ENERGY STAR® Commercial Dishwasher Version 3.0 Specification and Test Method Discussion Document
July 2017

Overview
The U.S. Environmental Protection Agency (EPA) is sharing this ENERGY STAR Version 3.0 commercial dishwasher discussion document to invite stakeholder input on key topics for discussion prior to developing and releasing a Draft 1 Version 3.0 specification. EPA will host a webinar on **August 16, 2017 from 1:00 – 2:00 pm EST** to seek input from stakeholders on the topics outlined below. Please submit feedback and relevant data to commercialdishwashers@energystar.gov by October 15, 2017.

The main driver for this revision is the availability of a new American Society for Testing and Materials (ASTM) test method for washing performance. During the Version 2.0 specification development process, EPA noted that the Agency would revise the specification to address washing energy performance when the new test methods became available. EPA is requesting additional performance data based on the new test method. In addition, with this discussion document, EPA is seeking information on new product features and product types that offer promising energy and water savings.

Stakeholder engagement is key to the success of the ENERGY STAR program. As such, EPA looks forward to working with all stakeholder to revise the ENERGY STAR commercial dishwasher specification.

Equipment & Scope
Commercial dishwasher equipment classes include under counter, stationary rack door type, rack conveyor machines and flight type machines. Sanitation is a key performance characteristic for a commercial dishwasher; products may use single or multiple wash tanks, hot water, or chemicals for sanitization. The ENERGY STAR program addresses all of these product types. Based on market research and discussions with stakeholders, EPA believes the most common product types available in the market are currently within scope. However, if there is justification to consider additional product types, EPA welcomes stakeholder input.

Energy Savings Strategies
As part of the specification revision, EPA plans to introduce stricter idle energy performance requirements, along with introducing a washing energy performance metric. Based on market research EPA is aware of several energy savings strategies, including:

- Heat recovery technology (vent-less)
- Improved insulation
- Sophisticated controls and sensors
- Low power mode during extended periods of non-use
- Automatic pump shut-off during idle periods

EPA is interested in learning about other strategies and technologies being implemented to achieve improved energy and water efficiency. What other techniques can stakeholders share?

Water Saving Opportunities

In many regions across the United States, water conservation has become an important consideration. The water consumed by a commercial dishwasher to effectively sanitize utensils, trays, etc. can account for the majority of a commercial kitchen's total water consumption. As water availability continues to become a growing concern, product manufacturers will continue to develop innovative ways that a commercial dishwasher can perform its function while using less water, less energy and without sacrificing performance.

EPA understands that product manufacturers are using new technologies and design approaches that significantly reduce water consumption in commercial dishwashers. Examples of water efficiency techniques include:

- Multi-staging rinse water reuse for pre-rinse application
- Advanced sensor controls to conserve water during periods of non-washing
- Efficient rinse nozzles

EPA is interested in learning about other technologies and design approaches that can further increase water efficiency. What other techniques can stakeholders share?

Test Method

The current Version 2.0 specification references the *ENERGY STAR Test Method for Commercial Dishwashers (Rev. May-2012)*, which is used to measure idle energy rates for each type of eligible product. The Version 2.0 eligibility criteria include maximum idle energy rates and water consumption rates. Dishwashing machines can spend a large portion of their operating time in an idle, or stand-by condition. The idle energy rate of a dishwasher can have an impact on its overall energy consumption.

However, EPA understands that in order to effectively characterize the total energy profile of dishwashers and potential for energy and water savings, it is necessary to analyze performance data from both washing and idle settings, from both wash and idle energy tests. The current ENERGY STAR test method does not include a test procedure to measure wash energy consumption. EPA believes this metric is critical to accurately compare total energy performance of these products. The ASTM test methods EPA is proposing to adopt include washing energy performance, water rate and idle energy rate tests.

<u>Test Method References</u>

- ASTM F1696-15 *Standard Test Method for Energy Performance of Stationary-Rack, Door-Type Commercial Dishwashing Machines*
    - Applicable products include: under counter; stationary single tank, door type; and pot-pan-utensil type
- ASTM F1920-15 *Standard Test Method for Energy Performance of Rack Conveyor Commercial Dishwashing Machines*
    - Applicable products include: single tank conveyor; multiple tank conveyor; single tank flight type; and multiple tank flight type

