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Bombardier SMP 800-C Toxic Gas Generation of "7500 Series Glo Brite" Material

A Report To: **Jessup Manufacturing Company**
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Attention: Al Carlson

Submitted By: Fire Testing

Report No. 06-02-605(C)
3 pages + 1 appendix

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ACCREDITATION Standards Council of Canada, Registration #1.

REGISTRATIONS • ISO 9001:2000, registered by QMI, Registration #001109.
 • New York City Department of Buildings, MEA Division, Registration #110-05-L.

SPECIFICATIONS OF ORDER

Determine toxic gas production according to Bombardier SMP 800-C, as per your P.O. #18083-00 and our Quotation No. 06-02-04856 accepted July 21, 2006.

IDENTIFICATION

Photoluminescent material with self-adhesive backing (peel and stick), approximately 0.2 mm in thickness, identified as "7500 Series Glo Brite".

(Bodycote sample identification number 06-02-S0605)

TEST RESULTS

Note: Prior to testing the material was adhered to 6 mm thick fiberglass reinforced cement board.

Bombardier SMP 800-C

Toxic Gas Generation

| | | <u>Flaming Mode</u> | <u>Non-Flaming Mode</u> | <u>Specified Maxima</u> |
|--------------------------|----------------|-------------------------|-----------------------------|-----------------------------|
| Carbon Monoxide (CO ppm) | at 1.5 minutes | <10 | <10 | - |
| | at 4.0 minutes | 10 | <10 | - |
| | at maximum | 668 | 45 | 3500 |
| Carbon Dioxide (CO2 ppm) | at 1.5 minutes | <50 | <50 | - |
| | at 4.0 minutes | 400 | <50 | - |
| | at maximum | 12350 | <50 | 90000 |

TEST RESULTS (Cont..)**Bombardier SMP 800-C**Toxic Gas Generation

| | <u>Flaming Mode</u> | <u>Non-Flaming Mode</u> | <u>Specified Maxima</u> |
|------------------------------------------|-------------------------|-----------------------------|-----------------------------|
| Nitrogen Oxides (as NO ₂ ppm) | 2 | <1 | 100 |
| Sulfur Dioxide (SO ₂ ppm) | <1 | <1 | 100 |
| Hydrogen Chloride (HCl ppm) | 10 | 5 | 500 |
| Hydrogen Fluoride (HF ppm) | <2 | <2 | 100 |
| Hydrogen Bromide (HBr ppm) | <1 | <1 | 100 |
| Hydrogen Cyanide (HCN ppm) | <1 | <1 | 100 |
| Original Weight (g) | 1.9 | 1.8 | - |
| Final Weight (g) | <u>Not determinable</u> | <u>Not determinable</u> | - |
| Weight Loss (g) | - | - | - |
| Weight Loss (%) | - | - | - |
| Time to Ignition (s) | 4 | Did not ignite | - |
| Burning Duration (s) | Not determinable | - | - |

CONCLUSIONS

The photoluminescent material identified in this report, when tested adhered to cement board at an approximately thickness of 0.2 mm, meets Bombardier requirements as they pertain to toxic gas production (Bombardier SMP 800-C) and therefore also meets the toxicity requirements of paragraph 3.0 of the New York City Building Code § 27-383(b) Reference Standard RS 6-1A (Photoluminescent exit path markings).



I. Smith,
Fire Testing.



Richard J. Lederle,
Fire Testing.

Note: This report consists of 3 pages, including the cover page, that comprise the report "body". It should be considered incomplete if all pages are not present. Additionally, the Appendix of this report comprises a cover page, plus 1 page.

APPENDIX

(1 Page)

Summary of Test Procedure

Bombardier SMP 800-C

Toxic Gas Sampling and Analytical Procedures

Toxic Gas Generation

Gases produced for analysis are generated in a specified, calibrated smoke chamber during standard rate of smoke generation testing (typically ASTM E 662), in both flaming combustion and non-flaming pyrolytic decomposition test modes.

Carbon Monoxide (CO) and Carbon Dioxide (CO₂)

CO and CO₂ are monitored continuously during the 20 minute test using a non-dispersive infrared (NDIR) analyzer. Data are reported in ppm by volume at 1.5 and 4.0 minutes and at maximum concentration.

Acid Gas Sampling

HCN, HF, HCl, HBr, NO_x and SO₂ are sampled by drawing 6 litres of the chamber atmosphere through two midjet impingers, each containing 10 ml of 0.25N NaOH, at a rate of 400 ml per minute. The 15 minute sampling period is commenced at the 4 minute mark. All determinations are performed in both the flaming and non-flaming modes and all data are reported in parts per million (ppm) by volume in air.

Analysis of Impingers for Hydrogen Cyanide (HCN)

Cyanide in the NaOH impinger, as NaCN, is converted to CNCl by reaction with chloramine-T at pH greater than 8 without hydrolyzing to CNO⁻. After the reaction is complete, CNCl forms a red-blue colour on addition of a pyridine-barbituric acid reagent. Cyanide is quantified by spectrometric measurement of the increase in colour 578 nm.

Reference: In-house SOP 00-13-SP-1216 based on ASTM Method D 2036-91

Analysis of Impingers for Hydrogen Fluoride (HF)

Fluoride, as NaF, in the NaOH impinger is determined using SPADNS colorimetry.

Reference: In-house SOP 01-13-SP-1295

Analysis of Impingers for Hydrogen Chloride (HCl) and Hydrogen Bromide (HBr)

Alkali halides (chloride and bromide) formed in the NaOH solution are measured using ion chromatography and conductivity detection.

Reference: In-house SOP 02-13-SP-1402

Analysis of Impingers for Nitrogen Oxides (NO_x)

Nitrite and nitrate formed in the alkaline solution are determined using ion chromatography and conductivity detection. The nitrite and nitrate results are combined and the total expressed as nitrogen dioxide (NO₂).

Reference: In-house SOP 02-13-SP-1402

Analysis of Impingers for Sulfur Dioxide (SO₂)

SO₂ is trapped in the NaOH impinger as sulfite and sulfate (SO₃²⁻ and SO₄²⁻). Hydrogen peroxide is added to convert SO₃²⁻ to SO₄²⁻. Resulting sulfate is determined using ion chromatography and conductivity detection.

Reference: In-house SOP 02-13-SP-1402