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An American National Standard

Standard Test Method for Performance of Double-Sided Griddles[1]

This standard is issued under the fixed designation F1605; 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 covers the energy consumption and cooking performance of double-sided griddles. The food service operator can use this evaluation to select a double-sided griddle and understand its energy efficiency and productivity.

1.2 This test method is applicable to thermostatically controlled, double-sided gas and electric (or combination gas and electric) contact griddles with separately heated top surfaces.

1.3 The double-sided griddle can be evaluated with respect to the following (where applicable):

1.3.1 Energy input rate (10.2);

1.3.2 Temperature uniformity across the cooking surface(s) and thermostats accuracy (10.3);

1.3.3 Preheat energy and time (10.4);

1.3.4 Idle energy rate (10.5);

1.3.5 Pilot energy rate, if applicable (10.6);

1.3.6 Cooking energy rate and efficiency (10.7); and

1.3.7 Production capacity and cooking surface temperature recovery time (10.7).

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

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

2.2 *AOAC Documents:*[3]

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

2.3 *ASHRAE Document:*[4]

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

3. Terminology

3.1 *Definitions:*

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

3.1.2 *cooking energy, n*—energy consumed by the double-sided griddle as it is used to cook hamburger patties under heavy-, medium-, and light-load conditions.

3.1.3 *cooking energy efficiency, n*—a quantity of energy imparted to the hamburgers, expressed as a percentage of energy consumed by the double-sided griddle during the cooking event.

3.1.4 *cooking energy rate, n*—the average rate of energy consumption (Btu/h (kJ/h) or kW) during the cooking energy efficiency tests. It refers to all loading scenarios (heavy, medium, and light).

3.1.5 *double-sided griddle, n*—a device for cooking food by direct contact with two hot surfaces.

3.1.6 *energy input rate, n*—the peak rate at which a double-sided griddle consumes energy (Btu/h (kJ/h) or kW).

3.1.7 *idle energy rate, n*—the average rate of energy consumed (Btu/h (kJ/h) or kW) by the double-sided griddle while" holding" or "idling" the cooking surface at the thermostat set point.

3.1.8 *pilot energy rate, n*—the average rate of energy consumption (Btu/h (kJ/h)) by a double-sided griddle's continuous pilot (if applicable).

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

[3] Available from AOAC International, 481 North Frederick Ave., Suite 500, Gaithersburg, Maryland 20877-2417, http://www.aoac.org.

[4] Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329, http://www.ashrae.org.

3.1.9 *preheat energy, n*—the amount of energy consumed by the double-sided griddle while preheating the cooking surface from ambient room temperature to the thermostat set point.

3.1.10 *preheat rate, n*—the average rate (°F/min (°C/min)) at which the cooking surface temperature is heated from ambient temperature to the double-sided griddle's thermostat set point.

3.1.11 *preheat time, n*—the time required for the cooking surface to preheat from ambient room temperature to the thermostat set point.

3.1.12 *production capacity, n*—the maximum rate (lb/h (kg/h)) at which the double-sided griddle can bring the specified food product to a specified "cooked" condition.

3.1.13 *production rate, n*—the average rate (lb/h (kg/h)) at which the double-sided griddle brings the specified food product to a specified "cooked" condition. It does not necessarily refer to the maximum rate. The production rate varies with the amount of food being cooked.

3.1.14 *recovery time, n*—the average time from the removal of the last hamburger patty of a load until all sections of the cooking surfaces are back up to within 10°F (5.56°C) of set temperature and are ready to be reloaded.

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

4. Summary of Test Method

4.1 The double-sided griddle is connected to the appropriate metered energy source, and the energy input rate is determined to confirm that it is operating within 5 % of the nameplate energy input rate.

4.2 The bottom cooking surface is monitored directly above the thermostat sensing points and at additional predetermined locations while the double-sided griddle is idled at a nominal 350°F (177°C). The temperature uniformity of the bottom cooking surface is determined.

4.3 The amount of energy and time required to preheat the double-sided griddle to 350°F (177°C) is determined with the upper platens in the raised and lowered positions.

4.4 The idle energy rate is determined with the thermostats set to a calibrated 350°F (177°C) for both raised and lowered upper platen positions.

