



Draft for Comment

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PART C(i):

INSPECTION AND MAINTENANCE STANDARDS FOR PHOTOLUMINESCENT EXIT SIGNS (v4.1)

SECTION 1 - PRINCIPLES

1.1 Scope

This standard sets out the periodic inspection and maintenance procedures necessary to ensure that photoluminescent exit signs continue to meet the requirements of the relevant building code. The standard applies to all photoluminescent exit signs installed to meet either NCC Volume 1 Part EP 4.2 or NZBC Clause F8.3.

1.2 Objective

The objective of this standard is to define the frequency and process for the periodic maintenance of photoluminescent exit signs to ensure that exits and routes to exits are identified.

1.3 Application

This standard details the periodic inspection and maintenance procedures required for photoluminescent exit signs, and requires that inspection outcomes are recorded accordingly.

1.4 Referenced Documents

This standard refers to the following regulations or codes:

- a. National Construction Code 2016, Volume 1 “Building Code of Australia, Class 2 to Class 9 Buildings” (NCC).
- b. New Zealand Building Code Clause F8 Signs, 2nd edition, amendment 4, 1 January 2017 (NZBC).
- d. ASTM G155-2013 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.
- e. ASTM E2073-10 Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings.

1.5 Definitions

- a. Charging Illuminance Level: means the level of illuminance required on the face of the photoluminescent exit sign to charge, being a minimum illuminance of 100 lux on the face of the sign, either from a Dedicated Light Source (with a colour temperature not less than 4000 K) or otherwise.
- b. Dedicated Light Source: means a light source or light sources that are assigned to charge one or more photoluminescent exit signs when natural daylight is below the Charging Illuminance Level.
- c. Emergency Visibility Enhancement: means any arrangement of

photoluminescent products that enhances emergency visibility and is included in the Installation Documentation.

- d. Installation Documentation: means the documentation detailed in Section 2.1 hereunder.
- e. Lighting Control Systems: means any system, whether automatic, semi-automatic, or manual, that is designed to ensure that the necessary lighting to charge the photoluminescent materials/components is turned on when required, so that the photoluminescent system is sufficiently charged whenever the building is lawfully occupied.
- f. Luminance Test: has the same meaning as defined in ASTM E2073-10 except that the activation illumination in clause 8.3 thereunder is replaced with 54 lux.
- g. Managing Entity: means the individual or entity managing the building.
- h. Minor Defect: means a defect which does not cause the entire system to be ineffective. For example, an unclean or obstructed photoluminescent exit sign or failure of a Dedicated Light Source.
- i. Modified: means changed in a way that affects its functionality. For example, a Dedicated Light Source is moved or replaced with a different type of Dedicated Light Source.
- j. Outstanding Defects: means those defects recorded from the previous inspection and are unresolved.
- k. Qualified Person: means a person or entity qualified to carry out inspections of photoluminescent exit signs and/or emergency visibility systems.
- l. Representative Sample: means 1 of 10, 3 of 50 or 4 of 100 or part thereof for each applicable environment.
- m. Serious Defect: means a defect which causes the entire system to be ineffective. For example a failed Luminance Test on a Representative Sample.
- n. 1000 Hour UV Durability Test: means the tests detailed in Appendix 1.
- o. 2000 Hour UV Durability Test: means the tests detailed in Appendix 1, but the exposure time is 2000 hours OR the same samples are subjected to two consecutive 1000 Hour UV Durability Tests.
- p. 3000 Hour UV Durability Test: means the tests detailed in Appendix 1, but the exposure time is 3000 hours OR the same samples are subjected to three consecutive 1000 Hour UV Durability Tests.

