

Ecoglo International Limited

Technical Manual
for
Photoluminescent Disaster Preparedness
Signs

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Section 10 45 00

Ecoglo Photoluminescent Disaster Preparedness 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). For convenience, all products are contained within Section 10 45 00 (Photoluminescent Emergency Visibility) but if desired may be edited/adapted to suit any other Section(s) of Work in accordance with project requirements.

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 10 45 00

Photoluminescent Disaster Preparedness Signs

Part 1 General

- 1.1 Summary
 - A Work Included: Supply and installation of photoluminescent disaster preparedness signs

- 1.3 Quality Assurance
 - A Manufacturer Qualifications: to have minimum of 20 years' experience with similar work.

- 1.4 Submittals
 - A Submit the following [in accordance with Section 01 33 00 – Submittal Procedures]:
 - 1 Product Data: Manufacturer's product data sheets for each sign used in project.
 - 2 Manufacturer's Instructions: Pre-printed material describing installation of product, including special notices, safety data sheets outlining hazards and safety precautions and maintenance and cleaning instructions.
 - 3 Test Reports: Showing compliance with required standards, ordinances and codes.
 - 4 Substitutions: Substitutions must be submitted and approved prior to bid date. All requests shall include test results, product descriptions, confirmation of piece design and engineering calculations meeting design criteria.

- 1.5 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.

- 1.6 Warranty
 - A Provide manufacturer's limited warranty. Warranty to cover defects in materials and workmanship.
 - 1 High Temperature Curing (HTC) Products: (5) years from the date of delivery.
 - 2 15 Year Warranty on photoluminescent performance of HTC outdoor Signs (specially coated for outdoor conditions) when positioned outdoors.

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 (aluminum) sheet.
- B All HTC disaster preparedness 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. Luminance
Independent luminance testing shall be undertaken as follows:
Excitation Condition (charging) – 20W Fluorescent lamp, 5000 lux for 60 minutes.
PC – Minimum luminance of: PC – Minimum luminance of:
4,900 mcd/m² after 2 minutes; and
950 mcd/m² after 10 minutes; and
250 mcd/m² after 30 minutes; and
120 mcd/m² after 60 minutes; and
10 mcd/m² after 480 minutes.
 - 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 Photoluminescent Disaster Preparedness

Signs

1 Description:

- a. Stores energy from ambient light
- b. Non-toxic, non-radioactive
- c. No electricity or batteries required

[Click here](#) to view Ecoglo Disaster Preparedness Signs

| Product Code | Product Name | Sign Definition | Sign Size |
|----------------|------------------------|--------------------------------|----------------|
| S20-THZ315290 | Tsunami Hazard Zone | Tsunami hazard zone | 315mm x 290mm |
| S20-THZ588475 | Tsunami Hazard Zone | Tsunami hazard zone | 588mm x 475mm |
| S20-THZ950588 | Tsunami Hazard Zone | Tsunami hazard zone | 950mm x 588mm |
| S20-THZ1190980 | Tsunami Hazard Zone | Tsunami hazard zone | 1190mm x 980mm |
| S20-THZ2380980 | Tsunami Hazard Zone | Tsunami hazard zone | 2380mm x 980mm |
| S20-LS315290 | Landslide Warning | Danger of landslides | 315mm x 290mm |
| S20-LS588475 | Landslide Warning | Danger of landslides | 588mm x 475mm |
| S20-LS950588 | Landslide Warning | Danger of landslides | 950mm x 588mm |
| S20-LS1190980 | Landslide Warning | Danger of landslides | 1190mm x 980mm |
| S20-LS2380980 | Landslide Warning | Danger of landslides | 2380mm x 980mm |
| S20-TE315155 | Tsunami Evacuate | Evacuate straight on from here | 315mm x 155mm |
| S20-TEL315155 | Tsunami Evacuate Left | Evacuate left from here | 315mm x 155mm |
| S20-TER315155 | Tsunami Evacuate Right | Evacuate right from here | 315mm x 155mm |
| S20-EA315290 | Evacuation Area | Evacuation area straight ahead | 315mm x 290mm |
| S20-EA588475 | Evacuation Area | Evacuation area straight ahead | 588mm x 475mm |
| S20-EA950588 | Evacuation Area | Evacuation area straight ahead | 950mm x 588mm |
| S20-EA1190980 | Evacuation Area | Evacuation area straight ahead | 1190mm x 980mm |
| S20-EA2380980 | Evacuation Area | Evacuation area straight ahead | 2380mm x 980mm |
| S20-EAL315290 | Evacuation Area Left | Evacuation area left from here | 315mm x 290mm |
| S20-EAL588475 | Evacuation Area Left | Evacuation area left from here | 588mm x 475mm |
| S20-EAL950588 | Evacuation Area Left | Evacuation area left from here | 950mm x 588mm |
| S20-EAL1190980 | Evacuation Area Left | Evacuation area left from here | 1190mm x 980mm |
| S20-EAL2380980 | Evacuation Area | Evacuation area | 2380mm x 980mm |

