



Designation: **F793/F793M – 15 F793/F793M – 20**

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

This standard is issued under the fixed designation F793/F793M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

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

1.1.1 This classification applies to ~~any~~ any wall coverings ~~covering~~ but some sections apply specifically to vinyl-coated wall covering materials.

1.1.2 Whenever this classification refers to wall coverings, it is intended also to refer to ceiling coverings of the same type.

1.1.3 This classification does not apply to wall coverings intended to be applied to exterior walls.

1.1.4 This classification does not apply to rigid panel products, irrespective of whether or not they include a flexible lining or veneer.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems has the potential to result in non-conformance with the 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; concerns,~~ if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate ~~safety~~ safety, health, and health environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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:<sup>2</sup>

[D618 Practice for Conditioning Plastics for Testing](#)

[D685 Practice for Conditioning Paper and Paper Products for Testing](#)

[D751 Test Methods for Coated Fabrics](#)

<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 Dec. 15, 2015 Oct. 1, 2020. Published January 2016 November 2020. Originally approved in 1982. Last previous edition approved in 2010 2015 as ~~F793 – 10a~~ F793/F793M – 15. DOI: ~~10.1520/F0793\_F0793M-15~~ 10.1520/F0793\_F0793M-20.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- D1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
- D2486 Test Methods for Scrub Resistance of Wall Paints
- E84 Test Method for Surface Burning Characteristics of Building Materials
- E2404 Practice for Specimen Preparation and Mounting of Textile, Paper or Polymeric (Including Vinyl) and Wood Wall or Ceiling Coverings, Facings and Veneers, to Assess Surface Burning Characteristics
- G21 Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- 2.2 *Federal Standards:*<sup>3</sup>
  - Fed. Std. No. 191A Textile Test Methods (Superseding Fed. Std. No. 191) (Revisions to August 2000)
  - Fed. Spec. CCC-W-408D Wall Covering, Vinyl-Coated (Dated January 1994, Reinstated December 2003)
- 2.3 *ICC Codes:*<sup>4</sup>
  - IBC International Building Code
  - IFC International Fire Code
  - IRC International Residential Code
- 2.4 *NFPA Codes and Standards:*<sup>5</sup>
  - NFPA 1 Fire Code
  - NFPA 101 Life Safety Code
  - 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 701 Methods of Fire Tests for Flame Propagation of Textiles and Films
  - 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.
- 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 *croaking 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.
  - 3.1.8.1 *Discussion*—  
Typically the flame spread index is determined in accordance with Test Method E84 (see 1.3).

<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 22041-5000 New Jersey Ave., NW, 6th Floor, Washington, DC 20001, <http://www.iccsafe.org>.

<sup>5</sup> Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269-9101-02169-7471, <http://www.nfpa.org>.

<sup>6</sup> Available from Underwriters Laboratories (UL), Corporate Progress, 333 Pfingsten Rd., Northbrook, IL 60062-2600 N.W. Lake Rd., Camas, WA 98607-8542, <http://www.ul.com>.

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.

3.1.14.1 *Discussion*—

Typically the smoke developed index is determined in accordance with Test Method E84 (see 1.3).

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 coverings of appropriate use characteristics can be chosen for particular residential and commercial decorating applications.

## 5. Basis of Classification

5.1 Wall coverings are classified based on their 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 coverings 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 coverings 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 coverings primarily decorative but more washable and colorfast than Category I wall coverings.

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

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

5.2.5 *Category V, Type II Commercial Serviceability (for Vinyl-Coated Wall Coverings)*—Wall coverings manufactured for use where better wearing qualities are required and exposure to wear is greater than normal. Category V wall coverings shall 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 coverings shall meet Type II performance as defined by Fed. Spec. CCC-W-408D.

5.2.6 *Category VI, Type III Commercial Serviceability (for Vinyl-Coated Wall Coverings)*—Wall coverings manufactured for use in heavy traffic areas. Category VI wall coverings shall meet the 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 coverings shall meet 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 [18.1 kg]	50 lb [22.7 kg]	100 lb [45.4 kg]
MD (machine direction)					30 lb [13.6 kg]	55 lb [24.9 kg]	95 lb [43.1 kg]
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>A</sup>	7.10				192 gf	800 gf	1600 gf
Maximum blocking resistance	7.11				2	2	2
Minimum coating adhesion	7.12				2 lb/in. [36 kg/m]	3 lb/in. [54 kg/m]	3 lb/in. [54 kg/m]
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)	5.3.2		25	25	25	25	25
Maximum flame spread index (Class B)	5.3.2		75	75	75	75	75
Maximum flame spread index (Class C)	5.3.2		200	200	200	200	200
Maximum smoke developed index (Class A, B, or C)	5.3.2		450	450	450	450	450
Other Flammability	5.3.4 or 5.3.5		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>A</sup> The “gf” is an abbreviation for gram force, consistent with pounds force as lbf.

