



Designation: F 793 – 06

## Standard Classification of Wall Covering by Use Characteristics<sup>1</sup>

This standard is issued under the fixed designation F 793; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This classification covers the classification of wall covering by use characteristics, that is, according to its serviceability in use, recognizing that certain wall covering is designed primarily for decorative effect, while other wall covering is also designed to achieve a high degree of serviceability.

1.2 The values stated in inch-pound units are to be regarded as the 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 is used to measure and describe the properties 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.*

1.4 *This standard does not purport to address all of the safety problems, 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:<sup>2</sup>

- D 685 Practice for Conditioning Paper and Paper Products for Testing
- D 751 Test Methods for Coated Fabrics
- D 1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
- D 2486 Test Methods for Scrub Resistance of Wall Paints
- E 84 Test Method for Surface Burning Characteristics of Building Materials
- E 2404 Practice for Specimen Preparation and Mounting of Paper or Vinyl Wall or Ceiling Coverings to Assess Surface

#### Burning Characteristics

- G 21 Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- 2.2 *Federal Standards:*<sup>3</sup>
  - Fed. Std. No. 191 Textile Test Methods
  - Fed. Spec. CCC-W-408D Wall Covering, Vinyl-Coated
- 2.3 *ICC Standards:*<sup>4</sup>
  - IBC International Building Code
  - IFC International Fire Code
- 2.4 *NFPA Standards:*<sup>5</sup>
  - NFPA 101 Life Safety Code
  - NFPA 255 Method of Test of Surface Burning Characteristics of Building Materials
  - NFPA 265 Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls
  - NFPA 286 Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
  - NFPA 5000 Building Construction and Safety Code
- 2.5 *UL Standard:*<sup>6</sup>
  - UL 723 Test for Surface Burning Characteristics of Building Materials

### 3. Terminology

#### 3.1 Definitions of Terms Specific to This Standard:

- 3.1.1 *abrasion resistance*—ability to withstand mechanical action such as rubbing, scraping, or scrubbing that may progressively tend to remove material from the surface of a wall covering.
- 3.1.2 *blocking resistance*—ability to resist adhesion or sticking between two surfaces of a wall covering that touch under uniform loading and temperature conditions for a specified time.
- 3.1.3 *breaking strength*—ability of a wall covering to withstand a pulling force in the plane of the web.

<sup>1</sup> This classification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.15 on Wallcoverings.

Current edition approved May 1, 2006. Published May 2006. Originally approved in 1982. Last previous edition approved in 2005 as F 793 – 05.

<sup>2</sup> 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.

<sup>3</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, ATTN: NPODS.

<sup>4</sup> Available from International Code Council (ICC), 5203 Leesburg Pike, Suite 600, Falls Church, VA 22041.

<sup>5</sup> Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269-9101.

<sup>6</sup> Available from Underwriters Laboratories (UL), Corporate Progress, 333 Pfingsten Rd., Northbrook, IL 60062.

3.1.4 *coating adhesion*—measure of the strength of the bond between the surface coating and the backing or substrate of a wall covering.

3.1.5 *cold cracking resistance*—ability to resist cracking of the coated or decorative surface when a wall covering is folded during exposure to low temperatures.

3.1.6 *colorfastness*—ability to resist change or loss of color resulting from exposure to light.

3.1.7 *crocking resistance*—ability to resist transfer of color from a wall covering surface when rubbed.

3.1.8 *flame spread index*—comparative measure expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time in Test Method E 84 (see 1.3).

3.1.9 *heat aging resistance*—ability to resist deterioration of the coated or decorative surface when a wall covering is exposed to elevated temperatures over an extended period.

3.1.10 *mildew-resistant wall covering*—wall covering that has been treated to deter the growth of fungi (mildew) on the decorative surface.

3.1.11 *peelable wall covering*—wall covering from which the decorative surface may be dry-peeled from the substrate, leaving a continuous layer of the substrate on the wall, when the wall covering has been installed and peeled in accordance with the manufacturer's instructions.

