Certificate

No.: 968/FSP 3020.00/25

Product tested	Trunnion Ball Valves	**Certificate holder**	TIV Valves srl Via Fratelli Rosselli 17 20027 Rescaldina (MI) Italy
Type designation	DN ½" – 60" Side entry bolted body and fully welded, Top-Entry, Modular DBB		
Codes and standards	IEC 61508 parts 1-2:2010	EN 17955:2024 (non accred.)	
Intended application	Safety Functions: - Close on demand and external tightness - Close on demand with leakage class VI acc. IEC 60534-4 and external tightness - Open on demand and external tightness The valves are 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 for the complete final element the valves may be used up to SIL 3.		
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 2030-12-11

The issue of this certificate is based upon an evaluation in accordance with the Certification Program CERT FSP1 V3.0:2020 in its actual version, whose results are documented in Report No. 968/FSP 3020.00/25 dated 2025-12-04. This certificate is valid only for products, which are identical with the product tested. Issued by the certification body accredited by DAkkS according to DIN EN ISO/IEC 17065. The accreditation is only valid for the scope listed in the annex to the accreditation certificate D-ZE-11052-02-00.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
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Am Grauen Stein, 51105 Köln

Köln, 2025-12-11

Certification Body Safety & Security for Automation & Grid

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TÜVRheinland®
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Holder: TIV Valves S.r.l.
Via Fratelli Rosselli 17
20027 Rescaldina (MI)
Italy

Product tested: Trunnion Ball Valves size : ½" ... 60"
Side entry bolted body and fully welded, Top-Entry, Modular DBB

Results of Assessment

Route of Assessment	2_H / 1_S
Type of Sub-system	Type A
Mode of Operation	Low Demand Mode
Utilization Rate	Low and High Utilization Rate
Hardware Fault Tolerance	HFT = 0
Systematic Capability	**SC 3**

Close on demand and external tightness

Dangerous Failure Rate	λ_D	2.40 E-08 / h	**24 FIT**
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.07 E-04	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.07 E-05	

Close on demand with leakage class VI acc. IEC 60534-4 and external tightness

Dangerous Failure Rate	λ_D	3.70 E-08 / h	**37 FIT**
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.65 E-04	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.65 E-05	

Open on demand and external tightness

Dangerous Failure Rate	λ_D	2.10 E-08 / h	**21 FIT**
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	9.35 E-05	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	9.36 E-06	

Assumptions for the calculations above: DC = 0 %, T_1 = 1 year, MRT = 72 h, β_{1oo2} = 10 %

Failure Rates for DBB-version
For the double block and bleed version DBB the following failure rates are valid:
Close on demand and external tightness: 3 FIT
Close on demand with leakage class VI acc. IEC 60534-4 and external tightness: 4 FIT
Open on demand and external tightness: 42 FIT

Origin of failure rates
The stated failure rates are the result of an FMEDA acc. EN 17955:2024 Annex C.
The stated failure rates do not release the end-user from collecting and evaluating application-specific reliability data.

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.