

U.S. Department of Commerce
National Institute of Standards and Technology
(formerly: National Bureau of Standards-NBS)
Office of Standards Services

**Commercial Standard (CS) 191-53
Flammability of Clothing Textiles**

Commercial Standard CS191-53, Flammability of Clothing Textiles, was withdrawn by the U.S. Department of Commerce.

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The U.S. Consumer Product Safety Commission is the U.S. Federal regulatory agency for the Code of Federal Regulations (CFR) Title 16, Parts 1000 through 1799 (some examples: Consumer Product Safety Act Regulations; Flammable Fabrics Act Regulations, Part 1610, Standard for the Flammability of Clothing Textiles; Part 1610.61, Clarification of flammability standard for clothing textiles; Part 1630 Standard for the surface flammability of carpets and rugs (FF 1-70), Part 1631 Standard for the surface flammability of small carpets and rugs (FF 2-70), Part 1615, Standard for the Flammability of Children's Sleepwear: Sizes 0 through 6X (FF3-71), Part 1616 Standard for the Flammability of Children's Sleepwear: Sizes 7 through 14 (FF5-74), Part 1632, Standard for the Flammability of Mattresses and Mattress Pads (FF4-72, amended, Part 1633, Standard for the flammability (open flame) of mattress sets).

For additional information on standards, regulations and other requirements, contact:

U.S. Consumer Product Safety Commission (CPSC), Office of Compliance and Field Operations, 4330 East West Highway, Bethesda, MD 20814-4408, USA, Telephone: (301) 504-7626, Fax: (301) 504-0008, E-mail: info@cpsc.gov; <http://www.cpsc.gov> .

For technical assistance, contact:

Directorate of Engineering Sciences staff at (301) 504-7531, Fax: (301) 504-0533
Combustion and Fire Sciences Division at (301) 504-7530, Fax: (301) 504-0533

The CFR can be accessed, browsed and/or searched on-line at

<http://www.gpoaccess.gov/nara/index.html> or <http://www.gpoaccess.gov/nara>.

Contact: U.S. Government Printing Office (GPO), Washington, DC 20402, USA
Telephone: (202) 512-1800, Fax: (202) 512-2250.

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The following ASTM standards may also be of interest: ASTM D1230 Standard Test Method for Flammability of Apparel Textiles; ASTM D4391 Standard Terminology Relating to The Burning Behavior of Textiles; ASTM D123 Standard Terminology Relating to Textiles. ASTM standards are under the responsibility and jurisdiction of many ASTM Committees and Subcommittees.

For additional information, contact:

ASTM International (formerly: American Society for Testing and Materials-ASTM)
100 Barr Harbor Drive, West Conshohocken, PA 19428-2459, USA; Telephone: (610) 832-9500/-9585, Fax: (610) 832-9555, <http://www.astm.org> (to search standards or technical committees, etc).

WITHDRAWN

Commercial Standard 191-53

(REVISED)

Flammability of Clothing Textiles

A RECORDED VOLUNTARY STANDARD OF THE TRADE

COMMODITY STANDARDS

Simplified Practice Recommendations and Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Commodity Standards Division of the Office of Industry and Commerce, Bureau of Foreign and Domestic Commerce, and with the National Bureau of Standards.

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A Simplified Practice Recommendation or a Commercial Standard originates with the proponent industry. The sponsors may be manufacturers, distributors, or users of the specific product. One of these three elements of industry submits to the Commodity Standards Division the necessary data to be used as the basis for developing a standard of practice. The Division, by means of assembled conferences or letter referenda, or both, assists the sponsor group in arriving at a tentative standard of practice and thereafter refers it to the other elements of the same industry for approval or for constructive criticism that will be helpful in making any necessary adjustments. The regular procedure of the Division assures continuous servicing of each effective Simplified Practice Recommendation and Commercial Standard, through review and revision, whenever, in the opinion of the industry, changing conditions warrant such action. Simplified Practice Recommendations and Commercial Standards are printed and made available by the Department of Commerce through the Government Printing Office and the Department of Commerce field offices.

UNITED STATES DEPARTMENT OF COMMERCE

Sinclair Weeks, Secretary

WITHDRAWN

WITHDRAWN

U. S. DEPARTMENT OF COMMERCE

SINCLAIR WEEKS, Secretary

**BUREAU OF FOREIGN AND DOMESTIC
COMMERCE**

**Office of Industry and Commerce
H. B. McCox, Director**

**IN COOPERATION WITH
NATIONAL BUREAU OF STANDARDS**

A. V. ASTIN, DIRECTOR

CHANGE IN THE FLAMMABLE FABRICS ACT

(Act of August 23, 1954, Chapter 833, 68 Stat. 770 [Public Law 629, 83d Congress])

In the Flammable Fabrics Act, Congress adopted CS191-53 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, 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.

Flammability of Clothing Textiles

[Effective Date, January 30, 1953].

See Appendix, page 13, clarifying intent and purpose of Standing Committee regarding "Note" and sections 3 and 4

NOTE.—All fabrics of natural or regenerated cellulose, as well as certain types of finished and unfinished fabrics made from other natural or synthetic fibers, are combustible. Some combustible fabrics, when used for clothing, are potentially dangerous to the wearer because of the speed and intensity of flame with which those fabrics burn and their ease of ignition, and because of the design of the garment. Two of these factors, the ease of ignition and the speed of flame spread, can be measured with the instrument described herein.

It is suggested that measurement of these two factors, together with visual observation of flame intensity, will permit the separation of various fabrics into three classes of flammability, thus assisting in a judgment of fabric suitability for clothing.

1. PURPOSE

1.1 The purpose of this standard is to reduce danger of injury and loss of life by providing, on a national basis, standard methods of testing and rating the flammability of textiles and textile products for clothing use, thereby discouraging the use of any dangerously flammable clothing textiles.

2. SCOPE

2.1 The standard provides methods of testing the flammability of clothing and textiles intended to be used for clothing,¹ establishes three classes of flammability, sets forth the requirements which textiles shall meet to be so classified, and warns against the use of those textiles which have burning characteristics unsuitable for clothing.

2.2 *Specific exceptions.*—This standard shall not apply to—

- (a) Hats, gloves, and footwear
- (b) Interlining fabrics²

3. REQUIREMENTS

3.1 *Flammability.*

3.1.1 *Normal flammability, Class 1.*—This class shall include textiles which meet the minimum requirements set forth in 3.1.1.1 or 3.1.1.2. Textiles meeting these requirements are generally accepted by the trade as having no unusual burning characteristics.

¹ Hereinafter, "clothing and textiles intended to be used for clothing" shall be referred to as "textiles."

² Interlining fabrics are not considered dangerously flammable when used as interlinings. When used for other purposes they should be tested and rated the same as any other fabrics.

3.1.1.1 *Textiles without 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 4.4 and 4.5, when tested as described in section 4, shall be classified as Class 1, normal flammability, when the time of flame spread is 4 seconds^{2a} or more.

3.1.1.2 *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 4.4 and 4.5, when tested as described in section 4, shall be classified as Class 1, normal flammability, when the time of flame spread is more than 7 seconds, or when they burn with a rapid surface flash (from 0 to 7 seconds), provided the intensity of the flame is so low as not to ignite or fuse the base fabric.

3.1.2 *Intermediate flammability, Class 2.*—This class shall include textiles which meet the minimum requirements set forth in 3.1.2.1. Textiles meeting these requirements are recognized by the trade as having flammability characteristics between normal and rapid and intense burning.

3.1.2.1 *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 4.4 and 4.5, when tested as described in section 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.

