

Memo

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<i>to:</i>	Department of Energy	<i>via email:</i>	expartecommunications@hq.doe.gov
<i>from:</i>	Jennifer Cleary		
<i>date:</i>	October 27, 2022		
<i>subject:</i>	Ex Parte Communication; Docket No. EERE-2016-BT-TP-0012		

This memo memorializes the meeting between the Association of Home Appliance Manufacturers (AHAM) and the Department of Energy on October 19, 2022, for inclusion in the above-captioned public docket.

AHAM requested the meeting with DOE in order to discuss possible improvements DOE could make to its proposed test procedure. Specifically, AHAM continues to have significant concerns about DOE pursuing a performance threshold in its energy test procedure given the proposed test's significant variation and AHAM's assessment that the test, as proposed, is unduly burdensome to conduct. Nothing in this memorandum or in our comments during the ex parte meeting alter our comments on the above-captioned docket. In fact, we incorporate by reference and attach to this memo, at Attachment A, comments we filed after the conclusion of the comment period updating our comments with regard to the significant variation in the proposed test procedure.¹

Recognizing, however, that DOE may nevertheless move forward with the approach it proposed for measuring cleaning performance and establishing a cleaning performance threshold, AHAM asked DOE to consider our proposals aimed at mitigating some of the concerns we have raised regarding DOE's proposal. Some of the proposals are directly related to the test procedure, while others are related to other aspects of certification, compliance, and enforcement. Together, we believe our proposals could help address some of the concerns we raised in our comments, though we note that it is not possible to satisfactorily address variation given that the biggest contributor to the proposed performance test's variation is human grading.

¹ AHAM Supplemental Comments on DOE's Energy Conservation Program: Test Procedure for Dishwashers; Notice of Proposed Rulemaking; Docket No. EERE-2016-BT-TP-0012; RIN 1904-AD96 and Energy Conservation Standards for Dishwashers, Notification of Availability of Preliminary Technical Support Document; Docket No. EERE-2019-BT-STD-0039; RIN 1904-AE32 (Sept. 2, 2022).

Test Procedure Proposals

AHAM proposed the following modifications to DOE's proposed test procedure.

1. DOE proposed that each test run on every tested model must meet the proposed cleaning performance threshold of 65 in order for the test to be considered valid. AHAM recommended that DOE instead use the *average* of each soil level across the test population. This is the method the ENERGY STAR performance test procedure, upon which DOE relied for its proposed test and which DOE authored, uses. This approach recognizes that there is significant test variation and, thus, is a better method.
2. DOE also proposed that when the proposed cleaning performance threshold of 65 is not achieved on a single test on any soil level, the test must be re-run on the "most energy intensive" cycle that achieves the score of 65. AHAM believes that the "most" energy intensive cycle will almost never meet proposed standards because it will likely be one that uses high heat to provide specific consumer utility such as, for example, sanitization or cleaning of pots and pans. These consumer utilities should not be compromised—they must be maintained. This is especially true as consumers now are specifically looking for features to help them keep their families healthy.² Moreover, data continues to show that the normal cycle is the most-used cycle and there is no data to suggest that consumers are shifting to the most energy-intensive cycle in response to perceived poor performance.

AHAM proposes that DOE instead require that if the test must be re-run, it be re-run on the "next more" energy intensive cycle. (This leveling up approach would be used until a cycle is found that meets the performance threshold—i.e., if the "next more" energy intensive cycle still does not satisfy the performance requirement, the test would be repeated on the cycle using the next higher amount of energy and so forth). We acknowledge that this does not decrease test burden and we continue to believe that the test burden is too high. But we expect that it will not have the unintended consequence of banning cycles that rely on high heat to provide consumer utility and that is paramount. Instead, different from DOE's proposal, AHAM's proposal will allow manufacturers to provide consumers with incremental levels of energy and cleanliness. AHAM's proposed approach is also consistent with our comments on DOE's proposed rule that consumers will not necessarily go to the most energy intensive cycle to remedy perceived poor cleaning performance. We, therefore, believe this is a more reasonable approach than DOE's proposal.

3. DOE proposed that soil, streaks, spots, etc. would all be counted in the grading consistent with the scoring method in AHAM DW-2-2020. AHAM proposes that DOE instead require soil-only scoring to eliminate the scoring of spots/streaks which are harder for graders to see and will likely be more prevalent due to DOE's proposal that the energy test not use rinse agent (a proposal with which we agree and would not support DOE changing). Running the product at the "next more" level of energy is not likely to reduce

² Nearly 60 percent (57%) of consumers are interested in additional cleaning/sanitization cycles in major home appliances since the start of the COVID-19 pandemic. *See* DIG Insights for AHAM, COVID-19 Appliance Impact Research (Feb. 2021).

the streaks, thus proposal is meant to minimize false findings of noncompliance due to the variation in the test. DOE mentioned in its proposed rule that it would consider this method, but could revisit the threshold requirement if it did so. AHAM would not support the qualifying threshold score of 65 being raised much or at all as a result of this change. We believe that this approach will alleviate some burden and reduce false findings of noncompliance, but that result will not occur if the threshold score is adjusted.

4. Finally, DOE proposed to include the proposed performance threshold and test in the current test procedure—Appendix C1—which means that the performance threshold would be required to demonstrate compliance with current standards. The implication is that DOE does not believe the proposal impacts measured efficiency, and thus DOE proposed a compliance date of 180 days after publication of the final rule in the Federal Register. AHAM strongly opposed this proposal in our prior comments, which we hereby incorporate by reference and include at Attachment B, and we continue to oppose both the proposal to include the performance test and threshold in Appendix C1 and we disagree with the conclusion that the proposed changes would not impact measured efficiency.³ AHAM continues to urge DOE to require compliance with the performance test and threshold to demonstrate compliance only with amended standards. As we demonstrated in our February 2022 comments, according to DOE’s own data, the proposed test will impact measured efficiency, and will likely even result in models that currently comply with the standard (or even ENERGY STAR) no longer complying with energy conservation standards. This is not an acceptable result under EPCA.

Enforcement Proposals

Together with the above proposals specific to the test procedure itself, AHAM makes the following proposals aimed at mitigating the impact of the known test procedure variation.

1. As we demonstrated in our comments, the proposed performance test is highly variable, significantly more so than other test procedures. Thus, AHAM proposes that DOE adopt an enforcement scheme similar to that it has adopted for other products such as refrigerator/freezers. Specifically, AHAM proposes that if DOE’s test results are within 14 percent of the 65 threshold score, DOE will use the normal cycle for the assessment/enforcement test. Otherwise, if the tested score is not within that range, DOE would follow the test’s requirements for when the score of 65 is not achieved. The proposal is based on the data we provided in our comments demonstrating that standard deviation can be as high as seven and that even years-long efforts to improve variation have not been successful in changing that value. The 14 percent tolerance represents a 95 percent confidence interval defined by two times the standard deviation.
2. AHAM also proposes that DOE, together with AHAM (and other stakeholders as DOE deems appropriate or necessary) develop a process to qualify laboratories to conduct the DOE test procedure specifically. This would be in addition to the usual accreditations

³ See AHAM Comments on DOE’s Energy Conservation Program: Test Procedure for Dishwashers; Notice of Proposed Rulemaking; Docket No. EERE-2016-BT-TP-0012; RIN 1904-AD96, at 13-15 (Feb. 22, 2022).

certified laboratories have (e.g., A2LA, etc.). As mentioned above, most of the test's variation is likely attributable to the fact that a human is grading tiny spots on dishes. Thus, the particular technicians must be highly trained and skilled and laboratories must have a common understanding of how to conduct grading. A process for qualifying labs and technicians would help with this goal, including within manufacturer labs. AHAM has a process for qualifying laboratories as part of our air cleaner certification program. It has been quite successful in reducing variation and we would be glad to offer that as a starting point.

AHAM requests that DOE consider these proposals which we believe are relatively minor changes DOE could make to mitigate AHAM's concerns related primarily to the variation in the test. We believe longer-term solutions will be necessary to truly improve variation and reduce test burden and we remain concerned about DOE's proposed procedure. But we offer these suggestions in the interim in order to minimize what we believe are likely to be frequent false findings of non-compliance (or compliance). We appreciate the Department's willingness to meet with us to discuss these proposals and hope that DOE will consider making these changes as it proceeds to a final rule.

The attendees at the meeting were as follows:

Ashley Armstrong, DOE
Gabriel Daly, DOE
Alexandra Kloss, DOE
Carl Shapiro, DOE
Troy Watson, DOE
Amelia Whiting, DOE
Jennifer Cleary, AHAM
Randy Cooper, AHAM
Kevin Girdharry, AHAM
Inhye Kang, AHAM

Slides AHAM presented during the meeting are attached at Attachment C.

Attachment A



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September 2, 2022

Submitted by email

Ashley Armstrong
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Building Technologies Program
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Washington, DC 20585-0121

ResDishwasher2016TP0012@ee.doe.gov
Dishwashers2019STD0039@ee.doe.gov

Re: AHAM Supplemental Comments on DOE's Energy Conservation Program: Test Procedure for Dishwashers; Notice of Proposed Rulemaking; Docket No. EERE-2016-BT-TP-0012-; RIN 1904-AD96 and Energy Conservation Standards for Dishwashers, Notification of Availability of the Preliminary Technical Support Document; Docket No. EERE-2019-BT-STD-0039; RIN 1904-AE32

Dear Ms. Armstrong:

The Association of Home Appliance Manufacturers (AHAM) respectfully submits the following supplemental comments to the Department of Energy (DOE or Department) on its Test Procedure for Dishwashers; Notice of Proposed Rulemaking; Docket No. EERE-2016-BT-TP-0012; RIN 1904-AD96; 86 Fed. Reg. 72738 (Dec. 22, 2021) (test procedure NOPR) and Notification of Availability of Preliminary Technical Support Document on Energy Conservation Standards for Residential Dishwashers; Docket No. EERE-2019-BT-STD-0039; RIN 1904-AE32; 87 Fed. Reg. 3450 (Jan. 24, 2022) (standards Pre-TSD). Although the comment deadlines in these matters have closed, we respectfully request that DOE place these supplemental comments on the docket in these rulemakings and consider them in its decision-making.

EPCA requires that new and amended test procedures be reasonably designed to produce test results that measure energy efficiency, energy use, water use, or estimated annual operating cost of covered products or equipment during a representative average use cycle or period of use. 42 U.S.C. § 6293(b)(3). No test can be considered "reasonably designed" under EPCA if the test is not accurate, repeatable, and reproducible. The proposed test procedure, which is based on the ENERGY STAR cleaning performance test (which is based on AHAM DW-2 and uses DW-2's scoring method) continues to be too variable to be used for mandatory criteria.

In our comments on the test procedure NOPR, AHAM provided data regarding a 2018 round robin test we conducted to evaluate the repeatability and reproducibility of the scoring method in AHAM DW-2. Upon further review we believe that data from our prior round robin, which was conducted in 2013 in coordination with DOE, is more relevant. The 2018 round robin assessed AHAM DW-2, which includes more soiled dishes in the load than DOE's proposed test procedure.¹ But the round robin conducted in 2013 evaluated the variation of the test under the same or very similar conditions to what DOE is now proposing. Thus, with these supplemental comments, we are providing data on that prior round robin. We do not believe that anything has changed substantially from the time that testing was completed and so, we expect these results represent the variation in the test DOE now proposes which is nearly identical to that used by the Environmental Protection Agency (EPA) in the ENERGY STAR program. That ENERGY STAR performance method was originally developed by DOE and AHAM has been commenting on the unacceptable variation in the test method since 2012.²

¹ With that said, that round robin which compared AHAM DW-1-2010's repeatability and reproducibility to AHAM DW-1-2019's repeatability and reproducibility and found that there was not an improvement and that, in fact, there was an increase in standard deviation between the 2010 version and the 2019 version, demonstrating that even improving the test conditions for clarity and repeatability did not actually improve the outcome in terms of reducing variation. Thus, those results are still relevant.