Noteworthy Changes/Additions Based on New Test Methods

	Metric	Current ENERGY STAR test method requirement	New ASTM test method requirement ASTM F1696-15 ASTM F1920-15	Notes
Washing Energy Performance Test	Washing Energy Performance (expressed in total kWh/rack)	N/A	Described in ASTM F1696-15 (Section 10.7) and ASTM F1920-15 (Section 10.8)	New certification requirement
Energy Usage and Cycle Rate Performance Tests	Cycle Rate (expressed in racks/hr)	N/A	Described in ASTM F1696-15 (Section 11.8) and ASTM F1920-15 (Section 11.9.1.8)	New reporting requirement
Tested Voltage Configuration	Volts	N/A	N/A	New reporting requirement
Fresh Water Sanitizing or Post Sanitizing Rinse Stationary Rack Type Machines	Water pressure reading	(Section 6.1.b) requires verification within 1 psig of manufacturer's specified value	ASTM F1696-15 (Section 10.5.2) requires verification within 2 psig of the manufacturer's specified value	Modification to test method
Fresh Water Sanitizing or Post Sanitizing Rinse Stationary Conveyor Type Machines	Activation of sanitizing rinse	(Section 6.1.3.a) requires activation for 5 minutes and to verify that the water pressure is within 1 psig of the manufacturer's specified value	ASTM F1920-15 (Sections 10.7.1 and 10.7) require activation for at least 1 minute and to verify that the water pressure is within 2 psig of the manufacturer's specified value	Modification to test method
Pumped Water Sanitizing or Post Sanitizing Rinse Stationary Conveyor Type Machines	Activation of sanitizing rinse	(Section 6.1.4.a) requires activation for 5 minutes and to verify that the water pressure is within 1 psig of the manufacturer's specified value	ASTM F1920-15 (Section 10.7.1) requires activation of the sanitizing rinse for at least 1 minute and to verify that the water pressure is within 2 psig of the manufacturer's specified value	Modification to test method
Water Consumption Tests	Number of testing runs	Requires five repeat runs for all dishwasher types	Requires three repeat runs for all dishwasher types	Modification to test method

EPA believes that adopting these new test methods will provide additional value to purchasers and ensure ENERGY STAR is labeling top performing products within this product category. The Agency would like to offer stakeholders the opportunity to express any questions or concerns with adopting the ASTM test methods for the Version 3.0 specification. Do stakeholders have any suggestions that EPA should consider regarding the ASTM standard test methods?

*Note for Labs/CBs – The ATSM test methods specify a minor adjustment to instruments used to measure water consumption and idle rate energy (i.e., accuracy allowance). Please review.

Data Collection

This product category includes multiple equipment types and EPA recognizes the time required for stakeholders to test models of different types and configurations. As such, EPA is proposing a 3-month data collection period.

During this time, EPA will accept performance data for all products eligible to be certified. The scope of eligible products includes electric, high-temp and low-temp commercial dishwashers. EPA encourages stakeholders with performance data for any eligible commercial dishwasher units to submit data as soon

as possible, in support of this Version 3.0 revision, but no later than October 15, 2017 if it is to be considered for Draft 1.

Tentative Timeline
Revision Launch and Data Assembly: July – October 2017

- Discussion Guide: July 2017
- Stakeholder webinar: August 2017
- Draft 1 Version 3.0 and webinar: October 2017
- Draft 2 Version 3.0: November 2017
- Final Draft: December 2017
- Final: January 2018

Market Characteristics & Leasing Equipment
Based on past research, EPA understands that the upfront cost of high efficiency dishwashers can be a market barrier. The Agency is interested in learning whether there is still an incremental cost to developing machines that incorporate energy and water efficient measures. If so, what information can manufacturers or suppliers offer to help EPA better understand the range of incremental costs for efficient technologies?

In addition to incremental cost, EPA is interested in learning more about the way these products are sold and purchased. What percentage of dishwashers are direct sales and what percentage are leased to end-users?

Voltage Reporting Requirement
EPA has received some questions about testing products that may have more than one voltage configuration. EPA understands that products with more than one voltage configuration will not vary greatly with regard to efficiency performance across the voltage options (i.e., 208 V versus 240 V). Therefore, EPA is proposing that in the event a dishwasher has voltage versatility, it should be tested in its most energy consumptive (worst-case) scenario. This ensures the end user can be confident in the ENERGY STAR certification, regardless of the voltage setting in operation. In an effort to avoid confusion, EPA will require voltage to be reported along with the certification criteria. Do stakeholders have any feedback on this topic or other suggestions?

Connected Functionality Opportunity
EPA requests feedback on any connected functionality applications or other energy management systems that could be or are being introduced with commercial dishwashers. Demand response capabilities indicate some promising load shifting opportunities, and operational status reporting offers end-user's additional convenience when interacting with products. EPA sees an opportunity to help drive innovation and market adoption. Are there opportunities for both water and energy management and tracking, remote management, fault detection through the use of connected functionality?

Data Assembly
In support of this specification revision process, EPA has developed an energy and water performance data assembly template, available here. EPA encourages all stakeholders with data to submit information that will help inform this specification revision. Please fill out the template and return it electronically to commercialdishwashers@energystar.gov. Furthermore, if additional testing is

scheduled or is expected to be completed over the coming months, EPA would be interested in including the forthcoming results in the data analysis. In order to set meaningful performance requirements, it is important that the data is reflective of product availability in the market, including baseline product, high-efficiency product, and products in between. As a reminder, data assembled during the specification revision process does not need to be third-party certified or tested. However, upon certification, the partners must adhere to the third-party certification process.

Please send any written comments and performance data to commercialdishwashers@energystar.gov no later than October 15, 2017. If more time is needed to assemble data, please reach out to EPA. If you have any questions, please feel free to contact Kirsten Hesla, EPA, at Hesla.Kirsten@epa.gov and (202) 564-2984 or Adam Spitz, ICF, at Adam.Spitz@icf.com and (916) 231-7685.