| | | | |
|----------------|--------------------------|------------------------------------|----------------|
| | Left | left from here | |
| S20-EAR315290 | Evacuation Area Right | Evacuation area right from here | 315mm x 290mm |
| S20-EAR588475 | Evacuation Area Right | Evacuation area right from here | 588mm x 475mm |
| S20-EAR950588 | Evacuation Area Right | Evacuation area right from here | 950mm x 588mm |
| S20-EAR1190980 | Evacuation Area Right | Evacuation area right from here | 1190mm x 980mm |
| S20-EAR2380980 | Evacuation Area Right | Evacuation area right from here | 2380mm x 980mm |
| S20-WDG | Water Depth Gauge | Not applicable | 115mm x 1000mm |

Note: Subject to minimum order quantities graphics can be customised for different provinces, regions or offices

Part 3 Execution

3.1 Examination

- A Before installation, examine surfaces on which the work of this section depends. Notify [Contractor] if substrates 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 dirt, dust, grease, oil, loose material, frost, paint, coatings, or other matter that may affect bonding or installation of photoluminescent products.
- B Test substrates for fit with products before using adhesives or mechanical fastening.

3.3 Installation

- A Unless otherwise indicated in the specifications, install products in accordance with manufacturer's instructions. Obtain written instructions directly from manufacturer.

3.4 Cleaning

- A At completion of installation, clean soiled product 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

- C Do not allow heavy objects to come into contact with installed products.

End of Section

Appendices to

Ecoglo International Ltd

Technical Manual

for

Photoluminescent Disaster Preparedness

Signs



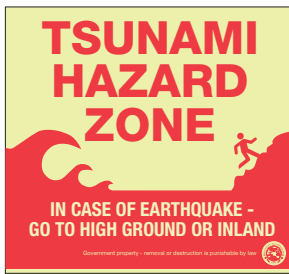
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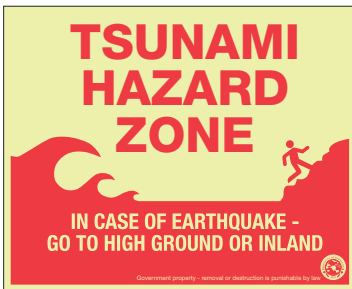
Appendix 1

Ecoglo International Ltd

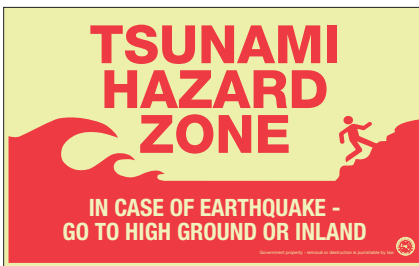
Product Data Sheets



315mm x 290mm



588mm x 475mm



950mm x 588mm



1190mm x 980mm



2380mm x 980mm

Please note graphics above are examples only. Customisation of the artwork is available for different provinces, regions or offices. Contact Ecoglo for more information.

Ecoglo S20 Tsunami Hazard Zone signs are designed to be used in tsunami hazard zones to advise persons to go to high ground or inland in the event of an earthquake. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

SIGN DEFINITION Tsunami hazard zone.

PERFORMANCE

Ecoglo S20 Tsunami Hazard Zone signs will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

The sign is available in sizes listed – see product order codes below.

| PRODUCT CODE | PRODUCT NAME | SIGN DEFINITION | SIGN SIZE |
|----------------|---------------------|---------------------|----------------|
| S20-THZ315290 | Tsunami Hazard Zone | Tsunami hazard zone | 315mm x 290mm |
| S20-THZ588475 | Tsunami Hazard Zone | Tsunami hazard zone | 588mm x 475mm |
| S20-THZ950588 | Tsunami Hazard Zone | Tsunami hazard zone | 950mm x 588mm |
| S20-THZ1190980 | Tsunami Hazard Zone | Tsunami hazard zone | 1190mm x 980mm |
| S20-THZ2380980 | Tsunami Hazard Zone | Tsunami hazard zone | 2380mm x 980mm |

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.