² AHAM has commented numerous times on the unacceptable variation in the ENERGY STAR Performance Test Method. *See, e.g.*, AHAM Comments on ENERGY STAR Draft 2 Test Method for Determining Residential Dishwasher Cleaning Performance, at 7 ("As AHAM previously commented, and DOE recognizes, the cleanability test procedure must be repeatable and reproducible, especially with increasing enforcement and verification testing. . . . The raw cleaning performance test data DOE provided with Draft 1 of the Draft Procedure show significant variation.") (Nov. 9, 2012); AHAM Comments on ENERGY STAR Draft Final Test Method for Determining Residential Dishwasher Cleaning Performance, at 3-4 (commenting that DOE should suggest that one grader perform scoring in a given facility and stating that AHAM is "disappointed that DOE, based only on about 250 tests on 12 units, refuses to acknowledge what industry is collectively telling it based on running these tests *every day for more than a decade*. Accordingly, we must re-emphasize that it is critically important that the graders and the facility are consistent and that graders are trained and experienced in order to minimize variation in the test procedure. Introducing multiple graders introduces variation, especially if those graders have varying degrees of knowledge about the test. . . . We do not see any reason why DOE should not want to do what it can to reduce variation.") (emphasis in original) (March 14, 2013); AHAM Comments on ENERGY STAR Program Requirements: Product Specification for Residential Dishwashers, Eligibility Criteria, Draft 1, Version 6.0, at 4 ("The scoring results, using the AHAM scoring method, from the round robin AHAM conducted showed a[n average] range of two standard deviations It will be difficult to accurately or confidently compare data across manufacturers given the concerns we have raised about reproducibility. . . . [performance] data should not be posted on the ENERGY STAR qualified products list. Given the inherent variation in the data, it would be confusing and potentially misleading to provide it to consumers.") (March 31, 2013); AHAM Comments on ENERGY STAR Program Requirements: Product Specification for Residential Dishwashers, Eligibility Criteria, Draft 2, Version 6.0, at 2 (reiterating comments on Draft 1) (July 22, 2014); AHAM Comments on ENERGY STAR Most Efficient 2015 Proposed Recognition Criteria, at 3 ("AHAM has commented numerous times (with supporting data from our round robin testing) that the ENERGY STAR Test Method for Determining Residential Dishwasher Cleaning Performance is not sufficiently repeatable or reproducible. And both DOE and EPA have recognized that laboratories need further experience with the test procedure.") (Sept. 11, 2014); AHAM Comments on ENERGY STAR Proposed Recognition Criteria

DOE's proposed performance test is limited in that it is highly variable—it does not produce consistent or reliable results. In 2013, AHAM conducted a round robin test (testing the same product at different labs for comparison) to evaluate the ENERGY STAR performance test, upon which DOE's proposed test procedure is based. We tested two units at six labs, two of which were third-party labs. The test was conducted twice on each unit in each laboratory by two technicians (graders) at each lab. There was also an observer(s) at each lab—including, for some labs, DOE's consultant. AHAM provided the raw data from this testing to DOE in December 2013. We will again provide this data to DOE, through Guidehouse. The standard deviations from lab-to-lab varied widely. For a soil-sensing unit, the standard deviation was as high as 6.8 percent. ***That means, if a unit achieved an average cleaning score of 65 (DOE's proposed threshold), accounting for variation, the score could actually be anywhere from 58.2 (fail)-71.8 (pass). Even a unit that receives a cleaning score of 70 (higher than the proposed minimum of 65), could pass or fail with a range of possible scores from 63.2 (fail) – 76.8 (pass).***

Thus, whether a unit passes or fails DOE's proposed criteria depends significantly on who is doing the grading, maybe even more so than on the actual performance of the unit itself. Nothing in this cleaning performance test has changed that would improve variation. AHAM worked for several years to improve the test's variation without success (as shown in the 2018 data we provided in our original comments). Despite many changes designed to improve repeatability and reproducibility, the variation remained consistent. This is likely because the test relies on a human in a lab counting specks on plates—the scoring is inherently subjective.

AHAM is not aware of data to show that repeatability and reproducibility concerns have been addressed. Neither EPA nor DOE have conducted a subsequent round robin test or any other test to assess variation. And, though EPA collects data on performance scores, that data does not include data that can help EPA or DOE—or commenters—assess the test's variability. To the contrary, as we previously commented, AHAM's test results from attempts to improve the clarity of the test show that the variation concerns remain.

for Most Efficient 2020 (“AHAM continues to oppose EPA's proposed performance criteria and reporting for . . . dishwashers in the Most Efficient program. EPA has determined that the test[] that [is] the basis for these criteria [is] not repeatable and reproducible enough for use in the underlying specification. Yet, EPA uses them for Most Efficient. It should not continue to do so.”) (Sept. 9, 2019); AHAM Comments on ENERGY STAR Program Requirements, Product Specification for Residential Dishwashers, Eligibility Criteria, Draft 1, Version 7.0 (“The ENERGY STAR performance test procedure continues to be too variable to be used for mandatory eligibility criteria. . . . The actual score could be anywhere in the range the standard deviation encompasses meaning that it is possible that . . . if a different laboratory conducted the testing, the model might not be eligible. Similarly, a score . . . could actually meet the criteria if tested by another laboratory, but the model would nevertheless be ineligible for ENERGY STAR.”) (May 18, 2020); AHAM Comments on ENERGY STAR Proposed Recognition Criteria for Most Efficient for Dishwashers 2021 (“EPA has determined that the test that is the basis for these criteria [is] not repeatable and reproducible enough for use in the underlying specification, yet EPA uses them for Most Efficient. EPA should not continue to do so.”) (Jan. 21, 2021); AHAM Comments on ENERGY STAR Program Requirements, Product Specification for Residential Dishwashers, Eligibility Criteria, Final Draft, Version 7.0 (“The ENERGY STAR performance test is not designed to do what EPA is asking of it. It produces highly variable results, which are unreliable for EPA's intended use. Unreliable test results are harmful to consumers, manufacturers, and the ENERGY STAR program.”) (July 2022).

The variation in the test will also make enforcement of cleaning scores virtually impossible (and we do not yet understand how DOE would plan to enforce the performance portion of the test). Because the test is not repeatable or reproducible, it will be highly likely that there will be false findings of both compliance and non-compliance with DOE's proposed cleaning criteria.

As we previously commented, DOE does not have any data demonstrating that its proposed test is repeatable or reproducible. When asked if it conducted a round robin, DOE replied—during the February 3, 2022 public meeting—that it did not. When asked if DOE had any data on the variation of its proposed test procedure, DOE responded that it did not.³ Thus, AHAM is not aware of any data supporting the repeatability and reproducibility—and therefore, the accuracy—of DOE's proposed test. Without such data, DOE's proposal is arbitrary and capricious and does not satisfy the requirements of the Data Quality Act or the Administrative Procedures Act. On the other hand, AHAM's data demonstrate that the test is **not** sufficiently repeatable or reproducible to provide accurate results. Accordingly, on this basis alone, DOE should not adopt its proposed performance test or metric.

In our comments on the standards Pre-TSD, AHAM commented on pages 12-13, that DOE's data demonstrate that many models at EL 1 would not meet DOE's performance score of 65 when test variation is taken into account. We assumed 1 sigma for test variation (i.e., 7 points) based on the test's variation based on our comments on the test procedure, which we update with these comments. Notably, however, that analysis is unchanged by these updated comments given that the test variation based on our round robin of the ENERGY STAR Performance Test Method is 6.8, which rounds to 7.

We also wish to reiterate that DOE's proposed test is limited in a second way—it focuses only on one aspect of performance and ignores others. Thus, it is likely to drive dishwasher designs that frustrate consumers and could drive them away from dishwasher use, thus increasing energy and water use.

The dishwasher is a holistic system. Focusing on one aspect of performance—cleaning—may have a ripple effect to the detriment of other performance features consumers value such as drying effectiveness, cycle length, and noise. In order to design dishwashers that meet DOE's proposed cleaning performance criteria and possibly more stringent energy conservation standards (should those standards be too stringent), it is likely that manufacturers will need to reduce drying energy and lengthen cycles. This could result in fewer dry dishes and/or cycles that take longer to complete. Noise levels could also be impacted.

³ Transcript of Proceedings, In the Matter of Dishwashers Test Procedure Notice of Proposed Rulemaking Public Meeting, Docket No. EERE-2016-BT-TP-0012 (Feb. 3, 2022) (Question: "Has DOE looked at lab-to-lab variation in detail for the performance portion of the test? . . .", Answer: ". . . I don't think we have done any lab-to-lab variation testing or round-robin testing with cleaning performance other than whatever experience that's been done, you know, as far as the ENERGY STAR program. But no specific round-robin or anything like that for cleaning performance, no." Question: "So does DOE have then any data demonstrating that either lab-to-lab variation or low or that within-lab variation is low for the performance portion of the test? . . ." Answer: "Yeah, to my knowledge, we don't have any specific data on that area.")

Moreover, DOE's proposed cleaning test focuses only on one aspect of cleaning—whether or not the soils are removed from the dish and not redeposited back on. It does not address grease or detergent build-up over time, which consumers will notice as they use the dishwasher. This is a significant issue because when consumers pre-rinse—and most do—the detergent has less to attach itself to and, as a result, there is more soil left on the dishes when the cycle ends. Moreover, if consumers are not satisfied with their dishwasher's performance, they are not likely to use it, which will result in increased water and energy usage through handwashing, thus undercutting DOE's energy and water savings goals.

Importantly, DOE has no data to indicate whether the performance criteria it has selected are consumer relevant—will consumers accept performance at the selected level and not at levels below that? Do the test results correlate to performance in the field? DOE has not studied either of these issues. Thus, DOE's proposals related to the performance criteria are arbitrary and capricious and do not satisfy the requirements of the Data Quality Act. DOE has, however, been presented with data that its proposed criteria are not consumer relevant and must not ignore that data.

AHAM strongly agrees that performance needs to be maintained for the consumer. We have been advocating for maintaining dishwasher performance as energy and water criteria (through the ENERGY STAR program and the Appliance Standards Program) have become more stringent. But the test DOE proposes was not developed for that purpose and will not accomplish that goal. In fact, it may drive the opposite result by forcing manufacturers to focus on only one aspect of cleaning performance at the detriment of other important performance functionalities. Thus, the addition of a cleaning performance metric into the test procedure will not assist DOE in ensuring EPCA's mandate that amended standards not result in any lessening of the product's utility or performance. 42 U.S.C. § 6295(o)(4).

AHAM appreciates the opportunity to submit these supplemental comments on DOE's test procedure NOPR and standards Pre-TSD, and would be glad to discuss these matters in more detail should you so request. We respectfully request that DOE place these comments on the docket in these rulemakings and evaluate them in its consideration of the proposed test procedure and energy conservation standards.

Sincerely,



Jennifer Cleary
Vice President, Regulatory Affairs

About AHAM: AHAM represents more than 150 member companies that manufacture 90% of the major, portable and floor care appliances shipped for sale in the U.S. Home appliances are the heart of the home, and AHAM members provide safe, innovative, sustainable and efficient products that enhance consumers' lives. The home appliance industry is a significant segment of the economy, measured by the contributions of home appliance manufacturers, wholesalers, and retailers to the U.S. economy. In all, the industry drives nearly \$200 billion in economic output

throughout the U.S. and manufactures products with a factory shipment value of more than \$50 billion.