5.3 Wall coverings required to exhibit a flammability classification shall be tested and classified as a “Class A, B, or C Interior Finish” in accordance with one of the codes indicated in 5.3.1, using the fire test methods indicated in 5.3.2, 5.3.3, 5.3.4, or 5.3.5, as appropriate. NFPA 701 is a test method to assess the flammability of fabrics and films; however, it does not apply to wall coverings, including textile wall coverings.

5.3.1 Sections of codes that classify interior finish materials in accordance with their flammability.

5.3.1.1 Chapter 10 of NFPA 101, Life Safety Code,

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

5.3.1.3 Chapter 12 of NFPA 1, Fire Code,

5.3.1.4 Chapter 8 of IBC, International Building Code,

5.3.1.5 Chapter 8 of IFC, International Fire Code,

5.3.1.6 Chapter R3 of the IRC, International Residential Code, and

5.3.1.7 Relevant sections of the applicable local codes, including legacy codes.

5.3.2 Test Method E84 is suitable for assessing the flame spread index and smoke developed index of a wall covering. If wall or ceiling coverings are tested in accordance with Test Method E84, the tests shall be conducted using the specimen preparation and mounting methods contained in Practice E2404. When a wall covering is tested using Test Method E84, it is classified by the codes as follows:

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

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

5.3.2.3 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.

5.3.3 Tests conducted in accordance with UL 723 are likely to produce results that are consistent with those produced from tests in accordance with Test Method E84.

5.3.4 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 interior finish materials (including wall covering materials or ceiling covering materials) are required to meet a classification of Class A, B, or C in accordance with Test Method E84.

5.3.4.1 Codes require that materials tested to NFPA 286 comply with the following criteria:

- (1) During the 40 kW exposure, flames shall not spread to the ceiling.
- (2) The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
- (3) Flashover, as defined in NFPA 286, shall not occur.
- (4) The peak heat release rate throughout the test shall not exceed 800 kW.
- (5) The total smoke released throughout the test shall not exceed 1000 m<sup>2</sup>.

5.3.5 Tests conducted on textile wall coverings or on expanded vinyl wall coverings in accordance with Test Method B of 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 E84. However, wall covering materials which have been tested only in accordance with NFPA 265 are not permitted to be used as ceiling covering materials.

5.3.5.1 Codes require that materials tested to NFPA 265 comply with the following criteria:

- (1) During the 40 kW exposure, flames shall not spread to the ceiling.
- (2) The flame shall not spread to the outer extremity of the sample on the 88 ft by 12 ft. ~~2440ft~~ [2440 mm by 3660 mm] walls.

(3) Flashover, as defined in NFPA 265, shall not occur.

(4) The total smoke released throughout the test shall not exceed 1000 m<sup>2</sup>.

5.3.6 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.

5.4 Wall coverings described as peelable shall be capable of having the decorative surface removed as a discrete self-supporting film by a dry method defined by the manufacturer, leaving a surface that is either removable in the conventional manner or able to be left on the wall for rehang.

5.5 Wall coverings described as strippable shall be capable of being dry-stripped in accordance with the manufacturer's instructions without leaving appreciable residue or otherwise damaging the wall.

5.6 Wall coverings described as mildew-resistant shall be protected to resist fungi (mildew) growth on the decorative surface to achieve a rating of 0 or 1 when tested in accordance with Practice G21.

## 6. Labeling

6.1 Either of the following statements is suggested for use in representing products as conforming to all requirements of this classification:

6.1.1 "This Category \_\_\_ (descriptive phrase) wall covering conforms to all requirements established in Standard Classification of Wall Coverings by Use Characteristics ASTM F793. Full responsibility for the conformance of this product to the standard is assumed by (name and address of manufacturer or distributor);" or

6.1.2 "Conforms to ASTM F793, Category \_\_\_ (descriptive phrase) (name and address of manufacturer or distributor)."

6.2 When specified in the purchase order or contract, a producer's or supplier's certification shall be furnished to the purchaser that the material was manufactured, sampled, tested, and inspected in accordance with this specification and has been found to meet the requirements. When specified in the purchase order or contract, a report of the test results shall be furnished.

## 7. Test Methods

7.1 *General*—The inspection and test procedures contained in this section shall be used to determine the conformance of the product to the requirements of this classification. Each manufacturer who represents a product as conforming to this classification is allowed to use statistically-based sampling plans that are appropriate for each particular manufacturing process, but shall keep such essential records as are necessary to document with a high degree of assurance the claim that the requirements of this classification have been met.

