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NFPA 260 Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture 1994 Edition

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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.

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NFPA 260

Standard Methods of Tests and Classification

System for

Cigarette Ignition Resistance of Components of Upholstered Furniture

1994 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 Fall Meeting held November 15-18, 1993, in Phoenix, AZ. It was issued by the Standards Council on January 14, 1994, with an effective date of February 11, 1994, and supersedes all previous editions.

The 1994 edition of this document has been approved by the American National Standards Institute.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

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 in addition to wearing apparel and home textiles that might constitute an unreasonable flammability risk. The National Bureau of Standards (NBS) began funding laboratory research on 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 related to flammable fabrics.

In 1976, NBS submitted a draft to the CPSC for a proposed cigarette ignition resistance standard for upholstered furniture. Shortly thereafter, however, the CPSC was reorganized into separate program areas, followed by nearly a year's worth of study on its children's sleepwear standards, which was prompted by findings that a chemical used in sleepwear to make it flame-retardant might be carcinogenic. In November 1978, the CPSC staff, after modifying the originally proposed NBS standard on upholstered furniture, recommended to the CPSC commissioners that they publish the proposed standard.

In December 1978, at an informal meeting during which the CPSC asked that comments be submitted before publishing the final version of the standard, the upholstered furniture industry proposed its own voluntary program, 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 Technical Committee on Fire Tests and drew heavily on the UFAC test method for components of upholstered furniture. The 1986 edition brought the document into substantial agreement with the UFAC test method. The 1989 edition was renumbered as NFPA 260 and included refinements for further agreement with the UFAC test method.

The 1994 edition of this standard provides further refinements that reflect minor changes and editorial clarification. These changes involve current definitions and technology used within the upholstered furniture industry.

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Committee Scope: This Committee shall have primary responsibility for documents on fire testing procedures when such standards are not available. The Committee also shall review existing fire test standards and recommend appropriate action to NFPA; recommend the application of and advise on the interpretation of acceptable test standards for fire problems of concern to NFPA technical committees and members; and act as liaison between NFPA and the committees of other organizations developing fire test standards. The Committee is not responsible for fire tests that are used to evaluate extinguishing agents, devices, or systems.

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NFPA 260

Standard Methods of Tests and Classification System for

Cigarette Ignition Resistance of Components of Upholstered Furniture

1994 Edition

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Information on referenced publications can be found in Chapter 8 and Appendix C.

Chapter 1 General

1-1 Purpose. These test methods are designed to evaluate ignition resistance of upholstered furniture when exposed to smoldering cigarettes under specified conditions.

1-1.2 It is the intent of this standard to provide tests to determine whether covered upholstered furniture components such as cover fabrics, welt cords, decking materials, interior fabrics, and filling/padding materials are relatively resistant to ignition by smoldering cigarettes.

1-1.3* This standard establishes a classification system for determining the resistance of upholstered furniture components to cigarette ignition.

1-2 Scope.

1-2.1 These tests apply to upholstered furniture components that are tested in a standard, defined composite.

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 man-made fibers, foamed or cellular filling materials, resilient pads of natural or man-made fibers, and loose particulate filling materials (such as shredded polyurethane or feathers and down).

1-3 Significance.

1-3.1 Tests specified by this standard are intended to measure the performance of upholstered furniture components under conditions of exposure to a smoldering cigarette.

1-3.2 Tests specified by this standard are not intended to measure the performance of upholstered furniture under conditions of open flame exposure and do not indicate whether the furniture will resist the propagation of flame under severe fire exposure or when tested in a manner that differs substantially from the test standard.

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

1-3.4 Tests specified by this standard measure and describe the response of materials, products, or assemblies to a smoldering cigarette under controlled laboratory conditions and do not necessarily describe or appraise the fire hazard or fire risk of materials, products, or furniture assemblies under actual fire conditions.

1-3.5 This standard is intended to assist in component selection and composite design for upholstered furniture in order to achieve a high level of resistance to cigarette ignition.

1-3.6 The effects of aging on components and composites made from components have not been studied. As a result, the test methods contained in this standard might not predict changes caused by aging or contamination during normal use.

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 fabric 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 within 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.

Barrier/Barrier Fabric. The fabric or other material placed directly under the cover fabric when Class II cover fabric is used. All barrier materials used in cigarette-resistant furniture construction shall be classified as Class I barrier fabric using the test method described in Section 4-6.

Char. Carbonaceous material formed by pyrolysis or incomplete combustion.

Fill/Filling Direction. The filling direction of a woven fabric is that direction perpendicular to the warp direction. The term "fill" often is used to describe the yarns used in the filling direction.

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

Machine Direction. In the case of nonwoven or film-type materials, the machine direction is that direction parallel to the longest dimension of the roll goods. Where rolls or sheets are cut into small pieces, the machine direction can become impossible to distinguish unless the samples are identified individually prior to cutting.

Obvious Ignition. Pronounced, continuous, and self-sustaining combustion of the test system. This 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.

Selvedge. The selvedge of a fabric is the outermost edge of the narrowest width of the fabric. In upholstery fabrics, the selvedge is the edge at the 1373 mm (54 in.) dimension, and in most upholstery fabrics, the selvedge is woven in such a manner that it cannot be used as upholstery fabric.

Specimen. Individual pieces of a sample used in a single test assembly.

