Appliance Standards Awareness Project

February 23, 2021

Tanja Crk
U.S. Environmental Protection Agency
William Jefferson Clinton Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: ENERGY STAR® Commercial Refrigerators and Freezers Version 5.0 Specification and Test Method Discussion Guide

Dear Ms. Crk,

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP) on the Commercial Refrigerators and Freezers Version 5.0 Specification and Test Method Discussion Guide released on December 22, 2020. We appreciate the opportunity to comment.

We strongly support EPA revising the ENERGY STAR specification for commercial refrigerators and freezers and expanding the scope to additional equipment types currently covered by Department of Energy (DOE) standards as well as to equipment types not currently covered by federal standards. In expanding the scope to remote condensing display cases, we encourage EPA to include remote condensing models regardless of how they are installed in the field (i.e., regardless of whether they are installed with a dedicated remote condensing unit or a rack system). We also encourage EPA to consider ways to address models of commercial refrigerators and freezers rated at non-standard temperatures to provide a fair comparison of relative efficiency across all models. Finally, we encourage EPA to pursue opportunities to encourage retrofits of open display cases with transparent doors.

We support expanding the scope of the specification to include additional equipment types covered by the DOE standards for commercial refrigeration equipment. The Discussion Guide states that EPA is considering expanding the scope of the commercial refrigerators and freezers specification to three remote condensing equipment classes (VCT.RC.M, VCT.RC.L, and SOC.RC.M) and one self-contained equipment class (SOC.SC.M) that are covered by DOE standards.[1] We strongly support this scope expansion. Based on DOE's analysis for the 2014 final rule, these four equipment classes represent about 14% of the total linear feet shipped[2] and the majority of the shipments (in linear feet) of refrigerated cases with doors that are not currently covered by the ENERGY STAR specification.[3] Furthermore, as EPA illustrates in the Discussion Guide, there is significant potential to distinguish more-efficient models in these equipment classes. As shown in Table 1 below, the most-efficient models in each of the four equipment classes consume between 29% and 91% less energy than models just meeting the DOE standards.

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[1] https://www.energystar.gov/sites/default/files/asset/document/ENERGY%20STAR%20Commercial%20Refrigerators%20and%20Freezers%20V5.0%20Discussion%20Guide.pdf. p. 2.

[2] https://www.regulations.gov/document?D=EERE-2010-BT-STD-0003-0102. p. 9-10.

[3] We believe that it continues to make sense to exclude cases without doors from the ENERGY STAR specification.

Table 1. Maximum available efficiency levels[4]

Equipment type	Max % savings relative to DOE standard
VCT.RC.M	76%
VCT.RC.L	29%
SOC.RC.M	91%
SOC.SC.M	72%

We encourage EPA to include remote condensing display cases regardless of how they are installed in the field. In the Discussion Guide, EPA states that the remote condensing models being considered in the scope expansion are refrigerated cases that are designed to be connected to separate remote condensing units (as opposed to rack systems).[5] During the webinar on February 2, EPA explained that the rationale for considering only remote condensing models designed to be connected to dedicated condensing units was to keep the specification simple. While we appreciate the desire for simplicity, we believe that in this case it would in fact be simpler to include all remote condensing models. Furthermore, including all remote condensing models would allow the ENERGY STAR specification to have greater impact on the market and ultimately achieve greater energy savings and carbon reductions.

We understand that remote condensing display cases are often purchased separately from the condensing unit they are ultimately connected to in the field and that a given display case can be connected to a wide variety of condensing units. For this reason, the DOE standards for remote condensing equipment apply only to the display case.[6] Furthermore, a more-efficient display case will provide energy savings in the field regardless of whether it is connected to a dedicated condensing unit or a rack system (and regardless of the efficiency of the condensing unit itself). Therefore, we see no reason to limit the specification to remote condensing models designed to be connected to dedicated condensing units. In addition, we believe that limiting the specification may only cause confusion in the market if the same display case is eligible for ENERGY STAR certification for certain applications and not for others.

