

ENERGY STAR®

Residential Dishwashers

Draft 1 Version 6.0 Specification
Stakeholder Webinar
March 21, 2014



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Webinar Logistics



- All phone lines will be muted, **to unmute please press *6**
- Please do not use the GoTo Webinar 'Questions' feature to ask questions.
- Presented material can be found on the ENERGY STAR Dishwasher Product Development webpage at www.energystar.gov/revisedspecs and follow the Version 6.0 link for Residential Dishwashers

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Webinar Goals



1. Highlight proposed changes in the Draft 1, Version 6.0 specification.
2. Solicit stakeholder feedback on outstanding issues/questions identified and facilitate discussion .
3. Address stakeholder questions about proposal and/or the V6.0 specification revision process.
4. Share next steps and anticipated timeline.

ENERGY STAR Guiding Principles



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

Specification Development Cycle



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.

Dishwasher Specification Background & V6.0 Drivers



- Background:
 - The efficiency requirements in the current ENERGY STAR dishwasher specification (Version 5.2) have been effective since January 20, 2012:
 - Standard: ≤ 295 kWh/year; ≤ 4.25 gallons/cycle
 - In V5.2, in light of the new Federal standards, starting at the end of 2013 EPA excluded compact dishwashers from the program scope.
- Drivers for Version 6.0 revision:
 - EPA estimates the ENERGY STAR residential dishwasher market share in 2012 was approximately 89%.
 - Availability of products in the market that significantly exceed the minimum ENERGY STAR criteria.
 - Changes to the Federal standard have reduced the savings of an ENERGY STAR product relative to a standard model.

Overview of Draft 1 V6.0



- Revised energy and water criteria for both standard and compact dishwashers.
 - Reintroduces compact dishwashers into the specification.
- Reporting requirement for dishwasher cleaning performance.
- Optional ‘connected’ criteria for dishwashers, along with a 5% allow energy allowance as a temporary incentive.
- Minor revisions to definitions, etc.
- Effective date would be 9 months after the final Version 6.0 specification is published.

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Definitions



- EPA removed the definitions from 10 CFR 430 Subpart B Appendix C, reflecting the move to Appendix C1 that manufacturers began using in May 2013.
- A definition for Consumer Product has been added.
- Footnotes provide the applicable citations (e.g., the CFR, AHAM/ANSI DW-1-2009) for relevant definitions.
 - Clarification added that in cases of conflict, the CFR definition takes precedence.

Compact Dishwashers Reintroduced



- In May 2013, the Federal standards for compact dishwashers were amended and matched the ENERGY STAR criteria.
- EPA responded by suspending compact dishwashers from the program until revised criteria could be developed.
- Revised criteria for compact dishwashers are proposed in the Draft 1, Version 6.0 specification that would allow them to once again be eligible to earn the ENERGY STAR label.

Proposed Criteria



- Proposed ENERGY STAR criteria for residential dishwashers:

Product Type	Annual Energy Consumption (AEC) _{BASE} (kWh/year)	Water Consumption (gallons/cycle)
Standard	270	≤ 3.5
Compact	195	≤ 2.6

- Dishwashers that are certified to optional Section 4 connected criteria and tested using the final and validated ENERGY STAR Test Method for Residential Dishwashers to Validate Demand Response Functionality – (TBD) may be eligible for a 5% allowance against the minimum energy requirements:

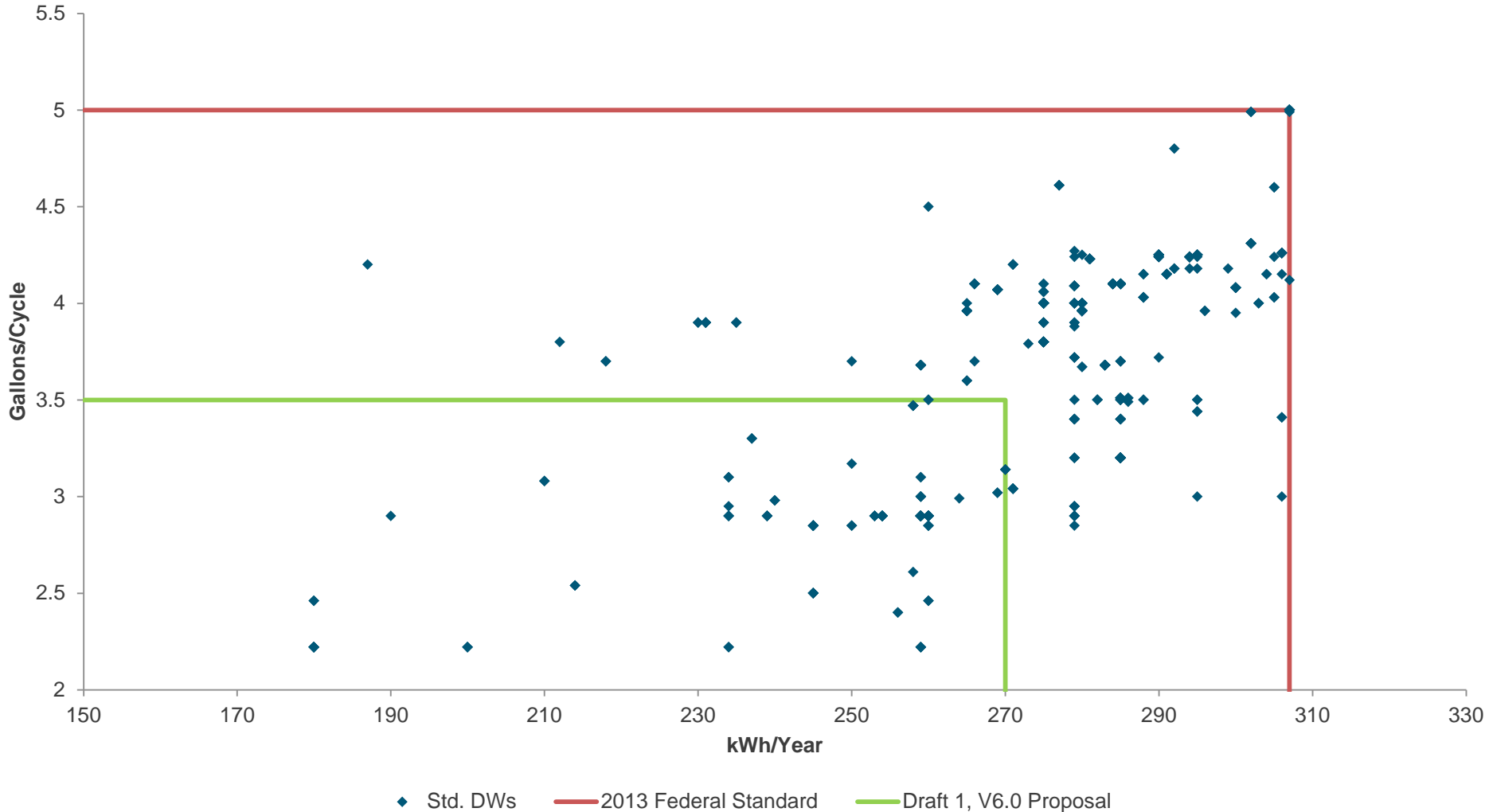
Equation 1: Calculation of Maximum Annual Energy Consumption

$$AEC_{MAX} = AEC_{BASE} + AEC_{AdderConnected}$$

Connected Allowance	
Product Type	AEC _{Adder_Connected}
Dishwashers	0.05 x AEC _{BASE}

Standard Dishwasher Scatter Plot

ENERGY STAR qualified models



Product Availability



Type	Number of Models Meeting Proposed V6.0	% of Models Meeting Proposed V6.0
Standard	134	24%
Compact	2	10%
All Dishwashers	136	24%

- EPA's Dishwasher dataset merges the ENERGY STAR qualified product list with the DOE certification database.
- Approximately 24 percent of standard dishwashers on the market would meet the proposed criteria.
 - Includes products from nine manufacturers.
- For compact dishwashers, EPA found approximately 10% (2 of 20 models) meet the proposed criteria.
 - Both products from one manufacturer.

