



# ENERGY STAR® Program Requirements Product Specification for Commercial Ovens

## Eligibility Criteria Final Draft, Version 3.0

Following is the **Final Draft, Version 3.0** product specification for ENERGY STAR certified commercial ovens. 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. Oven: A chamber designed for heating, roasting, or baking food by conduction, convection, radiation, and/or electromagnetic energy.<sup>1</sup>

### **Oven Types**

- B. Combination Oven: A device that combines the function of hot air convection (oven mode), steam heating (steam mode), and a combination of both (combination mode), which includes high and low temperature steaming, baking, roasting, rethermalizing, and proofing of various food products. In general, the term combination oven is used to describe this type of equipment, which is self-contained.<sup>2</sup> The combination oven is also referred to as a combination oven/steamer, combi, or combo.
- a. Half-Size Combination Oven: A combination oven capable of accommodating a single 12.7 x 20.8 x 2.5-inch steam table pan per rack position, loaded from front-to-back or lengthwise.
- b. Full-Size Combination Oven: A combination oven capable of accommodating two 12.7 x 20.8 x 2.5-inch steam table pans per rack position, loaded from front-to-back or lengthwise.
- c. 2/3-Size Combination Oven: A combination oven capable of accommodating a single 13.8 x 12.7 x 2.5-inch steam table pan per rack position, loaded from front-to-back or lengthwise. The 2/3-Size Combination oven may also be referred to as a mini-size combination oven.
- C. Convection Oven: A general-purpose oven that cooks food by forcing hot dry air over the food product's surface. The rapidly moving hot air strips away the cooler air layer next to the food and enables the food to absorb the heat energy. For this specification, convection ovens do not include ovens that can heat the cooking cavity with saturated or superheated steam. However, this oven type may have moisture injection capabilities (e.g., baking ovens and moisture-assist ovens). Ovens that include a *hold feature* are eligible under this specification as long as convection is the only method used to cook the food fully.
- a. Half-Size Convection Oven: A convection oven capable of accommodating half-size sheet pans measuring 18 x 13 x 1-inch.
- b. Full-Size Convection Oven: A convection oven capable of accommodating standard full-size sheet pans measuring 18 x 26 x 1-inch.
- D. Conventional or Standard Oven: An oven that cooks food primarily using the naturally occurring hot air currents to transfer heat over the food product's surface without the use of a fan or blower. The burner or elements heat the air within the oven cavity and the cavity walls, causing currents of hot air that transfer heat to the surface of the food. The hot air's buoyancy

<sup>1</sup> NSF/ANSI 170-2019, *Glossary of Food Equipment Terminology*.

<sup>2</sup> ASTM Standard F2861-20 *Standard Test Method for Enhanced Performance of Combination Oven in Various Modes*.

