



ENERGY STAR®

Clothes Washer

Draft 2, Version 8.0 Specification

Draft 1, Cleaning Performance Test Method

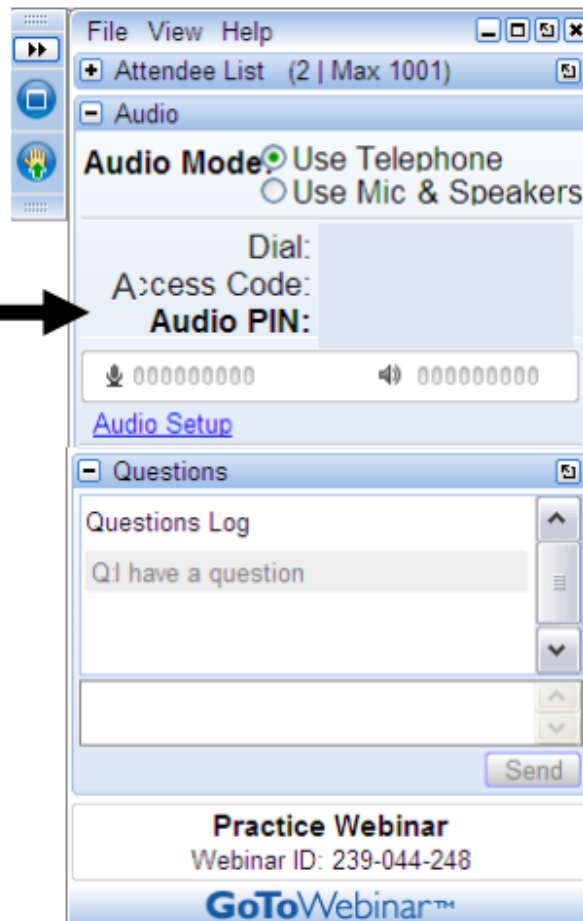
Stakeholder Webinar
November 3, 2016

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Webinar Logistics

- All phone lines will be muted, **to unmute please press *6**
- Presented material can be found on the [ENERGY STAR Version 8.0 Clothes Washer Product Development webpage](#)



Introduction – Welcome/Goals	Melissa Fiffer, EPA
Clothes Washer Draft 2, Version 8.0 – Presentation & Discussion	
<ul style="list-style-type: none"> - Overview - Optional Connected Criteria - Definitions/Scope - Combination All-in-One Washer-Dryers - Residential Clothes Washers Proposed V8 Draft 2 Criteria 	Melissa Fiffer, EPA Doug Frazee, ICF Ryan Fogle, D+R International
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Webinar Goals

1. Highlight proposed changes in the Draft 2, V8.0 specification and introduce the Draft 1 cleaning performance test method.
2. Solicit stakeholder feedback on outstanding issues/questions identified.
3. Address stakeholder questions about the process and/or changes.
4. Discuss next steps and timeline.



Specification Development

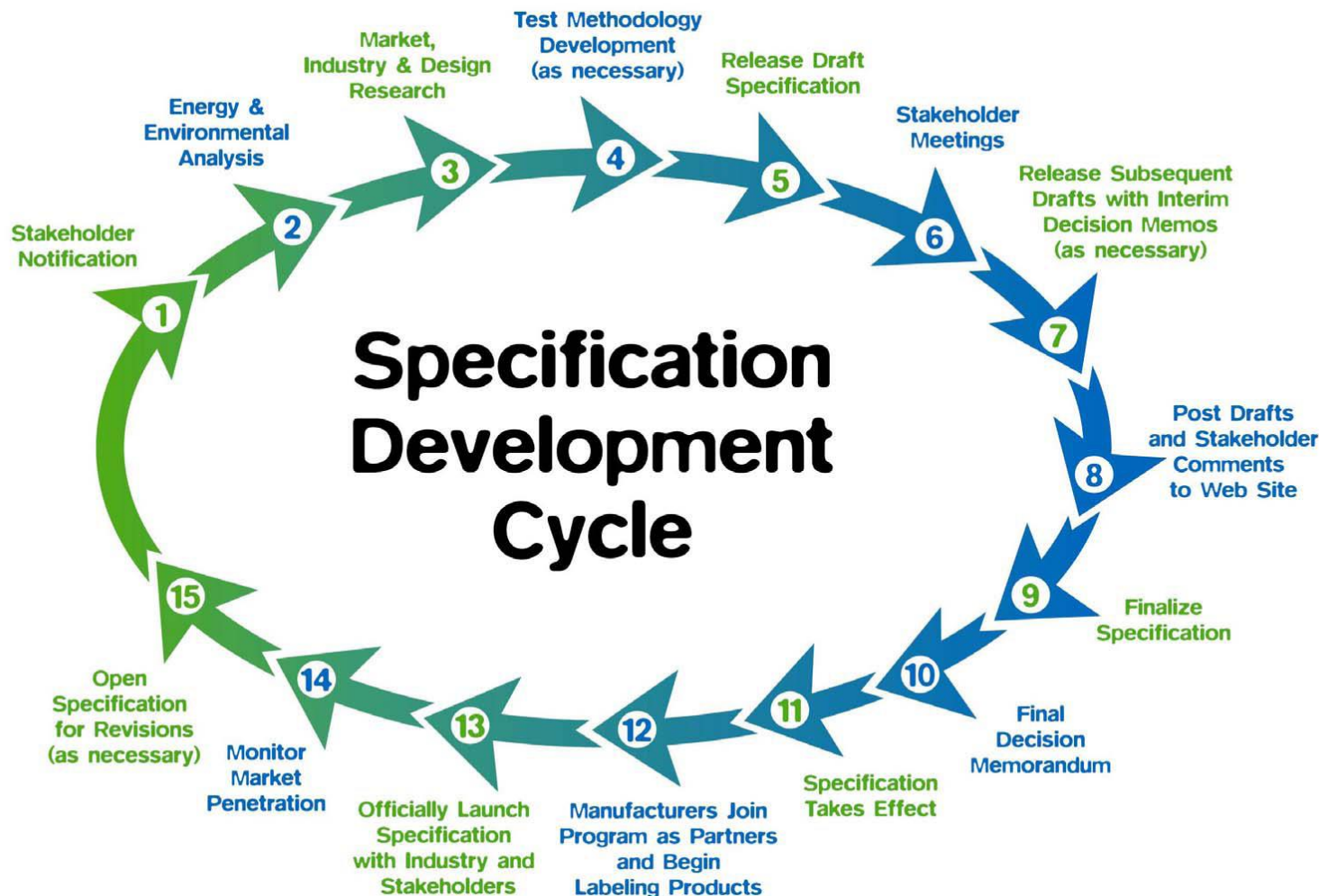
- When developing or revising a specification, EPA balances:
 - The need to keep pace with evolution among leading products and continue to effectively differentiate for consumers.
 - Timing of new federal standards.
 - Production cycles, other factors important to the industry.
- Key elements of the stakeholder process:
 - Consistency, transparency, inclusiveness, responsiveness, and clarity.