7.2 *Testing Conditions*—Unless otherwise provided, test specimens under standard conditions as set forth in Practice D685 or Practice D618, as appropriate. To determine whether the visual appearance of a test specimen has been appreciably changed by a test, suspend the specimen at eye level in a vertical position, as on the wall, under illumination between ~~400 to 100 fc~~ and 150 fc [~~4000 to 1000 lx~~ and 1500 lx], and view the specimen from a distance of 4 ft [1.2 m]. An appreciable change is one such as discoloration, change in gloss, blistering, softening, swelling, or loss of adhesion that is noticeable when the tested specimen is compared with a sample of the original specimen.

7.3 *Colorfastness*—Test for colorfastness to light in accordance with Fed. Std. No. 191A, Method 5660.1. The exposed sample shall show no appreciable change after the prescribed hours of exposure.

7.4 *Washability*—Cut a sample of wall covering 6½ in. by 17 in. [~~65~~165 mm by 430 mm] with the longer dimension in the cross direction. Choose an area with as many different printed colors as possible. The test shall include each printed color and the ground surface. For routine quality control it is not necessary for the specimen to be "hung." If the wall covering is a type that cannot be washed, the requisite number of rubs without wrinkling or tearing, hang the specimen or mount it on ⅛-in. [3.2-mm] smooth-finish board and allow it to dry 24 h at room temperature with good air circulation.

7.4.1 Place the specimen in a washability machine, equipped with a cellulose sponge, mounted on a plated brass holder (weight



1 lb [454 g]). Distribute 1 tablespoon [15 mL] of detergent solution (**Note 1**) over the area to be washed. Install the cellulose sponge holder, after it has been soaking in detergent solution for at least 15 min, in the machine, set the counter at zero, and turn the switch to start. At the end of the requisite number of cycles, stop the machine, remove the specimen, rinse it under running water, and set it aside for examination after drying.

NOTE 1—One way of making the detergent solution is by combining the following ingredients in the order given under agitation:

Demineralized water	160 mL
Anhydrous trisodium phosphate	0.14 oz [4 g]
A nonionic surfactant that has a hydrophilic polyethylene oxide chain (on average it has 9.5 ethylene oxide units) and an aromatic hydrocarbon lipophilic or hydrophobic group. The hydrocarbon group is a 4-(1,1,3,3-tetramethylbutyl)- phenyl group	0.28 oz [8 g]
An acid containing cross-linked acrylic emulsion copolymer which serves as an alkali soluble anionic thickener	0.42 oz [12 g] mixed with
Demineralized water	40 mL
Glacial acetic acid	trace <sup>A</sup>

<sup>A</sup> If necessary to adjust pH to 9.0 to 9.5.

7.4.1.1 If the specimen tears or wrinkles excessively during the washing cycle, terminate the test and repeat it with a new test specimen (**Note 2**).

NOTE 2—A strip of 1/8-in. [3.2-mm] brass or stainless steel 2 1/2 in. by 17 in. [64 mm by 430 mm] placed on the edge of the specimen aids in avoiding wrinkling and tearing. The use of a semi-hard rubber mat, an accessory to an abrasion boat that would fit some washability machines, is another way to help minimize wrinkling.

7.4.2 After drying, the specimen shall show no evidence of appreciable change to the printed or ground surface. Areas of localized wear clearly related to wrinkles are acceptable. [ASTM F 793/F793M-20](https://standards.iteh.ai/catalog/standards/sist/e05eb05b-ebfd-4d3e-a01f-66df4516e041/astm-f793-f793m-20)

7.5 *Stain Resistance* (**Note 3**)—Cut samples of wall covering 6 1/2 in. by 17 in. [165 mm by 430 mm] with the longer dimension in the cross direction. Choose an area with as many different printed colors as possible. The test shall include each printed color and the ground surface.

NOTE 3—This method is based upon Test Method **D1308**.

7.5.1 Lay the specimens horizontally with the decorative surface upward. Measure onto the wall covering surface each of the following reagents, as specified in **Table 1** (**Note 4**):

7.5.1.1 Distilled water, 65°F to 75°F [18.3°C to 23.8°C],

7.5.1.2 Distilled water, 115°F to 125°F [46.1°C to 51.6°C],

7.5.1.3 Ethyl alcohol,

7.5.1.4 Vinegar, 3 % acetic,

7.5.1.5 Alkali solution,

7.5.1.6 Hydrochloric acid solution, 5 %,

7.5.1.7 Soap solution,