



Standard Test Method for Flame Resistance of Textiles (Vertical Test)¹

This standard is issued under the fixed designation D 6413; 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 is used to measure the vertical flame resistance of textiles.

1.1.1 As a part of the measure of flame resistance, after-flame and afterglow characteristics are evaluated.

1.2 This standard shall be used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled laboratory conditions and shall not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions.

1.3 The values stated in either SI units or other units are to be regarded separately. The values stated in each system are not exact equivalents; therefore, each system shall be used independently without combining values.

1.4 *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:

D 123 Terminology Relating to Textiles²

D 1776 Practice for Conditioning Textiles for Testing²

D 4391 Terminology Relating to Burning Behavior of Textiles³

3. Terminology

3.1 *Definitions*—For definitions of terms relating to the combustion of textiles, see Terminology D 4391. For definitions of other textile terms used in this test method, refer to Terminology D 123.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *afterflame, n*—persistent flaming of a material after the ignition source has been removed.

3.2.2 *after-flame time, n*—the length of time for which a material continues to flame after the ignition source has been removed.

3.2.3 *afterglow, n*—glow in a material after the removal of an external ignition source or after the cessation (natural or

induced) of flaming of the material.

3.2.4 *afterglow time, n*—the time afterglow continues after the removal of the ignition source and the cessation of flaming.

3.2.5 *char length, n*—in measuring flame resistance of textiles, the distance from the fabric edge, which is directly exposed to the flame to the furthest point of visible fabric damage after a specified tearing force has been applied.

3.2.6 *charring, n*—the formation of carbonaceous residue as the result of pyrolysis or incomplete combustion.

3.2.7 *flame, n*—as related to ignition of textiles, a controlled hot, luminous zone of gas or matter in gaseous suspension, or both, of constant size and shape that is undergoing combustion as evidenced by a low-intensity heat flux of less than 1 kw, such as candle flame or match flame.

3.2.8 *flame application time, n*—the time interval for which the ignition flame is applied to a material.

3.2.9 *flame resistance, n*—the property of a material whereby flaming combustion is prevented, terminated, or inhibited following application of a flaming or nonflaming source of ignition, with or without subsequent removal of the ignition source.

3.2.10 *glow, n*—visible, flameless combustion of the solid phase of a material.

3.2.11 *ignition, n*—the initiation of combustion.

3.2.12 *melting, n*—a liquification of material under the influence of heat.

3.2.13 *smoldering, n*—the combustion of a solid material without accompaniment of flame but generally with the production of smoke.

4. Summary of Test Method

4.1 A specimen is positioned vertically above a controlled flame and exposed for a specified period of time. The flame then is removed, and afterflame time and afterglow time are measured.

4.2 Char length is measured under a specified force.

4.3 Any evidence of melting or dripping is noted.

5. Significance and Use

5.1 This test method determines the response of textiles to a standard ignition source, deriving measurement values for afterflame time, afterglow time, and char length.

5.2 The vertical flame resistance, as determined by this test method, only relates to a specified flame exposure and application time.

¹ This test method is under the jurisdiction of ASTM Committee D-13 Textiles and is the direct responsibility of Subcommittee D13.52 on Flammability.

Current edition approved April 10, 1999. Published August 1999.

² Annual Book of ASTM Standards, Vol 07.01.

³ Annual Book of ASTM Standards, Vol 07.02.