

Emergency & Exit Lighting including Dynamic EXIT Signage – Specification Section

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Exit and Emergency Lighting

1. Scope

Provide a computer monitored exit and emergency lighting system comprising:-

- self-contained emergency lights
- self-contained emergency exit lights
- wiring and controls
- PC based software for monitoring, testing and fault diagnosis.

2. Standards

- AS2293 Emergency Escape Lighting and Exit Signs for Buildings and as amended by the NZBC Clause F6 Appendix B in New Zealand.
- Exit and emergency lighting complying with all relevant clauses in the Luminaires section of this specification.

3. Regulatory Authority Requirements

Comply with requirements applicable to the relevant jurisdiction:

- Applicable Local Government Authority.
- National Construction Code of Australia (Building Code of Australia).
- New Zealand Building Code.

4. General Requirements

Provide a single point exit and emergency luminaire installation as follows:

4.1. Battery

- Lithium Iron Phosphate cells with a minimum design life of seven years at a cell temperature of 40°C.
- Battery protection: over voltage in charge, low voltage protection and over current in discharge.
- Mount battery in location as far as practicable from heat producing components.
- Emergency Period: 2 hours initial duration, 90 minutes in-service duration.
- Labelling: date of manufacture, ampere hour (Ahr) rating and replacement part number.

4.2. Controls

Provide a test push button and LED monitor for each luminaire.

4.3. NATA Classification

Test results of luminaires and components from a registered NATA laboratory shall be available on request. Classify luminaires in accordance with AS2293 and supply copies of test results on request to Principal.

- Be tested in accordance with AS2293.3 with respect to Thermal/Duration, and Photometry resulting in a classification.
- Be tested to comply with EMC Standard AS/NZS CISPR 15:2011.
- The AS2293 classification shall be clearly marked on the luminaire label.

4.4. Circuit Breaker Labelling

Label all lighting circuit breakers controlling circuits to which emergency lights or exit signs are connected in accordance with AS 2293.1, Clause 2.5.

4.5. Luminaire Labelling

- All exit and emergency luminaires and system routers to be numerically identified with permanent approved device reference labels with numbers corresponding with the log book identification and as installed drawings.
- The user reference numbers (Device Ref) will be entered into the electronic logbook and used as the primary reference for the device.

5. Emergency Luminaires

5.1. General

Emergency luminaires shall:

- incorporate long life, low energy LED lamp source
- contain a mains failure relay
- be adequately ventilated
- be located clear of any heat source
- be connected to external components via quick connect tab and receptacle connectors
- be positioned to permit easy access for maintenance removal and replacement
- have a minimum design life of seven years at an operating temperature of 40°C
- have reverse battery polarity protection
- comply with the relevant clauses in the luminaire section of this specification

5.2. Single Point Type

Self-contained, non-maintained, single point fittings complete with batteries, charger and electronic controls.

5.3. Integral Type

Where shown, normal lighting luminaires shall incorporate an emergency lighting self-contained power pack.

5.4. Wiring and Sensing of Supply Failure

Exit and emergency luminaires shall be connected to an unswitched active that originates from the circuit breaker of the adjacent normal lighting circuit, or a separate dedicated emergency lighting circuit.

The failure of the normal supply to one or more final lighting subcircuits in an area shall cause the exit and emergency lighting in that area to be automatically connected to its emergency power source as per AS2293.1 Section 2.3.3.2.

6. Illuminated Exit Signs

6.1. Maintained

Self-contained, maintained, single point, illuminated exit signs with LED lamp sources. Wire with an active wire direct from the load side of the normal lighting sub-circuit protective devices or connect to dedicated circuit.

- Incorporate the same general features as specified for Emergency Luminaires.

6.2. Types

Exit signs shall be both aesthetically and functionally suitable for the intended location and application. In general:

- Restaurants, meeting rooms, office areas and the like recessed or surface blade style exits with narrow edge illuminated diffuser.
- Back of house, undercover concourse areas, car park slide connect surface mounted exits. The exit luminaire shall slide fit into the bracket and engage the power socket by a suitable fitted plug. A locking tab shall automatically secure the luminaire into position.
- Other exit types suitable for exterior use, impact resistant or large format as required or specified in the luminaire schedule.

6.3. Brackets

Provide mounting brackets, rods or wire suspension for ceiling mounting, surface wall mounting and cantilevered wall mounting as required.

