Health Canada Santé Canada

Flammability of Textile Products in Canada

Canada

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Health Canada

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Preface

The intent of this document is to:

- provide information about the legislation in Canada that applies to hazardous or potentially hazardous products
- explain how the legislation applies to general textile products and children's sleepwear

  General textile products are defined, in accordance with the legislation, as all consumer products made in whole or in part of textile products, other than children's sleepwear, bedding, dolls, plush toys, soft toys, carpets, rugs, tents, and mattresses, which must comply with different legislative requirements. General textile products include such items as fabric, drapery, outerwear and daywear.

- describe the testing methods for general textile products and children's sleepwear
- discuss the influences of fibre content, fabric construction and design on the flammability characteristics of the finished textile products
- outline the roles and responsibilities of industry and government

To obtain information on the legislative requirements for consumer textile products not covered in this document, refer to the '*Hazardous Products Act* and Regulations' listed in Appendix C – Canadian Information Resources, on page 23 of this document.

Legislation

Consumer Product Safety (CPS) of Health Canada's Product Safety Programme (PSP) works closely with partners and stakeholders to protect consumers and children from product-related hazards and to promote the safe use of products. CPS gets its regulatory authority from the *Hazardous Products Act (HPA)*, which covers the sale, importation and advertising of a variety of hazardous or potentially hazardous products. The onus is on industry to comply with the legislation. Enforcement actions taken by Product Safety Officers on noncompliant products range from negotiation with industry for the voluntary removal of these products from the market to seizure and/or prosecution under the *HPA*.

Certain consumer products are prohibited from sale, importation or advertising in Canada. Other products are restricted, and must meet specific regulatory requirements prior to sale, importation or advertising. General textile products and certain children's sleepwear (sleepwear for infants up to 7 kg, as well as hospital sleepwear, polo pyjamas and sleepers in sizes up to and including 14x) are prohibited if they do not meet minimum flammability requirements. Other children's sleepwear (nightgowns, nightshirts, dressing gowns, bathrobes, housecoats, robes, pyjamas and baby-doll pyjamas in sizes up to and including 14x) have specific regulatory requirements that must be met prior to sale.

Flammability requirements for general textile products have been in effect under Item 4 of Part I of Schedule I to the *HPA* since 1971. These products, when tested in accordance with ASTM Method D1230-61: *Standard Method of Test for Flammability of Clothing Textiles*, are prohibited if they have a flame spread time of:

- 3.5 seconds or less, where the products do not have a raised fibre surface; or
- 4 seconds or less, where the products have a raised fibre surface and exhibit ignition or fusion of their base fibres

More stringent flammability requirements were established in 1971 for all children's sleepwear in sizes up to and including 6x under Item 5 of Part I of Schedule I to the *HPA*. In 1987, the flammability requirements for children's sleepwear were modified by developing even more stringent requirements for loose-fitting children's sleepwear such as nightgowns, robes, tailored pyjamas and baby-doll pyjamas in sizes up to and including 14x under Item 40 of Part II of Schedule I to the *HPA*. Children's polo pyjamas and sleepers, children's sleepwear designed for hospital use, and sleepwear designed for infants up to 7 kg, remained subject to the flammability requirements under Item 5 of Part I of Schedule I to the *HPA*. To provide school-age children with the same level of protection as preschoolers, Item 5 was extended to include products in sizes up to and including 14x.

Children's sleepwear governed under Item 5 of Part I of Schedule I to the *HPA*, when tested in accordance with ASTM Method D1230-61: *Standard Method of Test for Flammability of Clothing Textiles*, are prohibited if they have a flame spread time of:

- 7 seconds or less (for products with or without a raised fibre surface, and irrespective of a base burn)

Children's sleepwear governed under Item 40 of Part II of Schedule I to the *HPA*, when tested in accordance with the Flame Resistance Test set out in Schedule I of the Hazardous Products (Children's Sleepwear) Regulations, must have:

- an average char length for five specimens that does not exceed 178 mm; and
- not more than one individual specimen with a char length equal to the full length of the specimen (254 mm)

For additional information on the *HPA* flammability requirements for children's sleepwear, refer to the 'Children's Sleepwear: Flammability Requirement Guidelines' listed in Appendix C – Canadian Information Resources, on page 23 of this document.