3.1.12 *scrubbability*—ability of a wall covering to withstand scrubbing with a brush and a prescribed detergent solution.

3.1.13 *shrinkability*—change in the dimension of the wall covering after wetting it and drying it.

3.1.14 *smoke developed index*—comparative measure expressed as a dimensionless number, derived from measurements of smoke obscuration versus time in Test Method E 84.

3.1.15 *stain resistance*—ability of a wall covering to show no appreciable change in appearance after application and removal of specified reagents.

3.1.16 *strippable wall covering*—wall covering that can be dry-stripped from the wall after having been installed and stripped in accordance with the manufacturer's instructions, leaving a minimum of product residue on the wall and without damage to the wall surface.

3.1.17 *tear strength*—ability of a wall covering to resist the propagation of an existing tear.

3.1.18 *wall covering*—flexible product designed to cover walls and ceilings for decorative or functional purposes, or both.

3.1.19 *washability*—ability of a wall covering to withstand occasional sponging with a prescribed detergent solution.

#### 4. Significance and Use

4.1 This classification provides criteria by which wall covering of appropriate use characteristics can be chosen for particular residential and commercial decorating applications.

#### 5. Basis of Classification

5.1 Wall covering is classified based on its performance in tests for:

- Abrasion resistance
- Blocking resistance
- Breaking strength
- Coating adhesion
- Cold cracking resistance
- Colorfastness
- Crocking resistance
- Heat aging resistance
- Maximum flame spread index
- Maximum shrinkage
- Maximum smoke developed index
- Other flammability characteristics
- Scrubbability
- Stain resistance
- Tear resistance
- Washability

5.2 Wall covering shall be classified in accordance with the performance criteria listed in Table 1 when tested in accordance with the appropriate test methods in Section 7.

5.2.1 *Category I, Decorative Only*—Wall covering manufactured for decorative purposes that can be hung without damage in accordance with the manufacturer's instructions.

5.2.2 *Category II, Decorative with Medium Serviceability*—Wall covering primarily decorative but more washable and colorfast than Category I wall covering.

5.2.3 *Category III, Decorative with High Serviceability*—Wall covering manufactured for medium use, where abrasion resistance, stain resistance, scrubbability, and increased colorfastness are necessary. Category III wall covering must also meet breaking strength and crocking resistance criteria.

5.2.4 *Category IV, Type I Commercial Serviceability*—Wall covering manufactured for use where higher abrasion resistance, stain resistance, and scrubbability are necessary in heavy consumer and light commercial use. Category IV wall covering must also meet crocking resistance, tear resistance, blocking resistance, cold cracking resistance, heat aging resistance, and breaking strength criteria. Wall covering meets Type I performance as defined by Fed. Spec. CCC-W-408D.

5.2.5 *Category V, Type II Commercial Serviceability*—Wall covering manufactured for use where better wearing qualities are required and exposure to wear is greater than normal. Category V wall covering must meet high abrasion resistance, stain resistance, and colorfastness criteria, in addition to higher crocking resistance, tear resistance, and breaking strength criteria than Categories I to IV. Blocking resistance, cold cracking resistance, coating adhesion, and heat aging resistance tests also apply. Wall covering meets Type II performance as defined by Fed. Spec. CCC-W-408D.

5.2.6 *Category VI, Type III Commercial Serviceability*—Wall covering manufactured for use in heavy traffic areas. Category VI wall covering must meet highest abrasion resistance, stain resistance, tear resistance, colorfastness, crocking resistance, and breaking strength criteria. Blocking resistance, coating adhesion, cold cracking resistance, and heat aging resistance tests also apply. Wall covering meets Type III performance as defined by Fed. Spec. CCC-W-408D.

