



ENERGY STAR® Program Requirements for Residential Water Heaters

Partner Commitments

Following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacture and labeling of ENERGY STAR qualified products. The ENERGY STAR Partner must adhere to the following partner commitments:

Qualifying Products

1. Comply with current ENERGY STAR Eligibility Criteria, which define performance requirements and test procedures for residential water heaters. A list of eligible products and their corresponding Eligibility Criteria can be found at www.energystar.gov/specifications.
2. **Prior to associating the ENERGY STAR name or mark with any product**, obtain written certification of ENERGY STAR qualification from a Certification Body recognized by EPA for residential water heaters. As part of this certification process, products must be tested in a laboratory recognized by EPA to perform residential water heater testing. A list of EPA-recognized laboratories and Certification Bodies can be found at www.energystar.gov/testingandverification.

Using the ENERGY STAR Name and Marks

3. Comply with current ENERGY STAR Identity Guidelines, which define how the ENERGY STAR name and marks may be used. Partner is responsible for adhering to these guidelines and ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance. The ENERGY STAR Identity Guidelines are available at www.energystar.gov/logouse.
4. Use the ENERGY STAR name and marks only in association with qualified products. Partner may not refer to itself as an ENERGY STAR Partner unless at least one product is qualified and offered for sale in the U.S. and/or ENERGY STAR partner countries.
5. Provide clear and consistent labeling of ENERGY STAR qualified residential water heaters.
 - 5.1. The ENERGY STAR mark must be clearly displayed on the top/front of the product (on product labels and/or as a permanent mark), in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed.
 - 5.2. It is also recommended that the mark appear on the product packaging.

Verifying Ongoing Product Qualification

6. Participate in third-party verification testing through a Certification Body recognized by EPA for residential water heaters, providing full cooperation and timely responses. EPA/DOE may also, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at the government's request.

Providing Information to EPA

7. Provide unit shipment data or other market indicators to EPA annually to assist with creation of ENERGY STAR market penetration estimates, as follows:

- 7.1. Partner must submit the total number of ENERGY STAR qualified residential water heaters shipped in the calendar year or an equivalent measurement as agreed to in advance by EPA and Partner. Partner shall exclude shipments to organizations that rebrand and resell the shipments (unaffiliated private labelers).
- 7.2. Partner must provide unit shipment data segmented by meaningful product characteristics (e.g., type, capacity, presence of additional functions) as prescribed by EPA.
- 7.3. Partner must submit unit shipment data for each calendar year to EPA or an EPA-authorized third party, preferably in electronic format, no later than March 1 of the following year.

Submitted unit shipment data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner.

8. Report to EPA any attempts by recognized laboratories or Certification Bodies (CBs) to influence testing or certification results or to engage in discriminatory practices.
9. Notify EPA of a change in the designated responsible party or contacts within 30 days using the My ENERGY STAR Account tool (MESA) available at www.energystar.gov/mesa.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures, and should keep EPA informed on the progress of these efforts:

- Provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.
- Consider energy efficiency improvements in company facilities and pursue benchmarking buildings through the ENERGY STAR Buildings program.
- Purchase ENERGY STAR qualified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes.
- Feature the ENERGY STAR mark(s) on Partner website and other promotional materials. If information concerning ENERGY STAR is provided on the Partner website as specified by the ENERGY STAR Web Linking Policy (available in the Partner Resources section of the ENERGY STAR website), EPA may provide links where appropriate to the Partner website.
- Ensure the power management feature is enabled on all ENERGY STAR qualified displays and computers in use in company facilities, particularly upon installation and after service is performed.
- Provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified products.
- Provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, and communicate Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR website, etc. The plan may be as simple as providing a list of planned activities or milestones of which Partner would like EPA to be aware. For example, activities may include: (1) increasing the availability of ENERGY STAR qualified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrating the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) providing information to users (via the website and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products; and (4) building awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event.

- Join EPA's SmartWay Transport Partnership to improve the environmental performance of the company's shipping operations. The SmartWay Transport Partnership works with freight carriers, shippers, and other stakeholders in the goods movement industry to reduce fuel consumption, greenhouse gases, and air pollution. For more information on SmartWay, visit www.epa.gov/smartway.
- Join EPA's Green Power Partnership. EPA's Green Power Partnership encourages organizations to buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-based electricity use. The partnership includes a diverse set of organizations including Fortune 500 companies, small and medium businesses, government institutions as well as a growing number of colleges and universities. For more information on Green Power, visit www.epa.gov/greenpower.



