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Ecoglo HYU Hybrid Photoluminescent Exit Signs: Compliance with NZBC F8/AS1

Ecoglo HYU hybrid exit signs are photoluminescent exit signs that are charged with an integrated light source. The light source ensures the signs are sufficiently charged at all times to meet the requirements of the New Zealand Building Code (NZBC) Clause F8/AS1.

The following information provides a technical explanation of how Ecoglo hybrid signs comply with NZBC F8/AS1.

As with Ecoglo S20 photoluminescent exit signs (S20 signs), the physical format of Ecoglo HYU hybrid photoluminescent exit signs (hybrid signs) meets all the relevant requirements of F8/AS1. Where hybrid signs differ from S20 signs is in the way the signs are charged.

1. NZBC F8/AS1 Requirements

The relevant paragraph of NZBC Clause F8/AS1 is detailed below:

4.5.4 Photoluminescent signs

Photoluminescent signs shall, in the event of a power failure, continue to provide a **minimum luminance of 30 mcd/m² for the duration** prescribed in NZBC Clause F6 whenever the *building* is occupied.

Photoluminescent signs **shall be maintained in a charged state** such that in the event of an emergency when the *building* is occupied, the exit signs will be at full operational charge and will continue to operate at the prescribed level and for the prescribed time (refer to NZBC Clause F6).

Illumination for charging the photoluminescent signage **shall be not less than 100 lux** and suitable for charging photoluminescent material.

Key terms in F8/AS1 4.5.4

“Minimum luminance of 30mcd/m² for the duration...”

Luminance:

NZBC Clause F6 requires luminance at 30mcd/m² for a minimum period of:

Duration:

30 minutes duration for Risk Group C buildings; and

90 minutes duration for Risk Group B buildings.

Ecoglo runs an in-house luminance test facility, which is validated by comparative testing with independent test laboratories. The in-house test facility enables the efficient testing of a wide range of photoluminescent materials. Ecoglo has carried out over 3000 in-house tests since 2003.

The data below and chart (see Appendix) is extracted from Ecoglo records for the following in house test:

| Test ID | Date | Test Sample | Charging Lamp Type | Illuminance on Sample | Charging Time |
|---------|-------------|-------------|--------------------|-----------------------|---------------|
| HO63 | 11 May 2017 | HYU1-RM | Integral LEDs | N/A | 60 minutes |

F6 Risk Group C buildings:

The test results revealed that the luminance at 30 minutes is 290mcd/m², clearly well above the 30mcd/m² required. At this level, even if the integrated light source were to lose as much as 50% of its initial brightness during its lifetime, there would still be sufficient luminance.

F6 Risk Group B buildings:

The test results revealed that the luminance at 90 minutes is 87mcd/m², clearly well above the 30mcd/m² required. At this level, even if the integrated light source were to lose as much as 50% of its initial brightness during its lifetime, there would still be sufficient luminance.

Signs “shall be maintained in a charged state...”

During installation hybrid signs are connected to a permanent electrical supply to ensure that they will be maintained in a charged state. A suitably qualified electrical tradesperson is required to connect the signs to the lighting circuit supplying general lighting in the area concerned. The signs shall be powered through one circuit breaker per building and the breaker shall be labeled “Emergency Lighting Supply – Do not isolate”.

Charging illumination “shall be not less than 100 lux...”

Ecoglo has recorded in-house measurements to confirm the charging illumination. The luminance of Ecoglo hybrid signs when connected to an electrical supply is 150cd/m².

Ecoglo photoluminescent material is typically 70% reflective during charging/charged states, so using the following formula:

$$\text{Illuminance (lux)} = \text{luminance (cd/m}^2\text{)} \times \text{Pi/reflectivity}$$

the charging illumination is shown to be 150 x Pi/70% = 670 lux.

The result is clearly well above the required 100 lux. At this level, even if the integrated light source were to lose 50% of its initial brightness during its lifetime, there would still be sufficient charging illumination.

