Ecoglo International Limited

Technical Manual
for
Photoluminescent Exit Signs

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Contents:

Section 26 53 00

Ecoglo Photoluminescent Exit Signs (inc. Floor Proximity Exit Signs)

This specification has been numbered, organized and formatted in accordance with the MasterFormat, Section Format and Page Format documents published jointly by Construction Specifications Institute (CSI).

It is offered as a guide to experienced and knowledgeable construction professionals who assume full responsibility for its interpretation and use.

Square brackets [ ] containing text indicate an option to be considered/inserted by the specifier. Remove brackets and unused options before printing.

Section 26 53 00

Photoluminescent Exit Signs (inc. Floor Proximity Exit Signs)

Part 1 General

1.1 Summary

A Work Included: Supply and installation of photoluminescent exit signs to identify the Means of Egress.

1.2 References

A [Fire Code of the Philippines SECTION 10.2.5.12 EXIT MARKING]

B American Society for Testing & Materials (ASTM) E2073-10 – Standard Test Method for Photopic Luminance of Photoluminescent Phosphorescent) Markings

1.3 Design Requirements

A Photoluminescent exit signs shall be provided to identify all interior and exterior parts of the Means of Egress including, but not limited to, exit doors, exit stairways, exit ramps and exit passageways.

B In addition to the exit signs required at 1.3A, to assist with emergency egress in smoke conditions, photoluminescent floor proximity exit signs may also be provided on doors and in corridors along the Means of Egress.

C Locations. Signs shall be located:

a. at each point in the Means of Egress where the exit is not immediately visible to occupants;
b. to clearly indicate each door in the Means of Egress; and
c. to clearly identify the direction of travel to reach the nearest exit door.

D Position.

a. A sign provided to identify a door in the Means of Egress shall be positioned on a vertical surface within 600mm of the door and be positioned where it is least likely to be obscured from view and where it cannot be obscured when the door is open.
b. A floor proximity exit sign may also be positioned on, or adjacent to, doors in the Means of Egress through which occupants must pass. The bottom of the sign shall be not less than 150 mm, and not more than 450 mm, above the floor. The sign shall be mounted on the door or adjacent to the door with the nearest edge of the sign within 100 mm of the door frame.
c. Floor proximity exit signs may be positioned on walls along corridors in the Means of Egress through which occupants must pass. The bottom of the sign shall be not less than 150 mm, and not more than 450 mm, above the floor.

E Illumination: Where photoluminescent exit signs are installed, they shall be provided with not less than 54 lux of illumination from a light source with a colour temperature not less than 4000K for not less than 60 minutes prior to periods when the building is occupied, and continuously during the building occupancy.

F In the event of a power failure, a photoluminescent exit sign shall:

a. continue to provide a minimum luminance of 30mcd/m^2 for not less than 90 minutes; and
b. have its performance verified by testing in accordance with ASTM E2073-10, except the activation illumination in clause 8.3 is replaced with 54 lux.

G Viewing Distance. The maximum viewing distance and minimum text height is defined in Table 1.

Table 1

Maximum Viewing Distance (m)	Minimum Text Height (mm)
16	150
24	210

H Exit signs shall be aluminium based and manufactured using High Temperature Curing (HTC) technology.

1.4 Quality Assurance

A Manufacturer Qualifications: to have a minimum of 25 years' experience manufacturing photoluminescent materials.

1.5 Submittals

Submit the following [in accordance with Section 01 33 00 – Submittal Procedures]:

1 Product Data: Manufacturer's printed product data sheets for materials used in system.
2 Shop Drawings: Provide drawings showing details, dimensions, extent of work, and other data necessary for the satisfactory installation of the products stated herein.
3 Manufacturer's Instructions: Pre-printed material describing installation of product, system or material, including special notices, Safety Data Sheets outlining hazards and safety precautions and maintenance and cleaning instructions.
4 Test Reports: Showing compliance with required standards, ordinances and codes.
5 Substitutions: Not permitted, however requests for substitutions will be considered provided substitute products and methods of execution are submitted at least 15 days prior to the bid closing date. All requests shall include test results, product descriptions, confirmation of piece design and engineering calculations meeting design criteria.

1.6 Delivery, Storage and Handling

A Handle and store Products in a manner to prevent damage, deterioration and soiling to Products, other building components, assemblies, other Products, the structure, the Site and surrounding property and in accordance with manufacturer's instructions.

B Store packaged or bundled Products in original and undamaged containers and packaging with manufacturer's seals and labels intact. Do not remove from packaging or containers until ready to be installed.

C Store products subject to damage from weather in weatherproof enclosures.

1.7 Warranty

A Provide manufacturer's limited warranty.

1 Warranty to cover defects in materials and workmanship: 5 years from date of delivery of the signs.

2 30 Year Warranty on photoluminescent performance of HTC Signs when positioned indoors.

Part 2 Products

2.1 Manufacturers

A Contract Documents are based on products by Ecoglo International Ltd (www.ecoglo.com)

B Substitutions: [Under provisions of Division 01.] [Not permitted.]

2.2 Materials

A Photoluminescent pigment embedded in thermoset polyester manufactured using a High Temperature Manufacturing (HTC) process at a temperature exceeding 160°C to integrally bond the active ingredients to 5005 0.9mm aluminium sheet.

B All HTC Signs to meet or exceed the performance criteria specified in the following tests or standards.
PC = Performance Criteria

a. UV Resistance
ASTM G155-04 Cycle 1 1000hrs, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials.
PC – Loss in luminance after exposure < 10%

b. Salt Spray Resistance
ASTM B117-97, Standard Practice for Operating Salt Spray (Fog) Apparatus. PC – Slight corrosion build up along scribes, no blistering or filiform growth along scribes.

c. Washability
ASTM D4828-94 (2003), Standard Test Methods for Practical Washability of Organic Coatings. PC – crayon, pen, 3M soil: all rating 10, being complete removal of soilant.

d. Rate of Burning
ASTM D635-03, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
PC – Time of burn 0 seconds, does not burn.

e. Surface Flammability
ASTM E162-02, Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source. PC – Flame

spread index 7.6, ignites with difficulty.

f. Toxicity
Bombardier Toxic Gas Generation Test SMP800-C. PC – Pass.

g. Radioactivity
ASTM D3648-2004, Standard Practices for the Measurement of Radioactivity. PC – Pass.

h. Visibility
ASTM E2073-10 Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings except that the activation illumination in clause 8.3 is replaced with 54 lux. PC – Pass

i. High Temperature Curing
Independently tested by placing 3 samples in an oven at 150°C for 20 minutes and then examining the samples after removing from the oven. PC – the samples shall have no shrinkage, delamination, distortion, or yellowing.

2.3 Components

A Basis of design: Ecoglo S20 Photoluminescent BFP Exit Signs

Description:

a. Stores energy from ambient LED, fluorescent, metal halide or mercury vapor light.

b. Non-toxic, non-radioactive.

B Visibility rating: [16metres] [24metres] [As per Schedule attached at end of Section] [As indicated in drawings]

Click here to view Ecoglo S20 Photoluminescent BFP Exit Signs

Product Code	Product Name	Sign Size	Maximum Viewing Distance
S20-BFP2916-16m	Exit	290mm x 162mm	16m
S20-BFP4223-24m	Exit	420mm x 230mm	24m
S20-BFP2916L-16m	Exit Left	290mm x 162mm	16m
S20-BFP4223L-24m	Exit Left	420mm x 230mm	24m
S20-BFP2916R-16m	Exit Right	290mm x 162mm	16m
S20-BFP4223R-24m	Exit Right	420mm x 230mm	24m
S20-BFP162-16m	Chevron	50mm x 162mm	16m
S20-BFP230-24m	Chevron	70mm x 230mm	24m

Part 3 Execution

3.1 Examination

A Before installation, examine surfaces on which the Work of this Section depends. Notify [Contractor] if surfaces do not comply with requirements of this Section.

B Do not proceed with Work of this Section until all unsatisfactory conditions have been corrected, if any.

C Commencement of Work will imply acceptance of surfaces.

3.2 Preparation

A Clean surfaces to remove debris, dirt, dust, grease, oil, loose material, or other matter that may affect installation of photoluminescent products.

3.3 Installation

A Install Signs [as per Schedule attached at end of Section] [as indicated in Drawings].

B Unless otherwise indicated in the specifications, install Signs in accordance with manufacturer's instructions. Obtain written instructions directly from manufacturer.

3.4 Cleaning

A At completion of installation, clean soiled Sign surfaces in accordance with manufacturer's instructions.

3.5 Waste Management and Disposal

A Separate waste materials for [reuse] [and] [recycling] at nearest used building materials facility.

3.6 Protection

A Do not allow heavy objects to come into contact with installed Signs.

3.7 Signage Schedule

Specification articles (product selections) contained within square brackets [ ] are shown as example choices only.

Sign Designation	**Product Code**
[Sign designation on drawing]	[S20-BFP2916-24m]
[Sign designation on drawing]	[S20-BFP4223L-24m]

End of Section

Appendices to

Ecoglo International Ltd
Technical Manual
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Contents

Appendix 1

Ecoglo International Ltd

Product Data Sheets

Product Data Sheet - Exit EX-BFP

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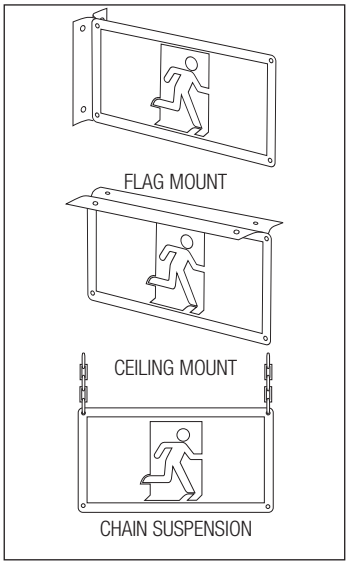

Ecoglo "Exit" S20 Signs are designed to meet the Exit sign requirements of Section 10.2.5.12 of the Fire Code of the Philippines. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including emergency conditions.

SIGN DEFINITION
Exit straight on from here.