3.1.3 *Rapid and intense burning, Class 3.*—This class shall include textiles which have burning characteristics as described in 3.1.3.1 and 3.1.3.2. Such textiles are considered dangerously flammable and recognized by the trade as being unsuitable for clothing because of their rapid and intense burning.

3.1.3.1 *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 4.4 and 4.5, when tested as described in section 4, shall be classified as Class 3, rapid and intense burning, when the time of flame spread is less than 4 seconds.^{2a}

3.1.3.2 *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 4.4 and 4.5, when tested as described in section 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.

4. METHODS OF TEST

4.1 *Test specimens.*

4.1.1 *Number and size of specimens required.*—Five specimens, each measuring 2 by 6 inches, are required for each test.

4.1.2 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 4.7, with specimens cut in different directions.

4.1.3 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,

^{2a} See page 2, "Change in the Flammable Fabrics Act."

tufting, etc., the specimens are taken from that part and tested on that surface which has the fastest rate of burning.

4.1.4 If the specimens in the preliminary test, when tested as described in 4.7, 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 4.4 and 4.5. The specimens for the flammability test are then taken from it.

4.1.5 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.

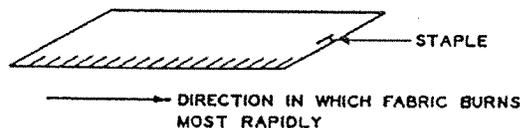


FIGURE 1. Specimen showing staple.

4.2 *Flammability tester*.³—The flammability tester consists of a draft-proof ventilated chamber enclosing a standardized ignition medium, sample rack, and automatic timing device.

4.2.1 *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.

4.2.2 *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.

4.2.3 *Specimen holder (C, fig. 2)*.—The specimen holder consists of two ¼₁₆-inch matched metal plates with clamps mounted along the sides, between which the specimen is fixed. The plates are slotted and loosely pinned for alinement. 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.

4.2.4 *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.

³This apparatus is manufactured by the United States Testing Co., 1415 Park Avenue, Hoboken, N. J. Blueprints of working plans for the manufacture of this apparatus are available, at a nominal charge, from the above-named company.

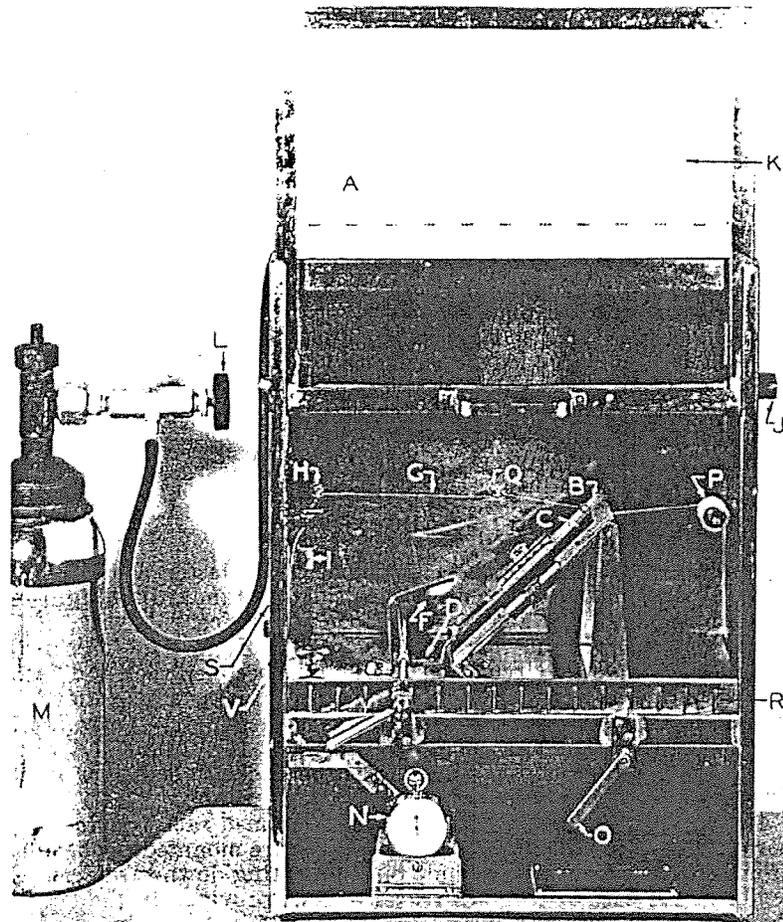


FIGURE 2. Flammability tester.

4.2.5 *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.

4.2.6 *Ignition medium (F, 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.

4.2.7 *Stop cord (G, 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 posi-

tion exactly 5 inches from the point where the center of the ignition flame impinges on the 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.

4.2.8 *Pulley or eye (H, fig. 2).*—The pulley or eye is the support and guide for the stop cord.

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

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

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

4.2.12 *Fuel-control valve (L, 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.

4.2.13 *Flow meter (V, 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.

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

4.2.15 *Stop watch and timing mechanism (N, fig. 2).*—This watch, by means of special attachments, is actuated to a start by connection with the gas jet (F, 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 (I, fig. 2), when caused to move by severance of cord (G, fig. 2), stops the watch. Timing is read directly.

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

4.2.17 *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.

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

4.2.19 *Draft ventilator strip (R, 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.

4.3 *Brushing device.⁵*

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.

⁵This device is manufactured by the United States Testing Co., 1415 Park Avenue, Hoboken, N. J.

4.3.1 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.

4.3.2. 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.

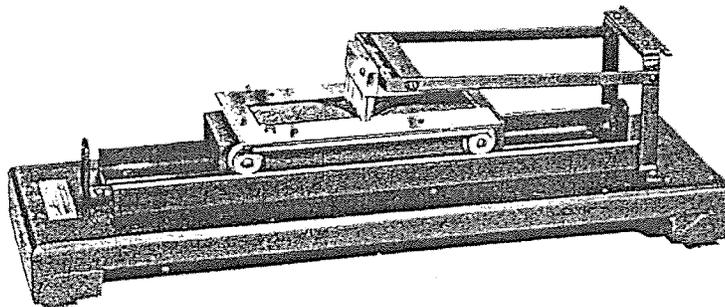


FIGURE 3. *Brushing device.*

4.3.3 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.

4.4 *Dry cleaning.*—A swatch from each sample, as mentioned in paragraph 4.1.4, shall be subjected to the following dry-cleaning procedure.

4.4.1 *Apparatus.*—The apparatus is a cylinder, preferably of metal, approximately 13 inches high and about $8\frac{3}{4}$ 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.

4.4.2 *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

⁶ The 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.

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

one-third with fresh perchlorethylene without soap, and the apparatus is operated for an additional 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.

4.5 *Washing procedure.*—The swatches, after being subjected to the dry-cleaning procedure (par. 4.4), 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 4.1.5 and tested as described in 4.6 and 4.7.

4.6 *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 (par. 4.3) 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 (par. 4.2.3), 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.

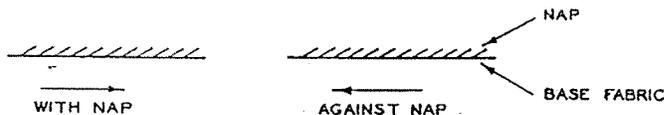


FIGURE 4. *Lay of nap.*

4.7 *Procedure for testing flammability.*

4.7.1. Adjust the position of the rack of the flammability tester (par. 4.2.2) 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.

4.7.2 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.

4.7.3 Remove the mounted specimen from the desiccator and place it in position on the rack in the chamber of the apparatus.

