

Appliance Standards Awareness Project  
American Council for an Energy-Efficient Economy  
Natural Resources Defense Council

August 29, 2022

Dr. Stephanie Johnson  
U.S. Department of Energy  
Office of Energy Efficiency and Renewable Energy  
Building Technologies Office, EE-2J  
1000 Independence Avenue SW  
Washington, DC 20585

**RE: Docket Number EERE-2017-BT-TP-0008: Test Procedures for Commercial Refrigerators, Refrigerator-Freezers, and Freezers**

Dear Dr. Johnson:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), and Natural Resources Defense Council (NRDC) on the notice of proposed rulemaking (NOPR) for test procedures for commercial refrigerators, refrigerator-freezers, and freezers, herein referred to as commercial refrigeration equipment (CRE). 87 Fed. Reg. 39164 (June 30, 2022). We appreciate the opportunity to provide input to the Department.

Overall, we are supportive of DOE's proposed changes to the CRE test procedures as presented in the NOPR. Specifically, we support DOE's proposed changes regarding ice-cream freezers and the establishment of a definition and uniform test procedure for high-temperature refrigerators. We are pleased DOE has proposed test methods for additional equipment categories including buffet and preparation tables, chef bases and griddle stands, and blast chillers and freezers. We also support DOE's proposals regarding testing equipment with long defrost cycles and those utilizing CO<sub>2</sub> refrigerant. Each of these topics are discussed in more detail below.

**We support DOE's proposed changes regarding ice cream freezers.** DOE currently defines an "ice-cream freezer" as a commercial freezer that is designed to operate at or below -5 °F that the manufacturer designs, markets, or intends for the storing, displaying, or dispensing of ice cream. Appendix B requires testing all ice-cream freezers to an integrated average temperature (IAT) of -15 °F. However, as discussed in the NOPR,<sup>1</sup> some products currently considered ice-cream freezers (e.g., dipping cabinets) are unable to reach this test condition and are instead tested at their lowest application product temperature (LAPT). This approach means that these models are tested at various temperatures and that resulting efficiency ratings across models may not be directly comparable.<sup>2</sup>

In the NOPR, DOE has proposed that an ice-cream freezer that meets the current ice-cream freezer definition but cannot operate at an IAT of -15 °F will be referred to as a "low-temperature freezer" and

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<sup>1</sup>87 Fed. Reg. 39168.

<sup>2</sup>Per the NOPR, 50 of the 418 models certified by DOE are rated at LAPTs higher than -15 °F.

will be tested at an IAT of 0 °F, consistent with other freezer classes.<sup>3</sup> Concurrently, DOE is proposing to amend the ice-cream freezer definition to specify that the designed operating temperature is required to be at or below –15 °F. DOE has also proposed to amend the ice-cream freezer definition to refer more generally to frozen desserts.<sup>4</sup> Overall, we support DOE’s proposed changes that remove ambiguity in the definition of ice cream freezers and ensure all ice-cream and low-temperature freezers are tested at a uniform temperature, –15 °F and 0 °F, respectively.

**We support DOE’s proposed definition and test procedure for high-temperature CRE.** Current Appendix B requires testing commercial refrigerators at an IAT of 38 °F. However, certain equipment that meet the definition of “commercial refrigerator” are only capable of operating at temperatures above 38 °F;<sup>5</sup> examples include CREs that display chocolate or wine with typical recommended storage temperatures of about 55 °F. Per the current test procedure, manufacturers certify such equipment at the LAPT. However, LAPT can vary by model and thus the resulting measured energy consumption may not be directly comparable. In the NOPR, DOE is proposing that a commercial refrigerator incapable of operating at or below 38 °F would be considered a “high-temperature” refrigerator;<sup>6</sup> these units would be tested according to draft AHRI 1200-202X at an IAT of 55 °F. Further, DOE is proposing that units would be rated as either a medium-temperature refrigerator if capable of operating at 38 °F or as a high-temperature refrigerator if incapable of doing so. We support DOE’s proposal regarding high-temperature CREs, particularly basing the distinction between medium- and high-temperature on operating ability rather than intended use, as this will ensure consistent application of DOE’s definitions and test procedures.