- 54 carries it upward through cooler air, which then slowly sinks to the bottom of the oven as it  
55 cools off.
- 56
- 57 E. Conveyor Oven: An oven designed to carry food product on a moving belt into and through a  
58 heated chamber.
- 59
- 60 F. Slow Cook-and-Hold Oven: An oven designed specifically for low-temperature (e.g., less than  
61 300°F) cooking, followed by a holding period at a specified temperature.
- 62
- 63 G. Deck Oven: An oven that cooks food product directly on the floor of a heated chamber. The  
64 bottom of each compartment is called a deck and heat is typically supplied by burners or  
65 elements located beneath the deck. The oven ceiling, floor, and walls are designed to absorb  
66 heat quickly and radiate that heat back slowly and evenly.
- 67
- 68 H. Hearth Oven: An oven designed with an open doorway and dome-shaped interior, usually  
69 composed of high-temperature refractory ceramic or concrete. Hearth ovens do not include  
70 ovens designed to use interior walls as cooking surfaces.
- 71 NOTE — Hearth ovens are designed with an unrestricted open doorway due in part to  
72 potentially high operational temperatures. A closed grease-laden oven compartment may  
73 present a fire hazard when oven surface temperatures exceed 600 °F (316 °C), and an  
74 oven door is opened.<sup>3</sup>
- 75
- 76 I. Microwave Oven: An oven in which foods are heated and/or cooked when they absorb  
77 microwave energy (short electromagnetic waves) generated by a magnetron(s).<sup>4</sup>
- 78
- 79 J. Rack Oven: A high-capacity oven that offers the ability to produce steam internally and is fitted  
80 with a motor-driven mechanism for rotating multiple pans inserted into one or more removable or  
81 fixed pan racks within the oven cavity.
- 82
- 83 a. Mini Rack Oven: A stand-mounted rack oven designed with a load-in-place rack that cannot  
84 be removed. Mini rack ovens can accommodate up to 10 standard full-size sheet pans  
85 measuring 18 x 26 x 1-inch.
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- 87 b. Single Rack Oven: A floor-model rack oven that can accommodate one removable  
88 single rack of standard sheet pans measuring 18 x 26 x 1-inch.
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- 90 c. Double Rack Oven: A floor-model rack oven that can accommodate two removable single  
91 racks of standard sheet pans measuring 18 x 26 x 1-inch or one removable double-width  
92 rack.
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- 94 d. Quadruple Rack Oven: A floor-model rack oven that can accommodate four removable  
95 single racks of standard sheet pans measuring 18 x 26 x 1-inch or two removable double-  
96 width racks.
- 97
- 98 K. Range Oven: An oven base for a commercial range top (i.e., burners, electric elements, or  
99 hobs). Range ovens may use either standard or convection technologies to cook food.
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- 101 L. Rapid Cook Oven: An oven that utilizes one or more non-traditional heat transfer technologies to  
102 cook food product significantly faster than would be possible using conventional (e.g., convection,  
103 conduction, radiant) heat transfer technologies. Heat transfer technologies that may be employed  
104 include microwave, quartz halogen, and high-velocity or impingement convection.
- 105
- 106 M. Rotisserie Oven: An oven fitted with a mechanism to move or turn food past a fixed heat source  
107 while the food is slowly being cooked on all sides.
- 108
- 109 N. Reel-type Oven (revolving tray oven): An oven with a motor-driven Ferris wheel device.<sup>5</sup>

<sup>3</sup> NSF/ANSI 170-2019, *Glossary of Food Equipment Terminology*.

<sup>4</sup> NSF/ANSI 170-2019, *Glossary of Food Equipment Terminology*.

<sup>5</sup> NSF/ANSI 170-2019, *Glossary of Food Equipment Terminology*.

110 **Preheat Values**

- 111
- 112 O. Preheat Energy: The amount of energy consumed by the convection, combination, or rack oven
- 113 while preheating its cavity from ambient temperature to the specified thermostat set point. It is
- 114 expressed in Btu or kWh.
- 115
- 116 P. Preheat Time: The time required for the oven cavity to preheat from ambient temperature to the
- 117 specified thermostat set point. It is expressed in minutes (min).

118 **Energy Efficiency Metrics**

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- 120
- 121 Q. Baking-Energy Efficiency: Quantity of energy imparted to the specified load, expressed as a
- 122 percentage of energy consumed by the oven during the baking event.
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- 124 R. Cooking-Energy Efficiency: Quantity of energy imparted to the specified load, expressed as a
- 125 percentage of energy consumed by the oven during the cooking event.
- 126
- 127 S. Idle Energy Rate: The rate of oven energy consumption while it is maintaining or holding at a
- 128 stabilized operating condition or temperature. Also called standby energy rate.
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- 130 T. Total Idle Energy Rate: The rate of oven energy consumption while it is maintaining or holding at
- 131 a stabilized operating condition or temperature. Total idle energy rate includes gas and electric
- 132 energy (primary and auxiliary). Also called total standby energy rate.