4.5 When applicable, the pilot energy rate is determined for gas double-sided griddles.

4.6 The double-sided griddle is used to cook frozen, ¼-lb (0.11-kg) 20 % fat, pure beef hamburger patties to a medium-done condition with the thermostats set to a calibrated 350°F (177°C). The cooking energy rate and efficiency are determined for heavy-, medium-, and light-load conditions. The production rate and bottom cooking surface recovery time are also reported for each of the three loading scenarios.

5. Significance and Use

5.1 The energy input rate test is used to confirm that the double-sided griddle is operating properly prior to further testing.

5.2 The temperature uniformity of the bottom cooking surface may be used by food service operators to select a double-sided griddle that provides a uniformly cooked product.

5.3 The preheat energy and time can be useful to food service operators to manage power demands and to know how rapidly the double-sided griddle can be ready for operation.

5.4 The idle energy rate and pilot energy rate can be used to estimate energy consumption during non-cooking periods.

5.5 Cooking energy efficiency is a precise indicator of double-sided griddle energy performance under various loading conditions. This information enables the food service operator to consider energy performance when selecting a double-sided griddle.

5.6 Production capacity is used by food service operators to choose a double-sided griddle that matches their food output requirements.

6. Apparatus

6.1 *Analytical Balance Scale,* for measuring weights up to 10 lb (4.5 kg), with a resolution of 0.01 lb (0.004 kg) and an uncertainty of 0.01 lb (0.004 kg).

6.2 *Barometer,* for measuring absolute atmospheric pressure, for adjustment of the measured gas volume to standard conditions. It shall have a resolution of 0.2 in. Hg (670 Pa) and an uncertainty of 0.2 in. Hg (670 Pa).

6.3 *Canopy Exhaust Hood,* 4 ft (1.2 m) in depth, wall-mounted, with the lower edge of the hood 6 ft, 6 in. (1.98 m) from the floor and with the capacity to operate at a nominal net exhaust ventilation rate of 300 cfm per linear foot (460 L/s per linear metre) of active hood length. This hood shall extend a minimum of 6 in. (152 mm) past both sides and the front of the cooking appliance and shall not incorporate side curtains or partitions. Makeup air shall be delivered through face registers or from the space, or both.

6.4 *Convection Drying Oven,* with the temperature controlled at 215 to 220°F (101 to 104°C), used to determine the moisture content of both the raw and cooked food product.

6.5 *Data Acquisition System,* for measuring energy and temperatures, capable of multiple temperature displays and updating at least every 2 s.

6.6 *Gas Meter,* for measuring the gas consumption of a double-sided griddle, being a positive displacement type with a resolution of at least 0.01 ft^3 (0.0003 m^3) and a maximum uncertainty no greater than 1 % of the measured value for any demand greater than 2.2 ft^3/h (0.06 m^3/h). If the meter is used for measuring the gas consumed by the pilot lights, it shall have a resolution of at least 0.01 ft^3 (0.0003 m^3) and a maximum uncertainty no greater than 2 % of the measured value.

6.7 *Pressure Gage,* for monitoring gas pressure, having a range of 0 to 15 in. H_2O (0 to 3.7 kPa), resolution of 0.5 in. H_2O (125 Pa), and maximum uncertainty of 1 % of the measured value.

6.8 *Strain Gage Welder,* capable of welding thermocouples to steel.[5]

6.9 *Stop Watch,* with a 1-s resolution.

6.10 *Temperature Sensor,* for measuring gas temperature in the range of 50 to 100°F (10 to 38°C) with an uncertainty of ±1°F (0.56°C).

6.11 *Thermocouple(s),* fiberglass insulated, 24 gage, Type K thermocouple wire, peened flat at the exposed ends and spot welded to surfaces with a strain gage welder.

6.12 *Thermocouple Probe(s),* industry standard Type T or K thermocouples capable of immersion with a range of 50° to 200°F (10 to 93°C) and an uncertainty of ±1°F (0.56°C).

6.13 *Watt-Hour Meter,* for measuring the electrical energy consumption of a double-sided griddle, having a resolution of at least 10 Wh and a maximum uncertainty no greater than 1.5 % of the measured value for any demand greater than 100 W. The meter shall have a resolution of at least 10 Wh and a maximum uncertainty no greater than 10 % for any demand less than 100 W.

