

§ 1610.4

16 CFR Ch. II (1-1-08 Edition)

(2) *Intermediate flammability, Class 2.* This class shall include textiles which meet the minimum requirements set forth in paragraph (a)(2)(i) of this section. Textiles meeting these requirements are recognized by the trade as having flammability characteristics between normal and rapid and intense burning.

(i) *Napped, pile, tufted, flocked, or other textiles having a raised-fiber surface.* Such textiles in their original state and/or after being dry-cleaned and washed as described in §§1610.4(d) and 1610.4(e), when tested as described in §1610.4, shall be classified as Class 2, intermediate flammability, when the time of flame spread is from 4 to 7 seconds, both inclusive, and the base fabric ignites or fuses.

(3) *Rapid and intense burning, Class 3.* This class shall include textiles which have burning characteristics as described in paragraphs (a)(3)(i) and (a)(3)(ii) of this section. Such textiles are considered dangerously flammable and recognized by the trade as being unsuitable for clothing because of their rapid and intense burning.

(i) *Textiles free from nap, pile, tufting, flock, or other type of raised-fiber surface.* Such textiles in their original state and/or after being dry-cleaned and washed as described in §§1610.4(d) and 1610.4(e), when tested as described in §1610.4, shall be classified as Class 3, rapid and intense burning, when the time of flame spread is less than 4 seconds.^e

(ii) *Napped, pile, tufted, flocked, or other textiles having a raised-fiber surface.* Such textiles in their original state and/or after being dry-cleaned and washed as described in §§1610.4(d) and 1610.4(e) when tested as described in §1610.4 shall be classified as Class 3, rapid and intense burning, when the time of flame spread is less than 4 seconds and when the intensity of flame is such as to ignite or fuse the base fabric.

§ 1610.4 Methods of test.

(a)(1) *Number and size of specimens required.* Five specimens, each measuring 2 by 6 inches, are required for each test.

^e See footnote d.

(2) For textiles without a raised-fiber surface the long dimension shall be that in which they burn most rapidly, and the more rapidly burning surface shall be tested. To establish the long dimension and the surface, preliminary tests are made as described in paragraph (g) of this section, with specimens cut in different directions.

(3) For textiles having a raised-fiber surface, the direction of the lay of the surface fibers shall be parallel with the long dimension of the specimens. For this type of textiles with varying depths of pile, tufting, etc., the specimens are taken from that part and tested on that surface which has the fastest rate of burning.

(4) If the specimens in the preliminary test, when tested as described in paragraph (g) of this section, do not ignite or are very slow burning, or should have a fire-retarding finish, a swatch large enough to provide the specimens required for the test, with allowance for shrinkage in dry cleaning and washing, is subjected to the dry cleaning and washing procedures described in paragraphs (d) and (e) of this section. The specimens for the flammability test are then taken from it.

(5) The specimens required for testing, each 2 by 6 inches, are marked out on the back (or under side) of each sample with the long dimension in the direction in which burning is most rapid, as established in the preliminary trials. The end of the specimen toward which and on the face of which burning is most rapid is identified by attaching a staple to it. The specimens are then cut out.

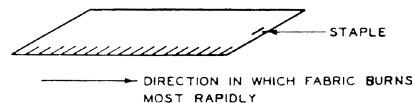


FIGURE 1—Specimen showing staple.

(b) *Flammability tester.* The flammability tester consists of a draft-proof ventilated chamber enclosing a standardized ignition medium, sample rack, and automatic timing device.

