1 SCOPE

1.1 This method describes procedures for evaluating the flammability of children's nightgowns, nightshirts, dressing gowns, bathrobes, housecoats, robes and pyjamas (baby doll and tailored pyjamas) up to and including size 14X, and is applicable to item 40 of Part II of Schedule I of the Hazardous Products Act (HPA).

1.2 This method is provided to facilitate laboratory procedures only. It is the trader's responsibility to ensure that the product is tested according to, and meets the requirements of the HPA and its Regulations.

2 APPLICABLE DOCUMENTS

2.1 Hazardous Products (Children's Sleepwear) Regulations SOR 87-443, SOR 91-351 (Appendix I)

2.2 Standard FF5-74 of the United States Consumer Product Safety Commission , *Standard for the Flammability of Children's Sleepwear; Sizes 7 through 14*, dated January 1, 1985 and published in the Code of Federal Regulations Part 1000 to end (Appendix II - referenced sections only)

2.3 Method 58, CGSB Standard CAN2-4.2M77, *Colour Fastness and Dimensional Change in Domestic Laundering of Textiles*, December 1984 (Appendix III - referenced sections only)

2.4 Method 30.3, CGSB Standard CAN2-4.2M77, *Procedure for the Removal of Flame Retardant Treatments from Textile Products*, May 1980 (Appendix IV)

2.5 CGSB Standard CAN 2GP-115M, *Standard for Detergent, Laundry, Powder, Built*, January 1979 [1]

2.6 Product Safety Reference Manual: *Book 4 - Flammable Products*

2.7 Children's Sleepwear: Flammability Requirements Guidelines, August 1998

2.8 Method F-22 of this manual: *Test Methods for Detection of Flame Retardants in Textile Products and Fibres*

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[1] This detergent described in this method is no longer commercially available as it contains phosphates. The Product Safety Laboratory has a sufficient supply of the required detergent to last until the Regulations are amended.

2.9 Product Safety Laboratory Project #99-0505 - Children's Sleepwear: Test Method Review

3 DEFINITIONS

3.1 See section 2 of the Hazardous Products (Children's Sleepwear) Regulations. (Appendix I)

4 APPARATUS

4.1 Dummy load - pieces of undyed spun polypropylene fabric, mass per unit area approximately 160 g/m² (Test Fabrics Inc., style 976)

4.2 See section 1616.5(a) of Standard FF5-74. (Appendix II)

5 PROCEDURE

5.1 Verify that, based on the design and dimensions, the sample is subject to the requirements of Item 40 of Part II of Schedule I of the HPA by classifying the sample using the "Children's Sleepwear: Flammability Requirement Guidelines".

5.2 Test the sample for flame retardants as per Method F-22 "Test Methods for Detection of Flame Retardants in Textile Products and Fibres".

5.3 If the sample contains a flame retardant, ensure that the labelling has been done in accordance with Section 4 of the Hazardous Products (Children's Sleepwear) Regulations (Appendix I).

5.4 Test samples as per Schedule I of the Hazardous Products (Children's Sleepwear) Regulations (Appendix I). If the sample has piping or edging, cut the specimens to ensure that as much as possible of this material is exposed to the flame. If it is likely that the thread used in a seam or other stitch line is more flammable that the rest of the garment, cut some specimens so that the seam or stitch line is in the centre of the specimen. (e.g. Cotton thread used in the seams of a polyester robe)

5.5 Cut three swatches (app. 25 mm × 25 mm) from the sample and mark them with an arrow on the outer surface indicating the lengthwise direction of the garment, and attach the swatches to the report.

6 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

6.1 The frames should be properly aligned inside the flammability cabinet.

6.2 The flame must be adjusted to specified height before testing.

6.3 The methane should be at least 97% pure.

6.4 The desiccant used must be anhydrous. This can be ensured by using a desiccant with a colour indicator.

6.5 The temperature of the water in the washing machine must be controlled and adjusted before the sample is put in it.

6.6 The dryer's temperature must be controlled.

6.7. There are no Quality Control procedures for this method at this time.

7 TEST REPORT

7.1 The test report should contain the following information:

7.1.1 Composition or fibre content (from the label, Sample Record (SR) form or analysis) and construction of the fabric.

7.1.2 If applicable, whether the labelling meets the requirements of section 4 of the Hazardous Products (Children's Sleepwear) Regulations.

7.1.3 The number of washing and drying [dry cleaning] cycles to which the sample was subjected.

7.1.4 The direction of test and char length for each specimen.

7.1.5 The average char length for the five specimens.

7.1.6 The number of specimens that burned full length.

7.2 The report will be prepared in the format illustrated below:

Composition (from label, SR form or analysis):
Construction: knit/woven; specify if raised fibre surface

Arc emission spectrography and the Beilstein's test [did/did not] reveal the presence of flame retardant chemicals containing phosphorus, aluminum, boron or halogens.