Product Availability



Manufacturers	Brands
Arcelik (10) ASKO (2) Bonferraro (2) BSH (66) Electrolux (1) Fagor (2) Fisher & Paykel (2) Kenmore (20) LG (6) Whirlpool (25)	Amana (1) Asko (2) Blomberg (5) Bosch (57) Electrolux (1) Fagor (1) Fisher & Paykel (2) Gaggenau (4) GE Profile (1) Ikea (1) Jenn-Air (1) Kenmore (20) KitchenAid (4) LG (6) Smeg (2) Summit Professional (1) Thermador (5) Viking (4) Whirlpool (18)

Average Energy & Water Savings Proposed V6.0 Criteria



	Weighted Per-Unit Electricity Savings (kWh)		Weighted Per-Unit Gas Savings (Therms)		Per-Unit Water Savings (Gallons)	
	Annual	Lifetime	Annual	Lifetime	Annual	Lifetime
Standard	25	300	.55	6.6	269	3228
Compact	18	216	.4	4.8	194	2328

Assumptions:

- The applicable Federal standard was used as the baseline
- Weighted per-unit electricity and gas savings based on national estimates of gas and electric water heating in the 2009 U.S. Residential Energy Consumption Survey (RECS)
- Calculations assume an average of 215 cycles per year (DOE Test Procedure, Appendix C1) and an average dishwasher lifetime of 12 years from Appliance Magazine

Estimated Average Cost Savings



	Weighted Per-Unit Electricity Savings (\$)		Weighted Per-Unit Gas Savings (\$)		Per-Unit Water Savings (\$)		Per Unit Total Savings (\$)	
	Annual	Lifetime	Annual	Lifetime	Annual	Lifetime	Annual	Lifetime
Standard	2.80	33.70	0.60	7.10	2.30	27.10	5.70	67.90
Compact	2.10	24.60	0.40	5.20	1.60	19.60	4.10	49.40

Estimation of average annual and 12-year per-unit cost savings was based on:

- \$0.113 per kWh
- \$1.064 per therm
- \$0.0084 per gallon

Consumer Payback



	Per Unit Total Savings (\$)		Retail Price Data (\$)		Estimated Payback (Years)
	Annual	Lifetime	Lowest Retail Price	Estimated Price Premium	
Standard	5.70	67.90	315	16	2.8

Estimation of average annual and 12-year per-unit cost savings was based on:

- \$0.113 per kWh
- \$1.064 per therm
- \$0.0084 per gallon

- Price data collected from retail stores indicates there are models available today that would meet the proposed V6.0 criteria and offer consumers a reasonable payback.
 - EPA reviewed pricing information for V5.0 spec revision and found the most cost effective model meeting V5.0 was \$399; 9 months later products priced at \$279 were found in retail stores.
- EPA unable to estimate payback on compact DWs.
 - Current products meeting the spec are limited to dishdrawer models, which serve a different market than countertop dishwashers.

Cleaning Performance Reporting Requirement



- Draft 1 Version 6.0 includes cleaning performance reporting criteria.
 - Reporting of the per-cycle Cleaning Index (as defined in the Test Method for Determining Residential Dishwasher Cleaning Performance, discussed later) for each test cycle consistent with sampling requirements in Section 5A.
- Reporting is expected to:
 - Enable test labs to gain experience with the test method.
 - Enable EPA to better understand how cleaning performance varies by efficiency.
- Individual-model cleaning performance scores will not be posted on the ENERGY STAR certified product list.

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Overview



- EPA is seeking to help advance products with intelligent features in ways that deliver immediate consumer benefit and support a low-carbon electricity grid over the long term.
- Draft 1 introduces *optional* Connected Functionality (CF) criteria for residential dishwashers.
 - EPA will flag ENERGY STAR dishwashers that are certified as meeting all of the connected criteria on the ENERGY STAR website.
 - Draft 1 builds on CF in other product specifications while also tailoring criteria to opportunities specific for residential dishwashers.
 - Consumers will have full control (i.e. ability to override) as to if and how their dishwasher responds to Demand Response (DR) signals.
 - 5% energy allowance for ENERGY STAR qualified products certified to optional connected criteria, and tested using the (TBD) ENERGY STAR Test Method for Residential Dishwashers to Validate Demand Response.

