



COMPLIANCE

with IEC EN 61508 and IEC EN 61511

Certificate No.: C – IS – 722164325

CERTIFICATE OWNER: GALPERTI Engineering and Flow Control S.p.A.
Via Prati della Rosa 17
23823 Colico (LC) – Italy

WE HEREWITH CONFIRM THAT

THE ANALYSIS DEVELOPED BY GALPERTI; REPORTED IN THE REPORT:

“Galperti – Technical SIL Report for Ball Valves Rev.1 – 31/05/2018”

MEETS THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLE

FOR THE SAFETY FUNCTION:

“Switching on demand (open to closed/closed to open) and tight for closing phase, in low demand mode of operation”

Examination result: The above described report was found to meet the standard defined requirements of the safety levels detailed in the following table (T-IS-722164325) according to IEC EN 61508 and IEC EN 61511, under fulfillment of the conditions listed in the Report R-IS-722164325 Rev.1 dated June, 05th 2018 in its currently valid version, on which this Certificate is based

Examination parameters: Compliance of the operational approach adopted and followed in the aforementioned report by GALPERTI: *“Galperti – Technical SIL Report for Ball Valves Rev.1 – 31/05/2018”*.

Official Report No.: R-IS-722164325 Rev.1

Expiry Date June, 04th 2021

IT IS TO BE INTENDED THAT THE ABOVE OFFICIAL REPORT AND ITS ANNEXES ARE AN INTEGRAL PART OF THIS DOCUMENT

THE PRESENT DOCUMENT SUBSTITUTES AND REPEALS THE DOCUMENT C-IS-249106-01

Reference Standards IEC EN 61508:2010 Part 2, 4, 6, 7
IEC EN 61511:2016 Part 1, 2, 3

Sesto San Giovanni, June, 05th 2018

TÜV ITALIA Srl

TÜV ITALIA Srl
Industry Service Division
Technical Manager

Paolo Marcone



SUMMARY TABLE T – IS – 722164325

<i>E/EE/EP safety-related system (final element)</i>	BALL VALVES produced by GALPERTI Engineering and Flow Control S.p.A.		
<i>Size (Class)</i>	1/4" ≤ DN ≤ 4" (CLASS A)	4" ≤ DN ≤ 14" (CLASS B)	16" ≤ DN ≤ 60" (CLASS C)
<i>System type</i>	Type A		
<i>Systematic Capability</i>	SC3		
<i>Safety Function Definition</i>	Correct switching on demand (open to closed and closed to open) and tight for closing phase, in low demand mode of operation		
<i>Max SIL⁽¹⁾</i>	SIL3	SIL3	SIL3
λ_{TOT}	5,464E-08	2,764E-07	4,089E-07
λ_{NE}	2,366E-08	1,197E-07	1,771E-07
λ_S	0,000E+00	0,000E+00	0,000E+00
λ_{DU}	2,983E-08	1,509E-07	2,232E-07
$\lambda_{DU,PST}^{(2)}$	1,022E-08	5,169E-08	7,645E-08
$\lambda_{DU,FPT}^{(3)}$	1,961E-08	9,922E-08	1,467E-07
λ_{DD}	1,151E-09	5,824E-09	8,613E-09
<i>MTTR</i>	1,3 h	2,5 h	4,9 h
<i>β and β_D factor</i>	10% - 5%	10% - 5%	10% - 5%
<i>Hardware Safety Integrity</i>	Route 2 _H	Route 2 _H	Route 2 _H
<i>Systematic Safety Integrity</i>	Route 2 _s	Route 2 _s	Route 2 _s
Remarks			
<p>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{AVG} considering the redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each subsystem must be checked to assure compliance with the minimum hardware fault tolerance (HFT) requirements.</p> <p>(2) Portion of failure rate related to dangerous failure modes that can be detected by means of Partial Stroke Testing (DU,PST).</p> <p>(3) Portion of failure rate related to dangerous failure modes that can be detected by means of periodical Full Proof Testing (DU,FPT).</p>			

SIL classification according to Standards IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) and IEC EN 61511:2016 (Chapters: 1, 2, 3) for Ball Valves produced by GALPERTI Engineering and Flow Control S.p.A.