



Standard Guide for Laboratory Requirements Necessary to Test Commercial Cooking and Warming Appliances to ASTM Test Methods¹

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1. Scope

1.1 The scope of this guide includes the laboratory and organizational requirements to test commercial cooking and warming appliances (for example, griddles, fryers, ovens, steam cookers, and hot food holding cabinets) for preheat energy consumption and time, idle energy rate, cooking-energy efficiency, and production capacity, in accordance with the appropriate ASTM test methods under the jurisdiction of Committee F26, including the following:

Test Method	F1275
Test Method	F1361
Test Methods	F1484
Test Method	F1496
Test Methods	F1521
Test Method	F1605
Test Method	F1639
Test Method	F1695
Test Method	F1784
Test Method	F1785
Test Method	F1786
Test Method	F1787
Test Method	F1817
Test Method	F1964
Test Method	F1965
Test Method	F1991
Test Method	F2093
Test Method	F2140
Test Method	F2142
Test Method	F2144
Test Method	F2237
Test Method	F2238
Test Method	F2239
Test Method	F2380
Test Method	F2473

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *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

- F1275 Test Method for Performance of Griddles
- F1361 Test Method for Performance of Open Deep Fat Fryers
- F1484 Test Methods for Performance of Steam Cookers
- F1496 Test Method for Performance of Convection Ovens

¹ This guide 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.



- F1521 Test Methods for Performance of Range Tops
- F1605 Test Method for Performance of Double-Sided Griddles
- F1639 Test Method for Performance of Combination Ovens (Withdrawn 2012)³
- F1695 Test Method for Performance of Underfired Broilers
- F1784 Test Method for Performance of a Pasta Cooker
- F1785 Test Method for Performance of Steam Kettles
- F1786 Test Method for Performance of Braising Pans
- F1787 Test Method for Performance of Rotisserie Ovens
- F1817 Test Method for Performance of Conveyor Ovens
- F1964 Test Method for Performance of Pressure Fryers
- F1965 Test Method for Performance of Deck Ovens
- F1991 Test Method for Performance of Chinese (Wok) Ranges
- F2093 Test Method for Performance of Rack Ovens
- F2140 Test Method for Performance of Hot Food Holding Cabinets
- F2142 Test Method for Performance of Drawer Warmers
- F2144 Test Method for Performance of Large Open Vat Fryers
- F2237 Test Method for Performance of Upright Overfired Broilers
- F2238 Test Method for Performance of Rapid Cook Ovens
- F2239 Test Method for Performance of Conveyor Broilers
- F2380 Test Method for Performance of Conveyor Toasters
- F2473 Test Method for Performance of Water-Bath Rethermalizers

3. Terminology

3.1 Definitions:

3.1.1 *cooking-energy efficiency, n*—quantity of energy imparted to the specified food product, expressed as a percentage of energy consumed by the appliance during the cooking event.

3.1.2 *cooking energy rate, n*—average rate of energy consumption during the cooking-energy efficiency tests, Btu/h (kJ/h) or kW.

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

3.1.4 *idle energy rate, n*—an appliance's rate of energy consumption while maintaining a ready-to-cook or hold state at a specified thermostat set point, Btu/h (kJ/h) or kW, .

3.1.5 *pilot energy rate, n*—rate of energy consumption by an appliance's continuous pilot (if applicable), Btu/h (kJ/h).

3.1.6 *preheat energy, n*—amount of energy consumed by the appliance while warming the cooking or holding area from ambient temperature to the specified thermostat set point, Btu (kJ) or kWh.

3.1.7 *preheat time, n*—time required for the appliance to warm the cooking or holding area from ambient temperature to the specified thermostat set point, min.

3.1.8 *production capacity, n*—maximum rate at which an appliance can bring the specified food product to a specified "cooked" condition, lb/h (kg/h).

3.1.9 *production rate, n*—rate at which an appliance brings the specified food product to a specified "cooked" condition, lb/h (kg/h).

NOTE 1— Does not necessarily refer to maximum rate.

NOTE 2—Production rate varies with the amount of food being cooked.