COMPLIANCE
Ecoglo "Exit" S20 Signs require a minimum of 54 lux on the face of the sign 60 minutes prior to, and during, occupancy of the building to ensure a minimum luminance of 30mcd/m2 for 90 minutes after failure of the normal lighting.

Luminance - S20 grade signs easily exceed PSPA Class G.
UV Resistance - Loss of luminance after 1000 hrs ASTM G-155 Cycle 1 exposure: <10%
Salt Spray Resistance – ASTM B117: Pass
Washability – ASTM D4828: Pass
Rate of Burning – ASTM D635: Pass
Surface Flammability - ASTM E162: Pass
Toxicity - Bombardier Toxic Gas Generation Test SMP800-C: Pass
Radioactivity - ASTM D3648: Pass
High Temperature Curing: Pass

Operating Temperature Range: -20°C to +40°C*
* For controlled environment (constant temperature) rooms below 0°C contact Ecoglo.

SUPPLY
The product is available in 2 sizes - maximum viewing distance 16 metres and maximum viewing distance 24 metres.

PRODUCT CODE	PRODUCT NAME	SIGN DEFINITION	SIGN SIZE	MAXIMUM VIEWING DISTANCE
S20-BFP2916-16m	Exit	Exit straight on from here	290mm x 162mm	16 metres
S20-BFP4223-24m	Exit	Exit straight on from here	420mm x 230mm	24 metres

COMPOSITION
The high visibility flat panel is manufactured from 5005 0.9mm aluminium sheet. Custom made photoluminescent pigments are embedded in thermoset polyester carriers to integrally bond the active ingredients onto the aluminium sheet following curing at high temperature.

HTC
HIGH TEMPERATURE CURING

INSTALLATION
The standard sign is supplied with fixers for mounting flat on a wall. *Signs with brackets for ceiling or flag mounting are available - see order codes for signs and brackets below.*

PRODUCT CODE	PRODUCT NAME	CEILING MOUNT BRACKET	FLAG MOUNT BRACKET
S20-BFP2916-16m	Exit	BR1-290	BR1-162
S20-BFP4223-24m	Exit	BR1-420	BR1-230

Chain suspension is also available.

Contact

Ecoglo Fire Protection Product Trading
Address: 36-C Gloria Street, Barangay San Carlos, Binangonan Rizal 1940, Philippines
Office: +632-8802-4760
Cell: +63917-514-6803
+63968-356-4773
Email: keith.phillips@ecoglo.com
Web: www.ecoglo.ph

Product Data Sheet - Exit Right EXR-BFP

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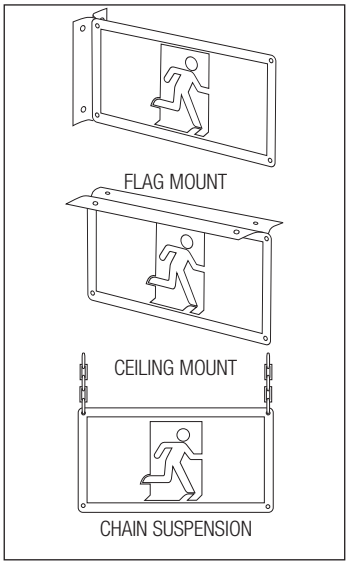

Ecoglo "Exit Right" S20 Signs are designed to meet the Exit sign requirements of Section 10.2.5.12 of the Fire Code of the Philippines. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including emergency conditions.

SIGN DEFINITION
Exit right from here.

COMPLIANCE
Ecoglo "Exit Right " S20 Signs require a minimum of 54 lux on the face of the sign 60 minutes prior to, and during, occupancy of the building to ensure a minimum luminance of 30mcd/m2 for 90 minutes after failure of the normal lighting.

Luminance - S20 grade signs easily exceed PSPA Class G.
UV Resistance - Loss of luminance after 1000 hrs ASTM G-155 Cycle 1 exposure: <10%
Salt Spray Resistance – ASTM B117: Pass
Washability – ASTM D4828: Pass
Rate of Burning – ASTM D635: Pass
Surface Flammability - ASTM E162: Pass
Toxicity - Bombardier Toxic Gas Generation Test SMP800-C: Pass
Radioactivity - ASTM D3648: Pass
High Temperature Curing: Pass

Operating Temperature Range: -20°C to +40°C*
* For controlled environment (constant temperature) rooms below 0°C contact Ecoglo.

SUPPLY
The product is available in 2 sizes - maximum viewing distance 16 metres and maximum viewing distance 24 metres.

PRODUCT CODE	PRODUCT NAME	SIGN DEFINITION	SIGN SIZE	MAXIMUM VIEWING DISTANCE
S20-BFP2916R-16m	Exit Right	Exit right from here	290mm x 162mm	16 metres
S20-BFP4223R-24m	Exit Right	Exit right from here	420mm x 230mm	24 metres

COMPOSITION
The high visibility flat panel is manufactured from 5005 0.9mm aluminium sheet. Custom made photoluminescent pigments are embedded in thermoset polyester carriers to integrally bond the active ingredients onto the aluminium sheet following curing at high temperature.

HTC
HIGH TEMPERATURE CURING

INSTALLATION
The standard sign is supplied with fixers for mounting flat on a wall. *Signs with brackets for ceiling or flag mounting are available - see order codes for signs and brackets below.*

PRODUCT CODE	PRODUCT NAME	CEILING MOUNT BRACKET	FLAG MOUNT BRACKET
S20-BFP2916R-16m	Exit right	BR1-290	BR1-162
S20-BFP4223R-24m	Exit right	BR1-420	BR1-230

Chain suspension is also available.

Contact

Ecoglo Fire Protection Product Trading
Address: 36-C Gloria Street, Barangay San Carlos, Binangonan Rizal 1940, Philippines
Office: +632-8802-4760
Cell: +63917-514-6803
+63968-356-4773
Email: keith.phillips@ecoglo.com
Web: www.ecoglo.ph

Product Data Sheet - Exit Left EXL-BFP

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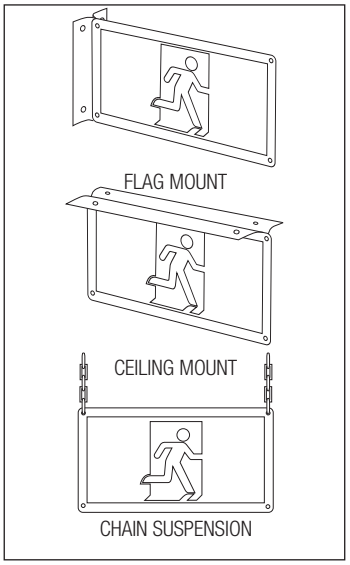

Ecoglo "Exit Left" S20 Signs are designed to meet the Exit sign requirements of Section 10.2.5.12 of the Fire Code of the Philippines. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including emergency conditions.

SIGN DEFINITION
Exit left from here.

COMPLIANCE
Ecoglo "Exit Left " S20 Signs require a minimum of 54 lux on the face of the sign 60 minutes prior to, and during, occupancy of the building to ensure a minimum luminance of 30mcd/m2 for 90 minutes after failure of the normal lighting.

Luminance - S20 grade signs easily exceed PSPA Class G.
UV Resistance - Loss of luminance after 1000 hrs ASTM G-155 Cycle 1 exposure: <10%
Salt Spray Resistance – ASTM B117: Pass
Washability – ASTM D4828: Pass
Rate of Burning – ASTM D635: Pass
Surface Flammability - ASTM E162: Pass
Toxicity - Bombardier Toxic Gas Generation Test SMP800-C: Pass
Radioactivity - ASTM D3648: Pass
High Temperature Curing: Pass

Operating Temperature Range: -20°C to +40°C*
* For controlled environment (constant temperature) rooms below 0°C contact Ecoglo.

SUPPLY
The product is available in 2 sizes - maximum viewing distance 16 metres and maximum viewing distance 24 metres.

PRODUCT CODE	PRODUCT NAME	SIGN DEFINITION	SIGN SIZE	MAXIMUM VIEWING DISTANCE
S20-BFP2916L-16m	Exit Left	Exit left from here	290mm x 162mm	16 metres
S20-BFP4223L-24m	Exit Left	Exit left from here	420mm x 230mm	24 metres

COMPOSITION
The high visibility flat panel is manufactured from 5005 0.9mm aluminium sheet. Custom made photoluminescent pigments are embedded in thermoset polyester carriers to integrally bond the active ingredients onto the aluminium sheet following curing at high temperature.

HTC
HIGH TEMPERATURE CURING

INSTALLATION
The standard sign is supplied with fixers for mounting flat on a wall. *Signs with brackets for ceiling or flag mounting are available - see order codes for signs and brackets below.*

PRODUCT CODE	PRODUCT NAME	CEILING MOUNT BRACKET	FLAG MOUNT BRACKET
S20-BFP2916L-16m	Exit left	BR1-290	BR1-162
S20-BFP4223L-24m	Exit left	BR1-420	BR1-230

Chain suspension is also available.