This sign also has HTC Clear Coating added to protect the print in outdoor environments.

INSTALLATION

The sign should be installed using fixers (screws). Please note the sign is supplied without drill holes.

Contact

Ecoglo Fire Protection Product Trading

Address: D1 Lot Concepcion Street, JLL Building #2,
Barangay Pag-asa, Binangonan Rizal 1940
Philippines

Office: +632-7915-9355
+632-7218-1848

Cell: +63917-514-6803
+63927-033-3496
+63928-279-7527

Email: keith.phillips@ecoglo.com

Web: www.ecoglo.ph www.EcogloAsia.com www.EcogloVenues.com



315mm x 290mm



588mm x 475mm



950mm x 588mm



1190mm x 980mm



2380mm x 980mm

Please note graphics above are examples only. Customisation of the artwork is available for different provinces, regions or offices. Contact Ecoglo for more information.

Ecoglo S20 Landslide Warning signs are designed to be used to warn persons of the danger of landslides in the area. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

SIGN DEFINITION Danger of landslides.

PERFORMANCE

Ecoglo S20 Landslide Warning signs will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

The sign is available in sizes listed – see product order codes below.

| PRODUCT CODE | PRODUCT NAME | SIGN DEFINITION | SIGN SIZE |
|---------------|-------------------|----------------------|----------------|
| S20-LS315290 | Landslide Warning | Danger of landslides | 315mm x 290mm |
| S20-LS588475 | Landslide Warning | Danger of landslides | 588mm x 475mm |
| S20-LS950588 | Landslide Warning | Danger of landslides | 950mm x 588mm |
| S20-LS1190980 | Landslide Warning | Danger of landslides | 1190mm x 980mm |
| S20-LS2380980 | Landslide Warning | Danger of landslides | 2380mm x 980mm |

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.



This sign also has HTC Clear Coating added to protect the print in outdoor environments.

INSTALLATION

The sign should be installed using fixers (screws). Please note the sign is supplied without drill holes.

Contact

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Example only

Ecoglo S20 Tsunami Evacuate signs are designed to be used in tsunami hazard zones to direct persons to safety. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

SIGN DEFINITION

Evacuate straight on from here

PERFORMANCE

Ecoglo S20 Tsunami Evacuate signs will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

The sign is available in one size only – see product order code below.

| PRODUCT CODE | PRODUCT NAME | SIGN DEFINITION | SIGN SIZE |
|--------------|------------------|--------------------------------|---------------|
| S20-TE315155 | Tsunami Evacuate | Evacuate Straight On From Here | 315mm x 155mm |

Please note graphics above are example only. Customisation of the artwork is available for different provinces, regions or offices. Contact Ecoglo for more information.

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.



This sign also has HTC Clear Coating added to protect the print in outdoor environments.

INSTALLATION

The sign should be installed using fixers (screws). Please note the sign is supplied without drill holes.

Contact

Ecoglo Fire Protection Product Trading

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Web: www.ecoglo.ph www.EcogloAsia.com www.EcogloVenues.com



Example only

Ecoglo S20 Tsunami Evacuate Left signs are designed to be used in tsunami hazard zones to direct persons to safety. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

SIGN DEFINITION

Evacuate left from here

PERFORMANCE

Ecoglo S20 Tsunami Evacuate Left signs will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

The sign is available in one size only – see product order code below.

| PRODUCT CODE | PRODUCT NAME | SIGN DEFINITION | SIGN SIZE |
|---------------|-----------------------|-------------------------|---------------|
| S20-TEL315155 | Tsunami Evacuate Left | Evacuate Left From Here | 315mm x 155mm |

Please note graphics above are example only. Customisation of the artwork is available for different provinces, regions or offices.

Contact Ecoglo for more information.

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.



This sign also has HTC Clear Coating added to protect the print in outdoor environments..

INSTALLATION

The sign should be installed using fixers (screws). Please note the sign is supplied without drill holes.

Contact

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Example only

Ecoglo S20 Tsunami Evacuate Right signs are designed to be used in tsunami hazard zones to direct persons to safety. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

SIGN DEFINITION

Evacuate right from here

PERFORMANCE

Ecoglo S20 Tsunami Evacuate Right signs will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

The sign is available in one size only – see product order code below.

| PRODUCT CODE | PRODUCT NAME | SIGN DEFINITION | SIGN SIZE |
|---------------|------------------------|--------------------------|---------------|
| S20-TER315155 | Tsunami Evacuate Right | Evacuate Right From Here | 315mm x 155mm |

Please note graphics above are example only. Customisation of the artwork is available for different provinces, regions or offices.