SECTION 2 - FUNDAMENTAL REQUIREMENTS

2.1 Installation Documentation

The following documents are required to be collated by a Qualified Person and/or the Managing Entity on or before the initial installation of any photoluminescent exit sign(s):

- a. Plan detailing the layout, position and model number of the photoluminescent exit sign(s), the installation date of the photoluminescent exit sign(s), the position and type of Dedicated Light Source(s) and detail of any positions with Emergency Visibility Enhancements or low level signs for smoke risk environments.
- b. Details of any Lighting Control Systems.
- c. Luminance Test report(s) traceable to the photoluminescent exit signs as new.
- d. UV Durability Test reports (if available).

The UV Durability Test reports can be provided as an addition to Installation Documents after installation.

A Qualified Person and/or the Managing Entity shall update the Installation Documentation if any photoluminescent exit signs are replaced or any Dedicated Light Source(s) are Modified or any Lighting Control Systems are Modified.

2.2 Periodic Inspection and Maintenance

Photoluminescent exit signs shall be inspected and maintained by a Qualified Person in accordance with the relevant provisions of this standard.

2.3 Periodic Inspection and Maintenance Records

Inspection and maintenance records, as detailed in Section 3 Required Reporting and Records, shall be kept up to date and be accessible at the installation site.

2.4 Frequency of Inspection and Maintenance Procedures

The date of the periodic inspection and maintenance may be advanced or extended by agreement in writing between the Managing Entity and the Qualified Person. However, such advance or extension shall not exceed 14 days for a six month inspection, 21 days for a one year inspection, and 30 days for a 5 year inspection.

SECTION 3 - REQUIRED REPORTING AND RECORDS

3.1 Summary Report

At the completion of the inspection the Qualified Person or representative of the Managing Entity shall provide the Managing Entity with a summary report detailing any unresolved Serious Defects for immediate remedy.

3.2 Detailed Report

Within 72 hours of the inspection the Qualified Person shall provide the Managing Entity with a detailed report containing the following:

- a. Name and/or address of the installation.
- b. Inspection frequency
- c. Inspection date
- d. Applicable building code reference
- e. Serious Defects
- f. Minor Defects
- g. Outstanding Defects
- h. Managing Entity details
- i. Qualified Person details

(NOTE: Example of Detailed Report is contained in Appendix 2.)

SECTION 4 - INSPECTION AND MAINTENANCE PROCEDURES

4.1 Required Inspection and Maintenance Procedures

The inspection and maintenance procedures shall be carried out by a Qualified Person at the frequency and as detailed in Section 4 of this standard.

4.2 Six-monthly Procedures

- a. Refer to the Installation Documentation and check whether the photoluminescent exit signs are in place, legible, not materially damaged, and not obstructed. Fix or report all Minor Defects and all Serious Defects.
- b. Refer to the Installation Documentation and check whether all Dedicated Light Sources are operational and have had no unauthorised alterations. Fix or report all Minor Defects and all Serious Defects.
- c. If there is any visible accumulation of dust or other deposits on the face of the photoluminescent exit sign then clean in accordance with manufacturers

cleaning instructions.

- d. Refer to the Installation Documentation and check whether all Lighting Control Systems are operating as designed. Fix or report all Minor Defects and all Serious Defects.

(NOTE: Example of Six-monthly Inspection is contained in Appendix 3.)

4.3 Annual Procedures

- a. Repeat six-monthly procedures detailed in 4.2.
- b. Photoluminescent exit signs installed outdoors:
 - i. If no UV Durability Test has been completed (check the Installation Documentation) then complete a Luminance Test on a Representative Sample.
 - ii. If the photoluminescent exit sign(s) have passed the 1000 Hour UV Durability Test (but not a longer UV durability test) and the sign(s) have been installed for 5 years or more then complete a Luminance Test on a Representative Sample.
 - iii. If the photoluminescent exit sign(s) have passed the 2000 Hour UV Durability Test (but not the 3000 Hour UV Durability Test) and the sign(s) have been installed for 10 years or more then complete a Luminance Test on a Representative Sample.
 - iv. If the photoluminescent exit sign(s) have passed the 3000 Hour UV Durability Test and the sign(s) have been installed for 15 years or more then complete a Luminance Test on a Representative Sample.
 - v. If in (i) to (iv) above a Luminance test is indicated but no Luminance Test is undertaken or the test result is a fail then replace the photoluminescent exit sign(s).