Contact

Ecoglo Fire Protection Product Trading
Address: 36-C Gloria Street, Barangay San Carlos, Binangonan Rizal 1940, Philippines
Office: +632-8802-4760
Cell: +63917-514-6803
+63968-356-4773
Email: keith.phillips@ecoglo.com
Web: www.ecoglo.ph

Product Data Sheet - S20 CHEVRON BFP

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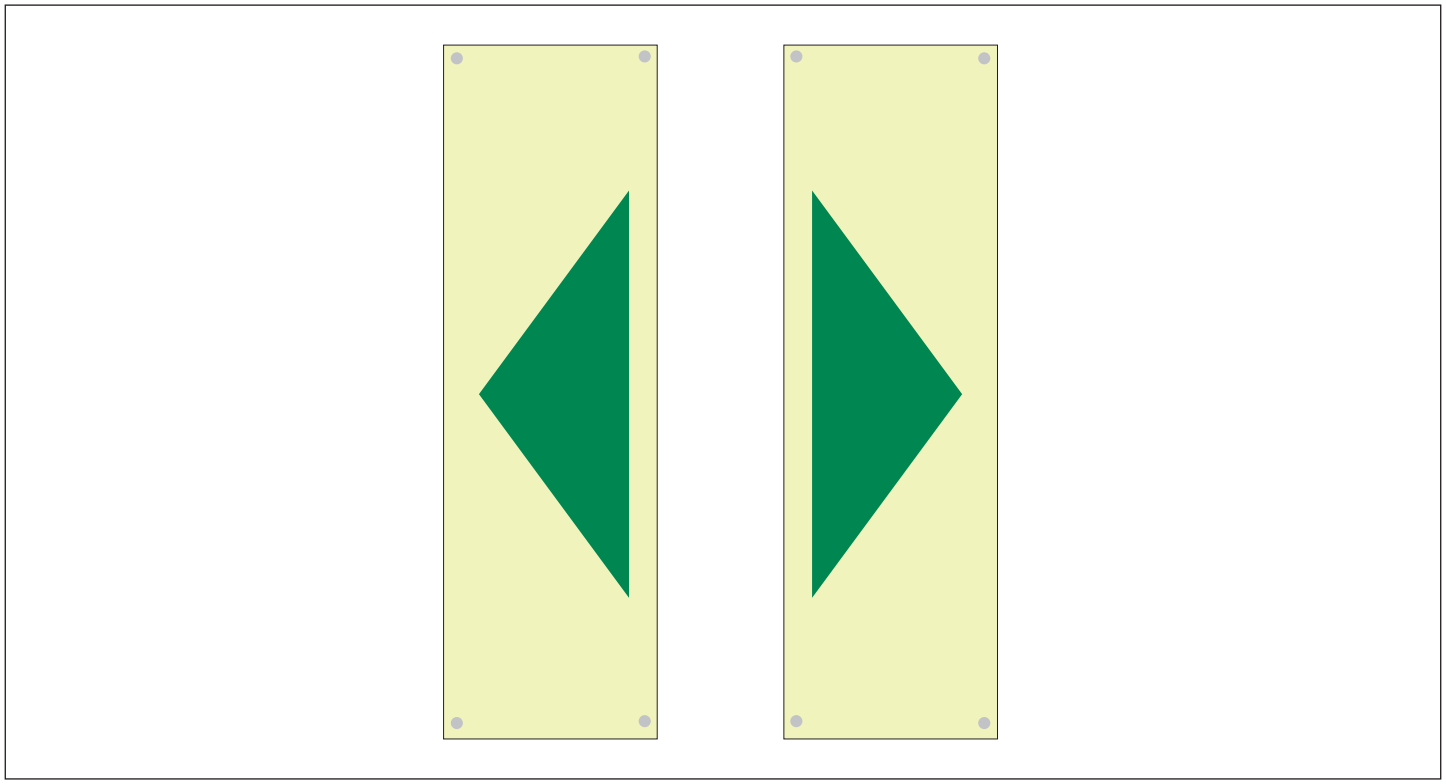

Ecoglo S20 Directional "Chevron" signs are designed to meet the Directional sign requirements of Section 10.2.5.12 of the Fire Code of the Philippines. The Chevron signs can be used as standalone directional indicators or can be used alongside Ecoglo S20 Directional signs. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including emergency conditions.

SIGN DEFINITION
Travel in this direction.

COMPLIANCE
Ecoglo S20 Directional "Chevron" signs require a minimum of 54 lux on the face of the sign 60 minutes prior to, and during, occupancy of the building to ensure a minimum luminance of 30mcd/m2 for 90 minutes after failure of the normal lighting.

Luminance – S20 grade signs easily exceed PSPA class G
UV Resistance – Loss of luminance after 1000 hrs ASTM G-155 Cycle 1 exposure: <10%
Salt Spray Resistance – ASTM B117: Pass
Washability – ASTM D4828: Pass
Rate of Burning – ASTM D635: Pass
Surface Flammability – ASTM E162: Pass
Toxicity – Bombardier Toxic Gas Generation Test SMP800-C: Pass
Radioactivity – ASTM D3648: Pass
High Temperature curing: Pass

Operating Temperature Range: -20°C to +40°C*
*For controlled environment (constant temperature) rooms below 0°C contact Ecoglo.

SUPPLY
The sign is available in 2 sizes - maximum veiwing distance 16 metres and maximum viewing distance 24 metres.

PRODUCT CODE	PRODUCT NAME	SIGN DEFINITION	SIGN SIZE	MAXIMUM VIEWING DISTANCE
S20-BFP162-16m	Chevron	Travel in this direction	50mm x 162mm	16 metres
S20-BFP230-24m	Chevron	Travel in this direction	70mm x 230mm	24 metres

COMPOSITION
The high visibility flat panel is manufactured from 5005 0.9mm aluminium sheet. Custom made photoluminescent pigments are embedded in thermoset polyester carriers to integrally bond the active ingredients onto the aluminium sheet following curing at high temperature - a process known as HTC.

HTC HIGH TEMPERATURE CURING

INSTALLATION
The sign is supplied with fixers for mounting on a flat wall.

Contact

Ecoglo Fire Protection Product Trading
Address: 36-C Gloria Street, Barangay San Carlos, Binangonan Rizal 1940, Philippines
Office: +632-8802-4760
Cell: +63917-514-6803
+63968-356-4773
Email: keith.phillips@ecoglo.com
Web: www.ecoglo.ph www.EcogloAsia.com www.EcogloVenues.com

Appendix 2

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Installation Instructions

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V19.1

Installation Instructions For

Signs

Surface Mounted Signs

Ecoglo exit signs are to be installed only where there will be sufficient natural or artificial light to keep them charged whenever the building is occupied.

If unsure, contact Ecoglo

Ecoglo International Limited
Email: info@ecoglo.com
www.ecoglo.com

Signs Surface Mounted Signs

Mounting Location

- At doors: mount on a vertical surface within 600mm of the door where the sign is least likely to be obscured from view. Where the ceiling is directly above the top of the door, the sign can be mounted on the door as long as the door is outward opening, and has a self-closer mechanism.
- On walls: mount 2 - 2.5 metres above floor level, or where it is least likely to be obscured from view.
- When installing the sign make sure it is parallel to the nearest horizontal building feature, so that it looks level to the eye.

Mounting Surfaces

- Timber: screw install (use all 4 holes in the sign).
- Plasterboard: screw install with suitable anchors (use all 4 holes in the sign).
- Glass: adhere with suitable high strength white foam back mounting tape. For signs up to 420mm x 230mm apply two strips of tape 200mm x 25mm near the top and bottom of the sign.
- Concrete, Solid plaster, Steel: adhere with Bostik Seal'N"Flex FC or Wurth KD Bond and seal, and use suitable foamback tape to ensure sign stays in position while the adhesive is curing.

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Installation Instructions For

Sign Brackets

Flag and Ceiling Mounted Signs

Ecoglo exit signs are to be installed only where there will be sufficient natural or artificial light to keep them charged whenever the building is occupied.

If unsure, contact Ecoglo

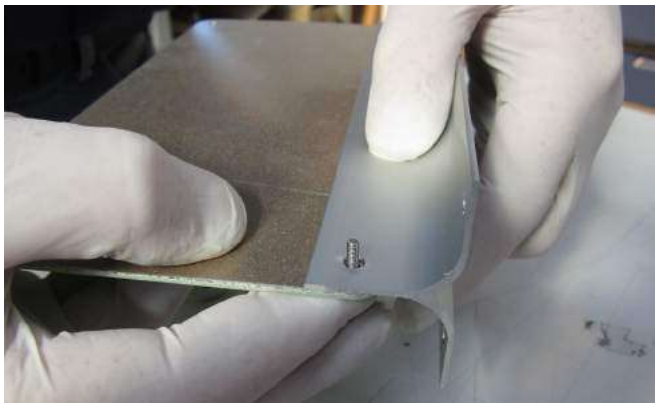
Ecoglo International Limited
Email: info@ecoglo.com
www.ecoglo.com

Sign Brackets Flag & Ceiling Mounted Signs

Note: For signs without pre-drilled holes, place the mounting bracket over the sign and, using the holes in the bracket, mark on the sign where the screws are to go. Remove sign and drill holes where required.

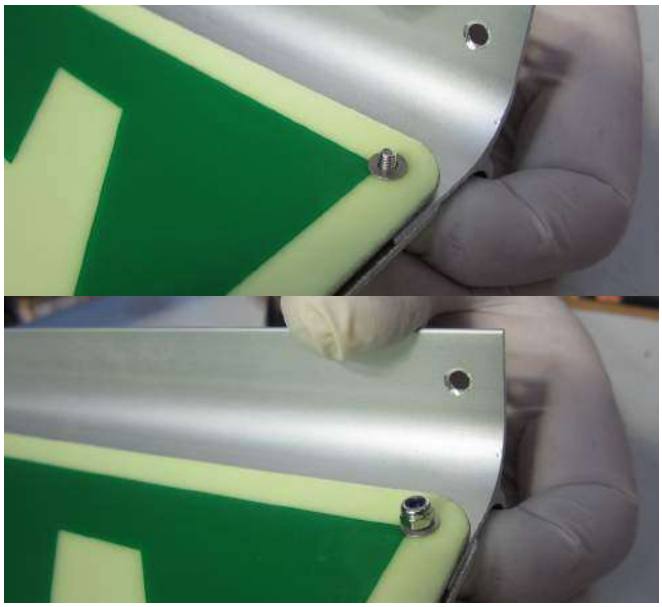
1. Assembling the Bracket

- Place a washer on screw and insert into top-left corner of first sign.

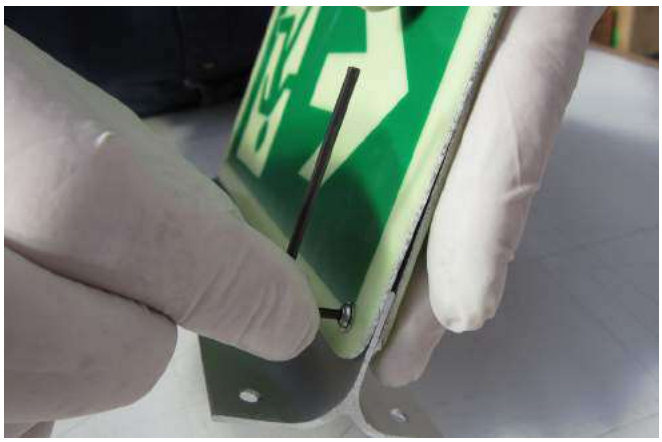


- Place mounting bracket over screw.

