



# ENERGY STAR® Program Requirements Product Specification for Residential Electric Cooking Products

## Eligibility Criteria Final Draft Version 1.0

Following is the **Final Draft Version 1** product specification for ENERGY STAR certified residential electric cooking products. A product shall meet all of the identified criteria to earn the ENERGY STAR.

### 1. DEFINITIONS:

- A. Active cooling: the feature by which a conventional electric cooking top cools a cooking zone via an integrated fan after the power to all cooking zones on the cooking top has been turned off.
- B. Active mode<sup>1</sup>: a mode in which the product is connected to a mains power source, has been activated, and is performing the main function of producing heat by means of electric resistance heating or electric inductive heating.
- C. Basic model<sup>2</sup>: 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 characteristics that affect energy consumption or energy efficiency.
- D. Combined electric cooking product<sup>1</sup>: a household cooking appliance that combines an electric cooking product with other appliance functionality, which may or may not include another cooking product. Combined electric cooking products include the following products: conventional electric range, microwave/conventional electric cooking top, microwave/conventional electric oven, and microwave/conventional electric range.
- E. Combined low-power mode<sup>3</sup> the aggregate of available modes other than active mode, but including the delay start mode portion of active mode.
- F. Conventional electric cooking top<sup>2</sup>: a category of cooking products which is a household cooking appliance consisting of a horizontal surface containing one or more surface units that utilize electric resistance heating or electric inductive heating. This includes any conventional electric cooking top component of a combined electric cooking product.
- G. Cooking area<sup>1</sup>: an area on a conventional electric cooking top surface heated by an inducted magnetic field where cookware is placed for heating, where more than one cookware item can be used simultaneously and controlled separately from other cookware placed on the cooking area, and that may or may not include limitative markings.
- H. Cooking zone<sup>1</sup>: a part of a conventional electric cooking top surface that is either a single electric resistance heating element, multiple concentric sizes of electric resistance heating elements, or an inductive heating element that is defined by limitative markings on the surface of the electric cooking top and can be controlled independently of any other cooking area or

<sup>1</sup> Modified from 10 CFR 430, Subpart B, Appendix I1 to limit scope to conventional electric cooking products for ENERGY STAR's purposes.

<sup>2</sup> Modified from 10 CFR 430 Subpart A, Section 430.2 to limit scope to conventional electric cooking products for ENERGY STAR's purposes.

<sup>3</sup> 10 CFR 430, Subpart B, Appendix I1.

47 cooking zone.

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- 49 I. Inactive mode<sup>3</sup>: a standby mode that facilitates the activation of active mode by remote switch
- 50 (including remote control), internal sensor, or timer, or that provides continuous status display.
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- 52 J. Integrated Annual Energy Consumption (IAEC): the sum of the conventional electric cooking
- 53 top annual active mode energy consumption and the annual combined low-power mode energy
- 54 consumption of a conventional electric cooking top or any conventional electric cooking top
- 55 component of a combined electric cooking product.
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- 57 K. Minimum-above-threshold power setting<sup>4</sup>: the power setting on a conventional electric cooking
- 58 top that is the lowest power setting that results in smoothed water temperature data that
- 59 meet the evaluation criteria specified in Section 7.5.4.1 of IEC 60350–2. This power setting is
- 60 also referred to as the simmering setting.
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- 62 L. Multi-ring cooking zone<sup>4</sup>: a cooking zone on a conventional electric cooking top with multiple
- 63 concentric sizes of electric resistance heating elements.
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- 65 M. Off mode<sup>5</sup>: any mode in which a product is connected to a mains power source and is not
- 66 providing any active mode or standby function, and where the mode may persist for an
- 67 indefinite time. An indicator that only shows the user that the product is in the off position is
- 68 included within the classification of an off mode.
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- 70 N. Portable conventional electric cooking top: a conventional electric cooking top designed to be
- 71 moved from place to place.
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- 73 O. Smoothened water temperature<sup>5</sup>: the 40-second moving-average temperature as calculated in
- 74 10 CFR 430, Subpart B, Appendix I1 according to Section 7.5.4.1 of IEC 60350-2, rounded to
- 75 the nearest 0.1 degree Celsius.
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- 77 P. Specialty cooking zone<sup>5</sup>: a warming plate, grill, griddle, or any cooking zone that is designed for
- 78 use only with non-circular cookware, such as a bridge zone. Specialty cooking zones are not
- 79 tested as part of 10 CFR 430, Subpart B, Appendix I1.
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- 81 Q. Standby mode<sup>5</sup>: any mode in which a product is connected to a mains power source and offers
- 82 one or more of the following user-oriented or protective functions which may persist for an
- 83 indefinite time:
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- 85 (1) Facilitation of the activation of other modes (including activation or deactivation of
- 86 active mode) by remote switch (including remote control), internal sensor, or timer;
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- 88 (2) Provision of continuous functions, including information or status displays (including
- 89 clocks) or sensor-based functions. A timer is a continuous clock function (which may or
- 90 may not be associated with a display) that allows for regularly scheduled tasks and that
- 91 operates on a continuous basis.
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- 93 R. Time  $t_{90}$ <sup>6</sup>: the first instant during the simmering test on the minimum-above-threshold power
- 94 setting for each cooking zone at which the smoothed water temperature is greater than or
- 95 equal to 90°C.
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<sup>4</sup> Modified from 10 CFR 430, Subpart B, Appendix I1 to limit scope to conventional electric cooking products for ENERGY STAR's purposes.