Testing Methods

A) General Textile Products (Item 4 of Part I of Schedule I to the *HPA*); and Children's Sleepwear (Item 5 of Part I of Schedule I to the *HPA*)

In accordance with ASTM Method D 1230-61: *Standard Method of Test for Flammability of Clothing Textiles*, a dried piece of fabric measuring 5.1 cm x 15.2 cm (2″ x 6″) is mounted at a 45 degree angle to the horizontal, and a standardized flame is applied for one second to the surface near the lower end of the fabric. The flame spread time is the time taken for any flaming to proceed a distance of 12.7 cm (5″) up the fabric, and is automatically recorded by the burning of a stop cord.

Before a product sample is tested for flammability, preliminary trials are conducted on fabric specimens cut from the sample in different directions to determine the direction in which to cut the test specimens and the surface to test whereby the fabric burns most rapidly. Once this has been established, the flammability of the product sample is determined by measuring the flame spread time for five test specimens from the same sample and averaging the results. If the average flame spread time is equal to or less than 3.5 seconds for general textile products with a flat fibre surface, 4 seconds for general textile products with a raised fibre surface, or 7 seconds for children's

sleepwear, or if some specimens do not burn (i.e., do not ignite or ignite but extinguish), five additional specimens from the sample are tested. The flame spread time of the product sample is then the average flame spread time for the ten specimens, or for the number of specimens that burned.

Borderline or extremely variable flammability test results are followed up by testing at least one, and preferably two or more, additional product samples to ascertain reasonable consistency of the test results.

For detailed information on this test, refer to the 'Test Method for the Flammability of Textiles – Method F-01' listed in Appendix C – Canadian Information Resources, on page 23 of this document.

B) Children's Sleepwear (Item 40 of Part II of Schedule I to the *HPA*)

In accordance with the Flame Resistance Test set out in Schedule I of Hazardous Products (Children's Sleepwear) Regulations, product samples are first washed and dried or dry cleaned according to specified procedures. Five specimens per product, each measuring 89 mm x 254 mm (3.5″ x 10″), are held vertically and tested individually by applying a standardized flame for three seconds to the base, and the average char length is determined.

For detailed information on this test, refer to the 'Test Method for the Flammability of Children's Sleepwear – Method F-17' listed in Appendix C – Canadian Information Resources, on page 23 of this document.

Factors Affecting Textile Flammability

Fibre content, fabric construction, fabric weight and fabric finishes can all affect the flammability or rate of burn of textiles. All textiles will burn to varying degrees if exposed long enough to a flame or an intense heat source. When discussing any one factor below, it is assumed that all other pertinent factors remain constant.

A) Fibre Content

With regards to flammability, fabrics may be classified generally according to fibre content:

- **readily flammable:**
  These fibres ignite readily and burn rapidly, leaving a light ash residue (e.g., cotton, acetate, triacetate, rayon, ramie).
- **moderately flammable:**
  These fibres are more difficult to ignite. The synthetics tend to melt and drip, sometimes self-extinguishing upon removal of the ignition source (e.g., acrylic, nylon, polyester, olefin, silk).
- **relatively nonflammable:**
  In general, these fibres will not support combustion after removal of the ignition source (e.g., wool, modacrylic, vinyon, saran).

Blends

Fabrics made of two or more fibres (blends) display flammability characteristics that are different from those of the individual fibres, and testing is the only way to ascertain the flammability of the blend. For example, although polyester is less flammable than cotton, some cotton/polyester blends have been shown to burn rapidly and generate more heat than 100% cotton fabrics. This is due to a "scaffolding" effect, where the charred cotton in the blend acts as a support or scaffold for the polyester fibres. The melting polyester in the blend does not drip away as it may do in 100% polyester fabrics, and continues to burn.

Blended fleece fabrics such as 80% cotton/20% polyester may burn quickly like 100% cotton fleece because the brushed surface can be 100% cotton, while the base may be a blend of 50% cotton/50% polyester or 60% cotton/40% polyester. A flame can quickly pass over the raised surface of the fleece, igniting the readily flammable cotton. Once the base of the fabric is ignited, the moderately flammable polyester slows down the rate of burn to one somewhat slower than that of a pure cotton fabric of equal weight and construction.