- If required, place second sign over screw onto opposing side of bracket. Ensure the signs are facing the correct direction.



- Place a washer and nut onto screw and tighten with fingers.



- Using supplied Hex Key tighten the nut until flush with surface of sign.

- Repeat previous steps on all corners.

Sign Brackets Flag & Ceiling Mounted Signs

2. Installing the Bracket

- Once mounting location has been decided hold flat to wall or ceiling.
- When installing the sign make sure it looks level to the eye.

- Using screwdriver or battery drill mount sign using screws provided.

Mounting Surfaces

- Mounting surfaces:
- Timber: screw install (use all 4 holes in the bracket).
- Plasterboard, Concrete, Solid plaster: screw install with suitable anchors (use all 4 holes in the bracket).
- Steel: screw or rivet install as appropriate (use all 4 holes in the bracket).

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V19.1

Installation Instructions For

Signs

Suspension Mounted Signs

Ecoglo exit signs are to be installed only where there will be sufficient natural or artificial light to keep them charged whenever the building is occupied.

If unsure, contact Ecoglo

Ecoglo International Limited
Email: info@ecoglo.com
www.ecoglo.com

Signs Suspension Mountined Signs

Mounting Location

- When installing the sign make sure it is parallel to the nearest horizontal building feature, so that it looks level to the eye.

Mounting Surfaces

- Use chain or wire from suitable anchor points on the building. Attach to the top 2 holes in the Ecoglo sign with key rings or D-shackles.
- If installed in locations where the sign may be blown around, attach 2 wires or chains to each of the top 2 holes in the Ecoglo sign. The wires or chains should be hung at an angle, for example from 4 points that mark out a 1 metre square.

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Appendix 3

Ecoglo International Ltd

Product Test Reports

For Photoluminescent S20 Exit Signs

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Order No. 3078911 Date: November 15, 2005

REPORT NO. 3078911CRT-006

TEST OF FOUR PHOTOLUMINESCENT MATERIAL MODELS

RENDERED TO

ECOGLO LTD.
77 KINGSLEY ROAD
CHRISTCHURCH, NEW ZEALAND 8002

DATA REQUESTED

Luminance measurements after activation tests on four photoluminescent material models after UV exposure in accordance with New York City Building Code Reference Standards RS 6-1 and RS 6-1A: Photoluminescent Low-level Exit Path Markings.

AUTHORIZATION

This test service was authorized by signed quote number 18761099.

DEVICES SUBMITTED

The client submitted three photoluminescent material samples each of four Models: G3001C/E2071C, and G5001C/H5001C. The samples were received by Intertek on June 18, 2005 in undamaged condition, and tested as received. The sample designations are E2218Z through E2223Z.

DATE OF TESTS

June 28, 2005 through November 13, 2005.

TEST SUMMARY

NYC Building Code RS 6-1A Photoluminescent Low-level Exit Path Markings	Model G3001C/E2071C	Model G5001C/H5001C
Clause 1.0 Brightnes Rating Post UV Exposure	Complies	Complies

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Calibration Date
Optronic Luminance Standard	455-6-2	Y174	09/30/04
Optronic based Luminance Meter consisting of:			
Optronic Photometer	730C	E290	06/23/05
Optronic Direct Viewing Module	600	---	---
Optronic Amplified Photodetector	730-5H-LED	---	---
Fisher Scientific Stopwatch	---	N853	05/05
UDT Illumination Meter	S371R	L060	09/02/04

TEST AND TEST METHOD

Selective Process

After evaluation at Intertek, it was determined that Models G3001C and E2071C are identical in regards to luminance performance and that Models G5001C and H5001C are identical in regards to luminance performance.

Luminance Measurements Before and After Weathering Test

The luminance measurements were made on the photoluminescent test samples with the Intertek License Plate Test Apparatus. The center of each test sample was measured at normal (0°) viewing angle. The aperture of the Optronic based luminance meter was adjusted in order to view the maximum area on the test sample. The Intertek License Plate Test Apparatus consists of a Optronic based luminance meter and a horizontal and vertical movement system. The luminance calibration of the luminance meter is traceable to the National Institute of Standards and Technology through the calibration of the Optronic Luminance Standard.

The test samples were conditioned for at least 16 hours at zero footcandle illumination. The photoluminescent material samples were then conditioned for 120 minutes (two hours) by 2 footcandle illumination from a 4100K fluorescent light source. Luminance measurements were made on each test sample at two minutes intervals after conditioning for a period of one hour and at ninety minutes after conditioning. Luminance measurements were reported for ten minutes, sixty minutes and ninety minutes after conditioning.

Weathering Tests

The test samples were sent to Canesis Network Limited for 1000 hours exposure to Xenon Arc light apparatus per ASTM G155 Cycle 1. The samples were returned to Intertek for the post UV luminance measurements. Average post UV luminance measurements must be at least 90% of the initial average luminance measurements at each time interval.

Checked by: ME

RESULTS OF TEST

Luminance Measurements After Two Hours Activation Period

Model No. G5001C/H5001C
Intertek Sample Nos. E2220Z, E2218Z, E2219Z

Time After Exposure	Luminance (mcd/m^2) Sample One	Sample Two	Sample Three	Average	Specified Minimum
		Pre UV Exposure			
Ten Minutes	41.1	40.8	42.3	41.4	30
One Hour	9.96	9.66	10.25	9.96	7.0
Ninety Minutes	6.56	6.37	6.78	6.57	5.0
		Post UV Exposure			
Ten Minutes	37.6	37.5	36.9	37.3	37.3*
One Hour	10.09	9.54	10.19	9.94	8.96*
Ninety Minutes	6.97	6.41	7.02	6.80	5.91*

Model No. G3001C/E2071C
Intertek Sample Nos. E2222Z, E2221Z, E2223Z

Time After Exposure	Luminance (mcd/m^2) Sample One	Sample Two	Sample Three	Average	Specified Minimum
		Pre UV Exposure			
Ten Minutes	105.6	104.7	107.3	105.9	30
One Hour	29.0	28.5	29.2	28.9	7.0
Ninety Minutes	20.2	19.7	20.1	20.0	5.0
		Post UV Exposure			
Ten Minutes	99.1	97.2	100.0	98.8	95.3*
One Hour	27.3	28.4	27.6	27.8	26.0*
Ninety Minutes	18.1	19.4	18.4	18.6	18.0*

* Specified minimum is 90% of average initial luminance value at each time interval

In Charge Of Tests:

David Ellis
Project Engineer
Photometric Testing

Report Reviewed By:

Ernest Dykeman
Senior Project Engineer
Photometric Testing

Attachment: None

SSL
Scientific Services Laboratory

Report No: XC2278/R1

TEST REPORT

File: BPB/MISC

SALT SPRAY TESTING OF STAIR NOSING

1. SAMPLE DETAILS

Client: Delwyn Ralston
LincLab Ltd
Private Bag 4749
Christchurch New Zealand

Sample Details: Five samples of aluminium stair nosings with anti-slip and photoluminescence inserts.

Requirements: To determine the salt spray resistance on the stair nosing.

2 TEST DETAILS-NATA REGISTRATION 219

2.1 Salt Spray

The samples were exposed in a Singleton Model 21 Salt Spray Cabinet for 500 hours.
A second sample of 120201 J was kept as a reference sample. The salt spray testing was carried out in accordance with ASTM B117-97 'Standard Test Method of Salt Spray (Fog) Testing'.

2.2 Evaluation

After exposure, the samples were evaluated in accordance with ASTM D1654-92 'Evaluation of Painted or Coated Specimens Subject to Corrosive Environment. The degree of corrosion was determined in accordance with ASTM D610. The anti-slip properties were assessed visually at 10 x magnification. The photoluminescence of the exposed samples was compared with that of the reference sample in a dark room.

3 RESULTS

Sample No	XC 2278/F	XC 2278/G	XC 2278/H	XC 2278/I	XC 2278/J
Details	Aluminium stair nosing Labelled 120201F	Aluminium stair nosing Labelled 120201G	Aluminium stair nosing Labelled 120201H	Aluminium stair nosing Labelled 120201I	Aluminium stair nosing Labelled 120201J
Degree of Corrosion	0.5 % (Rating 9)	0.3 % (Rating 9)	0.3 % (Rating 9)	0.2 % (Rating 9)	0.2 % (Rating 9)
Anti Slip Properties	No deterioration observed	No deterioration observed	No deterioration observed	No deterioration observed	No deterioration observed
Photo - luminescence	No deterioration observed	No deterioration observed	No deterioration observed	No deterioration observed	No deterioration observed

G Eccleston

G Eccleston
Senior Materials Scientist
9 April 2001

National Association of Testing Authorities, Australia
NATA Endorsed Test Report
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177 Salmon St, Port Melbourne, Vic, 3207 Telephone (03) 9248 4900 Fax (03) 9646 5165
A Business Unit of the Australian Government Analytical Laboratories (AGAL)
Industry, Science and Resources

TEST REPORT

DATE: 07/07/2005 **TEST NUMBER**: 096346

CLIENT	Ecoglo Ltd

TEST METHOD CONDUCTED	ASTM D4828 Washability of Organic Materials

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	E2071
COLOR	Photoluminescent
ROLL	-----
CONSTRUCTION	-----
FIBER	-----
BACKING	-----
REFERENCE	

GENERAL PRINCIPLE

This test method covers the determination of the relative ease of removal of common soil and stains from interior coatings. The stains used in this procedure include: crayon, pen, lipstick, and 3M soil. The soilants are applied to the material and are subsequently removed manually using a sponge and liquid cleaner. The area stained is rated for color change and the number of cleaning cycles reported at the point of complete removal. Three replicates of each stain were applied with the results reported as the average of all three ratings.