<sup>5</sup> 10 CFR 430, Subpart B, Appendix I1.

<sup>6</sup> Modified from 10 CFR 430, Subpart B, Appendix I1 to report a heating time for ENERGY STAR's purposes.

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**Note:** EPA adds a definition for active cooling for the purposes of certification reporting (i.e., presence / absence of the feature) and a definition for minimum-above-threshold power setting for clarity of use in the Time  $t_{90}$  definition.

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**2. SCOPE:**

- A. Included Products: Products that meet the definition of a conventional electric cooking top are eligible for ENERGY STAR certification. The following product types are eligible for ENERGY STAR certification:
  - Electric cooking top component of conventional electric ranges (a combined electric cooking product)
  - Standalone conventional electric cooking tops (including portable conventional electric cooking tops)
  
- B. Excluded Products: The following product types are ineligible for ENERGY STAR certification under this specification:
  - Commercial or other non-residential products
  - Combined cooking products that include a microwave oven component (i.e., microwave/conventional electric cooking top, microwave/conventional oven, and microwave/conventional electric range)
  - Gas cooking tops, ranges, or standalone ovens
  - Griddles

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**3. CERTIFICATION CRITERIA:**

A. Energy Use Requirement:

Table 1: Energy Use Requirement for Standalone Conventional Electric Cooking Tops	
IAEC	$\leq 195$ kWh/yr

Table 2: Energy Use Requirements for Combined Electric Cooking Products	
IAEC	$\leq 195$ kWh/yr
$E_{TLP,O}^*$	$\leq 7$ kWh/yr

\*  $E_{TLP,O}$  is the annual combined low-power mode energy consumption of the conventional electric oven component of a combined electric cooking product and is calculated in kWh/year as follows:

$$E_{TLP,O} = [(P_{IA} \times F_{IA}) + (P_{OM} \times F_{OM})] \times K \times S_{TOT} \times H_o$$

Where:

$P_{IA}$ ,  $F_{IA}$ ,  $P_{OM}$ ,  $F_{OM}$ ,  $K$ ,  $S_{TOT}$  are as defined in Section 4.2.2 of 10 CFR 430, Subpart B, Appendix I1  
 $H_o$  is equal to 40% for conventional electric ranges.

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B. Significant Digits and Rounding:

- 1) All calculations shall be carried out with directly measured (unrounded) values. Only the final result of a calculation shall be rounded.
  
- 2) The IAEC value shall be rounded off to the nearest kWh per year. If the calculation is halfway between the nearest two kWh per year values, the IAEC shall be rounded up to the higher of these values.

C. Model Numbers: Model numbers used for ENERGY STAR certified product submissions shall be consistent with any Federal Trade Commission (FTC) and Department of Energy (DOE) submissions.

137 **Note:** Through further analysis of the available test data, EPA proposes revising the IAEC level to 195  
138 kWh/year and maintaining the level set for the oven low-power mode energy consumption.  
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140 EPA received several comments regarding the proposed levels. Stakeholders encouraged EPA to consider  
141 relaxing the IAEC levels, 195 kWh/yr or 200kWh/yr, to allow more models to qualify. One stakeholder had  
142 suggested EPA consider providing a necessary reporting margin in the certification levels to cover  
143 manufacturing and test procedure variability. Commenters expressed concern that the draft 2 proposed levels  
144 along with the test procedure variability would lead to exclusion of radiant technologies under this  
145 specification. EPA is not relying on any test procedure variability claims as a basis for revising proposed  
146 criteria because DOE has addressed this concern in the final rule published August 22, 2022. However, EPA  
147 agrees with stakeholders that an adjustment to the proposed level from 190 to 195 kWh/year effectively  
148 expands the selection of residential electric cooking products eligible for certification, with the potential to  
149 expand participation without undermining overall savings.  
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151 Stakeholders also proposed that the oven low-power mode energy consumption criteria be removed for  
152 ranges while another proposed that ENERGY STAR should include a low-power mode energy consumption  
153 requirement of 10.7 kWh/year for standalone cooking tops. In the test data there are several examples of  
154 products with extremely high low-power mode energy consumption. While all of the test models that meet the  
155 IAEC criteria also meet the oven low-power energy consumption criteria, it does not mean this is true for all  
156 models. Thus, EPA is maintaining the oven low-power mode energy consumption criteria to ensure ENERGY  
157 STAR products are efficient in their low-power mode. Ahead of Draft 1, EPA initially considered a separate  
158 level for the low-power mode energy consumption for standalone cooking tops. Though this energy is captured  
159 through the IAEC, monitoring the low-power mode energy consumption is important for new ENERGY STAR  
160 appliance categories that are only operated periodically. Thus, EPA is maintaining a criteria level for the oven  
161 component of the annual low-power energy consumption,  $E_{TLP,O}$ , and for monitoring purposes a reporting  
162 requirement for the cooking top component of the annual low-power energy consumption,  $E_{TLP}$ .  
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164 The new ENERGY STAR proposed efficiency level is 18% more efficient in annual energy consumption,  
165 operational costs to consumers, and emissions compared to the weighted efficiency level using 2022 AHAM  
166 shipment data market share estimates to weight smooth (74.4% of market) and coil (25.6% of market) electric  
167 product types. All estimates are based on cooking tops and ranges; however, stand-alone ovens were not a  
168 part of the savings analysis. Low-power mode energy is included within the IAEC estimate and is thus a part of  
169 the savings analysis.