TABLE 1 Classification Criteria

Property	Section Reference	Category I Decorative Only	Category II Decorative with Medium Serviceability	Category III Decorative with High Serviceability	Category IV Type I Commercial Serviceability	Category V Type II Commercial Serviceability	Category VI Type III Commercial Serviceability
Minimum colorfastness	7.3		23 h	46 h	200 h	200 h	200 h
Minimum washability	7.4		100 cycles	100 cycles	100 cycles	100 cycles	100 cycles
Minimum scrubability	7.7			50 cycles	200 cycles	300 cycles	500 cycles
Minimum abrasion resistance	7.8				200 cycles (220 grit)	300 cycles (220 grit)	1000 cycles (220 grit)
Minimum breaking strength	7.9				40 lb	50 lb	100 lb
MD (machine direction)					30 lb	55 lb	95 lb
CMD (cross machine direction)							
Minimum crocking resistance	7.6			good	good	good	good
Minimum stain resistance	7.5			Reagents 1 to 9	Reagents 1 to 9	Reagents 1 to 12	Reagents 1 to 12
Minimum tear resistance <sup>4</sup>	7.10				192 gf	400 gf	800 gf
Maximum blocking resistance	7.11				2	2	2
Minimum coating adhesion	7.12				2 lb/in	3 lb/in.	3 lb/in.
Minimum cold cracking resistance	7.13				no change	no change	no change
Minimum heat aging resistance	7.14				pass	pass	pass
Maximum flame spread index (Class A)	5.2		25	25	25	25	25
Maximum smoke developed Index (Class A)	5.2		450	450	450	450	450
Other Flammability	5.2		No flashover and heat release and smoke release as required by the codes in accordance with NFPA 286 (any wall covering) or NFPA 265 (textile and expanded vinyl wall coverings)				
Maximum shrinkage	7.19						
MD (machine direction)					2	2	2
CMD (cross machine direction)					1	1	1.5

<sup>4</sup> The “gf” is an abbreviation for gram force, consistent with pounds force as lbf.

5.3 Wall covering required to exhibit a flammability classification shall be tested and classified as a “Class A, B, or C Interior Finish” in accordance one of the codes below:

5.3.1 Chapter 10<sup>7</sup> of NFPA 101, Life Safety Code,

5.3.2 Chapter 10 of NFPA 5000, Building Construction and Safety Code,

5.3.3 Chapter 8 of IBC, International Building Code, and

5.3.4 Chapter 8 of IFC, International Fire Code.

5.3.5 Test Method E 84 is suitable for assessing the flame spread index and smoke developed index of a wall covering. When a wall covering is tested using Test Method E 84, it is classified by the codes as follows:

5.3.5.1 A Class A material exhibits a flame spread index no greater than 25 and a smoke developed index no greater than 450,

5.3.5.2 A Class B material exhibits a flame spread index greater than 25 but no greater 75 and a smoke developed index no greater than 450, and

5.3.5.3 A Class C material exhibits a flame spread index greater than 75 but no greater than 200 and a smoke developed index no greater than 450.

5.3.6 Tests conducted in accordance with NFPA 255 or with UL 723 are likely to produce results that are consistent with those produced from tests in accordance with Test Method E 84.

5.3.7 If paper or vinyl wall coverings are tested in accordance with Test Method E 84, the tests shall be conducted using the specimen preparation and mounting methods contained in Practice E 2404.

5.3.8 Tests conducted in accordance with NFPA 286, a room-corner fire test, and exhibiting pass/fail criteria of heat release and smoke release as shown in the codes are permitted to be used wherever wall covering materials are required to meet a classification of Class A, B, or C in accordance with Test Method E 84 or NFPA 255.

5.3.9 Tests conducted on textile wall coverings or on expanded vinyl wall coverings in accordance with NFPA 265, a room-corner fire test, and exhibiting pass/fail criteria of heat release and flashover as shown in the codes are permitted to be used, with some restrictions, wherever such wall covering materials are required to meet a classification of Class A, B, or C, in accordance with Test Method E 84 or NFPA 255.

5.3.10 Local authorities having jurisdiction, including transportation authorities, are entitled to develop specific flame spread index, smoke developed index, or other flammability criteria, different from those in the codes described.

<sup>7</sup> Chapter 10 of NFPA 101 references NFPA 255, which is essentially identical to Test Method E 84 and UL 723.