

Canadian General Standards Board

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Office des normes générales du Canada

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CAN/CGSB-1.151-92

WITHDRAWAL

August 1994

**CANADIAN GENERAL
STANDARDS BOARD**

**FIRE-RETARDANT INTUMESCENT
INTERIOR COATING**

This standard is hereby withdrawn. It has been determined that the product covered by this standard is no longer used in quantities that warrant the continued maintenance of the standard.

RETRAIT

Août 1994

**OFFICE DES NORMES
GÉNÉRALES DU CANADA**

**REVÊTEMENT DE PEINTURE D'INTÉRIEUR,
INTUMESCENT, IGNIFUGE**

Cette norme est retirée par le présent avis. Il a été constaté que le produit qui fait l'objet de la présente norme n'est plus utilisé en quantité suffisante pour maintenir cette norme en vigueur.

Canada

NATIONAL STANDARD OF CANADA

CAN/CGSB-1.151-92

Supersedes 1-GP-151M

**Fire-Retardant
Intumescent
Interior Coating**



QUALITY

Withdrawn/Retired

Canadian General Standards Board

CGSB

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FIRE-RETARDANT INTUMESCENT INTERIOR COATING

This new edition supersedes CGSB standard 1-GP-151M, March 1980. Technical changes include a revised colour requirement and the addition of procedures for rating the effects of change, film thickness for testing to detailed requirements in Section 5 and a definition for intumescent coating.

The Canadian General Standards Board administers a Qualification Listing Program for products conforming to the requirements of this standard. Further information on the listing program is available from the Qualification and Certification Listing Branch of CGSB.

Prepared by the
Canadian General Standards Board 

Approved by the
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Acknowledgment is made for the French translation of this National Standard of Canada by the Translation Bureau of the Department of the Secretary of State.

CANADIAN GENERAL STANDARDS BOARD

**FIRE-RETARDANT INTUMESCENT
INTERIOR COATING****1. SCOPE**

- 1.1 This standard applies to an intumescent fire-retardant coating for interior use on properly prepared combustible and non-combustible surfaces, including structural steel.
- 1.2 For more detailed information on intended uses and application see par. 8.2 and 8.3 respectively.
- 1.3 The testing and evaluation of a product against this standard may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any existing applicable regulatory requirements prior to its use.

2. APPLICABLE PUBLICATIONS

- 2.1 The following publications are applicable to this standard:
- 2.1.1 Canadian General Standards Board (CGSB)
1-GP-12 — Standard Paint Colors, Part III
CAN/CGSB-1.38 — Interior Enamel Undercoater
CAN/CGSB-1.40 — Primer, Structural Steel, Oil Alkyd Type
1-GP-71 — Methods of Testing Paints and Pigments
CAN/CGSB-1.94 — Xylene Thinner (Xylol).
- 2.1.2 ASTM
E 84 — Test Method for Surface Burning Characteristics of Building Materials.
- 2.2 Reference to the above publications and other related standards is to the latest issues unless otherwise specified by the authority applying this standard. The sources of these publications are shown in the Notes section.

3. TERMINOLOGY

Intumescent Coating is defined in ASTM D 16 — Definition of Terms Relating to Paint, Varnish, Lacquer and Related Products as a fire-retardant coating that when heated forms a foam produced by nonflammable gases, such as carbon dioxide and ammonia, resulting in a thick, highly insulating layer of carbon (about fifty times as thick as the original coating) that serves to protect the coated substrate from fire.

4. GENERAL REQUIREMENTS

- 4.1 Coating complying with this standard shall be supplied as either a solvent-based or water-reducible type as specified (par. 8.1) and shall consist of an intimate mixture of suitable pigments, intumescent agents, vehicle and additives.
- 4.2 The coating as supplied shall be suitable for brushing or roller-coating and shall be satisfactory for spraying when reduced, if necessary, in accordance with the manufacturer's instructions.
- 4.3 The coating shall produce a uniform finish having good adhesion and shall be free from agglomerates, streaks and lap marks but may show some orange peel.

- 4.4 The coating shall not skin, settle, thicken excessively nor cake in the original unopened container for one year from date of shipment when stored at temperatures between 5 and 40°C. At the end of this time it shall be capable of being readily mixed to a uniform condition by stirring and shall meet the requirements for applicability and appearance (par. 5.13).
- 4.5 **Colour** — When specified, the colour of the coating shall conform to the CGSB standard 1-GP-12 colour and number or to an adequately defined commercial colour, as specified in par. 8.1 (Note 1).