[If treated with a flame retardant] A label was permanently affixed to the sample and it displayed in a clear and legible manner the instructions in English and in French for the care of the product, including cleaning procedures, to ensure that the product is not exposed to conditions that could reduce its flame resistance.

The material was subjected to one [twenty] washing cycle and one drying cycle prior to testing.

Specimen	Direction of Test	Char Length (mm)
1	lengthwise (wales)	156
2	lengthwise (wales)	179
3	crosswise (courses)	250
4	crosswise (courses)	245
5	crosswise (courses)	254

Average char length for the five specimens = 217 mm
Number of specimens having burned full length = 1

The arrow on the attached sample swatch has been marked on the outer surface of the garment in its lengthwise (wales) direction.

7.3 Attach sample swatches to the report.

8 PRECISION AND BIAS

8.1 Precision - No statement concerning precision can be made at this time.

8.2 Bias - Since the true values of flammability samples are not known, bias cannot be determined.

9 SAMPLING

9.1 One or more (identical) garments containing sufficient fabric to provide six specimens measuring 100 mm × 300 mm (to compensate for shrinkage during laundering), three of them in the lengthwise direction and three of them in the crosswise direction of the garment.

APPENDIX I

Hazardous Products (Children's Sleepwear) Regulations (SOR/87-443)

REGULATIONS RESPECTING THE ADVERTISING, SALE AND IMPORTATION OF CHILDREN'S NIGHTGOWNS, NIGHTSHIRTS, DRESSING GOWNS, BATHROBES, HOUSECOATS AND ROBES, PYJAMAS AND BABY-DOLL PYJAMAS

[SOR/91-351, s. 1(F)]

Short Title

1. These Regulations may be cited as the Hazardous Products (*Children's Sleepwear*) Regulations.

Interpretation

2. In these Regulations,

"CGSB" means the Canadian General Standards Board; (*ONGC*)

"char length" means the maximum extent of the damaged length of a material that has been subjected to the test conditions set out in these Regulations; (*longueur carbonisée*)

"flame resistance" means the property of a material whereby flaming combustion is slowed, terminated or prevented; (*résistance à la flamme*)

"flame retardant" means a substance used to impart improved flame resistance to a material; (*ignifugeant*)

"OECD" means the Organization for Economic Cooperation and Development; (*OCDE*)
"product" means any children's clothing included in item 40 (as enacted by Order in Council P.C. 1987-1449, dated July 30, 1987 and registered as SOR/87-444, and numbered as item 39 in the December 1, 1989 loose-leaf consolidation of the Statutes of Canada) of Part II of Schedule I to the Hazardous Products Act. (*produit*) SOR/91-351, s. 2.

General

3. A product may be advertised, sold or imported into Canada only if it meets the requirements of these Regulations. SOR/91-351, s. 3(F).

Labelling requirements

4. Every product treated with a flame retardant shall have a label that is permanently affixed to the product and that displays in a clear and legible manner

(a) the words "flame retardant" and "ignifugeant"; and

(b) instructions in English and in French for the care of the product, particularly cleaning procedures, to ensure that the product is not exposed to agents or treatments that could reduce the flame resistance of the product.

Performance Requirements

5. Every product, when tested in accordance with the procedures set out in Schedule I, shall have

(a) an average char length for five specimens that does not exceed 178 mm; and

(b) not more than one individual specimen with a char length equal to the full length of the specimen (254 mm).

6. No product treated with a flame retardant, no component extracted or broken down from the treated product, nor any flame retardant used to treat the product shall cause

(a) acute lethality (death) as a result of oral exposure to a dose of 500 mg/kg body weight or less or as a result of dermal exposure to a dose of 1000 mg/kg body weight or less when tested for acute oral toxicity or acute dermal toxicity in accordance with section 1 or 2, respectively, of Schedule II;

(b) an effect graded at a mean greater than 1 for erythema formation (redness) or for edema formation (swelling) measured at any specified time points when tested for dermal irritation in accordance with section 3 of Schedule II;

(c) a response in greater than 15% of the test animals when using the Draize Test or the Buehler Test or in greater than 30% of the test animals when using one of the five other tests specified in OECD Test Guideline No. 406-tests in which an adjuvant is incorporated-when tested for dermal sensitisation in accordance with section 4 of Schedule II;

(d) gene mutation or chromosomal aberration when tested for mutagenicity in accordance with section 5 of Schedule II; or

(e) tumors when tested for tumorigenicity according to section 6 of Schedule II.

SCHEDULE I
(Section 5)

FLAME RESISTANCE TEST

Washing, Drying and Dry Cleaning Procedures

1. (1) Subject to subsection (2), a product not treated with a flame retardant shall be subjected to one washing cycle in accordance with the washing procedure set out in section 3, with the exception of paragraphs (b) and (e), followed by one drying cycle in accordance with the drying procedure set out in section 4.