Connected Dishwasher System



- Defines the connected dishwasher system as:
 - Consisting of all required hardware and software
 - Communications hardware may be built-in or external
 - Open standards
 - On-premises, open standards connectivity preferred
 - Open standards only in the cloud also acceptable
 - Remote Management excluded from open standards & open access criteria

Communications & Open Access



- Aligns with the final R/F connected communications criteria:
 - Open standards:
 - In the NIST SGIP Catalog of Standards, or;
 - In the NIST Smart Grid Framework Table 4.1 or 4.2, or;
 - Adopted by ANSI or by a well recognized international SDO.
 - Communications hardware may be:
 - Built-in.
 - Proprietary external paired with module/device.
 - Open standards based port & module.
 - Open standards based port (no module) with one or more of the above.
 - Open Access – API available to interested parties

Consumption Reporting, Remote Management



- Also aligns with final R/F Connected Communications criteria
 - Energy consumption reporting allows implementation flexibility. API allows 3rd party access and includes reporting accuracy.
 - Remote management may be provided to 3rd parties at the discretion of the manufacturer

Operational Status, User Settings & Messages



- Proposes consumer-authorized reporting of current Demand Response and operational status (e.g., off, cycle in process, DAL, TALR).
 - Enables load-balancing entities to better assess available dispatch-able load. Increased importance for appliances that are not continuously operated
- At least two types of energy-related messages required, for example.
 - Notification of performance issues, or
 - Energy consumption that is outside the product's normal range.

Demand Response



- Builds off the recommended smart dishwasher definition included in the AHAM / efficiency advocate petition to ENERGY STAR.
- Delay Appliance Load Capability – cycle start moved outside of delay period.
 - Defaults:
 - 4-hour minimum delay
 - Capable of responding at the start of each operating cycle
 - Capable of responding at least 3x per rolling 24h period
 - Consumer override – before or during delay period.

Demand Response (cont)



- Section G clarifies that EPA expects products to be able to provide DR in all operational cycles. (i.e., not just in the cycle(s) tested in the DOE energy/water test).
- Temporary Appliance Load Reduction Capability – average power draw during the load reduction period reduced by at least 50%.
 - Defaults:
 - 10-minute minimum response duration.
 - Capable of responding at least 1x per operating cycle.
 - Consumer override – before or during load reduction period.

Stakeholder Feedback



- EPA welcomes stakeholder feedback on optional connected criteria.

Verification of Connected Functionality



- Compliance with connected functionality will be through examination of the product and/or product documentation.
- Additionally, DR functionality will be certified using an ENERGY STAR Test Method for Residential Dishwashers to Validate Demand Response (TBD).
 - DOE is planning to develop a test that will validate the DR capabilities of residential dishwashers, to be referenced in the V6.0 specification.
 - DOE is initiating this effort now and will be contacting manufacturers to obtain products for testing or to witness testing in manufacturer labs.
 - Products must be certified using this new ENERGY STAR test method in order to be eligible for the 5% allowance .

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Dishwasher Performance Testing



- Energy and water consumption testing will be conducted according to the DOE test procedure found at 10 CFR 430 Subpart B Appendix C1 (Appendix C1).
- Manufacturers have been using Appendix C1 since May 2013 to determine compliance with the energy conservation standards that took effect on that date.

Dishwasher Performance Testing



- Cleaning performance testing will be conducted according to the Test Method for Determining Residential Dishwasher Cleaning Performance Rev. Feb-2014.
 - The test method is based on the DOE test procedure in Appendix C1, and determines per-cycle Cleaning Indexes for each of the individual test cycle soil loads (heavy, medium, light).
 - Individual items in the test load are graded according to the ANSI/AHAM DW-1-2010 method.
 - The per-cycle Cleaning Index is on a 100-point scale using the ANSI/AHAM DW-1-2010 calculation.
- As indicated previously, the Draft 1 Version 6.0 includes cleaning performance reporting criteria.

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Anticipated Timeline for Version 6.0 Spec Revision



February 26, 2014	Draft 1, Version 6.0 Specification Released
March 21, 2014	Stakeholder Webinar (Today)
March 31, 2014	Comment Period Closes on Draft 1 Specification
May/June 2014	Draft 2 Specification Distributed, Stakeholder Webinar or Meeting, and Comment Period
July/August 2014	Final Draft Specification Distributed and Comment Period
Q4 2014 – tentative	Final V6.0 Specification Published

- EPA welcomes all partner and stakeholder comments **by March 31, 2014**
- Comments should be submitted in writing to appliances@energystar.gov

Questions?

Contacts



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