

Certificate



SIL/PL
Capability

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ID 0600000000

No.: V 369.03/15

Product tested	Ball Valves	Certificate holder	Metso Automation USA Inc. 44 Bowditch Drive Shrewsbury, MA 01545 USA
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Type designation	Jamesbury 4000
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Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010	IEC 61511 Parts 1-3:2004
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Intended application	The valves are suitable for usage up to SIL 3 under consideration of the required hardware fault tolerance (HFT) of the applicable application standard.
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Specific requirements	The instructions of the associated Installation, Operating and Safety Manual have to be considered.
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Summary of test results see back side of this certificate.

Valid until 2020-11-17

The issue of this certificate is based upon an examination, whose results are documented in Report No. V 369.03/15 dated 2015-11-17.

This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the codes and standards forming the basis of testing for the intended application.

TÜV Rheinland Industrie Service GmbH

Bereich Automation
Funktionale Sicherheit

Am Grauen Stein, 51105 Köln

Köln, 2015-11-17

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Stephan Häb

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TÜVRheinland®
Precisely Right.

Manufacturer **Metso Automation USA Inc.**
44 Bowditch Drive
Shrewsbury, MA, 01545
USA

Product tested **Ball Valves, Jamesburry Series 4000**

Device-Specific Values

Probability of Dangerous Failure on Demand	PFD _{spec}	1,54 E-04
Confidence Level	1- α	95 %
Safe Failure Fraction ^(see note)	SFF	63 %
Hardware Fault Tolerance	HFT	0
Diagnostic Coverage	DC	0 %
Type of Sub System		Type A
Mode of Operation		Low Demand
Proof Test Coverage	PTC	83 %

Note

The Safe Failure Fraction (SFF) was estimated by an alternative method with a FMEA according to EN 161:2011/A3:2013.

Derived Values for 1oo1-Architecture

Assumed Demands per Year	n_{op}	1 / a	1,14 E-04 / h
Assumed Test Interval	T_i	8760 h	1 a
Total Failure Rate	$\lambda_S + \lambda_D$	4,75 E-08 / h	48 FIT
Lambda Dangerous	λ_D	1,76 E-08 / h	18 FIT
Lambda Safe	λ_S	2,99 E-08 / h	30 FIT
Mean Time To Failure	MTTF	2,10 E+07 h	2.403 a
Mean Time To Dangerous Failure	MTTF _D	5,69 E+07 h	6.494 a
Average Probability of Failure on Demand	PFD_{avg}	7,70 E-05	

Useful Lifetime

A time of usage of more than 5 years (+ 1.5 years of storage) can only be favoured under responsibility of the operator, consideration of specific external conditions (securing of required quality of media, max. temperature, time of impact), and adequate test cycles. Please consider the references in the Safety Manual according test intervals and procedures as well as maintenance in respect with the useful lifetime , including the possibility of longer periods of use.

Quality Management

These statements are bound to a proven and verified deployment of safety-related quality management of the manufacturer.