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

July 6, 2020

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–2016–BT–TP–0011/RIN 1904-AD95: Request for Information for Test Procedures for Residential and Commercial Clothes Washers

Dear Mr. Berringer:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), Consumer Federation of America (CFA), National Consumer Law Center, on behalf of its low-income clients (NCLC), and Natural Resources Defense Council (NRDC) on the request for information (RFI) for test procedures for residential and commercial clothes washers. 85 Fed. Reg. 31065 (May 22, 2020). We appreciate the opportunity to provide input to the Department.

In the RFI, DOE has identified a range of issues that suggest that the current test procedure for clothes washers is not representative of an average use cycle. Most importantly, the test procedure is likely significantly underestimating drying energy for many clothes washers by not providing a representative measurement of remaining moisture content (RMC). The test procedure is also likely significantly underestimating hot water energy use on the Warm Wash/Cold Rinse temperature selection for many washers and may be significantly underestimating energy and/or water use for the increasing number of washers that offer cycle modifiers such as “deep fill” and “extra rinse.” In addition, the test procedure is not capturing the additional power consumption associated with “connected” washers and, for commercial washers, low-power mode energy consumption. We also encourage DOE to consider specifying that the average load size be a constant value independent of capacity, and we continue to urge DOE to consider alternative efficiency metrics that could help eliminate the current bias towards large-capacity washers.

In the sections below we urge DOE to address these issues and others to improve the representativeness of the test procedure. An improved test procedure that better reflects real-world use will ultimately lead to consumers having more accurate information about energy and water use.

DOE should amend the test procedure to measure RMC for all load sizes and temperature selections. Drying energy is the most important component of the integrated modified energy factor (IMEF) metric. (The other components are machine energy use, hot water energy use, and low-power mode energy use.) Based on DOE’s analysis for the 2012 direct final rule (DFR), for washers that just meet the current

standards, drying energy use represents 56% and 72% of total energy use for top-loading and front-loading washers, respectively.[1] In the clothes washer test procedure, drying energy use is calculated based on the RMC of the clothes at the end of the clothes washer cycle. However, unlike machine energy use and hot water energy use, which are measured for each combination of load size and temperature selection, the RMC is measured at only the maximum load size and using only the Cold Wash/Cold Rinse temperature selection.[2] If multiple spin settings are available, the maximum and minimum settings are tested on the Cold/Cold setting and the final RMC is calculated as a weighted average.

The RFI states that DOE is aware of clothes washers that offer multiple spin settings, but which offer only the maximum spin setting on the Cold/Cold temperature selection.[3] Similarly, as described in comments submitted by the Northwest Energy Efficiency Alliance (NEEA), their testing found that the current measurement of RMC is not representative. Specifically, NEEA found that the current measurement of RMC represents a "best case" scenario. Furthermore, NEEA's testing found that the relative ranking of washers changed significantly when RMC was measured using the Warm/Cold temperature selection (which is assumed in the test procedure to be used for 49% of all loads) and a smaller load size. It thus appears that the current test procedure is significantly underestimating drying energy use and leading to efficiency ratings that are not providing accurate information to consumers.

We urge DOE to amend the test procedure to measure RMC for all load sizes and temperature selections and to weight the measurements using the load usage factors (LUFs) and temperature use factors (TUFs). This change would improve the representativeness of the test procedure and better ensure that the test procedure is providing a reasonable relative ranking of products. We understand that this change would simply require weighing the test load after the completion of each cycle that is already being tested.

We urge DOE to incorporate a measurement of network mode power consumption in the test procedure. DOE notes in the RFI that the Department is aware of "connected" clothes washers on the market from at least four major manufacturers.[4] We urge DOE to incorporate a measurement of "network mode" power consumption in the test procedure to improve the representativeness of the test procedure for "connected" products and to provide consumers with information about any additional energy consumption associated with connected features. We understand that DOE is concerned about impeding innovation. However, the power consumption associated with network mode can be accounted for in the energy conservation standards so as not to hinder the availability of models with connected features.

We urge DOE to incorporate low-power mode energy consumption in the metric for commercial clothes washers. The energy efficiency of residential clothes washers is represented by the IMEF metric, which incorporates low-power mode energy consumption. In contrast, commercial clothes washers are rated using MEF, which excludes low-power mode energy consumption. NEEA's testing found that the average standby power of the commercial clothes washers in their test sample was more than 12 times higher than that of residential clothes washers. We urge DOE to incorporate low-power mode energy consumption in the metric for commercial clothes washers to better represent annual energy use.