4.7.4 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.

4.7.5 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.

4.7.6 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.

4.7.7 Results.

4.7.7.1 *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.

4.7.7.2 *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.

4.7.8 *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 section 3.

5. NOTES

5.1 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.

6. EFFECTIVE DATE

6.1 Having been passed through the regular procedure of the Commodity Standards Division, and approved by the acceptors herein-after listed, this Commercial Standard was issued by the United States Department of Commerce, effective from January 30, 1953.

EDWIN W. ELY,
Chief, Commodity Standards Division.

HISTORY OF PROJECT

The American Association of Textile Chemists and Colorists, on March 4, 1946, requested the cooperation of the Commodity Standards Division in the establishment of a Commercial Standard covering standard methods of testing and rating the flammability of textiles and textile products for clothing use. The following month the National Retail Dry Goods Association voted to act as cosponsor with the AATCC on this project. The purpose of the request was to reduce the danger of injury and loss of life by discouraging the use of any dangerously flammable clothing textiles.

⁸ See page 2. "Change in the Flammable Fabrics Act."

The American Association of Textile Chemists and Colorists submitted a description, with operating instructions and test procedures, of an apparatus it had developed, known as the AATCC Flammability Tester. A proposed Commercial Standard based on this flammability tester and test data was drafted by the flammability committee of the AATCC and representatives of the NRDGA, after several joint meetings, which were attended also by a representative of the Commodity Standards Division. On May 21, 1946, copies of this draft were forwarded for comment to all trade associations representing manufacturers, distributors, and users primarily concerned. As a result of the suggestions submitted, the draft was modified and redistributed on November 5, 1946. Additional comments were received, and after further adjustment of the draft in agreement with the consensus of comment, a recommended Commercial Standard (TS-4350) was referred to the trade for written acceptance on March 12, 1947.

It was the general feeling of the cotton interests that the requirements of TS-4350 restricted the use of some cotton fabrics for wearing apparel which have been in use for years and have not proved dangerously flammable. On May 13, 1947, at a conference with representatives of the cotton industry, the NRDGA, and the AATCC, it was voted to have the standing committee appoint a representative technical committee to review the recommended Commercial Standard and submit a method of test and evaluation of test results which would overcome these difficulties.

At a meeting of the standing committee on May 23, 1947, the technical committee was organized, consisting of not more than five members each from the cotton textile industry, the rayon industry, the retail trade, and the wholesale trade, and one member each from the AATCC, the American Society for Testing Materials, the American Association of Textile Technologists, and the American Council of Commercial Laboratories.

At the request of the technical committee, and through the cooperation of the flammability committee of the AATCC, two complete investigations on a large number of samples of fabrics were conducted by seven laboratories representing manufacturers, distributors, consumers, and the National Bureau of Standards. As a result of these tests, modifications were made in the flammability tester and in the method of testing and rating flammability.

A new draft (TS-5131) embodying the recommendations of the AATCC, the technical committee, and the standing committee was referred to the trade for written acceptance on April 7, 1952. This draft had been approved by these committees, and thus reflected the composite opinion, as coordinated by the AATCC and the ASTM, of a group representing cotton and rayon producers, fabric manufacturers, finishers, converters, testing laboratories, wholesalers, retailers, and consumers.

Acceptances in writing estimated to represent a satisfactory majority having been received, an announcement was issued on December 30, 1952, that the standard would become effective for new production on January 30, 1953.

Project Manager: H. A. Ehrman, Commodity Standards Division, Office of Industry and Commerce.
Technical Adviser: W. D. Appel, Organic and Fibrous Materials Division, National Bureau of Standards.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Commodity Standards Division, Office of Technical Services, U. S. Department of Commerce, which acts as secretary for the committee.

C. W. DORN, *Chairman*

BAKER, C. A., United States Testing Co., 1415 Park Avenue, Hoboken, N. J. (representing American Council of Commercial Laboratories; also American Society for Testing Materials).
BONNET, FREDERIC, American Viscose Corp., Marcus Hook, Pa. (representing Rayon Yarn Producers Group).
BUCK, GEO. S., National Cotton Council of America, 1832 M Street NW., Washington 6, D. C.
DANIEL, Mrs. E. H., Broad Branch and Grant Roads NW., Washington, D. C. (representing General Federation of Women's Clubs).
DORN, CHAS. W., J. C. Penney Co., Inc., 330 West 34th Street, New York 1, N. Y. (representing American Retail Federation and National Retail Dry Goods Association).
EYERLY, EDWIN G., Cranston Print Works, 40 Worth Street, New York 13, N. Y. (representing National Association of Finishers of Textile Fabrics).
FREEDMAN, E., R. H. Macy & Co., 34th Street and Broadway, New York 1, N. Y. (representing American Association of Textile Technologists).
GOLDBERG, J. B., 11 West 42d Street, New York, N. Y. (representing National Federation of Textiles, Inc.).
HAGER, H. E., General Dyestuff Corp., 435 Hudson Street, New York 14, N. Y. (representing American Association of Textile Chemists and Colorists).
HOLLAND, V. D., Cannon Mills, Kannapolis, N. C. (representing American Cotton Manufacturers Institute, Inc.).
MELLOR, J. B., Cone Mills, Inc., 59 Worth Street, New York 13, N. Y. (representing Textile Fabrics Association).
STABB, A. J., Underwriters Laboratories, Inc., 161 Sixth Avenue, New York, N. Y.
STEINMETZ, J. W., Cone Mills, Inc., 59 Worth Street, New York 13, N. Y. (representing Association of Cotton Textile Merchants of New York).
THOMAS, F. A., Thomas, Field & Co., Charleston 27, W. Va. (representing Wholesale Dry Goods Institute).

Subsequently appointed:

DR. DOROTHY STEPAT, Hunter College, 695 Park Avenue, New York, N. Y. (representing National Council of Women of the United States).
ROY A. CHENEY, Underwear Institute, 2 Park Avenue, New York 16, N. Y.
R. A. MANSFIELD, B. F. Goodrich Co., Plastics Division, Marietta, Ohio (representing Plastic Coatings & Film Association).

APPENDIX

Statement of the Standing Committee for CS191-53 in regard to the *intent* of the Committee and the *purpose* of several paragraphs of the standard

It has been brought to the attention of the Commodity Standards Division of the Office of Technical Services, and to the standing committee for Commercial Standard 191-53, that certain provisions of the standard are not entirely clear. In a number of cases two or more interpretations are possible.

The standing committee met in New York on December 11, 1953, to consider these provisions and after a thorough discussion drew up this appendix. A copy of it was sent to the Federal Trade Commission on December 15, 1953, for their information in interpreting the standard. Since such an explanation might also prove beneficial to all segments of the trade concerned with meeting the legal requirements of the Flammable Fabrics Act, the Commodity Standards Division is releasing the full text of the appendix to the trade and to all acceptors. The appendix lists the paragraphs of the standard which have been questioned and contains statements which clarify the intent of those who originally prepared the standard.

I. PARAGRAPHS 3.1.1.1, 3.1.1.2, 3.1.2.1, 3.1.3.1, AND 3.1.3.2

In each of the above paragraphs, the following statement appears: "Such textiles in their original state and/or after being dry-cleaned and washed. . . ." As written, this statement requires that either the subject textiles shall be tested both in their original state and after being dry-cleaned and washed, or indicates that there is an option as to whether said textiles shall be tested in their original state or after being dry-cleaned and washed.