Contact Ecoglo for more information.

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.



This sign also has HTC Clear Coating added to protect the print in outdoor environments.

INSTALLATION

The sign should be installed using fixers (screws). Please note the sign is supplied without drill holes.

Contact

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Ecoglo S20 Evacuation Area signs are designed to be used in hazard zones to direct persons to safety. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

SIGN DEFINITION

Evacuation area straight ahead.

PERFORMANCE

Ecoglo S20 Evacuation Area signs will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

The sign is available in sizes listed – see product order codes below.

| PRODUCT CODE | PRODUCT NAME | SIGN DEFINITION | SIGN SIZE |
|---------------|-----------------|--------------------------------|----------------|
| S20-EA315290 | Evacuation Area | Evacuation area straight ahead | 315mm x 290mm |
| S20-EA588475 | Evacuation Area | Evacuation area straight ahead | 588mm x 475mm |
| S20-EA950588 | Evacuation Area | Evacuation area straight ahead | 950mm x 588mm |
| S20-EA1190980 | Evacuation Area | Evacuation area straight ahead | 1190mm x 980mm |
| S20-EA2380980 | Evacuation Area | Evacuation area straight ahead | 2380mm x 980mm |

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.



This sign also has HTC Clear Coating added to protect the print in outdoor environments.

INSTALLATION

The sign should be installed using fixers (screws). Please note the sign is supplied without drill holes.

Contact

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Please note graphics above are examples only. Customisation of the artwork is available for different provinces, regions or offices. Contact Ecoglo for more information.

Ecoglo S20 Evacuation Area Left signs are designed to be used in hazard zones to direct persons to safety. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

SIGN DEFINITION

Evacuation area left from here.

PERFORMANCE

Ecoglo S20 Evacuation Area Left signs will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

The sign is available in sizes listed – see product order codes below.

| PRODUCT CODE | PRODUCT NAME | SIGN DEFINITION | SIGN SIZE |
|----------------|----------------------|--------------------------------|----------------|
| S20-EAL315290 | Evacuation Area Left | Evacuation area left from here | 315mm x 290mm |
| S20-EAL588475 | Evacuation Area Left | Evacuation area left from here | 588mm x 475mm |
| S20-EAL950588 | Evacuation Area Left | Evacuation area left from here | 950mm x 588mm |
| S20-EAL1190980 | Evacuation Area Left | Evacuation area left from here | 1190mm x 980mm |
| S20-EAL2380980 | Evacuation Area Left | Evacuation area left from here | 2380mm x 980mm |

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.



This sign also has HTC Clear Coating added to protect the print in outdoor environments.

INSTALLATION

The sign should be installed using fixers (screws). Please note the sign is supplied without drill holes.

Contact

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Address: D1 Lot Concepcion Street, JLL Building #2,
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Email: keith.phillips@ecoglo.com

Web: www.ecoglo.ph www.EcogloAsia.com www.EcogloVenues.com



315mm x 290mm



588mm x 475mm



950mm x 588mm



1190mm x 980mm



2380mm x 980mm

Please note graphics above are examples only. Customisation of the artwork is available for different provinces, regions or offices. Contact Ecoglo for more information.

Ecoglo S20 Evacuation Area Right signs are designed to be used in hazard zones to direct persons to safety. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

SIGN DEFINITION

Evacuation area right from here.

PERFORMANCE

Ecoglo S20 Evacuation Area Right signs will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

The sign is available in sizes listed – see product order codes below.

| PRODUCT CODE | PRODUCT NAME | SIGN DEFINITION | SIGN SIZE |
|----------------|-----------------------|---------------------------------|----------------|
| S20-EAR315290 | Evacuation Area Right | Evacuation area right from here | 315mm x 290mm |
| S20-EAR588475 | Evacuation Area Right | Evacuation area right from here | 588mm x 475mm |
| S20-EAR950588 | Evacuation Area Right | Evacuation area right from here | 950mm x 588mm |
| S20-EAR1190980 | Evacuation Area Right | Evacuation area right from here | 1190mm x 980mm |
| S20-EAR2380980 | Evacuation Area Right | Evacuation area right from here | 2380mm x 980mm |

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.