133 **Water Consumption**

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- 136 U. Average Water Consumption Rates: The monitored water consumption of an oven during
- 137 specified test conditions. These metrics shall include condensate cooling water, if applicable.
- 138
- 139 a. Combination Oven Water Consumption Rate: The water consumed during idle and heavy-
- 140 load cooking periods in steam and convection mode, expressed as gallons per hour per
- 141 steam pan (gal/hr/pan) during idle, and gallons per steam pan (gal/pan) during cooking.
- 142 Gallon per hour per pan and gallons per pan shall be based on GN 1/1 steam table pans
- 143 as defined in Section 1.B.a. and 1.B.b. for full and half-size combination ovens and GN
- 144 2/3 steam table pans as defined in Section 1.B.c. for 2/3-size combination ovens.
- 145
- 146 b. Convection Oven Water Consumption Rate: The water consumed during the steam
- 147 injection mode is expressed as gallons per min (gal/min), as defined in Section 1.C.a and
- 148 1.C.b., respectively.
- 149
- 150 c. Rack Oven Water Consumption Rate: The water consumed during the steam injection
- 151 mode is expressed as gallons per minute (gal/min).
- 152
- 153 V. Average Combination Oven Condensate Temperature: The condensed steam and cooling
- 154 water mixture's average temperature exiting the combination oven and directed to the drain
- 155 during heavy-load cooking in steam and convection modes.
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- 157 W. Maximum Combination Oven Condensate Temperature: The maximum temperature of the
- 158 condensed steam and cooling water mixture exiting the combination oven and directed to the
- 159 drain during heavy-load cooking in steam and convection modes.
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**Note:** EPA received stakeholder support on the Draft 2 proposal to include maximum water consumption criteria for combination ovens in steam and convection modes during cooking periods. The Agency also received positive feedback in support of introducing the new water use reporting requirements for combination ovens in idle modes, convection and rack ovens.

Following the release of the Draft 2 proposal, EPA hosted an [ENERGY STAR Version 3.0 Commercial Ovens Draft 2 Webinar](#) along with representatives from WaterSense® to discuss the proposed changes in the Draft 2, including harmonization with other standards that have existing maximum water consumption criteria levels for combination ovens. Specifically, the Agency cited:

- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 189.1-2020 *Standard for the Design of High-Performance Green Buildings* (10 gallons per hour in full operational mode),
- *Leadership in Energy and Environmental Design (LEED) Version 4.1* (<1.5 gallons per hour per pan including condensate cooling water),
- ANSI/GBI 01-2019 *Green Globes Assessment Protocol for Commercial Buildings* (<1.5 gallons per hour per pan in steam mode), and
- International Association of Plumbing and Mechanical Officials (IAPMO's) *Water Efficiency and Sanitation Standard for the Built Environment 2020* (<0.5 gallons per hour per oven cavity in convection mode, and <1.5 gallons per hour per pan in steamer mode).

The concept of normalizing the water consumption in gallons per hour per pan was to allow end-users to compare the water consumption rates of the ovens with similar capacities. This approach was also intended to align the water consumption rate unit (gal/hr/pan) rate with market standards.

However, during this webinar and in subsequent meetings with various stakeholders, along with formal written comments in response to the Draft 2 specification, stakeholders expressed concern with EPA's proposed water consumption units (gal/hr/pan) during cooking, noting that energy efficient combination ovens with higher production rates would be placed at a disadvantage. Higher production capacity combination ovens have shorter cook times. Expressing the water consumption value in gal/hr/pan during cooking periods could therefore potentially be misleading for some models and may reflect negatively on some highly energy and water efficient ovens with high throughput. Multiple stakeholders suggested that EPA instead consider using (gal/pan) to express the water consumption value during combination oven cooking periods for both steam and convection modes to avoid any displacement of highly energy and water efficient combination ovens with high production capacities.

As such, EPA has amended the Combination Oven Water Consumption Rate definition in Section 1.U.a. to reflect the unit change. Similarly, the combination oven water consumption rate for steam and convection cooking periods has been amended under Section 3.B. in Table 2 to reflect the change in units and corresponding criteria. Furthermore, Sections 1.U.b. and 1.U.c. were simplified to align more closely with the units and terminology in the respective ASTM test methods, F1496 for convection ovens and F2093 for rack ovens. Similarly, the convection and rack ovens water consumption units and/or terminology have been amended under Section 3.B. Table 1 and Table 3.

