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An American National Standard

Standard Test Method for Performance of Booster Heaters[1]

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1. Scope

1.1 This test method evaluates the energy efficiency, energy consumption and water heating performance of booster heaters. The food service operator can use this evaluation to select a booster heater and understand its energy consumption.

1.2 This test method is applicable to electric, gas, and steam powered booster heaters.

1.3 The booster heater can be evaluated with respect to the following (where applicable):

1.3.1 Energy input rate (9.2).

1.3.2 Pilot energy rate (9.3).

1.3.3 Flow capacity rate, energy rate, and energy efficiency with 110°F (43.3°C) and 140°F (60.0°C) supply to the booster heater inlet (9.4).

1.3.4 Thermostat calibration (9.5).

1.3.5 Energy rate and energy efficiency at 50% of flow capacity rate with 110°F (43.3°C) and 140°F (60.0°C) supply to the booster heater inlet (9.6).

1.3.6 Preheat energy and time (9.7). The preheat test is not applicable to booster heaters built without water storage and will not have auxiliary water storage connected to the booster heater to complete the water heating system.

1.3.7 Idle (standby) energy rate (9.8).

1.4 The values stated in inch-pound units are to be regarded as standard. The SI units 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:* [2]

D 3588 Practice for Calculating Heating Value, Compressibility Factor, and Relative Density of Gaseous Fuels

2.2 *ANSI Standard:*[3]

ANSI Z223.1-1996 National Fuel Gas Code

2.3 *ASHRAE Handbook:*[4]

ASHRAE 1993 Fundamentals Handbook

2.4 *ASHRAE Guideline:*[4]

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

2.5 *NSF Standards:*[5]

NSF Listing—Food Equipment and Related Components and Material

ANSI/NSF 3-1996 Commercial Spray-Type Dishwashing Machines and Glasswashing Machines

ANSI/NSF 5-1992 Water Heaters, Hot Water Supply Boilers, and Heat Recovery Equipment

ANSI/NSF 26-1980 Pot, Pan, and Utensil Washers

3. Terminology

3.1 *Definitions:*

3.1.1 *booster heater*, *n*—a water heater that raises the booster heater inlet water supply temperature (typically 110°F to 140°F (43.3°C to 60°C)) to 180°F (82.2°C) or more to provide high temperature sanitizing rinse water for a dishwasher machine.

3.1.2 *dishwasher machine*, *n*—(hereafter referred to as dishwasher) machine that uniformly washes, rinses, and heat sanitizes eating and drinking utensils. The machine shall be capable of removing physical soil from properly racked and pre-scraped items, and sanitizing multi-use eating and drinking utensils.

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *batch water flow*—intermittent mode of water delivery at specified flow rate and elapse time. This is the typical style of water delivery of a booster heater supplying final rinse water to a door type dishwasher machine.

3.2.2 *booster heater energy efficiency*—quantity of energy imparted to the water while heating, expressed as a percentage of total amount of energy consumed by the booster heater during the capacity tests.

[1] This test method is under the jurisdiction of ASTM Committee F26 on Food Service Equipment and is the direct responsibility of Subcommittee D26.06 on Productivity and Energy Protocol.

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[2] *Annual Book of ASTM Standards*, Vol 05.06.

[3] Available from the American National Standard Institute (ANSI), 11 West 42nd Street, New York, New York 10036.

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

[5] Available from NSF International, P.O. Box 130140, Ann Arbor, MI 48113–0140.

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