2. Compliance with Other Relevant Standards**Compliance with AS2293 Standards**

The AS2293 standards do not cover photoluminescent exit signs, and are therefore not applicable to Ecoglo hybrid exit signs.

Electrical Safety Testing

The Ecoglo Supplier Declaration of Conformance confirms that Ecoglo hybrid signs comply with the relevant standards:

AS/NZS 60598.1 Luminaires Part 1: General Requirements and Tests; and
AS/NZS IEC 61347 Lamp Controlgear Part 1 and Part 2.13.

Electromagnetic Compatibility Testing

The Ecoglo Supplier Declaration of Conformance confirms that Ecoglo hybrid signs comply with the relevant standard:

AS/NZS CISPR 15 Limits and Methods of Measurement of Radio Disturbance Characteristics of Electrical Lighting and Similar Equipment.

3. Ongoing Inspection and Maintenance

The Ecoglo document “*Technical Justification for Ecoglo Photoluminescent Exit Signs v16.2*” (available under Technical at www.ecoglo.co.nz) shows that ongoing verification of the performance of Ecoglo photoluminescent material is not necessary.

‘Discharge testing’ as specified in AS/NZS2293.2 is required for battery back-up electrical exit sign systems because these systems have a relatively high frequency of fault/failure for a life safety building component.

Ecoglo hybrid signs are intrinsically fail-safe and are electronically much simpler than battery back-up exit signs.

The photoluminescent material will continue to provide useful glow for many hours after failure of the main lighting system, and requires no more than 5 minutes re-charge after an extended loss of power to be fully operational again. It also still works as a standard photoluminescent exit sign even if the integrated light source fails. Nonetheless, hybrid signs do have electrical components, and all electrical components are subject to failure. Therefore, regular inspection is warranted to ensure that the integrated charging light is still operating.

The following specified system information, and inspection and maintenance procedures are appropriate to the reasonably expected frequency of fault/failure of Ecoglo hybrid signs. They are recommended to be part of the Compliance Schedule for the building:

4. Specified System SS15/4 Exit Signs

(only required if any of Specified Systems 1-6, 9, or 13 are required in the building)

System Description

Photoluminescent exit signage.

Make

Ecoglo

Product Code and Quantity

See drawing(s) titled "XXXX", attached.

Location

To identify escape routes as per the Fire Report.

Relevant Performance Standard

NZBC Clause F8.3.1 and F8.3.3 as they relate to exit signage.

Relevant Inspection and Maintenance Standard

Photoluminescent Lighting Council Standard PLCS101 Photoluminescent Exit Signs, Part C: Inspection and Maintenance. The relevant requirements are detailed below.

Inspection and Maintenance Procedures

Planned preventative maintenance and responsive maintenance should be carried out in accordance with the corresponding table below to ensure signs remain correctly positioned and legible.

| Action | Complete |
|---|----------|
| All signs are still configured as at installation and there is no material damage to any of these products. | |
| All signs are clean from general dust build up and any other specific obscuring deposits. | |
| All signs are clearly visible and have not been covered up. | |
| All Ecoglo hybrid signs are still illuminated. | |

Monthly:

Inspect the system, and carry out any maintenance necessary to confirm each statement in the table.

Annually:

Inspect the system, to confirm each statement in the table.

Immediate Corrective Action

Signs shall be replaced before they become illegible, and shall be replaced immediately should they be missing.

Defects in illuminated signs shall be fixed immediately as they are apparent.

Reporting Procedure

All inspection and maintenance records of the above work are to be held on site in a durable, hard-bound log book, and are to be available to any authorised inspection agency.

Responsibilities

Monthly inspections and maintenance are to be carried out by the owner or their appointed agent.

Annual inspection is to be carried out by an Independent Qualified Person.

Inspection and maintenance records are to be maintained by the owner or their appointed agent.

