Meeting Details

• Slides and related materials will be available on the Dishwasher Product Development Web page:
  – www.energystar.gov/RevisedSpecs
  – Follow link to “Version 7.0 is in Development” under “Dishwashers”

• Audio provided via teleconference:

  **U.S. Phone Number:** 877-423-6338  
  **International Phone Number:** +1-571-281-2578  
  **Participant Code:** 436598

  – Phone lines will be muted at the start of the presentation
  – Please leave your line on mute unless speaking during the call for questions
  – Press *6 to unmute your line and when you are finished with your question or comment, *6 to mute
Introductions

Ga-Young Park
U.S. Environmental Protection Agency

Katharine Kaplan
U.S. Environmental Protection Agency

Steve Leybourn
ICF
## Introductions and Background

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
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<tr>
<td>1:00–1:10</td>
<td><strong>Background</strong></td>
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<tr>
<td>1:10–2:00</td>
<td>Version 7.0 Draft 1 Specification</td>
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<td>2:15–2:30</td>
<td>Timeline and Open Discussion</td>
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Webinar Goals

- Refresh stakeholders on ENERGY STAR principles and specification development process
- Engage with stakeholders on proposals shared in the Draft 1 Specification
- Present estimated energy savings from Draft 1 proposals
- Share expected next steps and schedule
ENERGY STAR Guiding Principles

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

• For more information see ENERGY STAR Products Program Strategic Vision and Guiding Principles
Specification Development

• ENERGY STAR follows [EPA’s Standard Operating Procedure](https://www.energystar.gov/partner_resources/products_partner_resources) through the specification development or revisions process, balancing:
  – The need to keep pace with evolution among leading products and continue to effectively differentiate for consumers
  – Production cycles, other factors important to the industry

• Key elements of the stakeholder process:
  – Consistency, transparency, inclusiveness, responsiveness, and clarity
  – Stakeholder engagement is a vital aspect to the success of the ENERGY STAR program

https://www.energystar.gov/partner_resources/products_partner_resources
We are here
ENERGY STAR Residential Dishwashers History

- EPA finalized the Version 6.0 Residential Dishwasher specification in 2015 and went into effect on January 29, 2016. Currently, there are 38 manufacturers participating, representing 62 brands, and covering 308 total base models.

- EPA released ENERGY STAR Most Efficient criteria with a minimum cleaning performance floor on October 3, 2014.
Version 7.0 Specification Background and Drivers

• EPA released a Version 7.0 Draft 1 Specification on March 11.

• Drivers for V7.0 Revision
  – Specifications are reviewed every 3 years.
  – According to shipment numbers in 2018, ENERGY STAR market penetration was ~90%.
  – Partners are requesting higher thresholds for ENERGY STAR certification to provide meaningful differentiation.
## Version 7.0 Draft 1 Specification

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<td>- Scope</td>
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<td>- Soil-Sensors</td>
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<tr>
<td></td>
<td>- Data &amp; Analysis</td>
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<td>- Efficiency Levels</td>
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**Background**

**Version 7.0 Draft 1 Specification**

- Definitions
- Scope
- Soil-Sensors
- Data & Analysis
- Efficiency Levels
- Connected Criteria
Definitions

• Added Definitions – all associated with the optional connected criteria
  – Consumer Override
  – Delay Appliance Load (DAL) Capability
  – Communications Link
  – Demand Response (DR)
  – Open Standards
  – Temporary Appliance Load Reduction (TALR) Capability

• Removed Definitions – not referenced anywhere else in the specification
  – Portable Dishwasher
Scope

• Amended scope will include minimum per-cycle Cleaning Index score of 70 for heavy, medium, and light soil load cycles
  – Partner shall submit testing documentation at the time of certification and the cleaning performance will not be subject to verification testing

2) Scope

A. Included Products: Products that meet the definition of a dishwasher, demonstrate a minimum per-cycle Cleaning Index score of 70\(^4\), and are a consumer product as specified herein are eligible for ENERGY STAR certification, with the exception of products listed in Section 2.B.

Soil-Sensors

EPA received a suggestion to only label dishwashers with a soil sensor to ensure at least a minimum cleaning functionality. EPA seeks data or comments regarding the following topics:

- Data that show dishwashers with soil-sensor systems achieve a cleaning index score of 70.
- Data that demonstrate the relationship between having a soil-sensor system and the product’s energy and water consumption under testing of a variety of soil-levels.
- Capabilities or components of soil-sensor systems that ensure minimum cleaning performance and achieve greater water and energy efficiency.

EPA requests any data submitted by stakeholders include the model numbers, the name of the cleaning performance test used (a preference being for the ENERGY STAR cleaning performance test), and description of the soil sensor system. EPA will only share information from this data that is de-identified and aggregated.
Version 7.0 Efficiency Criteria and Reported Data for ENERGY STAR Models

- **Standard Models**
  - Fed. Std. - Standard
  - ENERGY STAR V6.0 - Standard
  - ENERGY STAR V7.0 Proposal - Standard
- **Compact Models**
  - Fed. Std. - Compact
  - ENERGY STAR V6.0 - Compact
  - ENERGY STAR V7.0 Proposal - Compact
Efficiency Metric

- In setting the efficiency criteria, EPA evaluated levels that reflect a meaningful increase from the federal standards using measured data from models on the ENERGY STAR QPL.

