

Certificate



SIL/PL
Capability

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ID 0600000000

No.: 968/V 1026.00/17

Product tested	Ball Valves	Certificate holder	Beijing Valve General Factory Co., Ltd. No. 3 Lvhai Road Panggezhuang Industrial Park, Daxing District Beijing, 102601 P.R. China
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Type designation	Floating Ball series (DN 15 ... 350, Class 150 ... 2500, for oil, steam and water), Up and Down fixed shaft series (DN 50 ... 1500, Class 150 ... 2500, for oil, steam and water), Stay Plate series (DN 150 ... 1500, Class 150 ... 2500, for oil, steam and water)
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Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010
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Intended application	Safety Function: Close or Open Fluid Flow
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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 the valves may be used in a redundant architecture up to SIL 3.

Specific requirements	The instructions of the associated Installation, Operating and Safety Manual shall be considered.
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Summary of test results see back side of this certificate.

Valid until 2022-11-20

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/V 1026.00/17 dated 2017-11-20.

This certificate is valid only for products which are identical with the product tested.

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

Köln, 2017-11-20

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Stephan Häb

Holder: Beijing Valve General Factory Co., Ltd.
 No. 3 Lvhai Road Panggezhuang Industrial Park,
 Daxing District
 Beijing, 102601
 P.R. China

Product tested: Ball Valves
 - Floating Ball series
 - Up and Down fixed shaft series
 - Stay Plate series

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	
Lambda Dangerous confidence level of calculation $1-\alpha = 95\%$	λ_D	2.31 E-07 / h	231 FIT
Lambda Dangerous Undetected assumed Diagnostic Coverage DC = 0 %	λ_{DU}	2.31 E-07 / h	231 FIT
Mean Time To Dangerous Failure	MTTF _D	4.33 E+06 h	494 a
Average Probability of Failure on Demand 1oo1 assumed Proof Test Interval $T_1 = 1$ year	PFD_{avg}(T₁)	1.01 E-03	
Average Probability of Failure on Demand 1oo2 assumed Proof Test Interval $T_1 = 1$ year assumed $\beta_{1oo2} = 10\%$	PFD_{avg}(T₁)	1.02 E-04	

Origin of values

The stated values are the results of the analysis of field feedback of the last five years.
 Random and systematic failures which are the responsibility of the manufacturer were examined.

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.