Importantly, including all remote condensing display cases in the specification would help achieve greater energy savings and carbon reductions. We understand that it is common for remote condensing display cases to be connected to rack systems, for example in supermarket applications. Therefore, including these applications in the scope will significantly increase the potential impact of the specification.

[4] Models in the DOE Compliance Certification Database rated at standard rating temperatures as of February 19, 2021.

[5] https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Commercial%20Refrigerators%20and%20Freezers%20V5.0%20Discussion%20Guide.pdf. p.2.

[6] The DOE test procedure includes default EER values for the condensing unit to calculate the daily energy consumption of remote condensing display cases.

We support expanding the scope of the specification to include refrigerated preparation and buffet tables, chef bases/griddle stands, and blast chillers/freezers. For these equipment types, energy use across individual models varies significantly and large energy savings are likely possible using currently available technology.

Refrigerated preparation and buffet tables

DOE research found that as of 2008, refrigerated preparation tables and buffet tables consumed up to 6,600 kWh and 5,000 kWh per year, respectively.[7] As EPA shows in the Discussion Guide, there is a huge range in daily energy consumption among currently available models of refrigerated preparation tables.[8] Specifically, the California Energy Commission (CEC) database shows that daily energy consumption for this equipment type ranges from <1 kWh/day to more than 12 kWh/day. Similarly, DOE's analysis found that the daily energy consumption of buffet tables ranged from less than 3 kWh/day to more than 13 kWh/day.[9] These data suggest that there may be significant room for efficiency improvements in refrigerated preparation and buffet tables. In addition, many of the same technology options used in other types of commercial refrigeration equipment such as higher-efficiency compressors and fan motors and more-efficient anti-sweat heating can also be applied to refrigerated preparation and buffet tables. DOE found that applying currently available technologies to a standard new preparation table can result in energy savings of up to 56%.[10]

Chef bases and griddle stands

EPA notes in the Discussion Guide that work-top table commercial refrigeration equipment have similar designs to chef bases and may serve as an appropriate surrogate for potential efficiency improvements for chef bases.[11] Figure 1 below shows that the daily energy consumption of work-top tables in the CEC database ranges from <1 kWh/day to more than 8 kWh/day. The Discussion Guide notes that there are various technology options to improve the efficiency of chef bases and griddle stands such as thicker insulation, more-efficient refrigeration systems, energy-saving controls, and alternative refrigerants.[12]

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[7] https://www1.eere.energy.gov/buildings/pdfs/commercial_refrigeration_equipment_research_opportunities.pdf. p. 57.

[8] https://www.energystar.gov/sites/default/files/asset/document/ENERGY%20STAR%20Commercial%20Refrigerators%20and%20Freezers%20V5.0%20Discussion%20Guide.pdf. p. 7.

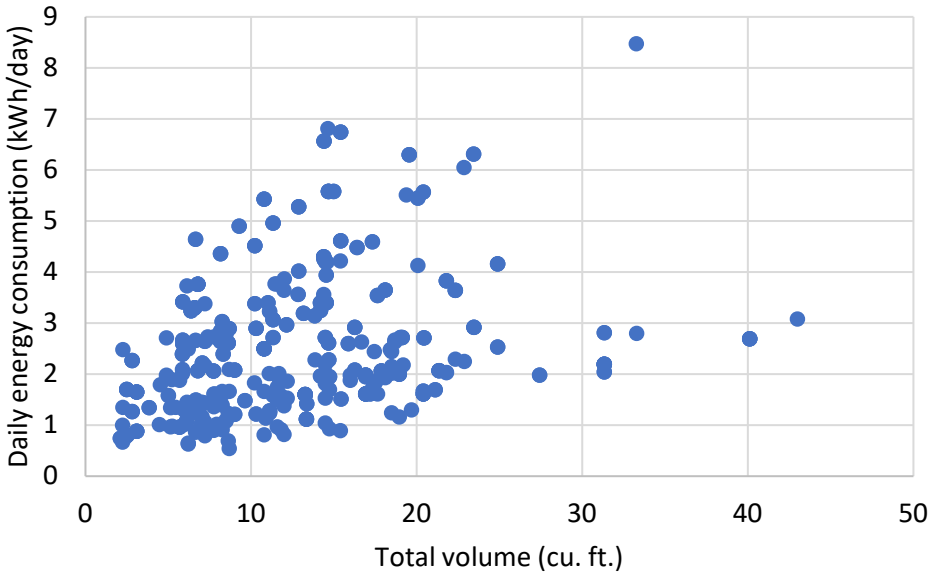
[9] https://www1.eere.energy.gov/buildings/pdfs/commercial_refrigeration_equipment_research_opportunities.pdf. p. 57.