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[1] https://www.regulations.gov/document?D=EERE-2008-BT-STD-0019-0047. pp. 7-4, 7-5.
[2] Unless the washer offers the option of a warm rinse, which we understand is rare among current models.
[3] 85 Fed. Reg. 31073.
[4] 85 Fed. Reg. 31068.

We encourage DOE to investigate the hot water supply temperature that would be most representative. DOE explains in the RFI that the current test procedure requires maintaining the hot water supply temperature between 130°F and 135°F, with 135°F as the target temperature. In contrast, the dishwasher test procedure specifies a hot water supply temperature of 120°F,[5] which reflects available field data on water heater set points and outlet water temperatures.[6] We believe that a hot water supply temperature of 120°F would better reflect current clothes washer usage conditions than the 135°F temperature specified in the test procedure. However, we also understand that there may be a trend towards higher water heater set points due to Legionella concerns. We encourage DOE to investigate the hot water supply temperature that would be most representative.

We encourage DOE to require a water meter with greater precision that the current specification. The RFI explains that DOE has observed that some clothes washers use very small amounts of hot water on some temperature selections and that the required water meter resolution (no larger than 0.1 gallons) may not be sufficient to accurately measure hot water usage on these selections.[7] We encourage DOE to require a water meter with greater precision to ensure that the test procedure is accurately representing energy use.

We encourage DOE to amend the test procedure so that it adequately represents the energy use of all clothes washers on the "Warm Wash/Cold Rinse" temperature selection. As DOE explains in the RFI, for clothes washers that offer four or more Warm Wash/Cold Rinse temperature selections, a manufacturer can either test all selections or can test at the 25%, 50%, and 75% positions between the hottest hot wash and the coldest cold wash (referred to as the "25/50/75 test").[8] DOE further explains that the 25/50/75 test was adopted before the widespread use of electronic controls and that with electronic controls, the 25%, 50%, and 75% positions on the temperature dial may not necessarily correspond to the 25%, 50%, and 75% temperature differences between the hottest and coldest selections. The RFI states that DOE is aware of clothes washers on the market that have temperature selections located at the 25%, 50%, and 75% positions that have wash temperatures only a few degrees higher than the coldest wash temperature, while the temperature selection labeled ''Warm'' is located beyond the 75% position and is therefore not included for testing under the 25/50/75 test.[9] We are concerned that for these clothes washers, the test procedure may be significantly underestimating the energy use of the Warm/Cold temperature selection by not reflecting the energy use of the temperature selection labeled "Warm." We encourage DOE to amend the test procedure so that it adequately represents the energy use of all clothes washers on the Warm/Cold temperature selection.

We encourage DOE to amend the test procedure to reflect market developments regarding water fill control systems (WFCSs). DOE explains in the RFI that the required test load sizes are based on the type of WFCS on the clothes washer (e.g. manual vs. adaptive). DOE further explains that as electronic control panels have become more sophisticated, it can be difficult to determine the type of WFCS employed by a given clothes washer, and there are now combinations of WFCSs (e.g. multiple different adaptive

[5] For water-heating dishwashers designed for heating water with a nominal inlet temperature of 120°F, which the RFI notes includes nearly all dishwashers currently on the U.S. market.
[6] 85 Fed. Reg. 31069.
[7] 85 Fed. Reg. 31069-70.
[8] 85 Fed. Reg. 31073.
[9] Ibid.

WFCSs) that are not addressed in the test procedure.[10] We encourage DOE to amend the test procedure so that it adequately reflects the varieties of WFCSs available on the market.