Attachment B



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February 22, 2022

Submitted via regulations.gov

Ms. Speakes-Backman
Acting Assistant Secretary for EERE
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Re: AHAM Comments on DOE's Energy Conservation Program: Test Procedure for Dishwashers; Notice of Proposed Rulemaking; Docket No. EERE-2016-BT-TP-0012-; RIN 1904-AD96

Dear Ms. Speakes-Backman:

The Association of Home Appliance Manufacturers (AHAM) respectfully submits the following comments to the Department of Energy (DOE or Department) on its Test Procedure for Dishwashers; Notice of Proposed Rulemaking; Docket No. EERE-2016-BT-TP-0012; RIN 1904-AD96; 86 Fed. Reg. 72738 (Dec. 22, 2021).

AHAM represents more than 150 member companies that manufacture 90% of the major, portable and floor care appliances shipped for sale in the U.S. Home appliances are the heart of the home, and AHAM members provide safe, innovative, sustainable and efficient products that enhance consumers' lives. The home appliance industry is a significant segment of the economy, measured by the contributions of home appliance manufacturers, wholesalers, and retailers to the U.S. economy. In all, the industry drives nearly \$200 billion in economic output throughout the U.S. and manufactures products with a factory shipment value of more than \$50 billion.

AHAM supports DOE in its efforts to save energy and ensure a national marketplace through the Appliance Standards Program. Repeatable and reproducible test procedures that are representative of average consumer use, but not unduly burdensome to conduct, are an integral part of the standards program. These qualities of mandatory test procedures are essential not only because they are statutory requirements, but also because of their importance to the integrity and effectiveness of the Appliance Standards Program.

AHAM appreciates that DOE proposes to incorporate by reference ANSI/AHAM DW-1-2020, "Uniform Test Method for Measuring the Energy Consumption of Dishwashers," (DW-1), into

the dishwasher test procedure at 10 CFR part 430. AHAM strongly supports this decision, though we also have some comments on the test procedure as DOE has proposed it, which are outlined below.

DOE also proposes to specify provisions for scoring the test load and calculating a per-cycle cleaning index per the scoring provisions of AHAM DW-2-2020 “Household Electric Dishwashers” (DW-2), and establish a minimum cleaning index threshold of 65 as a condition for a test cycle to be valid. AHAM agrees with DOE that performance is a concern—it is critical that performance and utility not be negatively impacted for consumers as the result of more stringent energy conservation standards. AHAM and its members have worked hard for nearly a decade to ensure that more stringent energy and water savings criteria in the form of energy conservation standards and/or ENERGY STAR criteria do not degrade performance for consumers. That said, AHAM cannot support DOE’s proposal to include a performance metric in the test procedure without DOE providing data and information to address the significant concerns AHAM raises in the comments below.

I. The DW-1 Test Procedure, Where Incorporated, Represents An Average Use Cycle While Properly Balancing Repeatability, Reproducibility, And Test Burden.

The Energy and Policy and Conservation Act of 1975, as amended (EPCA) requires that new and amended test procedures be reasonably designed to produce test results that measure energy efficiency, energy use, water use, or estimated annual operating cost of covered products or equipment during a representative average use cycle or period of use. 42 U.S.C. § 6293(b)(3). EPCA also requires that new and amended test procedures not be unduly burdensome to conduct. *Id.* EPCA, therefore, by its statutory terms, requires that DOE balance these factors when it sets a test procedure and does not require that all potential use conditions be tested.

In order to establish or amend representative average use cycles or periods of use, DOE must have national, statistically significant, field use data on consumer use. Without such data, it is impossible and inappropriate for DOE to determine or change the average use/cycle in a test procedure. The current dishwasher test procedure is based on consumer use studies, and changing the test would require some showing that something has changed with regard to consumer behavior or that more accurate consumer use study data is available. Importantly, any such data should be national in scope, as no known basis exists to extrapolate regional use data to usage across the country, and behavior in one part of the country cannot simply be assumed to be an accurate proxy for the rest of the country.

It is important to note that EPCA does not contemplate or require test procedures to measure every possible cycle, combination of options, or use pattern. Instead, EPCA requires test procedures measure only a “representative average use cycle or period of use.” 42 U.S.C. § 6293(b)(3). This is an important distinction. The dishwasher test procedure will inevitably become unduly burdensome to conduct if, in an effort to measure every possible kilowatt hour, it is amended to account for every possible cycle, option, or use pattern. DOE should be careful to focus on representative, average use cycles as reflected in our comments below. Doing so satisfies EPCA’s intent of allowing consumers to make purchases informed by energy efficiency/use based on a communicated expected use. The goal is to allow consumers to

compare like products based on representative test criteria, not to represent to consumers the exact energy use of the product under every possible condition.

To that end, AHAM agrees with DOE that its DW-1 test procedure meets EPCA's requirements. Accordingly, AHAM appreciates and strongly supports DOE's proposal to incorporate DW-1 by reference for a number of provisions in the proposed test procedure. There are other technical provisions within the proposed test procedure that could be improved, and AHAM provides suggestions for doing so in Section III of these comments.

II. DOE's Proposal To Include A Performance Metric In The Dishwasher Test Procedure Is Not Supported By Data And Is Fraught With Technical Challenges And Uncertainty.

EPCA requires that new and amended test procedures be reasonably designed to produce test results that measure energy efficiency, energy use, water use, or estimated annual operating cost of covered products or equipment during a representative average use cycle or period of use. 42 U.S.C. § 6293(b)(3). EPCA also requires that new and amended test procedures not be unduly burdensome to conduct. *Id.* EPCA, therefore, by its statutory terms, requires that DOE balance these factors when it sets a test procedure and does not require that all potential use conditions be tested. **No test can be considered “reasonably designed” under EPCA if the test is not accurate, repeatable, and reproducible.**

DOE proposes to specify provisions for scoring the energy test load and calculating a per-cycle cleaning index as specified in DW-2 and establish a minimum cleaning index threshold of 65 as a condition for a test cycle to be valid. DOE has not produced sufficient information or data to show that its proposed cleaning performance requirement, which is based on the ENERGY STAR Cleaning Performance Test Method and the scoring method in DW-2, meets EPCA's requirements. Nor has DOE provided sufficient support for its proposals—its proposal is not based on data and, therefore, is arbitrary and capricious under the Administrative Procedures Act and does not meet the requirements of the Data Quality Act. AHAM cannot support a performance metric without DOE providing data and information to address the significant concerns AHAM raises in the comments below.

A. EPCA Does Not Authorize A Cleaning Performance Metric In The Test Procedure.

EPCA requires that new and amended test procedures be reasonably designed to produce test results that measure energy efficiency, energy use, water use, or estimated annual operating cost of covered products or equipment during a representative average use cycle or period of use. 42 U.S.C. § 6293(b)(3) (emphasis added). Thus, on its face, EPCA only authorizes DOE to develop test procedures that measure energy efficiency, energy use, water use, or estimated annual operating cost. It does not authorize DOE to develop test procedures that measure product performance.

AHAM acknowledges that a number of DOE's test procedures have provisions relating to performance. For example, refrigeration products must reach a certain temperature, clothes washers must achieve a minimum remaining moisture content for the test load, and certain air

treatment products have set output thresholds for conditioned or treated air. In all of these cases, these provisions are directly related to how energy use is calculated under the products' respective test procedure. In other words, they are necessary, objective inputs to the test in order to measure energy efficiency, energy use, or water use.

That is not the case with the proposed cleaning threshold for dishwashers. In this instance, the performance metric, which is a highly subjective measurement—has nothing to do with advancing energy measurements. Rather, DOE's entire rationale for proposing the minimum score is consumer-based, and therefore the minimum cleaning index threshold is a pure performance metric. DOE's rationale for adopting the performance minimum does not establish a direct connection to the product's energy use or energy efficiency, rather it ties the threshold to avoiding certain consumer behavior in cases of what DOE deems to be (without data) unacceptable performance. EPCA does not permit this approach for incorporating performance criteria.

AHAM and its members understand that unacceptable performance may drive consumers toward less energy efficient behavior, and in fact we have been working for nearly a decade to prevent that outcome via our advocacy to DOE and the Environmental Protection Agency (EPA). But including a performance metric requirement in the test procedure is questionable at best under EPCA. There are other ways of ensuring that performance is maintained for the consumer that DOE can (and indeed, under EPCA, must) consider during the standards development process. DOE should focus its efforts there and AHAM will provide feedback on this point in our comments on DOE's preliminary standards analysis.

**B. DOE Has Not Demonstrated That Its Proposed
Cleaning Performance Metric Is Consumer Relevant.**

Although AHAM agrees that performance is a key consideration for consumers and that it must be protected as energy conservation standards become more stringent (and not through the test procedure process), DOE has failed to demonstrate that its proposed approach will do so (even if EPCA were to permit it to develop a test that measures and sets a threshold for product performance). DOE has not presented any consumer data to demonstrate that its proposed test and/or threshold are relevant to the consumer. Without this data, DOE's proposal is arbitrary and capricious and does not satisfy the Data Quality Act.

**i. *DOE's Proposed Cleaning Metric Will Likely
Drive Unintended Consequences For Consumers.***

DOE's decision to include a performance metric appears to come from its desire to ensure a consumer-acceptable level of cleaning performance, even as energy efficiency increases. As stated, AHAM agrees that performance must be maintained and protected for consumers as energy conservation standards (and, potentially also ENERGY STAR criteria) become more stringent. DOE's proposed test procedure for measuring cleaning performance, which is based in large part on the ENERGY STAR cleaning performance test and the scoring method from AHAM DW-2, and its reliance on a cleaning performance minimum threshold will not accomplish these goals. In fact, AHAM believes that DOE's approach—which focuses only on

cleaning performance using a metric that does not adequately measure or represent consumer satisfaction—is more likely to drive negative, unintended consequences for consumers relating to overall dishwasher performance.

To be consumer relevant, several elements of performance must be evaluated, and DOE's currently proposed cleaning performance threshold addresses only one of them: the cleaning performance outcome. The dishwasher is a holistic system—changes in one performance element impact other areas. The washing process, and ultimately wash performance, is a function of washing temperatures, length of washing cycles, types and amounts of detergent applied, and mechanics (power). These four factors all contribute to cleaning performance and can impact each other. Decreasing one factor, like energy or water, means that the other factors, such as time, need to increase. Thus, in order to reduce energy and water use and maintain cleaning performance, it is likely that cycle time could reach a level unacceptable to consumers or that other elements of performance could be impacted.

Not all elements of the wash performance can be altered and maintain product functionality. For example, wash temperature must be warm enough to activate the detergent and remove fatty soils, otherwise the dishwasher will lose its utility. This is a critical point because water heating is the biggest contributor to energy use regardless of the manufacturer and because once that lever has been pulled as far as it can, that leaves fewer options for manufacturers to consider other than lengthening cycles, reducing drying performance or eliminating drying all-together, or increasing the noise level of the dishwasher to allow for greater power, in order to maintain cleaning performance while also meeting more stringent standards.

DOE's proposed metric ignores all performance aspects other than cleaning performance and DOE does not appear to have made an effort to determine the consumer relevance of the other performance attributes. The test upon which DOE's proposed test is largely based—DW-2—was primarily designed to address performance through the lens of redeposition of soils and the soils were selected with that in mind. DW-2 does not, for example, assess greasy or detergent buildup over time, which is particularly an issue for the majority of dishwasher users who continue to pre-rinse their dishes. When the dishes are pre-rinsed, the detergent has nothing to attach itself to and, as a result, there is more left over after the cycle ends. Nor does the test address other elements of performance raised above such as drying performance, cycle length, and noise.

