



EPA ENERGY STAR® Program Requirements Product Specification for Commercial Coffee Brewers

Eligibility Criteria Final Draft: Version 1.0

Following is the **Final Draft Version 1.0** product specification for ENERGY STAR certified commercial coffee brewers. 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 Coffee Brewers: Commercial appliances designed to heat water and brew coffee.¹
- B. Residential Coffee Brewers: Residential appliances designed to heat water and brew coffee.
- C. Brew Event: The sequence of brewing a single cup (*Type I*) or batch (*Type II*) of coffee, starting with the initiation of a brew event by the user, and including the time for the remaining water to drip through the filter.²
- D. Brew Volume: The volume of brewed coffee per brew event. May be expressed in fluid ounces or gallons. May also be referred to as brew capacity.
- E. Tank Capacity: The volume of water the brewer tank can accommodate, expressed in gallons.

Commercial Coffee Brewer Products

- F. Bean-to-Cup: Single serving commercial coffee brewers designed to automatically measure and grind whole coffee beans per brew event.
- G. Liquid Coffee Dispensers: Single serving dispensers that mix coffee concentrate with hot water prior to delivery.
- H. Powdered Drink Dispensers: Single serving dispensers that mix powdered coffee (i.e. Cappuccino) with hot water prior to delivery.
- I. Espresso Machines: Machines that prepare single servings of espresso coffee through high-pressure steam.
- J. Type I: A single serving commercial coffee brewer designed to use brewer-specific, single-use packages of pre-ground coffee and has a standard brew volume of 6 to 24 fluid ounces per brew event.
- K. Type II: A batch commercial coffee brewer designed to use loose, ground coffee and a re-usable or single-use coffee filter, and has a standard brew volume of >24 to 384 fluid ounces per brew event. Type II brewers shall not use disposable packages of pre-ground coffee.
 - a. Small Batch Type II: Brew volume capacity with a range of 24oz. – 128oz.
 - b. Medium Batch Type II: Brew volume capacity with a range of >128oz. – 256oz.
 - c. Large Batch Type II: Brew volume capacity of >256oz. – 384oz.

¹ American Society for Testing and Materials (ASTM) Standard F2990-12 *Standard Test Method for Commercial Coffee Brewers*.

² Ibid.

- L. Type II with Warming Plates: A batch commercial coffee brewer (Type II) with the addition of 1 or more decanter warming plates.
- M. Type III: An urn or satellite commercial coffee brewer and has a standard brew volume of < 384 fluid ounces or greater per brew event. These products may contain more than one dispense station for simultaneous or sequential dispensing into more than one holding reservoir.
- N. Urn Coffee Brewers: Bulk commercial coffee brewers that brew into large, self-contained, insulated warming vessels with internal heating elements to maintain product temperature. Warming vessels may also use heat transferred from the hot water reservoir to maintain optimal serving temperature.
- O. Satellite Coffee Brewers: Bulk commercial coffee brewers that brew into large, removable vessels without internal heating elements. These products may include a separate heated docking station for remote use.
- P. Warming Plate: A heated metal plate intended to hold a non-insulated coffee decanter at optimal serving temperature after a brew event.

Energy Efficiency Metrics

- Q. Normalized Heavy-Use Brew Energy Rate: The average rate of the coffee brewer energy consumption during a brew cycle, calculated across brew volumes for comparison. Also referred to as normalized brew energy rate.
- R. Normalized Ready-to-Brew Idle Energy Rate: The average rate of the coffee brewer energy consumption while it is maintaining or holding at a stabilized ready-to-brew operating temperature. Also referred to as normalized idle energy rate.
- S. Energy Save Mode: An optional low power mode that is designed by the manufacturer to be different from and use less energy than ready to brew state. This is an optional idle energy rate used for reporting purposes only. The hot water tank temperature shall not drop below 140°F in this mode of operation.