ENERGY STAR Guiding Principles

- ENERGY STAR criteria are designed to balance a varied set of objectives, including:
 - Significant energy and/or water savings
 - Product performance maintained or enhanced
 - Purchasers can recover investment in increased efficiency within a reasonable time period
 - Efficiency can be achieved by more than one manufacturer
 - Energy/water consumption can be measured and verified with testing
 - Label provides meaningful differentiation

ENERGY STAR Specification Development Process





Overview of Draft 2, V8.0

- Connected
 - Minor clarification edits were made to the connected criteria.
- Definitions/Scope
 - Commercial clothes washer capacity: raising ceiling from 6.0 to 8.0 cu-ft.
 - Combination all-in-one washer-dryers are not eligible for ENERGY STAR certification.
 - EPA, if interest received from multiple stakeholders, will convene a working group along with DOE.
- Laundry center proposal remains as written in Draft 1.
- Top-load criteria to be maintained at V7.1 levels.
- Release of the Draft 1 ENERGY STAR Test Method for Determining Residential Clothes Washer Cleaning Performance
- Version 8.0 effective date: January 1, 2018



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Optional Connected Criteria Edits

- In Draft 1, EPA amended the connected criteria to clarify the requirements per the ENERGY STAR Q&A document.
- The Communications and Remote Management sections were amended for clarity and Note 2 in the Communications section was revised to read:
 - “...,the API or similar documents must ensure open access to the connected functions outlined in Section 4C.”
 - The added language from the communications section was removed.
- In the Energy Consumption Reporting and Demand Response section, the language from Draft 1 was retained as it is consistent with the [ENERGY STAR Connected Criteria Q&A](#).
 - Manufacturers are encouraged to provide test samples to support DOE development of the test method.
- EPA notes that the criteria continues to keep consumers in control of their appliances at all times.



Ways to Get “Connected”: Working Group Shared Resource and Demand Response Test Method Development

- Shared resource available on Google Drive
 - Stakeholders can learn from each other, share information and studies, network and advance the value proposition.
 - To access shared drive, see “ENERGY STAR Connected Appliances” folder on google drive.
 - Folder is restricted access.
 - For access, provide Doug Frazee dfrazee@icfi.com or Laura Wilson lwilson@navitas-partners.com with your contact information as well as your gmail address.
- Journal
 - E-newsletter compilation of newly released studies and papers on connected products and homes.
- Do you have laundry products for DOE testing?
 - Consider supporting DOE efforts to develop ENERGY STAR demand response test methods by providing connected products for testing



Definitions/Scope

- Definitions: *Laundry Centers*
 - Removed “and is powered by a single electric power source” from the laundry center definition.
- Scope: *Commercial Clothes Washers*
 - The capacity scope limitation increased from 6.0 to 8.0 cu-ft.
 - Definition of Commercial Clothes Washer maintains exclusion of products designed for use in “other commercial applications.”
 - Models that wish to qualify under the new extension would need a valid test procedure waiver from DOE.