This sign also has HTC Clear Coating added to protect the print in outdoor environments.

INSTALLATION

The sign should be installed using fixers (screws). Please note the sign is supplied without drill holes.

Contact

Ecoglo Fire Protection Product Trading

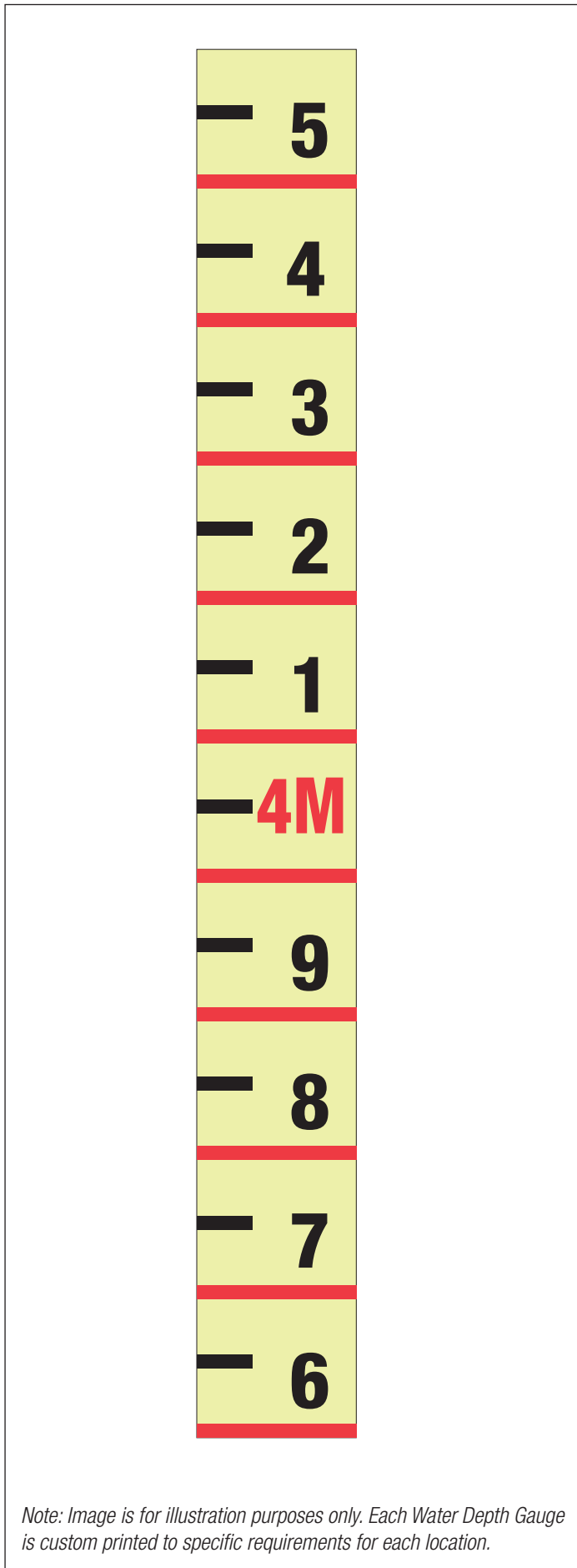
Address: D1 Lot Concepcion Street, JLL Building #2, Barangay Pag-asa, Binangonan Rizal 1940 Philippines

Office: +632-7915-9355
+632-7218-1848

Cell: +63917-514-6803
+63927-033-3496
+63928-279-7527

Email: keith.phillips@ecoglo.com

Web: www.ecoglo.ph www.EcogloAsia.com www.EcogloVenues.com



Ecoglo S20 Water Depth Gauges are designed to be used in flood prone waterways to alert persons to danger of flooding. The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including darkness.

PERFORMANCE

Ecoglo S20 Water Depth Gauges will absorb enough natural daylight to remain visible throughout the night.

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

SUPPLY

This product is made to order - print specifications are required at time of ordering. See order code below.

| PRODUCT CODE | PRODUCT NAME | PRODUCT DEFINITION | PRODUCT SIZE |
|--------------|-------------------|--------------------|--------------|
| S20-WDG | Water Depth Gauge | Not applicable | 115 X 1000mm |

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.



This product also has HTC Clear Coating added to protect the print in outdoor environments.

INSTALLATION

The Water Depth Gauge should be installed using fixers (screws). Please note the gauge is supplied without drill holes.