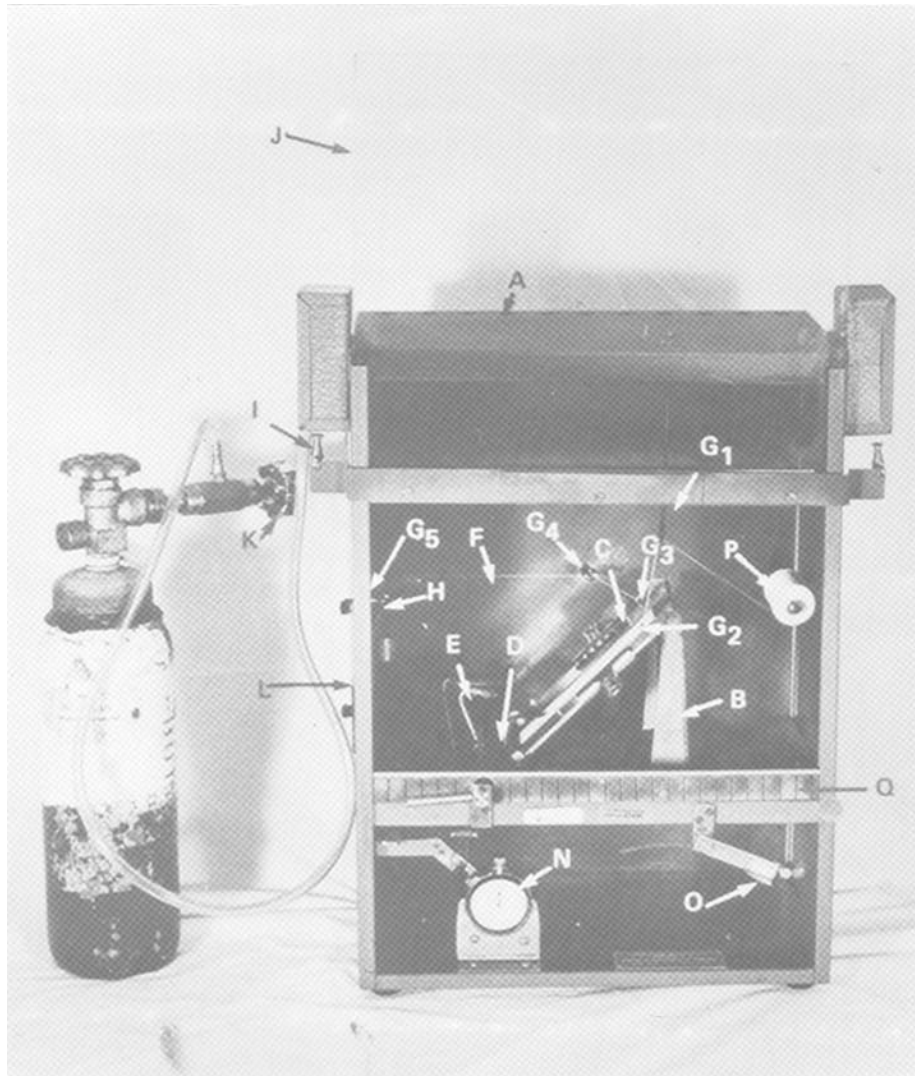
(1) *Draft-proof chamber with vented top (A, fig. 2).* This metal chamber prevents air circulation around the specimen

rack and flame, but permits free ventilation for rapid oxidation. The chamber is 14½ inches wide, 8½ inches deep, and 14 inches high. There are 12 half-inch holes equidistant along the rear of the top closure. A ventilating strip is provided at the base of the sliding glass door in the front of the apparatus.

(2) *Specimen rack (B, fig. 2)*. The specimen rack provides supports for the frames in which the specimens are mounted. The angle of inclination is 45°. Two guide pins projecting downward from the center of the base of the rack travel in slots provided in the floor of the chamber so that adjustment can be made for the thickness of the specimen in relation to the flame front. A stop is provided in the base of the chamber to assist in adjusting the position of the rack.

(3) *Specimen holder (C, fig. 2)*. The specimen holder consists of two ¼ inch matched metal plates with clamps mounted along the sides, between which the specimen is fixed. The plates are slotted and loosely pinned for alignment. The two plates of the holder cover all but 1½ inches of the width of the specimen for its full length. The specimen holder is supported in the draft-proof chamber on the rack at an angle of 45°. Five specimen holders are provided.

