



DEPARTMENT OF ENERGY

[Case Number 2019-011; EERE-2019-BT-WAV-0038]

Energy Conservation Program: Notification of Petition for Waiver of Vinotheque from the Department of Energy Walk-in Coolers and Walk-in Freezers Test Procedure and Notification of Grant of Interim Waiver

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

ACTION: Notification of petition for waiver and grant of an interim waiver; request for comments.

SUMMARY: This document announces receipt of and publishes a petition for waiver and interim waiver from Vinotheque Wine Cellars DBA WhisperKOOL Corp. DBA CellarCool (“Vinotheque”), which seeks a waiver for specified walk-in cooler refrigeration system basic models from the U.S. Department of Energy (“DOE”) test procedure used to determine the efficiency and energy consumption of walk-in coolers and walk-in freezers. DOE also gives notice of an Interim Waiver Order that requires Vinotheque to test and rate the specified walk-in cooler refrigeration system basic models in accordance with the alternate test procedure set forth in the Interim Waiver Order, which modifies the alternate test procedure suggested by Vinotheque. DOE solicits comments, data, and information concerning Vinotheque’s petition, its suggested alternate test procedure, and the alternate test procedure specified in the Interim Waiver Order so as to inform DOE’s final decision on Vinotheque’s waiver request.

DATES: The Interim Waiver Order is effective on [INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. Written comments and information will be accepted on or before [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at <http://www.regulations.gov>. Alternatively, interested persons may submit comments, identified by case number “2019-011”, and Docket number “EERE-2019-BT-WAV-0038,” by any of the following methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.
- *E-mail:* WhisperKOOL2019WAV0038@ee.doe.gov. Include Case No. 2019-011 in the subject line of the message.
- *Postal Mail:* Appliance and Equipment Standards Program, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, Mail Stop EE-5B, Petition for Waiver Case No. 2019-011, 1000 Independence Avenue, SW., Washington, DC 20585-0121. If possible, please submit all items on a compact disc (“CD”), in which case it is not necessary to include printed copies.
- *Hand Delivery/Courier:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, 950 L’Enfant Plaza, SW., 6th floor, Washington, DC, 20024. Telephone: (202) 287-1445. If possible, please submit all items on a “CD”, in which case it is not necessary to include printed copies.

No telefacsimilies (“faxes”) will be accepted. For detailed instructions on submitting comments and additional information on this process, see the “**SUPPLEMENTARY INFORMATION**” section of this document.

Docket: The docket, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at <http://www.regulations.gov>. All documents in the docket are listed in the <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.

The docket web page can be found at <https://www.regulations.gov/docket?D=EERE-2019-BT-WAV-0038>. The docket web page contains instruction on how to access all documents, including public comments, in the docket. See the “**SUPPLEMENTARY INFORMATION**” section for information on how to submit comments through <http://www.regulations.gov>.

FOR FURTHER INFORMATION CONTACT:

Ms. Lucy deButts, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC 20585-0121. E-mail: AS_Waiver_Request@ee.doe.gov.

Mr. Michael Kido, 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) 586-8145. E-mail: Michael.Kido@hq.doe.gov.

SUPPLEMENTARY INFORMATION:

DOE is publishing Vinotheque’s petition for waiver in its entirety appendix 1 to this document, pursuant to 10 CFR 431.401(b)(1)(iv), absent information for which the petitioner requested treatment as confidential business information. DOE invites all interested parties to submit in writing by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**, comments and information on all aspects of the petition, including the alternate test procedure. Pursuant to 10 CFR 431.401(d), any person submitting written comments to DOE must also send a copy of such comments to the petitioner. The

contact information for the petitioner is: Christian Bromme, cbromme@vinotheque.com, 1738 East Alpine Avenue, Stockton, CA 95205.

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

However, your contact information will be publicly viewable if you include it in the comment or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. If this instruction is followed, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to <http://www.regulations.gov> information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (“CBI”). Comments submitted through <http://www.regulations.gov> cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

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

Submitting comments via email, hand delivery/courier, or postal mail. Comments and documents submitted via email, hand delivery/courier, or postal mail also will be posted to <http://www.regulations.gov>. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information on a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. If you submit via postal mail or hand delivery/courier, please provide all items on a CD, if feasible, in which case it is not necessary to submit printed copies. Faxes will not be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, written in English and free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. According to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery/courier two well-marked copies: one copy of the document marked "confidential" including all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

Case Number 2019-011

Interim Waiver Order

I. Background and Authority

The Energy Policy and Conservation Act, 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 C² of EPCA, added by the National Energy Conservation Policy Act, Public Law 95-619, sec. 441 (Nov. 9, 1978), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve the energy efficiency for certain types of industrial equipment. Through amendments brought about by the Energy Independence and Security Act of 2007, Pub. L. 110-140, sec. 312 (Dec. 19, 2007), this equipment includes walk-in coolers and walk-in freezers, the subject of this Interim Waiver Order. (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), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), energy conservation standards (42 U.S.C. 6313), 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

¹ All references to EPCA in this document refer to the statute as amended through the Energy Act of 2020, Public Law 116-260 (Dec. 27, 2020).

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

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 the energy efficiency, energy use or estimated annual operating cost of covered products and 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 used to determine the net capacity and annual walk-in energy factor (“AWEF”) of walk-in cooler and walk-in freezer 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. 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. *See* 10 CFR 431.401(f)(2). A petitioner must include in its petition any alternate test procedures known to the petitioner to evaluate the performance of the equipment type in a manner representative of its energy consumption characteristics of the

basic model. *See* 10 CFR 431.401(b)(1)(iii). DOE may grant the waiver subject to conditions, including adherence to alternate test procedures. *See* 10 CFR 431.401(f)(2).

As soon as practicable after the granting of any waiver, DOE will publish in the *Federal Register* a notice of proposed rulemaking to amend its regulations so as to eliminate any need for the continuation of such waiver. *See* 10 CFR 431.401(1). As soon thereafter as practicable, DOE will publish in the *Federal Register* a final rule to that effect. *Id.*

The waiver process also provides that DOE may grant an interim waiver if it appears likely that the underlying petition for waiver will be granted and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination on the underlying petition for waiver. *See* 10 CFR 431.401(e)(2). Within one year of issuance of an interim waiver, DOE will either: (i) publish in the *Federal Register* a determination on the petition for waiver; or (ii) publish in the *Federal Register* a new or amended test procedure that addresses the issues presented in the waiver. *See* 10 CFR 431.401(h)(1).

When DOE amends the test procedure to address the issues presented in a waiver, the waiver will automatically terminate on the date on which use of that test procedure is required to demonstrate compliance. *See* 10 CFR 431.401(h)(2).

II. Vinotheque's Petition for Waiver and Application for Interim Waiver

DOE received correspondence, docketed on December 2, 2019, from Vinotheque seeking an interim waiver from the test procedure for walk-in cooler and walk-in freezer refrigeration systems set forth at Appendix C (Vinotheque, No. 1).³ The waiver process under 10 CFR

³ A notation in the form "Vinotheque, No. 1" identifies a written submission: (1) made by Vinotheque; and (2) recorded in document number 1 that is filed in the docket of this petition for waiver (Docket No. EERE-2019-BT-WAV-0038) and available at <http://www.regulations.gov>.

