



FUNCTIONAL SAFETY CERTIFICATE

This is to certify that the

LD15 LED Beacon

manufactured by

Eaton MEDC Ltd

Unit B
Sutton Parkway
Oddicroft Lane,
Sutton-In-Ashfield
NG17 5FB
UK

Have been assessed by Sira Certification Service with reference to the CASS methodologies and found to meet the requirements of

IEC 61508-2:2010

as an element/subsystem suitable for use in safety related systems performing safety functions up to and including;

SIL 2 (1001) *

When used in accordance with the scope and conditions of this certificate.

*This certificate does not waive the need for further functional safety verification to establish the achieved Safety Integrity Level (SIL) of the safety related system.

Certification Decision: 

James Lynskey

Initial Certification: 19th March 2014
This certificate re-issued: 22nd January 2024
Renewal date: 06th June 2024

This certificate may only be reproduced in its entirety, without any change.



Product description and scope of certification

The LD15 LED Beacon has been designed for use in potentially explosive atmospheres and harsh environmental conditions, including zone 1, 2, 21 and 22. ATEX certification to Ex II 2GD with operating temperatures ranging from -55°C to +70°C has been granted based on the mechanical design of the LD15 Beacon. The housing consists of UV stable glass reinforced plastic (GRP) and stainless steel fittings.

The LD15 LED Beacon can be assembled with two variants of rear housing depending on the mounting configuration set by the end user.

Use in safety function(s)

Safety Function:

'To provide a cycled pattern or permanent spherical visual warning light upon a demand'.

Certified data in support of use in safety functions

The assessment has been carried out with reference to the *Conformity Assessment of Safety-related Systems* (CASS) methodology¹ using the Route 1H² approach.

The following results in Table 1 summarize the LD15 LED Beacon in single mode (1oo1) of operation.

Table 1: Summary of proven in use assessment of the LD15

Parameter name	Symbol	Equation / source	Results
Hardware Fault Tolerance	HFT	Architecture of the valve	0
Proof Test Interval	T	Proof test in hours	8760 (1 yr)
Mean Time To Repair	MTTR	Mean time to repair in hours	3
Type A/B	Type A	Product classification	Type B
Dangerous undiagnosed failures	λ_{DU}	From return data (Route 2H)	1.15E-07
PFD _{AVG}	PFD _{AVG}	$\lambda_{DU} (T / 2 + MTTR)$	5.50E-04
SIL capability (Low demand mode)			SIL 2

Note: As per Route 2H clause 7.4.4.3.1 of IEC61508-2; a hardware fault tolerance of 1 for a specified safety function for SIL 3 unless the conditions in clause 7.4.4.3.2 are met, must apply. Clause 7.4.4.3.2 indicates that the hardware fault tolerance can be reduced if the sum of all dangerous failures does not exceed 1% of the target failure measure. This requires for the PFD value to be <1.00E-05, therefore in failing to meet this requirement the device is limited to SIL 2 with HFT = 0.

Table 2: Conditions for maintaining safety integrity capability

1	Product identification:	LD15 LED beacon
2	Functional specification:	<i>'To provide an intermittent spherical visual warning light upon demand'.</i>
3-5	Random hardware failure rates:	Refer to table 1 & 2 of this certificate.
6	Environment limits:	ATEX certification to Ex II 2GD with operating temperatures ranging from -55°C to +70°C
7	Lifetime/replacement limits:	Refer to safety manual.
8	Proof Test requirements:	Refer to safety manual, PTI at 1 year intervals.
9	Maintenance requirements:	Refer to safety manual section 5
10	Diagnostic coverage:	0% diagnostic coverage.