Warp/Warp Direction. In woven textiles, the warp direction is that direction on the roll of fabric that is parallel to the selvedges. Thus, yarns or patterns that run in the warp direction run parallel to the selvedges. Yarns running in the warp direction of woven fabrics are called warp yarns.

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

Chapter 2 Test Apparatus

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

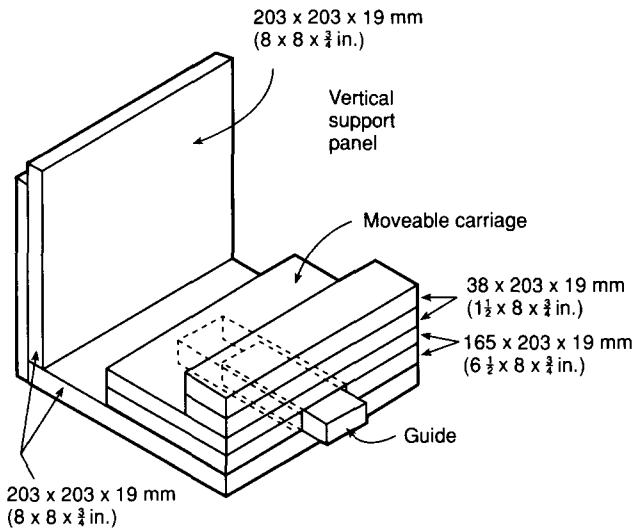

Figure 2-1 Mini-mock-up tester.

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 mm × 203 mm (8 in. × 8 in.) with nominal 19-mm (0.75-in.) thickness, joined together at one edge. The carriage has a 125 mm × 203 mm (5 in. × 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 of nominal 203 mm × 203 mm (8 in. × 8 in.) area and nominal 19-mm (0.75-in.) thickness, which stands against the vertical wall of the base.

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

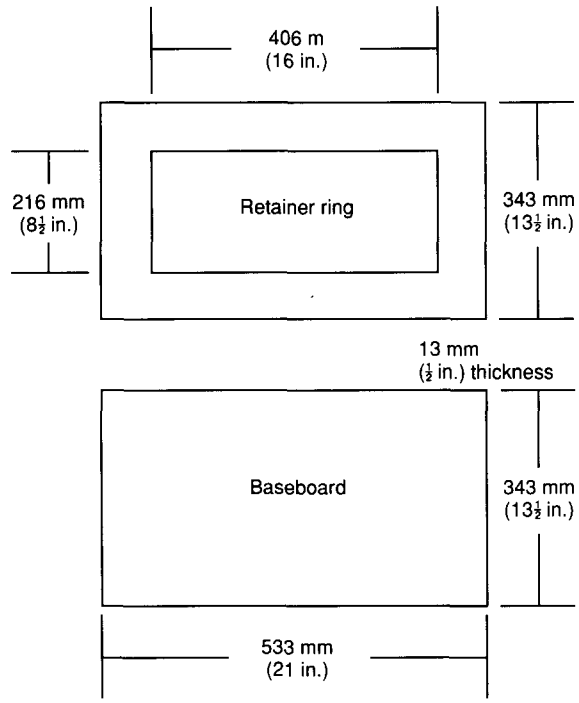

Figure 2-2 Decking materials tester.

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

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

2-5* Standard Type II Cover Fabric. Standard Type II cover fabric shall be UFAC Type II, 100 percent bright, regular rayon, scoured, 20/2, ring-spun, of basket-weave construction, 125 g/m^2 ± 12 g/m^2 (3.7 oz/yd^2 ± 0.8 oz/yd^2), and white in color and shall not be treated with any flame-retardant finishes, whiteners, or back coating.

2-6 Sheeting Material. Sheeting material shall be cotton bed sheeting weighing 125 g/m^2 ± 28 g/m^2 (3.7 oz/yd^2 ± 0.8 oz/yd^2) and white in color and shall not be treated with flame retardants. For testing, the fabric shall be cut into squares of 127 mm × 127 mm (5 in. × 5 in.). If 100 percent cotton sheeting is unavailable, a 50/50 blend of cotton/polyester conforming to the other specifications (weight, color, and untreated) shall be permitted to be used.

2-7 Polyurethane Foam Substrate. The polyurethane foam substrate shall be an open-celled, polyether-type, urethane UFAC foam having a density of 20 kg/m^3 to 25 kg/m^3 (1.3 lb/ft^3 to 1.6 lb/ft^3) and containing no inorganic fillers and shall not be treated with flame retardant.

2-8 Miscellaneous. Other apparatus needed to carry out the testing include 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. The air velocity across the test assemblies shall be maintained below 15.2 m/min (50 ft/min) (which is virtually the velocity of natural convection created by the burning cigarette) in order to minimize localized effects from draft superheating of cigarette embers. The smoke plume from the burning cigarette shall be visibly vertical and shall be a minimum of 152 mm (6 in.) in height.

NOTE: A fume hood with air curtains drawn 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 for handling 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. (*See Figure 2-11.*)

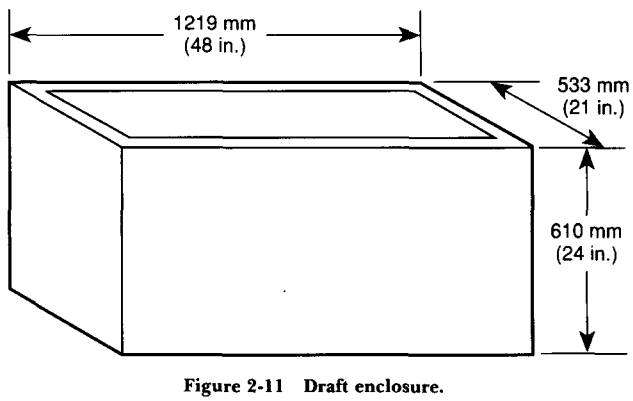

Figure 2-11 Draft enclosure.