(4) *Indicating finger (D, fig. 2)*. The forepart of this finger touches the specimen when the rack is adjusted. By means of this finger the thickness of the specimen is compensated for in the throw of the gas nozzle.



(5) *Control knobs (not shown)*. There are two of these knobs which hold the rack in test position. The knobs can be reached under the stage of the cabinet and permit forward and backward movements of the rack when loosened.

(6) *Ignition medium (E, fig. 2)*. The ignition medium consists of a spring-motor-driven gas jet formed around a 26-gage hypodermic needle. A trigger located in the front of the apparatus

serves to wind the spring-motor when the machine is placed in operation. The gas jet is protected by a copper shield.

(7) *Stop cord (F, fig. 2)*. This cord, stretched from the spool (P, fig. 2) through suitable thread guides provided on the specimen frame and chamber walls, permits the lacing of the cord in the proper position exactly 5 inches from the point where the center of the ignition flame impinges on the

Consumer Product Safety Commission

§ 1610.4

test specimen. The stop cord consists of a No. 50 mercerized sewing thread and measures the rise and spread of the flame from the test specimen.

(8) *Pulley or eye (G₅, fig. 2)*. The pulley or eye is the support and guide for the stop cord.^g

(9) *Stop weight (H, fig. 2)*. The weight, attached by means of a clip to the stop cord, in dropping actuates the stop motion.

(10) *Slide door control (I, fig. 2)*. This knob moves the catch mechanism used to hold the sliding door in an open position for insertion of test specimen racks.

(11) *Slide door (J, fig. 2)*. A glass door in its normal position slides in the grooves at the front of the cabinet.

(12) *Fuel-control valve (K, fig. 2)*. This valve consists of a sensitive control device for regulating the fuel supply at the tank. The valve ends in a 1/2-inch male connection for attachment to the standard butane tank of 2 pounds capacity.

(13) *Flow meter (L, fig. 2)*. A flow meter is used to bring the fuel supply to test level by means of the control valve. The flow meter consists of a U-shaped glass tube cut into the gas line in a manner to register the gas pressure delivered to the microburner. Attached to the case wall behind the flow meter is a movable metal plate with two parallel horizontal lines properly spaced for the desired flame length. When the pressure is off, the plate is so regulated that the liquid level in both sides of the U-shaped tube meets the lower line. When the test is made the pressure is so adjusted that the higher liquid level in the U-shaped tube meets the upper line.

^gOther guides are specifically identified as the skyhook (G¹), the L-shaped guides (G₂, G₃) and a pigtail guide (G₆). See §1610.61(c)(1) for a clarification of the stop cord position.

(14) *Butane, c.p., container⁴ (M, fig. 2)*. This fuel supply is a No. 4 cylinder of c.p. butane.

(15) *Stopwatch and timing mechanism (N, fig. 2)*. This watch, by means of special attachments, is actuated to a start by connection with the gas jet (E, fig. 2). A driving mechanism on rear of cabinet (S, fig. 2) moves the gas jet to its most forward position and automatically starts the timing at the moment of flame impact. The falling weight (H, fig. 2), when caused to move by severance of cord (F, fig. 2), stops the watch. Timing is read directly.

(16) *Starting lever (O, fig. 2)*. This lever is operated from left to right in one stroke and is released to operate the gas jet.

(17) *Cord supply (P, fig. 2)*. This supply, consisting of a spool of No. 50 mercerized cotton sewing thread, is fastened to the side of the chamber and can be withdrawn by releasing the thumbscrew holding same in position.

(18) *Cord loop (G₄, fig. 2)*. At a point behind the stop cord (F, fig. 2), on the rear panel, there is installed another loop to draw the cord away from directly over the flame.

(19) *Draft ventilator strip (Q, fig. 2)*. A draft ventilator strip is placed across the front opening, sealing the space between the sliding door when in lowered position and the base on which the grid rack is attached.

