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NFPA 260 Cigarette Ignition Resistance of Components of Upholstered Furniture 1989 Edition

National Fire Protection Association Batterymarch Park, Quincy, MA 02269

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Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

Statement on NFPA Procedures

This material has been developed under the published procedures of the National Fire Protection Association, which are designed to assure the appointment of technically competent Committees having balanced representation. While these procedures assure the highest degree of care, neither the National Fire Protection Association, its members, nor those participating in its activities accepts any liability resulting from compliance or noncompliance with the provisions given herein, for any restrictions imposed on materials or processes, or for the completeness of the text.

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NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 260

Standard Methods of Tests and Classification System for

Cigarette Ignition Resistance of Components of Upholstered Furniture

1989 Edition

This edition of NFPA 260, *Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture*, was prepared by the Technical Committee on Fire Tests, and acted on by the National Fire Protection Association, Inc. at its Annual Meeting held May 15-18, 1989 in Washington, D.C. It was issued by the Standards Council on July 14, 1989, with an effective date of August 7, 1989, and supersedes all previous editions.

The 1989 edition of this document has been approved by the American National Standards Institute.

Origin and Development of NFPA 260

Regulation of the manufacture of furniture has been a subject of research and debate since 1967, when the Flammable Fabrics Act was amended by Congress to include products besides wearing apparel and home textiles that might constitute an unreasonable flammability risk. The National Bureau of Standards (NBS) began funding laboratory research into the subject in 1968. With its formation in 1973, the U. S. Consumer Product Safety Commission (CPSC) became the government agency responsible for administration of the Flammable Fabrics Act, including the adoption of any program or standard regulating upholstered furniture. NBS retained responsibility for designing test methods relating to flammable fabrics.

In 1976, NBS gave the CPSC a draft for a proposed cigarette-ignition-resistance standard for upholstered furniture. Shortly thereafter, however, CPSC underwent a reorganization into separate program areas, followed by nearly a year's worth of work on its children's sleepware standards because of findings that a chemical added to sleepware to make it flame-retardant might be a carcinogen. In November 1978, the CPSC staff, after modifying the original NBS-proposed standard on upholstered furniture, recommended to the CPSC commissioners that they publish the proposed standard.

In December 1978, in an informal meeting where the CPSC asked for comments before the mandatory standard was published, the upholstered furniture industry proposed its own voluntary program. That program was the Upholstered Furniture Action Council (UFAC) Voluntary Action Program.

The UFAC voluntary program was adopted in April, 1979. The 1983 edition of this standard (then NFPA 260A) was developed subsequent to that date by the Fire Test Committee and draws heavily from the UFAC test method for components of upholstered furniture. The 1986 edition brought the document into substantial agreement with the UFAC test method. This 1989 edition has been renumbered as NFPA 260 and includes refinements for further agreement with the UFAC test method.

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

Contents

NFPA 260

Standard Methods of Tests and Classification System for

Cigarette Ignition Resistance of Components of Upholstered Furniture

1989 Edition

NOTICE: Information on referenced publications can be found in Chapter 8.

Chapter 1 General

1-1 Purpose. This method is designed to evaluate ignition resistance of upholstered furniture when exposed to smoldering cigarettes under specified conditions.

1-2 Scope.

1-2.1 These tests apply to upholstered furniture components.

1-2.2 These tests apply to cover fabrics, interior fabrics, welt cords, decking materials, barrier materials, and filling/padding materials including but not limited to: battings of natural or manmade fibers, foamed or cellular filling materials, resilient pads of natural or manmade fibers, and loose particulate filling materials (such as shredded polyurethane or feathers and down).

1-2.3 It is the intent to provide tests to determine whether cover fabrics, welt cords, decking materials, interior fabrics, and filling/padding materials are relatively resistant to ignition by smoldering cigarettes. Also provided is a means of classifying upholstered furniture components with respect to cigarette ignition resistance.

1-2.4 This standard measures and describes the properties of materials, products, or assemblies in response to a smoldering cigarette under controlled laboratory conditions and does not necessarily describe or appraise the fire hazard or fire risk of materials, products, or furniture assemblies under actual fire conditions.

1-3 Significance.

1-3.1 This standard is intended to measure the performance of upholstered furniture under conditions of exposure to a smoldering cigarette. This is accomplished by testing furniture components.

1-3.2 This standard is not intended to measure the performance of upholstered furniture under conditions of open flame exposure and does not indicate whether the furniture will resist the propagation of flame under severe fire exposure or when tested in a manner which differs substantially from the test standard.

1-3.3 The results obtained with a material component tested in mock-up, according to this method, do not necessarily indicate the performance of the same material component in other geometric configurations, such as in full-size furniture.

1-4 Test Selection.

1-4.1 All outer cover fabrics shall be subjected to the fabric test.

1-4.2 All interior fabrics used in intimate contact with outer fabrics shall be subjected to the interior fabrics test.

1-4.3 All welt cord shall be subjected to the welt cord test.

1-4.4 All material used under the cover fabric in seats or in inside vertical walls (inside arms and inside backs) shall be subjected to the filling/padding test.

1-4.5 Any material used in the deck under loose cushions shall be subjected to the decking test.

1-4.6 Any material intended to serve as a barrier between Class II cover fabrics and conventional polyurethane foam in a seat shall be subjected to the barrier test.

1-5 Definitions.

Char. Carbonaceous material formed by pyrolysis or incomplete combustion.

Ignition. Continuous, self-sustaining smoldering combustion of upholstered furniture substrates after exposure to burning cigarettes.

Obvious Ignition. Pronounced continuous and self-sustaining combustion of the test system. It is a matter of operator judgment based upon experience in this type of operation.

Sample. Material being tested.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

Specimen. Individual pieces of sample used in one test assembly.

Welt. The cord or piping sewn into the seam or border edge of a cushion, pillow, arm, or back of an item.