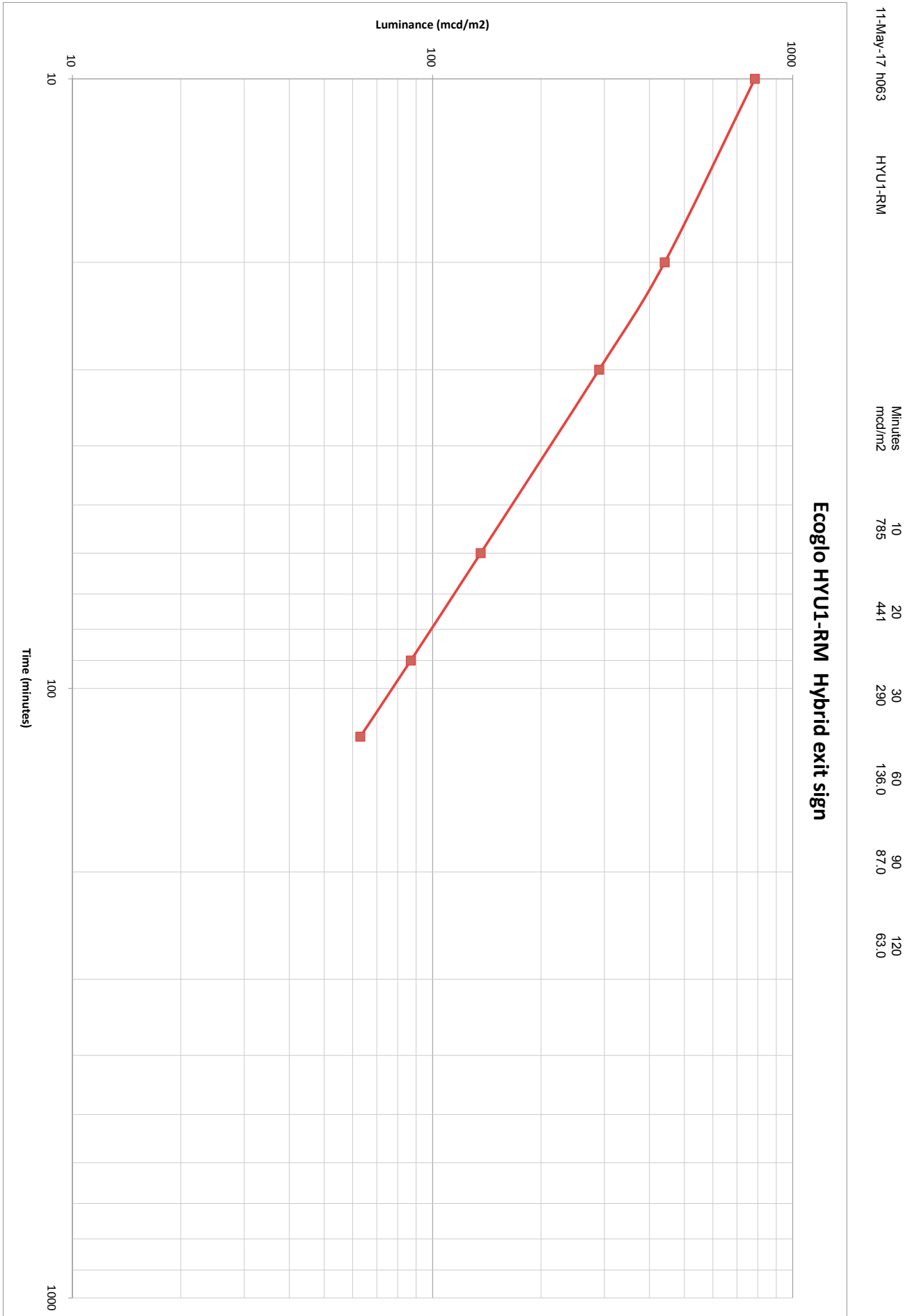


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Technical Manager

Ecoglo International Ltd.

Appendix



11-May-17 h063

HYU1-RM

Minutes
mcd/m2

10

20

30

60

90

120

Ecoflo HYU1-RM Hybrid exit sign