(c) *Brushing device.^h* (1) This device consists of a baseboard over which a smaller carriage is drawn. This carriage runs on parallel tracks attached to the edges of the upper surface of the baseboard. The brush is hinged with pin hinges at the rear edge of the baseboard and rests on the carriage vertically with a pressure of 150 grams.

⁴Butane, c.p. No. 4 cylinders containing 2 pounds of butane may be obtained from, among others, the Matheson Co., Inc., East Rutherford, N.J.

^hSee §1610.61(c)(2) for a clarification of the brushing technique for fabric with raised-fiber surfaces.

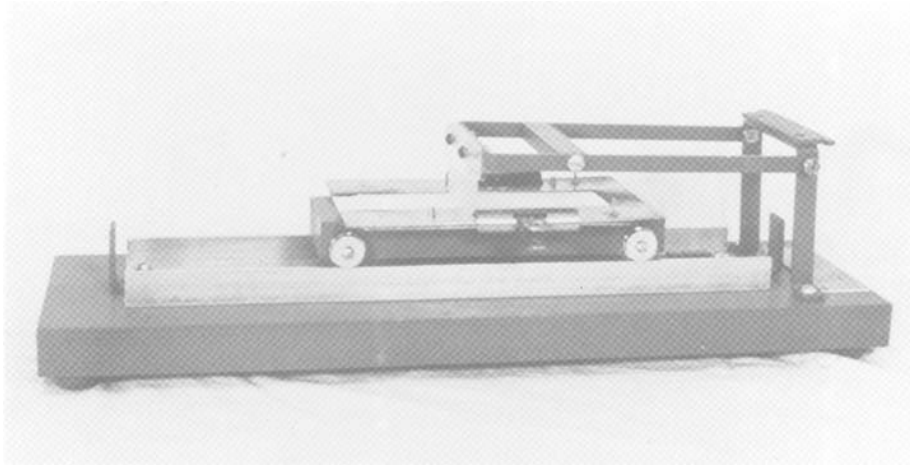


FIGURE 3—BRUSHING DEVICE. i

(2) The brush consists of two rows of stiff nylon bristles mounted with the tufts in a staggered position. The bristles are 0.016 inch in diameter and 0.75 inch in length. There are 20 bristles per tuft and 4 tufts per inch. A clamp is attached to the forward edge of the movable carriage to permit holding the specimen on the carriage during the brushing operation.

(3) After the specimen has been put in place on the carriage and fastened by means of the clamp, the brush is raised, the carriage pushed to the rear, and the brush lowered to the face of the specimen. The carriage is then drawn forward by hand at a uniform rate.

(d) *Dry cleaning.* A swatch from each sample, as mentioned in paragraph (a)(4) of this section, shall be subjected to the following dry-cleaning procedure.

(1) *Apparatus.* The apparatus is a cylinder, preferably of metal, approximately 13 inches high and about 8¾ inches in diameter (capacity 3 gallons). The cylinder is mounted in a vertical position on an axis which is inclined 50° to the axis of the cylinder, and is rotated about this axis at a speed of 45 to 50 revolutions per minute.¹

¹See footnote h; this picture is a reproduction of the figure published in the original

(2) *Cleaning procedure.* The apparatus is filled approximately one-third with perchlorethylene to which is added 270 ml of dry-cleaning soap.⁶ The swatches and sufficient suitable worsted cloth,⁷ in pieces of approximately 12 by 12 inches, to make a total dry load of 1 pound are placed in the apparatus. It is operated for 25 minutes. The solution is poured out, the apparatus refilled to approximately one-third with fresh perchlorethylene without soap, and the apparatus is operated for an additional

standard, and does not truly represent the Commission's interpretation of the proper position of the specimen during the brushing procedure (§1610.01(c)(2)). Specifically, the specimen in the picture appears to be below the level of the upper half of the specimen holder while the clarification requires the specimen to be placed above this level. Also §1610.61(c)(1) allows for the use of L-shaped guides.