(NOTE: Example of Annual Inspection is contained in Appendix 4.)

4.4 Five Yearly Procedures

- a. Repeat six-monthly procedures detailed in 4.2.
- b. Photoluminescent exit signs installed indoors:
 - i. If no UV Durability Test has been completed then complete a Luminance Test on a Representative Sample.
 - ii. If the photoluminescent exit sign(s) have passed the 1000 Hour UV Durability Test and the sign(s) have been installed for 30 years or more then complete a Luminance Test on a Representative Sample.
 - iii. If in (i) or (ii) above a Luminance test is indicated but no Luminance Test is undertaken or the test result is a fail then replace the photoluminescent exit sign(s).

(NOTE: Example of Five Yearly Inspection is contained in Appendix 5.)

APPENDIX 1

UV DURABILITY TEST

Photoluminescent exit signs shall be independently tested as follows to certify ongoing compliance with NCC Volume 1, Specification E4.8 clause 3c.

ASTM G 155-2004, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials

1. Test the luminance performance of 2 representative samples of the photoluminescent material used in the installed photoluminescent exit signs, as per NCC Volume 1, Specification E4.8 clause 3c.
2. The 2 specimens shall be exposed for a period of 1000 hours in accordance with ASTM G 155. The specimens shall be subjected to Cycle 1 exposure condition noted in Table X3.1 of such standard.
3. The testing laboratory that conducted the weathering exposure shall certify that none of the following surface characteristics exist when viewed under a minimum of 5x magnification: cracking, checking, crazing, or erosion.
4. After conclusion of the weathering exposure, such laboratory shall directly send the specimens to the luminance performance testing laboratory.
5. The luminance performance testing laboratory shall perform a Luminance Test. The specimens shall both indicate a luminance of at least 30 mcd/m² at 90 minutes.

APPENDIX 3

Six-monthly Inspection and Maintenance Checking Procedures for Photoluminescent Signs

Completed

- There has been no change to the configuration of the building which renders the marked escape routes unusable.
- All signs are still configured as at installation and there is no material damage to any of the signs.
- 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 lights checked that the positions have not altered from design.
- All lights are in working order and clean.
- All automated lighting control systems are operational as per design.

APPENDIX 4

Annual Inspection and Maintenance Checking Procedures for Photoluminescent Signs

Completed

- There has been no change to the configuration of the building which renders the marked escape routes unusable.
- All signs are still configured as at installation and there is no material damage to any of the signs.
- 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 lights checked that the positions have not altered from design.
- All lights are in working order and clean.
- All automated lighting control systems are operational as per design.

If signs are positioned outdoors, the following procedures also apply:

UV Durability Test completed? NO  Luminance Test performed
or
Sign replaced

YES



(Circle test which applies)

1000 hr UV Durability Test

Signs have been installed 5 years or more – luminance test performed

Not applicable

2000 hr UV Durability Test

Signs have been installed 10 years or more - luminance test performed

Not applicable

3000 hr UV Durability Test

Signs have been installed 15 years or more - luminance test performed

Not applicable

APPENDIX 5

Five Yearly Inspection and Maintenance Checking Procedures for Photoluminescent Signs

Completed

- There has been no change to the configuration of the building which renders the marked escape routes unusable.
- All signs are still configured as at installation and there is no material damage to any of the signs.
- 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 lights checked that the positions have not altered from design.
- All lights are in working order and clean.
- All automated lighting control systems are operational as per design.

If signs are positioned indoors, the following procedures also apply:

UV Durability Test completed? NO  Luminance Test performed
YES or Sign replaced


1000 hr UV Durability Test

Signs have been installed 30 years or more – Luminance Test completed

Not applicable