Note: During the ENERGY STAR Commercial Coffee Brewers Draft 1 stakeholder meeting held on November 4, 2015, stakeholders agreed that a hot water tank temperature drop below 140°F could introduce safety concerns associated with bacteria growth. EPA understands this concern and is including a minimum energy save mode tank temperature of 140°F, which is reflected in Section 1.S. Even with a minimum temperature threshold, EPA believes there are potential energy savings to be achieved through a low power mode. Therefore, EPA will continue to accept data on this optional mode and will list the data on the ENERGY STAR qualified products list (QPL).

Water Conditions

- T. Average Tank Temperature: The average temperature of the water held in the reservoir tank during ready-to-brew idle and energy save mode conditions.

Certification Terms

- U. Product Family: Individual models offered within a product line based on the same engineering design, including brew capacity and number of warming plates, as applicable. Acceptable differences within a product family for purposes of certification include aesthetic additions that do not impact coffee brewer energy consumption while in operation or during any idle situation. The addition of energy save mode options does not preclude products from a product family if all other design elements remain constant.

2) Scope:

- A. **Included Products:** Products, including Satellite Coffee Brewers without a heated docking station, that meet the definitions of Commercial Coffee Brewers and Type II (with or without warming plates) as specified herein are eligible for ENERGY STAR certification.

To ensure only eligible coffee brewers qualify under this specification, products shall be third-party certified to UL 197, *Standard for Commercial Electric Cooking Equipment*.

- B. **Excluded Products:** This specification is intended for commercial coffee brewers. Products designed for residential applications are ineligible for ENERGY STAR under this specification. The following commercial coffee brewers are ineligible for ENERGY STAR:

- a. Bean-to-Cup Brewers.
- b. Liquid Coffee Dispensers.
- c. Powdered Coffee Dispenser.
- d. Espresso Machines.
- e. Urn Brewers.

Note: During the ENERGY STAR stakeholder meeting, one participant commented that some urn and satellite brewers meet the maximum capacity brew volume of large Type II brewers, and therefore, should be eligible for ENERGY STAR certification. After consideration, EPA has determined that urn brewers will remain out of scope due to their classification as Type III brewers, which are not covered by the referenced ASTM F-2990-12, *Standard Test Method for Commercial Coffee Brewers*. However, EPA agrees that satellite brewers without separate heated docking stations, that do not exceed the brew capacity specified, would be classified as Type II brewers. Therefore, EPA has expanded the scope of eligible products to include satellite coffee brewers without separate heated docking stations, that also meet the Type II brewers definition.

In Draft 1 of this specification, EPA was optimistic about the opportunity of expanding the scope to include Type I brewers. However, the Agency was unable to assemble an adequate amount of Type I data to do so at this time. Therefore, the scope will remain limited to Type II brewers only. The Agency will continue to work with stakeholders to determine if there are opportunities for further scope expansion in the future.

3) Certification Criteria:

- A. **Energy Efficiency Requirements:**

Table 1: Energy Efficiency Requirements Type II Commercial Coffee brewers	
Normalized Ready-to-Brew Idle Energy Rate	≤ 65 watts/gal
Normalized Heavy-Use Brew Energy Rate	≤ 280 watts/gal

Note: EPA proposed a normalized approach for determining brewer compliance in Draft 1 in an effort to equitably compare brewers with different tank capacities and brew rates. Stakeholders were supportive of this approach.

Technology and Product Availability

There was some concern that the proposed levels may inadvertently favor a single technology or manufacturer. EPA conducted a technology assessment, including a review of the different types of brewers in the dataset. The results of this review indicate there are different components and design features among the brewers, and no single technology is favored. EPA sets levels to ensure that customers have multiple product options from various manufacturers when purchasing ENERGY STAR

Note Cont. equipment. Based on currently available data, a variety of manufacturers have products that will be eligible for certification.

There was also concern about product availability throughout the U.S. market. EPA confirmed that the products that meet the ENERGY STAR levels are readily available through various supply channels, including on-line procurement.

