

# TECHNIS

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## CERTIFICATE of RELIABILITY and FUNCTIONAL SAFETY

This is to certify that

The BExBG05D&E, BExBG10D&E, BExBG15D&E, GNEx B1&B2, D1xB2 range of Beacons provided by European Safety Systems, Impress House, Mansell Road, London W3 7QH UK. has been assessed and is considered suitable for use in a low demand safety function:

- As an unvoted item (ie hardware fault tolerance of 0) at SIL 2

This claim is in respect of random hardware failures and architectural constraints (ie safe failure fraction). The assessment was based on the assumptions, proven-in-use data provided, and recommendations given in Technis Report T727 (Issue 3.0). The product was assessed against the failure modes:

- Failure respond to an input by illuminating a beacon
- Spurious lighting despite no input

The products include the following:

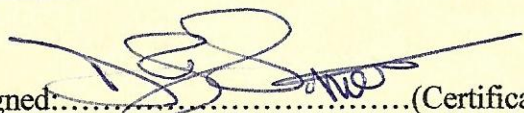
- BExBG05D&E, BExBG10D&E, BExBG15D&E, GNEx B1&B2, D1xB2

The assessment was carried out having regard to the guidance in IEC 61508 [2010] and the related body of guidance in respect of:

- Random Hardware Failures and Architectural Constraints [route 1<sub>H</sub>]

The validity of this certificate requires that:

The product is used in accordance with any assumptions, limitations or intervals stipulated in the underpinning reliability/integrity report. The product build state continues to conform to the drawings and issues quoted in the underpinning reliability/integrity report. The product is used having regard to the instructions, limitations of use, intervals etc as outlined in the manufacturer's Safety Manual. The manufacturer maintains a credible level of Functional Safety Management in respect of (for example) design configuration control, procurement, manufacturing and defect analysis. The certificate will not apply to any product variation/modification or to the use of functions not addressed in the original study. It is recommended that the design, defect records and the company FSM procedure are reviewed, at least every 2 years, and should any changes have occurred since the original certification then the manufacture should contact Technis to request re-certification.

Signed:  (Certificate No T727-041.2) – 12 May 2020

Dr David J. Smith BSc, PhD, CEng, FIEE, FIQA, HonFSaRS, MIGasE

*This certificate does not warrant fitness for any specific applications related purpose and is based on probabilistic and statistical assessment*

(BExBG05D&E, BExBG10D&E)

Integrity in respect of failure to release	SIL 2
Total Failure Rate	0.37 pmh
“hazardous” failure rate (revealed)	0.297 pmh
“hazardous” failure rate (unrevealed)	0.003 pmh
“safe” failure rate (revealed)	0
“safe” failure rate (unrevealed)	0
Diagnostic Coverage	99%
System Type	B
Hardware Fault Tolerance	0
Safe Failure Fraction	>99%
PFD (hazardous failure)	$3.8 \times 10^{-5}$
Proof Test Interval	Up to 1 year

(BExBG15D&E)

Integrity in respect of failure to release	SIL 2
Total Failure Rate	0.37 pmh
“hazardous” failure rate (revealed)	0.297 pmh
“hazardous” failure rate (unrevealed)	0.003 pmh
“safe” failure rate (revealed)	0.006 pmh
“safe” failure rate (unrevealed)	0
Diagnostic Coverage	99%
System Type	B
Hardware Fault Tolerance	0
Safe Failure Fraction	>99%
PFD (hazardous failure)	$3.8 \times 10^{-5}$
Proof Test Interval	Up to 1 year

(GNEx B1)

Integrity in respect of failure to release	SIL 2
Total Failure Rate	0.35 pmh
“hazardous” failure rate (revealed)	0.287 pmh
“hazardous” failure rate (unrevealed)	0.003 pmh
“safe” failure rate (revealed)	0.006 pmh
“safe” failure rate (unrevealed)	0
Diagnostic Coverage	99%
System Type	B
Hardware Fault Tolerance	0
Safe Failure Fraction	>99%
PFD (hazardous failure)	$3.7 \times 10^{-5}$
Proof Test Interval	Up to 1 year

(GNEx B2 & D1xB2)

Integrity in respect of failure to release	SIL 2
Total Failure Rate	0.35 pmh
“hazardous” failure rate (revealed)	0.287 pmh
“hazardous” failure rate (unrevealed)	0.003 pmh
“safe” failure rate (revealed)	0.006 pmh
“safe” failure rate (unrevealed)	0
Diagnostic Coverage	99%
System Type	B
Hardware Fault Tolerance	0
Safe Failure Fraction	>99%
PFD (hazardous failure)	$3.7 \times 10^{-5}$
Proof Test Interval	Up to 1 year