This was not the purpose of the standing committee in developing the above requirements. The intent was that all fabrics should be tested in their original state, and in that state meet the requirements set forth. The dry-cleaning and washing provision was provided for use whenever a fire-retardant finish might be present in the subject textile, in which case, after dry-cleaning and washing, the flammability might be greater than in the original state. Conversely, when the testing is carried out by the fabric manufacturer, who *knows* that no fire-retardant finish is present, and that no other condition would make the material more flammable after dry-cleaning and washing, it was not intended that the expensive dry-cleaning and washing operation should be carried out.

In summary, the textiles to which these paragraphs refer would *always* be tested in their original state as described in section 4. In the absence of proof that a fire retardant finish has not been applied, they would also be tested after dry-cleaning and washing as described in paragraphs 4.4 and 4.5.

II. PARAGRAPHS 3.1.1.2, 3.1.2.1, AND 3.1.3.2

The terminal clause in each of these three paragraphs is related to flame intensity, one of the factors recognized as bearing directly on possible or potential hazard in a combustible textile fabric. Through an oversight, this clause in paragraph 3.1.2.1 remains the same as in the April 3, 1952, draft of the Commercial Standard, then identified as TS-5131. In paragraph 3.1.3.2 this clause was changed from ". . . the base fabric is ignited or fused" to "and when the intensity of flame is such as to ignite or fuse the base fabric." This brought that terminal clause into agreement with the like statement in 3.1.1.2 which read, "provided the intensity of the flame is so low as not to ignite or fuse the base fabric."

The intent of the standing committee to have 3.1.2.1 conform in the above respect with 3.1.3.2 should be understood. However, even the modified sentences do not fully clarify the purpose of these references to flame intensity. A brief description of the manner in which the specified fabrics burn will make the committee's intent clear.

When a fabric having a napped, pile, tufted, or other raised-fiber surface burns, two things may occur: (1) A flame may move across the raised fibers, generally rapidly, and (2) the base fabric itself may be ignited, if the flaming of the raised fibers is of sufficient intensity to cause that effect. However, in some cases, the igniting flame itself may set fire to the base material, causing it to burn rather slowly after the surface flashing of the material has terminated. In such a case there exists a combination of two types of burning which are generally considered to constitute no unusual hazard. There is a non-hazardous surface flash which has not enough intensity to ignite the base fabric itself, and there is a rather slow burning, or normal combustion of the fabric resulting from ignition by the flame of the tester. The real danger from a fabric with a raised-fiber surface results from a rapidly spreading flame which has sufficient intensity to cause the fabric to ignite the base structure over a wide area. This latter effect can easily be observed in the tester, and should not be confused with occasional freak ignitions of the base fabric as described above, where the surface flash may have little volume or intensity.

The *intent* can be seen in paragraph 3.1.1.2, where the final clause reads "provided the intensity of the flame is so low . . ."; as well as in the similar clause in paragraph 3.1.3.2.

Therefore, in testing fabrics as directed in paragraphs 3.1.1.2, 3.1.2.1, and 3.1.3.2, the observation of flame intensity should be to establish the fact of whether or not the flaming of the raised-fiber surface causes the base fabric to ignite.

III. PARAGRAPH 4.1.4

This paragraph directs that when specimens "do not ignite or are very slow burning, or should have a fire-retarding finish," additional specimens shall be carried through the dry-cleaning and washing procedure and then retested.

There are many fabrics which, in their untreated state, will not ignite in the Flammability Tester, or if ignited, will burn slowly. It was not the purpose of this paragraph to require that such materials be carried through a dry-cleaning and washing procedure. Instead,

the intent was to require that any fabric which *might have received* a fire-retardant treatment be carried through the dry-cleaning and washing procedure as an assurance that such a finish would not be readily removed in service. In other words, this is another case of the dry-cleaning and washing provision being incorporated as a safeguard against fugitive fire-retardant finishes, with no intent that the dry cleaning and washing should be a testing requirement if it is *known* that the fabric has not been given a fire-retardant treatment.

In summary, this section has the same intent as section 3, which was reviewed above. All textiles will be tested in their original state, and testing after dry cleaning and washing will only be carried out in the absence of proof that a fire-retardant finish has not been applied.

IV. PARAGRAPH 4.7.6

As noted, the intensity or volume of flame in a burning textile fabric was recognized by the standing committee to be one of the important factors relating to the manner in which the fabric burns to its potential hazard when used as a garment. It was felt that a flame which had insufficient intensity or volume to ignite the base material itself would not transmit sufficient heat or flame through the fabric to the body. Therefore, the committee provided that, to be considered hazardous, a fabric must not only exhibit rapid flame spread, but also must show sufficient intensity or volume of flame so that the basic fabric structure itself will be ignited by that flame.

Paragraph 4.7.6 shows how base fabric ignition is to be observed. The purpose here was to examine the fabric on the reverse side from the face to which the testing flame was applied. Any evidence of scorching or fusing of fibers on the opposite face to that which was ignited would be considered evidence of base fabric ignition.

The term "bottom of the specimen" is confusing; the term "back or reverse side" would be preferable since the 45° mounting of the specimen permits another interpretation of "bottom."

In summary, the purpose of 4.7.6 is to require the notation of whether the fabric is ignited or fused by the spreading surface flame to a point where the damage is apparent on the surface of the specimen opposite to that which was ignited.

V. PARAGRAPH 4.7.1

This paragraph requires that where the time of flame spread is less than 4 seconds,⁹ or where the specimens do not burn, 5 additional specimens shall be tested. There are two parts of this requirement, and since the intent was different for each part, they will be explained separately.

The basic purpose of this paragraph is to provide for the testing of additional specimens in case of doubt as to the proper classification of the fabric. It is expected that very few fabrics will be hazardous and burn in less time than 4 seconds⁹ because manufacturers will avoid such constructions. When such an unusual fabric is encountered, however, it was deemed advisable that an additional 5 specimens be tested to provide a better basis from which an average time of burning could be obtained. Furthermore, sometimes fabrics which burn with a rapid

⁹ See page 2, "Change in the Flammable Fabrics Act."

surface flash will show a "freak" ignition of the base fabric. If such ignition occurs in only 1 or 2 of the specimens, the additional 5 specimens are provided for to show whether or not such base fabric ignition is indeed a characteristic of the fabric.

The second part of the requirement in 4.7.7.1 states that "if the specimens do not burn, test 5 additional specimens." This was not intended to apply to any fabric in which none of the specimens burned. There are a great many fabrics which will not burn in the Flammability Tester and there is no point in testing 10 strips when none of the first 5 burns. This provision was intended for those cases in which 1 to 4 of the first 5 strips burn. In many cases a reliable average burning time cannot be obtained, so an additional 5 strips are taken to provide the basis for a more satisfactory average. This is made clear at the end of the paragraph in the statement "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."

The first sentence in paragraph 4.7.7.1 indicates that the standard number of specimens required for a test is 5. This is also pointed out in paragraph 4.1.1, which states that 5 specimens are required for each test. Five additional specimens are only required where the presence of a fire-retardant finish is suspected, where some but not all of the first 5 specimens burn, and where the burning time is less than 4 seconds.¹⁰

To summarize, then, two conditions call for the testing of an additional 5 specimens: First, if the first 5 show a burning time of less than 4 seconds¹⁰ with 1 or 2 strips showing base fabric ignition; second, if some but not all of the first 5 strips burn, and when the burning time of the strips that do burn is close to the 4-second¹⁰ limit, so that an additional 5 strips would be desirable as the basis for a more reliable average.