Chapter 2 Test Apparatus

2-1 Mini-Mock-Up Tester. (*See Figure 2-1.*)

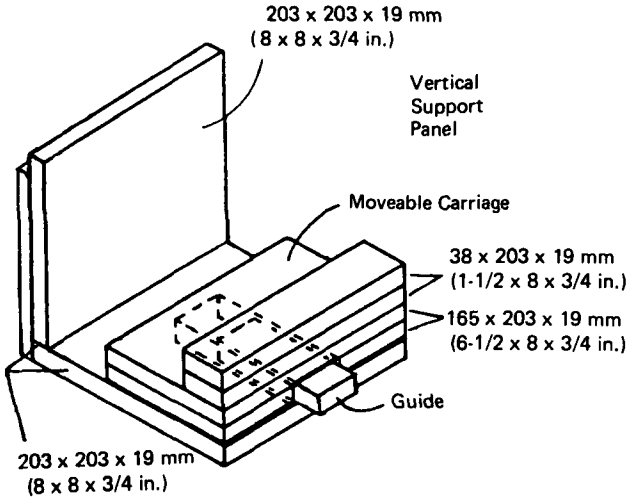

Figure 2-1 Mini-mock-up tester.

2-1.1 The mini-mock-up tester consists of a base with a centrally located guide and a stationary vertical panel, a movable horizontal carriage, and a removable vertical support panel.

2-1.2 The base consists of two wooden panels, each nominally 203 × 203 mm (8 × 8 in.) with nominal 19 mm (0.75 in.) thickness, joined together at one edge. The carriage has a 125 × 203 mm (5 × 8 in.) platform to support a horizontal specimen. The platform is 38 mm (1.5 in.) above the floor of the base and has a 38 mm (1.5 in.) lip at the front edge. The carriage is grooved to fit over a guide provided on the floor of the base. The removable vertical support panel consists of a wooden panel nominal 203 × 203 mm (8 × 8 in.) and nominal 19 mm (0.75 in.) thickness, which stands against the vertical wall of the base.

2-2 Decking Materials Tester. (*See Figure 2-2.*) The decking materials tester consists of a plywood base and a plywood retainer ring. The base measures 533 × 343 × 13 mm (21 × 13.5 × 0.5 in.). The retainer ring measures 533 × 343 × 13 mm (21 × 13.5 × 0.5 in.) with an opening measuring 406 × 216 mm (16 × 8.5 in.).

2-3 Ignition Source. The ignition source for the test shall be cigarettes without filter tips, made from natural tobacco, 85 ± 2 mm (3.4 ± 0.1 in.) long with a packing density of 0.270 ± 0.020 g/cm³ (0.156 ± 0.012 oz/in.³) and a total weight of 1.1 ± 0.1 g (0.039 ± 0.004 oz) (Pall Mall or equivalent).

2-4 Standard Type I Cover Fabric. The standard Type I cover fabric shall be 100 percent cotton mattress ticking conforming to Federal Specification CCC-C-436-D, Cloth, Ticking, Twill, Cotton; Type I. It shall be laundered and tumble-dried once before using.

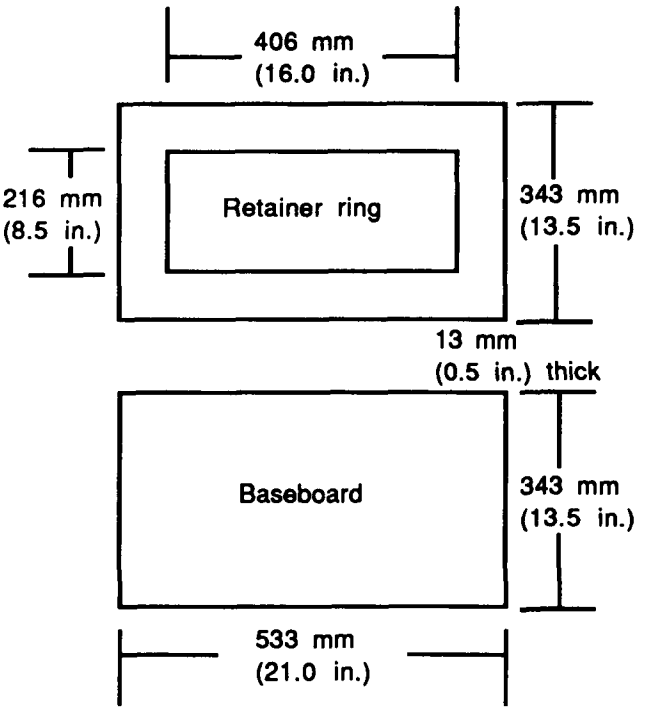

Figure 2-2 Decking materials tester.

2-5 Standard Type II Cover Fabric. The standard Type II cover fabric shall be UFAC standard Type II, 100 percent cotton, velvet, 490 ± 15 g/m² (14.5 ± 0.5 oz/yd²), undyed, containing no flame-retardant finishes or back coating.

NOTE: UFAC refers to the Upholstered Furniture Action Council.

2-6 Sheeting Material. Sheeting material shall be cotton bed sheeting, weight 125 ± 28 g/m² (3.7 ± 0.8 oz/yd²), white in color and not treated with flame retardants. For testing, the fabric is cut into squares 127 × 127 mm (5 × 5 in.).

2-7 Polyurethane Foam Substrate. The polyurethane foam substrate shall be an open-celled polyether-type urethane UFAC standard foam, containing no inorganic fillers or flame retardants, having a density of 20 to 25 kg/m³ (1.3 to 1.6 lb/ft³).

2-8 Miscellaneous. Other apparatus required to carry out the testing are: straight pins, a staple gun, a knife or scissors, tongs, and a linear scale graduated in millimeters or tenths of an inch.

2-9 Air Velocity. Air velocity across the test assemblies shall be maintained below 15.2 m/min (50 ft/min) in order to minimize localized effects from draft superheating of cigarette embers.