7. Reagents and Materials

7.1 *Drip Rack,* large enough to hold a full load of hamburger patties in a single layer (that is, 24 patties for a 24 by 36-in. (61 by 94-cm) double-sided griddle).

7.2 *Freezer Paper,* waxed commercial grade, 18-in. (46-cm) wide.

7.3 *Half-Size Sheet Pans,* measuring 18 by 13 by 1 in. (46 by 33 by 2.5 cm), for use in packaging frozen hamburger patties.

7.4 *Hamburger Patties*—A sufficient quantity of frozen hamburger patties shall be obtained from a meat purveyor to conduct the heavy-, medium-, and light-load cooking tests. Specifications for the patties shall be four per pound, 20 ± 2 % fat (by weight), finished grind, pure beef patties with a moisture content between 58 and 62 % of the total hamburger weight. The prefrozen ¼-lb (0.11-kg) patties shall be machine prepared to produce ⅜-in. (9.5-mm) thick patties with a nominal diameter of 5 in. (127 mm).

NOTE 1—It is important to confirm by laboratory tests that the hamburger patties are within the above specifications because these specifications impact directly on cook time and cooking energy consumption.

7.5 *Plastic Wrap,* commercial grade, 18-in. (46-cm) wide.

8. Sampling, Test Units

8.1 *Double-Sided Griddle*—Select a representative production model for performance testing.

9. Preparation of Apparatus

9.1 Install the appliance according to the manufacturer's instructions under a 4-ft (1.2-m) deep canopy exhaust hood mounted against the wall, with the lower edge of the hood 6 ft, 6 in. (1.98 m) from the floor. Position the double-sided griddle with the front edge of the cooking surface inset 6 in. (152 mm) from the front edge of the hood at the manufacturer's recommended working height. The length of the exhaust hood and active filter area shall extend a minimum of 6 in. (152 mm) past both sides of the double-sided griddle. In addition, both sides of the appliance shall be a minimum of 3 ft (0.9 m) from any side wall, side partition, or other operating appliance. The exhaust ventilation rate shall be 300 cfm per linear foot (460 L/s per linear metre) of hood length. (For example, a 3-ft (0.9-m) double-sided griddle shall be ventilated, at minimum, by a hood 4 by 4 ft (1.2 by 1.2 m) with a nominal air flow rate of 1200 cfm (1840 L/s). The application of a longer hood is acceptable, provided the ventilation rate is maintained at 300 cfm per linear foot (460 L/s per linear metre) over the entire length of active hood.) The associated heating or cooling system shall be capable of maintaining an ambient temperature of 75 ± 5°F (24 ± 2.8°C) within the testing environment when the exhaust ventilation system is operating.

9.2 Connect the double-sided griddle to a calibrated energy test meter. For gas installations, install a pressure regulator downstream from the meter to maintain a constant pressure of gas for all tests. Install the instrumentation to record both the pressure and temperature of the gas supplied to the double-sided griddle and the barometric pressure during each test so that the measured gas flow can be corrected to standard conditions. For electric installations, a voltage regulator may be required during tests if the voltage supply is not within ±2.5 % of the manufacturer's nameplate voltage.

9.3 For a gas double-sided griddle, adjust (during maximum energy input) the gas supply pressure downstream from the appliance's pressure regulator to within ±2.5 % of the operating manifold pressure specified by the manufacturer. Make adjustments to the appliance following the manufacturer's recommendations for optimizing combustion. Proper combustion may be verified by measuring air-free CO in accordance with ANSI Z83.11.

9.4 For an electric double-sided griddle, confirm (while the elements are energized) that the supply voltage is within ±2.5 % of the operating voltage specified by the manufacturer. Record the test voltage for each test.

NOTE 2—It is the intent of the test procedure herein to evaluate the performance of a double-sided griddle at its rated gas pressure or electric voltage. If an electric unit is rated dual voltage (that is, designed to operate at either 208 or 240 V with no change in components), the voltage selected by the manufacturer or tester, or both, shall be reported. If a double-sided griddle is designed to operate at two voltages without a change in the resistance of the heating elements, the performance of the unit (for example, the preheat time) may differ at the two voltages.

9.5 Condition the bottom cooking surface in accordance with the manufacturer's instructions. If not specified by the manufacturer, follow the procedures described in 9.5.1.