The testing of fabrics under Commercial Standard 191-53 and under the Flammable Fabrics Act will necessarily be an expensive operation for certain textile manufacturers. A misunderstanding of the Commercial Standard, which would require testing 10 or 20 specimens instead of the 5 which were deemed adequate in many cases, would impose an unjustified burden and expense on such manufacturers. Therefore, it is important that the intent of the standing committee, in formulating the paragraphs of the standard listed above, and of the industry in approving the standard, be clearly understood.

The standing committee for Commercial Standard 191-53 agrees that the above statements are in accordance with its intent and purposes in formulating the standard. Members of the standing committee, whose names appear below, request that this document of clarification be made an official supplement to Commercial Standard 191-53, and that it be brought to the attention of the Federal Trade Commission for use in reference to the Flammable Fabrics Act.

Representing

C. A. Baker----- American Council of Commercial Laboratories and
American Society for Testing Materials.
Frederic Bonnet----- Rayon Yarn Producers Group.
Geo. S. Buck, Jr.----- National Cotton Council of America.

¹⁰ See page 2, "Change in the Flammable Fabrics Act."

Edwin G. Eyerly.....	National Association of Finishers of Textile Fabrics.
E. Freedman.....	American Association of Textile Technologists and National Retail Dry Goods Association.
J. B. Goldberg.....	National Federation of Textiles, Inc.
H. E. Hager.....	American Association of Textile Chemists and Colorists.
V. B. Holland.....	American Cotton Manufacturers Institute, Inc.
Miss D. S. Lewis.....	National Council of Women of the United States.
(for Mrs. Charlotte Leyden)	
Henry Matter.....	Wholesale Dry Goods Institute.
(for F. A. Thomas).	
J. B. Mellor.....	Textile Fabrics Association.
A. J. Stabb.....	Underwriters Laboratories, Inc.
J. W. Steinmetz.....	Association of Cotton Textile Merchants of New York.

Subsequently endorsed by:

Mrs. E. H. Daniel.....	General Federation of Women's Clubs.
C. W. Dorn.....	American Retail Federation and National Retail Dry Goods Association.

CLARIFICATION OF "NOTE" ON PAGE 3

At a subsequent meeting of the standing committee, in an effort further to clarify the standard and its purposes, the committee declared that the "Note" on page 3, which serves as a preamble to the standard, is and was intended to be an integral part of the standard. Its purpose was to serve in the interpretation of the flammability of those fabrics which otherwise give uncertain or questionable results in the tests. The note suggests that visual observation of intensity be used to supplement the determination of the burning classification of napped, pile, tufted, or flocked raised-fiber types of fabrics wherein there may sometimes occur two safe types of burning. To illustrate: A raised-fiber type of fabric may have a surface flash of low intensity and, at the same time, localized base fabric ignition, followed by a relatively slow rate of burning. In such cases the intention was not to classify it as a hazardous fabric.

The committee further wishes it to be understood that this use of visual observation of flame intensity is a temporary expedient effective until the results of investigations now in progress produce a more scientific and definite test procedure.

ACCEPTORS

The organizations listed below have individually accepted this standard for use as far as practicable in assuring the manufacture and sale of only those clothing textiles that are not dangerously flammable. The organizations are directly concerned as fabric manufacturers, clothing manufacturers, testing laboratories, distributors, and users. In accepting the standard they reserved the right to depart from it as they individually deem advisable, but only those articles which actually comply with the standard in all respects can be represented as conforming thereto.

ASSOCIATIONS (General Support)

American Association of Textile Chemists and Colorists, Lowell, Mass.	National Cotton Council of America, Memphis, Tenn.
American Institute of Laundering, Joliet, Ill.	National Federation of Textiles, Inc., New York, N. Y.
Association of Cotton Textile Merchants of New York, New York, N. Y.	National Retail Dry Goods Association, New York, N. Y.
Boys' Apparel Buyers' Association, Inc., New York, N. Y.	New York Clothing Manufacturers Exchange, Inc., New York, N. Y.
Committee on Flammability of Clothing Textiles, American Association of Textile Chemists and Colorists, Lowell, Mass.	Rubber Manufacturers Association, Inc., New York, N. Y.
National Association of Wool Manufacturers, New York, N. Y.	Textile Distributors Institute, Inc., New York, N. Y.
National Commission on Safety Education, National Education Association, Washington, D. C.	Textile Fabrics Association, New York, N. Y.
	Tufted Textile Manufacturers Association, Dalton, Ga.

FIRMS AND OTHER INTERESTS

Abney Mills, Greenwood, S. C.	Cadillac Textiles Inc., New York, N. Y.
Aidan Rubber Co., Philadelphia, Pa.	Callaway Mills Co., LaGrange, Ga.
Aims & Doepke Co., Cincinnati, Ohio.	Cannon Mills Co., Kannapolis, N. C.
American Bleached Goods Co., Inc., New York, N. Y.	Cantor Greenspan Co., Inc., New York, N. Y.
American Cyanamid Co., Bound Brook, N. J.	Carter, William, Co., Needham Heights, Mass.
American Enka Corp., New York, N. Y. (General support.)	Casa Modes, Inc., West New York, N. J.
American Thread Co., Willimantic, Conn.	Ceasor Mills, Charles Perman & Sons, Inc., New York, N. Y.
American Viscose Corp., Philadelphia, Pa. (General support.)	Chandler & Co., Boston, Mass.
Angle Silk Mills, Inc., Rockymount, Va.	Cheney Bros., Manchester, Conn.
Archer Rubber Co., Milford, Mass.	Chicopee Manufacturing Corp., Chicopee Falls, Mass.
Arkwright Merchandising Corp., New York, N. Y.	Columbia University, Teachers College, New York, N. Y.
Ashland Knitting Mills, Ashland, Pa.	Commercial Textile Mills, Inc., Clifton, N. J.
Atlas Fabrics Corp., New York, N. Y.	Cone Mills Corp., Greensboro, N. C.
Augstein, S., & Co., Inc., College Point, N. Y.	Cone Mills Corp., Asheville Plant, Asheville, N. C.
Bally, Joshua L., & Co., Inc., New York, N. Y.	Cone Mills Corp., Cliffside Division, Cliffside, N. C.
Bamberger, L., & Co., Newark, N. J.	Cone Mills Corp., Minneola Plant, Gibsonville, N. C.
Bangor Mills, Inc., New York, N. Y.	Cone Mills Corp., Randleman Plant, Randleman, N. C.
Bates Fabrics Inc., New York, N. Y.	Cone Mills Corp., Revolution Division, Greensboro, N. C.
Baunitt Mills, Inc., New York, N. Y.	Cone Mills Corp., Revolution Rayon Division, Greensboro, N. C.
Beir, Arthur, & Co., Inc., New York, N. Y.	Cone Mills Corp., Salisbury Plant, Salisbury, N. C.
Beiding Heminway Co., Inc., New York, N. Y.	Cone Mills, Inc., New York, N. Y.
Bemis Bro. Bag Co., Boston, Mass.	Couture Fabrics, Ltd., New York, N. Y.
Berkshire Fine Spinning Associates, Inc., New York, N. Y.	Crompton Richmond Co., Inc., New York, N. Y.
Berkshire Fine Spinning Associates, Inc., Providence, R. I.	Dalby, William & Son, Hawthorne, N. J.
Bianchini Ferrier, Inc., New York, N. Y.	Dan River Mills, Inc., Danville, Va.
Bibb Manufacturing Co., Macon, Ga.	Davison-Paxon Co., Atlanta, Ga.
Bloomsburg Mills, Inc., New York, N. Y.	Denton Sleeping Garment Mills, Inc., Centreville, Mich.
Blue Bell, Inc., Greensboro, N. C.	Diener Knitting Mills, Inc., Leesport, Pa.
Blue Swan Mills, Sayre, Pa.	Dorchester Fabrics, Inc., Summerville, S. C.
Bofinger Knitting Mills, Inc., Oakland, Calif.	Dumari Textile Co., Inc., New York, N. Y.
Bradford Dyeing Association (USA), West-erly, R. I.	Dundee Mills, Inc., Clifton, N. J.
Brenham Cotton Mill, Inc., Brenham, Tex.	Duplan Corp., New York, N. Y.
Brewer & Gardner, Philadelphia, Pa.	duPont, E. I., de Nemours & Co., Inc., Textile Fibers Department, Wilmington, Del. (General support.)
Brown Bros. Hosiery Mills, Inc., Hickory, N. C.	Erwin Mills, Inc., West Durham, N. C.
Brown & Forth, Ltd., New York, N. Y.	Exeter Manufacturing Co., Exeter, N. H.
Brown's Beach Jacket Co., Worcester, Mass.	Fae Manufacturing Co., Palmyra, Pa.
Bryant Finishing Co., Inc., West Warwick, R. I.	
Burdines, Inc., Miami, Fla.	
Bush & Bull Corp., Bethlehem, Pa.	

