



Standard Test Method for Heat Gain to Space Performance of Commercial Kitchen Ventilation/Appliance Systems¹

This standard is issued under the fixed designation F2474; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This test method covers the determination of appliance heat gain to space derived from the measurement and calculation of appliance energy consumption, energy exhausted, and energy to food, based on a system energy balance, parametric evaluation of operational or design variations in appliances, hoods, or replacement air configurations.

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.*

1.4 *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 ASTM Standards:²

F1704 Test Method for Capture and Containment Performance of Commercial Kitchen Exhaust Ventilation Systems

2.2 ASHRAE Standard:³

ASHRAE Guideline 2-1986 (RA96) Engineering Analysis of Experimental Data

¹ This test method is under the jurisdiction of ASTM Committee F26 on Food Service Equipment and is the direct responsibility of Subcommittee F26.07 on Commercial Kitchen Ventilation.

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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.

³ Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329

ASHRAE Terminology of Heating, Ventilation, Air-Conditioning, and Refrigeration

2.3 ANSI Standards:⁴

ANSI/ASHRAE 51 and ANSI/AMCA 210 Laboratory Method of Testing Fans for Rating

NOTE 1—The replacement air and exhaust system terms and their definitions are consistent with terminology used by the American Society of Heating, Refrigeration, and Air Conditioning Engineers.⁵ Where there are references to cooking appliances, an attempt has been made to be consistent with terminology used in the test methods for commercial cooking appliances. For each energy rate defined as follows, there is a corresponding energy consumption that is equal to the average energy rate multiplied by elapsed time. Electric energy and rates are expressed in W, kW, and kWh. Gas energy consumption quantities and rates are expressed in Btu, kBtu, and kBtu/h. Energy rates for natural gas-fueled appliances are based on the higher heating value of natural gas.

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *energy rate, n*—average rate at which an appliance consumes energy during a specified condition (for example, idle or cooking).

3.1.2 *appliance/hood energy balance, n*—mathematical expression of appliance, exhaust system, and food energy relationship.

$$= \frac{[\text{actual appliance energy consumption}]}{[\text{heat gain to space from appliance(s)}] + [\text{energy exhausted}] + [\text{energy-to-food, if any}]}$$

3.1.3 *cold start, n*—condition in which appliances are energized with all components being at nominal room temperature.

3.1.4 *cooking energy consumption rate, n*—average rate of energy consumed by the appliance(s) during cooking specified in appliance test methods.

3.1.4.1 *Discussion*—In this test method, this rate is measured for heavy-load cooking in accordance with the applicable test method.

3.1.5 *exhaust energy rate, n*—average rate at which energy is removed from the test system.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

⁵ The boldface numbers in parentheses refer to the list of references at the end of these test methods.