

# CEE Residential Dishwasher Specification

Effective May 17, 2022

## Residential Dishwasher Efficiency Specification

Efficiency Level	Maximum Annual Energy Use (kWh/yr)	Water Consumption (gallons/cycle)
<b>Standard Dishwashers<sup>1</sup></b>		
CEE Tier 1 <sup>3</sup>	270	3.5
<b>Compact Dishwashers<sup>2</sup></b>		
CEE Tier 1	203	3.1

<sup>1</sup> Standard dishwashers are dishwashers that hold eight or more place settings.

<sup>2</sup> Compact dishwashers are dishwashers that hold fewer than eight place settings.

<sup>3</sup> CEE Tier 1 is aligned with ENERGY STAR Version 7.0 specification for residential dishwashers.

## Residential Dishwasher Connected Specification

In addition to an efficiency specification, CEE has requirements for dishwashers with connected functionality, as these products can help manage load and reduce demand on the grid. CEE requirements are consistent with the demand response functionality specified by EPA as part of the ENERGY STAR specification for dishwashers. CEE has imposed additional criteria by requiring a direct, open standards translation within the physical premise of the home for dishwashers with connected functionality. These requirements are intended to identify models that are enabled to support grid objectives, including load reduction and load delay, while offering possibilities for consumers to further save energy and money through greater knowledge and participation in grid services.

### A. Connected Dishwasher System

To claim compliance with the CEE connected specification, a Connected Dishwasher System shall include the appliance plus all hardware and software elements required to enable communication in response to consumer-authorized energy related commands, not including third-party remote management that may be made available solely at the discretion of the manufacturer. These elements may reside inside or outside of the appliance.

Connected capability shall be supported through at least two means, as identified in Section B.2. The specific design and implementation of the Connected Dishwasher System is at the manufacturer's discretion, provided it is interoperable with other devices via open communications protocols and enables economical consumer-authorized third-party access to the functionalities provided for in Sections D, F and G.

**CEE requires that a product enables economical and direct, on-premises, open standards interconnection.** Manufacturers may also choose to provide additional means to connect, including proprietary architecture and protocols.

The product must continue to comply with the applicable product safety standards—the addition of the functionality described below shall not override existing safety protections and functions.

## **B. Communications**

1. Open Standards—Communication with entities outside the Connected Dishwasher System that enables connected functionality (Sections D, F and G) must use, for all communication layers, at least one of the standards:
  - Included in the Smart Grid Interoperability Panel (SGIP) Catalog of Standards,
  - Included in the NIST vSmart Grid framework release 4.0 Table 23, or
  - Adopted by the American National Standards Institute (ANSI) or another well-established international standards organization such as the International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), International Telecommunication Union (ITU), Institute of Electrical and Electronics Engineers (IEEE) or Internet Engineering Task Force (IETF).
2. Communications Hardware Architecture—Communication with entities outside the Connected Dishwasher System that enables connected functionality described in Sections D through G shall be enabled by either option a), or the combination of option b) with options c) or d), according to the manufacturer's preference:
  - a) Open standards communication port on the appliance combined with open standards communications module
  - b) Open standards communication within the physical premises of the home
  - c) Built-in communication technology employing a manufacturer-maintained cloud connection
  - d) Manufacturer-specific external communication module(s) or device(s)

## **C. Open Access**

To enable interconnection with the product, in addition to Section B1 which requires open standards, an interface specification, application programming interface (API) or similar documentation shall be made available to interested parties that at a minimum allows transmission, reception, and interpretation of the following information:

- Energy consumption reporting specified in Section D that must include accuracy, units, and measurement interval
- Operational status, user settings, and messages specified in Section F if transmitted via a communication link
- Demand response specified in Section G

## **D. Energy Consumption Reporting**

In order to enable simple, actionable energy use feedback to consumers and consumer authorized energy use reporting to third parties, the product shall be capable of transmitting energy consumption data via a communication link to energy management systems and other consumer authorized devices, services, or applications. These data shall represent the product's interval energy consumption. It is recommended that data are reported in watt-hours for intervals of 15 minutes or less, however, representative data may also be reported in alternate units and intervals as specified in the product manufacturer's interface specification or API detailed in Section C.