**Certification Terms**

- X. **Product Family:** Individual models offered within a product line based on the same engineering design, including pan capacity, fuel type, and method of steam generation, as applicable. Acceptable differences within a product family for certification purposes include controls, door-opening orientation, and any aesthetic additions that have no impact on oven energy consumption in any operating mode. Double stacked ovens with two separate, individually operated ovens shall be listed as an additional model under the product family base model since these ovens are tested as a single cavity and therefore have identical performance values. All models within a product family shall be listed as an additional model.

- 227 Y. Pan Capacity: The number of steam table pans the combination oven can accommodate as per  
228 the ASTM F1495-20 standard specification.  
229
- 230 Z. Single Rack: Single racks shall accommodate 15 full-size sheet pans measuring 18 x 26 x 1-inch,  
231 at a 4-inch spacing between rack positions. Single racks accommodate 1 full-size sheet pan per  
232 rack position.  
233
- 234 AA. Double-Width Rack: Double racks shall accommodate 30 full-size sheet pans measuring 18 x 26  
235 x 1-inch, at a 4-inch spacing between rack positions. Double racks accommodate 2 full-size  
236 sheet pan per rack position.  
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- 238 BB. Set-Back Idle Mode: A feature that includes automatic temperature reduction after extended  
239 periods of non-use. In addition, the feature may also incorporate the reduction or elimination of  
240 fan speed, lighting, and automatic rack rotation during periods of non-use.  
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## 242 2) **Scope:**

- 243 A. Included Products: Products that meet the definitions of a Commercial Oven and Convection  
244 Oven, Combination Oven, or Rack Oven as specified herein are eligible for ENERGY STAR  
245 certification, except products listed in Section 2.B. The following sub-types are eligible:  
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- 249 a. Full-size gas and half- and full-size electric convection ovens.
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  - 251 b. Half- and full-size gas combination ovens with a pan capacity  $\geq 5$  and  $\leq 40$ .
  - 252
  - 253 c. Half- and full-size electric combination ovens with a pan capacity  $\geq 3$  and  $\leq 40$ .
  - 254
  - 255 d. 2/3-size electric combination ovens with a pan capacity  $\geq 3$  and  $\leq 5$ .
  - 256
  - 257 e. Single and double gas rack ovens.
  - 258

259 To ensure only commercial ovens are certified under this specification, products shall be third-party  
260 certified to NSF/ANSI Standard 4, *Commercial Cooking, Rethermalization, and Powered Hot Food*  
261 *Holding and Transport Equipment*.  
262

- 263 B. Excluded Products: This specification is intended for commercial food-grade ovens. Ovens  
264 designed for residential or laboratory applications cannot be certified for ENERGY STAR  
265 under this specification. The following oven types and sub-types are ineligible for ENERGY  
266 STAR:  
267
- 268 a. Half-size gas convection ovens.
  - 269
  - 270 b. Dual-fuel heat source combination ovens.
  - 271
  - 272 c. Hybrid ovens not listed in Section 2.A, above, such as those incorporating microwave  
273 settings in addition to convection.  
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  - 275 d. Conventional or standard ovens; conveyor; slow cook-and-hold; deck; hearth; microwave;  
276 range; rapid cook; reel-type; and rotisserie.
  - 277
  - 278 e. Half- and full-size gas combination ovens with a pan capacity of  $< 5$  or  $> 40$ .
  - 279
  - 280 f. Half- and full-size electric combination ovens with a pan capacity  $< 3$  or  $> 40$ .
  - 281
  - 282 g. Mini and quadruple gas rack ovens.
  - 283
  - 284 h. Electric rack ovens.
  - 285

- i. 2/3-size electric combination ovens with a pan capacity >5.

3) **Certification Criteria:**

A. Convection Oven Cooking-Energy Efficiency and Idle Energy Rate Requirements:

Table 1: Energy Efficiency and Water Consumption Rate Requirements for Convection Ovens		
<b>Gas</b>		
<b>Oven Capacity</b>	<b>Idle Rate, Btu/h</b>	<b>Cooking-Energy Efficiency, %</b>
Full-Size	≤ 9,500	≥ 49
<b>Electric</b>		
<b>Oven Capacity</b>	<b>Idle Rate, kW</b>	<b>Cooking-Energy Efficiency, %</b>
Half-Size	≤ 1.00	≥ 71
Full-Size ≥ 5 Pans	≤ 1.40	≥ 76
Full-Size < 5 Pans	≤ 1.00	
<b>Water Consumption Rate: All Convection Ovens with Moisture Injection Mode</b>		
<b>Mode</b>	<b>Steam Injection (gal/min)</b>	
Steam Injection Mode	Reporting Requirement	

Note: Pans = Standard full-size sheet pan capacity as defined in Section 1.C.b., above.

