Certificate

SIL/PL Capability

TÜVRheinland CERTIFIED

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ID 0600000000

No.: 968/V 1076.05/20

Product tested	Ball Valves	**Certificate holder**	TIV Valves S.r.l. Via Fratelli Rosselli 17 20027 Rescaldina (MI) Italy
Type designation	Floating Ball Valves 1/2" ... 8" EUA 1: FLT, FL2, FL3, FTE, CFL		
Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010		
Intended application	Safety Functions: - Move to open or close position by an automated actuator - Tight shut off by an automated actuator (Leakage Class VI according to IEC 60534-4) The assessment based on the certification program of the Certification Body comes to the result that the valves meet the requirements of IEC 61508:2010 and are therefore suitable for use in a safety instrumented system up to SIL 2 (low demand mode). Under consideration of the minimum required hardware fault tolerance HFT = 1 the valves may be used in a redundant architecture up to SIL 3 acc. IEC 61508 and IEC 61511.		
Specific requirements	The instructions of the associated Installation, Operating and Safety Manual shall be considered.		

Summary of test results see back side of this certificate.

Valid until 2025-11-04

The issue of this certificate is based upon an evaluation in accordance with the Certification Program CERT FSP1 V1.0:2017 in its actual version, whose results are documented in Report No. 968/V 1076.04/20 dated 2020-10-30. This certificate is valid only for products, which are identical with the product tested.

Köln, 2020-11-04

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln
Certification Body Safety & Security for Automation & Grid

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TÜVRheinland®
Precisely Right.

Holder: **TIV Valves S.r.l.**
Via Fratelli Rosselli 17
I – 20027 Rescaldina (MI)
Italy

Product tested: **Floating Ball Valve Types**
EUA 1: FLT, FL2, FL3, FTE, CFL

Results of Assessment

Route of Assessment		2_H / 1_S
Type of Sub-system		Type A
Mode of Operation		Low Demand Mode
Hardware Fault Tolerance	HFT	0

		fail to close / fail to open		fail to close with tight shut off class VI acc. IEC 60534-4	
Lambda Dangerous confidence level of calculation 1-α = 95 %	λ_D	1.94E-07	194 FIT	4.77E-07	477 FIT
Lambda Dangerous Undetected assumed Diagnostic Coverage DC = 0 %	λ_{DU}	1.94E-07	194 FIT	4.77E-07	477 FIT
Average Probability of Failure on Demand assumed Proof Test Interval T_1 = 1 year	**$PFD_{avg}(T_1)$**	**8.50 E-04**		**2.09 E-03**	
Average Probability of Failure on Demand 1oo2 assumed Proof Test Interval T_1 = 1 year assumed β_{1oo2} = 10 %	**$PFD_{avg}(T_1)$**	**8.58 E-05**		**2.14 E-04**	

Origin of values

The stated failure rates are the result of an FMEDA with tailored failure rates for the design and manufacturing process. Furthermore the results have been verified by qualification tests and field-feedback data of the last seven years.
Failure rates include failures that occur at a random point in time and are due to degradation mechanisms such as ageing.
The stated failure rates do not release the end-user from collecting and evaluating application-specific reliability data.

Systematic Capability

The development and manufacturing process and the functional safety management applied by the manufacturer in the relevant lifecycle phases of the product have been audited and assessed as suitable for the manufacturing of products for use in applications with a maximum Safety Integrity Level of 3 (SC 3).

Periodic Tests and Maintenance

The given values require periodic tests and maintenance as described in the Safety Manual.
The operator is responsible for the consideration of specific external conditions (e.g. ensuring of required quality of media, max. temperature, time of impact), and adequate test cycles.