(2) Where the label of a product not treated with a flame retardant displays the words "dry clean only", the product shall be dry cleaned once in accordance with the dry cleaning procedure set out in Method 30.3, the National Standard of Canada CAN2-4.2-M77, *Procedure for the Removal of Flame Retardant Treatments from Textile Products*, published by CGSB in May 1980, with the exception of sections 3.2 and 5.5 to 5.7 of the method.

2. (1) Subject to subsections (2) and (3), products treated with flame retardants shall be subjected to 20 successive washing cycles in accordance with the washing procedure set out in section 3, followed by one drying cycle in accordance with the drying procedure set out in section 4.

(2) Where the label of a product treated with a flame retardant displays the words "do not bleach", the product shall be subjected to 20 successive washing cycles in accordance with the washing procedure set out in section 3, with the exception of paragraph (e) thereof, followed by one drying cycle in accordance with the drying procedure set out in section 4.

(3) Where the label of a product treated with a flame retardant displays the words "dry clean only", the product shall be dry cleaned five times in accordance with the procedure referred to in subsection 1(2).

Washing Procedure

3. The apparatus and washing procedure set out respectively in sections 4.1 and 6 of Method 58, the National Standard of Canada CAN2-4.2-M77, *Colour Fastness and Dimensional Change in Domestic Laundering of Textiles*, published by CGSB in December 1984, shall be used, with the following modifications:

(a) the temperature of the wash water shall be maintained between 58°C and 62°C;

(b) the hardness of the wash water shall be less than 50 ppm of calcium carbonate;

(c) for automatic washing machines, the washing cycle shall be set for normal washing cycle;

(d) a synthetic detergent that conforms to CGSB Standard 2-GP-115M, *Standard for Detergent, Laundry, Powder, Built* dated January 1979, shall be used; and

(e) a bleaching agent containing sodium hypochlorite that produces 0.015% of available chlorine when it is added to the washing solution shall be used.

Drying Procedure

4. The apparatus and drying procedure set out respectively in sections 4.2 and 7.5 of Method 58, the National Standard of Canada CAN2-4.2-M77, *Colour Fastness and Dimensional Change in Domestic Laundering of Textiles*, published by CGSB in December 1984, shall be used.

Specimen Preparation and Testing

(1) Four specimens measuring 89 mm × 254 mm shall be cut from a sample of the product that has been washed and dried or dry cleaned in accordance with sections 1 to 4, in such a manner that two specimens are cut in the lengthwise direction and two are cut in the crosswise direction of the product. The specimens cut from a product made from a multilayered fabric shall include all layers of the fabric and shall be held in the relative positions they occupy. The direction in which each specimen was cut shall be indicated on the specimen.

(2) The four specimens shall be tested in accordance with the procedures set out in paragraphs 1616.5(a) and (b) and subparagraphs 1616.5(c)(1) to (3) of Standard FF5-74 of the United States Consumer Product Safety Commission, *Standard for the Flammability of Children's Sleepwear: Sizes 7 through 14*, dated January 1, 1985 and published in the *Code of Federal Regulations Part 1000 to end.*

(3) The average char lengths for the two specimens cut in the lengthwise direction and for the two specimens cut in the crosswise direction shall be determined.

(4) A fifth specimen shall be cut in the same direction as the specimens having the longer average char length, as determined pursuant to subsection (3), and this fifth specimen shall be tested in accordance with the procedures referred to in subsection (2).

(5) The char length, the direction in which each of the five specimens tested was cut and the average char length of the five specimens shall be recorded.

SCHEDULE II
(Section 6)

TOXICITY TEST

1. Acute oral toxicity shall be assessed in accordance with OECD Test Guideline No. 401, "Acute Oral Toxicity", published May 12, 1981 in the *OECD Standard entitled OECD Guidelines for Testing of Chemicals*.

2. Acute dermal toxicity shall be assessed in accordance with OECD Test Guideline No. 402, "Acute Dermal Toxicity", published May 12, 1981 in the OECD Standard referred to in section 1.

3. Dermal irritation shall be assessed in accordance with OECD Test Guideline No. 404, "Acute Dermal Irritation/Corrosion", published May 12, 1981 in the OECD Standard referred to in section 1.

4. Dermal sensitisation shall be assessed in accordance with OECD Test Guideline No. 406, "Skin Sensitisation", published May 12, 1981 in the OECD Standard referred to in section 1.

5. Mutagenicity shall be assessed in accordance with the "OECD Guidelines on Genetic Toxicology Testing and Guidance on the Selection and Application of Assays", published May 15, 1986 by OECD and the third level of concern (LOC III) of the federal "Guidelines on the Use of Mutagenicity Tests in the Toxicological Evaluation of Chemicals", published by Health and Welfare Canada and Environment Canada in 1986, which includes the following tests:

(a) To test in vitro gene mutation:

(i) OECD Test Guideline No. 471, "Genetic Toxicology: *Salmonella typhimurium*, Reverse Mutation Assay", published May 26, 1983 in the OECD Standard referred to in section 1,

(ii) OECD Test Guideline No. 476, "Genetic Toxicology: *In vitro* Mammalian Cell Gene Mutation Tests", published April 4, 1984 in the OECD Standard referred to in section 1, or

(iii) OECD Test Guideline No. 480, "Genetic Toxicology: *Saccharomyces cerevisiae* Gene Mutation Assay", adopted by OECD October 23, 1986.