#### 170 **4. TEST REQUIREMENTS:**

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- 172 A. One of the following sampling plans shall be used to test energy performance for certification to  
173 ENERGY STAR:
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- 175 1) A representative unit shall be selected for testing based on the definition for basic model  
176 provided in Section 1 of this specification; or
  - 177 2) Units shall be selected for testing per the sampling requirements defined in 10 CFR § 429.23  
178 for cooking products.
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- 181 B. When testing energy consumption of residential cooking tops, the following test methods shall be  
182 used to determine ENERGY STAR certification:  
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Table 3: Test Method for ENERGY STAR Certification		
Cooking Product Category	ENERGY STAR Requirement	Test Method Reference
Standalone Conventional Electric Cooking Tops and Conventional Electric Ranges	Integrated Annual Energy Consumption (IAEC) (kWh/year)	10 CFR 430, Subpart B, Appendix I1 - Uniform Test Method for Measuring the Energy Consumption of Conventional Cooking Products
Conventional Electric Ranges	Annual combined low-power mode energy consumption of the conventional electric oven component of a combined electric cooking product ( $E_{TLP,O}$ ) (kWh/year)	Methodology in 10 CFR 430, Subpart B, Appendix I1 - Uniform Test Method for Measuring the Energy Consumption of Conventional Cooking Products  Formulas in Section 3.A. Table 2 of this document.

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**Note:** Partner must ensure the product continues to meet the certification criteria through subsequent firmware, software, or other changes to the certified product, where applicable.

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C. Additional Reporting Requirements:

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- 1) The total number of cooking zones in the cooking top.
- 2) The maximum power of each cooking zone.
- 3) The size<sup>7</sup> (in mm) of each cooking zone.
- 4) Time  $t_{90}$  (in minutes) for each cooking zone.
- 5) Annual combined low-power mode energy consumption of the cooking top ( $E_{TLP}$ )<sup>8</sup>
- 6) Cooking top technology (*i.e.*, coil, radiant, induction)
- 7) Product type (*i.e.*, part of a combined electric cooking product or standalone)
- 8) Installation type (*i.e.*, portable, freestanding, or built-in/slide-in)
- 9) Presence or absence of active mode cooling

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**Note:** Several commenters oppose the inclusion of Time  $t_{90}$  and one stakeholder supports inclusion of the near-boil reporting requirement due to its high value for consumers. One stakeholder expressed that Time  $t_{90}$  reporting be amended from Time  $t_{90}$  to Time  $t_{80}$  to avoid technology bias and more accurately reflect consumer use, while others opposed  $t_{90}$  for other reasons suggesting lack of clarity on reporting this value and questioning its utility for consumers. For the Final Draft, EPA is maintaining the reporting time  $t_{90}$  for each cooking zone. EPA notes that DOE's test procedure is designed to measure the energy use during a representative average use cycle. Time  $t_{90}$  is the only applicable metric measured in the DOE test procedure. EPA also notes that  $t_{90}$  will be rounded to the nearest ½ minute.

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## 5. EFFECTIVE DATE:

- A. Effective Date: This Version 1 ENERGY STAR Residential Electric Cooking Products specification is effective on 9/25/2023. To certify 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.

<sup>7</sup> Section 3.1.1.1.1 of 10 CFR 430, Subpart B, Appendix I1.

<sup>8</sup> Section 4.2 of 10 CFR 430, Subpart B, Appendix I1.

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**Note:** EPA anticipates finalizing this Version 1 specification on September 25, 2023. Upon finalization, manufacturers will be able to immediately begin certifying products.

B. 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.