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°C ± 2.8°C (70°F ± 5°F) and a relative humidity of less than 65 percent for at least four hours prior to testing. If the test room does not meet these specifications for conditioning, 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 203 mm × 203 mm (8 in. × 8 in.) specimens shall be cut from the material to be tested for horizontal panels, and three 203 mm × 381 mm (8 in. × 15 in.) specimens shall be cut for vertical panels.

3-2.2 Each specimen shall have its long dimension cut in the direction of the warp and assembled for testing in a warp-to-warp orientation, such that the major areas of weave variation 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 or printed fabrics, or both, color shall not constitute a variation relative to cigarette ignition resistance in this test.

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

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

3-5 Filling/Padding Component Test.

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

3-5.2* For loose or particulate materials (shredded polyurethane, down, etc.), bags (sometimes referred to as "ticking") used to contain the loose or particulate material shall be sewn as follows:

"Knife edge"-type bags measuring 254 mm × 254 mm (10 in. × 10 in.) inside seam to inside seam. The bags shall be made of the same material used to manufacture the upholstered furniture, and the loose or particulate material shall be the same as that used to manufacture the upholstered furniture. The bags, sewn on three sides, then shall be filled with 40 g ± 2 g (1.4 oz ± 0.07 oz) of the loose or particulate material, and the fourth side shall be sewn closed. The composite of the bag material and the loose or particulate material shall be tested using the filling-padding test and shall pass the minimum Class I criteria for the filling and padding test when tested in the vertical wall of the mini-mock-up.

3-6 Decking Materials Test. One specimen measuring 533 mm × 343 mm (21 in. × 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 achieve the required thickness.

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

Chapter 4 Test Procedures

4-1 Cover Fabric Test.

4-1.1 For horizontal panels, the 203 mm × 203 mm (8 in. × 8 in.) cover fabric specimen shall be placed on a

203 mm × 127 mm × 51 mm (8 in. × 5 in. × 2 in.) polyurethane substrate as shown in Figure 4-1.1, using pins in the ends of the fabric specimen to hold it in place.

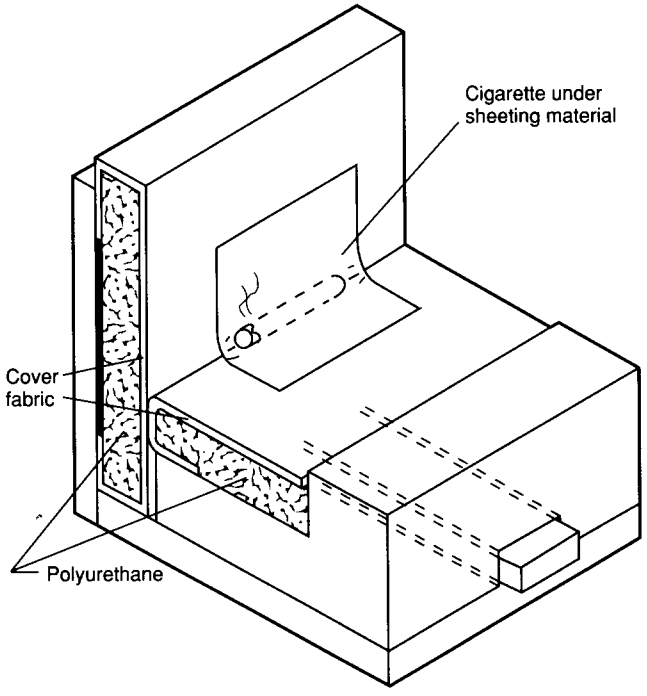

Figure 4-1.1 Cover fabric test method.

4-1.2 For vertical panels, the 203 mm × 381 mm (8 in. × 15 in.) fabric specimen shall be placed on a 203 mm × 203 mm × 51 mm (8 in. × 8 in. × 2 in.) polyurethane substrate as shown in Figure 4-1.1. 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 4-1.1.

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 a lighted cigarette shall be placed on each of the three test assemblies such that the cigarette lies in the crevice and against the vertical panel with each cigarette end equidistant from its respective side of the assembly.

4-1.6 A piece of sheeting material shall be placed over each cigarette and shall be smoothed over the cigarette to ensure intimate contact. The sheeting shall be pinned to the vertical panel approximately 63 mm (2.5 in.) above the crevice.

NOTE: Proper fabric-to-cigarette contact is ensured by running a finger over the covered cigarettes.

4-1.7 Each cigarette shall be allowed to burn its full length 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 one of the following occurs:

(a) Three cigarettes have burned their entire lengths on three individual test specimens, or

(b) 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 sample shall be recorded as a Class II cover fabric by the results of this test.

