Following is the Final Draft Version 1.0 product specification for ENERGY STAR qualified commercial water heaters. A product shall 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. Commercial Water Heater: A product that utilizes gas or electricity to heat potable water for use outside the heater upon demand, at a thermostatically controlled temperature, including:
   a. A storage type unit\(^1\) which heats and stores water within the appliance at a thermostatically controlled temperature for delivery on demand and that is industrial equipment, including:
      i. gas storage water heaters with an input rate greater than 75,000 British thermal units (Btu) per hour, and
      ii. electric heat pump water heater designed to transfer thermal energy from one temperature level to a higher temperature level for the purpose of heating water, including both air-source and water-source units, with an input rate greater than or equal to 1.6 kW.
   b. A gas instantaneous type unit\(^1\), with an input rating not less than 4,000 Btu/hr per gallon of stored water, and that is industrial equipment (input greater than 200,000 Btuh), including products meeting this description that are designed to heat water to temperatures of 180 °F or higher.

B. Thermal Efficiency (TE)\(^1\): The ratio of the heat energy (Btu/h) transferred to the water flowing through the water heater to the amount of energy (Btu/h) consumed by the water heater.

C. Standby Loss (SL)\(^1\): The average hourly energy, expressed in Btu per hour, required to maintain the stored water temperature.

D. Manufacturer Limited Warranty: An assurance by the manufacturer to the consumer that the water heater, including purchased system equipment and components, is guaranteed to work for a defined period of time.

E. Basic Model\(^1\): All units of a given type of covered product (or class thereof) manufactured by one manufacturer, having the same primary energy source, and which have essentially identical electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption, energy efficiency, water consumption, or water efficiency.

\(^1\) 10 CFR Part 431 Subpart G
Note: EPA has adopted the suggestion to clarify the definition for gas instantaneous water heaters by explicitly defining "industrial equipment" as units that have an input rate greater than 200,000 Btuh.

EPA received many stakeholder comments about the 1.6 kW compressor/fan input limit proposed for commercial electric heat pump water heaters in the Draft 1. After extensive EPA and DOE conversation with stakeholders, EPA remains interested in using the compressor and fan input power to distinguish between residential and commercial units, because commercial and residential units of all other types of water heaters are distinguished primarily by their input. EPA is also considering using output capacity to distinguish commercial units. EPA will participate in the Department of Energy (DOE)'s test method development and will continue to hold discussions with interested stakeholders on the appropriate definition for a commercial vs. residential product as the test method development continues.

2) Scope:

A. Included Products: Only products that meet the definition of a commercial water heater, as specified herein, which are marketed for sale in the commercial market are eligible for ENERGY STAR qualification.

B. Excluded Products: The following products are not eligible for qualification under this specification:

   a. Products that are covered under other ENERGY STAR product specifications. The list of specifications currently in effect can be found at [www.energystar.gov/specifications](http://www.energystar.gov/specifications).

   b. Oil fired water heaters.

   c. Combined heating, cooling and hot water systems.

   d. Storage water heaters with greater than 140 gallons of capacity.

Note: The scope of this specification is intended to cover water heaters sold for commercial applications only and are not intended to include heavy duty industrial applications. Therefore, EPA proposes to exclude water heater units greater than 140 gallon capacity from the scope of the specification.

3) Qualification Criteria:

A. Product Performance Requirements for Gas Water Heaters:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>ENERGY STAR Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Efficiency</td>
<td>( \geq 0.94 )</td>
</tr>
<tr>
<td>Maximum Standby Loss(^2) storage</td>
<td>( \leq 0.84 \times [(\text{Input Rate} / 800) + 110(\text{Volume},)^{1/2}] ) (Btu/h)</td>
</tr>
<tr>
<td>Maximum Standby Loss(^2) instantaneous</td>
<td>( \text{N/A} )</td>
</tr>
<tr>
<td>Minimum Manufacturer Limited Warranty</td>
<td>3 years on tank and/or heat exchanger and 1 year on parts</td>
</tr>
</tbody>
</table>

\(^2\) Volume is the rated volume in gallons. Input Rate is the nameplate input rate in Btu/hr.
Note: EPA received several comments about the proposed 0.94 Thermal Efficiency requirement for gas water heaters including suggestions to set the level at 0.90 TE. After stakeholder discussions, and in alignment with the program’s Guiding Principles, EPA is retaining the proposed Thermal Efficiency level as proposed. EPA found little evidence of significant per-unit manufacturing or installation cost differences between units with 0.90 TE and those with .94 TE ratings. Because of this, the 0.94 TE units provide a better pay back for purchasers (i.e., less than 2 years). In addition, purchasers have a sufficiently broad selection of brands and features that meet the 0.94 TE requirement. There are few models available between 0.90 and 0.94 TE, so the overall impact on availability of certified models by adopting the more stringent levels is small.