**We support establishing test procedures for buffet and preparation tables.** Buffet or preparation tables are CREs that temporarily store and display perishable items during food service or preparation. The California Energy Commission (CEC) Modernized Appliance Efficiency Database System (MAEDbS) includes over 100 buffet/preparation tables with a broad range of energy usage.<sup>7</sup> Further, a 2014 report discussed testing on eleven preparation tables which revealed a wide range of measured energy consumption.<sup>8</sup> This suggests the potential for meaningful energy savings for these products. In the April 2014 Final Rule, DOE stated that buffet/preparation tables meet the definition of CRE and are in scope, but no test procedures were established.<sup>9</sup> DOE is proposing a definition for buffet or preparation tables that combines elements of the existing industry definitions, ENERGY STAR definitions, and DOE’s CRE definitions,<sup>10</sup> while including further specificity regarding equipment characteristics.<sup>11</sup> DOE’s proposed test procedures are based primarily on ASTM F2143-16. Establishing test procedures for buffet and preparation tables will ensure that the energy consumption of this equipment is measured in a consistent manner.

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<sup>3</sup>87 Fed. Reg. 39170.

<sup>4</sup>87 Fed. Reg. 39169.

<sup>5</sup>87 Fed. Reg. 39170.

<sup>6</sup>87 Fed. Reg. 39171.

<sup>7</sup>Accessed on August 17, 2022. [cacertappliances.energy.ca.gov/Pages/Search/AdvancedSearch.aspx](https://cacertappliances.energy.ca.gov/Pages/Search/AdvancedSearch.aspx)

<sup>8</sup>Emerging Technologies (ET) Refrigerated Prep Tables, pp. 1, 2. [www.etcc-ca.com/reports/refrigerated-prep-tables](http://www.etcc-ca.com/reports/refrigerated-prep-tables)

<sup>9</sup>79 Fed. Reg. 22277, 22281.

<sup>10</sup>87 Fed. Reg. 39179.

<sup>11</sup>Underneath refrigerated compartments for buffet/preparation tables are not thermally separated from the open-top refrigerated area. CRE with thermally separated compartments are considered “commercial hybrid” CRE and must be tested with the applicable test procedures and comply with the applicable standards.

**We support the proposed test procedure to verify pull-down temperature performance.** A pull-down temperature CRE is a commercial refrigerator that, when fully loaded with 12-ounce beverage cans at 90 °F, can cool those beverages to 38 °F in 12 hours or less. While these pull-down units are subject to current test procedures and energy conservation standards, there are no test methods to verify whether a unit meets these pull-down requirements.<sup>12</sup> Thus, DOE is proposing to specify a method to verify whether a unit meets the above definition of a pull-down application CRE. While we support eliminating this class, as discussed in our comments to the preliminary technical support document for CRE standards, we support this proposed amendment if DOE maintains the pull-down class as it would clarify how DOE would determine whether a model is appropriately certified as a pull-down unit.

**We support establishing test procedures for blast chillers and freezers.** Blast chillers and freezers are CRE used for the rapid temperature pull-down of hot-food products. Since these CRE units have oversized refrigeration systems compared to other CRE for rapid temperature pull down, they use more energy than comparable equipment with similar volumes. DOE has tentatively identified the capability to pull down hot food from 135 °F to 40 °F within four hours as the primary operating characteristic of blast chillers and blast freezers;<sup>13</sup> this is consistent with the performance specification for rapid pull-down refrigerators and freezers specified in NSF 7-2019, the California Code of Regulations definition, and tentative definitions under consideration in ASHRAE 220. DOE's proposed test procedure for blast chillers/freezers is based primarily on the draft ASHRAE 220 with certain specifications based on updates to ASHRAE 72, the basis for DOE's current CRE test procedure.<sup>14</sup> The proposed test methods, consistent with ASHRAE 220, include pre-cooling the blast chiller's or blast freezer's cabinet to a pre-set or controlled operating temperature, loading of hot food pans into the blast chiller or blast freezer, and pull-down of the hot food pans to the target temperature. We are supportive of this proposed method, which captures energy usage during pull-down operation, as a representative method for estimating the energy usage of blast chillers/freezers.

Consistent with the tentative scope of ASHRAE 220, DOE is proposing test procedures only for self-contained commercial blast chillers and freezers with a refrigerated volume of up to 500 ft<sup>3</sup>. While we understand that most of the blast chillers/freezers market consists of self-contained equipment, remote condensing blast chillers/freezers are available on the market.<sup>15</sup> Thus, we encourage DOE to consider establishing test procedures for remote condensing blast chillers/freezers as part of a future rulemaking.

