unless such basic model has been tested in accordance with the provisions set forth above and such representations fairly disclose the results of such testing.

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

(5) This waiver is issued on the condition that the statements, representations, and documents provided by Store It Cold are valid. If Store It Cold makes any modifications to the controls or configurations of these basic models, the waiver will no longer be valid and Store It Cold will either be required to use the current Federal test method or submit a new application for a test procedure waiver. DOE may rescind 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 a basic model's true energy consumption characteristics. 10 CFR 430.401(k)(1). Likewise, Store It Cold may request that DOE rescind or modify the waiver if Store It Cold 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 430.401(k)(2).

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

Signed in Washington, DC, on July 30, 2019.

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