Combination All-in-One Washer-Dryers

- Combination all-in-one washer-dryers are not eligible for ENERGY STAR certification at this time for the following reasons:
 1. Concerns that at least 20% of the total water consumption of the product is from the dryer.
 2. Lack of an established test method to measure the water consumption of the dryer so this water consumption is currently not tested.
- EPA will, if there is interest from multiple stakeholders, convene a working group to discuss pathways forward.
 - Stakeholders interested in participating should express their interest to appliances@energystar.gov.





Laundry Centers

- In addition to amending the definition, EPA also considered comments related to the Draft 1 proposal for laundry centers.
- In Draft 2, EPA has maintained the Draft 1 proposal, which includes efficiency requirements for the clothes washer and clothes dryer.
 - This is consistent with the intent of the program to consider the energy and water consumption of the full product.
- EPA continues to believe that manufacturers will have products that meet both criteria.



Residential Clothes Washers Proposed V8 Draft 2 Criteria

	Proposed Draft 2, V8.0 IMEF	Proposed Draft 2, V8.0 IWF
Front Load Washer (>2.5 cu-ft)	2.76	3.20
Top Load Washer (>2.5 cu-ft)	2.06	4.30

- Stakeholders shared market data that broke out top-load and front-load shipments that EPA did not have previously.
- Based on an estimated ENERGY STAR market penetration of roughly 30%, the top-load criteria is maintained at the V7.1 levels.
 - EPA anticipates that market conditions will have changed in time for the V9.0 revision process such that top-load criteria can be strengthened.



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Cleaning Performance

- As the ENERGY STAR program sets more rigorous energy and water levels, the Agency wants to ensure consumer expectations continue to be met.
- EPA and DOE are releasing a draft test method for cleaning performance.
- EPA believes this approach will offer these additional benefits:
 - Early insights on performance needed to fully understand the market and effectively plan for future specification development efforts.
 - Data at an individual rather than an aggregate level to assess the relationship between performance and energy and water use.
 - Access to comparable data across brands and models provides the most equitable and comprehensive picture of how ENERGY STAR products are performing
- Reporting requirements will be TBD until ENERGY STAR Test Method for determining residential clothes washer cleaning performance is available.
 - Optional cleaning performance reporting will be applicable to residential products included under Section 2A.



Cleaning Performance Test Method Agenda

1	Background and Overview
2	Proposed Test Method
3	Wash Temperature and Load Size Considerations
4	Alternative Approach
5	Next Steps



Test Method Goals

- Provide strong link between cleaning performance measurement and existing energy and water use metrics
 - Energy and water use measured by the DOE test procedure:
 - 10 CFR 430 Subpart B, Appendix J2 (“Appendix J2”)
- Measure clothes washer cleaning performance under representative load conditions



Test Method Development Approach

- Leverage existing cleaning performance procedures
 - HLW-1-2013: Performance Evaluation Procedures for Household Clothes Washers
 - Section 6: Soil/Stain Removal Test
- The draft test method is based on AHAM HLW-1-2013, but uses the DOE test cloth and the test conditions specified in Appendix J2
 - DOE test cloth: 50% cotton, 50% polyester; momie weave

