



Standard Test Methods for Performance of Range Tops¹

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1. Scope

1.1 This test method covers the energy consumption and cooking performance of range tops. The food service operator can use this evaluation to select a range top and understand its energy consumption.

1.2 This test method is applicable to gas and electric range tops including both discreet burners and elements and hot tops.

1.3 The range top can be evaluated with respect to the following (where applicable):

1.3.1 Energy input rate (see 10.2), and

1.3.2 Pilot energy consumption (see 10.3).

1.3.3 Heat-up temperature response and temperature uniformity at minimum and maximum control settings (see 10.4), and

1.3.4 Cooking energy efficiency and production capacity (see 10.5).

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 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:

A 36/A 36M Specification for Carbon Structural Steel²

D 3588 Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels³

2.2 ASHRAE Standard:

ASHRAE Guideline 2-1986 (RA90) Thermal and Related Properties of Food and Food Materials⁴

3. Terminology

3.1 Definitions:

¹ These test methods are under the jurisdiction of ASTM Committee F26 on Food Service Equipment and are the direct responsibility of Subcommittee F26.06 on Productivity and Energy Protocol.

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² *Annual Book of ASTM Standards*, Vol 01.04.

³ *Annual Book of ASTM Standards*, Vol 05.06.

⁴ See *ASHRAE Handbook of Fundamentals*, Chapter 30, Table I, 1989, available from American Society of Heating, Refrigeration, and Air-Conditioning Engineers, 1791 Tullie Circle NE, Atlanta, GA 30329.

3.1.1 *cooking container*—a vessel used to hold the food product that is being heated by the cooking unit.

3.1.2 *cooking energy*—energy consumed by the cooking unit as it is used to raise the temperature of water in a cooking container under full-input rate.

3.1.3 *cooking energy efficiency*—quantity of energy input to the water expressed as a percentage of the quantity of energy input to the cooking unit during the full-input rate tests.

3.1.4 *cooking unit*—a heating device located on the range top that is powered by a single heat source comprised of either a gas burner or an electrical element that is independently controlled.

3.1.5 *energy input rate*—rate (Btu/h) at which an appliance consumes energy.

3.1.6 *heat-up temperature response*—temperature rise on the surface of a steel plate during the test period in accordance with the heat-up temperature-response test.

3.1.7 *production capacity*—maximum rate at which the cooking unit heats water in accordance with the cooking energy-efficiency test.

3.1.8 *production rate*—rate at which the cooking unit heats water in accordance with the cooking energy-efficiency test.

3.1.9 *range*—a device for cooking food by direct or indirect heat transfer from one or more cooking units to one or more cooking containers.

3.1.10 *temperature uniformity*—the comparison of individual temperatures measured on the surface of a steel plate at the end of the test period in accordance with the heat-up temperature-response test.

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

4. Summary of Test Methods

4.1 The range to be tested is connected to the appropriate metered energy source. The energy input rate is determined for each type of cooking unit on the range top and for the entire range top (all cooking units operating at the same time) to confirm that the range top is operating within 5.0 % of the nameplate energy input rate. The pilot energy consumption is also determined when applicable to the range being tested.

4.2 Thermocouples are attached to a circular steel plate which is then placed on the cooking unit to be tested. The heat-up temperature response of the cooking unit at the