TEST RESULTS

	Crayon	Felt Tip Pen	Lipstick	3M soil
Gloss Change	None	None	None	None
Color Change	None	None	None	None
Erosion	None	None	None	None
Cycles to Clean	74	7	31	14
Rating	10	10	10	10

NOTE: This sample **PASSES** the requirements as listed in the New York Department of Buildings RS6-1A section 6-1A 2.0

APPROVED BY: Gary Colburn

714 Glenwood Place Dalton, GA 30721 Phone: 706-226-3283 Fax: 706-226-6787 email: protest@optilink.us

Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 07/07/2005 **TEST NUMBER**: 096346

CLIENT	Ecoglo Ltd

TEST METHOD CONDUCTED	ASTM D635 Standard Test Method for Rate of Burning and or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position

	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	E2071
COLOR	Photoluminescent
ROLL	-----
CONSTRUCTION	-----
FIBER	-----
BACKING	-----
REFERENCE	

GENERAL PRINCIPLE

This method covers a small scale procedure for comparing the relative rate of burning and the extent and time of burning of self-supporting plastics that are tested in the horizontal position. A bar of the material is supported at one end. The free end is exposed to a gas flame for 30 seconds. The time and extent of burning are measured and reported. An average burn rate is reported over ten test specimens.

TEST RESULTS

	Burn Rate	Time of Burn	Extent of Burn
Specimen 1	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 2	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 3	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 4	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 5	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 6	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 7	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 8	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 9	No Burn Rate	0 Seconds	Did Not Ignite
Specimen 10	No Burn Rate	0 Seconds	Did Not Ignite
Average	No Burn Rate	0 Seconds	Did Not Ignite

APPROVED BY: Gary McCurry

714 Glenwood Place Dalton, GA 30721 Phone: 706-226-3283 Fax: 706-226-6787 email: protest@optilink.us

CALIFORNIA INSTITUTE OF ELECTRONICS AND MATERIALS SCIENCE

2115 Flame Tree Way, Hemet, CA 92545 • Phone: 951 929 2659; Fax: 951 929 1057 • www.ciems.com

JALITE USA P. O. No. APR 15 of APRIL 15, 2005

DIVISION OF ELECTRONIC MEASUREMENTS AND DEVICES

TEST REPORT

NO. 850850821B of 20 MAY 2005

BRIGHTNESS, RADIOACTIVITY AND FLAME SPREAD TEST

Table 1. LUMINANCE TEST (Contact Method)

No.	*S a m p l e*	*Tested Area Geometry*		*E x c i t a t i o n*		*Luminance (Brightness), mcd/m²*		
		Diameter mm	*Area cm²*	*Duration min*	*Illuminance lx*	*after the time period of 10 min*	*60 min*	*90 min*
1	Ecoglo-G3001c	56.39	25.0	120.0	21.63	111	28.8	19.7

CONCLUSION: ***1. The tested samples of Ecoglo-G3001c meet the requirements of NYC Building Code Ref. STD RS 6-1, para. 1.4.***
2. The material tested has the Brightness Rating of 111-29-20.

Table 2. RADIOACTIVITY TEST

No.	*Material*	*Test Result, μSv/hr*			*Comments*
		α-count	*β-count*	*γ-count*	
1	Ecoglo-G3001c	<0.01	<0.01	<0.01	Non-radioactive

CONCLUSION: ***The tested samples of Ecoglo-G3001c meet the requirements of NYC Building Code Ref. STD RS 6-1, para. 4.2.***

(continued on page 2)

3. FLAME SPREAD TEST

No.	Material	Test Parameters: Temperature Drop ΔT, K	Test Parameters: Spec. Temperature Rise, β, K/kW	Flame Spread Factor, F_s 1	Flame Spread Index, I_s 1	Comments
1	Ecoglo-G3001c	21.5	31.4	1.51	7.59	Ignites with difficulties

CONCLUSION: ***The tested samples of Ecoglo-G3001c meet the requirements of NYC Building Code Ref STD RS 6-1, para. 5.2.***

TEST DESCRIPTION

1. The test per ISO 17398:2000, Clause 7.11 and NYC BC Ref. STD RS-1, para. 1.1 - 1.4 (brightness); ASTM D3648 and NYC BC Ref. STD RS-1, para. 4.1 - 4.2 (radioactivity); and ASTM E162 and NYC BC Ref. STD RS 6-1, para. 5.1 - 5.2 (flame spread). Test conditions: T=22°C, RH=47±2%, P=101.0±0.2 kPa.

2. The samples were preconditioned for the luminance test in the dark chamber and being wrapped in the black photografic paper for 63 hours, and were removed from the chamber immediately before the test. The test was performed in the windowless room lighted with the red photo-processing light. The excitation fluorescent light source has the maximum equivalent radiation intensity of $1.94 \cdot 10^7$ W/m^2 ($4.3 \cdot 10^3$ K) with λ_{max}=674 nm.

3. The radiation intensity readings were taken at nine different points on the surface of each of the samples tested with the samples located inside and outside of the radiation insulation chamber and under twelve angles between the normal to the sample surface and the direction of the field of gravity. The data in Table 2 were processed to exclude both the cosmic and the earth radiation background noise.

4. The experimental error evaluated by the partial derivatives and least squares methods does not exceed 5%, 4% and 6.5% for the luminance, radioactivity and flame spread measurements, respectively. The data on the standard deviation are kept on file at CIEMS.

5. INSTRUMENTS AND DEVICES USED
   - Digital Photometer Model 840006 SSL (0 to 20,000 lx), Digital Scotopic/Photopic Meter Model SL-3101 SLC
   - Radiometer/Photometer Model DR-2000 w/Si Detector GS
   - Goniometer Model 3501-08 FD
   - Moseley X-Y Recorder Model 7035B HP
   - 50A, 6V Stabilized Power Supply Model SC-506FAVD HBC
   - Precision Micrometer Model 25/100 Krupp/Hommelwerke
   - Radiation Pyrometer Mode1 ST-30 Raynger
   - Digital Timer Model Labchron-1402 LLI
   - Programmed Temperature/Humidity Controller Model 100
   - Geiger-Mueller Counter Model SGM-49C PRI

(continued on page 3)

- Scintillator Counter Model 111 PRI
- Digital Nuclear Radiation Monitor Model DX-1 ITS
- Flame Spread Testing Device Model 394-19DI BD
- Digital Pyrometer Model Metis-MP25 SensorTherm GmbH (100°C - 700°C, 2.0 µm - 2.8 µm)
- Optical Pyrometer Model MX-2 Raytek
- IR Thermometer Model IR550 DKS
- Precision Potentiometer/Thermometer Model 8659-AZ L&N
- Microscopes: Model 9700 TSC, Model 500 PH, Model Tukon-300 Wilson
- Starrett Dial Indicator Model 25-109 (1.27 µm/div)
- Digital Hydrothermometer Model 63-844 MI, Barometer Model 602650 SB.

6. Reference materials used for the test setup calibration:
   - NIST SRM 4233C (Cs-137-Ba-137m) - for the radiation measurements
   - NIST SRM 1002d (I_s=153, Q=36.5) - for the flame spread test.

7. The equipment used in the test meets the applicable NIST, ASTM, ASME, OSHA and State requirements and was calibrated with the standards traceable to the NIST. The calibration was performed per ANSI/ISO ASQ Q9004-2000, ISO 10012-1:1992, ISO 10012-2:1997, MIL-STD-45662, MIL-I-45208, NAVAIR-17-35-MTL-1, CSP-1/03-93 and the instruments manufacturers' specifications.

8. The equipment passed a periodic accuracy test in June 2004. The linear and volume measure instruments and equipment were calibrated in December 2004. Next test - June 2005.

TEST ENGINEER: ***51***

DIVISION MANAGER: *Cynthia Smythe*

Bodycote MATERIALS TESTING CANADA INC.

BODYCOTE • 2395 SPEAKMAN DRIVE, MISSISSAUGA, ONTARIO, CANADA L5K 1B3 • TEL: (905) 822-4111 • FAX: (905) 823-1446

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

A Report To:	**Professional Testing Laboratory, Inc.** 714 Glenwood Place Dalton, GA 30721 USA
Phone:	(706) 226-3283
Fax:	(706) 226-6787
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

		Flaming Mode	Non-Flaming Mode	Specified Maxima
Carbon Monoxide (CO ppm)	at 1.5 minutes	<10	<10	-
	at 4.0 minutes	10	<10	-
	at maximum	463	<10	3500
Carbon Dioxide (CO2 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

	Flaming Mode	Non-Flaming Mode	Specified Maxima
Nitrogen Oxides (as NO2 ppm)	2	1	100
Sulfur Dioxide (SO2 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)	20.9	24.2	-
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.

Queensland University of Technology

PHOTOMETRIC LABORATORY

REPORT NO: 3391-1

CLIENT: Ecoglo International Ltd

Luminance Measurement of Photoluminescent Materials (Ecoglo S20 Series)

NATA Accreditation No: 4819
TFI No: T3899
Accredited for compliance with ISO/IEC 17025

Initials

Photometric Laboratory
School of Chemistry, Physics and Mechanical Engineering
Queensland University of Technology
2 George St
Brisbane Qld 4000

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Brisbane Qld 4001
Tel (07) 1138 5073
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PHOTOMETRIC LABORATORY

TEST REPORT

REPORT No: **3391-1**

DATE OF TEST: **10th – 11th April 2014**

CLIENT: **Ecoglo International LTD**
77 Kingsley St
Christchurch 8023
New Zealand

TEST: **Luminance Measurement of Photoluminescent Materials (Ecoglo S20 Series)**

ITEM DESCRIPTION: **4 identical samples of Photoluminescence materials**
Dimensions: 100 mm wide x 100 mm high x 2mm thick
Client ID markings on rear of samples :
Batch 1988 – 1335 20 Jan 2014 [Numbers (1) to (4)]
(See photographs on Page 8)

TESTS REQUIRED:
2 samples to be exposed to an illumination of 54 lux for 1 hour using lamp of CCT 4000K and
2 samples to be exposed to an illumination of 54 lux for 1 hour using lamp of CCT 4500K

APPLICABLE STANDARDS:
The samples were tested in accordance with ASTM E2073-10 *Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings* except the activation illumination in clause 8.3 is replaced with 54 lux.