ENERGY STAR® Program Requirements

Product Specification for Residential Water Heaters

Eligibility Criteria

Version 1.1

Following is the **Version 1.1** product specification for ENERGY STAR qualified 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. **Residential Water Heater:** A product that utilizes oil, gas, or electricity to heat potable water for use outside the heater upon demand, including:
 - a. Storage type units which heat and store water at a thermostatically controlled temperature, including: gas storage water heaters with an input of 75,000 British thermal units (Btu) per hour or less; oil storage water heaters with an input of 105,000 Btu per hour or less; and electric storage water heaters with an input of 12 kilowatts or less. Gas condensing products are defined as storage-type units in which the flue gases condense and the thermal energy is used to help heat the water.
 - b. Tankless (or “instantaneous”) type units which heat water but contain no more than one gallon of water per 4,000 Btu per hour of input, including: gas instantaneous water heaters with an input of 200,000 Btu per hour or less; oil instantaneous water heaters with an input of 210,000 Btu per hour or less; and electric instantaneous water heaters with an input of 12 kilowatts or less.
 - c. Heat pump type units, with a maximum current rating of 24 amperes at a voltage no greater than 250 volts and designed to transfer thermal energy from one temperature level to a higher temperature level for the purpose of heating water, including all ancillary equipment such as fans, storage tanks, pumps, or controls necessary for the device to perform its function.
 - d. Solar type units which have received an OG-300 rating from the Solar Rating and Certification Corporation.
- B. **Energy Factor:** Energy Factor (“EF”) is the ratio of useful energy output from the water heater to the total amount of energy delivered to the water heater.
- C. **Solar Fraction:** Solar Fraction (“SF”) is the portion of the total conventional hot water heating load (delivered energy and standby losses) provided by solar energy.
- D. **First-Hour Rating:** The First-Hour Rating (“FHR”) is the amount of hot water in gallons a storage water heater can supply per hour (starting with a tank full of hot water).
- E. **Gallons per Minute:** Gallons per Minute (“GPM”) is the amount of hot water in gallons a tankless water heater can supply per minute over a 77°F rise.
- F. **Manufacturer Limited Warranty:** Manufacturer limited warranty is an assurance by the manufacturer to the consumer that the water heater, including purchased system equipment and components, are guaranteed to work for a defined period of time.
- G. **Basic Model:** All units of a given type of covered product (or class thereof) manufactured by one manufacturer and which have the same primary energy source and which, with the exception of immersed heating elements, do not have any differing electrical, physical, or functional characteristics that affect energy consumption.

2) Scope:

- A. Included Products: Only products that meet the definition of a residential water heater, as specified herein, and which are of the gas storage, gas condensing, heat pump products in the “drop in” or “integrated” configuration, gas tankless, or solar type are eligible for ENERGY STAR qualification.
- B. Excluded Products: Electric resistance water heaters, commercial sized products, add-on heat pump water heaters, and combination appliances that supply both space and water heating are not eligible for ENERGY STAR.

3) Qualification Criteria:

- A. Product Performance Requirements:

Table 1: Gas Storage Requirements			
Energy Factor	First-Hour Rating	Warranty	Safety
$EF \geq 0.67$	$FHR \geq 67$ gallons per hour	Warranty \geq 6 years on sealed system	ANSI Z21.10.1/CSA 4.1

Table 2: Whole-Home Gas Tankless Requirements			
Energy Factor	Gallons-Per- Minute	Warranty	Safety
$EF \geq 0.82$	$GPM \geq 2.5$ over a 77°F rise	Warranty \geq 10 years on heat exchanger and 5 years on parts	ANSI Z21.10.1/CSA 4.1 or ANSI Z21.10.3/CSA 4.3, depending on burner size

Table 3: Gas Condensing Requirements			
Energy Factor	First-Hour Rating	Warranty	Safety
$EF \geq 0.8$	$FHR \geq 67$ gallons per hour	Warranty \geq 8 years on sealed system	ANSI Z21.10.1/CSA 4.1

Table 4: Heat Pump Water Heater Requirements			
Energy Factor	First-Hour Rating	Warranty	Safety
$EF \geq 2.0$	$FHR \geq 50$ gallons per hour	Warranty \geq 6 years on sealed system	UL 174 and UL 1995

Table 5: Solar Water Heater Requirements		
Solar Fraction	Warranty	Safety
SF \geq 0.5	Warranty \geq 10 years on solar collector, 6 years on storage tank, 2 years on controls and 1 year for piping and parts.	OG-300 Certification from the SRCC.

B. Significant Digits and Rounding:

- a. All calculations shall be carried out with actual measured or observed values. Only the final result of a calculation shall be rounded. Unless otherwise specified in 10 CFR part 430 or part 431, calculated results shall be rounded to the nearest significant digit as expressed in the corresponding specification limit.
- b. Unless otherwise specified, compliance with specification limit shall be evaluated using exact values without any benefit from rounding.

Note: Solar water heater results shall match published performance in the Solar Rating and Certification Corporation (SRCC) directory.

4) **Test Requirements:**

- A. A representative unit shall be selected for testing based on the definition for Basic Model provided in Section 1, above. **Note:** a Basic Model cannot be used to obtain ENERGY STAR qualification status for unique models.
- B. When testing residential water heaters, the following test methods shall be used to determine ENERGY STAR qualification:

Table 6: Test Methods for ENERGY STAR Qualification	
ENERGY STAR Requirement	Test Method Reference
Energy Factor	DOE Test Procedure found in 10CFR430, Subpart B, Appendix E*
First Hour Rating	
Gallons per minute	
Solar Fraction	From SRCC OG-300, using the formula $SF=(1- EF/SEF)$, where the EF for electric auxiliary products is 0.9 and the EF for gas auxiliary products is 0.6

***Note on recovery efficiency:** For thermostatically-controlled water heaters that do not completely recover or do not undergo a recovery cycle prior to the start of the second draw of the simulated-use test, the recovery efficiency shall be determined as specified in Section 11.2 of ASHRAE 118.2.

- 5) **Effective Date:** The ENERGY STAR Residential Water Heater specification shall take effect on **January 1, 2009**, with the exception of gas storage products. The gas storage criteria shall take effect on **September 1, 2010**. 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 (e.g., month and year) on which a unit is considered to be completely assembled.

- 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.