[10] Ibid. p. 134.

[11] https://www.energystar.gov/sites/default/files/asset/document/ENERGY%20STAR%20Commercial%20Refrigerators%20and%20Freezers%20V5.0%20Discussion%20Guide.pdf. p. 8.

[12] Ibid.

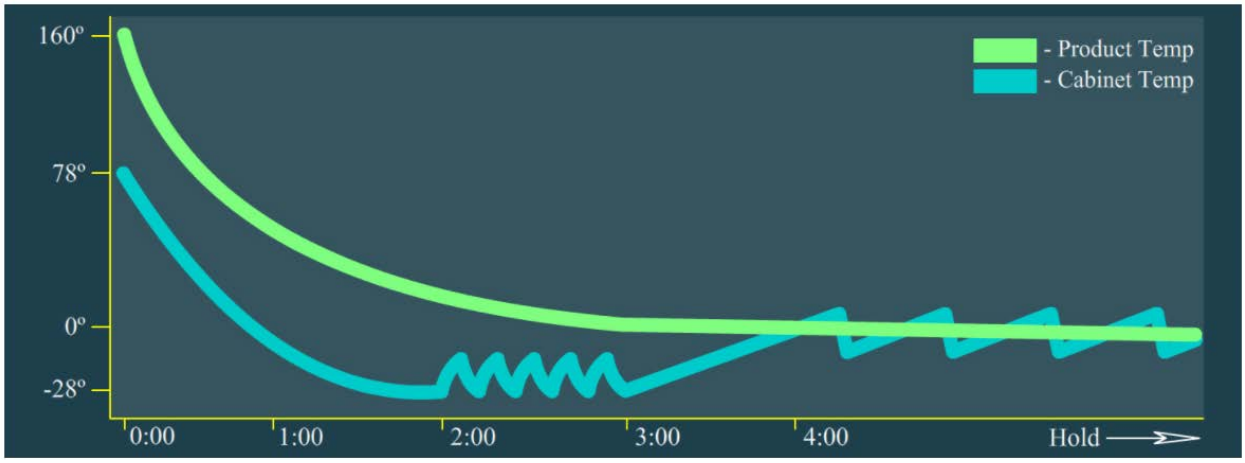
Figure 1. Daily energy consumption of work-top table commercial refrigeration equipment[13]



Blast chillers and freezers

As EPA explains in the Discussion Guide, blast chillers and freezers use more energy than similar commercial refrigeration equipment because they are intended to rapidly pull down the temperature of food.[14] Blast chillers and freezers cycle bursts of cold air to bring down the temperature of food as quickly as possible and regulate cabinet temperature. As can be seen in Figure 2 below, throughout much of the freezing process in a blast freezer, the cabinet of the equipment remains at subzero temperatures resulting in significant energy consumption.

Figure 2. Model of cabinet and product temperature (°F) over time (hr) in a blast freezer[15]



[13] Models in the CEC Modernized Appliance Efficiency Database System as of February 17, 2021.

[14] https://www.energystar.gov/sites/default/files/asset/document/ENERGY%20STAR%20Commercial%20Refrigerators%20and%20Freezers%20V5.0%20Discussion%20Guide.pdf. p. 9.

[15] http://www.americanpanel.com/cycles.html.