FIRMS AND OTHER INTERESTS—Continued

Fair Lawn Finishing Co., Fair Lawn, N. J.
 Fandel Co., St. Cloud, Minn.
 Fieldcrest Mills, Rayon Division, New York, N. Y.
 Filray Fabrics, Inc., New York, N. Y.
 Fibba Fabrics, Inc., New York, N. Y.
 Florence Mills, Greenville, S. C.
 Florida State University, Tallahassee, Fla.
 Freedlander, H. Co., Wooster, Ohio.
 Freeman, David, & Son, Inc., Chicago, Ill.
 French Fabrics Co., New York, N. Y.
 Fulton Bag & Cotton Mills, Atlanta, Ga.
 Garfinkel, Julius, & Co., Washington, D. C.
 Geigy Co., Inc., New York, N. Y. (General support.)
 Godde, Albert Bedin, Inc., New York, N. Y.
 Good Housekeeping Institute, New York, N. Y.
 Goodman & Thelse, Inc., New York, N. Y.
 Gosnold Mills Corp., New Bedford, Mass.
 Graniteville Co., Graniteville, S. C.
 Great Barrington Manufacturing Co., Inc., Great Barrington, Mass.
 Green, H. L. Co., Inc., New York, N. Y.
 Greenwood Mills, Greenwood, S. C.
 Greenwood Mills, Inc., New York, N. Y.
 Gurney Manufacturing Co., Prattville, Ala.
 Haartz-Mason, Inc., Watertown, Mass.
 Hafner Associates, Inc., Long Island City, N. Y.
 Halu Fabrics, Inc., New York, N. Y.
 Harodite Finishing Co., Inc., North Dighton, Mass.
 Harvard Cooperative Society, Cambridge, Mass.
 Hatch Textile Research, New York, N. Y.
 Hathaway Manufacturing Co., New Bedford, Mass.
 Heller Rayon Jersey Corp., New York, N. Y.
 Heller, William, Inc., New York, N. Y.
 Hertel Fabrics, Inc., New York, N. Y.
 Hess, Goldsmith & Co., Inc., New York, N. Y.
 Hesslein & Co., Inc., New York, N. Y.
 Hickory Overall Co., Hickory, N. C.
 Hodgman Rubber Co., Framingham, Mass.
 Hogan's, Savannah, Ga.
 Holly Wood Textile Converters, Los Angeles, Calif.
 Holmes Silk Co., Inc., New York, N. Y.
 Hoosac Mills Corp., Boston, Mass.
 Hornwood Warp Knitting Corp., Wadesboro, N. C.
 Hospital Bureau of Standards & Supplies, Inc., New York, N. Y.
 Industrial By-Products & Research Co., Philadelphia, Pa.
 Industrial Rayon Corp., Cleveland, Ohio.
 Interchemical Corp., Textile Colors Division, Pawtucket, R. I. (General support.)
 Iselin-Jefferson Co., Inc., New York, N. Y.
 Jetts (Department Store), Pratt, Kans.
 Joanna Cotton Mills Co., Division of Joanna Western Mills Co., Joanna, S. C.
 Jones Knitting Mills, Los Angeles, Calif.
 Kahn, Arthur, Co., Inc., New York, N. Y.
 Kalkow-Kellman Co., Inc., New York, N. Y.
 Kansas State College, Manhattan, Kans. (General support.)
 Kaufmann Department Stores, Pittsburgh, Pa.
 Karsner, Julius, & Co., New York, N. Y.
 Kendall Mills Division, Kendall Co., Walpole, Mass.
 Kern, Ernst, Co., Detroit, Mich.
 Klopman Mills, Inc., New York, N. Y. (General support.)
 Kugelman's, Woodsville, N. H.
 Landers Corp., Toledo, Ohio.
 Laros, R. K., Co., New York, N. Y.
 Lasalle & Koch Co., Toledo, Ohio.
 Levy, Myron B., Co., Inc., New York, N. Y.
 Liberman, Philip, Inc., New York, N. Y.
 Lounging Robe Manufacturing Co., Los Angeles, Calif.
 Lowenstein, M., & Sons, Inc., New York, N. Y.
 Mabel Dean Bacon Vocational High School, New York, N. Y.
 Macy, R. H., & Co., Inc., New York, N. Y.
 Macy's Kansas City, Kansas City, Mo. (General support.)
 Macy's San Francisco, San Francisco, Calif.
 Marston Co., San Diego, Calif.
 Martin, J. B., Co., Norwich, Conn.
 Masland, C. H., & Sons, Carlisle, Pa.
 Maupai, F. P., Dyeing Co., Inc., West New York, N. J.
 McClellan, Chas. P., & Son, Fall River, Mass.
 McNeill & McNeill, San Francisco, Calif.
 Meinig, E. Richard, Co., Reading, Pa.
 Mellon Institute, Pittsburgh, Pa.
 Meltzer Textile Corp., New York, N. Y.
 Merck & Co., Inc., Rahway, N. J.
 Merrimack Manufacturing Co., Lowell, Mass.
 Millburn Mills, Inc., West Warwick, R. I.
 Mooresville Mills, Mooresville, N. C.
 Mount Vernon-Woodberry Mills, Inc., Baltimore, Md.
 Mousley, Geo. E., Inc., West Warwick, R. I.
 Moyer, Walter W., Co., Ephrata, Pa.
 Munsingwear, Inc., Minneapolis, Minn.
 Murphy, G. C., Co., McKeesport, Pa.
 Muscogee Manufacturing Co., Columbus, Ga.
 Myers Bros., Springfield, Ill.
 Nachman & Meertlef, Montgomery, Ala.
 Naumkeag Steam Cotton Co., Salem, Mass.
 New Bedford Rayon Co., New Bedford, Mass.
 New Braunfels Textile Mills, New Braunfels, Tex.
 New England Spectrochemical Laboratories, Ipswich, Mass.
 Newmarket Manufacturing Co., New York, N. Y. (In principle.)
 Normandin Bros. Co., Los Angeles, Calif.
 North Carolina Finishing Co., Salisbury, N. C.
 Ott, Joseph M. P., Manufacturing Co., Inc., Pawtucket, R. I.
 Pacific Mills, New York, N. Y.
 Pansy Weaving Mills, Inc., Pawtucket, R. I.
 Patzig Testing Laboratories, Des Moines, Iowa.
 Penney, J. C., Co., Inc., New York, N. Y.
 Peppercell Manufacturing Co., Inc., New York, N. Y.
 Phoenix Silk Corp., Allentown, Pa.
 Ponemah Mills, Taftville, Conn.
 Prange, H. C., Co., Green Bay, Wis.
 Prince Lauten Corp., New York, N. Y.
 Princeton Knitting Mills, Inc., New York, N. Y.; Watertown, Conn.
 Puritan Piece Dye Works, Paterson, N. J.
 Rainfair Inc., Racine, Wis.
 Ray-Men Fabrics Corp., New York, N. Y.
 Raytrie Knitting Mill, Inc., Bristol, Conn.
 Read, D. M., Co., Bridgeport, Conn.
 Reeves Bros., Inc., New York, N. Y.
 Rhode Island School of Design, Providence, R. I.
 Richard Store Co., Miami, Fla.
 Rich's, Inc., Atlanta, Ga.
 Robbins Mills, Inc., New York, N. Y.
 Rubens & Marble, Inc., Chicago, Ill.
 S. M. S. Textile Mills, Allentown, Pa.
 Sagamore Manufacturing Co., Fall River, Mass.
 Shear's Department Store, Evansville, Ind.
 Scholler Bros., Inc., Philadelphia, Pa. (General support.)
 Schwartz-Liebman Textiles, Inc., New York, N. Y.
 Schwarzenbach Huber Co., New York, N. Y.
 Simmons Co., Sinter Mills Division (representing Roanoke Mills, Rosemary Manufacturing Co., Paterson Mills, Aileen Mills), New York, N. Y.
 Sorbeau Juvenile Manufacturing Co., Dubuque, Iowa.
 Southeastern Cottons, Inc., New York, N. Y.
 Southern Textile Commission Co., Inc., New York, N. Y.
 Spartan Mills, Spartanburg, S. C.
 Standard-Coosa-Thatcher Co., Chattanooga, Tenn.
 Standard Knitting Mills, Inc., Knoxville, Tenn.