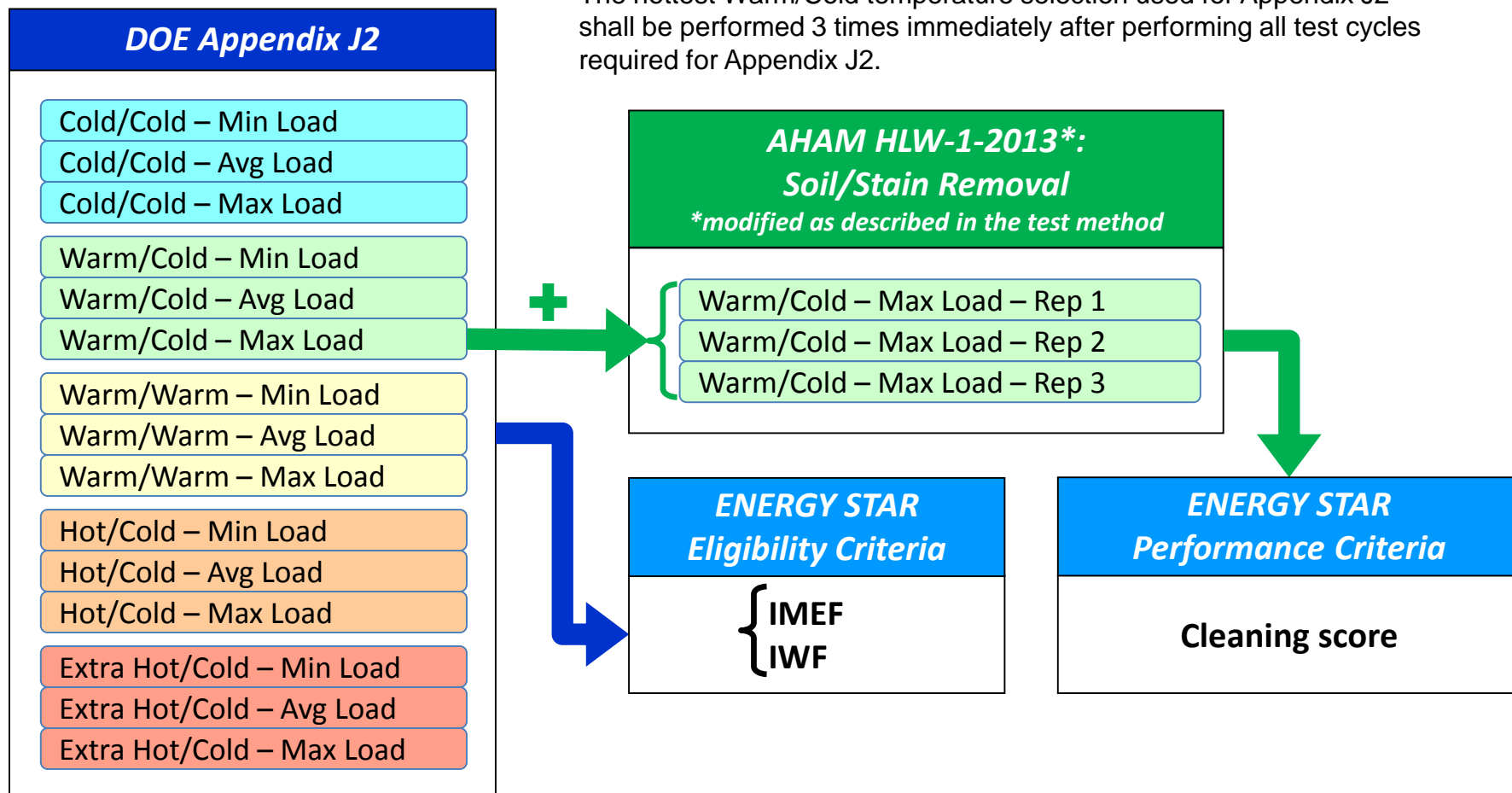


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Proposed Test Cycles for ENERGY STAR Test Method

The hottest Warm/Cold temperature selection used for Appendix J2 shall be performed 3 times immediately after performing all test cycles required for Appendix J2.

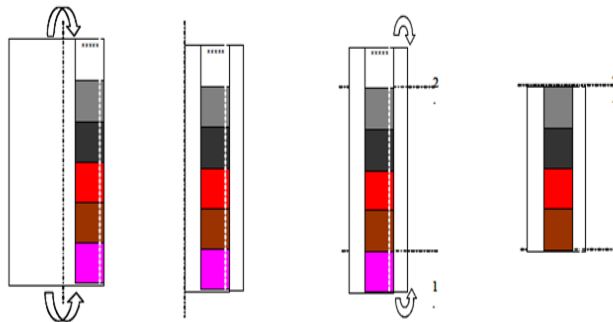


AHAM Cleaning Test Method



Stain strips are attached to individual towels, then folded and loaded into the washer in a defined order with other load items.

After the wash cycle, the optical whiteness of each stain swatch is measured.





Definitions

- Definitions in the Draft Test Method are consistent with applicable terms in DOE (Appendix J2), AHAM (HLW-1-2013), and ENERGY STAR (Program Requirements)
- New terms defined:
 - **3.B.1 Performance Test Load**
 - The maximum load size of energy test cloth as defined in Table 5.1 of Appendix J2, based on the UUT's capacity as measured in Section 3.1 of Appendix J2, plus the required amount of soil/stain removal test strips, as determined in Section 4.D of this test method.
 - **3.B.2 Total Cleaning Score**
 - A measure of soil/stain removal that represents an average of individual cleaning scores from soil/stain removal test strip swatches of different stain types. An individual cleaning score represents the ratio of the cleaning performance of the UUT to a calibrated reference level. A higher Total Cleaning Score represents better soil/stain removal (i.e., better cleaning performance).



Laboratory Test Conditions

- Conditions as specified in Appendix J2, with the addition:
 - **4.A.1** Supply water hardness (per HLW-1-2013)
 - Maintain the supply water hardness as specified in Section 4.5.3 of AHAM HLW-1-2013. [50 parts per million or less]

