

Certificate



SIL/PL
Capability

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ID 0600000000

No.: V 533.01/16

Product tested

Ball Valves
Soft Seated, Floating / Trunnion
Type
Metal Seated Floating / Trunnion
Type

**Certificate
holder**

Kingdom Flow Control Co.,
Ltd
No. 23-1, Nan-he West
Rd., Nan-tou Town
Zhongshan City,
Guangdong Province
P.R. China

Type designation

KV-L20
KV-L30, M30
KV-040, 060
KV-L40, L60
KV-070, L70
KV-080, L80
KV-090, L90
KV-M0F
KV-F40, F60
KV-M40, KV-M60

Codes and standards

IEC 61508 Parts 1-2 and 4-7:2010 IEC 61511-1:2016

Intended application

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 must be considered.

Summary of test results see back side of this certificate.

Valid until 2021-08-05

The issue of this certificate is based upon an examination, whose results are documented in Report No. V 533.01/16 dated 2016-08-05.

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, 2016-08-05

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Heinz Gall

Kingdom Flow Control Co., Ltd
No. 23-1, Nan-he West Rd., Nan-tou Town
Zhongshan City, Guangdong Province
P. R. China

Manufacturer

Ball Valves
Soft Seated Floating, Soft Seated Trunnion,
Metal Seated Floating / Trunnion

Product tested

Device-Specific Values

Probability of Dangerous Failure on Demand	p	9,08 E-05
Confidence Level	$1-\alpha$	95 %
Safe Failure Fraction ^(see note)	SFF	71 %
Hardware Fault Tolerance	HFT	0
Diagnostic Coverage	DC	0 %
Type of Sub System		Type A
Mode of Operation		Low Demand
Proof Test Coverage	PTC	> 62 %
Partial Stroke Test Coverage	PSTC	not considered

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	$\lambda_S + \lambda_D$	3,57 E-08 / h	36 FIT
Lambda Dangerous Detected	λ_{DD}	0,00 E+00 / h	0 FIT
Lambda Dangerous Undetected	λ_{DU}	1,04 E-08 / h	10 FIT
Lambda Safe	λ_S	2,54 E-08 / h	25 FIT
Mean Time To Failure	MTTF	2,80 E+07 h	3.195 a
Mean Time To Dangerous Failure	MTTF _D	9,65 E+07 h	11.016 a
Average Probability of Failure on Demand	PFD_{avg}	4,54 E-05	

Useful Lifetime

A time of usage of more than 5 years (+ 1.5 years of storage) can only be favored 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.