(b) To test in vitro mammalian chromosomal aberrations with the exclusion of sister chromatid exchange and micronuclei: OECD Test Guideline No. 473, "Genetic Toxicology: *In vitro* Mammalian Cytogenetic Test", published May 26, 1983 in the OECD Standard referred to in section 1.

(c) To test in vivo mammalian chromosomal aberrations excluding sister chromatid exchange:

(i) OECD Test Guideline No. 474, "Genetic Toxicology: Micronucleus Test", published May 26, 1983 in the OECD Standard referred to in section 1, or

(ii) OECD Test Guideline No. 475, "Genetic Toxicology: In Vivo Mammalian Bone Marrow Cytogenetic Test - Chromosomal Analysis", published April 4, 1984 in the OECD Standard referred to in section 1.

(d) To test *in vivo* mammalian gene mutation or other indicator tests in a second somatic tissue or species:

(i) Test as specified by J. W. Allen, C. F. Shuler, R. W. Mendes and S. A. Latt in the scientific paper entitled "A simplified technique for *in vivo* analysis of sister chromatid exchanges using 5-Bromodeoxyuridine tablets", published in the *Journal of Cytogenetics and Cell Genetics*, Vol. 18, 1977, pp. 231-237, or

(ii) Test as specified by J. C. Mirsalis and B. E. Butterworth in the scientific paper entitled "Detection of unscheduled DNA synthesis in hepatocytes isolated from rats treated with genotoxic agents: An *in vivo-in vitro* assay for potential carcinogens and mutagens", published in *Carcinogenesis*, Vol. 1, July 1980, pp. 621-625.

6. Tumorigenicity by the oral route shall be assessed in accordance with OECD Test Guideline No. 451, "Carcinogenicity Studies", published May 12, 1981 in the OECD Standard referred to in section 1.

APPENDIX II

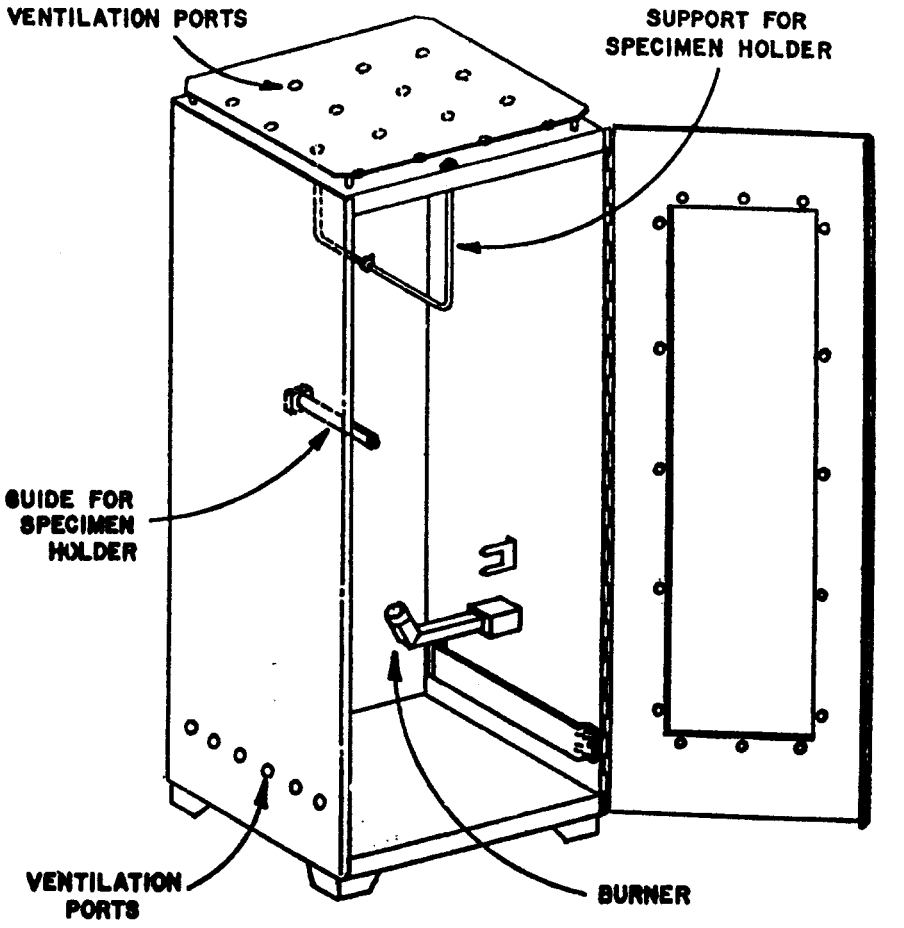
Standard FF5-74 of the United States Consumer Product Safety Commission, *Standard for the Flammability of Children's Sleepwear; Sizes 7 through 14*, dated January 1, 1985 and published in the Code of Federal Regulations Part 1000 to end

Only those sections of Standard FF5-74 referenced by the Regulations are reproduced here.