6.4. CleverEVAC Dynamic Signage

Dynamic EXIT signage shall comply with clauses 6.1, 6.2 & 6.3. The following shall also apply:

6.4.1. CleverEVAC Dynamic Signage System

- A CleverEVAC Dynamic Signage System can contain one or more of the following Dynamic Signage types as detailed in clauses 6.4.2, 6.4.3 & 6.4.4.
- CleverEVAC Dynamic Signage can be used as a stand-alone system within an emergency and exit lighting system, or:
- CleverEVAC Dynamic Signage can be used as part of a greater evacuation system, where the dynamic EXIT signs:
 - Are controlled through an interface from the Clevertronics Zoneworks System,
 - Are controlled via an interface from a Fire Detection System, or other building safety system, wired directly to the Dynamic Signs.
 - A combination of both options above
 - Are connected to the Clevertronics Zoneworks System for purposes of testing the Dynamic Signs
- Please refer to specification and interfacing detail for the other systems (ie fire engineering report and fire detection system) to ensure intended operation of the CleverEVAC Dynamic Signs.

6.4.2. Dynamic GREEN mode (positive enforcement)

- Dynamic GREEN EXIT signs shall have additional green LEDs that will be activated by a third party system (ie fire system)
- The additional LEDs will sequence flash either along the directional arrow, or inwards from either side of the running man door.
- The sign shall be capable of accepting either a volt-free or 24VDC control signal to activate the Dynamic GREEN mode
- When not activated into Dynamic GREEN mode – the sign will function in accordance with and comply to AS2293.
- Is capable of having the GREEN LEDs activated upon a loss of mains 240V supply (emergency mode)
- The Dynamic GREEN EXIT sign can be part of a Clevertronics Zoneworks automatic testing system
 - The activation of the GREEN LEDs can occur via a volt-free interface from the third party system to an input within the Zoneworks System. Where activation of the Dynamic GREEN mode via Zoneworks is to occur:
 - XT Controllers are to be connected to a UPS to ensure activation when a loss of power has occurred.
 - XT Controllers are to be located on each Distribution Board feeding Dynamic GREEN signs.
 - The testing of the GREEN LEDs can be conducted through the Zoneworks testing function, however only where the sign is configured to activate the GREEN LEDs upon loss of mains 240V supply (emergency mode)
 - Testing requirements of the fire or other system's control outputs to the Dynamic Signage System should be checked against those system's testing and maintenance provisions

6.4.3. Dynamic RED X mode (negative enforcement)

- Dynamic RED X mode shall only be used where stipulated within a fire engineered report
- Dynamic RED X EXIT signs shall have a prominent RED X that illuminates over the sign's decal, with flashing corner RED LEDs, that will only be activated by a third party system (ie fire system)
- The RED X sign can contain either a standard running man, or with a directional arrow decal.
- Is also capable of activating a Dynamic GREEN mode

- The sign shall be capable of accepting either volt-free or 24VDC control signals to activate either the RED X or the Dynamic GREEN mode
- An interface cable (twin) is to be wired to the sign for activation of the RED X mode, and a second interface cable will be needed for activating the Dynamic GREEN mode.
- When not activated into RED X or Dynamic GREEN mode – the sign will function in accordance with and comply to AS2293.
- The Dynamic RED X EXIT sign can be part of a Clevertronics Zoneworks automatic testing system
 - The activation of the Dynamic GREEN mode can occur via a volt-free interface from the third party system to an input within the Zoneworks System
 - The activation of the RED X is to be via a direct connection interface cable from the fire system to the RED X terminal within the sign.
 - The testing of the GREEN LEDs can be conducted through the Zoneworks testing function, however only where the sign is configured to activate the GREEN LEDs upon loss of mains 240V supply (emergency mode)
 - The testing of the RED X LEDs can be conducted through the Zoneworks system by way of a short function test. Then a duration test (90 mins) pass/fail will be calculated from an algorithm set from the run-time of the Dynamic GREEN function

6.4.4. Dynamic Sign with SoundEscape

A Dynamic Sign as detailed in clauses 6.4.2 & 6.4.3 can also have the SoundEscape technology incorporated. In addition to these clauses:

- When activated, the Sounder will produce a broadband sound pulse, which is a locatable sound, and also produce a verbal cue such as 'EXIT HERE'. (Please refer to Clevertronics SoundEscape documentation for further detail)
- The sign shall be capable of accepting either a volt-free or 24VDC control signal to activate the Sounder along with the Dynamic GREEN mode
 - The SoundEscape Sounder will always activate at the same time as the Dynamic GREEN mode
- The Dynamic EXIT sign with SoundEscape can be part of a Clevertronics Zoneworks automatic testing system
 - The activation of the Sounder along with the GREEN LEDs can occur via a volt-free or 24V interface from the third party system wired directly to the sign.

7. Emergency Lighting Monitoring System

The Emergency Lighting System shall be the Zoneworks computerised automatic testing and compliance system by Clevertronics Pty Ltd. The system shall provide group luminaire testing and individual real time monitoring facilities in addition to compliance management software and electronic logbook in accordance with the requirements of the AS2293 suite of standards.

