

Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
National Consumer Law Center, on behalf of its low-income clients

March 14, 2022

Ms. Julia Hegarty
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–0032/RIN 1904–AE77: Notice of Proposed Rulemaking for Test Procedure for Consumer Water Heaters and Residential-Duty Commercial Water Heaters

Dear Ms. Hegarty:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), and National Consumer Law Center, on behalf of its low-income clients (NCLC) on the notice of proposed rulemaking (NOPR) for test procedure for consumer water heaters and residential-duty commercial water heaters. 87 Fed. Reg. 1554 (January 11, 2022). We appreciate the opportunity to provide input to the Department.

We continue to urge DOE to adopt voluntary testing needed for calculating climate-specific efficiency. Differences in ambient temperature and inlet water temperature affect the efficiency of heat pump water heaters (HPWHs). In our comments on the request for information (RFI), we recommended that DOE allow for optional reporting of additional efficiency ratings at test conditions other than those found in the DOE test procedure in order to be able to calculate climate-specific efficiencies.¹ In the NOPR, DOE responded to our comment indicating that they do not have data to specify representative test conditions for different regions.² However, the value of having test data at both colder and warmer conditions than those specified in the current test procedure is that they would allow for calculating uniform energy factors (UEFs) for any climate regardless of whether the specific optional test conditions are representative of any region. Therefore, we continue to recommend that DOE allow voluntary reporting of ratings at two additional test conditions. This optional reporting would help provide a better understanding of the differences in HPWH performance at various conditions without increasing test burden for manufacturers who do not wish to report these additional ratings.

We support DOE’s proposal to include instructions for the installation of a mixing valve and encourage DOE to amend the test procedure to capture the associated increase in effective hot water storage volume. In the NOPR, DOE notes that there are water heaters on the market that are

¹ <https://www.regulations.gov/comment/EERE-2019-BT-TP-0032-0015>.

² 87 Fed. Reg. 1580.

designed, or able, to keep stored water at temperatures significantly higher than the required outlet water temperature specified in the test procedure.³ Often these tanks are meant to be installed with a mixing valve to lower the outlet water temperature to a typical outlet temperature. The current test procedure does not provide installation instructions for mixing valves, and we therefore support DOE's proposal to include instructions for the installation of a mixing valve for water heaters designed to be used with a mixing valve.

However, we also encourage DOE to amend the test procedure to capture the associated increase in effective hot water storage volume for water heaters designed to be used with a mixing valve. Raising the temperature of the stored water above the outlet water temperature requirements essentially increases the amount of hot water delivered without increasing the size of the water heater. For example, as DOE states in the NOPR, a 50-gallon water heater with an over-heated storage tank temperature could provide as much hot water as an 80-gallon water heater with a typical tank temperature.⁴ However, this is not reflected in the test procedure or standards because water heater ratings are calculated based on the rated storage volume, not the actual effective volume. Therefore, we recommend that DOE amend the test procedure to account for the additional effective storage volume enabled by a higher operating temperature and mixing valve. Specifically, we encourage DOE to consider specifying how to calculate the effective storage volume for water heaters designed to be installed with a mixing valve based on their highest possible temperature setpoint and requiring such water heaters to be tested at both 125 ± 5 °F and at their highest setpoint. Furthermore, we believe that water heaters designed to be installed with a mixing valve should be subject to the DOE standards based on both their rated storage volume (and first hour rating [FHR] at the 125 ± 5 °F setpoint) and their effective storage volume (and FHR at their highest setpoint).⁵

We encourage DOE to investigate the representativeness of the current draw pattern. HPWHs typically have auxiliary electric resistance elements to help increase hot water recovery and provide backup hot water in periods of high demand. In our comments on the RFI, we suggested modifying the test procedure to reflect the effectiveness of controls in minimizing the use of the electric element in HPWHs. According to the NOPR, DOE's test data shows that electric elements do not turn on during the 24-hour simulated-use test for most HPWHs.⁶ However, a 2015 HPWH study from the Northwest Energy Efficiency Alliance (NEEA) found that the average annual proportion of total input energy that was provided by resistance heat ranged from 4-45%, depending on the water heater model and location of installation.⁷ Figure 1, which shows the daily range of energy use for Voltex 60-gallon HPWHs, highlights the frequency at which the electric resistance elements were activated. Therefore, we encourage DOE to evaluate the current draw pattern and whether it is representative of the real-world operation of HPWHs.