§ 1616.5 Test procedure.

(a) *Apparatus.* The following test apparatus shall be used for the test. Alternate test apparatus may be used only with prior approval of the Consumer Product Safety Commission.

(1) *Test chamber.* The test chamber shall be a steel cabinet with inside dimensions of 32.9 cm. (12 15/16 in.) wide, 32.9 cm. (12 15/16 in.) deep and 76.2 cm. (30 in.) high. It shall have a frame which permits the suspension of the specimen holder over the center of the base of the cabinet at such a height that the bottom of the specimen is 1.7 cm. (¾ in.) above the highest point of the barrel of the gas burner specified in paragraph (a)(3) of this section, *Burner* and perpendicular to the front of the cabinet. The front of the cabinet shall be a close-fitting door with a transparent insert to permit observation of the entire test. The cabinet floor may be covered with a piece of asbestos paper, whose length and width are approximately 2.5 cm. (1 in.) less than the cabinet floor dimensions. The cabinet to be used in this test method is illustrated in Figure 1 and detailed in Engineering Drawings, Numbers 1 through 7.

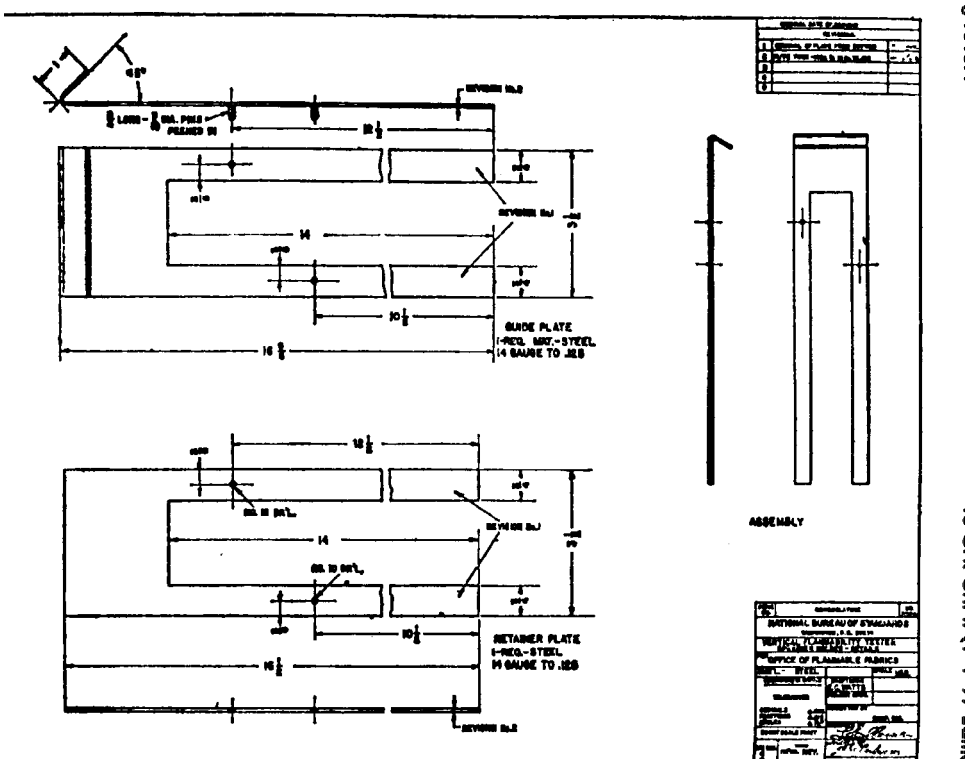


VERTICAL TEST CABINET

FIGURE I

In addition to Figure I, FF5-74 contains numerous pages of detailed technical drawings of the apparatus. These are difficult to read even in the original volume and do not reproduce well.

This instrument (Model 7650 Vertical Flammability Tester) may be purchased from Instrument Marketing Services Inc., 291 Fairfield Ave., Fairfield NJ 07004, USA (973) 439-0382. It requires the purchase of an Optional Kit to meet this standard.



Specimen Holder

(2) *Specimen holder.* The specimen holder to be used in this test method is detailed in Engineering Drawing Number 7. It is designed to permit suspension of the specimen in a fixed vertical position and to prevent curling of the specimen when the flame is applied. The specimen shall be fixed between the plates, which shall be held together with side clamps.

(3) *Burner.* The burner shall be the same as that illustrated in Figure 1 and detailed in Engineering Drawing Number 6. It shall have a tube of 1.1 cm. (0.43 in.) inside diameter. The input line to the burner shall be equipped with a needle valve. It shall have a variable orifice to adjust the height of the flame. The barrel of the burner shall be at an angle of 25 degrees from the vertical. The burner may be equipped with an adjustable stop collar so that it may be positioned quickly under the test specimen. The burner shall be connected to the gas source by rubber or other flexible tubing.