NOTE: A fume hood with air curtains across the face and zero air velocity at the test locations is recommended.

2-10 Extinguishing Equipment. A pressurized water fire extinguisher or other suitable fire extinguishing equipment shall be immediately available. A water bottle fitted

with a spray nozzle shall be provided to extinguish any ignited portions of the test specimen. A bucket of water shall be provided for immersing smoldering or burning materials removed from the tester. Tongs to handle smoldering materials prior to immersion, gloves, and breathing apparatus shall be provided.

2-11 Draft Enclosure. An open draft preventive enclosure shall be provided and used to restrict airflow to convection only.

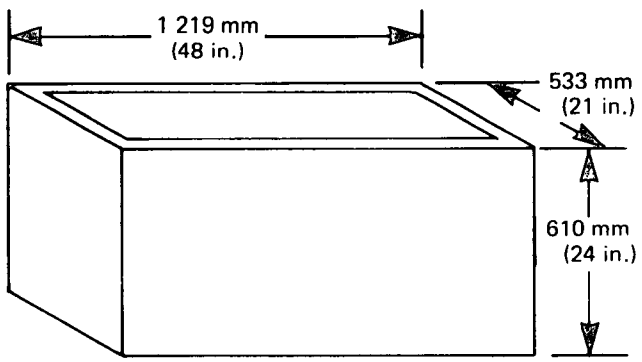

Figure 2-11 Draft enclosure.

Chapter 3 Test Specimens

3-1 Specimen Conditioning. All test upholstery fabrics and test materials (including cigarettes and sheeting material) shall be conditioned at a temperature of 21 ± 2.8 °C (70 ± 5 °F) and less than 65 percent relative humidity for at least four hours prior to testing. If the test room conditions do not meet the specifications above for the conditioning room, then the testing shall be initiated within ten minutes after the specimens are removed from the conditioning room.

3-2 Cover Fabric Test.

3-2.1 Three specimens, each 203 × 203 mm (8 × 8 in.), shall be cut from the material to be tested for horizontal panels and three specimens, each 203 × 381 mm (8 × 15 in.), shall be cut for vertical panels.

3-2.2 Each specimen shall be cut with its long dimension in the direction of the warp and assembled for testing in a warp-to-warp orientation, and such that the major areas of weave variation will lie in the crevice of the assembled test apparatus.

3-2.3 For fabrics with complex weaves, specimens shall be cut such that portions of the three largest areas of weave complexity are contacted by the cigarettes placed on the test assemblies. For dyed and/or printed fabrics, color shall not constitute a difference with respect to cigarette ignition resistance in this test.

3-3 Interior Fabric Test. Three specimens, each 203 × 203 mm (8 × 8 in.) shall be cut from the material to be tested.

3-4 Welt Cord Test. Three 203 mm (8 in.) long specimens shall be cut from the welt cord to be tested.

3-5 Filling/Padding Component Test.

3-5.1 Three specimens, each 203 × 127 × 51 mm (8 × 5 × 2 in.), shall be cut for the horizontal panels and three specimens, each 203 × 203 × 51 mm (8 × 8 × 2 in.), shall be cut for the vertical panels.

3-5.2 For loose or particulate materials (shredded polyurethane, down, etc.) bags of the above dimensions shall be sewn, using the same ticking and/or any other materials to be used in manufacturing the finished piece of furniture.

3-6 Decking Materials Test. One specimen 533 × 343 mm (21 × 13.5 in.) and at least 25 mm (1 in.) thick shall be cut from the decking material to be tested. If sample thickness is less than 25 mm (1 in.), multiple layers shall be used in this test to make up the required thickness.

3-7 Barrier Materials Test. Three specimens, each 203 × 203 mm (8 × 8 in.), shall be cut for horizontal panels from the material to be tested and three specimens, each 203 × 381 mm (8 × 15 in.), shall be cut for vertical panels.

Chapter 4 Test Procedures

4-1 Cover Fabric Test.

4-1.1 For horizontal panels, the 203 × 203 mm (8 × 8 in.) cover fabric specimen shall be placed on a 203 × 127 × 51 mm (8 × 5 × 2 in.) polyurethane substrate as shown in Figure 4-1, placing pins in the ends of the fabric specimens to hold it in place.

4-1.2 For vertical panels, the 203 × 381 mm (8 × 15 in.) fabric specimen shall be placed on a 203 × 203 × 51 mm (8 × 8 × 2 in.) polyurethane substrate as shown in Figure 4-1. The fabric shall overlap the top and bottom of the substrate and be pinned into place on the corners. The warp or machine direction of the fabric shall run from front to back on the test assembly.

4-1.3 Each assembled vertical and horizontal panel shall be placed in a mini-mock-up tester as shown in Figure 4-1.

4-1.4 The position of the crevice shall be marked on the sides of the vertical substrate.

4-1.5 Three cigarettes shall be lighted and one of the lighted cigarettes placed on each of the three test assemblies such that the cigarette lies in the crevice and against the vertical panel with equal distance of cigarette ends from either side of the assembly.

4-1.6 A piece of sheeting material shall be placed over each cigarette, smoothing it over the cigarette to ensure

intimate contact. The sheeting shall be pinned to the vertical panel about 63 mm (2.5 in.) above the crevice.

NOTE: A finger run over the covered cigarettes ensures a good fabric-to-cigarette contact.