5. DETAILED REQUIREMENTS

Coating to this standard shall comply with the following detailed requirements when tested in accordance with the specified test methods:

	Min.	Max.	Test Method CGSB 1-GP-71
5.1 Flash point, Pensky-Martens Closed cup, °C	35	—	3.1
5.2 Consistency, Krebs units	85	—	4.5
5.3 Drying Time			5.1 (Note 2)
Dry-to-touch, h	—	8	
Dry hard, h	—	18	
5.4 60° gloss, units	—	20	13.1
5.5 Accelerated Storage Stability			
5.5.1 Solvent-Reducible Formulations — When subjected to the accelerated storage stability test at 60°C for 96 h, the coatings shall not gel, liver, curdle or change in consistency by more than 5 Krebs units and shall show no evidence of seeding or hard settling. At the end of the heating period the coating shall be capable of being readily mixed to a uniform condition by stirring and shall produce a dry film that is uniform in appearance and free from streaking, mottling and seediness when tested in accordance with CGSB standard 1-GP-71, Method 30.3.			
5.5.2 Water-Reducible Formulations — After three freeze-thaw cycles, the change in consistency shall not exceed 8 Krebs units. There shall be no sign of coagulation and the product shall be capable of being stirred into a smooth coating of uniform consistency with relative ease when tested in accordance with CGSB standard 1-GP-71, Method 31.1.			
5.6 Flexibility — The dried coating film applied at a wet-film thickness of $125 \pm 10 \mu\text{m}$ shall show no cracking nor peeling when subjected to the bending test using a 12.5 mm mandrel in accordance with CGSB standard 1-GP-71, Method 119.5.			
5.7 Colour Stability — The dried coating film applied at a wet-film thickness of $125 \pm 10 \mu\text{m}$ shall not show more than a slight change in colour when exposed 48 h in an accelerated fading machine in accordance with CGSB standard 1-GP-71, Method 120.1.			
5.8 Scrubability — The coating applied at a wet-film thickness of $125 \pm 10 \mu\text{m}$ over an undercoater film and allowed to dry 14 d, shall withstand 500 cycles of scrubbing without exposing the contrasting colour of the undercoat to a total length of 12 mm in the direction of the scrub when tested in accordance with CGSB standard 1-GP-71, Method 125.2.			
5.9 Fire Hazard Classification — The coating, applied at a spreading rate of not less than 4 m ² /L on $510 \pm 20 \text{ mm} \times 7.3 \text{ m} \pm 15 \text{ mm}$ panels constructed of 25 mm thick by 100 mm wide pieces of Douglas Fir lumber, that have been previously coated with undercoater conforming to CAN/CGSB-1.38 at a spreading rate of			

Note 1: Because some pigments or excess tint colorant may increase the flame spread, tinting in the field is prohibited.

Note 2: But determined on the coating applied at a wet film thickness of $125 \pm 10 \mu\text{m}$.

10 ± 0.5 m²/L, shall have a maximum flame spread classification of 25, a maximum fuel contributed value of 25 and a maximum smoke density of 50 when subjected to the surface burning test in accordance with ASTM E 84.

- 5.10 **Self-Lifting** — The coating film applied by drawdown at a wet-film thickness of 125 ± 10 µm and allowed to dry for 48 h shall show no blistering, wrinkling, loosening, softening nor other defects due to the application of a second similar coat when examined after the second coat has been dried 24 h, in accordance with CGSB standard 1-GP-71, Method 132.1.
- 5.11 **Resistance to High Humidity** — The coating film, applied and dried as specified and then exposed for 7 d at 35°C and 92% relative humidity, shall show no change in appearance or adhesion when compared with a similar panel held under standard conditions, and there shall not be more than a slight loss in intumescence. A slight change in colour shall not be cause for rejection when tested in accordance with the procedures described in par. 7.2.3.
- 5.12 **Impact Resistance** — When a 0.45 kg steel ball is dropped 1 m, the coating shall not flake, lose adhesion nor expose the undercoat or substrate when tested in accordance with the procedures described in par. 7.2.4. Fine cracks that do not expose the undercoat or substrate shall not be cause for rejection.
- 5.13 **Applicability and Appearance** — When applied by roller in two coats, with 18 h drying between coats, the coating shall apply at a total spreading rate of 3.5 to 4.5 m²/L and shall meet the following requirements when tested in accordance with CGSB standard 1-GP-71, Method 134.7.
- 5.13.1 The coating shall exhibit complete uniform hiding and the black "X" shall not be discernible when the panel is viewed at a distance of 1.5 m.
- 5.13.2 The coating shall have suitable consistency, satisfactory drying time, and adequate rolling properties with absence of ridges, sagging or excessive roller marks. The resultant film shall be free from wrinkling and sagging, and be uniform in appearance.
- 5.13.3 During application, the odour of the coating shall not be more objectionable than the characteristic odour of thinner conforming to CGSB standard CAN/CGSB-1.94.
- 5.13.4 During application of the coating by roller, when a small area along one side of the panel is coated by brush and the panel allowed to dry for 8 h, there shall not be more than a slight colour difference between the brushed and rolled areas.