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 can be determined by laying a straightedge or ruler between the two marks required by 4-1.4 on the edges of the vertical panel. The highest point of destroyed or degraded fabric shall be 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 mm × 203 mm (8 in. × 8 in.) piece of interior fabric and the 203 mm × 203 mm (8 in. × 8 in.) standard Type I cover fabric shall be placed with the interior fabric against the polyurethane substrate as shown in Figure 4-2.1, using pins in the ends of the fabric specimens to hold them in place.

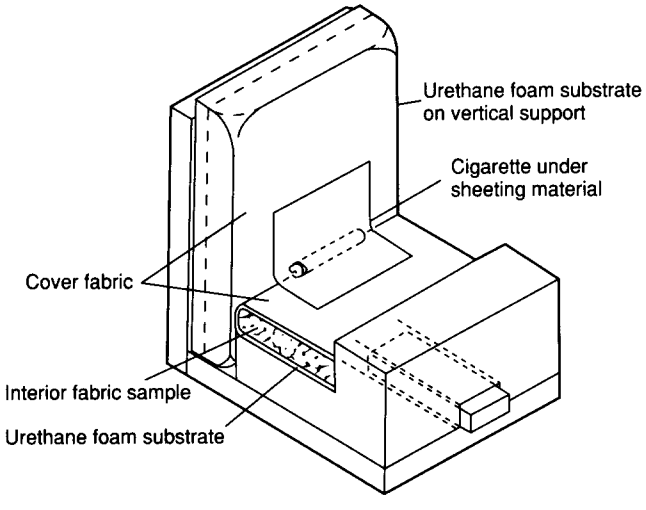

Figure 4-2.1 Interior fabric test method.

4-2.2 For vertical panels, 203 mm × 381 mm (8 in. × 15 in.) standard Type I cover fabric shall be placed on a 203 mm × 203 mm × 51 mm (8 in. × 8 in. × 2 in.) polyurethane substrate as shown in Figure 4-2.1. The fabric shall overlap the top and bottom of the substrate and be pinned into place at the corners.

4-2.3 Each assembled vertical and horizontal panel shall be placed in a mini-mock-up tester as shown in Figure 4-2.1.

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 a lighted cigarette shall be placed on each of the three test assemblies such that the cigarette lies in the crevice and against the vertical panel with each cigarette end equidistant from its respective side of the assembly.

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

NOTE: Proper fabric-to-cigarette contact is ensured by running a finger over the covered cigarettes.

4-2.7 Each cigarette shall be allowed to burn its full length 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 one of the following occurs:

(a) Three cigarettes have burned their entire length on three individual test specimens, or

(b) 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 sample shall be recorded as a Class II interior fabric by the results of this test.

4-2.9 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 interior fabric shall be recorded to the nearest 2.5 mm (0.1 in.). The original crevice position can be determined by laying a straightedge or ruler between the two marks required by 4-2.4 on the vertical panel. The highest point of destroyed or degraded fabric shall be 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 specimens of standard Type II cover fabric shall be cut for each of the sizes specified, as follows:

(a) 203 mm × 203 mm (8 in. × 8 in.) for horizontal panels

(b) 203 mm × 381 mm (8 in. × 15 in.) for vertical panels

(c) 203 mm × 25 mm (8 in. × 1 in.), folded for unsewn welts.

The width of the welt can be adjusted to the size of the welt cord.

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

4-3.1.2 For vertical panels, the 203 mm × 381 mm (8 in. × 15 in.) Type II cover fabric shall be placed on a 203 mm × 203 mm × 51 mm (8 in. × 8 in. × 2 in.) polyurethane substrate as shown in Figure 4-3.1.1. The fabric shall overlap the top and bottom of the substrate and be pinned into place at the corners.

4-3.2 Each assembled vertical and horizontal panel shall be placed in a mini-mock-up tester as shown in Figure 2-1.

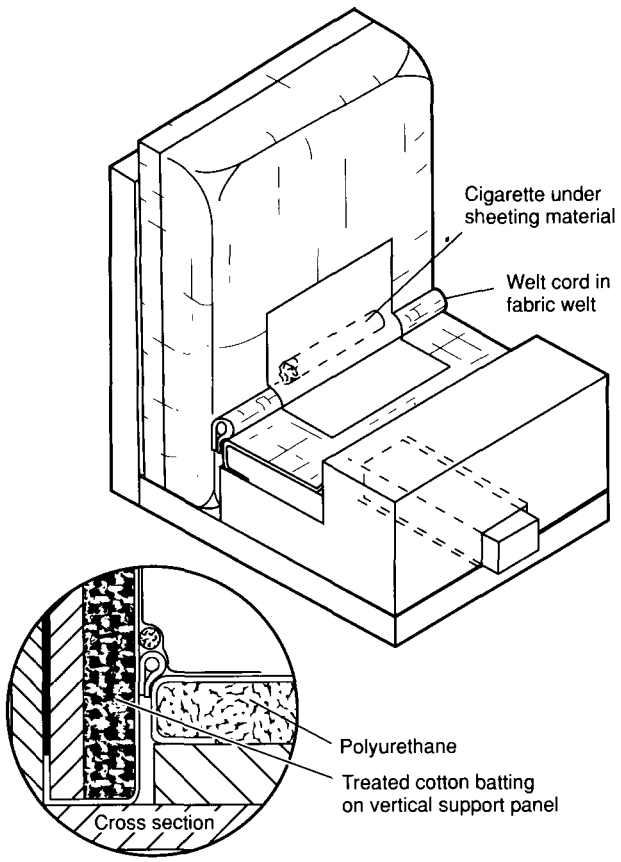

Figure 4-3.1.1 Welt cord test method.