B. Combination Oven Cooking-Energy Efficiency and Idle Energy Rate Requirements:

Table 2: Energy Efficiency and Water Consumption Rate Requirements for Combination Ovens		
<b>Gas: 5-40 Pan Capacity</b>		
<b>Operation</b>	<b>Idle Rate, Btu/h</b>	<b>Cooking-Energy Efficiency, %</b>
Steam Mode	≤ 200P+6,511	≥ 41
Convection Mode	≤ 140P+3,800	≥ 57
<b>Electric: 5-40 Pan Capacity</b>		
<b>Operation</b>	<b>Idle Rate, kW</b>	<b>Cooking-Energy Efficiency, %</b>
Steam Mode	≤ 0.133P+0.6400	≥ 55
Convection Mode	≤ 0.083P+0.35	≥ 78
<b>Electric: 3-4 Pan Capacity and 2/3-size with 3-5 Pan Capacity</b>		
<b>Operation</b>	<b>Idle Rate, kW</b>	<b>Cooking-Energy Efficiency, %</b>
Steam Mode	≤ 0.60P	≥ 51
Convection Mode	≤ 0.05P+0.55	≥ 70
<b>Water Consumption Rate: All Combination Ovens</b>		
<b>Operation</b>	<b>Electric and Gas During Idle Periods (gal/hr/pan)</b>	<b>Electric and Gas During Cooking Periods (gal/pan)</b>
Steam Mode	Reporting Requirement	< 0.5 gal/pan
Convection Mode	Reporting Requirement	< 0.4 gal/pan

Note: P = Pan capacity as defined in Section 1.Y, above.

C. Rack Oven Baking-Energy Efficiency and Idle Energy Rate Requirements:

Table 3: Energy Efficiency and Water Consumption Rate Requirements for Rack Ovens		
<b>Gas</b>		
<b>Oven Size</b>	<b>Total Energy Idle Rate, Btu/h</b>	<b>Baking-Energy Efficiency, %</b>
Single	≤ 25,000	≥ 48
Double	≤ 30,000	≥ 52
<b>Water Consumption Rate: All Racks Ovens with Steam Injection Mode</b>		
<b>Mode</b>	<b>Steam Injection (gal/min)</b>	
Steam Injection Mode	Reporting Requirement	

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**Note:**

Water Consumption Criteria

EPA received stakeholder support for the proposal to add new water consumption criteria thresholds for gas and electric combination ovens in both steam and convection modes during cooking periods. As outlined in the notebbox under Section 1., in response to stakeholder feedback, EPA revised the water consumption units (from gal/hr/pan to gal/pan) and criteria values for combination oven cooking in steam and convection modes to more accurately express the metric without disadvantaging high production (faster cook time) combination ovens. The unit conversion steps are included in Section 3.F. Additional Combination Oven Water Consumption Rate Guidance.

EPA reevaluated the combination oven data set and established reasonable water consumption thresholds in Table 2 for combination oven cooking periods in steam and convection modes. The Final Draft combination oven water consumption criteria in steam mode cooking (<0.5 gal/pan) and convection mode cooking (<0.4 gal/pan) do not impact the Draft 2 pass rates. In other words, all combination oven models that meet the four energy-based combination oven criteria also meet the water consumption criteria during cooking periods.

- D. Additional Idle Calculation Guidance: Compliance with the convection oven and combination oven idle rate requirements shall be based on gas energy only for purposes of certifying gas models. When calculating the gas oven idle rates, electric energy consumed by auxiliary components shall not be considered. However, the electric energy consumption measured during idle tests shall be reported separately, as per Section 4.G.c.
- E. Additional Total Idle Calculation Guidance: Compliance with the rack oven total idle rate requirements shall be based on gas and electric energy for purposes of certifying gas models. When calculating the gas rack oven total idle rates, electric energy consumed by auxiliary components shall be converted to Btu/h and added to the gas idle rate expressed in Btu/h. The electric energy consumption measured during idle tests shall also be reported separately as expressed in kW, as per Section 4.G.c.