Contact

Ecoglo Fire Protection Product Trading

Address: D1 Lot Concepcion Street, JLL Building #2,
Barangay Pag-asa, Binangonan Rizal 1940
Philippines

Office: +632-7915-9355
+632-7218-1848

Cell: +63917-514-6803
+63927-033-3496
+63928-279-7527

Email: keith.phillips@ecoglo.com

Web: www.ecoglo.ph www.EcogloAsia.com www.EcogloVenues.com

Appendix 2

Ecoglo International Ltd

Installation Instructions



Installation Instructions For

Signs (supplied without drill holes)

Surface Mounted Disaster Preparedness Signs

Ecoglo signs are to be installed only where there will be sufficient natural or artificial light to keep them charged.

If unsure, contact Ecoglo

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



Installation Instructions for Disaster Preparedness Signs

Surface Mounted

1. Positioning of Signs

- Mark position on the surface on which the sign is to be placed
Ensure sign is mounted where it is least likely to be obscured from view.

2. Placement of Signs

- Line the sign up with the markings you made.
- Approximately 1.5cm diagonally in from each corner of the sign, make a drill hole and screw the sign to the surface.
- Use plastic anchors where necessary.

Recommended screws - 6G x 25 Pan Square S/S S/Tap

For large signs ensure that a sufficient number of fixers of sufficient length to support the sign are used.

3. Maintenance of Signs

- Regular wiping with a soft cloth or brush is recommended to keep the sign clean.
- If the sign is noticeably dirty, clean with a sponge or cloth.

See Maintenance and Cleaning Instructions for more detailed information.

Note: Please contact Ecoglo for advice if installing signs which are not fully supported by a structure such as a wall.



Appendix 3

Ecoglo International Ltd

Product Test Reports

for Photoluminescent

Disaster Preparedness Signs

Master Format Section 10 45 00
- Photoluminescent Exit Specialties

| Contents | Page |
|---|-------------|
| ASTM G155-04 Cycle 1 1000hrs, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials | 25 |
| ASTM B117-97 1000hrs, Standard Practice for Operating Salt Spray (Fog) Apparatus | 28 |
| ASTM D4828-94 (2003), Standard Test Methods for Practical Washability of Organic Coatings | 29 |
| ASTM D635-03, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position | 30 |
| ASTM E162-02, Standard Test Method for Surface Flammability of Materials using a Radiant Heat Energy Source | 31 |
| Bombardier Toxic Gas Generation Test SMP800-C. | 34 |
| ASTM D3648-2004, Standard Practices for Measurement of Radioactivity | 31 |
| Brightness Analysis of Photoluminescent Material | 37 |
| HTC (High Temperature Curing) Test (based on AS/NZS 1580.481.1) | 38 |



SINCE 1886

REPORT



3933 US ROUTE 11 CORTLAND, NEW YORK 13045

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 |

An independent organization testing for safety, performance, and certification.

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. Measurement uncertainty budgets have been determined for applicable test methods and are available upon request

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 METHODSelective 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: 

RESULTS OF TESTLuminance Measurements After Two Hours Activation Period

Model No. G5001C/H5001C
Intertek Sample Nos. E2220Z, E2218Z, E2219Z
 Luminance (mcd/m²)

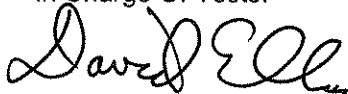
| Time After Exposure | Sample One | Sample Two | Sample Three | Average | Specified Minimum |
|-------------------------|------------|------------|--------------|---------|-------------------|
| <u>Pre UV Exposure</u> | | | | | |
| Ten Minutes | 41.1 | 40.8 | 42.3 | 41.4 | 30 |
| One Hour | 9.96 | 9.66 | 10.25 | 9.96 | 7.0 |
| Ninety Minutes | 6.56 | 6.37 | 6.78 | 6.57 | 5.0 |
| <u>Post UV Exposure</u> | | | | | |
| 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
 Luminance (mcd/m²)

| Time After Exposure | Sample One | Sample Two | Sample Three | Average | Specified Minimum |
|-------------------------|------------|------------|--------------|---------|-------------------|
| <u>Pre UV Exposure</u> | | | | | |
| 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 |
| <u>Post UV Exposure</u> | | | | | |
| 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



Scientific Services
Laboratory

Report No: XC2278/R1

TEST REPORT
SALT SPRAY TESTING OF STAIR NOSING

File: BPB/MISC

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



NATA Endorsed Test Report
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AS/NZS ISO 9001 Quality System Certified Organisation

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:

This report is provided for the exclusive use of the client to whom it is addressed. It may be used in its entirety to gain product acceptance from duly constituted authorities. This report applies only to those samples tested and is not necessarily indicative of apparently identical or similar products. This report, or the name of Professional Testing Laboratory Inc. shall not be used under any circumstance in advertising to the general public.