4-3.3 A welt cord specimen shall be placed into the center of a folded strip of standard Type II cover fabric to form an unsewn welt. An unsewn welt shall be placed in each test assembly such that the fabric edges are located between the horizontal and vertical panels and are held tightly in place by the panels. (*See Figure 4-3.1.1.*)

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 a lighted cigarette shall be placed on each of the three test assemblies such that the cigarette lies on the welt and against the vertical panel with each cigarette end equidistant from its respective side of the assembly.

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

NOTE: Proper fabric-to-cigarette contact is ensured by running a finger over the covered cigarettes.

4-3.7 Each cigarette shall be allowed to burn its full length 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 one of the following occurs:

(a) Three cigarettes have burned their entire lengths on three individual specimens, or

(b) Three cigarettes have self-extinguished on the sample.

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

4-3.9 If no obvious ignition occurs, the char on the vertical panel measured 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 can be determined by laying a straightedge or ruler between the two marks required by 4-3.4 on the edges of the vertical panel. The highest point of destroyed or degraded fabric shall be 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 203 mm × 203 mm (8 in. × 8 in.) specimens shall be cut from standard Type I cover fabric for the horizontal panels, and three 203 mm × 305 mm (8 in. × 12 in.) specimens shall be cut for the vertical panels.

4-4.1.1 Three horizontal panels shall be constructed by wrapping each panel with 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 4-4.1.1.*)

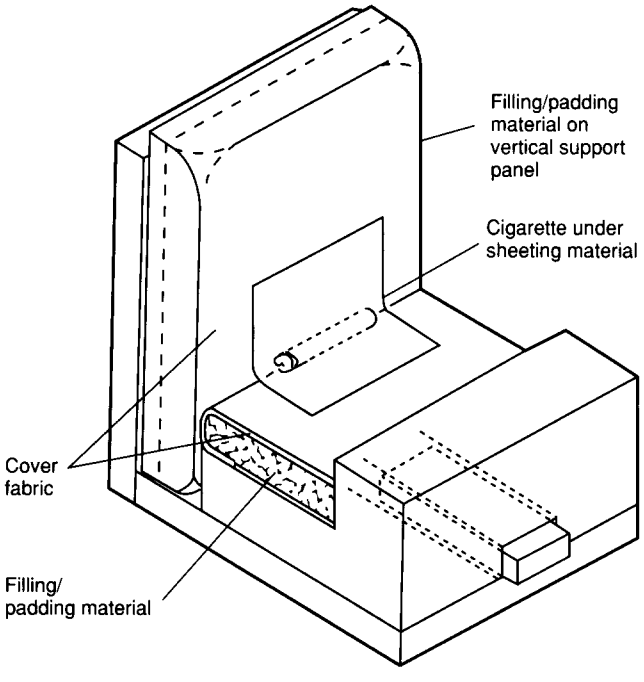

Figure 4-4.1.1 Filling/padding component test method.

4-4.1.2 Three vertical panels shall be constructed by covering one surface of a removable vertical support panel with a vertical pad of the test specimen material topped 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 back side.

4-4.2 Each assembled vertical and horizontal panel shall be placed in a mini-mock-up tester, as shown in Figure 4-4.1.1, such that a snug fit is created 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 a lighted cigarette shall be placed on each of the three test assemblies such that the cigarette lies in the crevice and against the vertical panel with each cigarette end equidistant from its respective side of the assembly.

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

NOTE: Proper fabric-to-cigarette contact is ensured by running a finger over the covered cigarettes.

4-4.6 Each cigarette shall be allowed to burn its full length 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 one of the following occurs:

(a) Three cigarettes have burned their entire lengths on three individual test specimens, or

(b) 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 sample shall be recorded as a Class II filling/padding material by the results of this test.

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 position can be determined by laying a straightedge or ruler between the two marks required by 4-4.3 on the edges of the vertical panel.

4-5 Decking Materials Test.

4-5.1 One 533 mm × 343 mm (21 in. × 13.5 in.) specimen shall be cut from 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 4-5.2.

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 shall be smoothed over the cigarette to ensure intimate contact.

4-5.5 Each cigarette shall be allowed to burn its full length. If a cigarette extinguishes before burning its entire length, another cigarette shall be placed on a fresh area of the cover fabric until one of the following occurs:

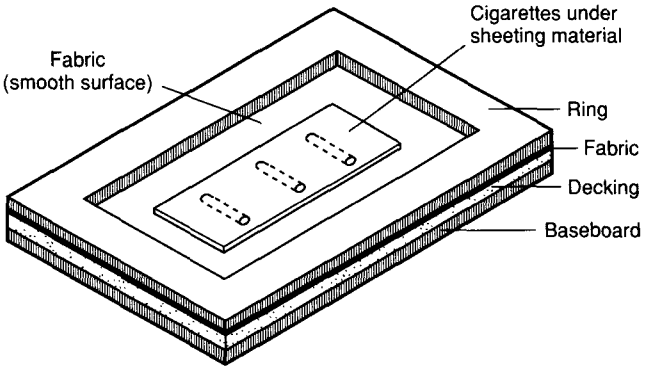

Figure 4-5.2 Decking materials test method.

(a) Three cigarettes have burned their entire lengths, or

(b) Three cigarettes have self-extinguished.

