CEE Residential Water Heating Specification

Effective March 16, 2018

Widespread promotion of common performance specifications provides a consistent definition of efficiency to all market actors. The CEESM Residential Water Heating Initiative and Specification are designed to complement the ENERGY STAR® Residential Water Heaters Specification by encouraging the support and adoption of the EPA platform. The CEE tiers seek to identify meaningful levels of additional energy savings.

Gas-Fired Residential and Residential-Duty Commercial Storage Water Heater Specification

<table>
<thead>
<tr>
<th>Level</th>
<th>UEF</th>
<th>Other Mandatory Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Medium Draw Pattern</td>
</tr>
<tr>
<td>CEE Tier 1</td>
<td>≥ 0.64 UEF</td>
<td>≥ 0.68 UEF</td>
</tr>
<tr>
<td>CEE Tier 2</td>
<td>≥ 0.78 UEF</td>
<td></td>
</tr>
</tbody>
</table>

Gas-Fired Residential Tankless Water Heater Specification

<table>
<thead>
<tr>
<th>Level</th>
<th>UEF</th>
<th>Other Mandatory Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE Tier 1</td>
<td>≥ 0.87 UEF</td>
<td>ENERGY STAR Version 3.2 Compliance</td>
</tr>
<tr>
<td>CEE Tier 2</td>
<td>≥ 0.92 UEF</td>
<td></td>
</tr>
</tbody>
</table>

Heat Pump Water Heater Specification

<table>
<thead>
<tr>
<th>Level</th>
<th>Tank Volume</th>
<th>UEF</th>
<th>Other Mandatory Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE Tier 1*</td>
<td>≤ 55 gal</td>
<td>≥ 2.00 UEF</td>
<td>ENERGY STAR Version 3.2 Compliance</td>
</tr>
<tr>
<td></td>
<td>&gt; 55 gal</td>
<td>≥ 2.20 UEF</td>
<td></td>
</tr>
<tr>
<td>CEE Tier 2</td>
<td>Any</td>
<td>≥ 3.10 UEF</td>
<td></td>
</tr>
<tr>
<td>CEE Advanced Tier</td>
<td>Any</td>
<td>≥ 3.75 UEF</td>
<td></td>
</tr>
</tbody>
</table>

* Aligns with ENERGY STAR Version 3.2 specification
For Tier 2 and the Advanced Tier, the following additional requirements apply.

**Compressor Shutdown Notification**
The unit shall provide notification to the consumer that the heat pump operation of the product has been disabled in any of the following situations.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
<th>Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal, Temporary Event</td>
<td>The compressor is temporarily disabled due to specific operational controls (for example, low intake temperature or defrosting).</td>
<td>The unit shall display that the heat pump is not currently operating. The controls shall automatically restore compressor operation as soon as conditions return to allowable control parameters (for example, return to minimum intake temperature or completion of the defrost cycle).</td>
</tr>
<tr>
<td>User-Selected Override or Power Failure</td>
<td>The unit has a temporary, user-selectable heat pump override option.</td>
<td>The unit shall provide a default override period of up to 72 hours before returning to the previously selected operating mode (preferably to the as-shiped or better settings) except 100% electric resistance.</td>
</tr>
<tr>
<td>Product Failure Alarm</td>
<td>The unit’s heat pump has a failure and requires service.</td>
<td>The unit shall provide to the consumer an audible and visible alarm on the interior unit. The unit shall provide a consumer acknowledgement feature which turns off the audible alarm. The visual alarm shall be visible without removal of panels or covers, with clear nomenclature and enunciation to notify the homeowner to take the needed action to solve the problem.</td>
</tr>
</tbody>
</table>

**Default Settings**

**Minimal Use of Electric Resistance Element:** In default operating mode, units shall make minimal or no use of electric resistance heating elements in order to maximize energy savings potential. During the first draw of the standard DOE First Hour Rating Test, the electric resistance heating element shall not be turned on until at least 66 percent of the tank’s measured water volume has been withdrawn. Measured water volume is defined as the amount of water the unit actually stores under test, and not the nominal rated tank volume.

**Shipment Mode:** The unit shall be shipped in the default operational mode and settings used in demonstrating compliance to federal energy efficiency standards. Enhanced efficiency operational modes may be selected by the consumer during installation. Should a user initiate an override to a mode less energy efficient than the default condition, such selection will expire after a period of no more than 72 hours. Upon expiration, the appliance shall then automatically return to the mode previously selected by the user unless that mode was less efficient than the default, in which case it shall return to the default. The customer, technician, or installer shall have the ability to override the default
setting. In the event of total power loss to the unit, it shall revert to the last setting selected, as long as this setting is not electric only.

**Heat Pump Water Heaters: Optional Connected Criteria**

Units shall meet the following requirements and parameters in order to fulfill the optional CEE connected criteria.

A. **Criteria Scope**

B. **Connected Electric HPWH Definition and Key Aspects**
To claim compliance with the CEE Connected Criteria, a connected heat pump water heater must include the device plus at least one communication interface at the device level that conforms with an open communication standard, to enable the product owner or an authorized third party to monitor and predictably execute load management functions as defined in Section D. Manufacturers may also choose to include an additional interface that may or may not use open communication standards to provide load management and other services. The product must continue to comply with the applicable product safety standards; the inclusion of the functionality described below shall not supersede existing safety protections and functions.

C. **Connectivity**

**On-Premise, Open Standards Connectivity:** CEE requires that a product must enable economical and direct, on-premise, open standards-based translation using the physical and data-link layers of an industry-accepted, modular communication interface such as ANSI/CTA-2045-A. The open standards interface must be combined with an open standards communication module. Manufacturers may also choose to include a secondary communication interface to facilitate load management or other services that may be proprietary to the manufacturer or a designated third party.

**Open Access:** Manufacturers must provide any documentation that is required for the product owner or any third party to develop technologies to connect to the device’s communication interface.

D. **Load Management Capabilities**
To ensure that connected products respond in a predictable manner and provide a standardized set of data, CEE requires that products support a common set of load control and monitoring messages. For more information about these messages,

- Application NAK (negative acknowledgement)
- Outside communication connection status
- End shed/run normal
- Shed
- Critical peak event
- Grid emergency
- Present relative price
- Autonomous cycling and terminate cycling
- Load up
- Get/set user preference level
- Customer override
- Query and response: operational state
- Query and response: device information request
- Get/set commodity read request and get/set commodity read reply
- Get present water temperature

E. Consumer Override

Consumers shall be able to temporarily override their product’s response to any current and future load management signals. The override status must be made available through the open communication interface. Upon expiration of the override, the product shall automatically return to the user-selected operational mode.

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