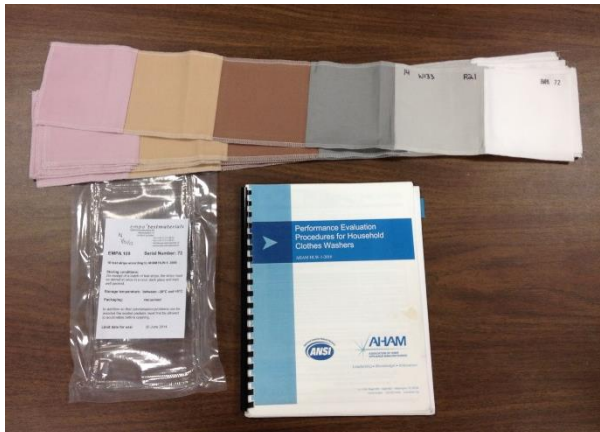


Required Instrumentation and Test Equipment

- Required instrumentation as specified in Appendix J2, with the following additions:
 - **4.B.1** Test cloth scale
 - Resolution no larger than 0.2 oz. (per Appendix J2)
 - Accuracy of 0.1 percent (per HLW-1-2013)
 - **4.B.2** Detergent scale (per HLW-1-2013)
 - **4.B.3** Tristimulus spectrophotometer (per HLW-1-2013)
- Test equipment as specified in Appendix J2, with the following additions:
 - **4.B.4** Equipment to fasten test strips to base load (per HLW-1-2013)

Test Materials

- Energy test cloth as specified in Appendix J2
- **4.C Detergent**
 - Formulation, concentration, storage and loading per HLW-1-2013
- **4.D Soil/Stain Removal Test Strips**
 - In accordance with HLW-1-2013



Test strip swatches, from left to right:
wine, cocoa, blood, charcoal, sebum, unsoiled

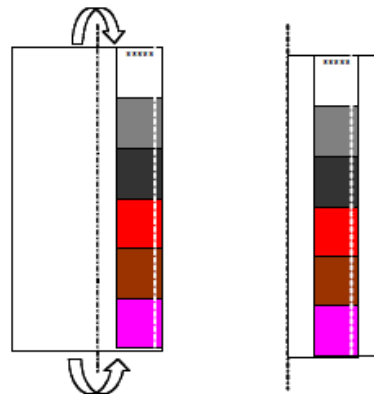


Test Strips

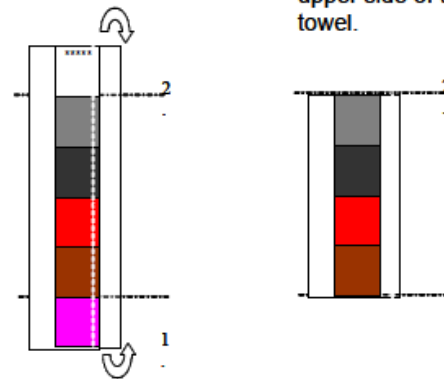
- Number of test strips:
 - 1 test strip for every 2 lb. of test load, consistent with HLW-1-2013
 - 2 lb. of test load is approximately 8 energy test cloths, based on the fabric weight specifications in Appendix J2, § 2.7.4.3
- Each test strip is accompanied by 8 energy test cloths
 - 1 cloth with the attached test strip
 - 7 cloths without test strips
- The last test strip may be accompanied by fewer than or greater than 7 test cloths without test strips, depending on the exact number of cloths required for the load size being tested.

Loading the Test Strips

- **4.F.1** Test strip attachment
 - Per HLW-1-2013, §6.5.7, substituting “energy test cloth” for “towel”
- **4.F.2** Folding
 - Per HLW-1-2013, Figure 1, substituting “energy test cloth” for “towel”



Fold the towel along the line. Strip should be on top in the center of the towel.

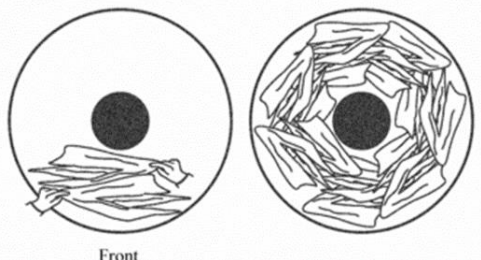
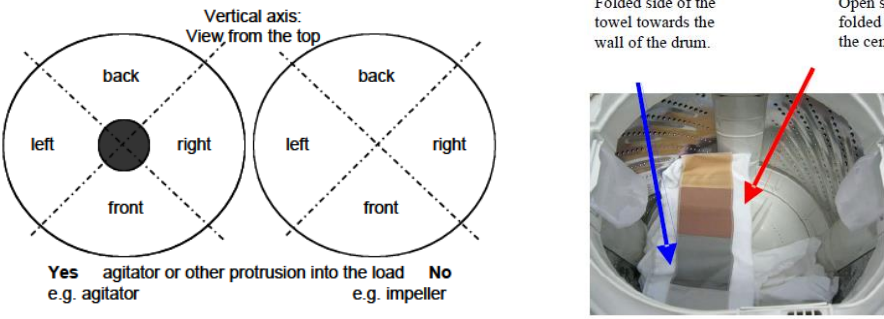


Four stains remain on the upper side of the towel.

Towel is folded twice again in such a way that strip parts do not cover themselves.