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:

This report is provided for the exclusive use of the client to whom it is addressed. It may be used in its entirety to gain product acceptance from duly constituted authorities. This report applies only to those samples tested and is not necessarily indicative of apparently identical of similar products. This report, or the name of Professional Testing Laboratory Inc. shall not be used under any circumstance in advertising to the general public.

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

Page 1 of 2

TEST REPORT
 NO. 850850821B of 20 MAY 2005

BRIGHTNESS, RADIOACTIVITY AND FLAME SPREAD TEST

Table 1. LUMINANCE TEST (Contact Method)

| No. | Sample | Tested Area Geometry | | Excitation | | Luminance (Brightness), mcd/m ² after the time period of | | |
|-----|---------------|----------------------|-------------------------|-----------------|-------------------|--|--------|--------|
| | | Diameter mm | Area cm ² | Duration min | Illuminance lx | 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, μ Sv/hr | | | Comments |
|------------------|---------------|--------------------------|----------------|-----------------|----------|
| | | α -count | β -count | γ -count | |
| 1 radioactive | Ecoglo-G3001c | <0.01 | <0.01 | <0.01 | Non- |

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 | | Flame Spread | Flame Spread | Comments |
|-----|---------------|-----------------------------------|--|--------------------|-------------------|---------------------------|
| | | Temperature Drop $\Delta T, K$ | Spec. Temperature Rise, $\beta, K/kW$ | Factor, F_s 1 | Index, I_s 1 | |
| 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

- 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.
- The samples were preconditioned for the luminance test in the dark chamber and being wrapped in the black photographic 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 $1.94 \cdot 10^7 \text{ W/m}^2$ ($4.3 \cdot 10^3 \text{ K}$) with $\lambda_{\text{max}}=674 \text{ nm}$.
- 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.
- 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 Model 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 • 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 <u>Mode</u> | Non-Flaming <u>Mode</u> | Specified <u>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 (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

| | <u>Flaming Mode</u> | <u>Non-Flaming Mode</u> | <u>Specified Maxima</u> |
|---|-------------------------|-----------------------------|-----------------------------|
| 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) | <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.



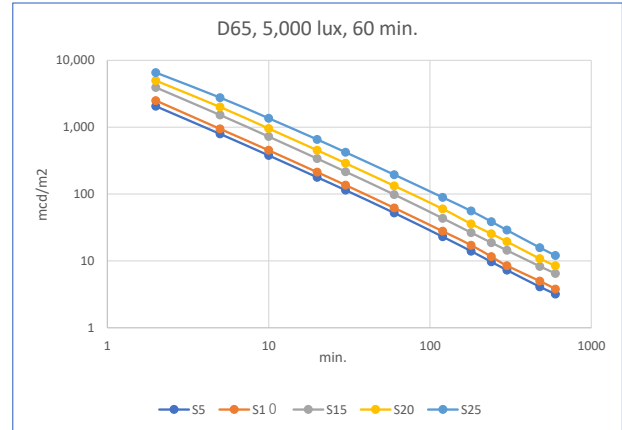
Brightness Analysis of Photoluminescent Rigid Sheet Manufactured by Ecoglo International Ltd.

Reporting date: September 26, 2018

Analyzer: Topcon BM-5AS
 Excitation Source: TOSHIBA 20W Fluorescent Lamp FL20S-D-EDL-D65
 Excitation Condition: D65 5,000 lux, 60 minutes

(mcd/m²)