A performance threshold that addresses only a single performance attribute is not consumer relevant because it ignores the fact that the dishwasher is a holistic system. Focusing on soil redeposition alone may have a ripple effect to the detriment of other performance criteria that a consumers may consider important. By requiring energy and water levels and a cleaning performance level, DOE could essentially force manufacturers into designing dishwashers that satisfy DOE's test procedure requirements, but do not satisfy consumers not only on the factors that are not addressed, but also even for the cleaning performance itself because DOE has failed to demonstrate that the cleaning metric it has selected correlates to consumer satisfaction. DOE must better understand these additional consumer impacts before instituting a mandatory performance requirement. We expect members will submit confidential information to DOE that further details consumer preferences.

We also note that DW-2 was designed for companies to use in their product development efforts, not to be used as a regulatory tool. Manufacturers use DW-2 internally, but that use does not require the same precision in repeatability and reproducibility as a mandatory performance threshold—which will need to be certified and verified/enforced—does. Moreover, DOE does not use DW-2 as written. DW-2 has different load sizes and different soil levels than the current DOE test procedure. DOE cannot claim that it is merely implementing industry’s own cleaning performance method. All that DOE has done is adopt the scoring system from an industry test procedure. In addition, actual product performance depends on how a consumer uses the product—how they load it, how much soil is on the dishes, how many dishes are in the dishwasher, the amount and type of detergent used, whether rinse-aid is used, etc.—but, DW-2 was never meant to replicate consumer interaction with the product (it was intended to assess re-deposition), and so these variables are not fully addressed.

ii. *DOE Has Failed To Provide Sufficient Evidence To Justify A Cleaning Metric Or To Justify 65 As The Cleaning Index Threshold.*

DOE has not demonstrated that its proposed cleaning performance requirement correlates to consumer satisfaction. During the February 3, 2022 public meeting to discuss the proposed test procedure, AHAM asked if DOE had data demonstrating that the performance test it proposed correlates to consumer satisfaction. DOE responded that it did not have such data. (Note, as of the date of writing these comments, the transcript was not yet posted. Nevertheless, we hereby incorporate it by reference here as support for our comments).

AHAM further asked if DOE had considered grease and detergent buildup over time at increasingly stringent efficiency levels. DOE said it had not. We also asked if the proposed minimum threshold score addresses those buildups and if DOE had data evaluating grease or detergent buildup. DOE said it had not and did not.

We asked these questions because of the concerns discussed above regarding holistic performance of the dishwasher as compared to evaluating only certain portions of dishwasher performance. We also asked this question because AHAM demonstrated during the last standards rulemaking that the ENERGY STAR test and DW-2, upon which DOE relied for its proposed procedure here do not account for detergent or greasy buildup over time. DOE indicated that it did not have data on detergent or grease buildup over time and that it did not evaluate any soils outside of the soils included in DW-2. (Again, we reference the transcript for support of this point).

Similarly, DOE has not demonstrated that the cleaning index of 65 is consumer relevant or that 65 is the “tipping point” between “good” and “poor” dishwasher performance. DOE has done no consumer research to show that a cleaning index of 65 reflects consumer expectations of cleaning performance. During the February 3, 2022 public meeting, AHAM asked if DOE had data showing that the proposed score of 65 is the tipping point between consumer perception that dishwasher performance is acceptable versus unacceptable, as well as data to support its general rationale for choosing 65 as the pass/fail score for the performance metric. DOE said it did not have any data to support the choice of a score of 65. (Again, the transcript will include more detail).

The only data DOE appears to have is data from a manufacturer or some manufacturers regarding the cycles consumers typically use. Specifically, DOE's proposal is based on manufacturer data indicating that 24 to 46 percent of selected cycles are not the normal cycle and are instead done on another cycle. DOE assumed that the only reason a consumer might use a cycle other than the normal cycle is because the consumer is not satisfied with the normal cycle's performance.

DOE has no data to prove that assumption is true, on what is a critical element of DOE's justification for a proposed cleaning metric requirement. In fact, consumers may choose other cycles for myriad other reasons and other cycles exist specifically to allow consumers to choose the cycle that best meets their needs. For example, a "pots and pans" cycle or other specialty cycle may be selected instead of the normal cycle, at times, in order to do a more heavily soiled load. Time-constrained users may select a shortened cycle. Nevertheless, DOE assumed that "consumers unsatisfied with the cleaning performance of the normal cycle would select alternate cycles that are more energy-intensive to achieve better cleaning results, the cycle selection data serves as a reasonable proxy for consumer acceptance of the cleaning performance of the normal cycle." AHAM does not agree that cycle selection data serves as a proxy for consumer acceptance of normal cycle cleaning performance and DOE has presented no data upon which to base the accuracy or reasonableness of that assumption. We expect our members may be able to provide additional information on this point.

On top of this assumption, DOE layered another one: that deviation from the normal cycle will result in consumers choosing a more energy intensive cycle 50 percent of the time, and a less energy intensive cycle the other 50 percent of the time—DOE assumed that 12 to 23 percent of cycles not operated on the normal cycle are instead operated on a more energy intensive cycle. Again, DOE has no data upon which to base this assumption nor does it appear to have made any effort to obtain it. DOE cannot base its rules on guesses and should collect data to support its proposals. In this case, DOE has no data and without it, its proposal does not meet the requirements of the Administrative Procedures Act or the Data Quality Act.

Even if its assumption were true, DOE's proposal that, if all three soil levels do not achieve a score of 65, the manufacturer must test on the most energy intensive cycle is not supported by its (baseless) assumption. If consumers are equally likely to select a more energy intensive cycle as they are to select a less energy intensive cycle, then the decision to measure performance on the most energy intensive cycle is unjustified. Further, there is no evidence that if a consumer selects a more energy-intensive cycle to achieve better performance that they would most often or always use that single cycle to get better performance as DOE's proposal suggests. Reliance on cycles for the test that are specialty cycles and are not representative of average consumer use does not satisfy EPCA's requirements and deviates from DOE's findings (that actually are based on data) that the normal cycle is still the most-used cycle.

DOE has not demonstrated that its proposed cleaning test or its proposed cleaning metric of 65 for cleaning performance correlates to actual consumer satisfaction with dishwasher performance. In fact, DOE has admitted that its proposals are almost entirely unsupported by data. Without data to support its proposal or its assumptions, DOE's proposal to include a

cleaning performance metric as well as its proposal that the threshold for the metric should be 65 is arbitrary and capricious and does not satisfy the requirements of the Data Quality Act or the Administrative Procedures Act.

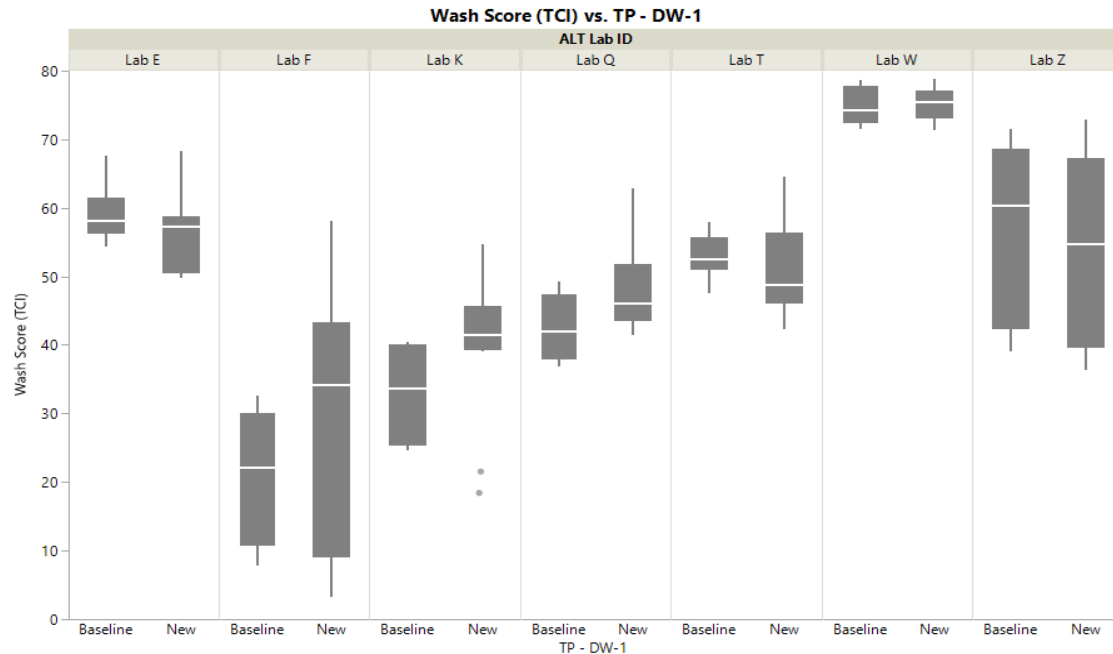
C. DOE Did Not Demonstrate That The Proposed
Performance Metric Is Repeatable And Reproducible.

EPCA requires that new and amended test procedures be reasonably designed to produce test results that measure energy efficiency, energy use, water use, or estimated annual operating cost of covered products or equipment during a representative average use cycle or period of use. 42 U.S.C. § 6293(b)(3). No test can be considered “reasonably designed” under EPCA if the test is not accurate, repeatable, and reproducible.

The proposed test procedure, which is based on the ENERGY STAR cleaning performance test (which is based on AHAM DW-2 and uses DW-2’s scoring method) continues to be too variable to be used for mandatory criteria. AHAM made this same argument with EPA’s ENERGY STAR program and provided EPA the AHAM round robin testing data to prove that the proposed cleaning performance test simply does not work for the purpose of setting or demonstrating compliance with a minimum performance threshold.

Because AHAM had concerns about the variation of its performance test (then called AHAM DW-1, but now called DW-2) as EPA considered making a performance threshold mandatory for ENERGY STAR eligibility, AHAM and its members endeavored to reduce the test’s variation. Previously, AHAM had demonstrated that the ENERGY STAR test method was highly variable noting that one standard deviation on the cleaning performance measurement was approximately seven points. After making several improvements designed to reduce variation, AHAM and its members conducted round robin testing in 2018 to assess the repeatability and reproducibility of the scoring method in AHAM DW-2. Testing occurred across seven test labs. The results, summarized in Figure 1 below for non-soil sensing units, show the significant variability (even without the machine making sensor decisions)—averaging the standard deviations on the round robin from each row in the red box below yields a standard deviation within lab of 7.7 points.