⁶The soap shall be made by dissolving 56 grams of caustic potash (KOH) in 100 ml of water. The potassium hydroxide solution shall be poured slowly, with constant stirring, into a mixture of 340 grams of oleic acid, 400 ml of Stoddard solvent (Commercial Standard CS3-40 grade), and 100 ml of tertiary butyl alcohol or an equal quantity of butyl cellosolve.

⁷A suitable worsted test fabric known as Moth Test cloth may be obtained from Testfabrics, Inc., 55 Van Dam St., New York 13, N.Y.

5 minutes. This last operation is repeated three times. The swatches are then removed and the excess solvent removed from the swatches by any convenient means, such as rolling them between two layers of turkish toweling or between two layers of absorbent paper. They are then permitted to dry at room temperature.

(e) *Washing procedure.* The swatches, after being subjected to the dry-cleaning procedure (paragraph (d) of this section), shall then be immersed and worked gently for 5 minutes in a bath of soft water in which 0.5-percent neutral chip soap has been dissolved. The volume of the bath shall be 30 times the weight of the swatches and the temperature shall be between 95° and 100 °F. The swatches shall then be rinsed twice in water at 80 °F., extracted, and dried. The individual specimens, each 2 by 6 inches, are then cut out as described in paragraph (a)(5)

of this section and tested as described in paragraphs (f) and (g) of this section.

(f) *Brushing and drying specimens.* Each specimen having a raised-fiber surface, in its original condition or after dry cleaning and washing, is placed on the brushing device carriage (paragraph (c) of this section) and drawn under the brush once against the lay of the raised-fiber surface (see fig. 4). Other specimens do not require brushing. All specimens are clamped individually in the specimen holders of the flammability tester (paragraph (b)(3) of this section), with the staple on top and the stapled end at the closed end of the holder. They are then dried in a horizontal position in an oven for 30 minutes at 221 °F (105 °C), removed from the oven, and placed over anhydrous calcium chloride in a desiccator until cool, but for not less than 15 minutes.

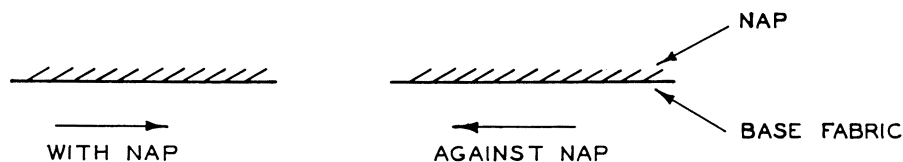


FIGURE 4—LAY OF NAP

(g) *Procedure for testing flammability.*
 (1) Adjust the position of the rack of the flammability tester (paragraph (b)(2) of this section) with a holder and trial specimen (not a prepared specimen) in position, so that the tip of the indicator finger touches the face of the specimen.

(2) Open the control valve in the fuel supply. Allow approximately 5 minutes for the air to be drawn from the fuel line, ignite the gas and adjust the flame to a length of $\frac{5}{8}$ inch, measured from its tip to the opening in the gas nozzle.

(3) Remove the mounted specimen from the desiccator and place it in a position on the rack in the chamber of the apparatus.

(4) See that the stop cord (No. 50 cotton sewing thread) is strung through

the guides in the upper plate of the specimen holder across the top of the specimen, and through the guides at the rear of the chamber over the guide ring, and that the weight is hooked in place close to and just below the guide ring. Set the stop watch at zero. Close the door of the apparatus. Conduct the test in a draft-free room with the apparatus at room temperature.

(5) Bring the starting lever over to the extreme right and release it. This starts the timing mechanism and applies the flame to the specimen for a period of 1 second. This should be done within 45 seconds of the time the specimen was removed from the desiccator. Timing is automatic, starting upon application of the flame and ending when the weight is released by the burning of the stop cord.