B) Fabric Construction

For textiles, the critical factor in determining flammability ratings for varying construction techniques is the availability of oxygen. Combustion is accelerated if air can permeate a fabric easily. The more loosely woven a fabric, the more combustible it is, and the faster the flame will travel over the surface of the fabric. For example, a lightweight tightly woven polyester fabric may be difficult to ignite, whereas a lightweight loosely woven (mesh) polyester fabric may fail flammabilty testing.

Fabrics with a raised fibre surface require special consideration. Fleece-style fabrics, flannelettes and terry towelling are some examples of construction which allow individual fibres or yarns to be exposed readily to accidental contact with ignition sources. This, combined with the fact that air readily penetrates and circulates around these loose fibres and yarns, increases the hazard level of raised fibre surface fabrics.

The flammability hazard with raised fibre surface fabrics involves the phenomenon called "surface flash" whereby a flame can travel rapidly over the fabric surface, singeing the fibre ends. This flash, in itself, may not be dangerous unless the intensity of the flame is sufficient to ignite the base fabric. In testing, this is known as timed surface flash with base burn.

C) Fabric Weight

A lightweight fabric tends to be more flammable than a heavier weight fabric of the same fibre content and fabric construction. For example, rayon chiffon usually fails to meet the *HPA* flammability requirements while rayon georgette generally passes. The georgette yarns are more tightly twisted and the weave is more tightly compacted than chiffon. Consequently, the georgette fabric is more difficult to ignite, and when it does ignite, the rate of burn is slower because of the restricted availability of oxygen.

D) Fabric Finishes

A chemical or mechanical finish alters the surface of a fabric and in doing so affects the flammability of that fabric. Finishes not designed specifically to retard flammability must be considered as unknown variables that influence the total flammability of the textile product. Only through testing can the effect of the system be ascertained. For example, enzyme washes designed to reduce the pile on 100% cotton fleece tend to reduce the surface flash by shortening and compacting the loose cotton fibres.

The proper choice of fabrics and design criteria will allow children's sleepwear to meet the applicable *HPA* flammability requirements without treatment with fire retardants. If fire retardants are used, they must meet strict toxicological testing set out in the Hazardous Products (Children's Sleepwear) Regulations.

Canadian Exports to the United States

General textile products and children's sleepwear produced in Canada and shipped to the United States are subject to textile flammability standards issued and enforced by the United States Consumer Product Safety Commission (CPSC). For more information, refer to Appendix D – United States Information Resources, on page 25 of this document.

Flammability requirements for general textile products and children's sleepwear are similar in Canada and the United States, but there are some differences such as the requirements and procedures for laundering. Canadian companies exporting to the United States are advised to ensure compliance with the United States standards and have their goods tested prior to export.

For a partial list of laboratories which provide textile testing services, refer to Appendix B – Canadian Textile Testing Laboratories, on page 20 of this document.

Roles and Responsibilities

The roles and responsibilities of government and industry in ensuring the safety of general textile products and children's sleepwear include, but are not limited to, the following:

A) Health Canada

- develop and enforce the legislation
- educate and inform industry and consumers
- monitor the marketplace, including following up on industry and consumer complaints, recalls by industry and the United States CPSC, and referrals from other agencies or governments
- obtain samples for testing to determine compliance with the *HPA* flammability requirements

For products that do not comply with the HPA flammability requirements:

- take enforcement actions depending on the risk of the products to the consumer, including:
  - providing a verbal or written warning for corrective action to be taken by industry

  - negotiating with industry to voluntarily discontinue the sale of these products through removal, disposal or recall at industry's expense
  - seizing noncompliant products and/or prosecuting industry under the *HPA*
- follow up with the supplier to ensure that the same noncompliant fabric was not sold to other manufacturers
- inform the United States CPSC if the noncompliant product or fabric has been shipped to the United States
- issue a public warning or advisory (press release and/or information bulletin) if the risk to the public is determined to be serious

B) Mills/Finishers/Importers

- ensure that the fabric (yard goods) they are producing, finishing or importing meets the basic *HPA* flammability requirements for general textile products
- if the fabric is intended for children's sleepwear, ensure that it meets the more stringent *HPA* flammability requirements for these products
- advise their customers in the event that the fabric they sell meets the basic *HPA* flammability requirements for general textile products but not the more stringent *HPA* flammability requirements for children's sleepwear