In addition, the Institute of Food Science & Technology recommends blast freezing for ensuring the preservation of food during unexpected supply problems caused by the COVID-19 pandemic.[16] Shipments of blast chillers and freezers will likely increase as they are being used more often to provide flexibility and safety to restaurants and commercial kitchens. Therefore, an ENERGY STAR specification for blast chillers and freezers may represent a significant opportunity for energy savings.

We encourage EPA to consider ways to address models of commercial refrigerators and freezers rated at non-standard temperatures to provide a fair comparison of relative efficiency across all models. In the DOE test procedure for commercial refrigeration equipment, the standard rating temperatures for refrigerators and freezers are 38°F and 0°F, respectively. However, units that are not able to operate at those rating temperatures are tested at the "lowest application product temperature" (LAPT), which is defined as "the lowest integrated average temperature at which a given basic model is capable of consistently operating."[17] The DOE Compliance Certification Database (CCD)[18] identifies the rating temperature for each model of commercial refrigeration equipment, which allows for identification of those models rated at non-standard temperatures. Because models rated at non-standard temperatures are typically rated at temperatures that are higher than the standard rating temperatures, they are able to achieve lower measured energy consumption values than comparable models rated at the standard rating temperatures. For example, in the VCT.SC.L equipment class, for which the standard rating temperature is 0°F, there are models rated at temperatures as high as 25°F. The difference between the specified ambient temperature in the DOE test procedure (75°F) and the rated temperature is 33% lower for a model with a rated temperature of 25°F compared to a model tested at the standard rating temperature.[19]

We understand that models rated at non-standard rating temperatures are eligible for ENERGY STAR certification, and we believe that it makes sense to continue to allow these models to be eligible for certification. However, we encourage EPA to consider ways to ensure that models rated at non-standard rating temperatures achieve similar levels of efficiency performance as other models. For example, EPA could consider applying an adjustment factor to the measured energy use of models rated at non-standard rating temperatures based on the difference between the rated temperature and the standard rating temperature in order to provide a fair comparison of relative efficiency across all models.

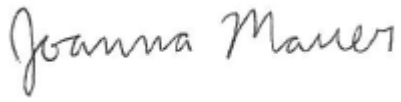
We encourage EPA to pursue opportunities to encourage retrofits of open display cases with transparent doors. The Discussion Guide notes that the ENERGY STAR program is interested in encouraging purchasers of open display cases "to reduce the high energy consumption of this equipment."[20] We believe that the best opportunity to reduce energy use of the installed stock of open display cases is to encourage retrofits with transparent doors. DOE's analysis for the 2014 final rule found that for display cases just meeting the current DOE efficiency standards, open cases consume

[16] https://www.ifst.org/sites/default/files/COVID-19-Guidance-on-freezing-product-to-preserve-life-v4-110520.pdf.
[17] 10 CFR §431.62.
[18] https://www.regulations.doe.gov/certification-data/#q=Product_Group_s%3A*.
[19] 1 – ((75 – 25) / (75 – 0))
[20] https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Commercial%20Refrigerators%20and%20Freezers%20V5.0%20Discussion%20Guide.pdf. p. 10.

about three times as much energy as cases with transparent doors.[21] DOE's Better Buildings guide for retrofitting open cases with doors notes that "a properly retrofitted display case can offer energy performance very similar to that of a case designed and shipped from the factory for use with doors."[22] In addition to saving energy, installing doors on open cases can provide a range of other benefits including increased shopper comfort, increased product life, and reduced product losses.[23]

Thank you for considering these comments.

Sincerely,



Joanna Mauer
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[21] https://www.regulations.gov/document/EERE-2010-BT-STD-0003-0102. p. 8-12. Comparing VOP.RC.M and VOP.RC.L to VCT.RC.M and VCT.RC.L, respectively. The current standards are equivalent to EL 1 for VOP.RC.M, VOP.RC.L, and VCT.RC.M and EL 2 for VCT.RC.L.
[22] https://www1.eere.energy.gov/buildings/commercial/pdfs/cbea_open_case_retrofit_guide.pdf. p. 3.
[23] https://www.energy.gov/sites/prod/files/2013/12/f5/commlbldgs18_goetzler_040413.pdf. p. 2.