7.1. System Server and Emergency Lighting Controllers

The System:

- Shall comprise a network of emergency luminaires monitored and tested by emergency lighting controllers.
- The emergency lighting controllers will be allocated specific emergency luminaires and these controllers will autonomously test and monitor these emergency luminaires. Each emergency lighting controller shall have a capability of monitoring up to 200 devices.
- The emergency lighting controllers and emergency luminaires will utilize the existing power supply cables as the communications medium between the controllers and the emergency

luminaires. No additional data cable will be used between the controllers and the emergency luminaires for the purpose of communication. The communications protocol used over the powerline shall be LONTALK™.

- CleverEVAC Dynamic Signage functions, where included, can be tested by the Zoneworks testing system.
- The emergency lighting controllers shall be networked together via a LAN/WAN or the WEB. If a converged site (client) network is not available then the Installing Contractor will provide and install the network facilities to connect the emergency lighting controllers. This will typically consist of an Ethernet Network Switch and CAT6 connections to emergency lighting controllers and the Server Hosting the management software application.
- The emergency lighting controllers shall in turn report test and status information to a WEB based management software application, connected to the same network as the emergency lighting controllers, that will display all the system devices on screen and record and hold all information such as status, test results and maintenance logbook history.
- The management software application will be hosted on a dedicated PC or Server, Microsoft Windows based, machine. This machine will be hosted either on site, directly connected to the network of emergency lighting controllers or offsite using WAN or WEB facilities to connect into the network of emergency lighting controllers.
- The system shall provide the capability for the management software application and database to be hosted in the “cloud” utilizing the LAN, WAN or WEB to connect with the controllers within the system.
- The system shall provide the capability for the system to contain emergency lighting controllers on multiple sites/locations.

7.2. System design detail and installation

Prior to installation contact Clevertronics for system documentation and to arrange a Zoneworks pre-installation meeting.

7.3. Luminaires

All emergency luminaires within the system must be capable of the following:

- Monitoring the battery voltage
- Monitoring the state of the emergency lamp in test
- Monitoring the state of the normal lamp (mains lamp)
- Storing the result of its last discharge test in non-volatile memory that is retained even after loss of both AC power and DC battery supply
- Support dynamic allocation of the network address - no pre-programming of network ID

7.4. System Software

The Management Software Application shall:

- Display graphical representations of the system server, controllers and emergency luminaires
- Display real time status information
- Provide the facility to create “groups” of emergency luminaires for testing and the ability to move devices between these different groups using “drag & drop”
- Provide reporting facilities capable of sorting by date, group and or device
- Provide the facility to replace of defective luminaires
- Provide the facility to program of multiple test groups to test at different times and dates
- Provide the facility to install emergency luminaires and dynamically allocate the network address
- Produce Emergency Lighting Test Reports that can be sorted by, fitting, group, test type (discharge or diagnostic) or date range plus the facility to generate a report with the last test result for each fitting
- Display a summary of the system status and produce a simple report containing only defective emergency luminaires including location details

- Provide an Emergency Lighting Electronic Logbook, that can be printed, detailing relevant location information (unit description, floor, DWG, grid ref, distribution board and circuit number), test results and maintenance history

7.5. Commissioning

- The Installing Contractor will engage the system manufacturer to commissioning the automatic emergency lighting system.
- Each emergency luminaire must be labelled with a user reference that can be entered into the electronic logbook and used as the primary reference for the device (device reference). The device reference shall be an alpha numeric reference such as the Building, Level and fitting number on that level, e.g. BLGA-L4-67 and permanently and indelibly fixed to a visible part of the emergency luminaire.
- Location information is to be entered into the electronic logbook by the installing contractor at the time of installation and will be retained by the system's management application on the server. This logbook information will be compiled during the construction of the project by the installing contractor in the form of Emergency Lighting Registers and Emergency Lighting Controller Registers. These registers will be provided to the emergency lighting system manufacturer for the purpose of commissioning the system and uploading into the management application's logbook facility.
- A complete set of "as installed" drawings must be provided by the installing contractor detailing the following:
 - The location of the emergency luminaires
 - The User ID (device reference) assigned to each emergency luminaire

7.6. Testing and Handover

- Test the emergency lighting system to the satisfaction of the Regulatory Authority.
- Demonstrate the operation of the emergency lighting system by performing the 12 monthly test as specified in AS/NZS 2293.2 prior to the date of practical completion.
- All units which fail to operate for the required period will be rejected and shall be repaired or replaced and shall be similarly tested after repair.
- Results of the test at practical completion shall be recorded in the electronic log book.
- Rectify all defects, including replacement of failed lamps during the defects liability period.
- The electronic log book shall be accessible on site.