



ENERGY STAR Program Requirements Product Specification for Commercial Water Heaters

Eligibility Criteria Version 1.0: Final Draft

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7 Following is the **Final Draft** Version 1.0 product specification for ENERGY STAR qualified commercial
8 water heaters. A product shall meet all of the identified criteria if it is to earn the ENERGY STAR.

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10 **1) Definitions:** Below are the definitions of the relevant terms in this document.

11 A. Commercial Water Heater: A product that utilizes gas or electricity to heat potable water for use
12 outside the heater upon demand, at a thermostatically controlled temperature, including:

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14 a. A storage type unit¹ which heats and stores water within the appliance at a
15 thermostatically controlled temperature for delivery on demand and that is industrial
16 equipment, including:

17 i. gas storage water heaters with an input rate greater than 75,000 British thermal
18 units (Btu) per hour, and

19 ii. electric heat pump water heater designed to transfer thermal energy from one
20 temperature level to a higher temperature level for the purpose of heating water,
21 including both air-source and water-source units, with an input rate greater than
22 or equal to 1.6 kW.

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24 b. A gas instantaneous type unit¹, with an input rating not less than 4,000 Btu/hr per gallon
25 of stored water, and that is industrial equipment (input greater than 200,000 Btu/h),
26 including products meeting this description that are designed to heat water to
27 temperatures of 180 °F or higher.

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

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

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

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39 E. Basic Model¹: All units of a given type of covered product (or class thereof) manufactured by one
40 manufacturer, having the same primary energy source, and which have essentially identical
41 electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption,
42 energy efficiency, water consumption, or water efficiency.

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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.
 - 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 1: Requirements for Qualified Gas Water Heaters

Criteria		ENERGY STAR Requirements
Thermal Efficiency		≥ 0.94
Maximum Standby Loss ²	storage	≤ 0.84 * [(Input Rate / 800) + 110(Volume _r) ^{1/2}] (Btu/h)
	instantaneous	N/A
Minimum Manufacturer Limited Warranty		3 years on tank and/or heat exchanger and 1 year on parts

² Volume is the rated volume in gallons. Input Rate is the nameplate input rate in Btu/hr.

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

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 98 B. Product Performance Requirements for Electric Heat Pump Water Heaters:
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100 **Table 2: Criteria for Qualified Electric Heat Pump Water Heaters**

Criteria	ENERGY STAR Requirements
Efficiency Metric TBD	TBD
Minimum Manufacturer Limited Warranty	TBD

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

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 108 C. Product Safety Requirements:
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110 **Table 3: Safety Requirements for Qualified Water Heaters**

Product	ENERGY STAR Requirements
Gas Water Heaters	ANSI Z21.10.3/CSA 4.3
Electric Heat Pump Water Heaters	TBD

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114 D. Significant Digits and Rounding:
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- 116 a. All calculations shall be carried out with directly measured (unrounded) values.
- 117 b. Unless otherwise specified below, compliance with specification limits shall be evaluated
 118 using directly measured or calculated values without any benefit from rounding.
- 119 c. Directly measured or calculated values that are submitted for reporting on the ENERGY
 120 STAR website shall be rounded to the nearest significant digit as expressed in the
 121 corresponding specification limit. TE (expressed as a decimal) shall be rounded to the
 122 nearest 0.01 and SL shall be rounded to the nearest whole number. COP shall be
 123 rounded to the nearest 0.1.

124 **4) Test Requirements:**

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- 126 A. One of the following sampling plans shall be used for purposes of testing for ENERGY STAR
- 127 qualification:
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- 129 a. A single unit is selected, obtained, and tested. The measured performance of this unit and of
- 130 each subsequent unit manufactured must be equal to or better than the ENERGY STAR
- 131 specification requirements. Results of the tested unit may be used to qualify additional
- 132 individual model variations within a basic model as long as the definition for basic model
- 133 provided in Section 1, above, is met; or
- 134
- 135 b. Units are selected for testing and results calculated according to the sampling requirements
- 136 defined in 10 CFR Part 429, Subpart B § 429.44. The certified rating must be equal to or
- 137 better than the ENERGY STAR specification requirements. Results of the tested unit may be
- 138 used to qualify additional model variations within a basic model as long as the definition for
- 139 basic model provided in Section 1, above, is met. Further, all individual models within a
- 140 basic model must have the same certified rating based on the applicable sampling criteria
- 141 per DOE's regulations in Part 429 and this rating must be used for all manufacturer
- 142 literature, the qualified product list, and certification of compliance to DOE standards.
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- 144 B. When testing commercial water heaters, the following test methods shall be used to determine
- 145 ENERGY STAR qualification:
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Table 4: Test Methods for ENERGY STAR Qualification

ENERGY STAR Requirement	Test Method Reference	Applicable Products
Thermal Energy	10 CFR Part 431.106	Gas Water Heaters
Standby Loss		
TBD	TBD	Heat Pump Water Heaters

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150 **5) Effective Date:**

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152 The ENERGY STAR Commercial Water Heater specification shall take effect December x, 2012. To

153 qualify for ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on the

154 model's date of manufacture. The date of manufacture is specific to each unit and is the date on which a

155 unit is considered to be completely assembled.

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157 **Note:** EPA aims to finalize the Version 1.0 Commercial Water Heaters specification in late December

158 2012. As for all other revised and new specifications, partners are invited to certify their products to the

159 new Version 1.0 specification as soon as it is finalized. For more information on the Third Party

160 Certification process visit www.energystar.gov/3rdpartycert.

161 A few stakeholders requested that EPA choose an effective date that provides a nine-month transition.

162 Unlike in the case of revised specifications, where a transition period is afforded to allow for appropriate

163 treatment of collateral material for products that will not meet the forthcoming criteria, the introduction of a

164 new specification does not call for such treatment. As such, the Version 1.0 specification will take effect

165 immediately upon its publication.

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167 **6) Future Criteria Revisions:**

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169 EPA reserves the right to change the specification should technological and/or market changes affect its

170 usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the

171 specification are arrived at through industry discussions. In the event of a specification revision, please

172 note that the ENERGY STAR qualification is not automatically granted for the life of a product model.