Appliance Standards Awareness Project
Natural Resources Defense Council
Northwest Energy Efficiency Alliance

April 18, 2019

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–0006: Request for Information for Test Procedures for Automatic Commercial Ice Makers

Dear Dr. Johnson:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), Natural Resources Defense Council (NRDC), and Northwest Energy Efficiency Alliance (NEEA) on the request for information (RFI) for test procedures for automatic commercial ice makers. 84 Fed. Reg. 9979 (March 19, 2019). We appreciate the opportunity to provide input to the Department.

We encourage DOE to expand the scope of the test procedure to cover automatic commercial ice makers with harvest rates less than 50 lb/24 hr. The scope of the current DOE test procedure includes ice makers with capacities between 50 and 4,000 lb/24 hr. Establishing a test procedure for ice makers with smaller capacities would ensure that any information provided to consumers about harvest rates and/or efficiency is based on a standardized test method. We understand that these smaller units could likely be tested with a test procedure similar to the existing test procedure for larger-capacity units.

We believe that it makes sense for the test procedure to address testing with temporary baffles. As DOE explains in the RFI, the Department issued test procedure guidance in 2013 regarding the use of temporary baffles during testing.[1] The guidance clarifies that temporary baffles may not be used during testing unless the baffle is part of the ice maker or "shipped with the ice maker to be installed according to manufacturers' installation instructions."[2] We agree that the guidance helps clarify the intent of the test procedure, and we believe that it makes sense for the test procedure to be amended to incorporate this guidance.

We understand that purge settings do affect measured energy use. In the RFI, DOE requests comment on whether purge settings affect measured energy use during a representative average use cycle. We agree with DOE's statement in the RFI that "Since purge water is cooled by the ice maker, it contributes to energy use during a representative average use cycle."[3] In addition, in the 2015 standards final rule, reduced potable water flow was included as a technology option for reducing energy use.[4] As DOE

[1] 84 Fed. Reg. 9982.
[2] https://www1.eere.energy.gov/buildings/appliance_standards/pdfs/acim_baffles_faq_2013-9-24final.pdf.
[3] 84 Fed. Reg. 9983.
[4] https://www.regulations.gov/document?D=EERE-2010-BT-STD-0037-0136. p. 4-4.

explained in the Technical Support Document, "Some or all of the purge water drained from batch ice makers leaves the equipment near 32°F. This represents lost refrigeration that could potentially have been used to produce more ice."[5]

We encourage DOE to attempt to capture how equipment with automatic purge water control settings performs in the field and to consider ways that the test procedure could capture any potential savings provided by these controls. DOE explains in the RFI that for ice makers with automatic purge water control settings, guidance issued by DOE in 2013 specifies that these units be tested using a fixed purge water setting that is described in the manufacturer's written instructions as "being appropriate for water of normal, typical, or average hardness."[6] We agree that this guidance is appropriate for use with the current test procedure since the current test procedure does not include any specification regarding water hardness. However, the test procedure would be more representative of the energy use of ice makers with automatic purge water control settings if these units were tested in such a way that allowed the controls to adjust automatically as they would in the field.

In a section below we encourage DOE to specify a value for water hardness in the test procedure that is representative of typical field conditions. We encourage DOE to investigate whether specifying water hardness in the test procedure would allow for testing ice makers with automatic purge water control settings with the automatic setting enabled.

We also understand that automatic purge water control settings may provide energy savings by reducing the purge water quantity when water hardness is low. We encourage DOE to investigate the potential energy savings provided by automatic purge water control settings and to consider ways that the test procedure could capture any potential savings provided by these controls.

We encourage DOE to investigate how to capture the impact of any "additional" or "increased-water" purge cycles. DOE notes in the RFI that some ice makers may include additional purges outside of regular cycling or continuous operation, which may not be captured by the current test procedure.[7] As described above, we understand that purge water quantity affects measured energy use. Therefore, by not capturing these "additional" or "increased-water" purge cycles, the test procedure may not be adequately representing energy use. We encourage DOE to investigate how the test procedure could capture the impact of any additional purge cycles.

We believe that the test procedure should provide default refrigerant charging and line set specifications. DOE explains in the RFI that while AHRI 810 includes a requirement to install remote condensing ice makers with at least 25 feet of interconnection tubing on each line, there are no additional instructions.[8] We believe that it makes sense to provide default refrigerant charging and line set specifications for cases where the manufacturer does not recommend a pre-charged line set. These additional specifications would improve the repeatability and reproducibility of the test procedure by ensuring that the same installation specifications are being used across test labs. This additional specificity would also ensure that equipment ratings are providing consistent information to purchasers.