**We support establishing test procedures for chef bases and griddle stands.** Chef bases or griddle stands are CRE that have a cooking appliance on top of the refrigerated compartment. A 2016 report found significant variation in energy performance of chef bases,<sup>16</sup> suggesting there is opportunity for efficiency improvements. DOE stated in the April 2014 Final Rule that chef bases and griddle stands are testable via the CRE test procedure, but they are currently excluded from the CRE energy conservation standards. In the NOPR, DOE tentatively determined that the existing DOE test procedure provides an

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<sup>12</sup>87 Fed. Reg. 39190.

<sup>13</sup>87 Fed. Reg. 39192.

<sup>14</sup>87 Fed. Reg. 39193.

<sup>15</sup>See for example: [www.culinarydepotinc.com/electrolux-727760-55-13-roll-in-blast-chiller-freezer/](http://www.culinarydepotinc.com/electrolux-727760-55-13-roll-in-blast-chiller-freezer/); [www.electroluxprofessional.com/us/pd/combi-ovens-and-blast-chillers/accessories-for-skyline-chills/installation-solutions-remote-units/accessories-keeprite-remote-condensing-unit-for-202-blast-chiller-only-for-one-unit-9R011M/](http://www.electroluxprofessional.com/us/pd/combi-ovens-and-blast-chillers/accessories-for-skyline-chills/installation-solutions-remote-units/accessories-keeprite-remote-condensing-unit-for-202-blast-chiller-only-for-one-unit-9R011M/); [www.culinarydepotinc.com/traulsen-tbc13-36-lp-41-blast-chiller/](http://www.culinarydepotinc.com/traulsen-tbc13-36-lp-41-blast-chiller/)

<sup>16</sup>Chef Bases for Foodservice Applications, p. 9. [www.caetrm.com/media/reference-documents/ET15SCE1010\\_Chef\\_Bases\\_Report\\_final2.pdf](http://www.caetrm.com/media/reference-documents/ET15SCE1010_Chef_Bases_Report_final2.pdf)

appropriate basis for measuring the energy consumption of this equipment;<sup>17</sup> the Department is also proposing to modify the definition of chef base/griddle stand to specify a maximum height of 32 inches to exclude worktop and undercounter units.<sup>18</sup> We believe that it is reasonable to test chef bases or griddle stands according to the same test procedure as other CRE, which would allow end users to compare energy consumption with other currently covered equipment.

**We support DOE's proposal for testing equipment with defrost cycles greater than 24 hours.** DOE's current test procedure requires a 24 hr test period that begins with a defrost after steady-state conditions are achieved. As DOE discusses in the NOPR, use of a fixed 24 hr test period can provide for a degree of variability in measured energy consumption based on additional defrost cycles.<sup>19</sup> For example, the impact of additional defrost cycles may be greater if the defrost cycle duration is very long (i.e., multiple days between defrost). Thus, DOE is proposing an optional two-part test procedure, based on an existing test waiver, wherein the first part captures energy usage during a 24 hr operating period and the second part captures a single defrost cycle. This approach mirrors that used to address a similar issue for consumer refrigeration equipment. We support this approach as providing a more representative estimate of energy usage for CRE with defrost periods lasting longer than 24 hrs.

**We support DOE's proposed specifications regarding CO<sub>2</sub> refrigerant in remote condensing CRE.** CO<sub>2</sub> is becoming increasingly popular as an energy efficient CRE refrigerant with low global warming potential. However, DOE's current test procedure for remote condensing units uses compressor values based on performance with historically common refrigerants (e.g., R-404A) and does not account for the unique operating conditions of CO<sub>2</sub> charged systems. Thus, for remote CRE with CO<sub>2</sub> refrigerant, DOE is proposing to adopt alternate refrigerant conditions consistent with those granted in a March 2021 waiver for walk-in cooler and walk-in freezer unit coolers using CO<sub>2</sub> refrigerant.<sup>20</sup> We are supportive of this change as it will result in more representative energy usage for CRE utilizing CO<sub>2</sub> refrigerant.

Thank you for considering these comments.

Sincerely,



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<sup>17</sup>87 Fed. Reg. 39201.

<sup>18</sup>Undercounter and worktop units have no surface intended for food preparation and cooking, respectively.

<sup>19</sup>87 Fed. Reg. 39205.

<sup>20</sup>87 Fed. Reg. 39209, 39210.