Approved Signatory _____ Date of issue: 16th April 2014
A/Prof. Ian Cowling

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PHOTOMETRIC LABORATORY

TEST REPORT

Report No: 3391-1

Test: Luminance Measurements of Photoluminescent materials (Ecoglo S20 Series)

NOTES ON PROCEDURE:

The preparation and testing procedure of the supplied samples was undertaken using the procedures set out in ASTM 2073-10 *Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings.*

In brief the samples were kept in a dark location for several days to ensure the luminescence was below threshold measurements levels. After this period two samples were exposed to a 1200 mm 36W 8400 fluorescent lamp (CCT = 4000 ± 20K) for 1 hour at an exposure of 54.0 ± 0.1 lux.

In a second test, the other two samples were exposed to a combination of the 36W 8400 lamp used previously, and a 36W 8500 lamp, again at 1 hour at an illumination of 54.0 ± 0.1 lux. The combination of these two lamps on together gave a measured CCT (Correlated Colour Temperature) of 4500 ± 40K measured at the samples.

CCT was measured using the laboratory Konica Minolta CS-500 colour and illuminance meter (Serial No 10001295). The illuminance on the exposure plane was measured using a calibrated laboratory Topcon IM-3 Illuminance meter (Serial No 90160485).

The luminance was measured normal to the surface off the samples with a laboratory Konica Minolta LS-100 luminance meter (Serial no 79413025) which has been calibrated against our laboratory primary standard lamp which itself has been calibrated by the National Measurement Institute (NMI) in Sydney.

The luminance was measured at the following intervals after the exposure lamps were switched off:

1, 2, 5 and 10 minutes;
then every 10 minutes up to 60 minutes;
then every 15 minutes up to 150 minutes;
then at 180, 210, 240, 300 and 360 minutes.

UNCERTAINTIES:

For these measurements the values of luminance have an uncertainty of ± 0.001 cd m^{-2} (95% confidence level, coverage factor k=2).
Measurements were taken within 10 seconds of the specified time.

Approved Signatory _____ Date of Issue: 16th April 2014
A/Prof. Ian Cowling

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PHOTOMETRIC LABORATORY

TEST REPORT

Report No: 3391-1

Test: Luminance Measurements of Photoluminescent materials (Ecoglo S20 Series)

RESULTS:

Laboratory conditions:
Temperature: 25 ± 0.5 ^{0}C Humidity: 45 ± 5%

Light Source: 36 W 8400 1200 mm (4000 K) fluorescent tube
Illumination: E_{av} = 54 lux for 1 hour; E_{max}:E_{min} = 1.04

Table 1: The luminance of the sample at the specified time after exposure.

Time(min)	Sample 2		Sample 3
1	0.625		0.661
2	0.49		0.484
5	0.317		0.318
10	0.225		0.227
20	0.142		0.145
30	0.106		0.107
40	0.082		0.082
50	0.067		0.068
60	0.057		0.058
75	0.045		0.045
90	0.038		0.038
105	0.031		0.032
120	0.028		0.028
135	0.024		0.024
150	0.021		0.022
180	0.018		0.019
210	0.016		0.016
240	0.013		0.014
300	0.009		0.01
360	0.006		0.007

Approved Signatory _____
A/Prof. Ian Cowling

Date of issue: 16th April 2014

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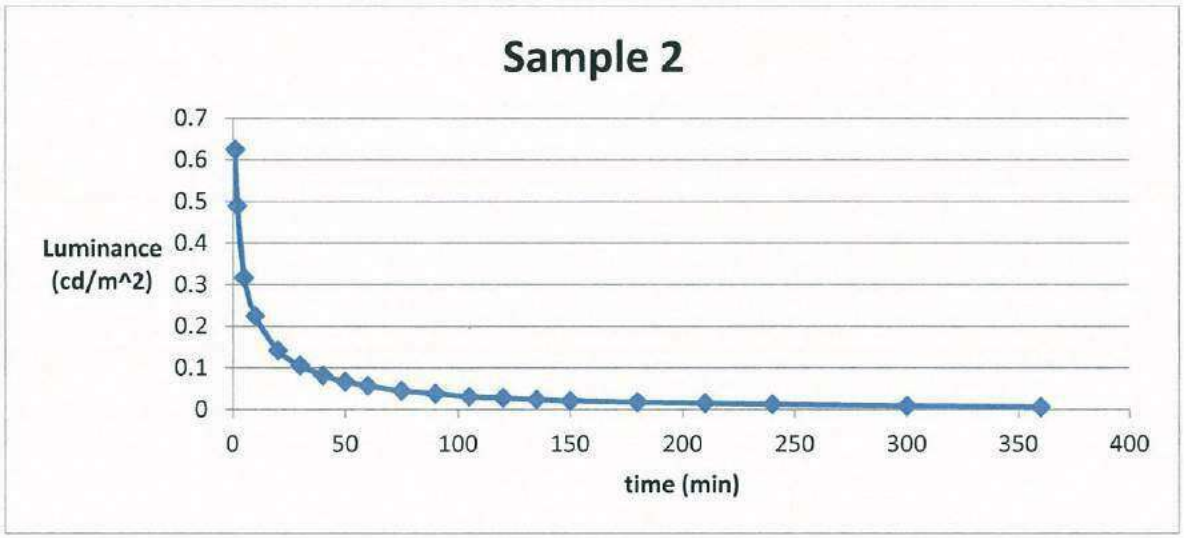
PHOTOMETRIC LABORATORY

TEST REPORT

Report No: 3391-1

Test: Luminance Measurements of Photoluminescent materials (Ecoglo S20 Series)

Graphs of decay- Samples exposed to 36W 8400 fluorescent lamp source



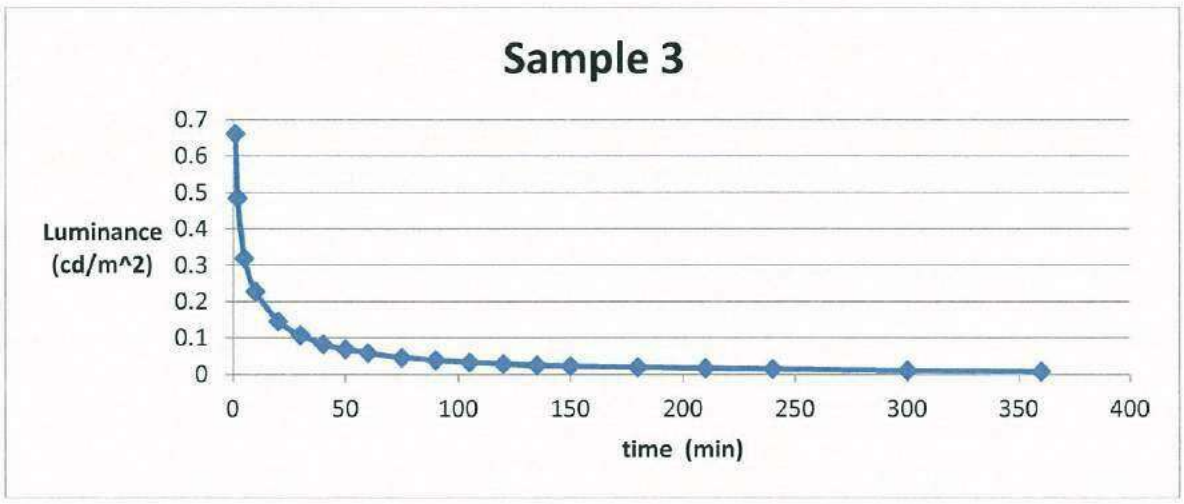


Figure 1. The luminance decay over time of the sample exposed to 8400 fluorescent light source.

Approved Signatory _____
A/Prof. Ian Cowling

Date of issue: 16th April 2014

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PHOTOMETRIC LABORATORY

TEST REPORT

Report No: 3391-1

Test: Luminance Measurements of Photoluminescent materials (Ecoglo S20 Series)

RESULTS:

Light Source: 36 W 8400 (4000 K) and 36W 8500 (5000K) fluorescent tube, combined to provide a CCT of 4500 ± 20K

Illumination: E_{av} = 54 lux for 1 hour; E_{max}:E_{min} = 1.04

Table 2: The luminance of the samples at the specified time after exposure.

Time(min)	Sample 1		Sample 4
1	0.558		0.548
2	0.478		0.446
5	0.367		0.342
10	0.253		0.238
20	0.154		0.147
30	0.115		0.107
40	0.087		0.083
50	0.072		0.069
60	0.061		0.057
75	0.048		0.045
90	0.04		0.036
105	0.032		0.031
120	0.03		0.027
135	0.023		0.022
150	0.022		0.02
180	0.021		0.017
210	0.015		0.015
240	0.013		0.014
300	0.01		0.008
360	0.009		0.006

Approved Signatory _____
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Date of issue: 16th April 2014