9.5.1 Heat the bottom griddle surface to 350°F (177°C) as indicated by the thermostat settings. Coat the entire cooking surface with a salt-free cooking oil. Wipe off the oil residue after heating for 5 min. The bottom griddle surface is now conditioned for testing.

[5] Eaton Model W1200 Strain Gauge Welder, available from Eaton Corporation, 1728 Maplelawn Road, Troy, MI 48084, has been found satisfactory for this purpose.

9.6 As applicable, follow the manufacturer's instructions to attach non-stick surfaces or condition top platen surfaces, or both.

9.7 Set the gap between the top and bottom cooking surfaces according to the manufacturer's recommendation for ⅜-in. (9.5-mm) thick hamburger patties. Contact the manufacturer for assistance if this is not accomplished easily.

10. Procedure

10.1 *General:*

10.1.1 For gas appliances, record the following for each test run: (*1*) higher heating value, (*2*) standard gas pressure and temperature used to correct the measured gas volume to standard conditions, (*3*) measured gas temperature, (*4*) measured gas pressure, (*5*) barometric pressure, (*6*) ambient temperature, and (*7*) energy input rate during or immediately prior to the test.

NOTE 3—Using a calorimeter or gas chromatograph in accordance with accepted laboratory procedures is the preferred method for determining the higher heating value of gas supplied to the double-sided griddle under test. It is recommended that all testing be performed with gas having a higher heating value of 1000 to 1075 Btu/ft^3 (37 300 to 40 100 kJ/m^3).

10.1.2 For gas double-sided griddles, add electric energy consumption to gas energy for all tests, with the exception of the energy input rate test (10.2).

10.1.3 For electric double-sided griddles, record the following for each test run: (*1*) voltage while elements are energized, (*2*) ambient temperature, and (*3*) energy input rate during or immediately prior to the test run.

10.1.4 For each test run, confirm that the peak input rate is within ±5 % of the rated nameplate input. Terminate testing and contact the manufacturer if the difference is greater than 5 %. The manufacturer may make appropriate changes or adjustments to the double-sided griddle.

10.2 *Energy Input Rate:*

10.2.1 Operate the double-sided griddle with the temperature controls set to maintain an average bottom cooking surface temperature of 350°F (177°C) and top cooking surface temperature of 350°F (177°C). Ensure that the upper platens are in the lowered position. Monitor the energy consumption for 10 min after the unit is turned on (or all burners have ignited). If the preheat time is less than 10 min (that is, the burners or elements have commenced cycling in that time), monitor the energy consumption and time after the unit is turned on until the first burner or element cycles off.

10.2.2 Confirm that the measured input rate or power (Btu/h for a gas double-sided griddle and kW for an electric double-sided griddle) is within 5 % of the rated nameplate input or power. (It is the intent of the test procedure herein to evaluate the performance of a double-sided griddle at its rated energy input rate.) Terminate testing and contact the manufacturer if the difference is greater than 5 %. The manufacturer may make appropriate changes or adjustments to the double-sided griddle or supply another double-sided griddle for testing.

10.3 *Temperature Uniformity and Thermostat Accuracy:*

10.3.1 Tack-weld thermocouples to the bottom cooking surface directly above each thermostat sensing probe that is embedded in, or located below, the plate.

NOTE 4—Research at Pacific Gas and Electric Co. (PG&E) indicates that thermocouples may be optimized for surface temperature measurement by flattening the thermocouple ends with locking pliers and tack-welding them to the bottom surface with a strain gage welder at the medium setting. Each end of the thermocouple is welded separately to the bottom surface ⅛ ± 1⁄16 in. (3.2± 1.6 mm) apart from the other (Fig. 1).

10.3.2 Preheat all sections (bottom and top) of the griddle to 350°F (177°C) as indicated by the temperature dial on the controls. Stabilize for 60 min after the cooking surfaces commence cycling at the thermostat set point.

10.3.3 Monitor the surface temperature over several complete cycles of the cooking surfaces, where applicable. Determine the average temperature for each thermostat sensor location.

NOTE 5—Double-sided griddles equipped with modulating thermostat controls may not exhibit cycling clearly. In this case, monitor the thermostat bulb temperatures for a minimum of 1 h.