**Example:** Consider a double-sized gas rack oven with a gas idle energy rate of 30,000.11 Btu/h; and the electric idle energy rate of 1.51 kW. First, convert the 1.51 kW electric idle energy rate to Btu/h by multiplying the 1.51 kW by 3,412.14. Then add the result to the 30,000.11 Btu/h gas idle rate.

$$1 \text{ kW} = 3,412.14 \text{ Btu/h}$$

$$\text{Electric idle energy rate, converted to Btu/h: } 1.51 \text{ kW} \times 3,412.14 \text{ Btu/h} = 5,152.3314 \text{ Btu/h}$$

$$\text{Total idle energy rate: } 30,000.11 \text{ Btu/h} + 5,152.3314 \text{ Btu/h} = 35,152.44 \text{ Btu/h}$$

- F. Additional Combination Oven Water Consumption Rate Guidance: Compliance with the combination oven water consumption rate for cooking periods shall be calculated according to the following steps. Use ASTM F2861-20 for the average weight of the potatoes per pan, and the ENERGY STAR certified product information for the number of steam pans and production capacity (lbs/hr). These values are used to generate the cook time (hr) in steam and convection modes per the following equation, which is then used with the cooking period time in each mode and multiplied by the average water consumption rate expressed in gal/hr. The final value results in water consumption during cooking periods expressed in gal/pan.

$$\text{Cooking time (hr)} = \frac{(\# \text{ of Pans}) * (\text{lbs of potatoes})}{\text{Production Capacity} \left(\frac{\text{lb}}{\text{hr}}\right)}$$

**Example:** Consider a 14 pan electric combination oven cooking in steam mode with a water consumption rate of 1.5 (gal/hr). Convert the water consumption to gallons per hour per pan (gal/hr/pan) by dividing the water consumption (gal/hr) by the number of pans. Then, apply the formula above to determine the cooking time (hr) in steam mode. Multiply the gal/hr/pan by the cooking time to determine the water consumption rate in gal/pan.

Gal/hr/pan:  $1.5 \text{ (gal/hr)} / 14 \text{ (pans)} = 0.11 \text{ (gal/hr/pan)}$   
 Cooking Time (hr):  $(14 \text{ pans} \times 8 \text{ lbs of potatoes}) / 150 \text{ lbs/hr} = 0.75 \text{ (hr)}$   
 Gal/pan =  $0.11 \text{ (gal/hr/pan)} \times 0.75 \text{ (hr)} = 0.083 \text{ (gal/pan)}$

G. Significant Digits and Rounding:

- a. All calculations shall be carried out with directly measured (unrounded) values. Only the final result of a calculation shall be rounded.
- b. Unless otherwise specified in this specification, compliance with certification criteria in Section 3 shall be evaluated using exact values without any benefit from rounding.
- c. Cooking and Baking-Energy Efficiency: Calculated values that are submitted for reporting on the ENERGY STAR website shall be rounded to the nearest significant digit as expressed in the certification criteria in Section 3.
- d. Idle Energy Rate: Calculated values for gas convection, combination, and rack oven idle rates submitted for reporting on the ENERGY STAR website shall be rounded to the nearest whole number. The calculated energy consumption values for electric convection and combination ovens shall be rounded to 0.01 for idle rates.

