



Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C¹

This standard is issued under the fixed designation E 136; 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.

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

1. Scope

1.1 This fire-test-response test method covers the determination under specified laboratory conditions of combustion characteristics of building materials. It is not intended to apply to laminated or coated materials.

1.2 This test method references notes and footnotes that provide explanatory information. These notes and footnotes, excluding those in tables and figures, shall not be considered as requirements of this test method.

1.3 The values stated in SI units are to be regarded as standard. The values given in brackets are for information only.

1.4 *This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of the materials, products, or assemblies under actual fire conditions.*

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 ASTM Standards:²

D 1929 Test Method for Ignition Properties of Plastics

D 3174 Test Method for Ash in the Analysis Sample of Coal and Coke from Coal

E 84 Test Method for Surface Burning Characteristics of Building Materials

E 176 Terminology of Fire Standards

2.2 ISO Standard:

ISO 1182 Noncombustibility Test for Building Materials³

2.3 Other Standard:

BS 476 Combustibility Test of Materials³

3. Terminology

3.1 Definitions—For definitions of terms found in this test method, refer to Terminology E 176.

4. Significance and Use

4.1 While actual building fire exposure conditions are not duplicated, this test method will assist in indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

4.2 Materials passing the test are permitted limited flaming and other indications of combustion.

5. Apparatus

5.1 The apparatus, as shown in Fig. 1, shall consist primarily of the following:

5.1.1 *Refractory Tubes*—Two concentric, refractory tubes, 76 and 102 mm [3 and 4 in.] in inside diameter and 210 to 250 mm [8½ to 10 in.] in length, with axes vertical, and with heat applied by electric heating coils outside of the larger tube. A controlled flow of air is admitted tangentially near the top of the annular space between the tubes and passes to the bottom of the inner tube. The outer tube rests on a refractory bottom and the inner tube rests on three spacer blocks so as to afford a total opening under the inner tube equal to or greater than that of the annular space. The refractory bottom plate has a removable plug for cleaning.

5.1.2 *Transparent Cover*—A transparent cover of heat-resistant glass or other transparent material shall be provided over the top of the inner tubes. The cover shall have a circular opening 28.7 ± 0.8 mm [$1\frac{1}{8} \pm \frac{1}{32}$ in.] centered over the axis of the tubes. This opening has an area of 645 mm² [1.0 in.²]. The cover shall be in two equally-sized, movable parts.

5.1.3 *Thermocouples* and an automatically recording device shall be provided. The thermocouples shall be located as follows:

¹ This test method is under the jurisdiction of ASTM Committee E05 on Fire Standards and is the direct responsibility of Subcommittee E05.23 on Combustibility.

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