Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
Northeast Energy Efficiency Partnerships
Alliance to Save Energy
Natural Resources Defense Council
Northwest Energy Efficiency Alliance

July 31, 2017

Dr. Stephanie Johnson
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue, SW
Washington, DC 20585

RE: Docket Number EERE–2017–BT–TP–0004: Request for Information for Test Procedures for Consumer 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), Northeast Energy Efficiency Partnerships (NEEP), Alliance to Save Energy, Natural Resources Defense Council (NRDC), and Northwest Energy Efficiency Alliance (NEEA) on the request for information (RFI) for test procedures for consumer refrigerators, refrigerator-freezers, and freezers. 82 Fed. Reg. 29780 (June 30, 2017). We appreciate the opportunity to provide input to the Department.

Door-in-door designs may warrant additional investigation. DOE notes in the RFI that some refrigerators available on the market incorporate a door-in-door design, which allows for accessing items in the door shelves without opening the interior door.[1] DOE further notes that with the door-in-door feature, opening the access door prevents the majority of the cool cabinet air from escaping to the room, as would be the case with a typical door opening. A Trinity University study estimated that door openings and container replacement account for about 17-23% of the overall cabinet load.[2] A study by the Florida Solar Energy Center (FSEC) similarly found that for a refrigerator with a rated annual energy consumption of 760 kWh, door openings were responsible for about 19% of the total energy consumption.[3] Reducing the energy consumption associated with door openings may therefore represent an opportunity for energy savings.

In general, test procedures should be designed to capture the benefits of features that can provide energy savings in the field. Additional investigation may therefore by warranted to evaluate

[1] 82 Fed. Reg. 29782.
[2] http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1835&context=iracc.
[3] http://www.fsec.ucf.edu/en/publications/html/FSEC-PF-239-92/index.htm.

whether door-in-door designs have the potential to save a significant amount of energy, and if so, how these savings could be captured in the test procedure.

We encourage DOE to amend the test procedure to capture the energy consumption associated with display screens and connected functions. DOE notes in the RFI that many refrigerators and freezers available on the market include user control panels or displays, some of which include internet connections.[4] As of July 2017, about 4% of all the ENERGY STAR certified top-freezer, bottom-freezer, and side-by-side refrigerator-freezer models had connected functionality.[5] The RFI also notes that the current test procedure specifies that customer-accessible features that are not required for normal operation be set at their lowest energy usage position during the test, and that this means that "the resulting measurements may not accurately represent actual consumer use."[6]

We understand that there are at least two general types of display screens that are currently present in some consumer refrigeration products. One is a more advanced option screen for refrigerator functionality (image A below). The other, which is sometimes referred to as a "Smart Screen," is essentially a tablet embedded into the refrigerator and offers users a view into the refrigerator as well as the ability to stream music, access the weather, etc. (image B below).

Image A:

http://products.geappliances.com/appliance/gea-specs/CFE28TSHSS

[4] 82 Fed. Reg. 29782.
[5] https://www.energystar.gov/productfinder/product/certified-residential-refrigerators/results. Accessed July 27, 2017.
[6] 82 Fed. Reg. 29782.

Image B:

http://www.samsung.com/us/explore/family-hub-refrigerator/connected-hub/

We encourage DOE to consider specifying that display screens, including those with connected functions, be set at their highest energy usage position during the test. Testing in their highest energy use position would provide both a consistent method for capturing the energy consumption associated with display screens and an incentive for manufacturers to provide display screen functionality with low power consumption. We note that there is already precedent in the refrigerator test procedures to test features in their highest energy use position. In particular, for compartments that are convertible—for example from a fresh food compartment to a freezer compartment—the test procedure specifies that these compartments "shall be operated in the highest energy use position."[7]

We also encourage DOE to ensure that any network mode power consumption is captured in the test procedure. IEC 62301 may provide a good starting point for defining network mode(s).

We continue to believe that a test to measure actual icemaker energy use is the most appropriate approach to account for icemaker energy use. Measured energy use is superior to the fixed adder approach currently in use not only because it provides consumers with more accurate information on the energy use associated with icemaking, but because it provides manufacturers with an incentive to improve icemaker energy efficiency and drive reductions in total refrigerator energy consumption. Testing of 10 icemakers conducted by DOE and NIST found that some icemakers use up to twice as much energy per pound of ice produced as others.[8] Differences were significant even among similar refrigerator models. Continued reliance on a fixed adder to account for icemaking energy use will do nothing to encourage greater adoption of the most efficient icemaker designs or any further efforts to reduce icemaker energy use. We continue to urge DOE to investigate a method to measure icemaker energy use without adding undue additional test burden.

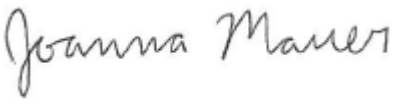
[7] https://www.ecfr.gov/cgi-bin/text-idx?SID=b1707a7b936c8abe896b2b48b89625a0&mc=true&node=ap10.3.430_127.a&rgn=div9. Section 2.7.
[8] 78 Fed. Reg. 41629 (July 10, 2013).

If the fixed adder approach is retained for icemaker energy use, DOE should evaluate available data to determine a more appropriate value for the adder. The current adder was developed assuming an average ice production rate of 1.8 lbs/day. However, field data from NEEA and one manufacturer suggest that average ice production is closer to 0.8 lbs/day.[9] Testing by DOE and NIST found icemaker energy use ranging from 0.092 to 0.192 kWh/lb,[10] or 27 to 56 kWh/year assuming an ice production rate of 0.8 pounds per day. Given the small number of products tested, the range could be much larger. This range demonstrates the difficulty in establishing a single fixed adder value that is representative of actual icemaker energy use and does not unfairly credit the least efficient or penalize the highest efficiency designs. We encourage DOE to evaluate available data to determine a more representative value for any fixed adder used and to ensure the adder does not mislead consumers by under-reporting expected energy use for products with icemakers.

We continue to believe that built-in products should be tested in an enclosure and encourage DOE to amend the test procedure accordingly. Testing of built-in products in a built-in condition, as they are installed in the field, will be more representative of field energy consumption than testing in a free-standing condition. As DOE notes in the RFI, preliminary testing indicated increased energy use for built-ins with heat rejection from the rear of the unit when tested in an enclosure designed to simulate field conditions.[11] To ensure comparable treatment and results for all built-in units, we urge DOE to test all built-ins in an enclosure, regardless of their configuration or heat-rejection approach. Effort should be taken to establish guidelines for the enclosure that are consistent with general installation instructions for these products.

Thank you for considering these comments.

Sincerely,



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[9] https://www.regulations.gov/document?D=EERE-2012-BT-TP-0016-0041; https://www.regulations.gov/document?D=EERE-2012-BT-TP-0016-0037.
[10] 78 Fed. Reg. 41629 (July 10, 2013).
[11] 82 Fed. Reg. 29783.

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