11	Diagnostic test interval:	No diagnostic test interval is required as no form of diagnostics is available in the products supported by this certificate.
12	Repair constraints:	Refer to safety manual section 5
13	Safe Failure Fraction:	71%
14	Hardware fault tolerance (HFT):	HFT=0, (1oo1) & HFT=1, (1oo2)
15	Highest SIL (architecture/type A/B):	Type B: (HFT=0, SIL2)
16	Systematic failure constraints:	Product to be proof tested in accordance with the manufacturers recommendations (8760 hours) in order to mitigate systematic failures.
17	Evidence of similar conditions in previous use:	Not applicable.
18	Evidence supporting the application under different conditions of use:	Not applicable.
19	Evidence of period of operational use:	Not applicable.
20	Statement of restrictions on functionality:	Not applicable.
21	Systematic capability (SC1, SC2, SC3)	SC2
22	Systematic fault avoidance measures:	See report R56A31253B
23	Systematic fault tolerance measures:	Not applicable for this device as there are no opportunities for user modification as all parts are encapsulated
24	Validation records:	All documents that have been used in support of the hardware assessment have been documented in report R56A31253A V1.0.

Failure to observe the above conditions will invalidate the certified data and may compromise the integrity of the safety function performed.

Management of functional safety

The assessment has demonstrated that the certified products are supported by an appropriate functional safety management system that meets the relevant requirements of IEC 61508-1:2010 clause 6. For further information refer to report **R56A31253B**.



Identification of certified equipment

A full list of certified equipment documents is defined below:

Sira ID	Document no	Rev	Date	Document description
CM01	379-107_A	A	03/05/2013	Circuit schematic of the LD15 LED Beacon.
CM02	379-109_A	A	07/05/2013	Circuit schematic of the LD15 LED Beacon LED array output board.
CM04	379-120	A	13/02/2013	LD15 wiring detail.

Conditions of Certification

The validity of the certified failure data is conditional on the manufacturer complying with the following conditions:

1. The manufacturer shall analyse failure data from returned products on an on-going basis. Sira Certification Service shall be informed in the event of any indication that the actual failure rates are worse than the certified failure rates. (A process to rate the validity of field data should be used. To this end, the manufacturer should co-operate with users to operate a formal field-experience feedback program).
2. Sira shall be notified in advance (with an impact analysis report) before any modifications to the certified equipment or the functional safety information in the user documentation is carried out. Sira may need to perform a re-assessment if modifications are judged to affect the product's certified functional safety.
3. On-going lifecycle activities associated with this product (e.g., modifications, corrective actions, field failure analysis) shall be subject to surveillance by Sira in accordance with 'Regulations Applicable to the Holders of Sira Certificates'.

Conditions of Safe Use

The validity of the certified failure data in any specific user application is conditional on the user complying with the following conditions:

1. The user shall comply with the conditions given in Table 2 above and the requirements given in the manufacturer's user instructions in regard to all relevant functional safety aspects such as application of use, installation, operation, maintenance, proof tests, maximum ratings, environmental conditions, repair, etc.
2. If the Beacon is to be used on a Fire Alarm system it is recommended as per BS 5839 part 1 (eq. EN 54), that the product is tested at least once a week. In all other applications it is strongly recommended to test the product at least once a year.
3. Selection of this equipment for use in safety functions and the installation, configuration, overall validation, maintenance and repair shall only be carried out by competent personnel, observing all the manufacturer's conditions and recommendations in the user documentation.
4. All information associated with any field failures of this product should be collected under a dependability management process (e.g., IEC 60300-3-2) and reported to the manufacturer.

General Conditions and Notes

1. This certificate is based upon a functional safety assessment of the product described in Sira Test & Certification Assessment Reports R56A31253A V1.0 and R56A31253B V1.0.
2. If certified product is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.
3. The use of this Certificate and the Sira Certification Mark that can be applied to the product or used in publicity material are subject to the 'Regulations Applicable to the Holders of Sira Certificates' and 'Supplementary Regulations Specific to Functional Safety Certification'.



4. This document remains the property of Sira and shall be returned when requested by the issuer.

Certificate History

Issue	Date	Report no.	Comment
02	20/02/2017	R56A31253A R56A31253B	Certificate re-issued following a company name change.
03	07/06/2019	R80000491A	Certificate reissued following successful recertification audit.
04	22 Jan 2024	80161666 R56A31253A v2.0	Updated to include Route 2H (PIU) calculations.