FIRMS AND OTHER INTERESTS—Continued

Stanley, William W., Co., Inc., New York, N. Y.
 Stehli & Co., Inc., New York, N. Y.
 Sterling Lindner Davis, Cleveland, Ohio.
 Stern & Stern Textiles, Inc., New York, N. Y.
 Stevens, J. P., & Co., Inc., New York, N. Y.
 Stonecutter Mills Corp., Spindale, N. C.
 Strassburger, Walter, & Co., Inc., New York, N. Y.
 Strongwall Mills, Inc., Cannelton, Ind.; Boston, Mass.
 Strouse Baer Co., Baltimore, Md.
 Susquehanna Mills, Inc., New York, N. Y.
 Tartikoff, J., & Sons, New York, N. Y.
 Taylor Chemical Co., Inc., Lawrenceville, N. J.
 Taylor, Thos., & Sons, Hudson, Mass.
 Tennessee Eastman Co., Kingsport, Tenn. (General support.)
 Tennessee, University of, College of Home Economics, Department of Textiles and Clothing, Knoxville, Tenn. (General support.)
 Textron, Inc., New York, N. Y.
 Thomaston Mills, Thomaston, Ga.
 Tilton Textile Corp., New York, N. Y.
 Tioga Silk Co., Inc., New York, N. Y.
 Union Manufacturing Co., Los Angeles, Calif.
 United Merchants & Manufacturers, Inc., New York, N. Y.
 U. S. Process Corp., New York, N. Y.
 U. S. Rubber Co., Coated Fabrics Division, Mishawaka, Ind.
 United States Testing Co., Inc., Hoboken, N. J.
 United Textile Co., Allentown, Pa.
 United Worsted Mills, Inc., New York, N. Y.
 Valentine, J. W., Co., Inc., New York, N. Y.
 Vaucanson Silk Mills, Inc., New York, N. Y.
 Wade Manufacturing Co., Wadesboro, N. C.
 Walker's, San Diego, Calif.
 Wasson, H. P., & Co., Indianapolis, Ind.
 Waverly Piece Dye Works, Elizabeth, N. J.
 Web Hill Co., Rapid City, S. Dak.
 Weil & Schoenfeld Fabrics, Inc., New York, N. Y.
 Wellington Sears Co., Inc., New York, N. Y.
 Westerhoff Fabrics Co., New York, N. Y.
 Wright, Wm. E., & Sons Co., West Warren, Mass.
 Wullschlegel & Co., New York, N. Y.

UNITED STATES GOVERNMENT

Agriculture, U. S. Department of, Washington, D. C.
 Interior, U. S. Department of, Bureau of Indian Affairs, Branch of Property and Supply, Washington, D. C.

COMMERCIAL STANDARDS

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| <p>CS No.</p> <ol style="list-style-type: none"> 0. Commercial standards and their value to business. 1. Clinical thermometers. 2. Mopsticks. 3. Stoddard solvent. 4. Staple porcelain (all-clay) plumbing fixtures. 5. Pipe nipples; brass, copper, steel and wrought-iron. 6. Wrought-iron pipe nipples. Superseded by CS5. 7. Standard weight malleable iron or steel screwed unions. 8. Gage blanks. 9. Builders' template hardware. 10. Brass pipe nipples. Superseded by CS5. 11. Moisture regains of cotton yarns. 12. Fuel oils. 13. Dress patterns. 14. Boys' sport and dress shirt (woven fabrics) size measurements. 15. Men's pajama sizes (made from woven fabrics). 16. Wallpaper. 17. (Withdrawn.) 18. Hickory golf shafts. 19. Foundry patterns of wood. 20. Vitreous china plumbing fixtures. 21. Interchangeable ground-glass joints, stopcocks, and stoppers. 22. Builders' hardware (nontemplate). 23. Feldspar. 24. Screw threads and tap-drill sizes. 25. Special screw threads. Superseded by CS24. 26. Aromatic red cedar closet lining. 27. Mirrors. 28. Cotton fabric tents, tarpaulins and covers. 29. Staple seats for water-closet bowls. 30. (Withdrawn.) 31. Wood shingles. 32. Cotton cloth for rubber and pyroxylin coating. 33. Knit underwear (exclusive of rayon). 34. Bag, case, and strap leather. 35. Hardwood plywood. 36. Foundriner wire cloth. 37. Steel bone plates and screws. 38. Hospital rubber sheeting. 39. (Withdrawn.) | <p>CS No.</p> <ol style="list-style-type: none"> 40. Surgeons' rubber gloves. 41. Surgeons' latex gloves. 42. Structural fiber insulating board. 43. Grading of sulphonated oils. 44. Apple wraps. 45. Douglas fir plywood. 46. Hose lengths and sizes. 47. Marking of gold-filled and rolled-gold-plate articles other than watchcases. 48. Domestic burners for Pennsylvania anthracite (underfeed type). 49. Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes. 50. Binders board for bookbinding and other purposes. 51. Marking articles made of silver in combination with gold. 52. Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze). 53. Colors and finishes for cast stone. 54. Mattresses for hospitals. 55. Mattresses for institutions. 56. Oak flooring. 57. Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings. 58. Woven elastic fabrics for use in overalls (overall elastic webbing). 59. Textiles—testing and reporting. 60. Hardwood dimension lumber. 61. Venetian blinds (grade A, custom-made). 62. Colors for kitchen accessories. 63. Colors for bathroom accessories. 64. Walnut veneers. 65. Methods of analysis and of reporting fiber composition of textile products. 66. Marking of articles made wholly or in part of platinum. 67. Marking articles made of karat gold. 68. Liquid hypochlorite disinfectant, deodorant, and germicide. 69. Pine oil disinfectant. 70. Phenolic disinfectant (emulsifying type) (published with CS71). 71. Phenolic disinfectant (soluble type) (published with CS70). 72. Household insecticide (liquid spray type). |
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CS No.