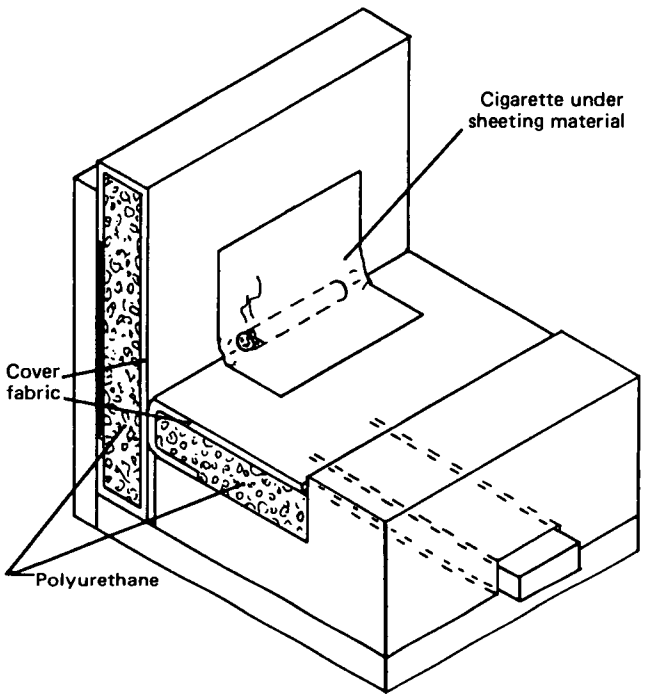

Figure 4-1 Cover fabric test method.

4-1.7 The cigarettes shall be allowed to burn their full lengths unless an obvious ignition of the polyurethane substrate occurs. If a cigarette extinguishes before burning its entire length, a fresh cigarette shall be placed on a fresh area of the test assembly and covered with sheeting fabric until either: (1) three cigarettes have burned their entire length on three individual test specimens, or (2) three cigarettes have self-extinguished on the sample.

4-1.8 If an obvious ignition occurs on any of the three specimens, the smoldering materials shall be extinguished and the results of the test recorded as a determination that the sample is a Class II cover fabric.

4-1.9 If no obvious ignition occurs, the char on the vertical panel measured from the original crevice position to the highest part of the destroyed or degraded fabric shall be recorded to the nearest 2.5 mm (0.1 in.). The original crevice position may be determined by laying a straightedge or ruler between the two marks previously marked on the edges of the vertical panel. The highest point of destroyed or degraded fabric is defined as the highest point at which any of the fabric is charred from front to back.

4-2 Interior Fabric Test.

4-2.1 For horizontal panels, the 203 x 203 mm (8 x 8 in.) piece of interior fabric and the 203 x 203 mm (8 x 8 in.) standard Type I cover fabric shall be placed with the interior fabric against the polyurethane substrate as shown in Figure 4-2, placing pins in the ends of the fabric specimens to hold them in place.

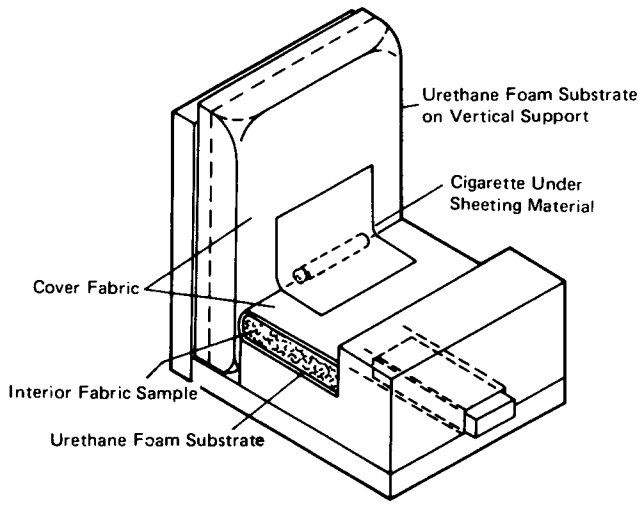

Figure 4-2 Interior fabric test method.

4-2.2 For vertical panels, 203 x 381 mm (8 x 15 in.) standard Type I cover fabric shall be placed on a 203 x 203 x 51 mm (8 x 8 x 2 in.) polyurethane substrate as shown in Figure 4-2. The fabric shall overlap the top and bottom of the substrate and be pinned into place on the corners.

4-2.3 Each assembled vertical and horizontal panel shall be placed in a mini-mock-up tester as shown in Figure 4-2.

4-2.4 The position of the crevice shall be marked on the sides of the vertical polyurethane substrate.

4-2.5 Three cigarettes shall be lighted and one of the lighted cigarettes placed on each of the three test assemblies such that the cigarette lies in the crevice and against the vertical panel with equal distance of cigarette ends from either side of the assembly.

4-2.6 A piece of sheeting material shall be placed over each cigarette, smoothing it over the cigarette to ensure intimate contact. The sheeting shall be pinned to the vertical panel about 63 mm (2.5 in.) above the crevice.

NOTE: A finger run over the covered cigarette ensures a good fabric-to-cigarette contact.

4-2.7 The cigarettes shall be allowed to burn their full lengths unless an obvious ignition of the polyurethane substrate occurs. If a cigarette extinguishes before burning its entire length, a fresh cigarette shall be placed on a new test assembly and covered with sheeting fabric until either: (1) three cigarettes have burned their entire length on three individual test specimens, or (2) three cigarettes have self-extinguished on the sample.

4-2.8 If an obvious ignition occurs on any of the three specimens, the smoldering materials shall be extinguished and the results of the test recorded as a determination that the sample is a Class II interior fabric.

4-2.9 If no obvious ignition occurs, the char on the vertical panel from the original crevice position to the highest

part of the destroyed or degraded interior fabric shall be recorded to the nearest 2.5 mm (0.1 in.). The original crevice position may be determined by laying a straightedge or ruler between the two marks previously marked on the vertical polyurethane substrate. The highest point of destroyed or degraded fabric is defined as the highest point at which any of the fabric is charred from front to back.

4-3 Welt Cord Test.

4-3.1 Three pieces of the standard Type I cover fabric, each 203 × 203 mm (8 × 8 in.), shall be cut for horizontal panels; three pieces, each 203 × 381 mm (8 × 15 in.), for vertical panels; and three pieces, each 203 × 25 mm (8 × 1 in.), folded for unsewn welts. (Width of welt may have to be adjusted to size of the welt cord.)