### ENERGY STAR Version 7.0 Draft 1 Efficiency Requirements

<table>
<thead>
<tr>
<th>Level</th>
<th>Standard</th>
<th>Compact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Energy Use (kWh/yr)</td>
<td>Water Use (gallons/cycle)</td>
</tr>
<tr>
<td>Federal Standard</td>
<td>307</td>
<td>5.0</td>
</tr>
<tr>
<td>ENERGY STAR Version 7.0 Draft 1</td>
<td>240</td>
<td>3.2</td>
</tr>
<tr>
<td>% Better Than Federal Standard</td>
<td>22%</td>
<td>36%</td>
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</table>
# Product Availability

**Product Availability and Percentage of Total Using Reported Values**

<table>
<thead>
<tr>
<th>Base Model Count of the Rated Values at each Level</th>
<th>Total Models</th>
<th>ENERGY STAR V7.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard-Size</td>
<td>331</td>
<td>51</td>
</tr>
<tr>
<td><em>Pass Rate</em></td>
<td>100%</td>
<td>15%</td>
</tr>
<tr>
<td><em>Count of Brands</em></td>
<td>50</td>
<td>27</td>
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</tbody>
</table>

**Product Availability and Percentage of Total Using Measured Values with a 5% Engineering Factor**

<table>
<thead>
<tr>
<th>Base Model Count of Measured Values with a 5% Engineering Factor at each Level</th>
<th>Total Models</th>
<th>ENERGY STAR V7.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard-Size</td>
<td>331</td>
<td>98</td>
</tr>
<tr>
<td><em>Pass Rate</em></td>
<td>100%</td>
<td>28%</td>
</tr>
<tr>
<td><em>Count of Brands</em></td>
<td>50</td>
<td>36</td>
</tr>
</tbody>
</table>
Optional Connected Criteria

• Optional connected criteria were introduced in the Version 6.0 specification
  – Currently, ~1% of ENERGY STAR certified residential dishwasher models are connected
• Updating optional connected criteria section to add clarity and consistency with more recent revisions to other appliance specifications
• EPA seeks feedback on any new developments on common protocols and configurations for control and data sharing, and data security standards
• Connected Allowance not revisited for residential dishwashers at this time
• Developing ENERGY STAR test method to validate the demand response capabilities of residential dishwashers
  - Manufacturers encouraged to submit products to DOE for test method development. Please contact Bryan Berringer for more information.
Version 7.0 Draft 1 Specification

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</table>
## Residential Consumer Savings: Energy & Water Use
### Proposed Version 7.0 Criteria

<table>
<thead>
<tr>
<th></th>
<th>Annual Savings</th>
<th>Lifetime Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Electricity</td>
<td>Gas</td>
</tr>
<tr>
<td></td>
<td>(kWh/yr)</td>
<td>(therms/yr)</td>
</tr>
<tr>
<td>Standard</td>
<td>67</td>
<td>0.28</td>
</tr>
<tr>
<td>Compact</td>
<td>67</td>
<td>0.26</td>
</tr>
</tbody>
</table>

**Assumptions:** (1) The baseline used to calculate savings was the DOE Standard (2) Elec. Emissions Factor = 1.559 lbs CO2E/kWh, (3) $0.1299/kWh, (4) Gas Emissions Factor = 116.98 lbs CO2/MMBtu, (5) $1.0793 $/Therm, (6) $0.01054 $/gal, (7) a lifetime of 12 years for dishwashers was used, per Appliance Magazine, Portrait of the U.S. Appliance Industry 1998.
## Residential Consumer Savings: Dollars & Payback

### Proposed Version 7.0 Criteria

<table>
<thead>
<tr>
<th>Annual Savings (Lifetime Savings)</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>Gas</td>
</tr>
<tr>
<td>$8.70 ($104.44)</td>
<td>$3.03 ($36.32)</td>
</tr>
</tbody>
</table>

Assumptions: Prices of $0.1299 per kWh; $1.0793 per therm; $0.01054 per gallon were applied to estimate consumers' cost savings.
### Version 7.0 Draft 1 Specification

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## Next Steps

<table>
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<tr>
<th>Event</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td><em>Version 7.0 Draft 1 Specification</em></td>
<td><em>March 10, 2020</em></td>
</tr>
<tr>
<td><em>Version 2.0 Draft 1 Webinar</em></td>
<td><em>March 26, 2020</em></td>
</tr>
<tr>
<td><strong>Draft 1 Comments Due</strong>*</td>
<td><strong>May 11, 2020</strong>*</td>
</tr>
<tr>
<td>Release Subsequent Drafts of Specification</td>
<td>Summer 2020</td>
</tr>
<tr>
<td>Publish Final Version 7.0 Specification</td>
<td>Q3 2020</td>
</tr>
<tr>
<td>Version 7.0 Specification Effective Date</td>
<td>Q2 2021</td>
</tr>
</tbody>
</table>

