



ENERGY STAR® Program Requirements for Commercial Dishwashers

Draft 2 Partner Commitments

Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified commercial dishwashers. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on commercial dishwashers and specifying the testing criteria for commercial dishwashers. EPA may, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at EPA's request;
- comply with current ENERGY STAR Identity Guidelines, describing how the ENERGY STAR marks and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;
- qualify at least one ENERGY STAR commercial dishwasher within one year of activating the commercial dishwashers' portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2) in effect at that time;
- provide clear and consistent labeling of ENERGY STAR qualified commercial dishwashers. The ENERGY STAR mark must be clearly displayed on the top/front of the product, in product literature (i.e., user manuals, spec sheets, etc.), on product packaging, and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed;
- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying commercial dishwasher models. Once the Partner submits its first list of ENERGY STAR qualified commercial dishwashers, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers;
- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified commercial dishwashers shipped (in units by model) or an equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR. The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;
- notify EPA of a change in the designated responsible party or contacts for commercial dishwashers within 30 days.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep EPA informed on the progress of these efforts:

- consider energy efficiency improvements in company facilities and pursue the ENERGY STAR mark for buildings;
- purchase ENERGY STAR qualified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes;
- ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;
- provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified product models;
- feature the ENERGY STAR mark(s) on Partner Web site and in other promotional materials. If information concerning ENERGY STAR is provided on the Partner Web site as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to the Partner Web site;
- provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, communicate, and/or promote Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR labeled products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) provide information to users (via the Web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products, and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;
- provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.



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Draft 2 Eligibility Criteria

Below is the **DRAFT 2** product specification for ENERGY STAR qualified commercial dishwashers. A product must meet all of the identified criteria if it is to earn the ENERGY STAR.

- 1) Definitions: Below are the definitions of the relevant terms in this document.
 - A. Dishwashing Machine: A machine designed to clean and sanitize plates, glasses, cups, bowls, utensils, and trays by applying sprays of detergent solution (with or without blasting media granules) and a sanitizing final rinse.
 - B. Under Counter Dishwasher: A machine with an overall height of less than 36-inches, in which a rack of dishes remains stationary within the machine while being subjected to sequential wash and rinse sprays, and is designed to be installed under food preparation workspaces. Under counter dishwashers can be either chemical or hot water sanitizing, with an internal booster heater for the latter.
 - C. Stationary Rack, Single Tank, Single Door Type Dishwasher: A machine in which a rack of dishes remains stationary within the machine while subjected to sequential wash and rinse sprays. This definition also applies to machines in which the rack revolves on an axis during the wash and rinse cycles. Subcategories of stationary door type machines include: single and multiple wash tank, double rack, pot, pan and utensil washers, chemical dump type and hooded wash compartment. Stationary rack, single tank, single door type dishwashers can be either chemical or hot water sanitizing, with an internal or external booster heater for the latter.
 - D. Single Tank Conveyor Dishwasher: A warewashing machine that employs a conveyor or similar mechanism to carry dishes through a series of wash and rinse sprays within the machine. Specifically, a single tank conveyor machine has a tank for wash water followed by a final sanitizing rinse and does not have a pumped rinse tank. This type of machine may include a pre-washing section ahead of the washing section and an auxiliary rinse section between the power rinse and final rinse sections. Single tank conveyor dishwashers can be either chemical or hot water sanitizing, with an internal or external booster heater for the latter.
 - E. Multiple Tank Conveyor Dishwasher: A conveyor type machine that has one or more tanks for wash water and one or more tanks for pumped rinse water, followed by a final sanitizing rinse. This type of machine may include a pre-washing section before the washing section and an auxiliary rinse section between the power rinse and final rinse sections. Multiple tank conveyor dishwashers can be either chemical or hot water sanitizing, with an internal or external booster heater for the latter.
 - F. Hot Water Sanitizing (High Temp) Machine: A warewashing machine that applies potable hot water to the surfaces of wares to achieve sanitization.
 - G. Chemical Sanitizing (Low Temp) Machine: A warewashing machine that applies potable water and a chemical sanitizing solution to the surfaces of wares to achieve sanitization.

Note: EPA received several suggestions for clarifying the definitions provided above so that they provide a better overall representation of the operation, design, and purpose of these machines. Also, a definition has been added for a multiple tank conveyor dishwasher, based on NSF/ANSI 170-2005. EPA is including this machine type in the list of products eligible for ENERGY STAR qualification. Proposed energy and water efficiency requirements for this machine type are provided in Section 3, below.

- 2) **Qualifying Products:** Commercial dishwashers must meet the definitions provided in Section 1, above, to be eligible for ENERGY STAR.