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 a product family certification, 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 ovens, the following test methods shall be used to determine ENERGY STAR certification

Table 4: Test Methods for ENERGY STAR Certification		
Oven Types	ENERGY STAR Requirements	Test Method Reference
Convection Ovens	Cooking-Energy Efficiency, Idle Energy Rate, Production Capacity, Water Consumption, Preheat Energy Consumption, and Preheat time	ASTM F1496-13(2019), <i>Standard Test Method for Performance of Convection Ovens</i>
Combination Ovens	Cooking-Energy Efficiency, Idle Energy Rate, Production Capacity, Water Consumption, Condensate Temperature, Preheat Energy Consumption, and Preheat time	ASTM F2861-20, <i>Standard Test Method for Enhanced Performance of Combination Oven in Various Modes</i>
Rack Ovens	Baking-Energy Efficiency, Total Idle Energy Rate, Production Capacity, Preheat Energy Consumption, Steam Rate, Steam Injection Cycle, and Preheat time	ASTM F2093-18, <i>Standard Test Method for Performance of Rack Ovens</i>

**Note:** The ASTM F2861-20 was removed from Section 3.B. Table 4 as a test method reference for water consumption under convection ovens. The test methods for evaluating water use in convection ovens in the steam injection mode are included in ASTM 1496-13 (2019) *Standard Test Method for Performance of Convection Ovens*.

- C. For ovens with variable Btu/h or kW input, each available input shall be tested and reported



404 individually. Ovens need to meet the idle energy rate or total idle energy rate and cooking- or  
405 baking-energy efficiency requirements presented in Table 1, Table 2, or Table 3, of this  
406 specification at each input setting.  
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- 408 D. For electric ovens with multiple voltage-versatility and those that are available in different voltage  
409 configurations, the representative oven shall be tested at the most energy consumptive voltage  
410 according to the manufacturer.  
411
- 412 E. If the representative combination oven model under test is designed to hold 18 x 26-inch sheet  
413 pans, the manufacturer-supplied wire racks shall be positioned in the oven to accommodate 12 x  
414 20x 2.5 -inch steam table pans.  
415
- 416 F. Combination ovens with roll-in, removable racks shall have the racks positioned in place during  
417 steam mode and convection mode idle tests.  
418
- 419 G. Additional Reporting Requirements:  
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- 421 a. The average water consumption rates, average steam injection rate, average steam  
422 injection cycle, average condensate drain temperatures, and the maximum condensate  
423 drain temperatures shall be reported for all applicable ovens and applicable modes.  
424
- 425 b. The production capacity for all convection ovens, combination ovens, and rack ovens  
426 cooking, or baking-energy efficiency tests shall be reported.  
427
- 428 c. The electric energy idle rate for gas convection, combination, and rack oven idle rate tests  
429 shall be reported.  
430
- 431 d. Rack ovens that include energy saving feature(s) and meet the minimum requirement of the  
432 set-back idle mode definition in Section 1.BB. shall be reported.  
433
- 434 e. Preheat energy consumption and time for all convection, combination, and rack ovens shall  
435 be reported in Btu or kWh for energy consumption and in minutes for preheat time. For  
436 combination ovens, both steam and convection preheat energy consumption and time shall  
437 be reported. For gas ovens, the auxiliary components (e.g., fan energy consumption) that  
438 use electrical energy shall also be reported.  
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- 440
- 441 **5) Effective Date:** This ENERGY STAR Version 3.0 Commercial Ovens specification shall take effect  
442 on January 19, 2023. To certify to ENERGY STAR, a product model shall meet the ENERGY STAR  
443 specification in effect on the model's manufacture date. The date of manufacture is specific to each  
444 unit and is the date on which a unit is considered to be completely assembled.  
445

446 **Note:** EPA anticipates completing the Version 3.0 process no later than April 19, 2022, with an effective  
447 date of January 19, 2023. Once a final specification is released, manufacturers may immediately begin  
448 certifying products to the new Version 3.0 specification, but will have nine months to transition,  
449 understanding that certification to the current version must cease 4.5 months after the final specification is  
450 published. Once the Version 3.0 specification takes effect, ovens that do not meet the criteria will be  
451 removed from the ENERGY STAR Product Finder and may no longer be marketed or labeled as ENERGY  
452 STAR unless retested and recertified to Version 3.0.  
453

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- 455 **6) Future Specification Revisions:** EPA reserves the right to change the specification should  
456 technological and/or market changes affect its usefulness to consumers, industry, or the environment.  
457 In keeping with current policy, revisions to the specification are arrived at through industry  
458 discussions. In the event of a specification revision, please note that ENERGY STAR certification is  
459 not automatically granted for the life of a product model.