4-3.1.1 For horizontal panels, the 203 × 203 mm (8 × 8 in.) Type II cover fabric shall be placed on a 203 × 127 × 51 mm (8 × 5 × 2 in.) polyurethane substrate as shown in Figure 4-3, placing pins in the ends of the fabric specimens to hold them in place.

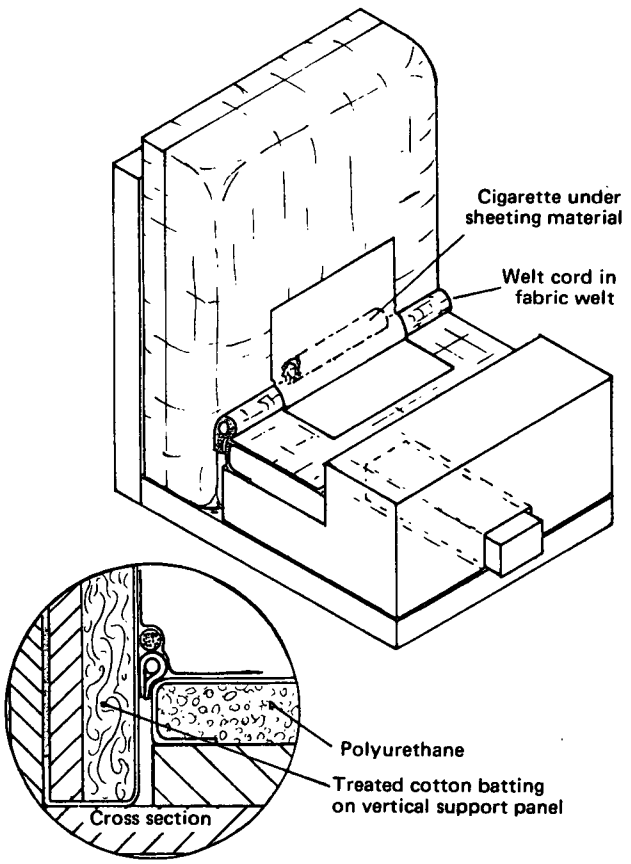

Figure 4-3 Welt cord test method.

4-3.1.2 For vertical panels, the 203 × 381 mm (8 × 15 in.) Type II cover fabric shall be placed on a 203 × 203 × 51 mm (8 × 8 × 2 in.) polyurethane substrate as shown in Figure 4-3. The fabric shall overlap the top and bottom of the substrate and be pinned into place in the corners.

4-3.2 Each assembled vertical and horizontal panel shall be placed in a mini-mock-up tester as shown in Figure 4-3.

4-3.3 A welt cord specimen shall be placed into the center of a folded strip of standard Type II cover fabric, to make an unsewn welt. An unsewn welt shall be placed in each test assembly such that the fabric edges are between the horizontal and vertical panels and held tightly in place by the panels. (*See Figure 4-3.*)

4-3.4 The position of the top of the welt shall be marked on the sides of the vertical polyurethane substrate.

4-3.5 Three cigarettes shall be lighted and one of the lighted cigarettes placed on each of the test assemblies such that the cigarette lies on the welt and against the vertical panel with equal distance of cigarette ends from either side of the assembly.

4-3.6 A piece of sheeting material shall be placed over each cigarette, smoothing it over the cigarette to ensure intimate contact. The sheeting shall be pinned to the vertical panel about 63 mm (2.5 in.) above the crevice.

NOTE: A finger run over the covered cigarettes ensures good fabric-to-cigarette contact.

4-3.7 The cigarettes shall be allowed to burn their full lengths. If a cigarette extinguishes before burning its full length, a fresh cigarette shall be placed on a new test assembly and covered with sheeting fabric until either: (1) three cigarettes have burned their full lengths on three individual specimens, or (2) three cigarettes have self-extinguished on the sample.

4-3.8 If an obvious ignition occurs on any of the three specimens, the smoldering material shall be extinguished and the results of the test recorded as a determination that the sample is a Class II welt cord.

4-3.9 If no obvious ignition occurs, the char on the vertical panel from the top of the original welt position to the highest part of the destroyed or degraded fabric shall be recorded. The top of the original welt position may be determined by laying a straightedge or ruler between the two marks previously marked on the edges of the vertical panel. The highest point of destroyed or degraded fabric is defined as the highest point at which any of the fabric is charred from front to back.

4-4 Filling/Padding Component Test.

4-4.1 Three pieces, each 203 × 203 mm (8 × 8 in.), shall be cut from the standard Type I cover fabric for the horizontal panels, and three pieces, each 203 × 305 mm (8 × 12 in.), shall be cut for the vertical panels.

4-4.1.1 Three horizontal panels shall be constructed by wrapping each horizontal specimen with a piece of Type I cover fabric such that the top surface is completely covered and the long direction of the fabric continues over the crevice edge and partially covers the bottom surface. The cover fabric shall be pinned in place, top and bottom. (*See Figure 4-4.*)

4-4.1.2 Three vertical panels shall be constructed by covering one surface of a removable vertical support panel with the vertical pad of the test specimen followed by the Type I cover fabric. The Type I cover fabric shall be pulled

around the top and bottom of the removable vertical support panel and stapled to the backside.

4-4.2 Each assembled vertical and horizontal panel shall be placed in a mini-mock-up tester as shown in Figure 4-4 such that a snug fit is obtained between the two panels.

4-4.3 The position of the crevice shall be marked on the edges of the cover fabric.

4-4.4 Three cigarettes shall be lighted and one of the lighted cigarettes placed on each of the three test assemblies such that the cigarette lies in the crevice and against the vertical panel with equal distance of cigarette ends from either side of the assembly.