Figure 1: Variability in 2018 Round Robin Testing to Assess Cleaning Performance Score



Variability Summary for Wash Score (TCI)

	Mean	Std Dev	Std Err	Lower 95%	Upper 95%	Minimum	Maximum	Range	Median	Observations
Wash Score (TCI)	51.57833	16.86125	1.405104	48.80087	54.35579	3.23	78.77	75.54	51.4	144
ALT Lab ID[Lab E]	57.88542	4.988131	1.018198	55.77911	59.99172	49.78	68.21	18.43	57.22	24
ALT Lab ID[Lab F]	26.54722	15.95159	3.759825	18.61468	34.47976	3.23	58.08	54.85	27.155	18
ALT Lab ID[Lab K]	37.86611	9.926344	2.339662	32.92986	42.80237	18.43	54.63	36.2	40.195	18
ALT Lab ID[Lab Q]	45.97722	6.068293	1.43031	42.95953	48.99491	36.85	62.82	25.97	45.425	18
ALT Lab ID[Lab T]	52.085	5.42365	1.107098	49.79479	54.37521	42.24	64.55	22.31	51.24	24
ALT Lab ID[Lab W]	75.04042	2.487011	0.507659	73.99024	76.09059	71.34	78.77	7.43	74.59	24
ALT Lab ID[Lab Z]	55.555	13.18053	3.10668	49.00048	62.10952	36.42	72.95	36.53	57.115	18
ALT Lab ID[Lab E] TP - DW-1[Baseline]	58.6	3.682739	1.063115	56.5601	61.2399	54.31	67.56	13.25	58.03	12
ALT Lab ID[Lab E] TP - DW-1[New]	56.87083	6.018004	1.737248	53.04718	60.69449	49.78	68.21	18.43	57.22	12
ALT Lab ID[Lab F] TP - DW-1[Baseline]	20.89667	9.67034	3.9479	10.74827	31.04507	7.76	32.54	24.78	22.065	6
ALT Lab ID[Lab F] TP - DW-1[New]	29.3725	18.01708	5.201083	17.92499	40.82001	3.23	58.08	54.85	34.16	12
ALT Lab ID[Lab K] TP - DW-1[Baseline]	32.975	6.802393	2.777065	25.83633	40.11367	24.57	40.41	15.84	33.62	6
ALT Lab ID[Lab K] TP - DW-1[New]	40.31167	10.56744	3.050558	33.59743	47.0259	18.43	54.63	36.2	41.425	12
ALT Lab ID[Lab Q] TP - DW-1[Baseline]	42.49333	4.824283	1.969505	37.43056	47.55611	36.85	49.25	12.4	41.915	6
ALT Lab ID[Lab Q] TP - DW-1[New]	47.71917	6.03328	1.741658	43.8858	51.55253	41.38	62.82	21.44	46.015	12
ALT Lab ID[Lab T] TP - DW-1[Baseline]	52.93917	2.966055	0.856226	51.05463	54.82371	47.63	57.97	10.34	52.535	12
ALT Lab ID[Lab T] TP - DW-1[New]	51.23083	7.149602	2.063912	46.68819	55.77347	42.24	64.55	22.31	48.815	12
ALT Lab ID[Lab W] TP - DW-1[Baseline]	74.91167	2.659371	0.767694	73.22198	76.60135	71.44	78.56	7.12	74.16	12
ALT Lab ID[Lab W] TP - DW-1[New]	75.16917	2.413362	0.696678	73.63579	76.70254	71.34	78.77	7.43	75.43	12
ALT Lab ID[Lab Z] TP - DW-1[Baseline]	57.05833	13.17985	5.38065	43.22693	70.88973	39.12	71.55	32.43	60.29	6
ALT Lab ID[Lab Z] TP - DW-1[New]	54.80333	13.69958	3.954729	46.09903	63.50763	36.42	72.95	36.53	54.745	12

The data show that DW-2 testing is not sufficiently repeatable to serve as a mandatory regulatory requirement. Nor did the testing demonstrate improved reproducibility. Accordingly, scores using DOE's proposed test procedure would be questionable at best.

Importantly, lack of experience with the test is not driving this variation. Manufacturers had extensive experience using DW-1 (now re-named DW-2) long before EPA and DOE adopted it in the ENERGY STAR performance test.

These data also demonstrate that scores using the existing ENERGY STAR performance test, and therefore, DOE's proposed performance metric, will be questionable given the level of variation our round robin testing demonstrated, even using the scoring method in DW-2. The actual score could be anywhere in the range the standard deviation between test runs encompasses, meaning that it is possible that a score of 65 could be 76.5 or 53.5 within a single

lab from run to run. Even within a single lab, the same model may pass on one test and fail on another test. This will be compounded if the testing is done across laboratories (even within a single entity, such as two different lab locations within the same manufacturer or third party).

Thus, if a different technician or laboratory conducted the testing, the model might not be eligible. Similarly, a score lower than 65 could actually meet the criteria if re-tested, but the model would nevertheless fail to meet the DOE's proposed threshold meaning that, depending on how the test is conducted in any given lab, some manufacturers may be more or less easily able to certify products.

Variation in the proposed performance metric can only be reduced to a certain point because a human soils the dishes and a human grades the dishes. The metric, therefore, is inherently subjective and impacted by potential human error. The only way to reduce this variation is through continual technician training across labs, which can really only be done within each individual company or laboratory, not across all labs. The result of this training may still not sufficiently reduce variation, especially lab to lab. Additionally, there is a significant burden associated with such training (which, for some manufacturers may involve training in several labs) on the soiling and grading of dishes in a repeatable manner for which DOE does not account. It is likely that additional lab space and technicians would be required. This burden, combined with other factors AHAM discusses in these comments make the proposed performance metric unduly burdensome to conduct, as set out in more detail below.

We note that, in its presentation for the February 3, 2022 public meeting, DOE indicated that specifying a loading pattern requirement would improve repeatability of the test procedure and reproducibility of results. Again, DOE had no data to support that point. When asked, DOE indicated that it had no data to indicate that a specified loading pattern would definitely reduce variation and stated that it was merely an assumption. DOE should not base its proposals on assumptions and guesses.

DOE must understand that AHAM is particularly focused on reproducibility because of the consequences for units that may pass in one lab and fail in another. In the United States, non-compliance could lead to costly fines. That is a risk that AHAM members find unacceptable and therefore the industry insists on test procedures that are proven to be reproducible. DOE has not proven the repeatability or reproducibility of the cleaning performance metric.

Importantly, DOE does not have any data demonstrating that its proposed test is repeatable or reproducible. When asked if it conducted a round robin, DOE replied—during the February 3, 2022 public meeting—that it did not. When asked if DOE had any data on the variation of its proposed test procedure, DOE responded that it did not. (Again, these discussions will appear in full in the transcript to further exemplify these points). Thus, AHAM is not aware of any data supporting the repeatability and reproducibility—and therefore, the accuracy—of DOE's proposed test. Without such data, DOE's proposal is arbitrary and capricious and does not satisfy the requirements of the Data Quality Act or the Administrative Procedures Act. On the other hand, AHAM's data demonstrate that the test is **not** sufficiently repeatable or reproducible to provide accurate results. Accordingly, DOE should not adopt it on this basis alone.

D. The Proposed Performance Metric Makes The Dishwasher Test Procedure Unduly Burdensome To Conduct.

The proposed test procedure states that if “a test cycle at a particular soil level does not achieve the defined cleaning index threshold, that soil level would need to be re-tested using the most energy-intensive cycle.” DOE goes on to propose that “that the most energy-intensive cycle would be determined by conducting a single test cycle with a clean test load for each available cycle (e.g., Normal, Heavy Duty, Pots and Pans, etc.).”

AHAM understands this to mean that a technician could potentially have to run several cycles with a clean load to identify the most energy intensive cycle, and then run another cycle with a soiled load because scoring of cleaning takes place after the energy test. Under DOE’s proposed test, if any single test cycle at a particular soil level does not achieve the arbitrary score of 65, the tester will have to test every single cycle on the dishwasher just to determine which cycle is the “most energy intensive.” And to do that, they will first have to unload the dirty dishes and replace them with clean ones. Then, after determining the most energy intensive cycle, the tester will again have to re-soil the dishes for each relevant soil level—a task that takes a long time and an extreme degree of precision—and run the test again.¹ This could significantly multiply the number of cycles a technician is required to run and makes the test procedure unduly burdensome to conduct.

A review of DOE’s test data from its Dishwasher Standards Pre-TSD (pre-TSD) highlights this point. Although DOE did not provide its underlying test data to allow stakeholders to thoroughly review it, DOE did provide summary data in graph form. AHAM did a manual review of DOE’s test results, focusing on how many models would need to proceed to testing the most energy intensive cycle for any particular soil level. Unfortunately, because DOE did not present the data in a way that allows commenters to track a particular model across the dataset (DOE did not identify the models even using generic identifiers such as “model A,” etc), AHAM could not determine how each model performed.

We evaluated each soil level and the number of models that would need to re-run the test on that particular soil level at the most energy intensive cycle. For our analysis, we assumed 1 sigma for test variation (i.e., 7 points) based on the test’s variation which, whether using the ENERGY STAR method or the DW-2 method for scoring is in that range. Any model that fell in that variation band, we determined would likely be retested due to concerns manufacturers would have about enforcement and verification, as detailed further below. Appendix A includes the charts AHAM used to evaluate DOE’s dataset. Below is a summary of AHAM’s findings.

¹ Where products do not achieve the required score with the normal cycle, DOE proposes the use of cycles for the test that are specialty cycles that are not meant to represent average consumer use. This, in turn, directly conflicts with other provisions in the Appendix C1 test procedure relating to the normal cycle.

	% of Products NOT Meeting the Performance Score of 65					
	Heavy Soil		Medium Soil		Light Soil	
Level	Energy	Water	Energy	Water	Energy	Water
Baseline (current DOE)	33%	33%	0%	0%	0%	0%
EL 1 (Current ENERGY STAR)	73%	73%	60%	60%	7%	7%
EL 2 (gap fill)	75%	75%	75%	75%	25%	25%
EL 3 (ENERGY STAR most efficient)	100%	100%	50%	50%	25%	25%
EL 4 (Max-tech)	100%	100%	100%	100%	100%	100%

Source: DOE Dishwasher Pre-TSD, Chapter 5

This analysis shows that at the current standards level, over a third of products would need to retest the heavy soil level on the highest energy consuming cycle, which would significantly add to the test burden for those products. Additionally, for products at the current ENERGY STAR level, which is a significant number of models, 73 percent of models would need to retest on the highest energy consuming cycle for the heavy soil load and 60 percent would need to retest for the medium soil level. We cannot tell how many of these models are the same products—in other words, we do not know, because of the way DOE presented the data, how many models would need to test one soil level, two soil levels, or all three soil levels. But what is clear is that most dishwashers—according to DOE’s own data—will need to conduct additional testing. Thus, the additional burden associated with determining the highest energy consuming cycle is likely to apply to most models and makes the test procedure unduly burdensome to conduct.

We note that DOE’s data is not transparent and request that DOE provide its full data set including generic model identifiers to allow commenters to fully evaluate DOE’s test data. DOE’s failure to provide that data is not consistent with requirements under the Data Quality Act and other applicable statutory provisions. If DOE decides to provide its full data, we ask that it do so in a format, such as a Notice of Data Availability, that allows the public to provide comment for at least 60 days on both the test procedure and the Dishwasher Standards Pre-TSD as this data is relevant to both rulemakings.

The proposed requirement also adds test burden with respect to dishwashers that do not have soil sensors. Currently, testing of non-soil-sensing dishwashers does not require soiled dishes for a test run. DOE’s proposal adds the extra burden of adding soils to dishwashers that do not have soil sensors. With this proposal, testing with the three soil levels—heavy, medium, and light—the number of tests for non-soil-sensing dishwashers could increase up to three-fold.

E. DOE Has Not Considered Certification, Verification, and Enforcement.

During the February 3, 2022 public meeting, AHAM asked DOE what happens to a product that fails to reach the 65 minimum threshold on the performance metric even after testing on the most energy intensive cycle, and DOE did not provide a clear answer. DOE suggested that test procedure waivers are a possibility for such products. While we appreciate that DOE was considering a way to ensure all products have a path toward compliance, we wonder what the value of a performance requirement is if DOE will grant test procedure waivers changing the

required score. It is also unclear whether scores are to be averaged to meet the 65 threshold, using DOE's usual statistical requirements and if so, how many test cycles can be averaged in that process. DOE did not appear to have contemplated these questions before the public meeting. (Again, the transcript will further support these points). DOE should not proceed with its proposal to include a performance metric in the test without addressing these questions in a clear way. Should DOE move forward with the performance metric despite the myriad technical concerns AHAM has raised, it should provide the responses in a format that allows for notice and comment, such as a supplemental proposal.