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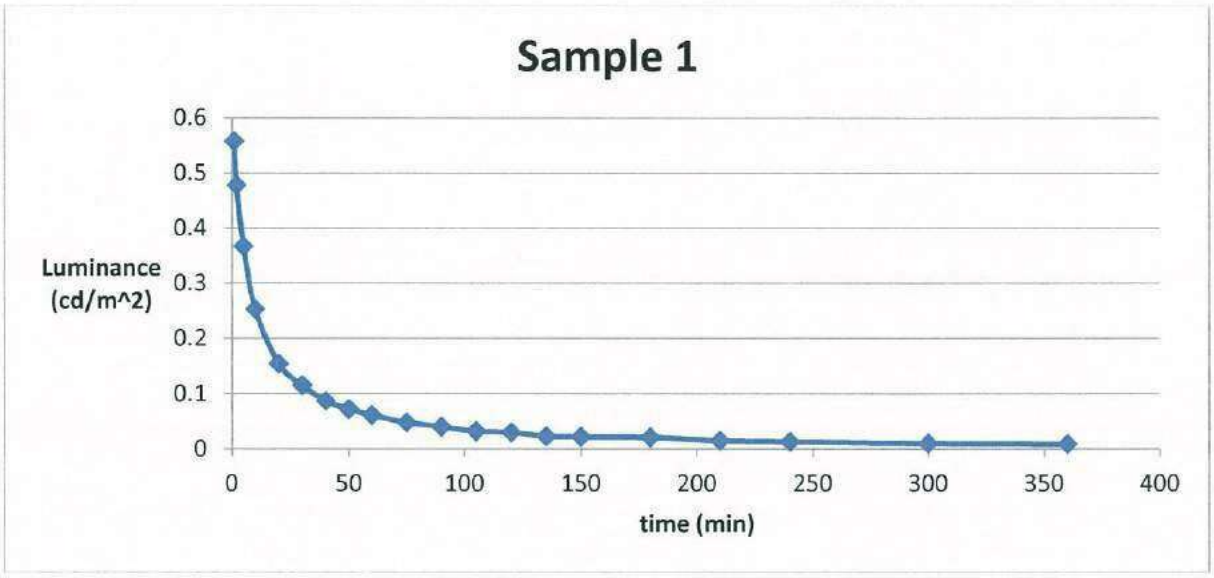
PHOTOMETRIC LABORATORY

TEST REPORT

Report No: 3391-1

Test: Luminance Measurements of Photoluminescent materials (Ecoglo S20 Series)

Graphs of decay – Samples exposed to 36W 8400 and 8500 fluorescent lamp source



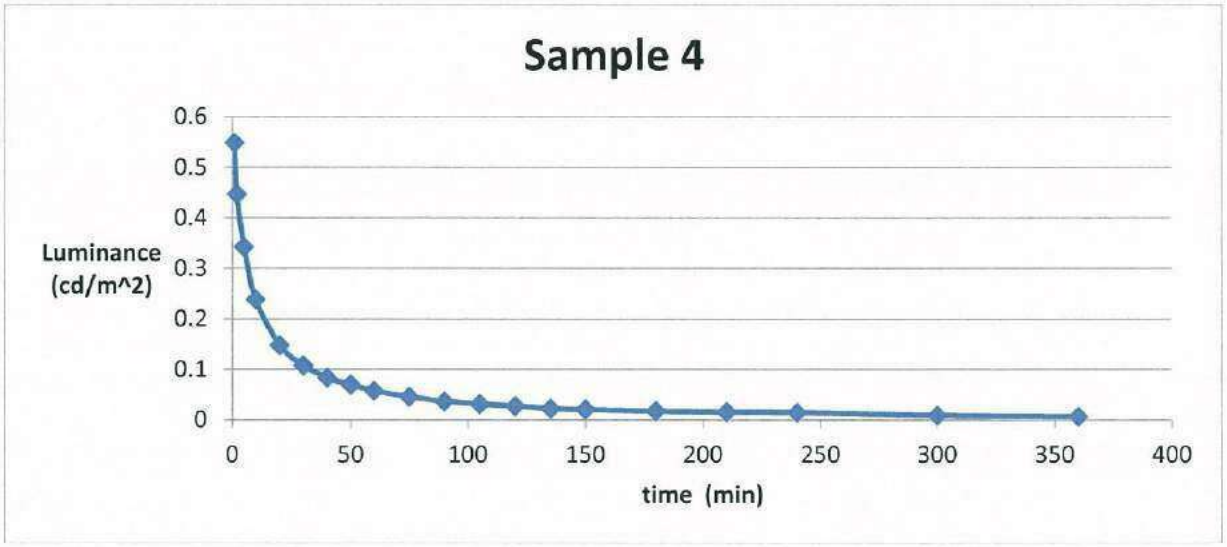


Figure 2. The luminance decay over time of the sample exposed to 8400 and 8500 fluorescent light source, giving a resulting CCT of 4500 ± 50 K.

Approved Signatory _____
A/Prof. Ian Cowling

Date of issue: 16th April 2014

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GPO Box 2434
Brisbane Qld 4001
Tel (07) 3138 5073
Fax (07) 3138 1402

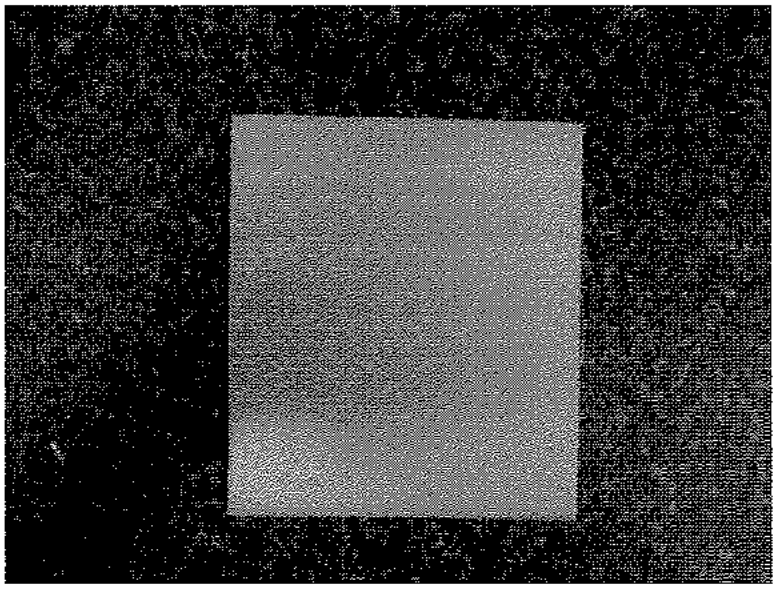
PHOTOMETRIC LABORATORY

TEST REPORT

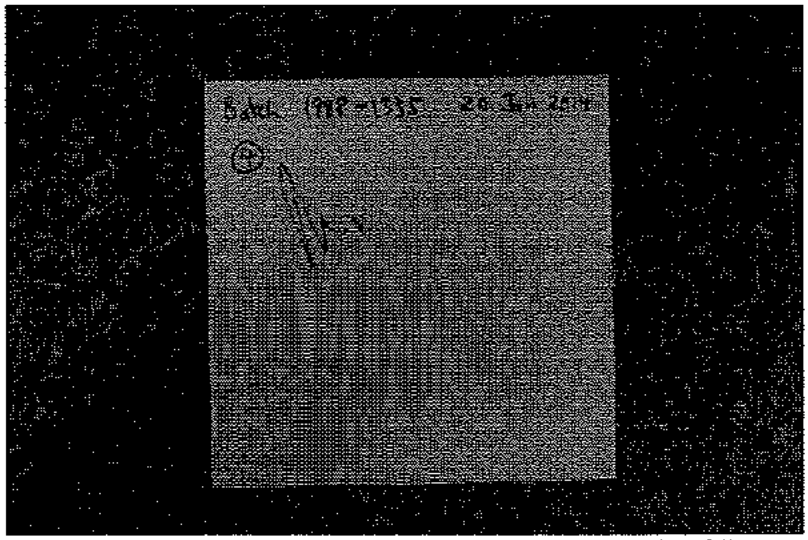
Report No: 3391-1

Test: Luminance Measurements of Photoluminescent materials (Ecoglo S20 Series)

PHOTOS OF THE ECOGLO S20 SERIES MATERIAL SUPPLIED FOR TESTING



Photoluminescent Surface



Rear Surface with ID markings as supplied by the Client

Approved Signatory _____
A/Prof. Ian Cowling

Date of issue: 16th April 2014

Photometric Laboratory
Queensland University of Technology
School of Chemistry, Physics & Mechanical Engineering
2 George St
Brisbane Qld 4000

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Allunga Exposure Laboratory

DURABILITY

Tel: + 61 7 4778 1697
Fax: +61 7 4422 0009
Lat 19°S, 147°E

Email:test@allunga.com.au
Web:www.allunga.com.au

Mail: Locked Bag 369, Aitkenvale Mail Centre, Queensland, AUSTRALIA 4814

Attention **Delwyn Ralston**

Ecoglo International Ltd

77 Kingsley St
Sydenham Christchurch 8023
New Zealand

Report Name **Samples / 1-6 @ 20 min @ 150°C**
Duration 20 min @ 150°C
Your Reference Samples / 1-6
Our Reference 20D06WW1-6
Report Date 07-Apr-2020

Exposure Type: See Below
Date Exposed 06-Apr-2020

Book & Page: 909/66
Site: Townsville (Main)

Authorised AEL Signatory: Chris Cooper

Notes:

EXPOSURE
Expose samples for 20 minutes at 150°C, as per client instructions.

Instrument: WiseVen WOF-105 Precision Laboratory Oven.

REPORT STANDARDS

VISUAL ASSESSMENT OF CHANGE
Based on Standard: AS/NZS 1580.481.1:1998 Coatings Exposed to Weathering (12 Parameters of Change)
Degree of colour change - AS/NZS 1580.481.1.12
Degree of Blistering - AS/NZS 1580.481.1.9 Blistering
Degree of distortion/shrinkage

AS/NZS, ISO Rating scale: 0-5. 0 = No change, 5 = Complete change

NOTE: AS/NZS 1580.481.1.9 Degree of Blistering
Rating is in two parts, Density (D) and Size (S)
Method 481.1.1.9: Degree of Blistering
0 = None
1 = Less than few
2 = Few
3 = Medium
4 = Medium-dense
5 = Dense

Note: Report prepared >24 Hours post exposure to allow any colour changes associated with energy absorption/radiation to dissipate. Photos taken at 45 minutes and at 24 hours.
Exposure conducted: 06 April 2020.
Report Prepared: 07 April 2020.