B. Product Performance Requirements for Electric Heat Pump Water Heaters:

Table 2: Criteria for Qualified Electric Heat Pump Water Heaters

<table>
<thead>
<tr>
<th>Criteria</th>
<th>ENERGY STAR Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency Metric TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Minimum Manufacturer Limited Warranty</td>
<td>TBD</td>
</tr>
</tbody>
</table>

Note: EPA received several comments on the appropriate warranty requirements for electric heat pump water heaters. We anticipate requiring a 5 year minimum warranty on the compressor, 3 year warranty on the tank (if provided with the unit from the point of manufacture) and 1 year on other parts, to match the requirements for other commercial storage water heaters. EPA will continue to work with stakeholders to finalize these requirements in parallel with test method development.

C. Product Safety Requirements:

Table 3: Safety Requirements for Qualified Water Heaters

<table>
<thead>
<tr>
<th>Product</th>
<th>ENERGY STAR Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Water Heaters</td>
<td>ANSI Z21.10.3/CSA 4.3</td>
</tr>
<tr>
<td>Electric Heat Pump Water Heaters</td>
<td>TBD</td>
</tr>
</tbody>
</table>

D. Significant Digits and Rounding:

a. All calculations shall be carried out with directly measured (unrounded) values.

b. Unless otherwise specified below, compliance with specification limits shall be evaluated using directly measured or calculated values without any benefit from rounding.

c. Directly measured or calculated values that are submitted for reporting on the ENERGY STAR website shall be rounded to the nearest significant digit as expressed in the corresponding specification limit. TE (expressed as a decimal) shall be rounded to the nearest 0.01 and SL shall be rounded to the nearest whole number. COP shall be rounded to the nearest 0.1.
4) Test Requirements:

A. One of the following sampling plans shall be used for purposes of testing for ENERGY STAR qualification:

a. A single unit is selected, obtained, and tested. The measured performance of this unit and of each subsequent unit manufactured must be equal to or better than the ENERGY STAR specification requirements. Results of the tested unit may be used to qualify additional individual model variations within a basic model as long as the definition for basic model provided in Section 1, above, is met; or

b. Units are selected for testing and results calculated according to the sampling requirements defined in 10 CFR Part 429, Subpart B § 429.44. The certified rating must be equal to or better than the ENERGY STAR specification requirements. Results of the tested unit may be used to qualify additional model variations within a basic model as long as the definition for basic model provided in Section 1, above, is met. Further, all individual models within a basic model must have the same certified rating based on the applicable sampling criteria per DOE’s regulations in Part 429 and this rating must be used for all manufacturer literature, the qualified product list, and certification of compliance to DOE standards.

B. When testing commercial water heaters, the following test methods shall be used to determine ENERGY STAR qualification:

Table 4: Test Methods for ENERGY STAR Qualification

<table>
<thead>
<tr>
<th>ENERGY STAR Requirement</th>
<th>Test Method Reference</th>
<th>Applicable Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Energy</td>
<td>10 CFR Part 431.106</td>
<td>Gas Water Heaters</td>
</tr>
<tr>
<td>Standby Loss</td>
<td>TBD</td>
<td>Heat Pump Water Heaters</td>
</tr>
</tbody>
</table>

5) Effective Date:

The ENERGY STAR Commercial Water Heater specification shall take effect December x, 2012. To qualify for ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on the model’s date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.

Note: EPA aims to finalize the Version 1.0 Commercial Water Heaters specification in late December 2012. As for all other revised and new specifications, partners are invited to certify their products to the new Version 1.0 specification as soon as it is finalized. For more information on the Third Party Certification process visit www.energystar.gov/3rdpartycert.

A few stakeholders requested that EPA choose an effective date that provides a nine-month transition. Unlike in the case of revised specifications, where a transition period is afforded to allow for appropriate treatment of collateral material for products that will not meet the forthcoming criteria, the introduction of a new specification does not call for such treatment. As such, the Version 1.0 specification will take effect immediately upon its publication.

6) Future Criteria Revisions:

EPA 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.