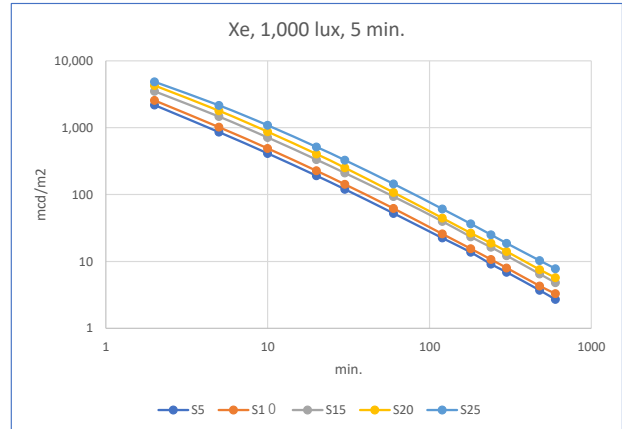
| Time after removal of ex. (min.) | S5 | S10 | S15 | S20 | S25 |
|----------------------------------|-------|-------|-------|-------|-------|
| 2 | 2,058 | 2,504 | 3,930 | 4,971 | 6,556 |
| 5 | 794 | 944 | 1,522 | 2,006 | 2,772 |
| 10 | 379 | 452 | 725 | 956 | 1,362 |
| 20 | 178 | 212 | 339 | 453 | 656 |
| 30 | 114 | 136 | 216 | 289 | 422 |
| 60 | 52.3 | 62.2 | 98.5 | 132.9 | 195.3 |
| 120 | 23.0 | 27.8 | 43.4 | 60.0 | 89.2 |
| 180 | 14.0 | 17.2 | 26.5 | 35.8 | 55.9 |
| 240 | 9.7 | 11.6 | 18.8 | 25.5 | 38.7 |
| 300 | 7.3 | 8.5 | 14.4 | 19.5 | 28.9 |
| 480 | 4.1 | 5.0 | 8.3 | 10.8 | 15.8 |
| 600 | 3.2 | 3.8 | 6.5 | 8.5 | 12.1 |



Analyzer: Topcon BM-5AS
 Excitation Source: Hamamatsu Photonics 150W Xenon lamp L2175
 Excitation Condition: Xe 1,000 lux, 5 minutes

(mcd/m²)

| Time after removal of ex. (min.) | S5 | S10 | S15 | S20 | S25 |
|----------------------------------|-------|-------|-------|-------|-------|
| 2 | 2,179 | 2,559 | 3,505 | 4,284 | 4,861 |
| 5 | 860 | 1,019 | 1,468 | 1,794 | 2,160 |
| 10 | 413 | 491 | 714 | 871 | 1,087 |
| 20 | 192 | 227 | 334 | 405 | 517 |
| 30 | 120 | 142 | 210 | 252 | 327 |
| 60 | 52.4 | 62.0 | 93.4 | 107.5 | 144.4 |
| 120 | 22.4 | 25.8 | 39.8 | 44.6 | 61.1 |
| 180 | 13.7 | 15.5 | 23.3 | 26.6 | 36.5 |
| 240 | 9.1 | 10.7 | 16.3 | 18.8 | 25.1 |
| 300 | 6.9 | 8.0 | 12.2 | 14.1 | 18.7 |
| 480 | 3.7 | 4.3 | 6.5 | 7.5 | 10.3 |
| 600 | 2.7 | 3.3 | 4.8 | 5.7 | 7.8 |





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

Colour: D65/10

All Samples Tested As Received

| | |
|----|----------------|
| b | bluer |
| y | yellow |
| 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 | severe |



Allunga Exposure Laboratory

DURABILITY

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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

| 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
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
d Darker
l lighter
r redder

Colour: D65/10

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 severe

Appendix 4

Ecoglo International Ltd

Safety Data Sheet

1. Identification

Product Name

Ecoglo S20 Disaster Preparedness Flat Panel Signs including: WDG, TEL315155, TER315155, TE315155, EA315290, EA588475, EA950588, EA1190980, EA2380980, EAL315290, EAL588475, EAL950588, EAL1190980, EAL2380980, EAR315290, EAR588475, EAR950588, EAR1190980, EAR2380980, LS315290, LS588475, LS950588, LS1190980, LS2380980, HZ315290, HZ588475, HZ950588, HZ1190980, HZ2380980

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

| 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 9001:2016 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:

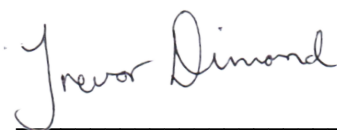
- To ensure that all products meet contractual and relevant regulatory obligations, both national and international.
- To offer a cost effective and sustainable alternative to traditional electrical lighting that all areas of industry can adopt in a safe and practical manner.
- To offer the most durable 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: Trevor Dimond
 Date: 10 October 2019

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 correct installation and 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 installed, 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.
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.

Appendix 7

Ecoglo International Ltd

Maintenance and Cleaning Instructions

Instructions For

Maintenance and Cleaning

Exit Signs and Escape Path Markings



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)

Ecoglo International Limited

Email: info@ecoglo.com

Web: www.Ecoglo.com