*Comment due date has been extended for all stakeholders from April 7, 2020 to May 11, 2020 following a request for extension. The expected timeline for specification publication and effective date has been adjusted accordingly.*
Webinar Wrap-up and Comment Deadline

• EPA and DOE appreciate the opportunity to discuss Draft 1.
• Comments are due on May 11, 2020.
• Please send all comments to:

  appliances@energystar.gov

• Unless marked as confidential, all comments will be posted to the Residential Dishwasher product development page at https://www.energystar.gov/products/spec/residential_dishwasher_specification_version_7_0.pdf
Open Discussion
Key Contacts

Specification Development
– Ga-Young Park, EPA ENERGY STAR
  Park.Ga-Young@epa.gov

– Katharine Kaplan, EPA ENERGY STAR
  Kaplan.Katharine@epa.gov

– Steve Leybourn, ICF
  Steve.Leybourn@icf.com

Test Method
– Bryan Berringer, DOE
  Bryan.Berringer@EE.doe.gov

– Mansi Thakkar, Guidehouse, f/k/a Navigant
  Mansi.Thakkar@guidehouse.com

– Judy Reich, Navigant Guidehouse, f/k/a Navigant
  jreich@guidehouse.com
Test Setup

• Setup requirements as specified in 10 CFR 430, Subpart B, Appendix C1.

• Water hardness as specified in section 4.8.3 of ANSI/AHAM DW-1-2010.
  – Between 0 and 85 parts per million (ppm) of calcium carbonate.

• Lighting setup as specified in section 5.10 of ANSI/AHAM DW-1-2010.
  – Room with diffused lighting.
  – Lamp with a color temperature of 3500 – 4500 Kelvin.
  – Lamp should be installed over grading area to avoid direct glare.
  – Illuminance measured at relevant plane shall be 1000 – 1500 lux.
Cleaning Performance Test for Soil Sensing Normal Cycle

Appendix C1

Test Cycle Settings:
• "Normal" Cycle
• Three Test Loads
  o Heavy Soil
  o Medium Soil
  o Light Soil

Load

- Heavy
- Medium
- Light

Water Consumption

Active Mode Energy

Grading

Consumer Use Factors

Water Consumption (gal/cycle)

Active Mode Energy

Low Power Mode Energy

Energy Consumption (kWh/year)

Per-Cycle Cleaning Index for Heavy Soil

Per-Cycle Cleaning Index for Medium Soil

Per-Cycle Cleaning Index for Light Soil
Cleaning Performance Test for Non-Soil Sensing Normal Cycle

Appendix C1

Test Cycle Settings:
- “Normal” Cycle
- Clean Test Load

Cleanability

Test Cycle Settings:
- “Normal” Cycle
- Three Test Loads
  - Heavy Soil
  - Medium Soil
  - Light Soil

Load

Water Consumption (gal/cycle)

Active Mode Energy

Energy Consumption (kWh/year)

Low Power Mode Energy

Per-Cycle Cleaning Index for Heavy Soil

Per-Cycle Cleaning Index for Medium Soil

Per-Cycle Cleaning Index for Light Soil

Grading
Loading Requirements

- Loading requirements as specified in 10 CFR 430, Subpart B, Appendix C1.

- Additional requirements:
  - Each item of test load shall alternate clean and soiled items.
  - Similar items shall be loaded in consecutive racks.
  - Empty rack spaces between different items are acceptable if:
    - Capacity of test unit is greater than the number of place settings required by the test method.
    - Loading guidance in the use and care manual specifies empty spaces while loading.
  - Clean items shall be loaded first.
Illustrative Example of Loading at Sensor Heavy Load for a Standard Dishwasher
Grading and Calculation of Cleaning Index

- For each test cycle, each item is graded on a scale from 0 to 9 as specified in section 5.10 of ANSI/AHAM DW-1-2010.

- The per-cycle cleaning index is calculated as follows:

\[ CI_l = 100 - \frac{(12.5 \times N_{1,i} + 25 \times N_{2,3,i} + 50 \times N_{4,5,6,i} + 75 \times N_{7,8,i} + 100 \times N_{9,i})}{N} \]

Where:
- \( N \) is the total number of items in the test load
- \( N_{1,i} \) is the total number of items in the test load with a grade of 1
- \( N_{2,3,i} \) is the total number of items in the test load with a grade of 2 and/or 3
- \( N_{4,5,6,i} \) is the total number of items in the test load with a grade of 4, 5, and/or 6
- \( N_{7,8,i} \) is the total number of items in the test load with a grade of 7 and/or 8
- \( N_{9,i} \) is the total number of items in the test load with a grade of 9
- \( i \) is the test cycle type (heavy, \( h \); medium, \( m \); or light, \( l \))