This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

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An American National Standard

Standard Test Method for Performance of Braising Pans[1]

This standard is issued under the fixed designation F1786; 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 cooking performance of braising pans. The food service operator can use this evaluation to select a braising pan and understand its energy consumption and performance characteristics.

NOTE 1—Braising pans also are commonly referred to as tilting skillets. This test method uses the term *braising pan* in accordance with Specification F1047.

1.2 This test method is applicable to self-contained gas or electric braising pans. The braising pan can be evaluated with respect to the following, where applicable:

1.2.1 Maximum energy input rate (10.2).

1.2.2 Capacity (10.3).

1.2.3 Heatup energy efficiency and energy rate (10.4).

1.2.4 Production capacity (10.4).

1.2.5 Simmer energy rate (10.5).

1.2.6 Surface temperature uniformity, optional, (10.6).

1.2.7 Pilot energy rate (10.7).

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

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F1047 Specification for Frying and Braising Pans, Tilting Type

F1275 Test Method for Performance of Griddles

2.2 *ANSI Standard:*[2]

ANSI Z83.11 American National Standard for Gas Food Service Equipment

2.3 *ASHRAE Documents:*[3]

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

ASHRAE *Handbook of Fundamentals*, "Thermodynamic Properties of Water at Saturation," Chapter 6, Table 2, 1989

3. Terminology

3.1 *Definitions:*

3.1.1 *braising pan, n*—an appliance wherein heat is imparted to food in a shallow-sided flat-bottomed vessel by conduction through the heated pan bottom.

3.1.2 *control electric energy, n*—the electric energy, for example, for controls, fans, consumed by braising pans whose primary fuel source is not electricity, that is, gas. Control electric energy is measured and reported separately from primary fuel energy so that their respective fuel prices can be applied to estimate energy costs.

3.1.3 *fill-to-spill capacity, n*—the maximum food capacity (gal) of the braising pan as determined by filling to the point of overflow.

3.1.4 *heatup energy, n*—energy consumed by the braising pan as it is used to heat the specified food product to a specified temperature.

3.1.5 *heatup energy efficiency, n*—a quantity of energy imparted to the specified food product, expressed as a percentage of energy consumed by the braising pan during the heatup event.

[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 *Annual Book of ASTM Standards* volume information, refer to 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, http://www.ashrae.org.

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3.1.6 *heatup energy rate, n*—the average rate of energy consumption (kBtu/h or kW) during the heatup energy efficiency test.

3.1.7 *maximum energy input rate, n*—the peak rate (kBtu/h or kW) at which a braising pan consumes energy, as measured in this test method.

3.1.8 *nameplate energy input rate, n*—the peak rate (kBtu/h or kW) at which a braising pan consumes energy, as stated by the manufacturer.

3.1.9 *nameplate capacity, n*—the food capacity (gal) of the braising pan, as stated by the manufacturer.

3.1.10 *pilot energy rate, n*—the rate of energy consumption (kBtu/h) by a gas braising pan's standing pilot, where applicable.

3.1.11 *production capacity, n*—the highest rate (lb/h) at which a braising pan can bring the specified food product to a specified temperature.

3.1.12 *simmer energy rate, n*—the rate (kBtu/h or kW) at which a braising pan consumes energy while maintaining the specified food product at a specified simmer temperature.

3.1.13 *surface temperature uniformity, n*—the variation in cooking surface temperature measured at several points across the pan bottom.

3.1.14 *testing capacity, n*—the capacity (gal) at which the braising pan is operated during the heatup and simmer tests, that is, 80 % of fill-to-spill capacity.

4. Summary of Test Method

4.1 Connect the braising pan to the appropriate metered energy source, and determine the energy input rate to confirm that it is operating within 5 % of the nameplate energy input rate.

4.2 Fill the braising pan to the point of overflow to determine the fill-to-spill capacity. For subsequent tests, a smaller volume or testing capacity, is calculated to allow adequate freeboard between the waterline and the lip of the pan.

4.3 Set the braising pan to maximum input and monitor as it heats water from 80°F to 160°F, which yields the heatup energy efficiency, heatup energy rate, and production capacity.

4.4 Adjust the braising pan controls to maintain water at 165°F for 3 h, yielding the simmer energy rate.

4.5 Monitor the surface temperature of the pan at several points to determine temperature uniformity (optional).

4.6 When applicable, measure the energy required to maintain the standing pilot for a gas appliance, and report pilot energy rate.

5. Significance and Use

5.1 Use the maximum energy input rate test to confirm that the braising pan is operating within 5 % of the manufacturer's rated input so that testing may continue. This test method also may disclose any problems with the electric power supply or gas service pressure. The maximum input rate can be useful to food service operators for managing power demand.

5.2 The capacity test determines the maximum volume of food product the pan can hold and the amount of food product that will be used in subsequent tests. Food service operators can use the results of this test method to select a braising pan, which is appropriately sized for their operation.

5.3 Production capacity is used by food service operators to choose a braising pan that matches their food output.

5.4 Heatup energy efficiency and simmer energy rate allow the operator to consider energy performance when selecting a braising pan.

5.5 Use the surface temperature uniformity to select a braising pan suitable for griddling applications.

5.6 Use the pilot energy rate to estimate energy consumption for gas-fired braising pans with standing pilots during non-cooking periods.

6. Apparatus

6.1 *Analytical Balance Scale,* for measuring weights up to 25 lb with a resolution of 0.01 lb and an uncertainty of 0.01 lb, for measuring the quantity of water loaded into the pan.

6.2 *Barometer,* for measuring absolute atmospheric pressure, for adjustment of measured natural gas volume to standard conditions. Barometer shall have a resolution of 0.2 in. Hg and an uncertainty of 0.2 in. Hg.

6.3 *Canopy Exhaust Hood,* 4 ft in depth, wall-mounted with the lower edge of the hood 6 ft, 6 in. from the floor and with the capacity to operate at a nominal exhaust ventilation rate of 300 cfm/linear ft of active hood length. This hood shall extend a minimum of 6 in. past both sides and the front of the pan body and shall not incorporate side curtains or partitions. Makeup air shall be delivered through face registers or from the space, or both.

6.4 *Gas Meter,* for measuring the gas consumption of a braising pan, shall be a positive displacement type with a resolution of at least 0.01 ft^3 and a maximum uncertainty no greater than 1 % of the measured value for any demand greater than 2.2 ft^3/h. If the meter is used for measuring the gas consumed by the pilot light, it shall have a resolution of at least 0.01 ft^3 and a maximum uncertainty no greater than 2 % of the measured value.

6.5 *Pressure Gage,* for monitoring gas pressure. The gage shall have a range from 0 to 15 in. H_2O, a resolution of 0.5 in. H_2O, and a maximum uncertainty of 1 % of the measured value.

6.6 *Stopwatch,* with a 1-s resolution.

6.7 *Strain Gage Welder*[4], capable of welding thermocouples to steel.

6.8 *Temperature Sensor,* for measuring natural gas temperature in the range from 50 to 100°F with an uncertainty of ±1°F.

[4] The sole source of supply of the apparatus known to the committee at this time is Eaton Model W1200 Strain Gage Welder, available from Eaton Corp., 1728 Maplelawn Rd., Troy, MI 48084. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee [1], which you may attend.

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