(4) *Gas supply system.* There shall be a pressure regulator to furnish gas to the burner under a pressure of 103-259 mm. Hg. (2-5 lbs. per sq. in.) at the burner inlet. (*Caution.* Precautionary laboratory practices must be followed to prevent the leakage of methane. Methane is a flammable gas which can be explosive when mixed with air and exposed to a source of ignition, and can cause asphyxiation because of the lack of air.)

(5) *Gas.* The gas shall be at least 97 percent pure methane.

(6) *Hooks and weights.* Metal hooks and weights shall be used to produce a series of loads for char length determinations. Suitable metal hooks consist of No. 19 gauge steel wire, or equivalent, made from 7.6 cm. (3 in.) lengths of the wire, bent 1.3 cm. (0.5 in.) from one end to a 45-degree angle hook. The longer end of the wire is fastened around the neck of the weight to be used and the other in the lower end of each burned specimen to one side of the burned area. The requisite loads are given in Table 1.

TABLE 1—ORIGINAL FABRIC WEIGHT [1]

Grams per square meter	Ounces per square yard	Loads	
		Grams	Pounds
Less than 101	Less than 3	54.4	0.12
101 to 207	3 to 6	113.4	.25
207 to 338	6 to 10	226.8	.50
Greater than 338.	Greater than 10	340.2	.75

[1] Weight of the original fabric, containing no seams or trim, is calculated from the weight of a specimen which has been conditioned for at least 8 hr at 21±1.1° C (70±2° F) and 65±2 pct relative humidity. Shorter conditioning times may be used if the change in weight of a specimen in successive weighings made at intervals of not less than 2 hr does not exceed 0.2 pct of the weight of the specimen.

(7) *Stopwatch.* A stopwatch or similar timing device shall be used to measure time to 0.1 second.

(8) *Scale.* A linear scale graduated in mm. or 0.1-inch divisions shall be used to measure char length.

(9) *Circulating air oven.* A forced circulation drying oven capable of maintaining the specimen at 105±2.8° C. (221±5° F.), shall be used to dry the specimen while mounted in the specimen holders.[3]

(10) *Desiccator.* An air-tight and moisture-tight desiccating chamber shall be used for cooling mounted specimens after drying. Anhydrous silica gel with an indicator shall be used as the desiccant in the desiccating chamber. Replace or reactivate the desiccant when it becomes inactive.

(11) *Hood.* A hood or other suitable enclosure shall be used to provide a draft-protected environment surrounding the test chamber without restricting the availability of air. This enclosure shall have a fan or other suitable means for exhausting smoke and/or toxic gases produced by testing.

(12) *Extinguishing plates.* Extinguishing plates shall be used to extinguish afterglow. The plates shall be metal, approximately 35.6 cm. x 5.1 cm. (14 x 2 in.) which fit within the opening of the specimen holder. The

[3] Procedure 1(1.1.1) of ASTM D 2654-71 "Standard Methods of Test for moisture content and moisture regain of textile material," describes a satisfactory oven (1972 Book of ASTM Standards, Part 24, published by the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103).

bottom plate shall be the thickness of the specimen holder and the top plate shall be at least 0.32 cm. (⅛ in.) thick. A suitable metal specimen mounting block may be used for the bottom plate.

(b) *Mounting and conditioning of specimens.* (1) The specimens shall be placed in specimen holders so that the bottom edge of each specimen is even with the bottom of the specimen holder. Mount the specimen in as close to a flat configuration as possible. The sides of the specimen holder shall cover 1.9 cm. (¾ in.) of the specimen width along each long edge of the specimen, and thus shall expose 5.1 cm. (2 in.) of the specimen width. The sides of the specimen holder shall be clamped with a sufficient number of clamps or shall be taped to prevent the specimen from being displaced during handling and testing. The specimens may be taped in the holders if the clamps fail to hold them. Place the mounted specimens in the drying oven in a manner that will permit free circulation of air at 105° C. (221° F.) around them for 30 minutes.[4]

(2) Remove the mounted specimens from the oven and place them in the desiccator for 30 minutes to cool. No more than five specimens shall be placed in a desiccator at one time. Specimens shall remain in the desiccator no more than 60 minutes.

(c) *Testing*—(1) *Burner adjustment.* With the hood fan turned off, use the needle valve to adjust the flame height of the burner to 3.8 cm. (1½ in.) above the highest point of the barrel of the burner. A suitable height indicator is shown in Engineering Drawing Number 6 and Figure 1.

(2) *Specimen burning and evaluation.* (i) One at a time, the mounted specimens shall be removed from the desiccator and suspended in the cabinet for testing. The cabinet door shall be closed and the burner flame impinged on the bottom edge of the specimen for 3.0 ±0.2 seconds.[5] Flame impingement is accomplished by moving the burner under the specimen for this length of time, and then removing it.