³ Ibid.

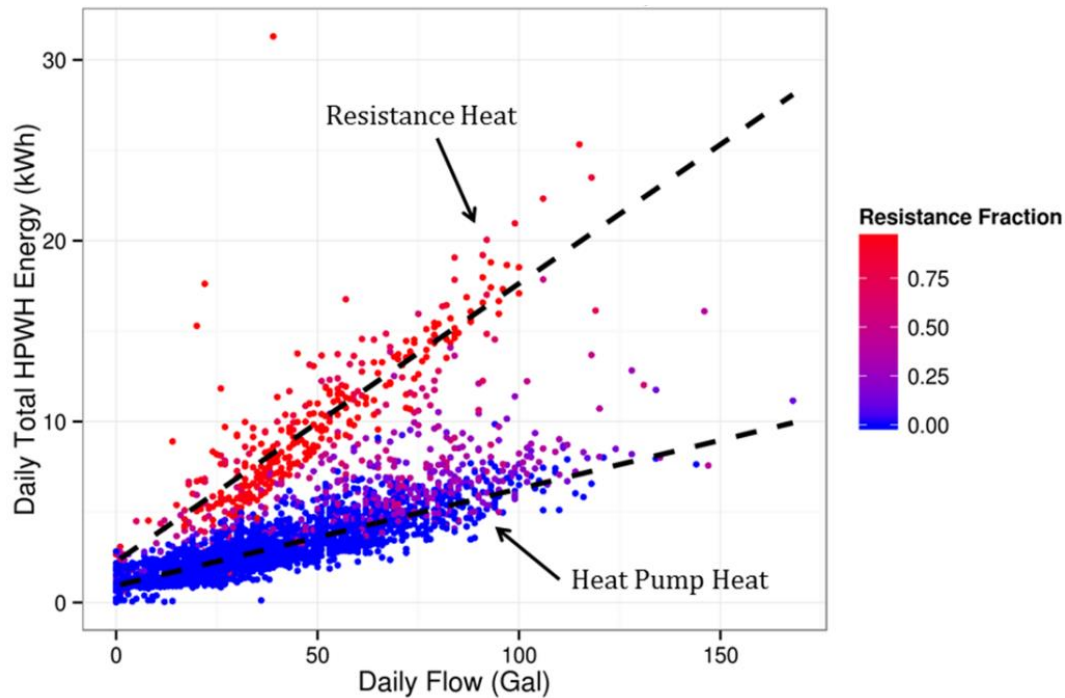
⁴ Ibid.

⁵ Such an approach would be similar to DOE's requirements for commercial refrigeration equipment (CRE) that can operate as a refrigerator or a freezer. In the 2014 CRE test procedures final rule, DOE explained that CRE with thermostats capable of operating at temperatures that span multiple equipment categories must be certified and comply with the standards for each applicable equipment category. 79 Fed. Reg. 22291 (April 21, 2014).

⁶ 87 Fed. Reg. 1583.

⁷ https://ecotopewebstorage.s3.amazonaws.com/2015_001_1_HPWHModelVal.pdf. p. 47.

Figure 1. Daily flow and range of energy use for AO Smith Voltex 60-gallon HPWH⁸



We support revising the untested models provisions in the test procedure to ensure that the rated FHR of an untested basic model is representative. As DOE describes in the NOPR, manufacturers are allowed to use the FHR of a tested electric storage water heater basic model for rating the FHR of an untested basic model with element wattages less than that of the tested basic model, as long as the two basic models have the same draw pattern.⁹ However, as DOE explains in the NOPR, the FHR of the untested basic model will generally be lower than that of the tested basic model, and therefore the FHR ratings of these untested basic models are likely not representative. We support requiring that the untested model's measured FHR be used for determining its FHR rating to improve representativeness. The NOPR notes that manufacturers must already measure the FHR of untested models to ensure it is in the same draw pattern bin as the tested model. We also support requiring that the represented value of maximum gallons per minute (GPM) for untested models of electric instantaneous water heaters be the actual value as determined for the untested model should DOE adopt untested provisions for this product category.

⁸ Ibid.

⁹ 87 Fed. Reg. 1587.

Thank you for considering these comments.

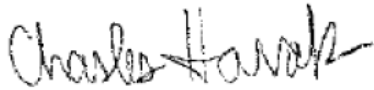
Sincerely,



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Amber Wood
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Charles Harak, Esq.
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(On behalf of its low-income clients)