10.3.4 Where required (as indicated by the average temperature), adjust the bottom temperature controls to attain an actual average surface temperature of 350 ± 5°F (177 ± 2.8°C). Repeat the step given in 10.3.3 to confirm that the temperature at each sensing location is 350 ± 5°F (177 ± 2.8°C).

10.3.5 To facilitate further testing of the double-sided griddle in accordance with 10.4 – 10.7, calibrate the bottom temperature controls at 350°F (177°C), following the manufacturer's instructions. If calibration is not recommended or accomplished easily, mark (on the dial) the exact position of the thermostat control that corresponds to an average surface temperature of 350°F (177°C).

10.3.6 Measure additional surface temperatures under each upper platen with no more than 5 in. (127 mm) between adjacent measurement points under a single platen by tack-welding thermocouples to the bottom cooking surface. The additional points shall be no closer to the outside edge of each upper platen than 2 in. (51 mm) when the platen is in the lowered position.

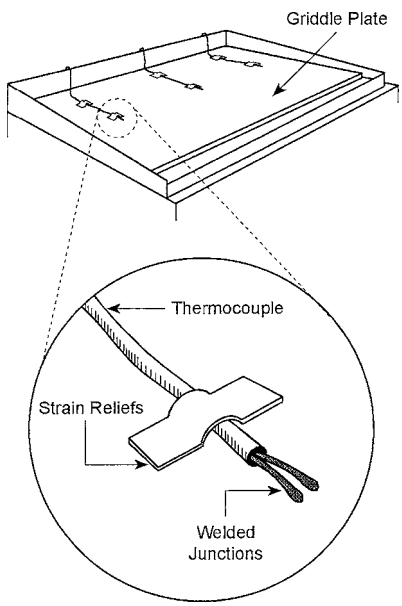


FIG. 1 Sample of Thermocouple Welding for a 3 by 2-ft (0.9 by 0.6-m) Double-Sided Griddle

NOTE 6—It is possible for points under two separate platens to be separated by more than 5 in. (127 mm).

NOTE 7—The additional measurement points on the 24 by 36-in. (61 by 91-mm) bottom surface with three 12-in. (30-cm) wide upper platens can be arranged most effectively in a 4 by 6 grid. This 24-point grid is representative of the placement of hamburger patties during cooking and provides a good representation of the bottom surface temperatures. A sample placement of the measurement points is shown in Fig. 2.

10.3.7 With both the top and bottom set to 350°F (177°C), monitor the temperature for a minimum of 1 h after the cooking surfaces have stabilized at the set temperature. The upper platens shall be in the lowered position.

10.3.8 Record the maximum temperature difference on the bottom surface. The maximum difference is the highest average temperature minus the lowest average temperature at any point on the cooking surface not closer than 2 in. (51 mm) from the outside edge of each upper platen.

NOTE 8—It is the intent of this procedure to determine the effective temperature uniformity of the double-sided griddle as it will be used in production.

10.4 *Preheat Energy and Time:*

NOTE 9—The preheat test should be conducted as the first appliance operation on the day of the test.

10.4.1 Tack-weld thermocouples to the cooking surface directly above the thermostat sensing points as in 10.3.1.

10.4.2 Record the cooking surface temperature and ambient kitchen temperature at the start of the test (both cooking surface temperatures shall be 75 ± 5°F (24 ± 2.8°C) at the start of the test).

10.4.3 Turn the unit on with the temperature controls set to attain a bottom and top surface temperature of 350°F (177°C), as determined in 10.3. Ensure that the upper platens are in the lowered position.

10.4.4 Preheat is judged complete when the last of the monitored bottom surface temperatures reaches 350°F (177°C). Record the energy and time to preheat all sections of the double-sided griddle jointly.

10.4.5 Repeat the steps given in 10.4.2 – 10.4.4 with the upper platens in the raised position.

10.5 *Idle Energy Rate:*

10.5.1 Allow the top and bottom cooking surfaces to stabilize at 350°F (177°C) for at least 60 min. Place the upper platens in the lowered position.

10.5.2 Monitor the energy consumption of the double-sided griddle while it is operated under the idle condition for a minimum of 2 h.

10.5.3 Repeat the steps given in 10.5.1 and 10.5.2 with the upper platens in the raised position.

10.6 *Pilot Energy Rate (Gas Models with Standing Pilots):*

10.6.1 Where applicable, set the gas valve that controls gas supply to the appliance at the "pilot" position. Otherwise, set the double-sided griddle temperature controls to the "off" position.