The variability inherent in soiling and scoring the performance metric also raises enforcement issues. As AHAM's data demonstrate, DOE's proposed performance metric has such high variation, verification (and, therefore, enforcement) will be virtually impossible. Because the test is not reproducible, it would be highly likely that there would be false findings of non-compliance. In such cases, because of the subjectivity of the test, if a verification lab yields a false finding of non-compliance, it becomes the manufacturer's word against that of the test lab, which puts DOE in the awkward position of having to adjudicate a dispute where both parties are acting in good faith. If DOE is determined to proceed with a performance requirement, it should allow for a wide tolerance to address variability and avoid such a scenario. That DOE has not presented any data showing that it assessed variation and may not possess such data should give the Department significant pause with respect to the performance requirement.

F. DOE Should Not Incorporate The Cleaning Threshold Into Appendix C1.

Should DOE move ahead with a performance metric in the test procedure despite the significant concerns AHAM raises in its comments, AHAM strenuously opposes inclusion of the performance metric before the compliance date of possible amended energy conservation standards. Manufacturers prioritize performance elements to meet consumer needs and preferences and introducing a minimum cleaning threshold into Appendix C1 now effectively forces manufacturers to redesign existing product in order to meet the threshold. This requirement potentially violates the investment and associated recovery assumptions underlying the manufacturer impact analysis that DOE presented in its preliminary technical support document on possible amended energy conservation standards for dishwashers.

Furthermore, DOE has not considered potential secondary effects that result from including a minimum cleaning threshold in Appendix C1. Specifically, DOE does not clearly address potential impacts to minimally compliant products and certified ratings. If testing is required on a more energy intensive cycle than the normal cycle, this will impact measured energy and water and could require recertification of the product at the more energy intensive level. This could not only affect the certified ratings and energy labeling of many products regardless of efficiency level, but it could also push minimally compliant products out of compliance. (Even models that are not currently minimally compliant could be pushed out of compliance (with the standard or ENERGY STAR criteria) if they do not meet the cleaning metric and must then be tested on the most energy-intensive cycle depending on how close they are to the standard level).

We find it surprising that DOE could not produce data on whether including the cleaning performance requirements in Appendix C1 would impact measured energy or provide any data

on why it made the proposal to include the performance requirement in Appendix C1 rather than including it in Appendix C2 and applying it when compliance with possible amended standards is required. Nevertheless, DOE indicated that it did not have such information. We note, however, that DOE's own data indicate that it believes 18 percent of models will need to use the more energy intensive cycle. We assume that most/all of these models would either need to re-rate and/or could no longer qualify for ENERGY STAR and/or possibly the current energy conservation standard. Thus, DOE has answered its own question—inclusion of DOE's proposed performance metric will unquestionably change measured energy and/or water use for many products. In its February 3, 2022 public meeting, DOE suggested that test waivers are a possibility for such products, but if DOE grants such waivers, then there is no real point to the minimum cleaning requirement and its usefulness to consumers is even further diminished.

We also note that DOE's test data in the Dishwasher Standards Pre-TSD further illuminates the degree to which re-rating may be required due to the inclusion of the performance metric in the test. As discussed above, AHAM reviewed the number of models in DOE's dataset that would require re-testing using the most energy intensive cycle at each soil level consistent with DOE's proposal that a model must achieve the proposed score of 65 on each soil level. The summary of our findings, which is discussed above, is again provided here and the details are in Appendix A.

	% of Products NOT Meeting the Performance Score of 65					
	Heavy Soil		Medium Soil		Light Soil	
Level	Energy	Water	Energy	Water	Energy	Water
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EL 1 (Current ENERGY STAR)	73%	73%	60%	60%	7%	7%
EL 2 (gap fill)	75%	75%	75%	75%	25%	25%
EL 3 (ENERGY STAR most efficient)	100%	100%	50%	50%	25%	25%
EL 4 (Max-tech)	100%	100%	100%	100%	100%	100%

Source: DOE Dishwasher Pre-TSD, Chapter 5

These data show that, at a minimum, re-rating would be required for a significant percentage of models that would need to be re-tested on any one of the three soil levels (or even more than one). Most models today are at EL 1 and at that level, the majority of products would need to be retested using the most energy intensive cycle for the heavy and/or medium soil level. Some would even need to be retested on the light soil level. This shows, according to DOE's own data, the vast majority of models will at least need to be re-rated under DOE's proposed test procedure. Because DOE provided only summary data, we cannot determine whether the re-testing would result in products no longer meeting current energy conservation standards, but it is possible that would be the case for at least the 33 percent of models in DOE's dataset that would require retesting the heavy soil level. It is also likely that products currently certified to ENERGY STAR would no longer be able to be certified (though because DOE's data is not sufficiently transparent, we cannot determine how many). It is not outside the realm of possibility that some models currently meeting ENERGY STAR criteria may no longer meet the baseline after being retested using the most energy consuming cycle.

For these reasons, DOE should, at the very least, abandon its proposal to apply the performance metric to Appendix C1.

III. Other Technical Issues.

A. Dishwashers With Built-In Water Softeners

The current test procedure requires that energy testing of dishwashers with water softeners must take place with the softeners activated. This is a carryover from Europe where AHAM understands this type of product is more common. AHAM believes this feature is present in a small number of European models that are imported into the United States as specialty items. Home water softeners are much more common in the United States than in Europe, so we do not expect this function is often used in this country. Therefore, AHAM respectfully requests that DOE allow these products to be tested as-shipped, where the default typically is that the water softeners are turned off. This change should not have a statistically significant impact on energy savings from dishwashers and is consistent with DOE's approach to similar features for other products.

B. The Use of Rinse Aid

If DOE moves forward with a performance metric despite the issues AHAM raises in these comments, DOE should evaluate use of Rinse Aid to decrease variation in grading. Alternatively, DOE can also evaluate running the energy test without Rinse Aid and adjust the scoring system to only grade soils and not streaks on glassware. AHAM recognizes that adding Rinse Aid to the energy test would be a significant alteration that may require additional evaluation by DOE. Nonetheless, DOE proposed to adopt only the scoring portion of a test that had the scoring portion developed based on the inclusion of Rinse Aid, which can make a substantial difference in the presence of streaks on glassware. This is yet another example of why adopting only the scoring system from DW-2 to create a performance threshold is not appropriate or justified by data. AHAM, therefore, prefers that DOE reexamine the need for a performance metric entirely.

C. Anomalous Cycles

The proposed test procedure contains no provisions to address anomalous cycles during the energy test. If the performance metric is included in the final test procedure despite the significant issues AHAM has raised, DOE should determine what occurs when a machine has an anomalous cycle. DOE has done this for other products, such as clothes washers.

D. Door Opening At The End Of The Test Cycle

For standby testing, DOE proposed—consistent with DW-1—that the door be opened and closed “immediately.” AHAM recognizes that DW-1 fails to specify what “immediately” means, though it is important to do so to ensure that the dishwasher does not unintentionally go back into a cycle-finished mode upon being re-closed. Thus, AHAM respectfully requests that DOE require a minimum time for door opening at the end of the test cycle. Doing so will avoid re-

starting end of cycle functions that could create misleading test results. AHAM suggests a minimum door opening time of ten seconds after completion of the cycle.

E. Water Meter Error Allowance

The current test procedure, clause 3.3, calls for water usage of the dishwasher to be measured by a water meter with the following specifications:

“The water meter must have a resolution of no larger than 0.1 gallons and a maximum error no greater than ± 1.5 percent of the measured flow rate for all water temperatures encountered in the test cycle.”

These allowances for resolution and flow rate error are too large and have the potential to introduce a great amount of uncertainty in the measurement, negatively impacting repeatability and reproducibility. In response, manufacturers often account for this by introducing additional margin in their per cycle water usage. For a dishwasher approaching the current DOE limit for water consumption of 5.0 gallons per cycle, a resolution of 0.1 alone introduces an error of $\pm 2.0\%$. The percent error increases to $\pm 2.9\%$ for the case in which a dishwasher is approaching the current ENERGY STAR limit of 3.5 gallons per cycle. Add in the error of measured flow rate itself, a maximum of $\pm 1.5\%$, a root mean square (rms) uncertainty calculation yields a measurement uncertainty of $\pm 2.5\%$ for a unit using 5.0 gallons per cycle and $\pm 3.3\%$ for a dishwasher using 3.5 gallons per cycle.

AHAM proposes revising the test procedure specification for the water meter to call for a minimum resolution of 0.01 gallons and a maximum flow rate measurement error of $\pm 0.5\%$. The technology is widely available to satisfy these tolerances, greatly enhancing inner lab repeatability and lab to lab reproducibility. Furthermore, the Rule of 10 in metrology states that a measurement tool should have ten times more resolution than the specification/tolerance of the dimension being measured. Since the water consumption metric is specified to the 0.1 decimal place, the instrument used to measure this value should have a resolution a tenth of this, or 0.01. For dishwashers using 5.0 or 3.5 gallon per cycle this would yield resolution errors of $\pm 0.2\%$ and $\pm 0.3\%$ respectively. This resolution error, in combination with a stricter maximum flow rate measurement error of $\pm 0.5\%$, for water usages of 5.0 and 3.5 gallons per cycle would yield measurement uncertainties of $\pm 0.5\%$ and $\pm 0.6\%$ respectively.

Water (gal/cycle)	Current Test Procedure				Proposed Changes			
	Res.	% Error (Res.)	% Error (Acc.)	Total Uncertainty	Res.	% Error (Res.)	% Error (Acc.)	Total Uncertainty
5.0	0.1	$\pm 2.0\%$	$\pm 1.5\%$	$\pm 2.5\%$	0.01	$\pm 0.2\%$	$\pm 0.5\%$	$\pm 0.5\%$
3.5	0.1	$\pm 2.9\%$	$\pm 1.5\%$	$\pm 3.3\%$	0.01	$\pm 0.3\%$	$\pm 0.5\%$	$\pm 0.6\%$

F. Absence of Main Detergent Compartment (Issue #8)

On October 15, 2020, FOTILE Kitchen Ware Co. Ltd. (“FOTILE”) filed a petition for waiver and interim waiver seeking a waiver from the installation requirements specified in appendix C1, which pertain to under-counter or under-sink dishwashers. DOE granted the waiver on May 17, 2021.²

AHAM agrees that the Petition for Waiver and Application for Interim Waiver appropriately described the need for relief. However, as written, the language pertaining to the detergent amount and placement is overly broad and needlessly in conflict with the detergent loading provisions of the current DOE dishwasher test procedure (10 CFR 430, Subpart B, Appendix C1).

The concern is threefold:

1. The waiver is too prescriptive in specifying that the detergent be placed directly in the “wash chamber” and eliminates the possibility for the manufacturer to specify an alternate location as allowed for in the current test procedure.
2. The term “main wash compartment,” as found in clause 2.10 of the current test procedure, is not defined and could be interpreted as being synonymous with “wash chamber”, thus making the additional language unnecessary.
3. The language proposed by the petition removes reference to section 2.10.1 thus eliminating the option of adding pre-wash detergent in another location as may be specified by the manufacturer.