Savings Potential

EPA estimates the average energy savings for ENERGY STAR commercial coffee brewers, compared to standard products, could range from 15 – 30%. EPA has posted the data plots used to develop the included levels on www.energystar.gov/productdevelopment. The normalized idle and brew rate data points in these plots offer a good indication of potential energy savings of products.

Stakeholders expressed concern over the incremental costs associated with more energy efficient models. EPA performed a survey of costs and found that in most cases there will be no incremental cost. In fact, most of the efficient products in the dataset cost less when compared to similar products with lower efficiencies.

B. Normalized Calculations:

- a. Ready-to-Brew Idle Rate and Heavy-Use Brew Rate: The following calculations shall be used to normalize the ready-to-brew idle and heavy-use brew energy rates:

Normalized Ready-to-Brew Idle Energy Rate, W/Gal:

$$q_{idle,n} = \frac{q_{ready}(W)}{Tank\ Capacity\ (gal)}$$

Normalized Heavy-Use Brew Energy Rate, W/Gal:

$$q_{brew,n} = \frac{q_{brew}(W)}{PC\ \left(\frac{gal}{h}\right)}$$

Where

q_{ready} = Ready-to-brew energy rate (W)

$Tank\ Capacity$ = (Gal)

q_{brew} = Heavy-use brewing energy rate (W)

PC = Production capacity of the coffee brewer (Gal/hr)

C. Significant Digits and Rounding:

- a. All calculations shall be carried out with directly measured (unrounded) values.
- b. Unless otherwise specified, compliance with specification limits shall be evaluated using exact values without any benefit from rounding.
- c. Normalized Heavy-Use Brew Energy Rate: Calculated heavy-use brew energy rate values that are submitted for reporting on the ENERGY STAR website shall be rounded to the nearest one hundredth (0.01).
- d. Normalized Ready-to-Brew Idle Energy Rate: Calculated idle rate values that are submitted for reporting on the ENERGY STAR website shall be rounded to the nearest one hundredth (0.01).

4) Test Requirements:

- A. Representative models shall be selected for testing per the following requirements:
- a. For certification of an individual product model, the representative model shall be equivalent to that which is intended to be marketed and labeled as ENERGY STAR.
 - b. For certification of a product family, any model within that product family can be tested and serve as the representative model. When submitting product families, manufacturers continue to be held accountable for any efficiency claims made about their products, including those not tested or for which data was not reported.
- B. When testing commercial coffee brewers, the following test method shall be used to determine ENERGY STAR certification.

Table 2: Test Method for ENERGY STAR Certification		
Category	ENERGY STAR Requirement	Test Method Reference
Commercial Coffee Brewers	Normalized Heavy-Use Brewing Energy Rate, Normalized Ready-to-Brew Idle Energy Rate	ASTM F-2990-12, <i>Standard Test Method for Commercial Coffee Brewers</i>

- C. Additional Reporting Requirements:
- a. The pre-heat time and energy for all commercial coffee brewers shall be reported.
 - b. The production capacity (gal/h) for all commercial coffee brewer heavy-use brew tests shall be reported.
 - c. The average tank temperature operating in the ready-to brew idle mode shall be reported.
 - d. Commercial coffee brewers that include energy saving feature(s) and that meet the minimum requirement of the energy save mode definition in Section 1.S. shall be reported, if applicable.
 - e. The idle rate (watts/gal) in an energy save mode may be reported, if applicable.
 - f. The average tank temperature operating in the energy save mode may be reported, if applicable.

Note: Based on stakeholder feedback, EPA has included reporting requirements for the idle rate in energy save mode and average tank temperature in energy save mode for applicable models to benefit the end-user in calculating total cost of ownership. The Agency believes a more complete energy and operational performance profile will help customers identify the best energy efficient model for their needs.

- 5) Effective Date:** The ENERGY STAR Commercial Coffee Brewer Specification shall take effect immediately upon finalization. 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 anticipates finalizing this Version 1.0 specification in May, 2016. Upon finalization, manufacturers will be able to immediately begin certifying products.

- 6) Future Specification 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 ENERGY STAR certification is not automatically granted for the life of a product model.