Loading the Performance Test Load

- **Loading procedure for top-loading clothes washers:**
 - Load 7 cloths without test strips; followed by 1 cloth with an attached test strip, placed in the left quadrant
 - Repeat this sequence, placing subsequent cloths with attached test strips in the next clockwise quadrant

Test cloths without test strips (7 per sequence)	Test cloths with attached test strips (1 per sequence)
<p>Following Appendix J2</p> <p>Vertical-Axis: View from the Top</p> 	<p>Similar to HLW-1-2013</p> <p>Vertical axis: View from the top</p>  <p>Folded side of the towel towards the wall of the drum.</p> <p>Open side of the folded towel towards the center of the drum.</p> <p>Yes agitator or other protrusion into the load e.g. agitator No e.g. impeller</p>

- The last loading sequence may include fewer than or greater than 7 test cloths without test strips

Loading the Performance Test Load



Sequence #1
7 cloths +
1 cloth with stain strip



Sequence #2



Sequence #3

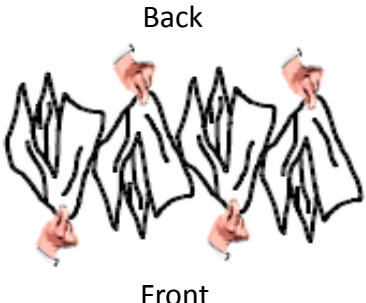
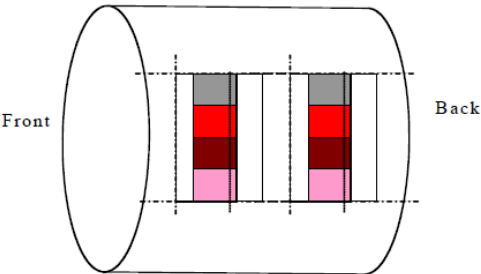



Sequence #4

Etc.

Loading the Performance Test Load

- **Loading procedure for front-loading clothes washers:**
 - Load 14 cloths without test strips; followed by 2 cloths with attached test strips side-by-side in the drum (if odd number, the last one is loaded in the middle)

Test cloths without test strips (14 per sequence)	Test cloths with attached test strips (2 per sequence)
<p>Following “towels” in HLW-1-2013</p> 	<p>Similar to HLW-1-2013</p>  

- Repeat until the entire performance test load is loaded
- The last loading sequence may include fewer than or greater than 14 test cloths without test strips



Loading the Performance Test Load

DOE has proposed loading sequences for test loads that would ensure a) even loading of test cloths without test strips, b) even distribution of test cloths with attached test strips throughout the test load, and c) consistent and repeatable loading conditions.

DOE is aware that the loading sequence can influence performance results and requests stakeholder comments on specific experience regarding the impacts of the loading sequence on the repeatability and reproducibility of cleaning performance results.

Scoring

- **5.B** Measure the post-wash reflectance for all soiled swatches and all test strips and all cycles
 - Average according to HLW-1-2013, Figure 14



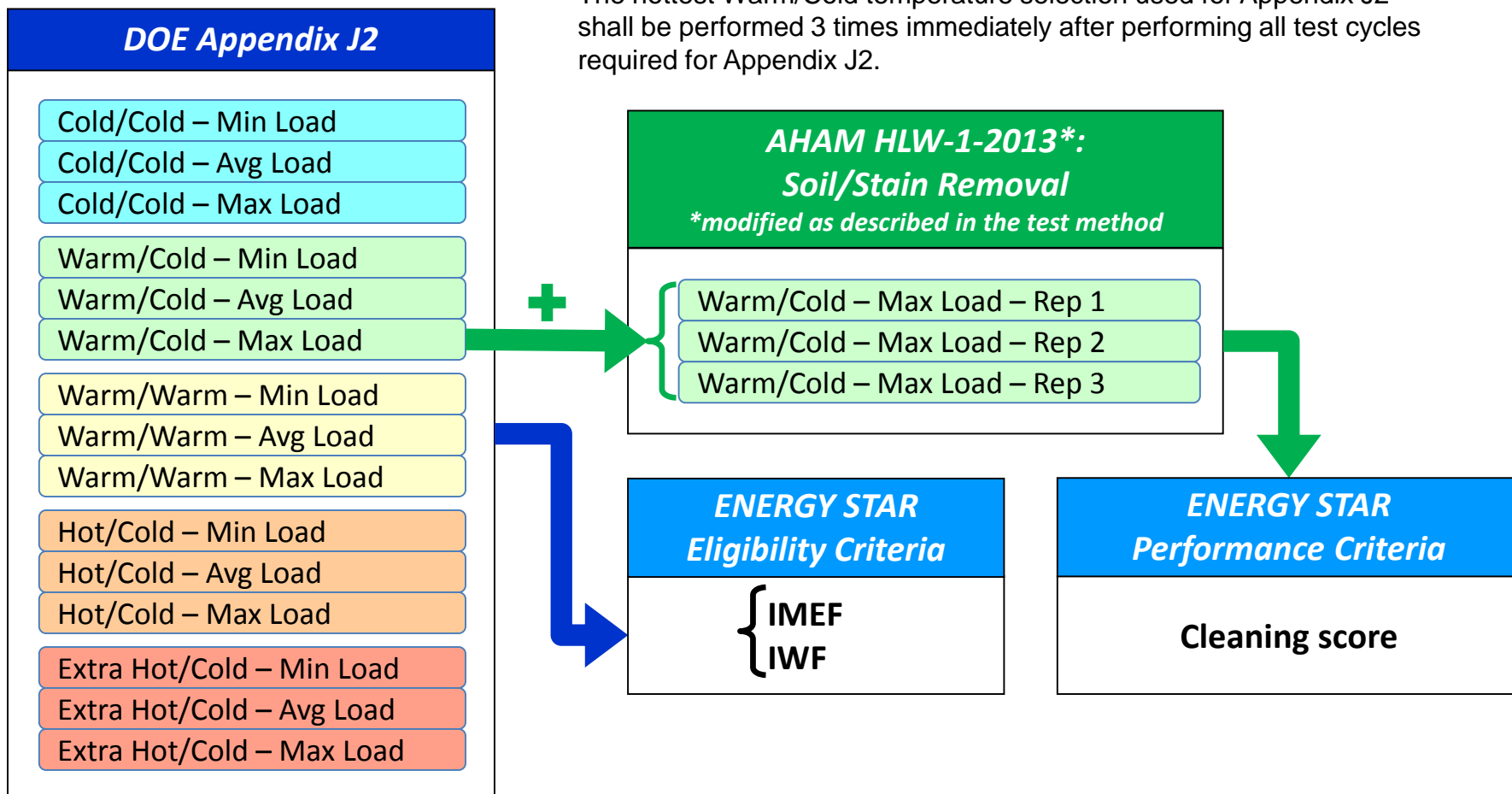
- **6.A** Calculate the Total Cleaning Score
 - According to HLW-1-2013, §6.7

