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An American National Standard

Standard Test Method for Performance of Underfired Broilers¹

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1. Scope

1.1 This test method covers the evaluation of the energy consumption and cooking performance of underfired broilers. The food service operator can use this evaluation to select an underfired broiler and understand its energy performance.

1.2 This test method is applicable to gas and electric underfired broilers.

1.3 The underfired broiler can be evaluated with respect to the following (where applicable):

- 1.3.1 Energy input rate (see 10.2),
- 1.3.2 Temperature distribution across the broiling area (see 10.3),
- 1.3.3 Preheat energy and time (see 10.4),
- 1.3.4 Pilot energy rate, if applicable (see 10.5),
- 1.3.5 Cooking energy rate (see 10.6), and
- 1.3.6 Cooking energy efficiency and product cook time (see 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 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 36 M Specification for Structural Steel²

2.2 ANSI Standard:

ANSI Z83.11 for Gas Food Service Equipment—Ranges and Unit Broilers³

2.3 AOAC Documents:⁴

AOAC Official Action 950.46 Air Drying to Determine Moisture Content of Meat and Meat Products%

AOAC Official Action 960.39 Fat (Crude) or Ether Extract in Meat

2.4 ASHRAE Document:⁵

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

2.5 Other Document:

Development and Application of a Uniform Testing Procedure for Griddles, 1989⁶

3. Terminology

3.1 Definitions:

3.1.1 *cooking energy, n*—energy consumed by the underfired broiler as it is used to cook hamburger patties under heavy- and light-load conditions.

3.1.2 *cooking energy efficiency, n*—quantity of energy imparted to the hamburgers, expressed as a percentage of energy consumed by the underfired broiler during the cooking event.

3.1.3 *cooking energy rate, n*—average rate of energy consumption (Btu/h (kJ/h) or kW) during the cooking energy efficiency tests, with the underfired broiler set such that the broiling area does not exceed 600°F (315°C).

3.1.4 *cook time, n*—time required to cook fresh hamburgers as specified in 7.4 to a 35 ± 2 % weight loss during a cooking energy efficiency test.

3.1.5 *energy input rate, n*—peak rate at which an underfired broiler consumes energy (Btu/h (kJ/h) or kW).

3.1.6 *pilot energy rate, n*—average rate of energy consumption (Btu/h (kJ/h)) by an underfired broiler's continuous pilot (if applicable).

3.1.7 *preheat energy, n*—amount of energy consumed by the underfired broiler while preheating the broiling area from ambient room temperature to 500°F (260°C).

3.1.8 *preheat rate, n*—average rate (°F/min (°C/min)) at which the broiling area temperature is heated from ambient temperature to 500°F (260°C).

3.1.9 *preheat time, n*—time required for the broiling area to preheat from ambient room temperature to 500°F (260°C).

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

¹ This test method is under the jurisdiction of ASTM Committee F-26 on Food Service Equipment and is 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 Available from the American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁴ Available from the Association of Official Analytical Chemists, 1111 N. 19th Street, Arlington, VA 22209.

⁵ Available from the American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc., 1791 Tullie Circle, NE, Atlanta, GA 30329.

⁶ Available from Pacific Gas and Electric Co., 3400 Crow Canyon Road, San Ramon, CA 94583.