



# ENERGY STAR® Program Requirements For Commercial Ovens

## 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

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1. Comply with current ENERGY STAR Eligibility Criteria, which define performance requirements and test procedures for commercial ovens. A list of eligible products and their corresponding Eligibility Criteria can be found at [www.energystar.gov/specifications](http://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 commercial ovens. As part of this certification process, products must be tested in a laboratory recognized by EPA to perform commercial oven testing. A list of EPA-recognized laboratories and Certification Bodies can be found at [www.energystar.gov/testingandverification](http://www.energystar.gov/testingandverification).

### Using the ENERGY STAR Name and Marks

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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](http://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 automatic commercial ovens.
  - 5.1. The ENERGY STAR mark must be clearly displayed on the front of the product, 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

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6. Participate in third-party verification testing through a Certification Body recognized by EPA for commercial ovens, 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

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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 commercial ovens 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](http://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](http://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](http://www.epa.gov/greenpower).



# ENERGY STAR® Program Requirements Product Specification for Commercial Ovens

## Eligibility Criteria Version 3.0

Following is the **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*.

carries it upward through cooler air, which then slowly sinks to the bottom of the oven as it cools off.

- E. Conveyor Oven: An oven designed to carry food product on a moving belt into and through a heated chamber.
- F. Slow Cook-and-Hold Oven: An oven designed specifically for low-temperature (e.g., less than 300°F) cooking, followed by a holding period at a specified temperature.
- G. Deck Oven: An oven that cooks food product directly on the floor of a heated chamber. The bottom of each compartment is called a deck and heat is typically supplied by burners or elements located beneath the deck. The oven ceiling, floor, and walls are designed to absorb heat quickly and radiate that heat back slowly and evenly.
- H. Hearth Oven: An oven designed with an open doorway and dome-shaped interior, usually composed of high-temperature refractory ceramic or concrete. Hearth ovens do not include ovens designed to use interior walls as cooking surfaces.  
NOTE — Hearth ovens are designed with an unrestricted open doorway due in part to potentially high operational temperatures. A closed grease-laden oven compartment may present a fire hazard when oven surface temperatures exceed 600 °F (316 °C), and an oven door is opened.<sup>3</sup>
- I. Microwave Oven: An oven in which foods are heated and/or cooked when they absorb microwave energy (short electromagnetic waves) generated by a magnetron(s).<sup>4</sup>
- J. Rack Oven: A high-capacity oven that offers the ability to produce steam internally and is fitted with a motor-driven mechanism for rotating multiple pans inserted into one or more removable or fixed pan racks within the oven cavity.
  - a. Mini Rack Oven: A stand-mounted rack oven designed with a load-in-place rack that cannot be removed. Mini rack ovens can accommodate up to 10 standard full-size sheet pans measuring 18 x 26 x 1-inch.
  - b. Single Rack Oven: A floor-model rack oven that can accommodate one removable single rack of standard sheet pans measuring 18 x 26 x 1-inch.
  - c. Double Rack Oven: A floor-model rack oven that can accommodate two removable single racks of standard sheet pans measuring 18 x 26 x 1-inch or one removable double-width rack.
  - d. Quadruple Rack Oven: A floor-model rack oven that can accommodate four removable single racks of standard sheet pans measuring 18 x 26 x 1-inch or two removable double-width racks.
- K. Range Oven: An oven base for a commercial range top (i.e., burners, electric elements, or hobs). Range ovens may use either standard or convection technologies to cook food.
- L. Rapid Cook Oven: An oven that utilizes one or more non-traditional heat transfer technologies to cook food product significantly faster than would be possible using conventional (e.g., convection, conduction, radiant) heat transfer technologies. Heat transfer technologies that may be employed include microwave, quartz halogen, and high-velocity or impingement convection.
- M. Rotisserie Oven: An oven fitted with a mechanism to move or turn food past a fixed heat source while the food is slowly being cooked on all sides.
- 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*.

