CEE SUPER EFFICIENT HOME APPLIANCES INITIATIVE
High efficiency specifications for RESIDENTIAL CLOTHES WASHERS
(Terms of Usage below)

Effective February 5, 2018

Efficiency Criteria

<table>
<thead>
<tr>
<th>Efficiency Level</th>
<th>Integrated Modified Energy Factor (IMEF)</th>
<th>Integrated Water Factor (IWF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard sized clothes washers (&gt; 2.5 cu. ft.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEE Tier 1(^3)</td>
<td>≥ 2.76</td>
<td>≤ 3.2</td>
</tr>
<tr>
<td>CEE Tier 2(^3)</td>
<td>≥ 2.92</td>
<td>≤ 3.2</td>
</tr>
<tr>
<td>CEE Advanced Tier(^4)</td>
<td>≥ 3.10</td>
<td>≤ 3.0</td>
</tr>
<tr>
<td>Small volume clothes washers (≤ 2.5 cu. ft.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEE Tier 1(^3)</td>
<td>≥ 2.07</td>
<td>≤ 4.2</td>
</tr>
<tr>
<td>CEE Tier 2(^3)</td>
<td>≥ 2.20</td>
<td>≤ 3.7</td>
</tr>
</tbody>
</table>

Connected Criteria

A. Connected Clothes Washer System

To claim compliance with the CEE Connected Specification requirements, a Connected Clothes Washer 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.

This capability shall be supported through at least two means, as identified in section B.2. The specific design and implementation of the Connected Clothes Washer System is at the manufacturer’s discretion, provided it is interoperable with other devices via open communications protocols and enables

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\(^1\) IMEF is a measure of the energy consumption of the total laundry cycle, washing and drying, normalized by capacity. It indicates how many cubic feet of laundry can be washed and dried with one kWh of electricity. As IMEF increases, efficiency increases.

\(^2\) IWF indicates the number of gallons of water needed for each cubic foot of laundry. A lower number indicates lower consumption and hence a more efficient use of water.

\(^3\) CEE Tiers 1 and 2 are performance levels intended to enable sufficient product volume for energy efficiency programs to achieve cumulative savings goals and to emphasize significant per unit savings over the performance baseline, which is typically the federal minimum efficiency standard. The CEE Tier 1 aligns with ENERGY STAR® Product Specification for Clothes Washers Version 8.0 and the CEE Tier 2 aligns with ENERGY STAR Most Efficient 2018 criteria for clothes washers.

\(^4\) A CEE Advanced Tier represents an aspirational level of efficiency and product performance, agreed by manufacturers to be technically feasible. While few or no products may fulfill the Advanced Tier’s standards at the time it is created and those that exist may not be appropriate for all applications, it lays the groundwork for future programs, provides a longer-term focus and shared performance target for manufacturers, and provides recognition for the first manufacturers to develop products that achieve new heights of efficiency and performance.
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
Open Standards—Communication with entities outside the Connected Clothes Washer 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 Smart Grid framework Tables 4.1 and 4.2
- 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)

Communications Hardware Architecture—Communication with entities outside the Connected Clothes Washer 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 that 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 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:

- 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:

- 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.

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.

2. Temporary Appliance Load Reduction Capability: The capability of the product to respond to a signal by providing load reduction for a short time period, typically 10 minutes. 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 50 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 cycles compliance with NSF Protocol P172 “Sanitization Performance of Residential and Commercial, Family-Sized Clothes Washers,” or
  - Allergen reduction, such as those cycles in compliance with NSF Protocol P351 “Allergen Reduction Performance of Residential and Commercial, Family-Sized Clothes Washers,” or
  - Laundering of handwash wool articles, such as those cycles in compliance with Woolmark Blue (formerly Gold) or Woolmark Green (formerly Platinum)

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 DR 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.

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.”

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