



Standard Test Method for Performance of Rack Ovens¹

This standard is issued under the fixed designation F 2093; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

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

1.2 This test method is applicable to thermostatically controlled, gas and electric rack ovens.

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

- 1.3.1 Energy input rate (10.2),
- 1.3.2 Thermostat calibration (10.3),
- 1.3.3 Preheat energy and time (10.4),
- 1.3.4 Idle energy rate (10.5),
- 1.3.5 Pilot energy rate, if applicable (10.6),
- 1.3.6 Oven main cavity vent performance (10.7),
- 1.3.7 White sheet cake browning (10.8), and
- 1.3.8 Baking uniformity and bread production capacity (10.9),
- 1.3.9 Steam performance (10.9), and
- 1.3.10 Baking energy efficiency and production capacity (10.10).

1.4 The values stated in inch-pound units are to be regarded as standard.

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

2. Referenced Documents

2.1 ASTM Standards:

D 3588 Practice for Calculating Heat Value, Compressibility Factor, and Relative Density (Specific Gravity) of Gaseous Fuels²

2.2 ANSI Documents:³

ANSI Standard Z83 American National Standard for Gas Food Service Equipment

2.3 ASHRAE Documents:⁴

ASHRAE Fundamentals 1997

ASHRAE Guideline 2-1986 (RA90) Engineering Analysis of Experimental Data

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *bake time, n*—time required to bake the frozen berry pies specified 7.3 to an internal temperature of $185 \pm 5^\circ\text{F}$ during a baking energy efficiency test.

3.1.2 *baking cavity, n*—that portion of the appliance in which food products are heated or cooked.

3.1.3 *baking energy, n*—energy consumed by the rack oven as it is used to bake frozen berry pies under heavy- medium-, and light-load conditions.

3.1.4 *baking energy efficiency, n*—quantity of energy imparted to the pies, expressed as a percentage of energy consumed by the rack oven during the baking event.

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

3.1.6 *idle energy rate, n*—the rate of energy consumed (Btu/h or kW) by the rack oven while “holding” or “idling” the baking cavity at the thermostat set point.

3.1.7 *measured energy input rate, n*—peak rate at which a rack oven consumes energy (Btu/h or kW), typically reflected during preheat.

3.1.8 *nameplate energy input rate, n*—the maximum or peak rate at which an appliance consumes energy as rated by the manufacturer and specified on the nameplate.

3.1.9 *pilot energy rate, n*—average rate of energy consumption (Btu/h) by a rack oven’s continuous pilot (if applicable).

3.1.10 *preheat energy, n*—amount of energy consumed by the rack oven while preheating the baking cavity from ambient room temperature ($75 \pm 5^\circ\text{F}$) to the thermostat set point.

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.

Current edition approved April 10, 2001. Published September 2001.

² *Annual Book of ASTM Standards* Vol. 05.06.

³ Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036

⁴ Available from the American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc., 1791 Tullie Circle, NE, Atlanta, GA 30329.