431.401 requires that a petitioner must request a waiver for there to be consideration of a petition for an interim waiver. Vinotheque later confirmed in a May 26, 2020 email that its petition should also be considered as a petition for waiver (Vinotheque, No. 4). Vinotheque later submitted an updated petition, docketed on December 11, 2020, providing maximum external static pressure (“ESP”) values for specified basic models and clarifying that the specified basic models cannot operate below 45°F (Vinotheque, No. 6). Due to two discrepancies in Vinotheque’s petition for waiver (the “Platinum 4000 Ducted” model is listed in the basic model list but is not listed in the table containing ESP values; the “SL2500” model is listed in the basic model list, but only appears as “SL” in the table containing ESP values), Vinotheque provided a maximum ESP for the “Platinum 4000 Ducted”, and confirmed the model number and maximum ESP for “SL2500” (Vinotheque, No. 9).

The primary assertion in the petition, absent an interim waiver, is that the prescribed test procedure would evaluate the specified basic models in a manner so unrepresentative of their true energy consumption as to provide materially inaccurate comparative data. As presented in Vinotheque’s petition, the specified basic models of walk-in cooler refrigeration systems operate at a temperature range of 45-65 °F; higher than that of a typical walk-in cooler refrigeration system. Thus, the 35 °F temperature specified in the DOE test procedure for medium-temperature walk-in refrigeration systems would result in the prescribed test procedures evaluating the specified basic models in a manner so unrepresentative of their true energy consumption characteristics as to provide materially inaccurate comparative data. Vinotheque also states that the specified basic models are “wine cellar cooling systems” that operate at temperature and relative humidity ranges optimized for the long-term storage of wine and are usually located in air-conditioned spaces. Vinotheque contends that because of these characteristics, wine cellar walk-in refrigeration systems differ in their walk-in box temperature

setpoint, walk-in box relative humidity, low/high load split,⁴ and compressor efficiency from other walk-in cooler refrigeration systems.

Vinotheque states that the specified basic models are designed to provide a cold environment at a temperature range between 45-65 °F with 50-70 percent relative humidity (“RH”), and typically are kept at 55 °F and 55 percent RH rather than the 35 °F and <50 percent RH test condition prescribed by the DOE test procedure. Vinotheque states that these temperature and RH conditions are optimized for the purpose of long-term wine storage to mimic the temperature and humidity of natural caves. Vinotheque also asserts that operating a wine cellar at the 35 °F condition would adversely mechanically alter the intended performance of the system, which would include icing of the evaporator coil that could potentially damage the compressor, and would not result in an accurate representation of the performance of the cooling unit.

Additionally, the basic models of walk-in refrigeration systems -- identified in Vinotheque’s waiver petition by the heading in the basic models list as “Single-Packaged” -- are single-package systems. Although not explicitly identified by Vinotheque, DOE recognizes that because of their single-package design, these basic models have insufficient space within the units and insufficient lengths of liquid line and evaporator outlet line for the dual mass flow meters and the dual temperature and pressure measurements required by the test procedure’s refrigerant enthalpy method. AHRI 1250-2009 does not include specific provisions for testing single-package systems and testing these basic models using the refrigerant enthalpy method as required by Appendix C would require extensive additional piping to route the pipes out of the

⁴ The DOE test procedure incorporates by reference Air-Conditioning, Heating, and Refrigeration Institute (“AHRI”) Test Standard 1250-2009, “Standard for Performance Rating of Walk-in Coolers and Freezers” (including Errata sheet dated December 2015) (“AHRI 1250-2009”). Section 6 of that standard defines walk-in box thermal loads as a function of refrigeration system net capacity for both high-load and low-load periods. The waiver petition asserts that wine cellars do not have distinct high and low load periods, and that the box load levels in the test standard are not representative for wine cellar refrigeration systems.

system where the components can be installed, and then back in.⁵ This additional piping would impact unit performance, likely be inconsistent between test labs, and result in unrepresentative test values for the unit under test. AHRI has published a revised version of the test standard that provides provisions for single-package systems without requiring extensive additional piping (AHRI 1250-2020, *2020 Standard for Performance Rating of Walk-in Coolers and Freezers*). As discussed below, the interim waiver alternative test procedure presented for comment in this notification adopts the new test methods included in AHRI 1250-2020 for single-package units.

DOE has received multiple requests from wine cellar manufacturers for waiver and interim waiver from Appendix C. In light of these requests, DOE met with both AHRI and the wine cellar walk-in refrigeration system manufacturers to develop a consistent and representative alternate test procedure that would be relevant to each waiver request. Ultimately, AHRI sent a letter to DOE on August 18, 2020, summarizing the industry's position on several issues ("AHRI August 2020 Letter").⁶ This letter documents industry support for specific wine cellar walk-in refrigeration system test procedure requirements, allowing the provisions to apply only to refrigeration systems with a minimum operating temperature of 45 °F, since wine cellar system controls and unit design specifications prevent these walk-ins from reaching a temperature below 45 °F. A provision for testing walk-in wine cellar refrigeration systems at an external static pressure ("ESP")⁷ of 50 percent of the maximum ESP to be specified by manufacturers for each basic model ("AHRI August 2020 Letter") is also included.

⁵ In a waiver granted to Store It Cold for certain models of single-package units, DOE acknowledged a similar issue in which the additional piping necessary to install the required testing components would affect performance of the units, rendering the results unrepresentative. See 84 FR 39286 (Aug. 9, 2019). In the case of the waiver granted to Store It Cold, the refrigerant enthalpy method yielded inaccurate data for the specified basic models compared to the basic models' true performance characteristics because of the additional piping required to attach the testing components required by the refrigerant enthalpy test. The same issues are present for the specified Single-Packaged basic models included in Vinotheque's waiver petition.

⁶ DOE's meetings with Vinotheque and other wine cellar refrigeration systems were conducted consistent with the Department's *ex parte* meeting guidance (74 FR 52795; October 14, 2009). The AHRI August 2020 letter memorializes this communication and is provided in Docket No. EERE- 2019-BT-WAV-0038-0005.

⁷ External static pressure is the sum of all the pressure resisting the fans, in this case chiefly the resistance generated by the air moving through ductwork

Vinotheque's updated petition, docketed on December 11, 2020, states that all basic models listed in the petition for waiver and interim waiver have a minimum operating temperature of 45 °F and provides maximum ESP values for specified ducted single-packaged and ducted matched-pair basic models.⁸ (Vinotheque, No. 6)

Vinotheque requests an interim waiver from the existing DOE test procedure. DOE will grant an interim waiver if it appears likely that the petition for waiver will be granted, and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination of the petition for waiver. See 10 CFR 431.401(e)(2).

III. Requested Alternate Test Procedure

EPCA requires that manufacturers use the applicable DOE test procedures when making representations about the energy consumption and energy consumption costs of covered equipment. (42 U.S.C. 6314(d)). Consistency is important when making representations about the energy efficiency of products and equipment, including when demonstrating compliance with applicable DOE energy conservation standards. Pursuant to its regulations at 10 CFR 431.401, and after consideration of public comments on the petition, DOE may establish in a subsequent Decision and Order an alternate test procedure for the basic models addressed by the Interim Waiver Order.