(6) Record the time of flame spread (reading of stop watch) of each specimen and note whether the base of each specimen having a raised-fiber surface is ignited or fused to a point where the damage is apparent from the bottom of the specimen.

(7) *Results*—(i) *Time of flame spread.* The time of flame spread of the textile is taken as an average time for 5 specimens. Results of tests of specimens before and after dry cleaning and washing shall be recorded and reported separately. If the time of flame spread is less than 4 seconds⁸ or if the specimens do not burn, test 5 additional specimens. The time of flame spread is then taken to be the average time for the 10 specimens or for as many of them as burn.

(ii) *Base fabric ignition or fusing.* Base fabric ignition or fusing of textiles having raised-fiber surfaces shall be reported when the base fabric of more than 1 of the 5 (or 2 of the 10) specimens tested ignites or fuses.¹

(8) *Reporting results.* The reported result shall be the flammability before or after dry cleaning and washing, whichever is the lower; and, based on this result, the textile shall be placed in the proper classification as given in § 1610.3.

[40 FR 59891, Dec. 30, 1975, as amended at 59 FR 33194, June 28, 1994]

§ 1610.5 Notes.

The methods of test and classifications outlined herein agree with all essential requirements of the Standard Test Method for Flammability of Clothing Textiles, of the American Association of Textile Chemists and Colorists.

⁸In the Flammable Fabrics Act, Congress adopted CS 191-53 as the Commercial Standard to be applied under the law.

On August 23, 1954, the Flammable Fabrics Act was amended, changing the test for the time of flame spread for plain-surfaced fabrics, provided in paragraphs 3.1.1.1 and 3.1.3.1 [codified as §§ 1610.3(a)(1)(i) and 1610.3(a)(3)(i)], by reducing the burning time from 4 to 3½ seconds.

For the purposes of the administration of that act, therefore, the 3½-second burning time for plain-surfaced fabrics is applicable.

¹See § 1610.61(c)(3) for a clarification of the criterion for classification of Class 3.

Subpart B—Rules and Regulations

AUTHORITY: Sec. 5, 15 U.S.C. 1194.

NOTE: An interpretation, with respect to Ornamental Veils or Veilings, issued by the Federal Trade Commission at 32 FR 11850, Aug. 17, 1967, provides as follows:

Ornamental millinery veils or veilings when used as a part of, in conjunction with, or as a hat, are not to be considered such a “covering for the neck, face, or shoulders” as would, under the first proviso of section 2(d) of the Flammable Fabrics Act, cause the hat to be included within the definition of the term “article of wearing apparel” where such ornamental millinery veils or veilings do not extend more than nine (9) inches from the tip of the crown of the hat to which they are attached and do not extend more than two (2) inches beyond the edge of the brim of the hat.

Where hats are composed entirely of ornamental millinery veils or veilings such hats will not be considered as subject to the Flammable Fabrics Act if the veils or veilings from which they are manufactured were not more than nine (9) inches in width and do not extend more than nine (9) inches from the tip of the crown of the completed hat.

§ 1610.31 Terms defined.

As used in this part, unless the context otherwise specifically requires:

(a) The term *act* means the “Flammable Fabrics Act” (approved June 30, 1953, Pub. Law 88, 83d Congress, 1st sess., 15 U.S.C. 1191; 67 Stat. 111) as amended, 68 Stat. 770, August 23, 1954.

(b) The terms *rule*, *rules*, *regulations*, and *rules and regulations*, mean the rules and regulations prescribed by the Commission pursuant to section 5(c) of the act.

(c) The term *United States* means, the several States, the District of Columbia, the Commonwealth of Puerto Rico and the Territories, and Possessions of the United States.

(d) The terms *marketing or handling* means the transactions referred to in section 3 of the Flammable Fabrics Act, as amended in 1967.

(e) The terms *uncovered or exposed part* of an article of wearing apparel as used in section 4(a) of the act, mean that part of such article of apparel which might during normal wear be open to flame or other means of ignition.