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

4. Summary of Guide

4.1 Guide to outline requirements for laboratories to test to ASTM performance specifications for commercial cooking appliances that include the necessary organizational structure, facility, equipment, instrumentation, procedures, reporting and proficiency testing.

5. Significance and Use

5.1 This guide provides criteria for evaluating the capability of a laboratory to properly perform commercial cooking appliance energy consumption and cooking-energy efficiency evaluations, and to establish essential characteristics pertaining to the organization, personnel, facilities, and quality systems of the laboratory.

³ The last approved version of this historical standard is referenced on www.astm.org.

6. Organization of the Laboratory

6.1 The following information concerning the organization of the laboratory shall be provided by documentation:

6.1.1 A description of the organization including:

6.1.1.1 The complete legal name and address of the main office,

6.1.1.2 The names and positions of the principal officers and directors,

6.1.1.3 The laboratory's ownership, managerial structure, and principal members,

6.1.1.4 The functional description of the laboratory's organizational structure, operational departments, and support departments and services. This may be demonstrated in the form of charts that depict all the divisions, departments, sections, and units and their relationships,

6.1.1.5 All relevant organizational affiliates of the laboratory and the principal officers of affiliates and directors of the affiliates, where applicable,

6.1.1.6 External organizations and organizational components, and their functions, that are utilized for significant technical support services, and

6.1.1.7 A brief history of the laboratory including its relationship with its organizational component affiliations and other supporting information.

6.1.2 A general description of the type of users of the laboratory's services.

6.1.3 A listing of the relevant technical services offered.

6.2 *Independence:*

6.2.1 If the testing laboratory is part of an organization performing activities other than testing or calibration, or both, the laboratory shall define the responsibilities of key personnel in the organization that have an involvement or influence on the testing, equipment purchase, test data, reports, and calibration activities, or combination thereof, of the laboratory in order to identify potential conflicts of interest.

6.2.2 When a laboratory is part of a larger organization, the organizational arrangements shall be such that departments having conflicting interests, such as design engineering, production, commercial marketing, or finance do not adversely influence the laboratory's compliance with the requirements of this guide.

6.2.3 If the laboratory wishes to be recognized as a third-party laboratory, it shall demonstrate that it is impartial and that it and its personnel are free from any undue commercial and financial pressures and job performance evaluations that might influence their technical judgment. The third-party testing or calibration laboratory shall not engage in any activities that may endanger trust in its independence of judgment and integrity in relation to its testing or calibration activities.

7. Responsibilities and Duties

7.1 An appliance testing laboratory's capabilities shall include, but not be limited to, the following (where applicable): preheat energy consumption and time, idle energy rate, cooking-energy efficiency, and production capacity, as defined in the appropriate ASTM test methods.

7.2 It is the responsibility of the laboratory to ensure the following:

7.2.1 It performs only examinations for which it is adequately equipped and staffed,

7.2.2 Its employees perform only examinations for which they are adequately qualified,

7.2.3 Its equipment is calibrated and its personnel are qualified, and

7.2.4 All equipment, equipment calibrations, and personnel qualifications are properly maintained in accordance with this guide.

7.3 The following duties are those usually performed by the laboratory:

7.3.1 Performance of all testing in accordance with the specified ASTM test methods, and

7.3.2 Preparation of formal reports of all the results of the testing defined in 7.3.1. The laboratory shall be prepared to substantiate examination results when required.

7.4 The laboratory shall maintain a records retention policy that is compatible with its mission.

8. Personnel

8.1 The laboratory shall document and maintain a record of the following:

8.1.1 Written outline or chart defining operational personnel positions and their lines of responsibility and authority,

8.1.2 Job description for each professional, scientific, supervisory, and technical position category, documenting the required education, training, or experience, or a combination thereof.

8.1.3 Records or resumes that document the qualifications, work experience, and training history of each person in a position described in 8.1.2.

8.1.4 The laboratory shall make available a description of its means of ensuring the continued competence of its personnel to perform commercial cooking appliance testing, including the maintenance of written records to document the results.