Vinotheque seeks to use an approach that would test and rate specific wine cellar walk-in refrigeration system basic models. The company's suggested approach specifies using an air-return temperature of 55 °F, as opposed to the 35 °F requirement prescribed in the current DOE

⁸ Vinotheque has stated that the maximum ESP values included in its updated petition for waiver are confidential business information. These values have been redacted from the publicly-available petition and email correspondence.

test procedure. Vinotheque also suggests using an air-return relative humidity of 55 percent RH, as opposed to <50 percent RH. Additionally, Vinotheque requests that a correction factor of 0.55 be applied to the final AWEF calculation to account for the different use and load patterns of the specified basic models as compared to walk-in cooler refrigeration systems generally.

Vinotheque cited the use of such a correction factor for coolers⁹ and combination cooler refrigeration products under DOE's test procedure for miscellaneous refrigeration products at 10 CFR part 430, subpart B, appendix A.

IV. Interim Waiver Order

DOE has reviewed Vinotheque's application, its suggested testing approach, representations of the specified basic models on the website for the WhisperKOOL and CellarCool brands, related product catalogs, and information provided by Vinotheque and other wine cellar walk-in refrigeration system manufacturers in meetings with DOE. Based on this review, DOE is granting an interim waiver that requires testing with a modified version of the testing approach suggested by Vinotheque.

The modified testing approach would apply to the models specified in Vinotheque's waiver petition that include two categories of WICF refrigeration systems, *i.e.*, single-packaged and matched-pair (split) systems. The systems that are single-package are identified by a "Single-Packaged" heading in the waiver petition. All of the single-package basic models are capable of some ducting; those that are specifically identified in their basic model name as "fully ducted" are designed to be ducted on both the evaporator and condenser sides. This enables the option of installing the unit cooler remotely by circulating air through ducts from the wine cellar

⁹ A *cooler* is a cabinet, used with one or more doors, that has a source of refrigeration capable of operating on single-phase, alternating current and is capable of maintaining compartment temperatures either: (1) No lower than 39 °F (3.9 °C); or (2) In a range that extends no lower than 37 °F (2.8 °C) but at least as high as 60 °F (15.6 °C). 10 CFR 430.2.

to the unit cooler and back, and from the condenser to the outside (or another conditioned space). The single-package basic models that are not identified in their basic model name as “fully ducted” are designed for installation through the wall or ceiling of the wine cellar, with optional ducting connecting the condenser side of the unit to the outside or another conditioned space. The basic models that are identified by the “Matched-Pair” heading in the waiver petition are matched-pair (split) systems, in which refrigerant circulates between the “evaporator unit” (unit cooler) portion of the unit and the “condensing unit.” The refrigerant cools the wine cellar air in the evaporator unit, while the condensing unit rejects heat from the refrigeration system in a remote location, often outside. The evaporator unit of the “Fully Ducted” (Platinum 4000 Fully Ducted, Platinum 8000 Fully Ducted, and Platinum Twin Fully Ducted) matched-pair system basic models circulates air through ducts from the wine cellar to the evaporator unit and back to provide cooling, while the evaporator unit of the remaining matched-pair systems is installed either partially or entirely in the wine cellar, allowing direct cooling. The capacity range of the specified basic models is from 1,453 Btu/h to 12,530 Btu/h at the specified operating conditions for each of the models (Vinotheque, No. 7).¹⁰

DOE considers the operating temperature range of the specified basic models to be integral to its analysis of whether such models require a test procedure waiver. Grant of the interim waiver and its alternative test procedure to Vinotheque for the specified basic models listed in the petition is based upon Vinotheque’s representation that the operating range for the basic models listed in the interim waiver does not extend below 45 °F.

¹⁰ The specified operating conditions are 55 °F cold-side air entering conditions and 85 °F warm-side air entering temperature. WhisperKOOL and CellarCool specification sheets and installation manuals do not specify a cold side relative humidity. An example series of specified models with capacity information based upon these conditions can be found in the Vinotheque owner’s manual at the associated docket number.

The alternate test procedure specified in the Interim Waiver Order requires testing the specified basic models according to Appendix C with the following changes. The required alternate test procedure specifies an air entering dry-bulb temperature of 55 °F and a relative humidity of 55 percent. The alternate test procedure also specifies that the capacity measurement for the specified basic models that are single-package systems (identified by the “Single-Packaged” heading in the basic models list) be conducted using a primary and a secondary capacity measurement method as specified in AHRI 1250-2020, using two of the following: The indoor air enthalpy method; the outdoor air enthalpy method; the compressor calibration method; the indoor room calorimeter method; the outdoor room calorimeter method; or the balanced ambient room calorimeter method.

The required alternate test procedure also includes the following additional modifications to Viotheque’s suggested approach: For systems that can be installed with (1) ducted evaporator air, (2) with or without ducted evaporator air, (3) ducted condenser air, or (4) with or without ducted condenser air, testing would be conducted at 50 percent of the maximum ESP, consistent with the AHRI August 2020 Letter recommendations, subject to a tolerance of -0.00/+0.05 in. wc.¹¹ DOE understands that maximum ESP is generally not published in available literature such as installation instructions, but manufacturers do generally specify the size and maximum length of ductwork that is acceptable for any given unit in such literature. The duct specifications determine what ESP would be imposed on the unit in field operation.¹² The provision of allowable duct dimensions is more convenient for installers than maximum ESP, since it relieves the installer from having to perform duct pressure drop calculations to determine ESP. DOE independently calculated the maximum pressure drop over a range of common duct

¹¹ Inches of water column (“in. wc”) is a unit of pressure conventionally used for measurement of pressure differentials.

¹² The duct material, length, diameter, shape, and configuration are used to calculate the ESP generated in the duct, along with the temperature and flow rate of the air passing through the duct. The conditions during normal operation that result in a maximum ESP are used to calculate the reported maximum ESP values, which are dependent on individual unit design and represent manufacturer-recommended installation and use.

roughness values¹³ using duct lengths and diameters published in Vintotheque's installation manuals (Vintotheque, No. 7).¹⁴ DOE's calculations show reasonable agreement with the maximum ESP values provided by Vintotheque for the specified basic models. Given that the number and degree of duct bends and duct type will vary by installation, DOE found the maximum ESP values provided by Vintotheque to be sufficiently representative.

Selection of a representative ESP equal to half the maximum ESP is based on the expectation that most installations will require less than the maximum allowable duct length. In the absence of field data, DOE expects that a range of duct lengths from the minimal length to the maximum allowable length would be used; thus, DOE believes that half of the maximum ESP would be representative of most installations. For basic models with condensing or evaporator units that are not designed for the ducting of air, this design characteristic must be clearly stated.

Additionally, if there are multiple condenser or evaporator unit fan speed settings, the speed setting used would be as instructed in the unit's installation instructions. However, if the installation instructions do not specify a fan speed setting for ducted installation, systems that can be installed with ducts would be tested with the highest available fan speed. The ESP would be set for testing either by symmetrically restricting the outlet duct¹⁵ or, if using the indoor air enthalpy method, by adjusting the airflow measurement apparatus blower.

¹³ Calculations were conducted over an absolute roughness range of 1.0-4.6 mm for flexible duct as defined in pages 1-2 of an OSTI Journal Article on pressure loss in flexible HVAC ducts at <https://www.osti.gov/servlets/purl/836654> (Docket No. EERE-2019-BT-WAV-0038-0008) and available at <http://www.regulations.gov>.