### **Preheat Values**

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

### **Energy Efficiency Metrics**

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

### **Water Consumption**

- U. Average Water Consumption Rates: The monitored water consumption of an oven during specified test conditions. These metrics shall include condensate cooling water, if applicable.
  - a. Combination Oven Water Consumption Rate: The water consumed during idle and heavy-load cooking periods in steam and convection mode, expressed as gallons per hour per steam pan (gal/hr/pan) during idle, and gallons per steam pan (gal/pan) during cooking. Gallon per hour per pan and gallons per pan shall be based on GN 1/1 steam table pans as defined in Section 1.B.a. and 1.B.b. for full and half-size combination ovens and GN 2/3 steam table pans as defined in Section 1.B.c. for 2/3-size combination ovens.
  - b. Convection Oven Water Consumption Rate: The water consumed during the steam injection mode is expressed as gallons per min (gal/min), as defined in Section 1.C.a and 1.C.b., respectively.
  - c. Rack Oven Water Consumption Rate: The water consumed during the steam injection mode is expressed as gallons per minute (gal/min).
- V. Average Combination Oven Condensate Temperature: The condensed steam and cooling water mixture's average temperature exiting the combination oven and directed to the drain during heavy-load cooking in steam and convection modes.
- W. Maximum Combination Oven Condensate Temperature: The maximum temperature of the condensed steam and cooling water mixture exiting the combination oven and directed to the drain during heavy-load cooking in steam and convection modes.

### **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.

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

## 2) Scope:

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

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

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

- h. Electric rack ovens.
- 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	



- 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.

$$\text{Gal/hr/pan: } 1.5 \text{ (gal/hr)} / 14 \text{ (pans)} = 0.11 \text{ (gal/hr/pan)}$$

$$\text{Cooking Time (hr): } (14 \text{ pans} \times 8 \text{ lbs of potatoes}) / 150 \text{ lbs/hr} = 0.75 \text{ (hr)}$$

$$\text{Gal/pan} = 0.11 \text{ (gal/hr/pan)} \times 0.75 \text{ (hr)} = 0.083 \text{ (gal/pan)}$$

- 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

<b>Table 4: Test Methods for ENERGY STAR Certification</b>		
<b>Oven Types</b>	<b>ENERGY STAR Requirements</b>	<b>Test Method Reference</b>
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>

- C. For ovens with variable Btu/h or kW input, each available input shall be tested and reported individually. Ovens need to meet the idle energy rate or total idle energy rate and cooking- or baking-energy efficiency requirements presented in Table 1, Table 2, or Table 3, of this specification at each input setting.
- D. For electric ovens with multiple voltage-versatility and those that are available in different voltage configurations, the representative oven shall be tested at the most energy consumptive voltage according to the manufacturer.
- E. If the representative combination oven model under test is designed to hold 18 x 26-inch sheet pans, the manufacturer-supplied wire racks shall be positioned in the oven to accommodate 12 x 20x 2.5 -inch steam table pans.
- F. Combination ovens with roll-in, removable racks shall have the racks positioned in place during steam mode and convection mode idle tests.
- G. Additional Reporting Requirements:
  - a. The average water consumption rates, average steam injection rate, average steam injection cycle, average condensate drain temperatures, and the maximum condensate drain temperatures shall be reported for all applicable ovens and applicable modes.
  - b. The production capacity for all convection ovens, combination ovens, and rack ovens

cooking, or baking-energy efficiency tests shall be reported.

- c. The electric energy idle rate for gas convection, combination, and rack oven idle rate tests shall be reported.
- d. Rack ovens that include energy saving feature(s) and meet the minimum requirement of the set-back idle mode definition in Section 1.BB. shall be reported.
- e. Preheat energy consumption and time for all convection, combination, and rack ovens shall be reported in Btu or kWh for energy consumption and in minutes for preheat time. For combination ovens, both steam and convection preheat energy consumption and time shall be reported. For gas ovens, the auxiliary components (e.g., fan energy consumption) that use electrical energy shall also be reported.

**5) Effective Date:** This ENERGY STAR Version 3.0 Commercial Ovens specification shall take effect on **January 12, 2023**. To certify to ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on the model's manufacture date. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.

**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.