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Temperature Selection: Hottest Warm Wash/Cold Rinse

- DOE proposes testing the hottest Warm/Cold temperature selection
 - Warm/Cold has the highest consumer usage factor in Appendix J2, Table 4.1.1
- DOE believes that this will provide an appropriate tradeoff between minimizing test burden and maintaining test conditions that are most representative of consumer usage.

DOE invites comment on whether testing the Warm/Cold cycle would:

- Provide results that sufficiently distinguish performance among clothes washer models at different efficiency levels.
- Represent an appropriate tradeoff between minimizing test burden and maintaining test conditions representative of consumer usage.



Maximum Load Size

- Maximum load represents the most challenging cleaning burden that a clothes washer would experience.
- Maximum load size is based on the maximum capacity of the clothes container, which is used to calculate IMEF and IWF.
- The maximum capacity of the clothes container is a key feature advertised to the consumer.
- Cleaning performance results will be comparable regardless of water fill control system
 - In Appendix J2, the maximum load size is tested on manual water fill washers *and* automatic water fill washers
 - Average load size has the highest usage factor for automatic fill washers, but is not tested on manual fill washers.

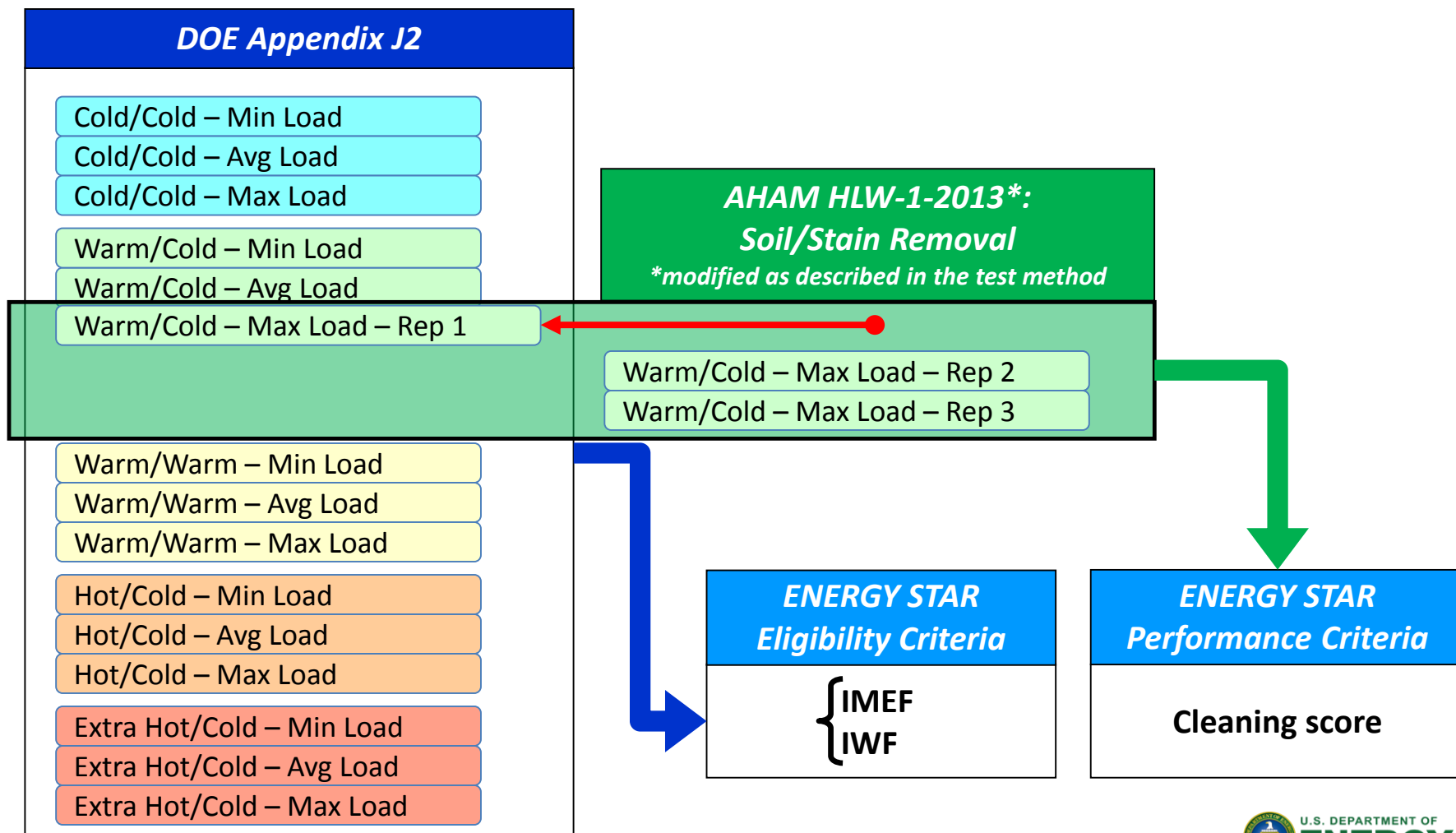
DOE invites comment on the appropriateness of using the maximum load size for measuring cleaning performance.