73. Old growth Douglas fir, Sitka spruce, and western hemlock standard stock doors.
74. Solid hardwood wall panelling.
75. Automatic mechanical draft oil burners designed for domestic installations.
76. Hardwood interior trim and molding.
77. Enameled cast-iron plumbing fixtures.
78. Ground-and-polished lenses for sun glasses (published with CS79).
79. Blown, drawn, and dropped lenses for sun glasses (published with CS78).
80. Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).
81. Adverse-weather lamps for vehicles (after market).
82. Inner-controlled spotlamps for vehicles (after market).
83. Clearance, marker, and identification lamps for vehicles (after market).
84. Electric tail lamps for vehicles (after market).
85. Electric license-plate lamps for vehicles (after market).
86. Electric stop lamps for vehicles (after market).
87. Red electric warning lanterns.
88. Liquid burning flares.
89. Hardwood stair treads and risers.
90. Power cranes and shovels.
91. Factory-fitted Douglas fir entrance doors.
92. Cedar, cypress, and redwood tank stock lumber.
93. Portable electric drills (exclusive of high frequency).
94. Calking lead.
95. Lead pipe.
96. Lead traps and bends.
97. Electric supplementary driving and passing lamps for vehicles (after market).
98. Artists' oil paints.
99. Gas floor furnaces—gravity circulating type.
100. Porcelain-enameled steel utensils.
101. Blue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
102. (Reserved for "Diesel and fuel-oil engines.")
103. Rayon Jacquard velour (with or without other decorative yarn).
104. Warm-air furnaces equipped with vaporizing-type oil burners.
105. Mineral wool insulation for low temperatures.
106. Boys' pajama sizes (woven fabrics).
107. (Withdrawn.)
108. Treading automobile and truck tires.
109. Solid-fuel-burning forced-air furnaces.
110. Tire repairs—vulcanized (passenger, truck, and bus tires).
111. Earthenware (vitreous-glazed) plumbing fixtures.
112. Homogeneous fiber wallboard.
113. Oil-burning floor furnaces equipped with vaporizing pot-type burners.
114. Hospital sheeting for mattress protection.
115. Porcelain-enameled tanks for domestic use.
116. Bituminized-fiber drain and sewer pipe.
117. Mineral wool insulation for heated industrial equipment.
118. Marking of jewelry and novelties of silver.
- (E) 119.¹ Dial indicators (for linear measurements).
120. Standard stock ponderosa pine doors.
121. Women's slip sizes (woven fabrics).
122. Western softwood plywood.

CS No.

123. Grading of diamond powder.
- (E) 124.¹ Master disks.
125. Prefabricated homes.
126. Tank-mounted air compressors.
127. Self-contained mechanically refrigerated drinking water coolers.
128. Men's sport shirt sizes—woven fabrics (other than those marked with regular neckband sizes).
129. Materials for safety wearing apparel.
130. Color materials for art education in schools.
131. Industrial mineral wool products, all types—testing and reporting.
132. Hardware cloth.
133. Woven wire netting.
134. Cast aluminum cooking utensils (metal composition).
135. Men's shirt sizes (exclusive of work shirts).
136. Blankets for hospitals (wool, and wool and cotton).
137. Size measurements for men's and boys' shorts (woven fabrics).
138. Insect wire screening.
139. Work gloves.
140. Testing and rating convectors.
141. Sine bars, blocks, plates, and fixtures.
142. Automotive lifts.
143. Standard strength and extra strength perforated clay pipe.
144. Formed metal porcelain enameled sanitary ware.
145. Testing and rating hand-fired hot-water supply boilers.
146. Gowns for hospital patients.
147. Colors for molded urea plastics.
148. Men's circular flat- and rib-knit rayon underwear.
149. Utility type house dress sizes.
150. Hot rolled rail steel bars (produced from tee-section rails).
151. Body measurements for the sizing of apparel for infants, babies, toddlers, and children (for the knit underwear industry).
152. Copper naphthenate wood-preservative (spray, brush, dip application).
153. Body measurements for the sizing of apparel for girls (for the knit underwear industry).
154. (Reserved for "Wire rope.")
155. Body measurements for the sizing of boys' apparel (knit underwear, shirts, trousers).
156. Colors for polystyrene plastics.
157. Ponderosa pine and sugar pine plywood.
158. Model forms for girls' apparel.
159. Sun glass lenses made of ground and polished plate glass, thereafter thermally curved.
160. Wood-fiber blanket insulation (for building construction).
161. "Standard grade" hot-dipped galvanized ware (coated after fabrication).
162. Tufted bedspreads.
163. Standard stock ponderosa pine windows, sash and screens.
164. (Reserved for "Concrete mixers.")
165. Zinc naphthenate wood-preservative (spray, brush, dip application).
166. Size measurements for men's work trousers.
167. Automotive and general service copper tube.
168. Polystyrene plastic wall tiles, and adhesives for their application.
169. Galvanized ware fabricated from pre-galvanized steel sheets.
170. Cotton flour-bag (sack) towels.
171. Hardwood veneered doors.
172. Brass trim for water-closet bowls, tanks, and urinals (dimensional standards).

¹ Where "(E)" precedes the CS number, it indicates an emergency Commercial Standard, drafted under war conditions.

CS No.	CS No.
173. Heavy-duty alpha-cellulose-filled melamine tableware.	184. Steel fence posts—field and line type (produced from hot-rolled steel sections).
174. 140-F dry-cleaning solvent.	185. Wool felt.
175. Circular-knitted gloves and mittens.	186. Boys' sports outerwear size measurements.
176. Prefinished wall panels.	187. Men's work shirt sizes.
177. Bituminous-coated metal septic tanks (single compartment, residential).	188. Service-weight cast-iron soil pipe and fittings.
178. Testing and rating ventilating fans (axial and propeller types).	189. Women's circular flat-knit rayon underwear sizes (including nightgowns and pajamas).
179. Installation of attic ventilation fans in residences.	190. Standard stock double-hung wood window units.
180. Model forms for boys' apparel.	191. Flammability of clothing textiles.
181. Water-resistant organic adhesives for installation of clay tile.	192. General purpose vinyl plastic film.
182. Latex foam mattresses for hospitals.	
183. Boys' trouser size measurements.	

NOTICE.—Copies of Commercial Standards may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. A price list may be obtained from the Commodity Standards Division, Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this Commercial Standard.

Date -----

Commodity Standards Division,
Office of Technical Services,
U. S. Department of Commerce,
Washington 25, D. C.

WITHDRAWN

Gentlemen:

We believe that this Commercial Standard constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable to insure the manufacture and sale of only those CLOTHING TEXTILES that are not dangerously flammable. We are directly concerned as a

- Fabric manufacturer ¹
- Clothing manufacturer ¹
- Testing laboratory ¹
- Distributor ¹
- Purchaser ¹

We reserve the right to depart from the standard as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be represented as conforming thereto.

(Cut along this line)

Signature of authorized officer -----
(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer -----

Organization -----
(Fill in exactly as it should be listed)

Street address -----

City, zone, and State -----

¹ Check the one that applies. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

WITHDRAWN

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial Standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of Commercial Standards is to establish, for specific commodities, nationally recognized grades or consumer criteria, and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the standard, where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of Commercial Standards on a Nation-wide basis is fourfold: first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and, fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.