Following is the Updated 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 unit¹ 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 heaters 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 unit¹, with an input rating not less than 4,000 Btu/hr per gallon of stored water, and that is industrial equipment, including products meeting this description that are designed to heat water to temperatures of 180 °F or higher.

B. Energy Factor (EF)²: The ratio of useful energy output from the water heater to the total amount of energy delivered to the water heater.

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

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

E. 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.

F. Basic Model¹: 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
² Based on definition in 10 CFR 430, Subpart B, Appendix E
Note: In the previous Final Draft, EPA clarified the definition for gas instantaneous water heaters by defining “industrial equipment” as units that have an input rate greater than 200,000 Btu/hr. However, this change unintentionally excluded a certain class of water heaters i.e., instantaneous water heaters less than 200,000 Btu/hr designed to heat water above 180F and sold for commercial applications. EPA does not intend to exclude these products and is proposing to remove the language “input rate greater than 200,000 Btu/hr” from the instantaneous water heater definition.

EPA has also added a definition for Energy Factor since some water heaters with input rates less than 200,000 Btu/hr must be rated using Energy Factor under the U.S. Department of Energy (DOE) test method, i.e., 10 CFR 430 Subpart B.

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.

3) Qualification Criteria:

   A. Product Performance Requirements for Gas Water Heaters:

   Table 1: Requirements for Qualified Gas Water Heaters

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Type</th>
<th>ENERGY STAR Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Efficiency or Energy Factor</td>
<td>Storage; Instantaneous</td>
<td>TE ≥ 0.94 or EF ≥ 0.93</td>
</tr>
<tr>
<td>Maximum Standby Loss³</td>
<td>Storage</td>
<td>≤ 0.84 * [(Input Rate / 800) + 110(Volume)⁷/²] (Btu/hr)</td>
</tr>
<tr>
<td></td>
<td>Instantaneous</td>
<td>N/A</td>
</tr>
<tr>
<td>Minimum Manufacturer Limited Warranty</td>
<td>Storage; Instantaneous</td>
<td>3 years on tank and/or heat exchanger and 1 year on parts</td>
</tr>
</tbody>
</table>

³ Volume is the rated volume in gallons. Input Rate is the nameplate input rate in Btu/hr.
Note: To include smaller gas instantaneous water heaters, and in light of the fact that the U.S. Department of Energy (DOE) requires that some instantaneous water heaters sold in the commercial market with input rates less than 200,000 Btu/hr be rated using the Energy Factor (EF) metric while others are required to be rated using Thermal Efficiency (TE), EPA is proposing that manufacturers who seek ENERGY STAR certification use EF or TE as required by the federal standard. EPA is proposing that products with input rates less than 200,000 Btu/hr certifying using EF, meet or exceed a rating of .93. Products that meet this EF rating will deliver essentially equivalent efficiency in use to the previously vetted level of .94 set for products certified using TE. This level also ensures that top performers across all product types covered by this specification are eligible for the ENERGY STAR. EPA sought stakeholder input on a EF level that would be comparable to the proposed 0.94 TE level. There was broad agreement among stakeholders that the EF rating is typically about one point lower. There are several reasons why EF rating is typically lower than TE on a system: 1) energy losses experienced during the six draws of the 24 hour EF test as a result of the system experiencing multiple fire-up/cool-down cycles; 2) inherent system efficiencies at steady state full fired draw as required for the TE test compared to the EF test that requires 3 full fire draws and 3 minimum fire draws; and 3) additional electrical draw being accounted for in the EF metric.

EPA received stakeholder recommendations to either set the standby loss requirement at the federal standard level or to remove it from the specification. The purpose of ENERGY STAR is to provide differentiation in the marketplace and adopting the federal standard level does not support this guiding principle. EPA believes that the proposed standby loss requirement as proposed in the Final Draft recognizes manufacturer efforts to reduce energy consumption while in standby and provides sufficient product differentiation in the marketplace.

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>

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. SL shall be rounded to the nearest whole number.

   **Note:** EPA has deleted the guidance on the TE metric, as there is generic guidance
   available that the reported value should be rounded to the nearest significant digit as expressed in the corresponding
   specification limit.

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></td>
<td></td>
</tr>
<tr>
<td>Standby Loss</td>
<td>10 CFR Part 431.106</td>
<td>Gas Storage and Instantaneous Water Heaters ≥ 200,000 Btu/hr; and some Gas Instantaneous &lt; 200,000 Btu/hr input rate</td>
</tr>
<tr>
<td>Energy Factor</td>
<td>10 CFR Part 430, subpart B, Appendix E</td>
<td>Some Gas Instantaneous &lt; 200,000 Btu/hr input rate</td>
</tr>
<tr>
<td>TBD</td>
<td>TBD</td>
<td>Heat Pump Water Heaters</td>
</tr>
</tbody>
</table>

Note: EPA added the federal test method for EF, 10 CFR Part 430, subpart B, Appendix E, to the test methods table. This test method is applicable to some instantaneous water heaters with less than 200,000 Btu/hr input rate. This change would allow manufacturers who seek ENERGY STAR certification for instantaneous water heaters with less than 200,000 Btu/hr to use EF or TE as required by the federal standard.

5) Effective Date:

The ENERGY STAR Commercial Water Heater specification shall take effect February x, 2013. 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 the first week of February. EPA received stakeholder comments to choose an effective date that provides a nine-month transition. EPA would like to reiterate that the transition period is afforded for revised specifications to allow for appropriate time to update the product literature or any other related material. But for new specifications, no such transition is required. 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.