[5] Ibid. p. 3-33.
[6] 84 Fed. Reg. 9983.
[7] Ibid.
[8] 84 Fed. Reg. 9983-84.

We also encourage DOE to verify that the minimum requirement of 25 feet of interconnection tubing specified in AHRI 810 is representative of typical installations.

We encourage DOE to pursue the development of a test method for remote condensing ice makers intended to be installed without a dedicated condensing unit. DOE notes in the RFI that the Department is aware of remote condensing ice makers that are designed to be connected to a compressor rack rather than a dedicated remote condensing unit. DOE also explains in the RFI that for other types of remote condensing refrigeration equipment designed to be connected to a compressor rack, the test procedures rely on a refrigerant enthalpy calculation and assumed compressor efficiencies to estimate the energy consumption of the rack system.[9] We agree that it would seem to make sense to apply a similar enthalpy test approach to remote condensing ice makers designed to be connected to compressor racks, and we encourage DOE to pursue the development of such a test method.

We believe that the test procedure should include standard conditions for relative humidity and wet bulb temperature. DOE explains in the RFI that while the moisture content of ambient air may affect the energy consumption of ice makers, neither AHRI 810 nor ASHRAE 29 specify a standard condition or tolerance for relative humidity or wet bulb temperature. The RFI further explains that test procedures for most other refrigeration equipment do specify these values.[10] We believe that the test procedure should include standard conditions for relative humidity and wet bulb temperature. Including these specifications would improve the repeatability and reproducibility of the test procedure by ensuring that similar conditions are being used across test labs. Further, specifying these standard conditions would prevent manufacturers from testing at conditions that may improve ratings but not be representative of typical field performance.

We encourage DOE to specify a value for water hardness in the test procedure that is representative of typical field conditions. DOE explains in the RFI that while the current test procedure does not specify water hardness, the Department has found that water hardness may affect measured energy use since harder water decreases the freezing temperature.[11] Specifying water hardness in the test procedure would improve repeatability and reproducibility by ensuring that water hardness is consistent across test labs. Standardizing water hardness would also prevent manufacturers from testing using a water hardness that may improve ratings but not be representative of typical field performance. Finally, as noted above, specifying water hardness may allow for testing ice makers with automatic purge water control settings with the automatic setting enabled. We encourage DOE to investigate a value for water hardness that can be specified in the test procedure that is representative of typical field conditions.

We encourage DOE to further investigate values for ambient temperature and supply water temperature that would best represent field conditions. DOE notes in the RFI that while the current test procedure specifies an ambient temperature of 90°F and a supply water temperature of 70°F, many ice makers may be installed in conditioned spaces where ambient temperatures may be closer to 70°F and water supply temperatures closer to 50°F.[12] If the current temperature specifications are not representative of typical field conditions, the efficiency ratings are not providing good information to purchasers. Further, the most-efficient units when tested at an ambient temperature of 70°F and a supply water temperature of 50°F may not be the same as the most-efficient units when tested at

[9] 84 Fed. Reg. 9984.
[10] Ibid.
[11] Ibid.
[12] 84 Fed. Reg. 9985.

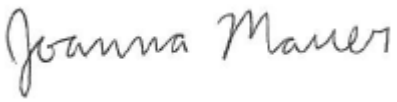
higher temperatures. Therefore, if the current temperature specifications do not reflect field conditions, the current test procedure may not be providing an accurate relative ranking of equipment.

We encourage DOE to further investigate values for ambient temperature and supply water temperature that would best represent field conditions. We also encourage DOE to consider testing ice makers at two sets of ambient temperature and supply water temperature conditions. Because there is likely a significant range of temperatures in the field reflecting different locations and applications, testing at two sets of conditions would help ensure that units perform efficiently across the range of typical applications.

We encourage DOE to incorporate standby energy use in the test procedure. As DOE notes in the RFI, the current test procedure does not measure standby energy use.[13] In the 2015 standards final rule, DOE estimated that ice makers spend 58% of the time in standby mode and assumed a standby mode power of 5 W.[14] Incorporating standby energy use in the test procedure would provide a better representation of the daily energy consumption of ice makers. We also understand that measuring standby mode power would imply a minimal additional test burden. We encourage DOE to incorporate standby energy use in the test procedure.

Thank you for considering these comments.

Sincerely,



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[13] 84 Fed. Reg. 9986.
[14] https://www.regulations.gov/document?D=EERE-2010-BT-STD-0037-0136. p. 8-11.