



Standard Test Method for Performance of Retherm Ovens¹

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1. Scope

1.1 This test method evaluates the energy consumption and cooking performance of retherm ovens. The food service operator can use this evaluation to select a retherm oven and understand its energy consumption.

1.2 This test method is applicable to gas and electric retherm ovens.

1.3 The retherm oven can be evaluated with respect to the following (where applicable):

- 1.3.1 Energy input rate (10.2),
- 1.3.2 Preheat energy consumption and time (10.3),
- 1.3.3 Idle energy rate (10.4),
- 1.3.4 Pilot energy rate (if applicable) (10.5), and
- 1.3.5 Cooking Energy Rate, Production Capacity, Cooking Energy Efficiency (10.7).

1.4 The values stated in inch-pound units are to be regarded as standard. The SI units given in parentheses are for information only.

1.5 *This test method may involve hazardous materials, operations, and equipment. This test method does not purport to address all of the potential safety problems associated with its use. It is the responsibility of the users of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to its use.*

2. Referenced Documents

2.1 *ASTM Standards*:²

D3588 Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels

2.2 *ASHRAE Documents*:³

ASHRAE Handbook of Refrigeration “Thermal Properties of Food,” Chapter 19, Table 3, 2014.

¹ This test method is under the jurisdiction of ASTM Committee F26 on Food Service Equipment and is the direct responsibility of Subcommittee F26.06 on Productivity and Energy Protocol.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at Service@astm.org. For the Annual Book of ASTM standards volume information, refer the standard’s Document Summary page on the ASTM website.

³ Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329.

3. Terminology

3.1 *Definitions*:

3.1.1 *cooking energy efficiency, n*—the ratio of the quantity of energy absorbed by the food product to the quantity of energy input to the oven during a cooking energy efficiency test expressed as a percent.

3.1.2 *cooking energy rate, n*—the average rate of energy consumption (Btu/h or kW) during the cooking energy efficiency tests.

3.1.3 *energy input rate, n*—the peak rate at which a retherm oven consumes energy (Btu/h or kW).

3.1.4 *idle energy rate* (ready-to-cook condition), *n*—the retherm oven’s rate of energy consumption (Btu/h or kW), when empty, required to maintain its cavity temperature at the specified thermostat set point or to otherwise maintain the oven in a ready-to-cook condition.

3.1.5 *oven cavity, n*—the portion of the retherm oven in which food products are heated.

3.1.6 *pilot energy rate, n*—the rate of energy consumed (Btu/h) by a retherm oven’s continuous pilot (if applicable).

3.1.7 *preheat energy, n*—the amount of energy consumed (Btu or kWh), by the retherm oven while preheating its cavity from ambient temperature to the specified thermostat set point or while preheating any other component of the oven, for example an integral heat exchanger, to a ready-to-cook condition.

3.1.8 *preheat time, n*—the time (min) required for the retherm oven cavity to preheat from ambient temperature to the specified thermostat set point or for the retherm oven to achieve a ready-to-cook condition.

3.1.9 *production capacity, n*—the maximum rate (lb/h or kg/h) at which a retherm oven can bring the specified food product to a specified “cooked” condition.

3.1.10 *retherm oven, n*—an appliance with a closed, heated cavity, designed specifically for low-temperature reheating.

3.1.11 *uncertainty, n*—the measure of systematic and precision errors in specified instrumentation or measure of repeatability of a reported test result.

4. Summary of Test Method

4.1 *Thermostat Calibration*—Accuracy of the retherm oven thermostat is checked at a setting of 250°F (121°C). This is