(ii) When flaming has ceased, remove the specimen from the cabinet, except for specimens which exhibit afterglow. If afterglow is evident, the specimen shall be removed from the cabinet 1 minute after the burner flame is impinged on the specimen if no flaming exists at that time. Upon removal from the cabinet, the afterglow shall be promptly extinguished. The afterglow shall be extinguished by placing the specimen while still in the specimen holder on the bottom extinguishing plate and immediately covering it with the top plate until all evidence of afterglow has ceased. After removing the specimen from the cabinet and, if appropriate, extinguishing afterglow, remove it from the holder and place it on a flat clean surface. Fold the specimen lengthwise along a line through the highest peak of the charred or melted area; crease the specimen firmly by hand. Unfold the specimen and insert the hook with the correct weight as shown in Table 1 in the specimen on one side of the charred area 6.4 mm. (¼ in.) from the lower edge. Tear the specimen by grasping the other lower corner of the fabric and gently raising the specimen and weight clear of the supporting surface.[6] Measure the char length as the distance from the end of the tear to the original lower edge of the specimen exposed to the flame. After testing each specimen, vent the hood and cabinet to remove the smoke and/or toxic gases.

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[4] If the specimens are moist when received, permit them to air dry in laboratory conditions prior to placement in the oven. A satisfactory preconditioning procedure may be found in ASTM D 1776-67, "Conditioning Textiles and Textile Products for Testing". (1972 Book of ASTM Standards, Part 24, published by the American Society for Testing and Materials, 1916 Race Street, Philadelphia Pennsylvania 19103.)

[5] If more than 30 seconds elapse between removal of a specimen from the desiccator and the initial flame impingement, that specimen shall be reconditioned prior to testing.

[6] A figure showing how this is done is given in AATCC Test method 34-1969, "Fire Resistance of Textile Fabrics," Technical Manual of the American Association of Textile Chemists and Colorists, Vol. 46, 1970, published by AATCC, P.O. Box 12215, Research Triangle Park, North Carolina 27709.

APPENDIX III

Only those sections referenced by the Regulations are reproduced here.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Textile Test Methods	CAN2-4.2-M77
	COLOR FASTNESS AND DIMENSIONAL CHANGE IN DOMESTIC LAUNDERING OF TEXTILES	Method 58 December 1984

Supersedes Issue of July 1977 as amended in February 1979 and July 1982

4.1 Automatic washing machine capable of being operated under the following conditions:

(a) Top loading, agitator type (NOTE 4)

(b) "Normal" agitator speed, 70 ± 5 cycles/min

(c) "Delicate" or "gentle" agitator speed, 50 ± 5 cycles/min

(d) Washing time adjustable between 0-15 min, controllable to ± 1 min

(e) Spin speed: Normal - 515 ± 15 r/min
Delicate - 425 ± 15 r/min.

NOTE 4 The Kenmore Automatic Washer Model 600 has been accepted as the standard machine. Interlaboratory trials have shown, however, that substantially similar results are obtained with other makes of machines that can be operated under the conditions specified.

4.2 **Dryer** of the rotary tumble type having a cylindrical basket approximately 750 mm in diameter and not less than 400 mm in depth, rotating at approximately 50 ± 5 r/min, equipped with means for maintaining a drying temperature of 50 to 70°C measured in the exhaust vent as close as possible to the drying cylinder, and providing a cooling period of 5 min while tumbling, at the end of the drying cycle (NOTE 5).

NOTE 5 The Kenmore Automatic Dryer Model 600 has been accepted as the standard machine. Other types of dryers may be used provided they can be operated under the specified conditions.

6.1 Place the specimens in the washing machine and add sufficient dummy load to make a total dry fabric load of 2 kg. Fill the machine with 40 ± 4 L of water and set the machine to operate at one of the following settings. If the mass of the specimen(s) equals 2 kg, no dummy load is used. If the mass exceeds 2 kg, the amount of water shall be increased proportionately.

Procedure I 40 ± 2°C - Set machine for "Delicate" or "Gentle" cycle

Procedure II 50 ± 2°C - Set machine for "Delicate" or "Gentle" cycle

Procedure III 50 ± 2°C - Set machine for "Normal" cycle

Procedure IV 70 ± 2°C - Set machine for "Normal" cycle.

Add sufficient detergent to provide a good running suds (NOTE 14) and set the machine to wash for 10 min. (If necessary, advance the operation of the machine manually to begin the rinse cycle after 10 min washing.) Continue until the end of the final spin cycle, except that if the specimens are to be drip-dried, stop the machine before the final spin and remove them.

6.2 On completion of the final spin cycle, remove the specimens from the machine and dry by one of the five procedures described in Section 7.

NOTE 14 Approximately 50 g detergent per 40 L water has been found to provide a reasonably good suds.