Note: Some stakeholders commented that the specification should address other categories of dishwashers, in particular: multiple tank conveyors; pot, pan and utensil; flight type; and glassware. In response, EPA conducted additional research on these product types, which included analyzing data provided in the NSF database. At this time, multiple tank conveyors show the greatest potential for ENERGY STAR labeling, offering a robust dataset that includes low energy and water using designs. The levels proposed in Table 1, below, are based on NSF and manufacturer supplied data. At this time, EPA is not pursuing **flight type** machines given that these are typically custom designed machines making it difficult to determine a specification requirement that would apply to all machine designs. Also, EPA sees this as a small, niche market. **Glassware machines** are not included because of the lack of available data in the NSF database. Stakeholders interested in including glassware washers in the specification are encouraged to provide idle and water usage data to EPA for consideration. Finally, **pot, pan and utensil machines** are not specifically identified as a separate category under this specification due to the realization that these machine types are inherently water and energy inefficient and also represent a more specialized and smaller, niche market. However, to encourage further innovation within this category EPA will allow pot, pan, and utensil machines to qualify as ENERGY STAR if they meet the idle and water consumption requirements for stationary single tank door type machines provided in Table 1, below.

- 3) **Efficiency Requirements for Qualifying Products:** Commercial dishwashers must meet the requirements provided below in Table 1 to qualify as ENERGY STAR. **Machines designed to be interchangeable in the field from high temp to low temp, and vice versa, must be indicated as such on their Qualified Product Information (QPI) form and must meet both the high temp and low temp requirements of Table 1, below, to qualify as ENERGY STAR.**

Table 1: Efficiency Requirements for Commercial Dishwashers				
Machine Type	High Temp Efficiency Requirements		Low Temp Efficiency Requirements	
	Idle Energy Rate*	Water Consumption	Idle Energy Rate*	Water Consumption
Under Counter	≤ 0.9 kW	≤ 1.0 gal/rack	≤ 0.5 kW	≤ 1.70 gal/rack
Stationary Single Tank Door**	≤ 1.0 kW	≤ 0.95 gal/rack	≤ 0.6 kW	≤ 1.16 gal/rack
Single Tank Conveyor	≤ 2.0 kW	≤ 0.70 gal/rack	≤ 1.6 kW	≤ 0.62 gal/rack
Multiple Tank Conveyor	≤ 2.0 kW	≤ 0.54 gal/rack	≤ 1.6 kW	≤ 0.54 gal/rack

* Note: Idle energy rate as measured with door closed.

** Note: Includes pot, pan, and utensil machines.

To determine gallons per rack, manufacturers must use the calculations provided below. These calculations are based on gallons per rack conversions provided in the NSF Products and Service Listing for commercial dishwashers at www.nsf.org.

$$\text{GPR} = \frac{\text{Conveyor Type}}{\text{CS} \times 60} \text{GPH} \times \text{RL}$$

Door Type

$$\text{GPR} = \frac{\text{GPH} \times (\text{WT} + \text{RT} + \text{DT} + \text{LT})}{3600}$$

Load Time= 5 seconds for straight through door-type dishwashers.

Load Time= 7 seconds for corner door-type dishwashers.

Undercounter Type

$$\text{GPR} = \frac{\text{GPH} \times (\text{WT} + \text{RT} + \text{DT} + \text{LT})}{3600}$$

Load time= 30 seconds for undercounter dishwashers.

WT= Wash Time in seconds.

RT= Rinse time in seconds.

DT= Dwell time in seconds.

RL= Rack length in feet.

LT= Load time.

CS= Maximum conveyor speed in feet per minute

GPH= Water use in gallons per hour.

Note: The proposed idle energy rates provided in Table 1 are based on data supplied by manufacturers over the last several months. EPA appreciates the efforts made by these manufacturers to contribute to the specification development process. While the dataset is not fully representative of all products available in the marketplace, it does provide EPA with enough information to propose levels that seek to initially cap idle energy use while more data can be collected through the ENERGY STAR qualification process. For this reason, these levels represent a large percentage of models that were submitted to EPA for consideration. It is also important to note that a smaller percentage of the models in this idle energy dataset actually meet both idle energy and water consumption requirements proposed above. EPA may revisit the idle energy rates once a more robust dataset is available and improvements in technology indicate an opportunity to garner additional direct energy savings. Coupled with the indirect energy savings that will be realized through reduced water use, the idle energy rates provided above seek to ensure that both energy and water efficiency are considered in product design.