¹⁴ A representative example of duct lengths and diameters can be found in the Vintotheque owner's manual at the associated docket number.

¹⁵ This approach is used for testing of furnace fans, as described in Section 8.6.1.1 of 10 CFR part 430, appendix AA to subpart B.

The alternate test procedure also describes the requirements for measurement of ESP consistent with provisions provided in AHRI 1250-2020 when using the indoor air enthalpy method with unit coolers.

According to Vinotheque's petition, the specified walk-in refrigeration system basic models that are matched-pair systems are sold as full systems (*i.e.*, split systems) rather than as individual unit cooler and condensing unit components. This Interim Waiver Order provides no direction regarding refrigerant line connection operating conditions, and as such is inapplicable to testing the basic models as individual components. Consequently, the Interim Waiver Order addresses only matched-pair testing of the specified basic models that are split-systems.

DOE notes that, despite the request from Vinotheque, it is not including a 0.55 correction factor in the alternate test procedure required by the Interim Waiver Order. In its petition for waiver, Vinotheque observed that the test procedure in appendix A to subpart B of 10 CFR part 430 ("Appendix A") includes such a factor to account for the difference in use and loading patterns of coolers (*e.g.*, single-packaged wine chiller cabinets) as compared to other residential refrigeration products and sought to include a factor as part of its petition. Coolers, like other residential refrigeration products, are tested in a 90 °F room without door openings (section 2.1.1 of Appendix A). The intent of the energy test procedure for residential refrigeration products is to simulate operation in typical room conditions (72 °F) with door openings by testing at 90 °F ambient temperature without door openings. 10 CFR 430.23(ff)(7). In section 5.2.1.1 of Appendix A, a correction factor of 0.55 is applied to the measured energy consumption of coolers so that measuring energy consumption at 90 °F ambient temperature without door openings provides test results that are representative of consumer usage at 72 °F ambient temperature with door openings. Specifically, the 0.55 correction factor reflects that (1) closed-door operation of single-packaged coolers in typical 72 °F room conditions results in an average

energy consumption 0.46 times the value measured at the 90 °F ambient temperature specified by the test procedure; and (2) expected door openings of a single-packaged wine chiller would add an additional 20 % thermal load. Multiplying 0.46 by 1.2 results in the overall correction factor of 0.55. See 81 FR 46768, 46782 (July 18, 2016) (final rule for miscellaneous refrigeration products).

In contrast, these same closed-door conditions on which the miscellaneous refrigeration correction factor is based are not present in the test procedure for walk-in cooler refrigeration systems. The WICF test procedure does not provide for closed-door testing at elevated ambient temperatures as the test procedure for residential refrigeration products does because walk-ins are tested and rated by component, with a walk-in refrigeration system tested and rated separately from a walk-in enclosure (panels and doors). See 76 FR 21580. Walk-in refrigeration load is set by using a representative ratio of box load to capacity (see discussion below). As a result, applying the 0.55 correction factor as suggested by Vinotheque is not appropriate for the specified basic models.

While not specifically addressed in the request for waiver submitted by Vinotheque, waivers submitted by other manufacturers have suggested that the 0.55 correction factor also addresses the differences in run time and compressor inefficiency of wine cellar refrigeration systems as compared to walk-in cooler refrigeration systems more generally and have suggested that the run time for wine cellar walk-in refrigeration systems ranges from 50 to 75 percent. AHRI 1250-2009 accounts for percent run time in the AWEF calculation by setting walk-in box load equal to specific fractions of refrigeration system net capacity—the fractions are defined based on whether the refrigeration system is for cooler or freezer applications, and whether it is designed for indoor or outdoor installation (see sections 6.2 (applicable to coolers) and 6.3 (applicable to freezers) of AHRI 1250-2009). The alternate test procedure provided by this

interim waiver requires calculating AWEF based on setting the walk-in box load equal to half of the refrigeration system net capacity, without variation according to high and low load periods and without variation with outdoor air temperature for outdoor refrigeration systems. Setting the walk-in box load equal to half the refrigeration system net capacity results in a refrigeration system run time fraction slightly above 50 percent. As previously discussed, walk-in energy consumption is determined by component, with separate test procedures for walk-in refrigeration systems, doors, and panels. Section 6 of AHRI 1250-2009 provides equations for determining refrigeration box load as a function of refrigeration system capacity. Using these equations with an assumed load factor of 50 percent maintains consistency with Appendix C while providing an appropriate load fraction for wine cellar refrigeration systems. Accordingly, DOE has declined to adopt a correction factor for the equipment at issue.

Based on DOE’s review of Vinotheque’s petition, the required alternate test procedure laid out in the Interim Waiver Order appears to allow for the accurate measurement of energy efficiency of the specified basic models, while alleviating the testing issues associated with Vinotheque’s implementation of wine cellar walk-in refrigeration system testing for these basic models. Consequently, DOE has determined that Vinotheque’s petition for waiver will likely be granted. Furthermore, DOE has determined that it is desirable for public policy reasons to grant Vinotheque immediate relief pending a determination of the petition for waiver.

For the reasons stated, it is **ORDERED** that:

(1) Vinotheque must test and rate the following single-packaged and matched-pair WhisperKOOL- and CellarCool-branded wine cellar walk-in refrigeration system basic models with the alternate test procedure set forth in paragraph (2).

Single-Packaged:

Basic Model	Brand Name
SC Pro 2000	WhisperKOOL

SC Pro 3000	WhisperKOOL
SC Pro 4000	WhisperKOOL
SC Pro 8000	WhisperKOOL
Extreme 3500 ti	WhisperKOOL
Extreme 5000 ti	WhisperKOOL
Extreme 8000 ti	WhisperKOOL
Extreme 3500 tiR	WhisperKOOL
Extreme 5000 tiR	WhisperKOOL
Extreme 8000 tiR	WhisperKOOL
Extreme 3500 tiR Fully Ducted	WhisperKOOL
Extreme 5000 tiR Fully Ducted	WhisperKOOL
Extreme 8000 tiR Fully Ducted	WhisperKOOL
Phantom 3500	WhisperKOOL
Phantom 5000	WhisperKOOL
Phantom 8000	WhisperKOOL
Slimline LS	WhisperKOOL
Optimum 2200	CellarCool
Optimum 3300	CellarCool
Optimum 4400	CellarCool
Optimum 8800	CellarCool
CX2200	CellarCool
CX3300	CellarCool
CX4400	CellarCool
CX8800	CellarCool
SL2500	CellarCool
Ultimate 3300	CellarCool
Ultimate 4400	CellarCool
Ultimate 8800	CellarCool
Ultimate 3300-R	CellarCool
Ultimate 4400-R	CellarCool
Ultimate 8800-R	CellarCool
Ultimate FD 3300	CellarCool
Ultimate FD 4400	CellarCool
Ultimate FD 8800	CellarCool
Ultimate PLUS Fully Ducted 3300	CellarCool
Ultimate PLUS Fully Ducted 4400	CellarCool
Ultimate PLUS Fully Ducted 8800	CellarCool

Matched-Pair:

Basic Model	Brand Name
Platinum Mini	WhisperKOOL
Platinum 4000	WhisperKOOL
Platinum 8000	WhisperKOOL
Platinum Twin	WhisperKOOL
Platinum 4000 Fully Ducted	WhisperKOOL
Platinum 8000 Fully Ducted	WhisperKOOL
Platinum Twin Fully Ducted	WhisperKOOL
Platinum 4000 Ducted	WhisperKOOL
Platinum 8000 Ducted	WhisperKOOL
Platinum Twin Ducted	WhisperKOOL

Ceiling Mount Mini	WhisperKOOL
Ceiling Mount 4000	WhisperKOOL
Ceiling Mount 8000	WhisperKOOL
Ceiling Mount Twin	WhisperKOOL
Quantum 9000	WhisperKOOL
Quantum 12000	WhisperKOOL
Magnum 9000	CellarCool
Magnum 12000	CellarCool
CM2500-S	CellarCool
CM3500-S	CellarCool
CM5000-S	CellarCool
CM9000 Twin Split	CellarCool
WM2500-S	CellarCool
WM3500-S	CellarCool
WM5000-S	CellarCool
WM9000 Twin-S	CellarCool
FD3500-S	CellarCool
FD5000-S	CellarCool
FD9000 Twin-S	CellarCool

(2) The alternate test procedure for the Vinotheque basic models identified in paragraph (1) of this Interim Waiver Order is the test procedure for Walk-in Cooler Refrigeration Systems prescribed by DOE at 10 CFR part 431, subpart R, appendix C (“Appendix C to Subpart R”), except as detailed below. All other requirements of Appendix C to Subpart R, and DOE’s regulations remain applicable.

In Appendix C to Subpart R, revise section 3.1.1 (which specifies modifications to AHRI 1250-2009 (incorporated by reference; see §431.303)) to read:

3.1.1. In Table 1, Instrumentation Accuracy, refrigerant temperature measurements shall have an accuracy of ± 0.5 °F for unit cooler in/out. Measurements used to determine temperature or water vapor content of the air (*i.e.* wet bulb or dew point) shall be accurate to within ± 0.25 °F; all other temperature measurements shall be accurate to within ± 1.0 °F.

In Appendix C to Subpart R, revise section 3.1.4 (which specifies modifications to AHRI 1250-2009) and add modifications of AHRI 1250-2009 Tables 3 and 4 to read:

3.1.4. In Tables 3 and 4 of AHRI 1250-2009, Section 5, the Condenser Air Entering Wet-Bulb Temperature requirement applies only to single-packaged dedicated systems. Tables 3 and 4 shall be modified to read:

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, %¹	Condenser Air Entering Dry-Bulb, °F	Maximum Condenser Air Entering Wet-Bulb, °F	Compressor Status	Test Objective
Evaporator Fan Power	55	55	-	-	-	Measure fan input wattage ²
Refrigeration Capacity	55	55	90	65 ³	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler, input power, and EER at Rating Condition
<p>Notes:</p> <ol style="list-style-type: none"> 1. The test condition tolerance (maximum permissible variation of the average value of the measurement from the specified test condition) for relative humidity is 3%. 2. Measure fan input wattage either by measuring total system power when the compressor and condenser are turned off or by separately submetering the evaporator fan. 3. Maximum allowable value for Single-Packaged 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, %¹	Condenser Air Entering Dry-Bulb, °F	Maximum Condenser Air Entering Wet-Bulb, °F	Compressor Status	Test Objective
Evaporator Fan Power	55	55	-	-	-	Measure fan input wattage ²

Refrigeration Capacity A	55	55	95	68 ³	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler, input power, and EER at Rating Condition
Refrigeration Capacity B	55	55	59	46 ³	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler and system input power at moderate condition
Refrigeration Capacity C	55	55	35	29 ³	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler and system input power at cold condition
Notes: <ol style="list-style-type: none"> 1. The test condition tolerance (maximum permissible variation of the average value of the measurement from the specified test condition) for relative humidity is 3%. 2. Measure fan input wattage either by measuring total system power when the compressor and condenser are turned off or by separately submetering the evaporator fan. 3. 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 Appendix C to Subpart R, following section 3.2.5 (instructions regarding modifications to AHRI 1250-2009), add sections 3.2.6 and 3.2.7 to read:

3.2.6 The purpose in section C1 of appendix C is modified by extending it to include Single-Packaged Dedicated Systems.

3.2.7 For general test conditions and data recording (appendix C, section C7), the test acceptance criteria in Table 2 and the data to be recorded in Table C2 apply to the Dual Instrumentation and Calibrated Box methods of test.

In Appendix C to Subpart R, revise section 3.3 to read:

3.3. *Matched systems, single-packaged dedicated systems, and unit coolers tested alone:*

Test any split system wine cellar walk-in refrigeration system as a matched pair. Any condensing unit or unit cooler component must be matched with a corresponding counterpart for testing. 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 following modifications:

* * * * *

In Appendix C to Subpart R, revise sections 3.3.3 through 3.3.3.2 to read:

3.3.3 *Evaporator fan power.*

3.3.3.1 The unit cooler fan power consumption shall be measured in accordance with the requirements in Section C3.5 of AHRI 1250-2009. This measurement shall be made with the fan operating at full speed, either measuring unit cooler or total system power input upon the completion of the steady state test when the compressors and condenser fan of the walk-in system is turned off, or by submetered measurement of the evaporator fan power during the steady state test.

Section C3.5 of AHRI 1250-2009 is revised to read:

Unit Cooler Fan Power Measurement. The following shall be measured and recorded during a fan power test.

$EF_{comp,on}$ Total electrical power input to fan motor(s) of Unit Cooler, W

FS	Fan speed (s), rpm
N	Number of motors
P _b	Barometric pressure, in. Hg
T _{db}	Dry-bulb temperature of air at inlet, °F
T _{wb}	Wet-bulb temperature of air at inlet, °F
V	Voltage of each phase, V

For a given motor winding configuration, the total power input shall be measured at the highest nameplated voltage. For three-phase power, voltage imbalance shall be no more than 2 %.

3.3.3.2 Evaporator fan power for the off-cycle is equal to the on-cycle evaporator fan power with a run time of ten percent of the off-cycle time.

$$EF_{comp,off} = 0.1 \times EF_{comp,on}$$

In Appendix C to Subpart R, following section 3.3.7.2, add new sections 3.3.8, 3.3.9, and 3.3.10 to read:

3.3.8. Measure power and capacity of single-packaged dedicated systems as described in sections C4.1.2 and C9 of AHRI 1250-2020. The third and fourth sentences of Section C9.1.1.1 of AHRI 1250-2020 (“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.”) shall not apply.

3.3.9. For systems with ducted evaporator air, or that can be installed with or without ducted evaporator air: Connect ductwork on both the inlet and outlet connections and determine external static pressure as described in ASHRAE 37-2009, sections 6.4 and 6.5. Use pressure measurement instrumentation as described in ASHRAE 37-2009 section 5.3.2. Test at the fan speed specified in manufacturer installation instructions—if there is more than one fan speed setting and the installation instructions do not specify which speed to use, test at the highest speed. Conduct tests with the external static pressure equal to 50 percent of the maximum external static pressure allowed by the manufacturer for system installation within a tolerance of $-0.00/+0.05$ in. wc. If testing with the indoor air enthalpy method, adjust the airflow measurement apparatus fan to set the external static pressure—otherwise, set the external static pressure by symmetrically restricting the outlet of the test duct. In case of conflict, these requirements for setting evaporator airflow take precedence over airflow values specified in manufacturer installation instructions or product literature.