7.5 **Procedure E - Tumble Dry**

7.5.1 Place the specimens and dummy load (if any) in the tumble dryer with the temperature of the exhaust from the drum set at 65 - 70°C for normal fabrics and at 50 - 55°C for permanent-press/delicate fabrics. Operate the dryer until the load is dry and continue tumbling, with the heat turned off, for 5 min. Remove the specimens immediately.

7.5.2 Place the specimens on a flat surface and condition (Method 2) for at least 4 h.

7.5.3 Remeasure the marked distances on the specimens and calculate the average dimensional change, for the warp and weft (wales and courses) separately, as a percentage of the original measurements. Average the results for the two specimens.

APPENDIX IV

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Textile Test Methods	CAN2-4.2-M77
	PROCEDURE FOR THE REMOVAL OF FLAME-RETARDANT TREATMENTS FROM TEXTILE PRODUCTS	METHOD 30.3 May 1980

1. PURPOSE AND SCOPE

1.1 The laundering and dry cleaning procedure described is intended for removing nonpermanent flame-retardant treatments applied to textile products.

1.2 This method is not applicable to textile floor coverings (*NOTE 1*).

2. PRINCIPLE

2.1 Specimens are dry cleaned for 25 min with a solution of perchloroethylene and dry cleaning soap, rinsed four times with perchloroethylene followed by extraction of the excess solvent and drying at room temperature. Specimens are then immersed in a neutral chip soap solution, worked gently for 5 min, rinsed, extracted, dried at room temperature and pressed lightly if required.

3. APPARATUS AND REAGENTS

3.1 Dry cleaning cylinder, preferably of metal, approximately 300 mm high and 220 mm in diameter (capacity approximately 12 L). The cylinder shall be mounted in a vertical position on an axis which is inclined at an angle of 50° to the axis of the cylinder, and rotated about this axis at a speed of 45 to 50 r/min.

3.2 Neutral chip soap (*NOTE 2*), confirming to ASTM D 496, Standard Specification for Chip Soap, as follows:

Moisture and matter volatile at 105°C (Max.)	10.0%
Sum of free alkali, total matter insoluble in alcohol and sodium chloride (Max.)	4.0%
Free alkali, calculated as Na OH (Max.)	0.2%
Matter insoluble in water (Max.)	1.0%
Titer of the mixed fatty acids prepared from the soap (Min.)	39°C
Anhydrous soap content (Min.)	85.0%

3.3 Dry cleaning soap, made by dissolving 56 g of caustic potash (KOH) in 100 mL of water. This solution is poured slowly into a mixture of 340 g of oleic acid, 400 mL of Stoddart solvent and 100 mL of tertiary butyl alcohol or ethylene glycol monobutyl ether (Butyl Cellosolve) with constant stirring.

3.4 Perchloroethylene.

3.5 Worsted test fabric (*NOTE 3*) – Undyed worsted cloth, plain weave, 310 to 340 g per linear metre. "Moth Test Cloth" has been found satisfactory for this purpose.

NOTE 1 A procedure for removing nonpermanent flame-retardant treatments from textile floor coverings is described in Method 30.2.

NOTE 2 Neutral chip soap conforming to ASTM D 496 may be obtained from the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, N.C. 27709, U.S.A.

NOTE 3 Worsted test fabric may be obtained from Testfabrics Inc., P.O. Drawer O, 200 Blackford Ave., Middlesex, N.J. 08846, USA.

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4. TEST SPECIMEN

4.1 Specimens shall be cut with the length in the direction of more rapid burning. Either a swatch having an area of at least 1330 cm^2, a minimum length of 70 mm and a minimum width of 190 mm or individual specimens 70 x 190 mm may be tested (*NOTE 4*).

5. PROCEDURE

5.1 Fill the cylinder of the dry cleaning apparatus with 2.5 L of perchloroethylene, and 270 mL of dry cleaning soap, the specimen(s) and sufficient worsted test fabric in pieces approximately 300 x 300 mm to make a total dry cloth load of 500 g.

5.2 Close the lid of the cylinder and operate the machine for 25 min.

5.3 Pour out the cleaning solution, replace with an equal amount of fresh perchloroethylene solvent and operate the apparatus for an additional 5 min. Repeat this operation three times.

5.4 Take the specimen from the cylinder and remove excess solvent from it by any convenient means e.g., centrifuging, or squeezing between layers of towelling or absorbent paper. Allow the specimen to dry at room temperature in a well-ventilated area, preferably in a fume hood with the exhaust fan on.

5.5 Immerse the specimen in a bath of soft water containing 0.5% by mass of a neutral chip soap at 35 to 38°C. Work gently for 5 min. The mass of the soap solution should be thirty times that of the specimen.

5.6 Rinse the specimen twice in water at 27°C, extract the water and allow the specimen to dry at room temperature.

5.7 If the specimen is creased, press lightly on one side with a cool iron.

NOTE 4 This specimen size is recommended when the flame resistance of textile products after laundering and dry cleaning is to be assessed by Method 27.5. If another flammability test method, with other requirements, is involved, suitable adjustments will have to be made.