In short, AHAM does not believe the design of this dishwasher differs significantly enough to warrant its own special provisions for detergent amount and placement.

We propose that the language requested by the petition be amended to take a more holistic approach by simply adding the phrase “or other location recommended by the manufacturer,” as currently provided for in clause 2.10 of 10 CFR 430, Subpart B, Appendix C1. This would be in line with the current test procedure’s intent and leave open the possibility of alternative designs for this dishwasher type and others that may follow. The original petition language and our proposed amendment are set forth below:

Current petition language:

In section 2.10, Detergent, add at the end of the section:

2.10 Detergent. Use half the quantity of detergent specified according to section 4.1 of ANSI/AHAM DW-1-2010 (incorporated by reference, see §430.3), using Cascade with the Grease Fighting Power of Dawn powder as the detergent formulation. Determine the amount of detergent (in grams) to be added to the prewash compartment (if provided) or

² 86 Fed. Reg. 26712 (May 17, 2021).

elsewhere in the dishwasher (if recommended by the manufacturer) and the main wash compartment according to sections 2.10.1 and 2.10.2 of this appendix. **For compact in-sink dishwashers with a combination sink that have neither prewash program nor a main detergent compartment, determine the amount of main wash detergent (in grams) to be added directly into the washing chamber according to section 2.10.2 of this appendix.**

Proposal for amended petition language:

In section 2.10, Detergent, add the phrase “or other location recommended by the manufacturer” behind the words “main wash compartment” to read as follows:

2.10 Detergent. Use half the quantity of detergent specified according to section 4.1 of ANSI/AHAM DW-1-2010 (incorporated by reference, see §430.3), using Cascade with the Grease Fighting Power of Dawn powder as the detergent formulation. Determine the amount of detergent (in grams) to be added to the prewash compartment (if provided) or elsewhere in the dishwasher (if recommended by the manufacturer) and the main wash compartment **or other location recommended by the manufacturer** according to sections 2.10.1 and 2.10.2 of this appendix.

IV. DOE’s Process Decreases The Value Of Early Stakeholder Engagement.

DOE published its proposed rule to amend the dishwasher test procedure on December 22, 2021, and requested comments by February 22, 2022. Then, only about a month later, DOE published the Dishwasher Standards Pre-TSD on January 24, 2022, with comments due to DOE by March 25, 2022. The comment periods for these two significant proposed rules thus overlapped by 30 days, with approximately half of the comment period on the proposed test procedure occurring concurrently with the comment period on the pre-TSD.

Although 60 days is the typical comment period length for test procedure proposals—and this time is often adequate—DOE proposed significant changes to the test procedure, namely the introduction of a minimum cleaning threshold. In AHAM’s view, DOE should fully receive and consider stakeholder comment on this major change, particularly in light of the scant data DOE provided on the docket to support the inclusion of a cleaning performance requirement or the performance threshold chosen in the test procedure, before proceeding with the energy conservation standard itself.

We recognize and support DOE’s interest in moving rulemakings forward especially rules such as the dishwasher energy conservation standards and test procedure, which have missed statutory deadlines. A better way for DOE to do that while still providing commenters with a real opportunity to evaluate the proposals would be for DOE to release the test procedure proposal before it conducts its preliminary analysis. DOE conducted its preliminary analysis based on the proposed test procedure. Therefore, that procedure must have been completed well before DOE released it for public comment. Why not release the proposed test procedure when DOE knows what it is so that DOE can receive feedback on it before proceeding with its resource-intensive preliminary analysis? This would permit both commenters and DOE more time to understand the

impact of a proposed test on potential standards and would allow the rulemaking process to move along more swiftly.

DOE (or other stakeholders) may claim that it must move concurrently on these rulemakings because it has missed the applicable statutory deadlines for both rulemakings. While it is true that those deadlines have passed, it is disingenuous to claim that the only option is to move so quickly as to short-circuit important early stakeholder engagement. DOE should not on one hand claim it needs to move quickly because of its missed deadlines and on the other hand do things that may not be immediately necessary and will slow down the process. (Likewise, other stakeholders who are pushing DOE to move quickly should not at the same time make requests that do not allow DOE to do so).

The process DOE has chosen in this rulemaking diminishes the value of early stakeholder engagement. Importantly, we note that regardless of DOE's desire to move quickly to rectify missed deadlines, DOE must ensure it meets its other statutory criteria, including that a standard must be technically and economically justified.

AHAM appreciates the opportunity to submit these comments on DOE's Test Procedures for Dishwashers and would be glad to discuss these matters in more detail should you so request.

Sincerely,

A handwritten signature in black ink, reading "Jennifer Cleary". The signature is written in a cursive, flowing style.

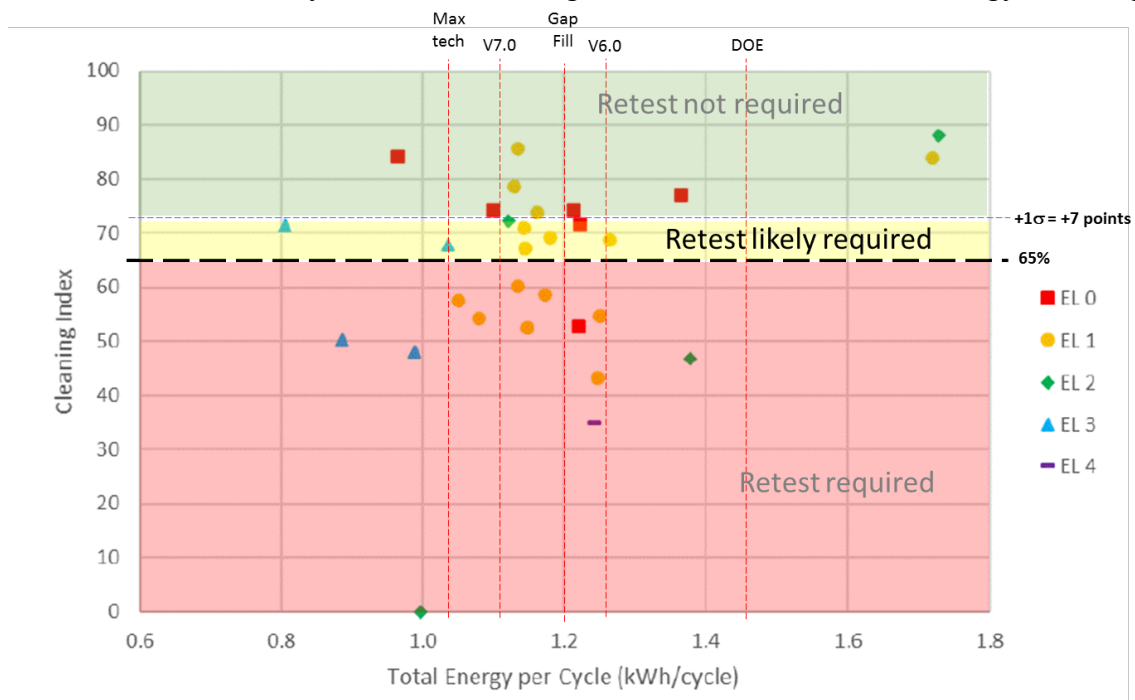
Jennifer Cleary
Vice President, Regulatory Affairs



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Appendix A

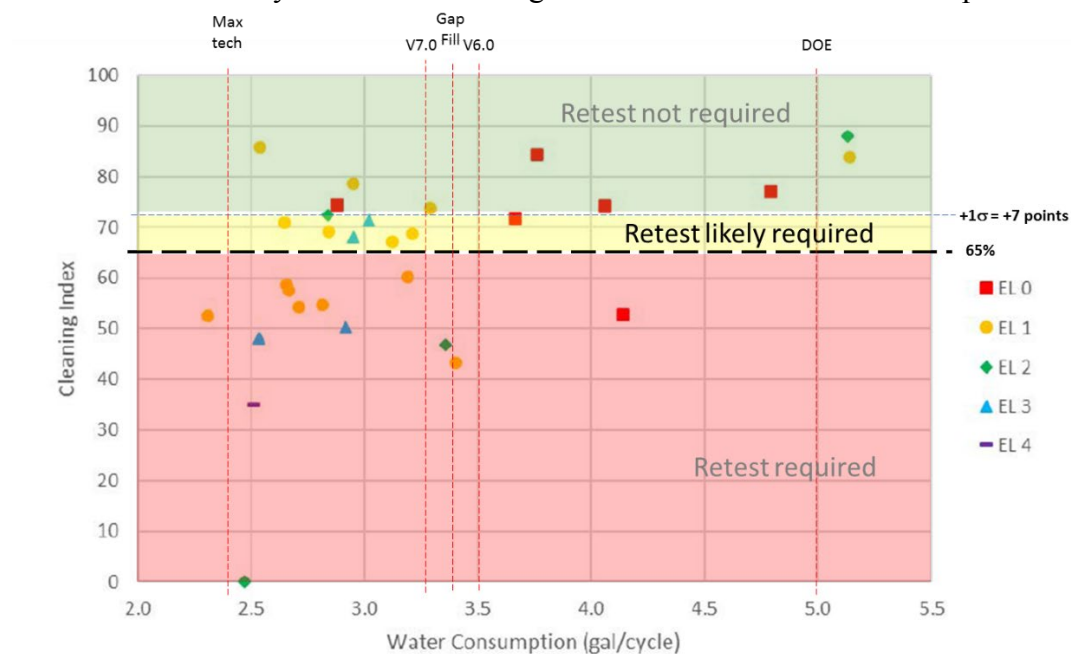
Standard Dishwasher Heavy Soil Load Cleaning Performance vs. Machine Energy Consumption:



TSD p.5-13

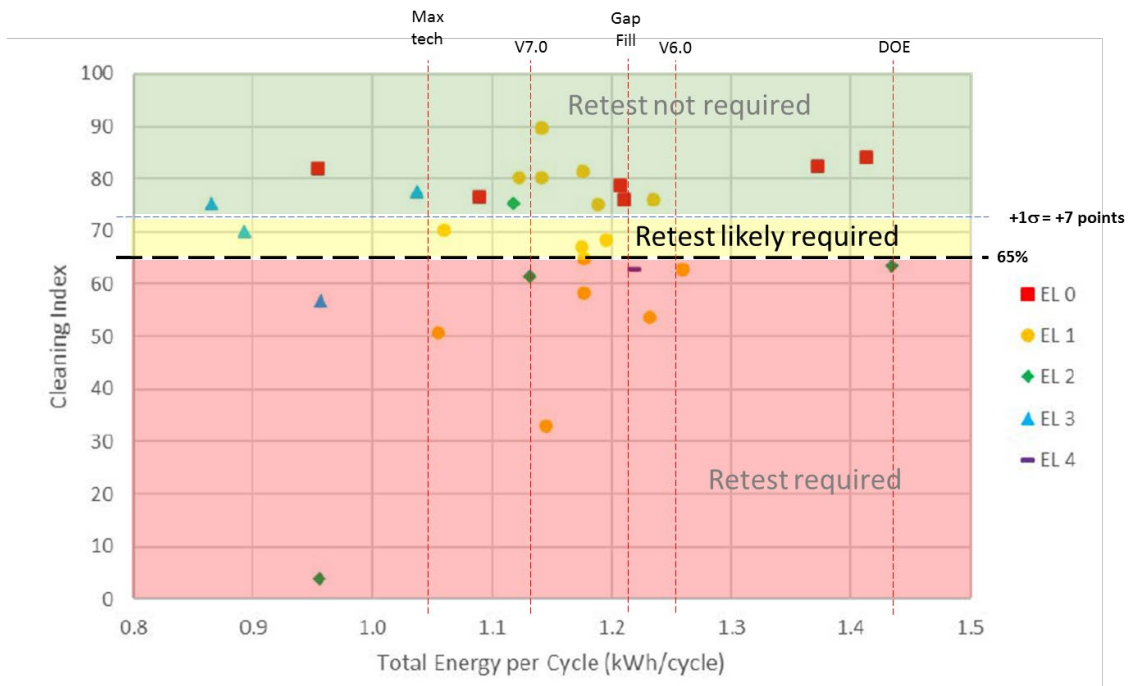
Source: DOE Pre-TSD, Figure 5.4, pg. 5-13

