



Standard Test Method for Performance of Refrigerated Buffet and Preparation Tables¹

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1. Scope

1.1 This test method covers evaluation of the energy consumption of refrigerated buffet and preparation tables. The food service operator can use this evaluation to select a refrigerated buffet and preparation table and understand its energy performance.

1.2 This test method is applicable to electric self-contained refrigerators used for holding and displaying refrigerated food in an open area.

1.3 The refrigerated buffet and preparation table can be evaluated with respect to the following (where applicable):

- 1.3.1 Maximum power, or maximum current draw (10.1),
- 1.3.2 Thermostat calibration (10.4), and
- 1.3.3 Energy consumption (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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *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 NSF Standard:²

ANSI/NSF 7 Commercial Refrigerators and Freezers

2.2 ASHRAE Guideline:³

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

2.3 ANSI/ASHRAE Standards:⁴

ANSI/ASHRAE 72-2014 Method of Testing Open Refrigerators for Food Stores

2.4 Food and Drug Administration, U.S. Public Health Service Regulation:⁵

Food Code, 1999

3. Terminology

3.1 Definitions:

3.1.1 *production capacity, n*—maximum volumetric storage capacity (ft^3 (m^3)) at which the refrigerated buffet and preparation table's open display area can hold using a specified container filled to $\frac{1}{2}$ in. of the container rim.

3.1.2 *refrigerated buffet and preparation table, n*—buffet/preparation table herein, equipment designed with a refrigerated open top or open condiment rail.

3.1.3 *refrigerated buffet table or unit, n*—equipment designed with mechanical refrigeration that is intended to receive refrigerated food and maintain food product temperatures and is intended for customer service such as a salad bar. A unit may or may not be equipped with a lower refrigerated compartment.⁶

3.1.4 *refrigerated food preparation unit, n*—equipment designed with a refrigerated open top or open condiment rail such as refrigerated sandwich units, pizza preparation tables, and similar equipment. The unit may or may not be equipped with a lower refrigerated compartment.⁶

3.1.5 *self-contained refrigerator, n*—a refrigerator whose condensing unit is attached as an integral component of the unit.⁶

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 Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48113-0140, <http://www.nsf.org>.

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>.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁵ Available from National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161, <http://www.ntis.gov>.

⁶ Available from National Technical Information Service (NTIS), 5301 Shawnee Rd., Alexandria, VA 22312, <http://www.ntis.gov>.

3.1.6 *storage refrigerator or freezer*, *n*—a refrigerator or freezer designed for cold storage of nonfrozen or frozen foods.

3.1.7 *storage capacity*, *n*—maximum volumetric storage capacity (ft^3 (m^3)) as determined by the manufacturer at which the refrigerated buffet or preparation table's storage component can hold food.

3.1.8 *test method*, *n*—a definitive procedure for the identification, measurement, and evaluation of one or more qualities, characteristics, or properties of a material, product, system, or service that produces test results.

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

4. Summary of Test Method

4.1 Power is determined to confirm that the buffet/preparation table is operating within 5 % of the manufacturer's rated power.

4.2 Buffet/preparation table energy consumption is determined with the upper lid in the raised position while the unit is used to maintain the temperature of water being held in the refrigerated rail and with the upper lid in the lowered position without any pans in the refrigerated rail.

4.3 Production capacity is determined by measuring the amount of water that the refrigerated rail can hold, using a specified container filled to $\frac{1}{2}$ in. of the container rim.

5. Significance and Use

5.1 The power test is used to confirm that the buffet/preparation table is operating properly prior to further testing.

5.2 Buffet/preparation table energy consumption is a precise indicator of buffet/preparation table energy performance under the test loading condition and under a simulated overnight operating condition. This information enables the food service operator to consider energy performance when selecting a buffet/preparation table.

5.3 Production capacity is used by food service operators to choose a buffet/preparation table that matches their food output requirements.

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.

6.2 *Pans*, for holding water. Standard 4-in. (102-mm) deep GN $\frac{1}{6}$ -size pans shall be used in this test method. Pans shall have nominal dimensions of $6 \times 6^{15/16} \times 4$ in. ($162 \times 176 \times 102$ mm). Metal pans shall be used. If alternate pans are used, they shall conform as closely as possible to the pans described in 6.2. All alternate pans must be metal in material, and any deviations from 6.2 must be reported. The weight of the pan shall be 0.70 ± 0.07 lb. The buffet/preparation table manufacturer may provide alternative pans if the unit is designed specifically to only be used with the alternative pans. If alternative pans are used, they shall have nominal dimensions as close to that of the standard pans as is available. All pans must be equipped with thermocouples for temperature measurement. An example of a typical setup is shown in Fig. 1. The thermocouple lead shall be long enough to allow connection to the monitoring device while the pans are in the storage refrigerator.

6.3 *Electronic Humidity Sensor*, for measuring the relative humidity within the test environment with a range of 25 to 45 % and an uncertainty of ± 2 %.

6.4 *Thermocouple Probe*, capable of immersion with a range of 30° to 50°F and an uncertainty of $\pm 2^\circ\text{F}$. Preferably industry standard type T or type K thermocouples.

6.5 *Power Meter*, for measuring the electrical energy consumption of a buffet/preparation table, shall have a resolution of at least 1 W and a maximum uncertainty no greater than 1.5 % of the measured value for any demand greater than 100 W. For any demand less than 100 W, the meter shall have a resolution of at least 1 W and a maximum uncertainty no greater than 10 %.

6.6 *Air Velocity Meter*, for measuring air velocity around the buffet/preparation table with an uncertainty of ± 10 % at 100 ft/min (0.51 m/s) and capable of measuring air velocities at 50 ft/min (0.25 m/s).

7. Reagents and Materials

7.1 *Water*—Distilled water shall be used.

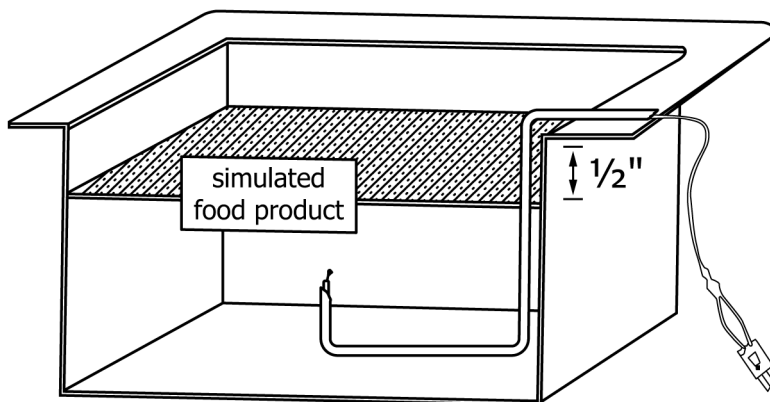


FIG. 1 Pan With Thermocouple Probe