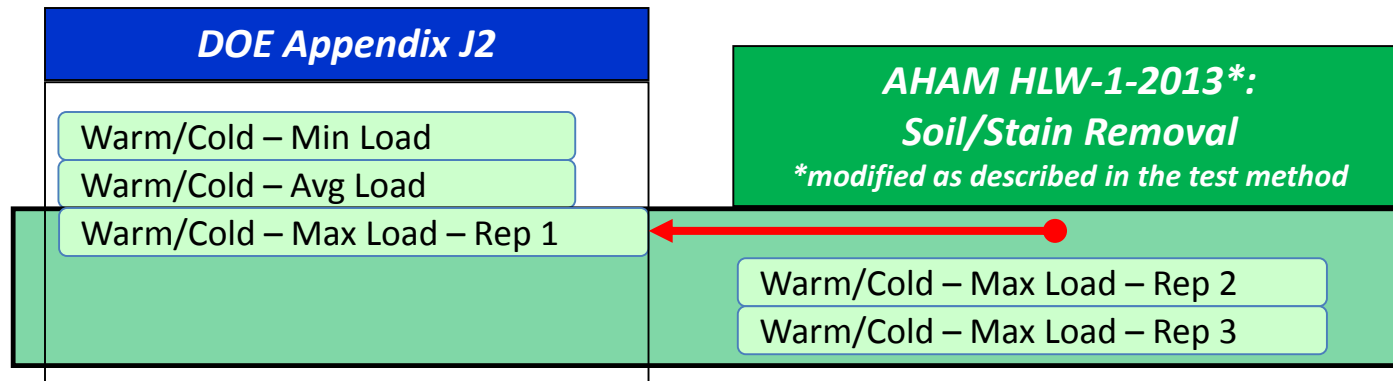
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Alternative Approach



Alternative Approach



- Cold water, hot water, and electrical energy would be measured during the first cleaning performance replication, which includes test strips and detergent
- The first cleaning performance replication would replace the hottest Warm/Cold Max Load cycle in Appendix J2



Alternative Approach

DOE invites comment on the proposed alternative structure for the cleaning performance test method.

DOE invites comment on the suitability of using the energy and water use measurements obtained during the first replication of the cleaning performance test to represent the hottest Warm/Cold Max Load cycle in Section 3.5.1 of Appendix J2.

DOE invites input on how the presence of detergent and test strips in the Warm/Cold Max Load cycle might impact the energy and water results of that cycle and the overall IMEF and IWF calculations.



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Test Method Timeline

Draft 1 Webinar	November 3, 2016
Comment Period for Draft 1	October 21, 2016 – November 21, 2016

DOE and EPA aim to publish future drafts of this test method in parallel with ENERGY STAR v8.0 specifications.



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Anticipated Timeline for V8.0 Specification Revision

October 21, 2016	EPA released Draft 2, Version 8.0 specification
November 3, 2016	Stakeholder webinar on Draft 2 specification
November 21, 2016	Comment period closes on Draft 2 specification
TBD	Final Draft Version 8.0 specification and comment period; Final Version 8.0 specification released
January 1, 2018	Final Version 8.0 specification is effective

- EPA welcomes all partner and stakeholder comments by November 21, 2016.
- Comments should be submitted in writing to appliances@energystar.gov



Questions?



Key Contacts – Appliances

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