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

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 203 mm × 203 mm (8 in. × 8 in.) specimens shall be cut from standard Type II cover fabric for horizontal panels and three 203 mm × 381 mm (8 in. × 15 in.) specimens shall be cut for vertical panels.

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

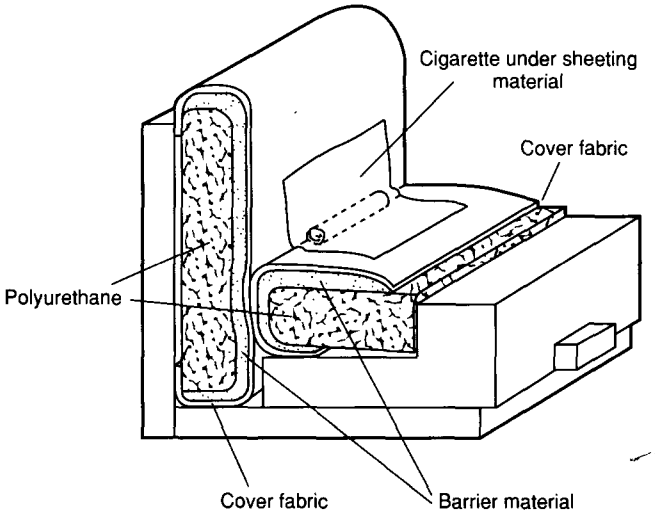

Figure 4-6.1.1 Barrier materials test method.

4-6.1.2 For vertical panels, a barrier specimen shall be placed on a 203 mm × 203 mm × 51 mm (8 in. × 8 in. × 2 in.) polyurethane substrate. The 203 mm × 381 mm (8 in. × 15 in.) cover fabric specimen shall be placed over each vertical panel and fastened in place with pins as shown in Figure 4-6.1.1.

4-6.2 Each assembled horizontal panel and vertical panel shall be arranged in the test assembly such that a 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 sides of the vertical polyurethane substrate.

4-6.4 Three cigarettes shall be lighted, and a lighted cigarette shall be placed on each of the three test assemblies such that the cigarette lies in the crevice and against the vertical panel with each cigarette end equidistant from its respective side of the assembly.

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

NOTE: Proper fabric-to-cigarette contact is ensured by running a finger over the covered cigarettes.

4-6.6 Each cigarette shall be allowed to burn its full length 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 one of the following occurs:

(a) Three cigarettes have burned their entire lengths on three individual test specimens, or

(b) 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 sample shall be recorded as a Class II barrier material by the results of this test.

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 fabric shall be recorded to the nearest 2.5 mm (0.1 in.). The original crevice position can be determined by laying a straightedge or ruler between the two marks required by 4-6.3 on the edges of the vertical panel. The highest point of destroyed or degraded fabric shall be defined as the highest point at which any of the fabric is charred from front to back.

Chapter 5 Cigarette Resistance Classifications

5-1 General. Furniture components shall be classified as Class I or Class II in accordance with Sections 5-2 through 5-7. An upholstered furniture component shall meet the requirements of Class I to be considered resistant to cigarette ignition.

5-2 Cover Fabric Classification.

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

5-2.1.1 When subjected to the cover fabric test, a specimen shall show no evidence of ignition of any test assembly.

5-2.1.2 The vertical char on any of the three specimens shall not exceed 45 mm (1.75 in.).

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

5-3 Interior Fabric Classification.

5-3.1 Class I. Class I interior fabric shall meet the criteria of 5-3.1.1 and 5-3.1.2.

5-3.1.1 When subjected to the interior fabric test, a specimen shall show no evidence of ignition of any test assembly.

5-3.1.2 The vertical char on the cover fabric of any of the three specimens shall not exceed 38 mm (1.5 in.).

5-3.2 Class II. Interior fabrics that do not meet Class I criteria shall be designated as Class II.

5-4 Welt Cord Classification.

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

5-4.1.1 When subjected to the welt cord test, a specimen shall show no evidence of ignition of any test assembly.

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

5-4.2 Class II. Welt cord that does not meet Class I criteria shall be designated as Class II.

5-5 Filling/Padding Components Classification.

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

5-5.1.1 When subjected to the filling/padding test, a specimen shall show no evidence of ignition of any test assembly.

5-5.1.2 When measured from the original crevice position, the vertical char length on the cover fabric shall not exceed 38 mm (1.5 in.) for any of three replicated tests.

5-5.2 Class II. Components that do not meet Class I criteria shall be designated as Class II.

5-6 Decking Materials Classification.

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

5-6.1.1 When subjected to the decking test, a specimen shall show no evidence of ignition at any cigarette location.

5-6.1.2 When measured from the original cigarette position, the char length on the cover fabric shall not exceed 38 mm (1.5 in.) at any of three cigarette locations.

5-6.2 Class II. Decking materials that do not meet Class I criteria shall be designated as Class II.

5-7 Barrier Materials Classification.

5-7.1 Class I. Class I barriers shall meet the criteria of 5-7.1.1 and 5-7.1.2.

5-7.1.1 When subjected to the barrier test, a specimen shall show no evidence of ignition of any test assembly.

5-7.1.2 When measured from the original crevice position, the vertical char length on the cover fabric shall not exceed 51 mm (2.0 in.) for any of three replicated tests.