10.6.2 Light and adjust the pilots according to the manufacturer's instructions.

10.6.3 Record the gas reading after a minimum of 8 h of pilot operation.

10.7 *Cooking Energy Efficiency and Production Capacity:*

10.7.1 Run the cooking energy efficiency test a minimum of three times for each loading scenario. Additional test runs may be necessary to obtain the required precision for the reported test results (Annex A1).

10.7.2 Verify the fat and moisture content of the hamburger patties in accordance with recognized laboratory procedures (AOAC Official Actions 960.39 and 950.46). Select hamburger patties randomly (1 for every 15), and weigh them. Record the average weight of these samples to determine the total raw weight for each load.

10.7.3 Prepare patties for the test by loading them onto half-size 18 by 13 by 1-in. (46 by 33 by 2.5-cm) sheet pans (Fig. 3). Package 24 patties per sheet (6 patties per level by 4 levels), separating each level by a double sheet of waxed

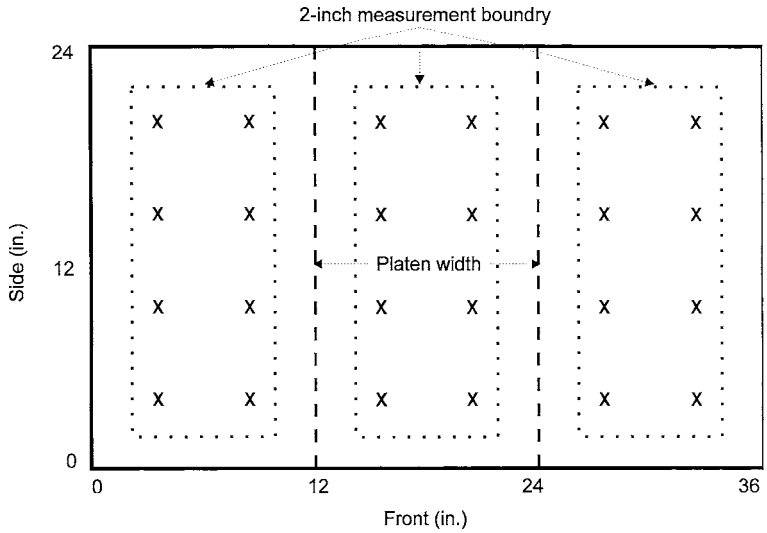


FIG. 2 Sample Placement of Thermocouples on a 3 by 2-ft (0.9 by 0.6-m) Double-Sided Griddle with 12-in. (30.5-cm) Wide Upper Platens

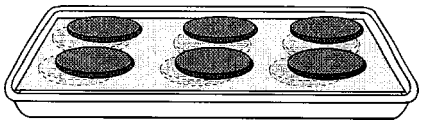


FIG. 3 Example of Hamburger Patty Packaging

freezer paper (Fig. 4). To facilitate verification that the patties are at the required temperature for the beginning of the test, implant a thermocouple horizontally into at least one hamburger patty on a sheet pan. Cover the entire package with a commercial grade plastic wrap. Place the sheet pans in a freezer near the double-sided griddle test area until the temperature of the patties has stabilized at the freezer temperature.

10.7.4 Monitor the temperature of a frozen patty with a thermocouple probe. Its internal temperature must reach 0 ± 5°F (−18 ± 2.8°C) before the hamburger patties can be removed from the freezer and loaded onto the double-sided griddle. Adjust the freezer temperature to achieve this required internal temperature (the typical freezer setting is −5°F) (−21°C)) if necessary.

10.7.5 Prepare a minimum number of loads for the three test runs (Figs. 5 and 6). Use four patties per square foot of cooking surface for the heavy-load tests; use half the number of patties required for the heavy-load test for the medium-load tests; use four patties per load for light-load tests. Count on 7 to 10 loads per test run.

10.7.6 Tack-weld thermocouples to the bottom cooking surface at the center of each linear foot, allowing one thermocouple for every 12 in. (31 cm) of cooking surface length (that is, three for a 24 by 36-in. (61 by 91-cm) double-sided griddle). For a 24 by 36-in. (61 by 91-cm) double-sided griddle, the locations are at 6, 18, and 30 in. (15, 46, and 76 cm) from the sides, centered front to back (Fig. 1).

