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CERTIFICATE of RELIABILITY and FUNCTIONAL SAFETY

This is to certify that

The below range of combines Beacons & Sounders 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 1**

This claim is in respect of random hardware failures and systematic failures. The assessment was based on the assumptions, proven-in-use data provided, and recommendations given in Technis Report T1001 (Issue 1.0). The product was assessed against the failure modes:

- **Failure to respond to an input by illuminating a beacon**
- **Failure to respond to an input by operating a sounder**

The products include the following:

BExCS110-05D and BExCS110-L2D

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 Systematic Failures [route 2_H]**

Signed..........(Certificate No T1001-184) – 1 December 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

BEACON FUNCTION

Integrity in respect of failure to close	SIL 1
Total Failure Rate	0.48 pmh
"hazardous" failure rate (revealed)	0 pmh
"hazardous" failure rate (unrevealed)	0.48 pmh
"safe" failure rate (revealed)	0 pmh
"safe" failure rate (unrevealed)	0
System Type	A
Hardware Fault Tolerance	0
PFD (hazardous failure)	2.1×10^{-3}
Proof Test Interval	Up to 1 year

SOUNDER FUNCTION

Integrity in respect of failure to close	SIL 1
Total Failure Rate	0.58 pmh
"hazardous" failure rate (revealed)	0 pmh
"hazardous" failure rate (unrevealed)	0.58 pmh
"safe" failure rate (revealed)	0 pmh
"safe" failure rate (unrevealed)	0
System Type	A
Hardware Fault Tolerance	0
PFD (hazardous failure)	2.5×10^{-3}
Proof Test Interval	Up to 1 year

Note: The above PFDs support SIL 2 claim, however SIL2 is not a realistic target to specify for these functions.

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.