5-7.2 Class II. Barriers that do not meet Class I criteria shall be designated as 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 extinguished readily. Any test shall be discontinued as soon as continuing combustion occurs. The exposed area shall be wet immediately with a water spray from the water bottle, and the charred or burned material shall be removed and immersed in a bucket of water. The test area then shall be ventilated.

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

Chapter 7 Precision and Accuracy

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

Chapter 8 Referenced Publications

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

Federal Specification CCC-C-436-E, *Cloth, Ticking Twill, Cotton*, February 14, 1986. General Services Administration, Specification Unit (3 FPB-W), Suite 8100, 470 E. L'enfant S.W., Washington, DC 20407.

Appendix A Explanatory Material

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

A-1-1.3 Cover fabrics determined to be Class II by this test should not be used without a Class I-type barrier in the manufacture of furniture intended to be resistant to cigarette ignition. Barrier materials also are classified by this test. Any other components determined to be Class II by this test should not be used in the manufacture of furniture intended to be resistant to cigarette ignition.

A-2-5 UFAC refers to the Upholstered Furniture Action Council. Standard Type II cover fabric can be obtained from TESTFABRICS, Inc, P.O. Box 420, Middlesex, NJ 08846-0420.

A-2-9 It is recommended that the properly loaded mini-mock-up tester and/or the decking materials tester be

placed in a draft enclosure (*see Section 2-11*), and then the draft enclosure should be placed into a fume hood having air curtains or a door across the hood face and containing virtually zero air velocity.

A-3-5.2 Composites of loose/particulate materials and bag materials that are not classified as Class I should not be used in upholstered furniture that is expected to be resistant to cigarette ignition.

Appendix B Commentary

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

B-1 Introduction.

B-1.1 In April 1979, the Upholstered Furniture Action Council (UFAC) adopted a voluntary program designed to reduce the cigarette ignition propensity of upholstered furniture. The UFAC program is based on the six test methods described in this standard and consists of the following 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 ensure that furniture manufacturers and their suppliers utilize materials and methods of construction as required by the voluntary program.

B-1.2 The UFAC construction criteria are intended to:

(a) Eliminate ignition-prone welt cords and to substitute smolder-resistant welt cords that meet the requirements of the UFAC welt cord test.

(b) Eliminate untreated cotton batting as a substrate in immediate contact with decking fabrics and to substitute materials that meet the requirements of the UFAC decking material test.

(c) Eliminate untreated cotton batting in immediate contact with the covering of the inside vertical walls and to substitute materials that meet the requirements of the UFAC filling/padding test.

(d) Eliminate intimate contact between Class II fabrics and the horizontal seating surfaces of conventional polyurethane foam cushions. Where Class II fabrics are used with conventional polyurethane foam cushions, a barrier meeting the requirements of the UFAC barrier test should be used.

B-2 Nature of Tests.

B-2.1 The six test methods outlined in this standard define the performance of welt cord, filling materials, decking substrates, barriers, interior fabrics, and cover fabrics. 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 these tests. Performance of each component is evaluated in an assembly 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 the performance of different components.

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

B-3 Experimental Study. The significance of the UFAC program was validated by a series of chair tests in July 1979. These tests demonstrated that the UFAC program yielded a significant reduction in cigarette ignition propensity of upholstered furniture components compared to components not meeting UFAC criteria. An improvement of 89 percent was achieved by application of the UFAC criteria. In furniture manufactured before implementation of the UFAC program, 41 percent of all test cigarettes caused ignition of the filling materials. In furniture manufactured by UFAC methods, only 4.5 percent of the cigarettes caused ignitions.

NOTE: For further information, see UFAC Voluntary Action Program Chair Tests, July 26, 27, and 28, 1979.

B-4 Further Experimental Study. A sound and sensible method(s) for developing statistically significant precision and bias statements for tests such as are contained in this standard has yet to be discovered. However, reproducibility within a laboratory and from laboratory to laboratory has been studied. The percentage of reproducibility when testing the same component in these two laboratory situations is specified in Tables B-4(a) and B-4(b):

Table B-4(a) Reproducibility within the Same Laboratory

Test Method	% Reproducibility[1]
Cover Fabric Classification	94
Interior Fabric Classification	94
Filling/Padding Classification:	
Slab and Garnetted F/P	89
Loose and Particulate F/P	89
Welt Cord Classification	94
Decking Material Classification	95
Barrier Material Classification	96

[1]The percent of reproducibility equals the percentage of replicates tested that produced the same result. For example, for welt cord classification, 94 percent of the replicate tests produced the same pass/fail or classification results.

Table B-4(b) Reproducibility from Laboratory to Laboratory

Test Method	% Reproducibility[1]
Cover Fabric Classification	89
Interior Fabric Classification	91
Filling/Padding Classification:	
Slab and Garnetted F/P	86
Loose and Particulate F/P	85
Welt Cord Classification	91
Decking Material Classification	94
Barrier Material Classification	96

[1]The percent of reproducibility equals the percentage of laboratories that obtained the same pass/fail or the same classification result. For example, for the filling/padding classification for slab and garnetted materials, the testing laboratories obtained the same results 86 percent of the time.

NOTE: For further information, see UFAC Voluntary Action Program Interlab Tests, 1981–1991, and Schnadig Corporation Test Data.

B-5 General Comments.

B-5.1 Cover fabrics determined to be Class II by these test methods may be permitted to be used where a Class I barrier is provided.

