



**Certificate of Conformity to IEC 61508
 Safety Integrity Level (SIL)**

Functional Safety of Safety-Related Programmable Electronic Systems

PhPC Atoll T35116-V Valve

The PhPC Atoll HIPPS valve T35116-V has been assessed for its ability to move to the designated safe state within the specified time in a low demand application.

The safe state is defined as 'valve is in the closed position'. Based on the assumptions, data provided, and recommendations given in ESC Ltd report: F044_SV001 rev. 4 (see section 10.1 and 10.2), F044_SM001 rev. 4 and Renewal Letter from BEL Valves Ltd, signed by Andrew Proud, Lead Project Engineer Dated: 24/06/2019, the assessed devices achieved the following results:

- Dangerous Undetected Failure Rate, λ_{DU} (/hr) = 4.3E-07;
- Safe Failure Rate, λ_s (/hr) = 1.1E-06.

Valve Model (Configuration)	Proof Test Coverage (PTC)	PFD Achieved	Achieved SIL (30% PFD band)	SFF	Type	Achieved SIL Architecture	SIL Capability (PFD & Architecture)
T35116-V (HFT=0)	100%	1.9E-03	2	71%	A	2	2
	97%	2.9E-03	2	71%	A	2	2
	90%	5.4E-03	1	71%	A	2	1
T35116-V (HFT=1)	100%	1.9E-04	3	71%	A	3	3
	90%	3.6E-04	3	71%	A	3	3

The assessment was carried out to determine compliance with IEC 61508 with regards to:

- Random Hardware Failures (Predicted Probability of Failure on Demand), based on a 1-year proof test;
- Architectural Constraints, with an achieved SFF between 60%-90%;
- Functional Safety Management and Systematic Requirements, suitable for up to SIL3.

Note 1: The sensing, logic solver and remaining final element sub-system have been excluded for the analysis and subsequently 70% of the SIL band has been allocated for their inclusion (e.g. SIL 2 band is between 3.0E-03 to 3.0E-04 and SIL 3 band is between 3.0E-04 to 3.0E-05).

Managing Director: Kenneth G L Simpson
 Member of IEC 61508 Maintenance Committee (TC 65/SC 65A/MT 61508-1-2)
 Assessment Date: March 2017
 Renewal Date: July 2019, valid to July 2021
 Certificate: F044_CT001 rev. 4

ENGINEERING SAFETY CONSULTANTS LTD
 is ISO9001-certified by Global Group, itself a
 UKAS-accredited ISO9001 certification
 body

Reg: 12Q12086

ENGINEERING SAFETY CONSULTANTS LTD
 Tuition House
 27-37 St George's Road Wimbledon London SW19 4EU UK
 Telephone/Fax: +44 (0)20 8542 2807
 E-Mail: info@esc.uk.net Web: www.esc.uk.net
 Registered in England and Wales: 7006868
 Registered Office: 27-37 St George's Road Wimbledon London SW19 4EU