Evaluation based on As 1580.481

1.1	General Appearance
1.2	Discolouration
1.3	Dirt Collection
1.4	Dirt Retention
1.5	Change of Gloss
1.6 (E)	Erosion
1.7 (F)	Checking
1.8 (G)	Cracking
1.9 (H)	Flaking & Peeling
1.9 (J)	Blistering
(K)	Visible Rusting
1.11 (L)	Chalking
1.13	Mould, Algae, Fungus
FIC	Ford Image Clarity
FD	Film Defects

Colour: D65/10

d	Darker
l	lighter
r	redder

All Samples Tested As Received

b	bluer
y	yellower
g	greyer
wh	whiter
f	fade
i	increase
c	continued
w	wide variation
t	trace

length measurements in mm

m	includes mould
loc	localized
nnc	no noticeable change
sd	surface distortion
ws	water spotting
af	adhesion failure
S	slight
md	moderate
sv	servere

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Report Name **Samples / 1-6 @ 20 min @ 150°C**
Duration 20 min @ 150°C
Your Reference Samples / 1-6
Our Reference 20D06WW1-6
Report Date 07-Apr-2020

Exposure Type: See Below
Date Exposed 06-Apr-2020

Book & Page: 909/66
Site: Townsville (Main)

Authorised AEL Signatory: Chris Cooper

Client Ref	Colour Change	Blistering	Distortion
Hazard tape	0 t	0	1-2
G3-001	0	0	0
S5 sign (1)	0	0	0
S5 sign (2)	0	0	0
S20	0	0	0
A20	1 d g	-	5

Client Ref.	Comments
Hazard tape	Tape has an 'orange peel' wrinkling across whole surface. See photographs
A20	Sample melted onto substrate trapping air in small voids that subsequently expanded giving appearance of blistering, substrate distorted as sample cooled. Exposed material appears a trace darker and greener 24 hours after exposure. See photographs.

Evaluation based on As 1580.481

1.1	General Appearance
1.2	Discolouration
1.3	Dirt Collection
1.4	Dirt Retention
1.5	Change of Gloss
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d	Darker
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Colour: D65/10

All Samples Tested As Received

b	bluer
y	yellower
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wh	whiter
f	fade
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c	continued
w	wide variation
t	trace

length measurements in mm

m	includes mould
loc	localized
nnc	no noticeable change
sd	surface distortion
ws	water spotting
af	adhesion failure
S	slight
md	moderate
sv	servere

Appendix 4

Ecoglo International Ltd

Safety Data Sheet

Ecoglo International Safety Data Sheet

June 2024

1. Identification

Product Name

Ecoglo S20 Flat Panel Signs including: EX2313-16m, EX2916-24m, RM2916-16m, RM4223-24m, RM5630-32m, RM7038-40m, RM8445-48m, RM2916HV-16m, RM4223HV-24m, RMR2916-16m, RMR4223-24m, RMR5630-32m, RMR7038-40m, RMR8445-48m, RML2916-16m, RML4223-24m, RML5630-32m, RML7038-40m, RML8445-48m, RM1616UN-16m, RM2323UN-24m, RMRL2916-16m, RMRL4223-24m, RMRL-2916HV-16m, RMRL4223HV-24m, EE6128-16m, EE7835-24m, NE4113-16m, AR1313, AR1616-16m, AR2323-24m, SQ-60, AC1616, EXRL310166, EXL310166, EXR310166, EX310166, BFP2916-16m, BFP4223-24m, BFP2916R-16m, BFP4223R-24m, BFP2916L-16m, BFP4223L-24m, BFP162-16m, BFP230-24m.

Manufacturer Details

Company: Ecoglo International Ltd
Address: 77 Kingsley St, Christchurch 8440, New Zealand **Phone No:** +64 3 348 3781

2. Hazard Identification

Not classified as hazardous or dangerous as per GHS.

3. Composition/information on ingredients

Component	CAS No.	Proportion
Aluminium Alloy (5005)	-	40-70%
Strontium Aluminate based photoluminescent pigment	-	10-40%
Cross-linked thermoset polyester based resins	-	10-30%
Other components	-	< 1%

4. First-aid measures

No special measures required.

5. Fire-fighting measures

No special measures required.

6. Accidental release measures

Not applicable.

7. Handling and storage

Cut edges may be sharp. No special storage requirements.

8. Exposure controls and personal protection

Wear gloves when handling.

9. Physical and chemical properties

Appearance:	Solid sheet material
Odour:	N/A
Melting point:	N/A
Specific gravity:	2.2-2.7 g/cc
Volatile:	N/A
Vapour pressure:	N/A
Vapour density:	N/A
Solubility in water:	Insoluble
Flammability:	Not easily combustible. Passes Bombardier SMP 800-C Toxic gas generation test
Explosivity:	Not explosive

10. Stability and reactivity

Hazardous reactions:	None known
Radioactivity:	Not Radioactive

11. Toxicological information

No toxicological properties.

12. Ecological information

No ecological hazards.

13. Disposal considerations

Offcuts can be sent for aluminium recycling.

14. Transport information

Not restricted.

15. Regulatory information

None applicable to product.

16. Any other relevant information

None.

Appendix 5

Ecoglo International Ltd

Quality Assurance Document

Ecoglo International Ltd

QUALITY POLICY

E.I.L is a world leader in the manufacture of photoluminescent signage and path marking. We pride ourselves on our strong focus on compliance and durability. Our policy is to achieve sustainable growth by offering quality products and service. All of our staff are committed to continual quality improvement. The company has earned respect and credibility, at an international level, as a result of our contributions to building code development around photoluminescent system design.

E.I.L maintains an ISO 9001:2015 compliant Business Management System. Management will ensure that all staff are committed to the principles of this system and its continual development.

Our key objectives are:

- To ensure that all products meet contractual and relevant regulatory obligations, both national and international.
- To offer a cost effective and sustainable alternative to traditional electrical lighting that all areas of industry can adopt in a safe and practical manner.
- To offer the most durable photoluminescent products on the market and back them with the best warranty and after-sales support.
- To identify and implement new processes to reduce our product cost without increasing our environmental impact.

Our strategy to achieve these goals is:

- Maintain a high level of staff input on quality control.
- Focus on keeping our staff fully aware of our expected quality output.
- Explore all opportunities to improve our products and processes.
- Effectively recognise the limitations of our product range and work with our clients and competitors to deliver the best result for our clients.
- Be active and engaged in the wider fire safety industry.
- Review any complaints or criticism and use them to construct educational material that assists all levels of industry, both national and international.

Ecoglo International Ltd.

77 Kingsley Street
Christchurch, New Zealand
www.ecoglo.com

Signed: _____

Name: Sam Haughey

Date: 30/06/2023

Appendix 6

Ecoglo International Ltd

Warranty

Ecoglo International Limited Warranty for Photoluminescent Performance of HTC* Signs and Products

1. We warrant the photoluminescent performance of both Signs and Products, manufactured using our High Temperature Curing (HTC) process, for a period of:

thirty years from the date of installation for standard Signs and Products which are positioned **indoors;** and

fifteen years from the date of installation for **outdoor** Signs (specially coated for **outdoor** conditions) and Products which are positioned **outdoors**.

2. This warranty assumes normal conditions of use and maintenance but does not cover normal wear and tear. This warranty does not cover deterioration due to abuse, mistreatment, natural disasters (e.g. fire, flood), exposure to harmful chemicals or environments or any other use or exposure not recommended in our product literature. In particular, this warranty is void in the following circumstances:

2.1 The Signs and/or Products have been misused, neglected, damaged, abused or involved in an accident.

2.2 The Signs and/or Products have been improperly operated, repaired or maintained.

2.3 The Signs and/or Products have been modified.

2.4 The Signs and/or Products have been used outside their stated specifications, capacity and operating parameters.

3. If you have a claim that, in our reasonable judgement, satisfies the terms of this warranty, we shall replace the defective Sign or Product (material only).

4. This is an express warranty. It is your sole and exclusive remedy. We disclaim any other express or implied warranties, including warranties of merchantability or fitness for purpose, to the maximum extent permitted by law. Under no circumstances shall we accept liability for any injury to persons, damage to property, loss of profits, loss of operations or other direct, indirect, special, incidental, or consequential losses, costs and damages whether incurred by you, your guests, licensees, invitees or other third parties. Our liability under any circumstance, whether in contract, tort or otherwise, shall not, in the aggregate, exceed the price that you paid for the Sign and/or Product.

V24.1

5. Some countries do not allow certain disclaimers, limitations or exclusions in warranties. Therefore, the above disclaimers, limitations and exclusions may not apply to you. This warranty gives you specific legal rights. You may have other rights or remedies pursuant to the laws of your country. Nothing in this limited warranty should be construed as limiting or restricting any other right or remedy available to you, except as allowed by the law in your country.

*Manufactured using High Temperature Curing (HTC)

V24.1

Appendix 7

Ecoglo International Ltd

Maintenance and Cleaning Instructions

ecoglo®

VISIBLY BETTER

V19.1

Instructions For

Maintenance and Cleaning

Exit Signs and Escape Path Markings

Ecoglo International Limited
Email: info@ecoglo.com
www.ecoglo.com

Maintenance and Cleaning Instructions For Exit Signs and Escape Path Markings

Overview

- Regular maintenance and cleaning to remove any obstructions or built up dirt and deposits will ensure the Ecoglo products continue performing to expectation.
- The photoluminescence will continue performing even after UV exposure or exposure to moisture.

Floor Mounted Products

- Check nothing is covering up the product.
- Visually inspect for any sign of damage.
- Vacuuming or brushing with a stiff bristle head brush (dry or wet) is often enough to keep the strips clean.
- The glowing strip can also be wiped clean with a (dry or wet) sponge or cloth.
- High-pressure water (but not steam cleaning) can also be used.
- Observation will determine if cleaning is required however a regular clean every 4 to 6 weeks or after particularly heavy use should ensure correct performance.

Wall Mounted Products

- Check nothing is covering up the sign.
- Visually inspect for any sign of damage.
- Dusting with a soft cloth or brush is often enough to keep the signs clean.
- The glowing material can also be wiped clean with a (dry or wet) sponge or cloth.
- Observation will determine if cleaning is required.

Note

- Do not use highly alkaline or acidic cleaning agents. The pH of the cleaning agents should be between pH 5 and pH 12.
- If cleaning agents are applied at more than pH 10, the Ecoglo material should be rinsed with pH neutral (pH 6 to pH 8) solution afterwards.

For more detailed information re inspection and maintenance procedures for signs please see Photoluminescent Lighting Council Standard PLCS 101 2019, Part C - Inspection and Maintenance (available for download from the Homepage at www.plcouncil.com.au)

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