

**Bombardier SMP 800-C Toxic Gas Generation  
on "Ecoglo E2071" HPPL Composite**

A Report To: **Professional Testing Laboratory, Inc.**  
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Attention: Lee Phillips

Submitted By: Fire Testing

Report No. 05-02-519  
3 pages + 1 appendix

Date: July 12, 2005

**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**

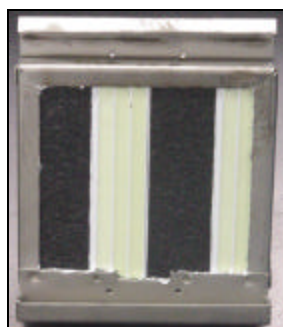
Determine toxic gas production according to Bombardier SMP 800-C, as per your P.O. #2005-062905 dated June 29, 2005.

**IDENTIFICATION** (BMTc sample identification number 05-02-S0519)

Composite, abrasive strip and high performance photoluminescent (HPPL) material on aluminum tracking substrate, approximately 2.1 to 2.4 mm in total thickness, identified as "Ecoglo E2071".

**SAMPLE PREPARATION**

Specimens were supplied as a two-material composite strip with two separate, and compositionally different materials attached to an aluminum tracking substrate. Since this strip represents the final product, it was determined that this test procedure was appropriate. Requisite specimen sizes were created by butting two strips of the material together vertically in the specimen holders, in alternate stripes, in an attempt to offer maximum exposure to both materials.



Far Left. Composite marking system shown as supplied (cut to length).

Right: Test specimen (2 sections butted together vertically) shown in sample holder with abrasive strip and HPPL ridges alternating.

**TEST RESULTS**

**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	463	<10	3500
Carbon Dioxide (CO <sub>2</sub> ppm)	at 1.5 minutes	<50	<50	-
	at 4.0 minutes	1850	<50	-
	at maximum	13400	<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 <sub>2</sub> ppm)	2	1	100
Sulfur Dioxide (SO <sub>2</sub> ppm)	<1	<1	100
Hydrogen Chloride (HCl ppm)	7	9	500
Hydrogen Fluoride (HF ppm)	<2	<2	100
Hydrogen Bromide (HBr ppm)	<1	<1	100
Hydrogen Cyanide (HCN ppm)	2	<1	100
Original Weight (g) (including substrate)	24.8	24.4	-
Final Weight (g) (including substrate)	<u>20.9</u>	<u>24.2</u>	-
Weight Loss (g)	3.9	0.2	-
Weight Loss (%)	15.86	0.78	-
Time to Ignition (s)	125	Did not ignite	-
Burning Duration (s)	Not determinable	-	-

**CONCLUSIONS**

The photoluminescent composite material on aluminum identified in this report, when tested at a total approximate thickness of 2.1 to 2.4 mm, meets Bombardier requirements as they pertain to toxic gas production (Bombardier SMP 800-C) and therefore 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).

***Note: This is an electronic copy of the report. Signatures are on file with the original report.***

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.*

**Bodycote Materials Testing Canada Inc.**

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*Bombardier SMP 800-C on "Ecoglo E2071" HPPL Composite*

*For: Professional Testing Laboratory, Inc.*

*Report No. 05-02-519*

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**APPENDIX**

(1 Page)

**Summary of Test Procedure**

## **Bodycote Materials Testing Canada Inc.**

### **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 (CO<sub>2</sub>)

CO and CO<sub>2</sub> 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<sub>x</sub> and SO<sub>2</sub> are sampled by drawing 6 litres of the chamber atmosphere through two midget 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<sup>-</sup>. 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 with conductivity detection.

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

##### Analysis of Impingers for Nitrogen Oxides (NO<sub>x</sub>)

Nitrite and nitrate formed in the alkaline solution are determined using ion chromatography with conductivity detection. The nitrite and nitrate results are combined and the total expressed as nitrogen dioxide (NO<sub>2</sub>).

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

##### Analysis of Impingers for Sulfur Dioxide (SO<sub>2</sub>)

SO<sub>2</sub> is trapped in the NaOH impinger as sulfite and sulfate (SO<sub>3</sub><sup>-2</sup> and SO<sub>4</sub><sup>-2</sup>). Hydrogen peroxide is added to convert SO<sub>3</sub><sup>-2</sup> to SO<sub>4</sub><sup>-2</sup>. Resulting sulfate is determined using ion chromatography with conductivity detection.

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