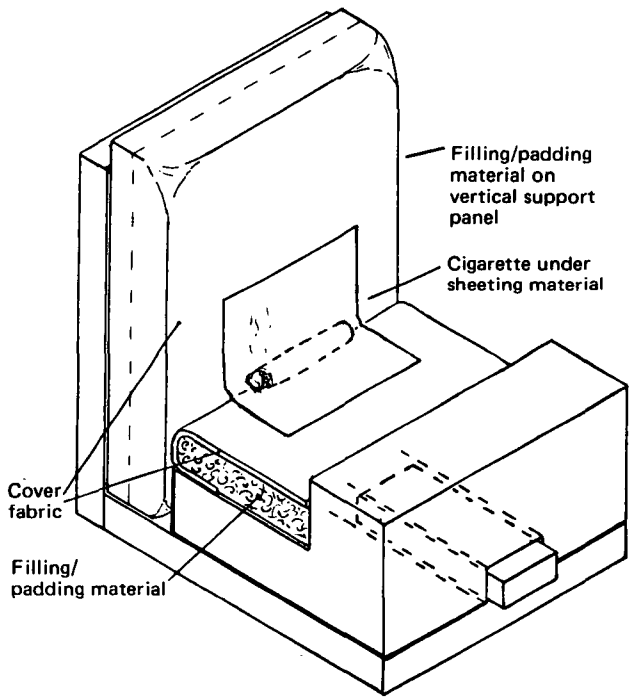

Figure 4-4 Filling/padding component test method.

4-4.5 A piece of sheeting material shall be placed over each cigarette, smoothing it over the cigarette to ensure intimate contact. The sheeting shall be pinned to the vertical panel about 63 mm (2.5 in.) above the crevice.

NOTE: A finger run over the covered cigarettes ensures good fabric-to-cigarette contact.

4-4.6 The cigarettes shall be allowed to burn their full lengths unless an obvious ignition of the substrate occurs. If a cigarette extinguishes before burning its entire length, a fresh cigarette shall be placed on a new test assembly and covered with sheeting fabric until either: (1) three cigarettes have burned their entire length on three individual test specimens, or (2) three cigarettes have self-extinguished on the sample.

4-4.7 If an obvious ignition occurs on any of the three specimens, the smoldering materials shall be extinguished and the results of the test recorded as a determination that the sample is a Class II filling/padding material.

4-4.8 If no obvious ignition occurs, the char on the vertical panel measured from the original crevice position to the highest part of the destroyed or degraded fabric shall be recorded. The original crevice may be determined by laying a straightedge or ruler between the two marks previously marked on the edges of the cover fabric.

4-5 Decking Materials Test.

4-5.1 One piece, 533 × 343 mm (21 × 13.5 in.), shall be cut from the standard Type II fabric.

4-5.2 The decking material specimen shall be placed on the plywood base of the decking materials tester and covered with the standard Type II fabric. The plywood retainer ring shall be placed on top of the cover fabric as shown in Figure 4-5.

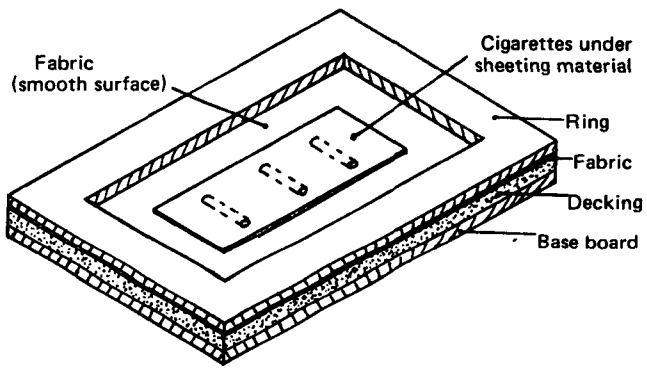

Figure 4-5 Decking materials test method.

4-5.3 Three cigarettes shall be lighted and placed on the surface of the standard Type II fabric so that they are equally spaced from each other and from the edges of the retainer ring.

4-5.4 A piece of sheeting material shall be placed over each of the cigarettes and smoothed over the cigarette to assure intimate contact.

4-5.5 The cigarettes shall be allowed to burn their full lengths. If a cigarette extinguishes before burning its entire length, another cigarette shall be placed on a fresh area of the cover fabric until either: (1) three cigarettes have burned their entire lengths, or (2) three cigarettes have self-extinguished.

4-5.6 If an obvious ignition occurs on any of the cigarette locations, the smoldering material shall be extinguished and the results of the test recorded as a determination that the sample is a Class II decking material.

4-5.7 If no obvious ignition occurs, the maximum length of char shall be measured from the original cigarette position and recorded to the nearest 2.5 mm (0.1 in.).

4-6 Barrier Materials Test.

4-6.1 Three pieces, each 203 × 203 mm (8 × 8 in.), shall be cut from the standard Type II cover fabric for horizontal panels and three pieces, each 203 × 381 mm (8 × 15 in.), shall be cut for vertical panels.

4-6.1.1 For horizontal panels, a barrier specimen shall be placed on a 203 x 127 x 51 mm (8 x 5 x 2 in.) polyurethane substrate. The barrier shall be folded around and under the polyurethane as shown in Figure 4-6 and fastened in place with pins. The 203 x 203 mm (8 x 8 in.) cover fabric shall be placed over each barrier and fastened in place with pins.

4-6.1.2 For vertical panels, a barrier specimen shall be placed on a 203 x 203 x 51 mm (8 x 8 x 2 in.) polyurethane substrate. The 203 x 381 mm (8 x 15 in.) piece of cover fabric shall be placed over each and fastened in place with pins as shown in Figure 4-6.

4-6.2 Each assembled horizontal panel and vertical panel shall be placed in the test assembly such that firm contact is achieved across the entire crevice formed by vertical and horizontal panels.

4-6.3 The position of the crevice shall be marked on the side of the vertical polyurethane substrate.

4-6.4 Three cigarettes shall be lighted and one of the lighted cigarettes placed on each of the test assemblies such that the cigarette lies in the crevice and against the vertical panel with equal distance of cigarette ends from either side of the assembly.