One stakeholder commented that the proposed water consumption level for low temp stationary door type machines was not representative of the top performers within the dump and fill only dataset. EPA has confirmed through correspondence with manufacturers that approximately 90% of low temp door type machines use a dump and fill design, while the remaining 10% use a recirculating design. However, the purpose of this ENERGY STAR specification is to highlight the more energy and water efficient dishwashers available without eliminating or specifying any one technology. Recognizing the prevalence of low temp dump and fill designs in the marketplace today, EPA decided to develop a specification that is inclusive of dump and fill machines even though they are more water intensive by design. Specifically, EPA is proposing performance levels that allow the most water efficient dump and fill machines to qualify, as well as the most energy and water efficient recirculating machines. As manufacturers begin to recognize the benefits of offering and promoting ENERGY STAR qualified machines, EPA expects that more efforts will be made to design even more efficient low temp machines across all types of technologies.

4) **Test Criteria:** Manufacturers are required to perform tests and self-certify those product models that meet the ENERGY STAR guidelines. The test results must be reported to EPA using the Commercial Dishwasher QPI Form. In measuring water consumption and idle energy rate, partner agrees to use the following test standards:

- **Water Consumption:** NSF/ANSI 3-2003 Standard, *Commercial Warewashing Equipment*.
- **Idle Energy Rate for Hot Water and Chemical Sanitizing Undercounter and Stationary Rack Single Tank Door-Type Dishwashers:** ASTM Standard F1696, *Standard Test Method for Energy Performance of Single-Rack Hot Water Sanitizing, Door-Type Commercial Dishwashing Machines*.
- **Idle Energy Rate for Hot Water and Chemical Sanitizing Single and Multiple Tank Rack Conveyor Dishwashers:** ASTM Standard F1920, *Standard Test Method for Energy Performance of Rack Conveyor, Hot Water Sanitizing, Commercial Dishwashing Machines*.

Note: Although the titles of the ASTM test procedures listed above specifically call out hot water sanitizing machines the idle energy rate portion is also applicable, and should be used, for chemical sanitizing machines, where applicable.

Note: Some stakeholders expressed concern regarding compromised sanitation and cleanability that may result from reducing the amount of water used in the rinse cycle to meet the ENERGY STAR water consumption levels proposed in Table 1, above. In response to these concerns, EPA contacted NSF to discuss the current NSF-3 test procedure. Based on this discussion, EPA found that water consumption measurements are taken during the soil removal and sanitation tests, which means that the water consumption data verified and listed by NSF represents the rinse water amount needed to meet applicable NSF sanitation requirements. To ensure consistency in the results reported for ENERGY STAR qualified products, EPA must rely on testing within a controlled laboratory setting. Where possible, EPA ensures that safety and overall product performance is maintained with lower energy and water use. While there may be issues in the field regarding the continued ability of a machine to provide the appropriate level of sanitation, cleanliness, and water consumption once installed and operated, it is EPA's hope that manufacturers, end users, and service providers take the means necessary to maintain and service the equipment such that it continues to provide superior energy, water, and cleaning performance. However, EPA may consider providing additional guidance and education via the ENERGY STAR Web site on the importance of equipment maintenance to ensure continued superior energy, water, and cleaning performance.

Manufacturers are required to use the American Society for Testing and Materials' (ASTM) Standard Test Methods for the Door Type Dish Machines (F1696) and Conveyor Type Dish Machines (F1920) to test idle energy performance. Testing performed by several manufacturers over the last few months using the ASTM standards indicates that they are adequate for purposes of measuring idle energy use.

5) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR will be defined as the *effective date* of the agreement. The ENERGY STAR Commercial Dishwasher Specification shall go into effect on **October 11, 2007**.

Note: EPA would like to launch the ENERGY STAR commercial dishwasher specification at the North American Food Equipment Manufacturers (NAFEM) Show in October, 2007. Manufacturers are encouraged to comment on whether this venue would be appropriate, as well as the required length of time to allow for ENERGY STAR qualified models to be available at the time of the announcement. Based on the number and complexity of comments received on this Draft 2 document, EPA may propose a stakeholder meeting at the National Restaurant Association (NRA) Show in May 2007 to discuss and resolve any outstanding issues.

- 6) **Future Specification Revisions:** ENERGY STAR reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions. In the event of a specification revision, please note that the ENERGY STAR qualification is not automatically granted for the life of a product model. To qualify with the energy efficiency criteria of ENERGY STAR, a product model must meet the ENERGY STAR specification in effect on the date of manufacture.

ASTM Test Standard Review: ENERGY STAR plans to revisit this specification once the revision processes for ASTM F1696 and ASTM F1920 are complete. These test methods will address energy consumption in various modes of operation as well as water consumption.