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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/m<sup>2</sup> 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/m<sup>2</sup> for the duration...”

Luminance:

NZBC Clause F6 requires luminance at 30mcd/m<sup>2</sup> 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 4000 in-house tests since 2003.

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

Test ID	Date	Test Sample	Charging Lamp Type	Illuminance on Sample	Charging Time
h221	1 Sep 2020	HYU1-2	Integral LEDs	N/A	60 minutes

F6 Risk Group C buildings:

The test results revealed that the luminance at 30 minutes is 348mcd/m<sup>2</sup>, clearly well above the 30mcd/m<sup>2</sup> 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 105mcd/m<sup>2</sup>, clearly well above the 30mcd/m<sup>2</sup> 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/m<sup>2</sup>.

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 AS 2293 Standards**

The AS 2293 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 S20 Photoluminescent Exit Signs V19.1*” (available under Technical at [www.ecoglo.co.nz](http://www.ecoglo.co.nz)) shows that ongoing verification of the performance of Ecoglo photoluminescent material is not necessary.

‘Discharge testing’ as specified in AS/NZS 2293.2 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 passive 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. Compliance Schedule Information

[only required if any of specified systems 1-6, 9, or 13 are required in the building]

<b>Specified System</b>	<b>Other fire safety systems or features</b>
<b>Description:</b>	<b>15(d) Signs for communicating information intended to facilitate evacuation</b>
<b>Type:</b>	Ecoglo photoluminescent exit signage
<b>Make/Model</b>	Make: Ecoglo Models: See exit signage plan XXXX
<b>Location:</b>	(Selected) Exit signs to identify the escape routes. See exit signage plan XXXX
<b>Performance Standard:</b>	New Zealand Building Code Clause F8.3.1, F8.3.3 and F8/AS1 4.5.4 January 2017.
<b>Inspection Procedures:</b>	<p>Inspection should be carried out as follows:</p> <p><b>Check:</b> 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.</p> <p><b>Monthly inspections</b> are to be carried out by the owner or their appointed agent. <b>Annual inspections</b> are to be carried out by carried out by an Independent Qualified Person.</p> <p>(for specific information relating to periodic inspection and maintenance procedures, refer to the Photoluminescent Lighting Council Standard PLCS101 Photoluminescent Exit Signs Part C: Inspection and Maintenance)</p>
<b>Interface testing</b>	The system is not interfaced with other specified systems listed in this compliance schedule and does not require additional testing or inspection for an interface.

<p><b>Maintenance Procedure:</b></p>	<p>Planned preventative maintenance and responsive maintenance should be carried out as follows:</p> <p><b>Check:</b>  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.</p> <p><b>Monthly</b> maintenance to be carried out by the owner or their appointed agent.</p> <p>(for specific information relating to periodic inspection and maintenance procedures refer to the Photoluminescent Lighting Council Standard PLCS101 Photoluminescent Exit Signs Part C: Inspection and Maintenance)</p>
<p><b>Reporting:</b></p>	<p>Logbooks or electronic records must be kept and maintained confirming the inspection dates and maintenance procedures (as applicable to this specified system) have been carried out by the individuals responsible (including but not limited to Owners, Owners Agent, Service Technicians, and Independent Qualified Persons).</p> <p>Reports relating to the inspection, maintenance and reporting procedures of this compliance schedule must be kept together with the compliance schedule, for a period of 2 years.</p> <p>The records must, at a minimum, include details of any inspection, test or preventative maintenance carried out, including dates, work undertaken, faults found, remedies applied, and the person who performed the work.</p>



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# Appendix

1-Sep-20 h221

HYU1.2

Batch 4619 07/20, Sign 14

Minutes	10	20	30	60	90	120
mcd/m2	1064	530	348	164	105	75