3.3.10. For systems with ducted condenser air, or that can be installed with or without ducted condenser air: Connect ductwork on both the inlet and outlet connections and determine external static pressure as described in ASHRAE 37-2009, sections 6.4 and 6.5. Use pressure measurement instrumentation as described in ASHRAE 37-2009, section 5.3.2. Test at the fan speed specified in manufacturer installation instructions—if there is more than one fan speed setting and the installation instructions do not specify which speed to use, test at the highest speed. Conduct tests with the external static pressure equal to 50 percent of the maximum external static pressure allowed by the manufacturer for system installation within a tolerance of $-0.00/+0.05$ in. wc. If testing with the outdoor enthalpy method, adjust the airflow measurement apparatus fan to set the external static pressure—otherwise, set the external static pressure by symmetrically

restricting the outlet of the test duct. In case of conflict, these requirements for setting condenser airflow take precedence over airflow values specified in manufacturer installation instructions or product literature. If testing using the outdoor air enthalpy method, the requirements of section 8.6 of ASHRAE 37-2009 are not applicable.

In Appendix C to Subpart R, revise section 3.3.6 (which specifies modifications to AHRI 1250-2009) to read:

3.3.6. AWEF is calculated on the basis that walk-in box load is equal to half of the system net capacity, without variation according to high and low load periods and without variation with outdoor air temperature for outdoor refrigeration systems, and the test must be done as a matched or single-package refrigeration system, as follows:

For Indoor Condensing Units:

$$\dot{B}L = 0.5 \cdot \dot{q}_{ss}(90 \text{ F})$$

$$LF = \frac{\dot{B}L + 3.412 \cdot \dot{E}F_{comp,off}}{\dot{q}_{ss}(90 \text{ F}) + 3.412 \cdot \dot{E}F_{comp,off}}$$

$$AWEF = \frac{\dot{B}L}{\dot{E}_{ss}(90 \text{ F}) \cdot LF + \dot{E}F_{comp,off} \cdot (1 - LF)}$$

For Outdoor Condensing Units:

$$\dot{B}L = 0.5 \cdot \dot{q}_{ss}(95 \text{ F})$$

$$LF(t_j) = \frac{\dot{B}L + 3.412 \cdot \dot{E}F_{comp,off}}{\dot{q}_{ss}(t_j) + 3.412 \cdot \dot{E}F_{comp,off}}$$

$$AWEF = \frac{\sum_{j=1}^n BL(t_j)}{\sum_{j=1}^n E(t_j)}$$

$$BL(t_j) = \dot{B}L \cdot n_j$$

$$E(t_j) = [\dot{E}_{ss}(t_j) \cdot LF(t_j) + \dot{E}F_{comp,off} \cdot (1 - LF(t_j))] \cdot n_j$$

Where: $\dot{B}L$ is the non-equipment-related box load
 LF is the load factor

And other symbols are as defined in AHRI 1250-2009.

(3) *Representations.* Vinotheque may not make representations about the efficiency of a basic model listed in paragraph (1) of this Interim Waiver Order for compliance, marketing, or other purposes unless that 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 interim waiver shall remain in effect according to the provisions of 10 CFR 431.401.

(5) This Interim Waiver Order is issued on the condition that the statements and representations provided by Vinotheque are valid. If Vinotheque makes any modifications to the controls or configurations of a basic model subject to this Interim Waiver Order, such modifications will render the waiver invalid with respect to that basic model, and Vinotheque 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 the Interim Waiver Order is incorrect, or the results from the alternate test procedure are unrepresentative of a basic model's true energy consumption characteristics. 10 CFR 431.401(k)(1). Likewise, Vinotheque may request that DOE rescind or modify the Interim Waiver Order if Vinotheque discovers an error in the information provided to DOE as part of its petition, determines that the interim waiver is no longer needed, or for other appropriate reasons. 10 CFR 431.401(k)(2).

(6) Issuance of this Interim Waiver Order does not release Vinotheque from the certification requirements set forth at 10 CFR part 429.

DOE makes decisions on waivers and interim waivers for only those basic models specifically set out in the petition, not future models that may be manufactured by the petitioner. Vinotheque may submit a new or amended petition for waiver and request for grant of interim waiver, as appropriate, for additional basic models of Walk-in Cooler Refrigeration Systems. Alternatively, if appropriate, Vinotheque may request that DOE extend the scope of a waiver or an interim waiver to include additional basic models employing the same technology as the basic model(s) set forth in the original petition consistent with 10 CFR 431.401(g).

Signing Authority

This document of the Department of Energy was signed on February 23, 2021, by Kelly Speakes-Backman, Principal Deputy Assistant Secretary and Acting Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Acting Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on February 24, 2021.

Treana V. Garrett,
Federal Register Liaison Officer,
U.S. Department of Energy.

Appendix 1

Petition for Waiver and Interim Waiver

Vinotheque Wine Cellars DBA WhisperKOOL Corp. DBA CellarCool is requesting for Interim Waiver from a DOE test procedure pursuant to provisions described in 10 CFR 431.401 for the following products on the grounds that “either the basic model contains one or more design characteristics that prevent testing of the basic model according to the prescribed test procedures or 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.”

[Product images provided with petition may be found at Docket No. EERE-2019-BT-WAV-0038-0006 and at <http://www.regulations.gov>]

The design characteristics constituting the grounds for the Interim Waiver Application:

AHRI 1250-2009 is silent on the definition of single packaged and matched pair refrigeration systems, however, as seen in Section 3.12 of the public comment version of soon to be published revision of AHRI1250, these types of products are defined as follows:

3.12 Refrigeration System. The mechanism (including all controls and other components integral to the system's operation) used to create the refrigerated environment in the interior of a walk-in cooler or walk-in freezer, consisting of:

A Dedicated Condensing Unit;

or

A Unit Cooler.

3.12.1 Matched Refrigeration System (Matched-pair). A combination of a Dedicated Condensing Unit and one or more Unit Coolers specified by the Dedicated Condensing Unit manufacturer which are all distributed in commerce together. Single-Packaged Dedicated Systems are a subset of Matched Refrigeration Systems.

3.12.2 Single-packaged Refrigeration System (Single-packaged). A Matched Refrigeration System that is a Single-packaged assembly that includes one or more compressors, a condenser, a means for forced circulation of refrigerated air, and elements by which heat is transferred from air to refrigerant, without any element external to the system imposing resistance to flow of the refrigerated air.

SELF-CONTAINED COOLING SYSTEMS FOR WALK-IN WINE CELLARS (refer to single-packaged walk-in cooler refrigeration systems in AHRI 1250)

- Self-contained cooling systems are designed to provide cold environment between 45~65 °F and maintain relative humidity within the range of 50~70% for properly insulated and sized wine cellars.
- These temperature and relative humidity ranges are optimized for long term storage of wine like that in natural caves.
- These cooling systems are all-in-one ready for use and no more refrigerant piping is required in the field.
- These cooling systems are factory-built, critically charged and tested, and only

- require through-the-wall installation on walk-in wine cellars in the field.
- These systems are available as indoor or outdoor uses with automatic off-cycle air defrost.
- Wine cellars are usually located in air-conditioned spaces.