- test the fabric as necessary to ensure continued compliance with the legislation
- co-operate in any removal, disposal or recall from the marketplace of their products found to be noncompliant

C) Clothing Manufacturers

- ensure that the fabric they are using meets the basic *HPA* flammability requirements for general textile products
- if the fabric is used to manufacture children's sleepwear, ensure that it meets the more stringent *HPA* flammability requirements which are applicable to the style of children's sleepwear they are producing
- request test results from their supplier or contract their own testing as deemed necessary
- co-operate in any removal, disposal or recall from the marketplace of their products found to be noncompliant

D) Retailers/Buyers

- ensure that the products being purchased meet the applicable *HPA* flammability requirements
- if products are being purchased outside of Canada, ensure that they meet the applicable *HPA* flammability requirements prior to importation

- when notified of a removal, disposal or recall of a noncompliant product, immediately remove the affected product from sale
- do not promote children's daywear as suitable for use as sleepwear
- segregate children's sleepwear from daywear to assist the consumer in making safe choices for their children

– CONSUMER SAFETY IS A SHARED RESPONSIBILITY –

APPENDIX A

List of Health Canada Product Safety Offices

British Columbia and Yukon

#210 – 3625 Lougheed Highway
Vancouver, British Columbia
V5M 2A6

Tel: (604) 666-5003
Fax: (604) 666-5988
Bby_Prodsafe@hc-sc.gc.ca

Alberta and Northwest Territories

Canada Place, Room 839
9700 Jasper Avenue
Edmonton, Alberta
T5J 4C3

Tel: (780) 495-2626
Fax: (780) 495-2624
Edm_Prodsafe@hc-sc.gc.ca

Harry Hays Building, Room 282
220 – 4th Avenue South East
Calgary, Alberta
T2G 4X3

Tel: (403) 292-4677
Fax: (403) 292-4644
Cal_Prodsafe@hc-sc.gc.ca

Manitoba and Saskatchewan

510 Lagimodiere Boulevard
Winnipeg, Manitoba
R2J 3Y1

Tel: (204) 983-5490
Fax: (204) 984-0461
Mb_Prodsafe@hc-sc.gc.ca

Room 412, Federal Building
101 – 22nd Street East
Saskatoon, Saskatchewan
S7K 0E1

Tel: (306) 975-4502
Fax: (306) 975-6040
Sk_Prodsafe@hc-sc.gc.ca

Ontario

2301 Midland Avenue
Toronto, Ontario
M1P 4R7

Tel: (416) 973-4705
Fax: (416) 973-1746
Tor_Prodsafe@hc-sc.gc.ca

Room 500
150 Main Street West
Hamilton, Ontario
L8P 1H8

Tel: (905) 572-2845
Fax: (905) 572-2047
Tor_Prodsafe@hc-sc.gc.ca

Quebec

1001 ouest, rue St. Laurent
Longueuil, Quebec
J4K 1C7

Tel: (450) 646-1353
Fax: (450) 928-4066
Quebec_Prod@hc-sc.gc.ca

901 Cap-Diamant, Suite 266-1
Quebec City, Quebec
G1K 4K1

Tel: (418) 648-4327
1-800-561-3350
Fax: (418) 649-6536
Quebec_Prod@hc-sc.gc.ca

Atlantic

1505 Barrington Street, Suite 1625
Halifax, Nova Scotia
B3J 3Y6
Tel: (902) 426-8300
Fax: (902) 426-6676
Atlantic_ProdSafe@hc-sc.gc.ca

10 High Field Street, 1st Floor
Moncton, New Brunswick
E1C 9V5
Tel: (506) 851-6638
Fax: (506) 851-3197
Atlantic_ProdSafe@hc-sc.gc.ca

The John Cabot Building, 3rd Floor
10 Barter's Hill
P.O. Box 1949
St. John's, Newfoundland
A1C 5R4
Tel: (709) 772-4050
Fax: (709) 772-5945
Atlantic_ProdSafe@hc-sc.gc.ca

National

Consumer Product Safety Bureau
MacDonald Building, 4th Floor
123 Slater Street
Ottawa, Ontario
K1A 0K9
Tel: (613) 954-0104
Fax: (613) 952-1994
cps-spc@hc-sc.gc.ca