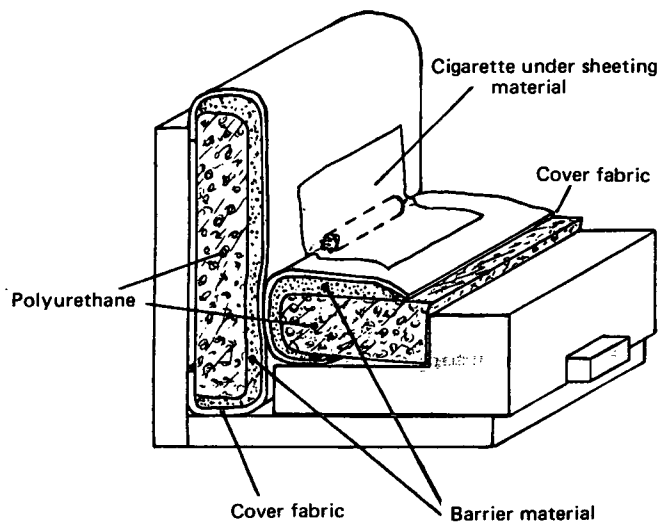

Figure 4-6 Barrier materials test method.

4-6.5 A piece of sheeting material shall be placed over each cigarette, smoothing it over the cigarette to ensure intimate contact The sheeting shall be pinned to the vertical panel about 63 mm (2.5 in.) above the crevice.

NOTE: A finger run over the covered cigarettes ensures good fabric-to-cigarette contact.

4-6.6 The cigarettes shall be allowed to burn their full lengths unless an obvious ignition of the substrate occurs. If a cigarette extinguishes before burning its entire length, a fresh cigarette shall be placed on a fresh area of the test assembly and covered with sheeting fabric until either: (1) three cigarettes have burned their entire length on three individual test specimens, or (2) three cigarettes have self-extinguished on the sample.

4-6.7 If an obvious ignition occurs on any of the three specimens, the smoldering materials shall be extinguished and the results of the test recorded as a determination that the sample is a Class II barrier material.

4-6.8 If no obvious ignition occurs, the char on the vertical panel measured from the original crevice position to the highest part of the destroyed or degraded cover fabric shall be recorded to the nearest 2.5 mm (0.1 in.). The original crevice position may be determined by laying a straightedge or ruler between the two marks previously marked on the edges of the vertical panel. The highest point of destroyed or degraded fabric is defined as the highest point at which any of the fabric is charred from front to back.

Chapter 5 Flame Resistance Classifications

5-1 Cover Fabric Classification.

5-1.1 Class I. Class I cover fabric shall meet the criteria of 5-1.1.1 and 5-1.1.2.

5-1.1.1 When subjected to cover fabric test, a specimen shall show no ignition.

5-1.1.2 The vertical char on any of the three specimens shall not exceed 45 mm (1.75 in.).

5-1.2 Class II. Cover fabrics that do not meet Class I criteria shall be designated Class II.

5-2 Interior Fabric Classification.

5-2.1 Class I. Class I interior fabric shall meet the criteria of 5-2.1.1 and 5-2.1.2.

5-2.1.1 When subjected to the interior fabric test, a specimen shall show no ignition.

5-2.1.2 The vertical char on the cover fabric of any of the three specimens shall not exceed 38 mm (1.5 in.).

5-2.2 Class II. Interior fabrics that do not meet Class I criteria shall be designated Class II.

5-3 Welt Cord Classification.

5-3.1 Class I. Class I welt cord shall meet the criteria of 5-3.1.1 and 5-3.1.2.

5-3.1.1 When subjected to the welt cord test a specimen shall allow no ignition of any test assembly.

5-3.1.2 When measured from the top of original welt location, the vertical char on the cover fabric shall not exceed 38 mm (1.5 in.) on any of three replicated tests.

5-3.2 Class II. Welt cord that does not meet Class I criteria shall be designated Class II.

5-4 Filling/Padding Components Classification.

5-4.1 Class I. Class I components shall meet the criteria of 5-4.1.1 and 5-4.1.2.

5-4.1.1 When subjected to the filling/padding test a specimen shall show no ignition of any test assembly.

5-4.1.2 When measured from the original crevice, the vertical char length on the cover fabric shall not exceed 38 mm (1.5 in.) on any of three replicated tests.

5-4.2 Class II. Components that do not meet Class I criteria shall be designated Class II.

5-5 Decking Materials Classification.

5-5.1 Class I. Class I decking materials shall meet the criteria of 5-5.1.1 and 5-5.1.2.

5-5.1.1 When subjected to the decking test a specimen shall allow no ignition at any cigarette location.

5-5.1.2 When measured from the original cigarette location, the char length on the cover fabric shall not exceed 38 mm (1.5 in.) at any of three cigarette locations.

5-5.2 Class II. Decking materials that do not meet Class I criteria shall be designated Class II.

5-6 Barrier Materials Classification.

5-6.1 Class I. Class I barriers shall meet the criteria of 5-6.1.1 and 5-6.1.2.

5-6.1.1 When subjected to the barrier test a specimen shall allow no ignition of any test assembly.

5-6.1.2 When measured from the original crevice, the vertical char length on the cover fabric shall not exceed 51 mm (2.0 in.) on any of three replicated tests.

5-6.2 Class II. Barriers that do not meet Class I criteria shall be designated Class II.

Chapter 6 Safety Precautions

6-1 CAUTION: Even under the most carefully observed conditions, smoldering combustion can progress to a point where it cannot be readily extinguished. It is imperative that a test be discontinued as soon as continuing combustion has definitely occurred. Immediately wet the exposed area with a water spray from the water bottle, remove the charred or burned material, and immerse the material in a bucket of water. Ventilate the test area.