SPLIT COOLING SYSTEMS FOR WALK-IN WINE CELLARS (refer to matched-pair walk-in cooler refrigeration systems in AHRI 1250)

- Split cooling systems are designed to provide cold environment between 45~65 °F and maintain relative humidity range within 50~70% for properly insulated wine cellars.
- These temperature and relative humidity ranges are optimized for long term storage of wine like that in natural caves.
- These cooling systems consist of a remote condensing unit and an evaporator unit, which are connected by a liquid line and an insulated suction line.
- These systems must be charged properly with refrigerant in the field.
- These systems are available as indoor or outdoor uses with automatic off-cycle air defrost.
- Wine cellars are usually located in air-conditioned spaces.
- As opposed to utilize large compressors, large surface area coils, multiple fans, and large volumes of refrigerant, these systems employ fractional compressors and automatic expansion valves to maintain 50~70% relative humidity.

DOE uniform test method for the measurement of energy consumption of walk-in coolers and walk-in freezers (WICF) described in 10 CFR 431.304 adopts the test standard set forth in AHRI 1250-2009. Both 10 CFR part 431 and AHRI 1250 define WICF products as "...an enclosed storage space refrigerated to temperatures, respectively, above, and at or below 32 degrees Fahrenheit that can be walked into, and has a total chilled storage area of less than 3,000 square feet..." Walk-in wine cellar cooling systems meet this definition. Therefore, WICF products are subject to the test method and minimum energy requirements as described in 10 CFR 431.401.

AHRI 1250 specifies that for walk-in coolers, the refrigeration system is to be rated at a cooler air-return temperature of 35°F (box setpoint) than is typically seen in a wine cellar application. Operating a wine cellar at this condition would adversely mechanically alter the intended performance of the system including icing of the evaporator coil, potential damage to the compressor, and will not result in an accurate representation of the performance of the cooling unit. Wine cellars generally are kept at 55°F, with 55% relative humidity.

The calculation of the Annual Walk-in Energy Factor (AWEF) found in AHRI 1250 accounts for typical usage of WICF products with high and low load periods. Wine cellars see a constant load, no highs or lows, that does not resemble the use patterns that are representative of typical WICF products.

Therefore, the AWEF calculation described in 10 CFR 431.304 and AHRI 1250 does not match the applications of wine cellar cooling systems.

The compressors used in wine cellar cooling systems are predominately fractional horsepower, which are inherently less efficient than larger compressors used in walk-in cooler refrigeration systems.

Therefore, we do not believe there is technology on the market that will provide the needed energy efficiency in wine cellar cooling systems to meet the minimum AWEF value for commercial walk-in cooler refrigeration systems set forth in 10 CFR 431.306.

The prescribed test procedure is unrepresentative of the products' true energy characteristics.

One or more design characteristics that prevent testing of the basic model according to the

prescribed test procedures or cause the prescribed test procedures to evaluate the basic model in a manner so unrepresentative of its true energy or water consumption characteristics as to provide materially inaccurate comparative data.

Basic Models on which the Interim Waiver is being requested: All models listed cannot operate at box temperature below 45°F. Due to controller set point limitations, the operating range is set from 70°F to 50°F.

Single-Packaged:

Basic Model	Brand Name
SC Pro 2000	WhisperKOOL
SC Pro 3000	WhisperKOOL
SC Pro 4000	WhisperKOOL
SC Pro 8000	WhisperKOOL
Extreme 3500 ti	WhisperKOOL
Extreme 5000 ti	WhisperKOOL
Extreme 8000 ti	WhisperKOOL
Extreme 3500 tiR	WhisperKOOL
Extreme 5000 tiR	WhisperKOOL
Extreme 8000 tiR	WhisperKOOL
Extreme 3500 tiR Fully Ducted	WhisperKOOL
Extreme 5000 tiR Fully Ducted	WhisperKOOL
Extreme 8000 tiR Fully Ducted	WhisperKOOL
Phantom 3500	WhisperKOOL
Phantom 5000	WhisperKOOL
Phantom 8000	WhisperKOOL
Slimline LS	WhisperKOOL
Optimum 2200	CellarCool
Optimum 3300	CellarCool
Optimum 4400	CellarCool
Optimum 8800	CellarCool
CX2200	CellarCool
CX3300	CellarCool
CX4400	CellarCool
CX8800	CellarCool
SL2500 ¹⁶	CellarCool
Ultimate 3300	CellarCool
Ultimate 4400	CellarCool
Ultimate 8800	CellarCool
Ultimate 3300-R	CellarCool
Ultimate 4400-R	CellarCool
Ultimate 8800-R	CellarCool
Ultimate FD 3300	CellarCool
Ultimate FD 4400	CellarCool
Ultimate FD 8800	CellarCool

¹⁶ As indicated in Vinotheque’s email (EERE-2019-BT-WAV-0038-0009), in the Single-Packaged table in the “Maximum External Static Pressure (ESP) for Each Basic Model” section of the petition, the “SL” basic model is the same as the “SL2500 basic model listed here.

Ultimate PLUS Fully Ducted 3300	CellarCool
Ultimate PLUS Fully Ducted 4400	CellarCool
Ultimate PLUS Fully Ducted 8800	CellarCool

Matched-Pair:

Basic Model	Brand Name
Platinum Mini	WhisperKOOL
Platinum 4000	WhisperKOOL
Platinum 8000	WhisperKOOL
Platinum Twin	WhisperKOOL
Platinum 4000 Fully Ducted	WhisperKOOL
Platinum 8000 Fully Ducted	WhisperKOOL
Platinum Twin Fully Ducted	WhisperKOOL
Platinum 4000 Ducted	WhisperKOOL
Platinum 8000 Ducted	WhisperKOOL
Platinum Twin Ducted	WhisperKOOL
Ceiling Mount Mini	WhisperKOOL
Ceiling Mount 4000	WhisperKOOL
Ceiling Mount 8000	WhisperKOOL
Ceiling Mount Twin	WhisperKOOL
Quantum 9000	WhisperKOOL
Quantum 12000	WhisperKOOL
Magnum 9000	CellarCool
Magnum 12000	CellarCool
CM2500-S	CellarCool
CM3500-S	CellarCool
CM5000-S	CellarCool
CM9000 Twin Split	CellarCool
WM2500-S	CellarCool
WM3500-S	CellarCool
WM5000-S	CellarCool
WM9000 Twin-S	CellarCool
FD3500-S	CellarCool
FD5000-S	CellarCool
FD9000 Twin-S	CellarCool

Maximum External Static Pressure (ESP) for Each Basic Model

Single-Packaged:

Basic Model	Brand Name	ESP (inH ₂ O)
SC Pro 2000	WhisperKOOL	
SC Pro 3000	WhisperKOOL	
SC Pro 4000	WhisperKOOL	
SC Pro 8000	WhisperKOOL	
Extreme 3500 ti	WhisperKOOL	
Extreme 5000 ti	WhisperKOOL	
Extreme 8000 ti	WhisperKOOL	
Extreme 3500 tiR	WhisperKOOL	
Extreme 5000 tiR	WhisperKOOL	
Extreme 8000 tiR	WhisperKOOL	
Extreme 3500 tiR Fully Ducted	WhisperKOOL	

