

# TECHNIS

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## CERTIFICATE of RELIABILITY and FUNCTIONAL SAFETY

This is to certify that

The Series of Reverse Acting Bursting Discs (as a group) provided by ELFAB Ltd, Alder Road, North Shields, Tyne & Wear NE29 8SD. has been assessed and is considered suitable for use in a low demand safety function:

- As unvoted items (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) based on returns (warranty) data alone from 2004 to 2014. The assessment was based on the assumptions, proven-in-use data provided, and recommendations given in Technis Report T730 (Issue 1.0). The product was assessed against the failure modes:

- Failure to Burst
- Spurious Bursting

Integrity in respect of failure to burst	SIL 2
Total Failure Rate	0.041 pmh
"hazardous" failure rate (unrevealed)	0.00225 pmh
"safe" failure rate (revealed)	0.0382 pmh
System Type	A
Hardware Fault Tolerance	0
Safe Failure Fraction	>98%
PFD (hazardous failure)	$9.9 \times 10^{-5}$
Proof Test Interval	Up to 10 years
Includes: Opti-Gard; Bio-Gard; OE4&4A; Posi-Gard; Vac-Gard; Reverse Holder	

Note: Numerically the parameters indicate >SIL 2 but a robust SIL 2 claim is made in view of returns data

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>]

Signed:..........(Certificate No T730-013) – 7 June 2014)

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