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

July 30, 2021

Mr. Bryan Berringer
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–2019–BT–TP–0026: Request for Information for Test Procedures for Dehumidifiers

Dear Mr. Berringer:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficiency Economy (ACEEE), and Natural Resources Defense Council (NRDC) on the request for information (RFI) for test procedures for dehumidifiers. 86 Fed. Reg. 34640 (June 30, 2021). We appreciate the opportunity to provide input to the Department.

We urge DOE to investigate load-based testing to better capture actual dehumidifier performance in the field, including part-load performance. The current test procedure for dehumidifiers measures only full-load performance and therefore does not capture the benefits of variable-speed compressors. Additionally, it does not capture the impact of cycling losses, including moisture re-evaporation. In dehumidifiers that continue to operate the fan after the compressor cycles off, some moisture that has been removed by the dehumidifier can be re-evaporated, resulting in wasted energy. For example, NREL tested part-load performance of two portable dehumidifiers and found that these models operated the fan for three minutes after the compressor shut off; when compressor runtimes ranged from 3-6 minutes, 17-42% of the removed moisture was returned to the space.[1] The current test procedure measures the fan power consumed in fan-only mode, but it does not capture this additional efficiency impact from moisture re-evaporation.

For variable-speed units, load-based testing would evaluate the effectiveness of the unit's controls in adjusting compressor and fan speeds to optimize efficiency. Furthermore, it would enable variable-speed technology to compete on a fair basis, which would likely increase the adoption of this feature. For single-speed units, load-based testing would capture the impact of cycling losses and wasted energy from re-evaporation. DOE should consider a load-based test, which would ensure that the test procedure reflects the real-world operation of dehumidifiers.

The test procedure for dehumidifiers should capture the energy used by "connected" features. In the RFI, DOE notes that certain manufacturers have incorporated "connected" features like WiFi capabilities

[1] https://www.nrel.gov/docs/fy14osti/61076.pdf.

into dehumidifiers.[2] While connected units can provide benefits by facilitating integration with the smart grid, connected functions may consume additional standby power in all operating modes. The test procedure should capture any power consumption associated with connected features in order to encourage manufacturers to provide connected functionality with low power consumption.

DOE should continue investigating how to better capture performance in defrost conditions. Dehumidifiers are likely to encounter frost conditions in the field; however, DOE's current test procedure, which tests at a dry-bulb temperature of 65°F, may not capture defrost performance because manufacturers would likely adjust a unit's controls or refrigeration system operation to avoid triggering defrost at 65°F.[3] In previous comments, we have encouraged DOE to consider requiring a test at a dry-bulb temperature of less than 65°F (e.g. 55°F) in addition to testing at 65°F in order to capture defrost performance.[4] Capturing defrost performance would encourage improved defrost methods and controls. In the 2015 final rule for the dehumidifiers test procedure, DOE recognized the value of testing at additional temperatures but determined that soil temperatures below 55°F would be limited during the dehumidification season.[5] We encourage DOE to reevaluate the use of soil temperatures as a proxy for basement and other sub-ground level location temperatures and reexamine whether there are significant operating hours below 65°F. Additionally, DOE should investigate at what temperature defrost is typically activated.

Thank you for considering these comments.

Sincerely,

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[2] 86 Fed. Reg. 34643.
[3] 80 Fed. Reg. 45808. July 31, 2015.
[4] https://www.regulations.gov/comment/EERE-2014-BT-TP-0010-0008.
[5] 80 Fed. Reg. 45808. July 31, 2015.