Appendix C Referenced Publications

C-1 The following documents or portions thereof are referenced within this standard for informational purposes only and thus are not considered part of the requirements of this document.

C-1.1 UFAC Publications. Upholstered Furniture Action Council, P.O. Box 2436, High Point, NC 27261.

UFAC Voluntary Action Program Chair Tests, July 26, 27, and 28, 1979.

UFAC Voluntary Action Program Interlab Tests, 1981–1991.

C-1.2 Other References.

Schnadig Corporation Test Data; Schnadig Corporation, Engineering and Technical Services, Belmont, MS 38827.

TESTFABRICS, Inc., P.O. Box 420, Middlesex, NJ, 08846-0420.

Index

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Since 1896, one of the primary purposes of the NFPA has been to develop and update the standards covering all areas of fire safety.

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The code adoption process takes place twice each year and begins with a call for proposals from the public to amend existing codes and standards or to develop the content of new fire safety documents.

Report on Proposals
Upon receipt of public proposals, the technical committee members meet to review, consider, and act on the proposals. The public proposals – together with the committee action on each proposal and committee-generated proposals – are published in the NFPA's Report on Proposals (ROP). The ROP is then subject to public review and comment.

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These public comments are considered and acted upon by the appropriate technical committees. All public comments – together with the committee action on each comment – are published as the Committee's supplementary report in the NFPA's Report on Comments (ROC).

The committee's report and supplementary report are then presented for adoption and open debate at either of NFPA's semi-annual meetings held throughout the United States and Canada.

Association Action
The Association meeting may, subject to review and issuance by the NFPA Standards Council, (a) adopt a report as published, (b) adopt a report as amended, contingent upon subsequent approval by the committee, (c) return a report to committee for further study, and (d) return a portion of a report to committee.

Standards Council Action
The Standards Council will make a judgement on whether or not to issue an NFPA document based upon the entire record before the Council, including the vote taken at the Association meeting on the technical committee's report.

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Voting at an NFPA Annual or Fall Meeting is restricted to members of record for 180 days prior to the opening of the first general session of the meeting, except that individuals who join the Association at an Annual or Fall Meeting are entitled to vote at the next Fall or Annual Meeting.

"Members" are defined by Article 3.2 of the Bylaws as individuals, firms, corporations, trade or professional associations, institutes, fire departments, fire brigades, and other public or private agencies desiring to advance the purposes of the Association. Each member shall have one vote in the affairs of the Association. Under Article 4.5 of the Bylaws, the vote of such a member shall be cast by that member individually or by an employee designated in writing by the member of record who has registered for the meeting. Such a designated person shall not be eligible to represent more than one voting privilege on each issue, nor cast more than one vote on each issue.

Any member who wishes to designate an employee to cast that member's vote at an Association meeting in place of that member must provide that employee with written authorization to represent the member at the meeting. The authorization must be on company letterhead signed by the member of record, with the membership number indicated, and the authorization must be recorded with the President of NFPA or his designee before the start of the opening general session of the Meeting. That employee, irrespective of his or her own personal membership status, shall be privileged to cast only one vote on each issue before the Association.

Sequence of Events Leading to Publication of an NFPA Committee Document

Call for proposals to amend existing document or for recommendations on new document.

▼

Committee meets to act on proposals, to develop its own proposals, and to prepare its report.

▼

Committee votes on proposals by letter ballot. If two-thirds approve, report goes forward. Lacking two-thirds approval, report returns to committee.

▼

Report is published for public review and comment. (Report on Proposals - ROP)

▼

Committee meets to act on each public comment received.

▼

Committee votes on comments by letter ballot. If two-thirds approve, supplementary report goes forward. Lacking two-thirds approval, supplementary report returns to committee.

▼

Supplementary report is published for public review. (Report on Comments - ROC).

▼

NFPA membership meets (Annual or Fall Meeting) and acts on committee report (ROP and ROC).

▼

Committee votes on any amendments to report approved at NFPA Annual or Fall Meeting.

▼

Complaints to Standards Council on Association action must be filed within 20 days of the NFPA Annual or Fall Meeting.

▼

Standards Council decides, based on all evidence, whether or not to issue standard or to take other action, including hearing any complaints.

▼

Appeals to Board of Directors on Standards Council action must be filed within 20 days of Council action.

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

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National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269-9101
Fax No. 617-770-3500

Note: All proposals must be received by 5:00 p.m. EST/EDST on the published proposal-closing date.

If you need further information on the standards-making process, please contact the Standards Administration Department at 617-984-7249.

Date 9/18/93 **Name** John B. Smith **Tel. No.** 617-555-1212

Company _____

Street Address 9 Seattle St., Seattle, WA 02255

Please Indicate Organization Represented (if any) Fire Marshals Assn. of North America

1. a) NFPA Document Title National Fire Alarm Code **NFPA No. & Year** NFPA 72, 1993 ed.

b) Section/Paragraph 1-5.8.1 (Exception No.1)

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Log # _____
Date Rec'd _____

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.

SAMPLE

4. Statement of Problem and Substantiation for Proposal: (Note: State the problem that will be resolved by your recommendation; give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

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. (Note: Original material is considered to be the submitter's own idea based on or as a result of his/her own experience, thought, or research and, to the best of his/her knowledge. is not copied from another source.)

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

Note 1: Type or print legibly in black ink.
Note 2: 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.

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Signature (Required)

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