Extreme 5000 tiR Fully Ducted	WhisperKOOL	
Extreme 8000 tiR Fully Ducted	WhisperKOOL	
Phantom 3500	WhisperKOOL	
Phantom 5000	WhisperKOOL	
Phantom 8000	WhisperKOOL	
Slimline LS	WhisperKOOL	
Optimum Series 2200	CellarCool	
Optimum 3300	CellarCool	
Optimum 4400	CellarCool	
Optimum 8800	CellarCool	
CX2200	CellarCool	
CX3300	CellarCool	
CX4400	CellarCool	
CX8800	CellarCool	
SL	CellarCool	
Ultimate 3300	CellarCool	
Ultimate 4400	CellarCool	
Ultimate 8800	CellarCool	
Ultimate 3300-R	CellarCool	
Ultimate 4400-R	CellarCool	
Ultimate 8800-R	CellarCool	
Ultimate FD 3300	CellarCool	
Ultimate FD 4400	CellarCool	
Ultimate FD 8800	CellarCool	
Ultimate PLUS Fully Ducted 3300	CellarCool	
Ultimate PLUS Fully Ducted 4400	CellarCool	
Ultimate PLUS Fully Ducted 8800	CellarCool	

Matched-Pair:¹⁷

Basic Model	Brand Name	ESP (inH ₂ O)
Platinum Mini	WhisperKOOL	
Platinum 4000	WhisperKOOL	
Platinum 8000	WhisperKOOL	
Platinum Twin	WhisperKOOL	
Platinum 4000 Fully Ducted	WhisperKOOL	
Platinum 8000 Fully Ducted	WhisperKOOL	
Platinum Twin Fully Ducted	WhisperKOOL	
Platinum 8000 Ducted	WhisperKOOL	
Platinum Twin Ducted	WhisperKOOL	
Ceiling Mount Mini	WhisperKOOL	
Ceiling Mount 4000	WhisperKOOL	
Ceiling Mount 8000	WhisperKOOL	

¹⁷ As indicated in Vinotheque’s email (EERE-2019-BT-WAV-0038-0009), the “Platinum 4000 Ducted” basic model is not included in the Matched-Pair table in the “Maximum External Static Pressure (ESP) for Each Basic Model” section of the petition, but it is a ducted unit that has an external static pressure identified by Vinotheque in the email, and redacted accordingly.

Ceiling Mount Twin	WhisperKOOL		
Quantum 9000	WhisperKOOL		
Quantum 12000	WhisperKOOL		
Magnum 9000	CellarCool		
Magnum 12000	CellarCool		
CM2500-S	CellarCool		
CM3500-S	CellarCool		
CM5000-S	CellarCool		
CM9000 Twin Split-S	CellarCool		
WM2500-S	CellarCool		
WM3500-S	CellarCool		
WM5000-S	CellarCool		
WM9000 Twin-S	CellarCool		
FD3500-S	CellarCool		
FD5000-S	CellarCool		
FD9000 Twin-S	CellarCool		

Specific Requirements sought to be waived

Petitioning for a waiver to exempt wine cellar walk-in cooler systems from being tested to the current test procedures, specifically the requirement for the refrigeration system to be rated at an air-return temperature of 35°F.

The petition also includes a correction factor of 0.55 to be applied to final AWEF calculations for wine cellar products to allow the unit to pass minimum efficiency as delineated by 10 CFR §431 Subpart R. There is precedent for wine cooling products receiving a correction factor of 0.55 from Appendix A to Subpart B of 10 CFR §430 and DOE Direct Final Rule EERE-2011-BT-STD-0043-0122.

List of manufacturers of all other basic models marketing in the United States and known to the petitioner to incorporate similar design characteristics –

- 11. Vinotheque
- 21. Bacchus
- 31. BreezAire
- 41. CellarPro
- 51. Vinotemp
- 61. WhisperKool
- 71. Emerson-Copeland (Stand alone condensing units for split systems)
- 81. Danfoss (Stand alone condensing units for split systems)
- 91. Tecumseh (Stand alone condensing units for split systems)

Proposed alternate test procedure

AHRI 1250 test procedure will be followed, but with the following modifications:

- 1. Temperature of the air returning to the walk-in cooling unit shall be 55°F.
- 2. Relative humidity of the air returning to the walk-in cooling unit shall be 55%RH.
- 3. The AWEF calculations shall include a correction factor of 0.55 to inflate the final AWEF value for wine-related products to meet minimum efficiency standards.

Technical Justifications for the alternate test procedure:

1. The request to change box setpoint from 35°F to 55°F is since this is the optimal temperature for wine to be aged. WhisperKOOL designs cooling units to meet this condition and operating at a lower box setpoint would result in adverse conditions in the unit. For example, at such a low return temperature, WhisperKOOL evaporator coils will ice over. This would then require additional energy to be expended to operate a defrost system or would result in adverse air flow through the coil during performance testing – leading to lower overall performance.
2. The same as above can be said with regards to the request to change the box humidity setpoint to 55%RH. This condition is ideal for helping wine to age as it maintains cork moisture and prevents damage to labels on the bottles, leading to damaged investments. Since WhisperKOOL cooling units are designed to age fine wines as ideally as possible, the unit will perform best during a performance test at the conditions which the unit attempts to maintain for the end-user.
3. Furthermore, WhisperKOOL is requesting a 0.55 correction factor to be applied to all cooling units in order to meet minimum energy efficiency requirements. In addition to there being precedent for a correction factor like this, WhisperKOOL is unable to achieve the required energy efficiency for a few reasons, most being related to the availability of technology and nuances specific to the wine cellar cooling industry.
 - a. First and foremost, due to the size of a refrigeration system designed for a wine cellar, WhisperKOOL uses fractional-horsepower reciprocating compressors, which are fundamentally more limited in space and design, and are inherently less efficient than larger compressors. For example, WhisperKOOL's most-sold cooling unit uses an Embraco-brand compressor which, at wine cellar conditions has an EER of about 9.85 BTU/Wh. At the same conditions, by comparison, a more-modern scroll compressor rated at 1.8 HP has an EER closer to 11 BTU/Wh. This is the case across the board with WhisperKOOL fractional-horsepower compressors (Embraco brand).
 - b. Additionally, some installs are difficult and require the use of a duct-able unit. This leads to the need for higher-wattage fans being used in WhisperKOOL products, further to the detriment of the overall energy efficiency.
 - c. Some of the most efficient modern compressors which operate in the fractional-horsepower range use R290 as the refrigerant (Propane). However, an R290 charging station retrofit would be excessively invasive to WhisperKOOL's facility as well as too costly to redesign all products in such a manner.

Success of the application for Interim Waiver will:

Success of the application for Interim Waiver will ensure that manufacturers of walk-in wine cellar cooling systems can continue to participate in the market.

What economic hardship and/or competitive disadvantage is likely to result absent a favorable determination on the Application for Interim Waiver

Economic hardship will be loss of sales due to not meeting the DOE energy conservation standards set forth in 10 CFR 431.306 if the existing products were altered in order to test per current requirements set forth in 10 CFR 431.304 and AHRI 1250, it would add significant cost and increase energy consumption.

Conclusion:

WhisperKOOL seeks an Interim Waiver from DOE's current test method for the measurement of energy consumption of walk-in wine cellar Self-contained and Split cooling systems.

Signed By: /s/ Christian Bromme Date:12/1/2020

Title: Engineering Manager

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