



Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This fire-test-response standard, to be used for research and development purposes, covers the measurement of surface flammability of materials. It is not intended for use as a basis of ratings for building code purposes.

1.2 *This standard should be used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions and should not be used to describe or appraise the fire-hazard or fire-risk of materials, products, or assemblies under actual fire conditions. However, results of the test may be used as elements of a firehazard assessment or a fire-risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard or fire risk of a particular end use.*

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 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

E 176 Terminology Relating to Fire Standards²

3. Terminology

3.1 **Definitions**—For definitions of terms used in this test method refer to the terminology contained in Terminology E 176.

4. Summary of Test Method

4.1 This test method of measuring surface flammability of materials employs a radiant heat source consisting of a 12 by 18-in. (300 by 460-mm) panel in front of which an inclined 6 by 18-in. (150 by 460 mm) specimen of the material is placed.

The orientation of the specimen is such that ignition is forced near its upper edge and the flame front progresses downward.

4.2 A factor derived from the rate of progress of the flame front and another relating to the rate of heat liberation by the material under test are combined to provide a flame spread index.

5. Significance and Use

5.1 This test method provides a laboratory test procedure for measuring and comparing the surface flammability of materials when exposed to a prescribed level of radiant heat energy. It is intended for measurements on materials whose surfaces may be exposed to fire. The test is made on specimens of small size (6 by 18 in. (150 by 460 mm)) that are representative, to the extent possible, of the material or assembly being evaluated. The test is intended for research and development only.

5.2 The rate at which flames will travel along surfaces depends upon the physical and thermal properties of the material, its method of mounting and orientation, the type and level of fire or heat exposure, the availability of air, and properties of the surrounding enclosure.³

6. Apparatus

6.1 The apparatus shall be essentially as shown in Figs. 1 and 2 and shall include the following:

6.1.1 **Radiant Panel with Air and Gas Supply**—The radiant panel shall consist of a porous refractory material vertically mounted in a cast iron frame, exposing a radiating surface of 12 by 18 in. (300 by 460 mm) and shall be capable of operating at temperatures up to 1500°F (815°C). The panel shall be equipped (see Fig. 2) with a venturi-type aspirator for mixing gas and air at approximately atmospheric pressure; a centrifugal blower, or equivalent, to provide 100 ft³/min (50 L/s) air at

³ Robertson, A. F., "Surface Flammability Measurements by the Radiant Panel Method," *Symposium on Fire Test Methods*, ASTM STP 344, ASTM, 1962, pp. 33–46.

Robertson, A. F., Gross, D., and Loftus, J., "A Method for Measuring Surface Flammability of Materials Using a Radiant Energy Source," *Proceedings*, ASTM, Vol 56, 1956, pp. 1437–1453.

Gross, D. and Loftus, J. J., "Surface Flame Propagation on Cellulosic Materials Exposed to Thermal Radiation," *Journal of Research*, NBS, Vol 67C, 1963, pp. 251–258.

Maggee, R. S. and McAlevy III, R. F., "The Mechanism of Flame Spread," *Journal of Fire and Flammability*, Vol 2, 1971, pp. 271–297.

¹ This test method is under the jurisdiction of ASTM Committee E-5 on Fire Standards and is the direct responsibility of Subcommittee E05.22 on Surface Burning.

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² *Annual Book of ASTM Standards*, Vol 04.07.