10.7.7 Preheat the top and bottom cooking surfaces to 350°F (177°C). Refer to the manufacturer's recommendations concerning the minimum surface area required for each loading scenario. Allow the cooking surfaces to stabilize at the set temperature for 1 h.

10.7.8 Load the patties sequentially on the bottom cooking surface over a 15-s time period for each linear foot of cooking surface (for example, 45 s for a 36-in. (91-cm) double-sided griddle and 60 s for a 48-in. (122-cm) double-sided griddle). Lower each upper cooking section as the area beneath it is loaded.

10.7.9 Cook the patties for 2.5 min, starting from the time the first hamburger patty is placed on the cooking surface.

10.7.10 Remove the patties in the order placed on the unit over a 15-s time period for each linear foot of cooking surface.

10.7.11 The hamburger patties shall be cooked to an internal temperature of 163°F (73°C) to confirm a medium-done condition. This can be accomplished by cooking the patties to a 35 % weight loss.

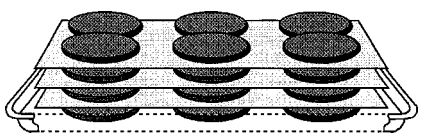
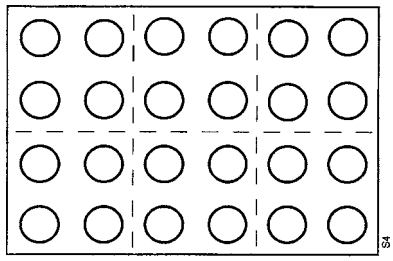


FIG. 4 Cutaway View of Packaged Hamburgers



All griddle sections on

FIG. 5 Patty Positions for Heavy-Load Tests on a 36 by 24-in. (91 by 61-cm) Double-Sided Griddle Surface

NOTE 10—Research conducted by PG&E has determined that the final internal temperature of cooked hamburger patties may be approximated by the percent weight loss incurred during cooking. The two are connected by a linear relationship (Fig. 7), provided that the hamburger patties are within the specifications described in 7.4.

10.7.12 Spread the patties on a drip rack using tongs. Turn the patties over after 1 min. Transfer the patties to a separate pan for weighing after another min. Calculate the weight loss using the average patty weight determined in 10.7.2. The percent weight loss shall be 35 ± 2 %.

NOTE 11—The actual cook time depends on the length of time that the patties remain on the double-sided griddle, average temperature of the cooking surfaces, gap between the top and bottom cooking surfaces, and total weight of the food being cooked.

10.7.13 If the percent weight loss is not 35 ± 2 %, repeat the steps given in 10.7.8 – 10.7.12, adjusting the total cooking time to attain the 35 ± 2 % weight loss. Ensure that the bottom surface has recovered to 340°F (171°C) prior to reloading (all monitored points are at least 340°F (171°C)). As required and as time permits, scrape the cooking surfaces with the appropriate utensils during this recovery period.

NOTE 12—Research at PG&E indicates that a double-sided griddle cooking surface has recovered sufficiently to cook another load when the surface temperature recovers to within 10°F (5.6°C) of the set temperature (that is, 340°F (171°C) when the thermostats are set to maintain 350°F (177°C)).

10.7.14 Cook a load of patties (10.7.8 – 10.7.12), using the cooking time determined to produce medium-done patties. After removing the patties, allow a minimum of 10 s per linear foot of cooking surface to scrape the cooking surfaces. After the scraping period, reload the double-sided griddle when all monitored points have recovered to at least 340°F (171°C).

10.7.15 Remove each patty load separately from the freezer, based on the previously determined elapsed time that is required for the patties to warm to the specified 0 ± 5°F (−18 ± 2.8°C) loading temperature. *Do not hand-hold the patties until loading takes place.*

10.7.16 Run as many stabilization loads as necessary to stabilize the double-sided griddle response (that is, maintain the 35 ± 2 % weight loss). Run an additional six loads after the double-sided griddle has stabilized. Monitor the energy consumption and total test time for the final six loads. Record the percent weight loss for each load. Ensure that the average weight loss for the six-load test is 35 ± 2 %.

NOTE 13—The test is invalid and must be repeated if the average weight loss for the six-load test is not 35 ± 2 %.