6. PREPARATION FOR DELIVERY

- 6.1 Unless otherwise specified (par. 8.1), preparation for delivery shall conform to normal commercial practice.
- 6.2 **Labelling** — In addition to complying with the labelling requirements of any relevant Acts or Regulations, each container shall bear a single label showing the following information:

Name of material

Standard number, CAN/CGSB-1.151-92

CGSB standard 1-GP-12 colour and number or commercial colour identification, as applicable

Manufacturer's name and address

Manufacturer's batch number

Manufacturer's code number

Date of manufacture

Fire hazard classification rating (Flame spread, fuel contributed, smoke density) by a nationally recognized laboratory acceptable to the authority having jurisdiction.

Instructions for use

Cautionary note to indicate that the coating shall not be tinted in the field and that the material should be kept from freezing.

7. INSPECTION

7.1 Sampling shall be carried out in accordance with CGSB standard 1-GP-71, Method 1.1.

7.2 Testing

7.2.1 All tests in Section 5 shall be conducted to the applicable test method except that the dry-film thickness shall be $125 \pm 10 \mu\text{m}$.

7.2.2 The procedures for rating the effects of change in CGSB standard 1-GP-71, Method 143.1 shall be used, as applicable, for evaluating performance.

7.2.3 **Resistance to High Humidity** — Apply two coats of the material to 75 x 125 mm glass panels and SAE 1020 steel panels, prepared as outlined in CGSB standard 1-GP-71, Methods 102.1 and 100.1 respectively. Apply each coat at a wet-film thickness of $125 \pm 10 \mu\text{m}$ per coat. Prior to application of the material to the steel panels, first coat them with CAN/CGSB-1.40 primer at a dry-film thickness of $35 \pm 5 \mu\text{m}$ and allow to dry 48 h. Allow the coated panels to dry for 72 h and then expose for 7 d in an atmosphere of 35°C and $92 \pm 5\%$ relative humidity (Note 3). After removal from the controlled atmosphere, compare the test samples with control panels kept under standard conditions (CGSB-1-GP-71, Method 103.1). After examination, expose the coated steel panels to a high-temperature Bunsen flame (held approximately 75 mm from the panel) for 30 s and examine the intumescence (swelling).

7.2.4 **Impact Resistance** — Coat the largest side of a 50 x 100 x 150 mm clear white pine panel with one coat of undercoater conforming to CAN/CGSB-1.38 at a dry film thickness of $35 \pm 5 \mu\text{m}$ and allow to dry for 72 h (CGSB 1-GP-71, Method 103.1). Then apply the fire retardant coating to give a wet film thickness of $125 \pm 10 \mu\text{m}$ and allow to dry 72 h. Support the panel on a non-resilient base, coated side up, and allow a 0.45 kg steel ball to drop freely onto the approximate centre from a height of 1 m. Examine the panel at the point of impact with the unassisted eye.

8. NOTES

8.1 **Options** — The following options must be specified in the application of this standard:

- a. Type of coating (par. 4.1)
- b. CGSB standard 1-GP-12 colour and number or commercial colour identification, as applicable (par. 4.5)
- c. Preparation for delivery, if other than as specified (par. 6.1).

8.2 Intended Uses

8.2.1 Coating complying with this standard is intended for use on an interior surface where a fire retardant is required, such as stairways, halls and corridors, kitchens, bedrooms, basements, storage and supply areas, etc.

8.3 Instructions For Use

8.3.1 This coating can be used alone or in conjunction with a topcoat conforming to CGSB standard 1-GP-152. An overcoat is normally used over this material in areas where better washability is required. When an overcoat is used, a CGSB standard 1-GP-152 overcoat from the same manufacturer should be applied.

8.3.2 To get the expected or required degree of fire retardancy, it is important that the coating be applied at the same application rate, 4 m²/L, as that used when the material was evaluated for the fire hazard classification (par. 5.9).

8.3.3 **Use on Wood** — Bare wood should receive a coat of undercoater conforming to CAN/CGSB-1.38 which is allowed to dry 24 h prior to application of the fire retardant coating. Previously painted surfaces should have all loose paint, dirt and grease removed and bare areas spot primed with the undercoater conforming to CAN/CGSB-1.38. The coating should then be applied allowing 48 h drying between coats.

Note 3: The General Foods Cabinet has been found satisfactory.

- 8.3.4 **Use on Steel** — Steel should receive a coat of primer conforming to CAN/CGSB-1.40 which is allowed to dry 24 h prior to application of the fire retardant coating. The coating should then be applied allowing 48 h drying between coats.
- 8.4 **Related Publication** — CGSB standard 1-GP-152 — Coating, Interior, Overcoat for Fire Retardant Coating.
- 8.5 **Sources of Referenced Publications**
- 8.5.1 The publications referred to in par. 2.1.1 and 8.3.1 may be obtained from the Canadian General Standards Board, Sales Unit, Ottawa, Canada K1A 1G6. Telephone (819) 956-0425 or 956-0426. Fax (819) 956-5644.
- 8.5.2 The publication referred to in par. 2.1.2 may be obtained from ASTM, 1916 Race Street, Philadelphia, PA 19103, U.S.A. or from the Standards Council of Canada, Standards Sales Branch, 45 O'Connor Street, Suite 1200, Ottawa, Ontario K1P 6N7.
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