The product may provide additional types of energy use feedback, such as energy use feedback on the product itself, or energy use associated with the previous cycle. Product feedback, if provided, may be in the units and format chosen by the manufacturer, for example, \$/month.

## **E. Remote Management**

The product shall be capable of receiving and responding to consumer authorized remote requests, not including third-party remote management which may be made available solely at the discretion of the manufacturer, via a communication link, similar to consumer controllable functions on the product. The product is not required to respond to remote requests that would compromise essential performance or product safety as determined by the product manufacturer.

## **F. Operational Status, User Settings, and Messages**

The product shall be capable of providing the following information to energy management systems and other consumer authorized devices, services, or applications via a communication link:

- o Operational and demand response status, for example, off or standby, cycle in process, delay appliance load, temporary appliance load reduction

The product shall be capable of providing the following information on the product to energy management systems and other consumer authorized devices, services, or applications via a communication link:

- o At least two types of messages relevant to the energy consumption of the product. For example, messages for clothes washers might address a performance issue or report energy consumption that is outside the product's normal range

The product shall be capable of storing operating schedules and consumer settings locally at the device should there be a temporary loss of connection from the communication pathway utilized for internal or external communication, or otherwise disrupted (e.g., in the case of an interruption to internet service at the house).

## G. Demand Response

The product shall have the capability to receive, interpret, and act upon consumer-authorized signals by automatically adjusting its operation depending on both signal contents and settings from consumers. At a minimum, the product shall be capable of providing the following for all cycle and setting combinations:

1. Delay Appliance Load Capability: The capability of the product to respond to a signal in accordance with consumer settings, except as permitted below, by delaying the start of an operating cycle beyond the delay period.
  - a. Default settings—The product shall ship with default settings that enable a response for at least four hours.
  - b. Consumer override—The consumer shall be able to override the product's Delay Appliance Load response at any time after the requesting signal has been received. If the consumer elects to override, the product is not required to respond to subsequent demand response signals requesting a response in the current operational cycle. However, responses in subsequent operational cycles shall not be automatically overridden.
  - c. The product shall be able to provide at least one Delay Appliance Load response per consumer initiated operating cycle, but is not required to provide more than three Delay Appliance Load responses in a rolling 24-hour period (with a maximum of one four-hour response per dishwasher cycle).
2. Temporary Appliance Load Reduction Capability: Upon receipt of signal and in accordance with consumer settings, except as permitted below, the product shall restrict its average power draw during the load reduction period to no more than 250 watts.
  - a. Default settings—The product shall ship with default settings that enable a response period of at least 10 minutes.
  - b. The product is not required to provide a response if the consumer selected wash cycle, as indicated in the product user documentation or on the product itself, is explicitly designed or primarily intended for sanitization, such as those in compliance with NSF/ANSI Standard 184.
  - c. Consumer override—The consumer shall be able to override the product's Temporary Appliance Load Reduction response at any time after the requesting signal has been received. If the consumer elects to override, the product is not required to respond to subsequent demand response signals requesting a response in the current operational cycle.
  - d. The product shall be able to provide at least one Temporary Appliance Load Reduction response per consumer initiated operating cycle.

If there is a loss of connectivity between the product and utility during a load management event, defined as the product's lack of response to the utility load management system within the bounds of response time set by the utility, or vice versa, the product will:

- Complete the load management event dictated operation as planned if participating in an event with a messaged set duration.
- Return to normal operations within 30 minutes of the start of the load management event dictated operation if no set time duration was messaged.

## **H. Information to Consumers**

If additional modules, devices, services, or infrastructure are part of the configuration required to activate the product's communications capabilities, prominent labels, or other forms of consumer notifications with instructions shall be displayed at the point of purchase and in the product literature. These shall provide specific information on what consumers must do to activate these capabilities, for example, "This product has Wi-Fi capability and requires Internet connectivity and a wireless router to enable interconnection with an Energy Management System or with other external devices, systems, or applications."

## **I. Device Security**

Where applicable, the product should be certified to a relevant cybersecurity industry standard such as UL 2900, UL IoT Security Rating, CSA T-200, or equivalent for that given product category. The product must also allow for secure over-the-air updates of firmware associated with normal product operation.

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