Standard Dishwasher Heavy Soil Load Cleaning Performance vs. Water Consumption:



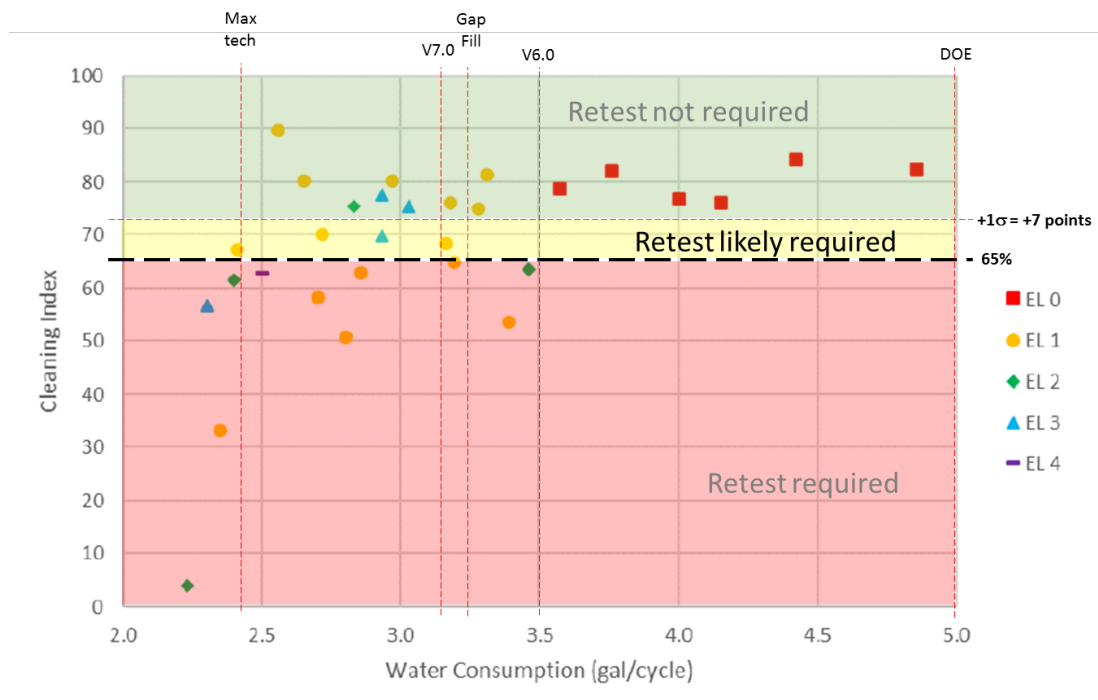
Source: DOE Pre-TSD, Figure 5.5, pg. 5-14

Standard Dishwasher Medium Soil Load Cleaning Performance vs. Machine Energy Consumption:



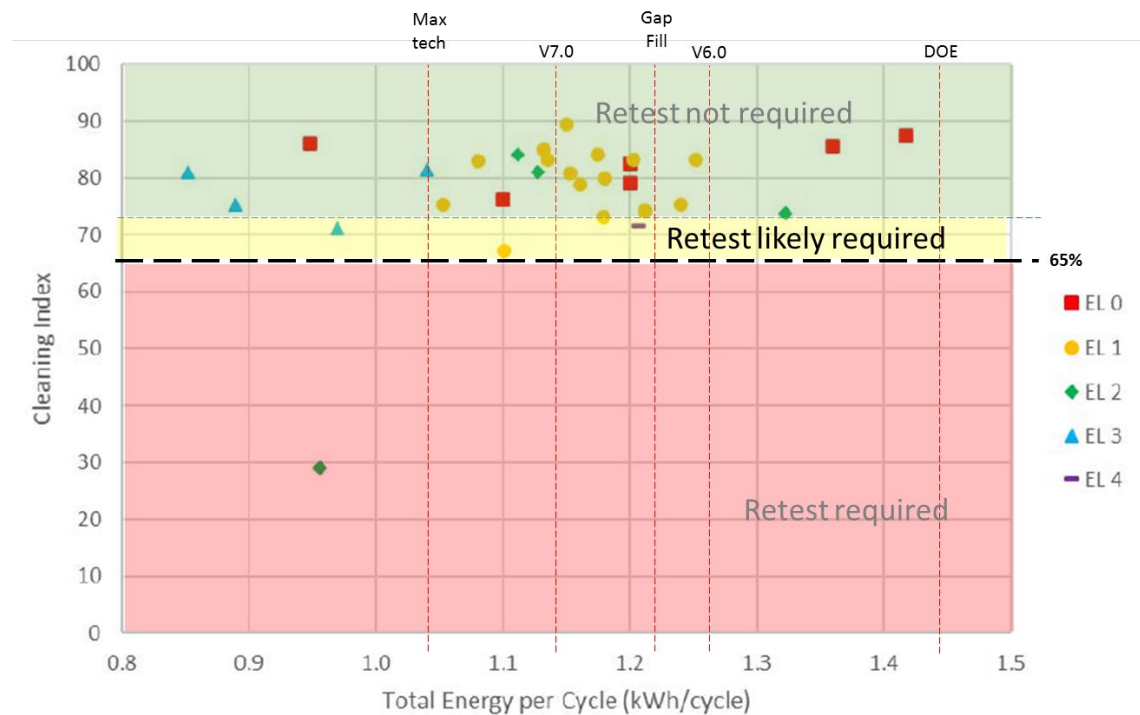
Source: DOE Pre-TSD, Figure 5.6, pg. 5-14

Standard Dishwasher Medium Soil Load Cleaning Performance vs. Water Energy Consumption:



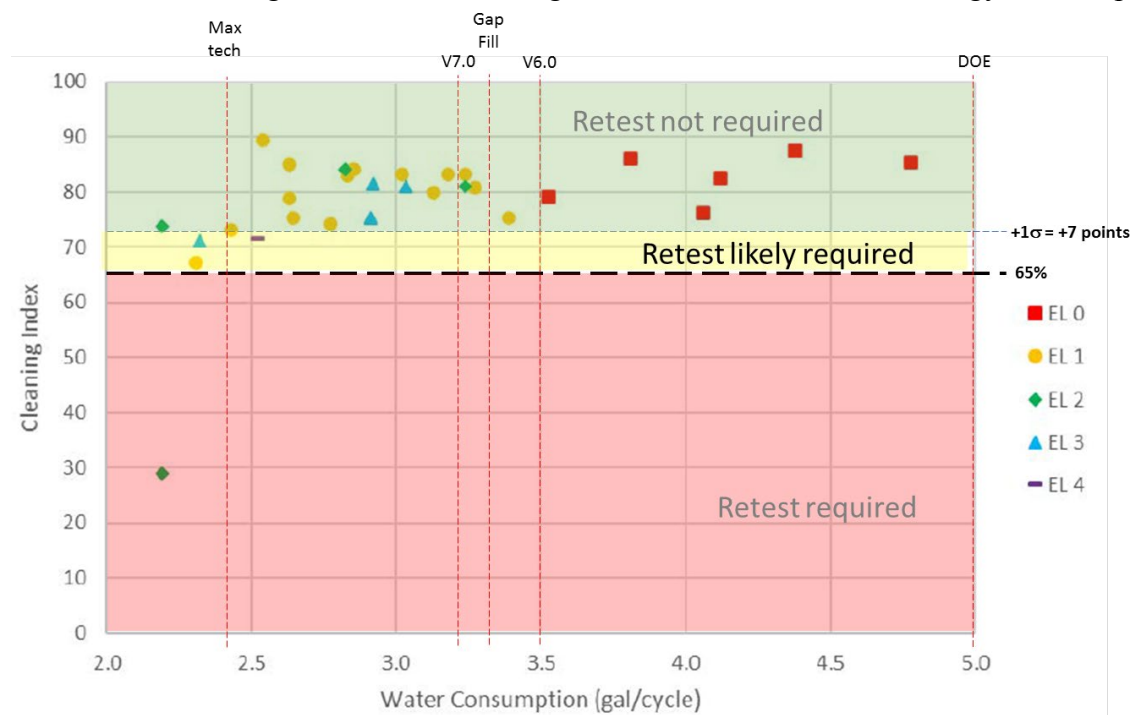
Source: DOE Pre-TSD, Figure 5.7, pg. 5-15

Standard Dishwasher Light Soil Load Cleaning Performance vs. Machine Energy Consumption:



Source: DOE Pre-TSD, Figure 5.8, pg. 5-15

Standard Dishwasher Light Soil Load Cleaning Performance vs. Machine Energy Consumption:



Source: DOE Pre-TSD, Figure 5.9, pg. 5-16

Attachment C

DOE Dishwasher Test Procedure

Ex Parte Meeting

October 19, 2022



Leadership > Knowledge > Innovation

Purpose

- AHAM continues to have significant concerns about DOE pursuing a performance threshold in its energy test procedure. That has not changed.
- But, recognizing DOE may move forward with that general approach, we want to offer some constructive feedback in hopes of addressing some of our concerns.
 - Longer term work may be needed. These suggestions are more “short term fixes”
- Some are test procedure related, others are not.

Test Procedure Suggestions

- DOE proposed that each test run on every tested model must meet 65 to have a valid test.
 - AHAM proposes that DOE use the average of each soil level across the test population instead.
 - Akin to existing ENERGY STAR approach authored by DOE
- DOE proposed that when 65 is not achieved on a single test at any soil level, the test must be re-run on the “most energy intensive” cycle that achieves 65
 - AHAM proposes that DOE instead specify re-running the test on the “next more energy intensive cycle”
 - The most energy intensive cycle is likely to be one that uses hot water for sanitization or other reasons.

Test Procedure Suggestions

- DOE proposes grading soil and streaks, consistent with AHAM's test.
 - AHAM proposes possibly scoring soil only
 - Spots and streaks are harder to see, especially without rinse aid in the energy test (and we agree with DOE that rinse aid should not be used in the energy test)
 - Meant to minimize false findings of noncompliance

Compliance Date

- DOE proposed to require the performance threshold in the current test procedure, meaning it would be required to demonstrate compliance with existing standards 180 days after publication.
 - AHAM proposes that DOE require the performance threshold to demonstrate compliance with upcoming amended energy conservation standards instead.
 - The proposed procedure impacts measured efficiency for many models.

Enforcement Suggestions

- Data demonstrate that the performance test is highly variable, more so than other test procedures
 - AHAM proposes that DOE adopt a verification tolerance akin to refrigeration and other products.
 - Proposal: If DOE tests within 14% of 65, it will use the normal cycle for the enforcement test. Otherwise, it will follow the test's requirements for when 65 is not reached.
 - Standard deviation is about 7 even after AHAM task force made several improvements

Enforcement Suggestions

- The main contributor to variation is that the test relies on humans to grade.
 - AHAM proposes that DOE, together with AHAM, develop a process to qualify laboratories to do this testing (including alternate labs and technicians). This is in addition to usual lab certifications.
 - AHAM does this for room air cleaners.