APPENDIX B

Canadian Textile Testing Laboratories

NOTICE: *This listing of laboratories implies no certification or endorsement by Health Canada, nor is it necessarily a complete listing of all laboratories in Canada that provide textile testing services. Many of these laboratories can also do flammability testing.*

Alberta

Textile Analysis Service
Department of Human Ecology
Room B33, Human Ecology Building
University of Alberta
Edmonton, Alberta
T6G 2N1

Tel: (780) 492-3832
Fax: (780) 492-4111

Manitoba

Textile Testing Service
Faculty of Human Ecology
University of Manitoba
H501 Duff Roblin Building
Winnipeg, Manitoba
R3T 2N2

Tel: (204) 474-8509
Fax: (204) 474-7593

Ontario

Bodycote Materials Testing Canada Inc.
Textile Department
2395 Speakman Drive
Mississauga, Ontario
L5K 1B3
Tel: (905) 822-4111
Fax: (905) 823-1446

MTL-ACTS
Consumer Products Division
of Bureau Veritas
8220 Bayview Avenue, Suite 207
Thornhill, Ontario
L3T 2S2
Tel: (905) 771-5723
Fax: (905) 771-5724

Quebec

Centre des technologies textiles/
Textile Technology Centre
3000, rue Boullé
Saint-Hyacinthe, Quebec
J2S 1H9
Tel: (450) 778-1870
Fax: (450) 778-3901

Bodycote Materials Testing Canada Inc.
121, Hymus Boulevard
Pointe Claire, Quebec
H9R 1E6
Tel: (514) 697-3273
Fax: (514) 697-2090

Intertek Testing Services
1829, 32nd Avenue
Lachine, Quebec
H8T 3J1

Tel: (514) 631-3100
Fax: (514) 631-1133

National

Product Safety Laboratory
1800 Walkley Road
Ottawa, Ontario
K1A 0L2

Tel: (613) 952-3645
Fax: (613) 954-8515

APPENDIX C

Canadian Information Resources

NOTICE: *For further information on textile products, contact a Health Canada Product Safety Office (refer to Appendix A – List of Health Canada Product Safety Offices, on page 17 of this document) or visit the following:*

- Product Safety Programme (PSP) **www.hc-sc.gc.ca/psp**
- *Hazardous Products Act* and Regulations **http://laws.justice.gc.ca/en/H-3/index.html**
- Health Canada, 1998. Children's Sleepwear: Flammability Requirement Guidelines – Policy Guidelines for the Children's Sleepwear Requirements under the *Hazardous Products Act*, 98-EHD-221. **http://www.hc-sc.gc.ca/ehp/ehd/catalogue/psb_pubs/sleepwear.pdf**
- Health Canada, 2000. Test Method for the Flammability of Textiles. Method F-01.
  – applicable to Items 4 and 5 of Part I of Schedule I to the *Hazardous Products Act*

– includes ASTM Method D1230-61: *Standard Method of Test for Flammability of Clothing Textiles*

http://www.hc-sc.gc.ca/ehp/ehd/psb/laboratory/f-01.pdf

- Health Canada, 2001. Test Method for the Flammability of Children's Sleepwear. Method F-17.

  – applicable to Item 40 of Part II of Schedule I to the *Hazardous Products Act*

  http://www.hc-sc.gc.ca/ehp/ehd/psb/laboratory/f-17.pdf

- Industry Canada, 2000. Guide to the *Textile Labelling Act* and the Textile Labelling and Advertising Regulations **http://strategis.ic.gc.ca/pics/cp/textile.pdf**

APPENDIX D

United States Information Resources

- Consumer Product Safety Commission (CPSC) **http://www.cpsc.gov**

- CPSC 16 CFR Part 1610 – *Standard for the Flammability of Clothing Textiles* **http://www.access.gpo.gov/nara/cfr/waisidx_00/16cfr1610_00.html**

- CPSC 16 CFR Part 1615 – *Standard for the Flammability of Children's Sleepwear: Sizes 0 through 6X (FF 3-71)* **http://www.access.gpo.gov/nara/cfr/waisidx_00/16cfr1615_00.html**

- CPSC 16 CFR Part 1616 – *Standard for the Flammability of Children's Sleepwear: Sizes 7 through 14 (FF 5-74)* **http://www.access.gpo.gov/nara/cfr/waisidx_00/16cfr1616_00.html**