6-2 Products of combustion can be irritating and dangerous to test personnel. Test personnel must avoid exposure to smoke and gases produced during testing as much as possible. A large hood with a low air velocity may be in operation during testing to remove products of combustion.

Chapter 7 Precision and Accuracy

7-1 A precision and accuracy statement is under study and will be provided for later inclusion in the test method. For preliminary data, see Appendix A.

Chapter 8 Referenced Publications

8-1 The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is current as of the date of the NFPA issuance of this document.

Federal Specifications CCC-C-436-D, *Cloth, Ticking, Twill, Cotton*; October 6, 1971, General Services Administration, Specification and Consumer Distribution Section (WFSIS), Washington Navy Yard, Building 197, Washington, DC 20407.

Appendix A Commentary

This Appendix is not a part of the requirements of this NFPA document, but is included for information purposes only.

A-1 Introduction.

A-1.1 The Upholstered Furniture Action Council (UFAC) adopted in April, 1979, a voluntary program designed to reduce the cigarette ignition propensity of upholstered furniture. The UFAC program is based on the five test methods described in this standard, and consists of four elements:

(a) Classification of cover fabrics.

(b) Construction criteria for use of complying materials.

(c) A labeling plan to inform the consumer of the safer product.

(d) A compliance verification program to assure that furniture manufacturers and their suppliers are utilizing materials and methods of construction as required by the voluntary program.

A-1.2 The UFAC construction criteria are aimed at:

(a) The elimination of ignition-prone welt cords and the substitution of smolder-resistant welt cords that will meet the requirements of the UFAC welt cord test.

(b) The elimination of untreated cotton batting as a substrate in immediate contact with decking fabrics and the substitution of materials that will meet the requirements of the UFAC decking material test.

(c) The elimination of untreated cotton batting in immediate contact with the covering of the inside vertical walls and the substitution of materials that will meet the requirements of the UFAC filling/padding test.

(d) Elimination of intimate contact between Class II fabrics and the horizontal seating surfaces of conventional

polyurethane foam cushions. When Class II fabrics are used with conventional polyurethane foam cushions, a barrier is required which will meet the requirements of the UFAC barrier test.

A-2 Nature of Tests.

A-2.1 The six test methods define the performances of welt cord, filling materials, decking substrates, barriers, interior fabrics, and cover fabrics. These all are composite tests of individual components in combination with actual materials used by the upholstery industry. Certain standard materials have been selected for use in the tests. Performance of each component is evaluated in a fixture in which all other materials are standard. Thus, individual performance can be measured. The test methods are essentially similar. They are varied only as necessary to measure performance of different components.

A-2.2 In the UFAC program, only those welt cords, filling materials, decking substrates, and barrier materials which meet the requirements for Class I performance are permitted. Class I cover fabrics are permitted to be used in contact with other Class I materials. Class II cover fabrics are permitted only when used in conjunction with Class I barrier materials.

A-3 Experimental Study.[1] The validity of the UFAC program utilizing these test methods was investigated in a series of chair tests in July, 1979. The series demonstrated that the UFAC program yielded a significant reduction in cigarette ignition propensity of upholstered pieces when compared to furniture items not meeting UFAC criteria. A significant improvement was brought about by application of the UFAC criteria. In furniture manufactured before the UFAC program, 41 percent of all cigarettes placed caused ignitions of the filling materials. In furniture manufactured by UFAC methods, only 4.5 percent of the cigarettes caused ignitions. This is an 89 percent improvement achieved by UFAC construction criteria.

[1]Reference: UFAC Voluntary Action Program Chair Tests, July 26, 27, and 28, 1979, UFAC, Box 2436, High Point, NC 27261.

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Contact NFPA Standards Administration for final date for receipt of proposals on a specific document.

INSTRUCTIONS

Please use the forms which follow for submitting proposed amendments. Use a separate form for each proposal.

1. For each document on which you are proposing amendment indicate:
   (a) The number and title of the document
   (b) The specific section or paragraph.

2. Check the box indicating whether or not this proposal recommends new text, revised text, or to delete text.

3. In the space identified as "Proposal" include the wording you propose as new or revised text, or indicate if you wish to delete text.

4. In the space titled "Statement of Problem and Substantiation for Proposal" state the problem which will be resolved by your recommendation and give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If a statement is more than 200 words in length, the technical committee is authorized to abstract it for the Technical Committee Report.

5. Check the box indicating whether or not this proposal is original material, and if it is not, indicate source.

6. If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.

NOTE: The NFPA Regulations Governing Committee Projects in Paragraph 10-10 state: Each proposal shall be submitted to the Council Secretary and shall include:

(a) identification of the submitter and his affiliation (Committee, organization, company) where appropriate, and

(b) identification of the document, paragraph of the document to which the proposal is directed, and

(c) a statement of the problem and substantiation for the proposal, and

(d) proposed text of proposal, including the wording to be added, revised (and how revised), or deleted.

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Date 5/18/85 **Name** John B. Smith **Tel. No.** 617-555-1212

Address 9 Seattle St., Seattle, WA 02255

Representing (Please indicate organization, company or self) Fire Marshals Assn. of North America

1. a) **Document Title:** Protective Signaling Systems **NFPA No. & Year** NFPA 72D

   b) **Section/Paragraph:** 2-7.1 (Exception)

2. **Proposal recommends: (Check one)** ☐ new text
   ☐ revised text
   ☒ deleted text.

3. **Proposal (include proposed new or revised wording, or identification of wording to be deleted):**

   Delete exception.

4. **Statement of Problem and Substantiation for Proposal:**

   A properly installed and maintained system should be free of ground faults. The occurrence of one or more ground faults should be required to cause a "trouble" signal because it indicates a condition that could contribute to future malfunction of the system. Ground fault protection has been widely available on these systems for years and its cost is negligible. Requiring it on all systems will promote better installations, maintenance and reliability.

5. ☒ **This Proposal is original material.**
   ☐ **This Proposal is not original material; its source (if known) is as follows:** _____

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