We encourage DOE to capture the impact of cycle modifiers on energy and water use. The RFI explains that for clothes washers with electronic controls, the default settings must be used for any cycle selections except for the temperature selection, water fill levels, and, if necessary, spin speeds (for determining RMC). DOE states in the RFI that the Department has observed a trend towards increased availability of optional cycle modifiers such as "deep fill" and "extra rinse," which may significantly impact energy and/or water consumption.[11] The RFI also states that DOE has observed that the default settings of these optional cycle modifiers is most often in the "off" position, which means that the energy and/or water use of these cycle modifiers is not being captured in the current test procedure. DOE notes, however, that the growing presence of these cycle modifiers may "be indicative of an increase in consumer demand and/or usage of these features."[12]

If the default settings for optional cycle modifiers are most often in the "off" position, the test procedure is effectively assigning a value of zero to the energy and water use of these features, which is likely not representative. We are concerned that the test procedure may therefore be significantly underestimating the energy and/or water use of clothes washers with optional cycle modifiers. We encourage DOE to consider amendments to the test procedure to capture the impact of cycle modifiers on energy and water use.

We support amending the final RMC value in the drying energy calculation to align with the clothes dryer test procedure in Appendix D2. The drying energy calculation assumes a clothes dryer final RMC of 4 percent. As DOE describes in the RFI, the clothes dryer test procedure in Appendix D1, which the current clothes dryer standards are based on, prescribes a final RMC of between 2.5 and 5.0 percent. Appendix D2, which manufacturers can optionally use to demonstrate compliance with the clothes dryer standards, requires a final RMC no greater than 2 percent.[13] DOE also explains that a final RMC of 2 percent is intended to represent the remaining moisture level that would be acceptable to consumers based on the DOE test load. We support amending the final RMC value in the drying energy calculation to reflect the clothes dryer test procedure in Appendix D2.

We encourage DOE to consider specifying that the average load size be a constant value independent of capacity. The current test procedure includes three load sizes: (1) a "minimum" load size of 3 lb.; (2) a "maximum" load size that reflects the maximum capacity of the washer; and (3) an "average" load size, which is the average of the "minimum" and "maximum" load sizes. As described in the RFI, until 2012, the load size table in the test procedure (Table 5.1) accommodated washer capacities up to 3.8 cu. ft.[14] The 2012 test procedure final rule extended the table to accommodate washer capacities up to 6.0 cu. ft., and Whirlpool and Samsung were both granted test procedure waivers to test washers with capacities between 6.0 and 8.0 cu. ft. The introduction of large-capacity washers to the market combined with the structure of the load size table has resulted in the weighted-average load size used in the test procedure for the largest washers being significantly greater than that for smaller washers. For example, the weighted-average load size for a 6.0 cu. ft. washer (13.68 lb.) is almost 60% larger than the

[10] 85 Fed. Reg. 31074.
[11] 85 Fed. Reg. 31076.
[12] Ibid.
[13] 85 Fed. Reg. 31079.
[14] 85 Fed. Reg. 31078.

weighted-average load size for a 3.5 cu. ft. washer (8.68 lb.).[15] As we described in our comments on the Whirlpool test procedure waiver petition, NEEA found in their laundry field study that there was no clear correlation between washer volume and load size.[16] Therefore, we are concerned that the current test procedure may not be representative of an average use cycle for large-capacity washers. We encourage DOE to consider specifying that the average load size be a constant value independent of capacity.

We continue to encourage DOE to consider alternative efficiency metrics based on pounds of clothes washed. We appreciate DOE's request for comment on potential alternative efficiency metrics.[17] In our comments on the 2019 RFI for standards for clothes washers, we encouraged DOE to consider potential approaches to eliminate the current bias towards large-capacity washers.[18] We suggested that one potential approach would be to change the efficiency metrics to be based on pounds of clothes rather than washer capacity. Specifically, we encourage DOE to consider alternative energy efficiency and water efficiency metrics based on the LUF weighted-average load size for a given washer capacity.

Thank you for considering these comments.

Sincerely,

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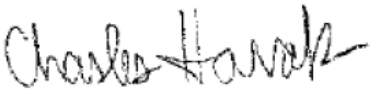

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[15] The minimum, average, and maximum load sizes are weighted using values of 0.14, 0.74, and 0.12, respectively. The average and maximum load sizes are 24.8 lb. and 13.9 lb., respectively, for a 6.0 cu. ft. washer, and 14.6 lb. and 8.8 lb. for a 3.5 cu. ft. washer.
[16] https://www.regulations.gov/document?D=EERE-2015-BT-WAV-0020-0002.
[17] 85 Fed. Reg. 31080.
[18] https://www.regulations.gov/document?D=EERE-2017-BT-STD-0014-0013.