

Certificate



SIL/PL
Capability

www.tuv.com
ID 0600000000

No.: V 344.03/15

Product tested	Ball Valves for cryogenic and non-cryogenic use	Certificate holder	AMPO S. Cooperativa Division Valvulas Poyam Katea Auzoa Z/G 20213 Idiazabal (Guipuzcoa) Spain
-----------------------	---	---------------------------	--

Type designation	Floating Ball Valves: Types: 1A, 1AC, 7A, 9AC, 16A, 16AC, 17A, 17AC, 18A, 18AC Trunnion Ball Valves: Types: 12A, 12AC, 14A, 14AC
-------------------------	---

Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010	IEC 61511 Parts 1-3:2004 (in extracts)
----------------------------	----------------------------------	--

Intended application	The valves are suitable for use in a safety instrumented system up to SIL 2. Under consideration of the minimum required hardware fault tolerance HFT=1 the valves may be used in a redundant structure up to SIL 3.
-----------------------------	--

Specific requirements	The instructions of the associated Installation and Operating Manual shall be considered.
------------------------------	---

Summary of test results see back side of this certificate.

Valid until 2020-07-01

The issue of this certificate is based upon an examination, whose results are documented in Report No. V 344.03/15 dated 2015-07-01.

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, 2015-07-01

Certification Body for FS-Products

Dipl.-Ing. Stephan Häb

www.fs-products.com
www.tuv.com

TÜVRheinland[®]
Precisely Right.

Manufacturer **AMPO S. Cooperativa-Division Valvulas Poyam**
Katea Auzoa Z/G
20213, Idiazabal-Guipuzcoa
SPAIN

Product tested **Floating ball Valves:**
Types 1A,1AC, 7A, 9AC, 16A, 16AC, 17A, 17AC, 18A, 18AC
Trunnion Ball Valves:
Types 12A, 12AC, 14A, 14AC

Device-Specific Values		Floating	Trunnion
Probability of Dangerous Failure on Demand	PFD _{spec}	2,36 E-04	1,43E-03
Assumed Test Interval	Ti	1 a	1 a
Confidence Level	1- α	95 %	95 %
Safe Failure Fraction ^(see note)	SFF	91 %	93 %
Hardware Fault Tolerance	HFT	0	0
Diagnostic Coverage	DC	0 %	0 %
Type of Sub System		Type A	Type A
Mode of Operation		Low Demand	Low Demand
Proof Test Coverage	PTC	not considered	not considered
Partial Stroke Test Coverage	PSTC	not considered	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		Floating		Trunnion	
Assumed Demands per Year	f _{np}	1 / a		1 / a	
Total Failure Rate	$\lambda_S + \lambda_D$	2,97 E-07 / h	297 FIT	2,17 E-06 / h	2.172 FIT
Lambda Dangerous Detected	λ_{DD}	0,00 E+00 / h	0 FIT	0,00 E+00 / h	0 FIT
Lambda Dangerous Undetected	λ_{DU}	2,70 E-08 / h	27 FIT	1,63 E-07 / h	163 FIT
Lambda Safe Detected	λ_{SD}	0,00 E+00 / h	0 FIT	0,00 E+00 / h	0 FIT
Lambda Safe Undetected	λ_{SU}	2,70 E-07 / h	270 FIT	2,01 E-06 / h	2.009 FIT
Mean Time To Failure	MTTF	3,37 E+06 h	385 a	4,61 E+05 h	53 a
Mean Time To Dangerous Failure	MTTF _D	3,71 E+07 h	4.232 a	6,13 E+06 h	701 a
Average Probability of Failure on Demand	PFD_{avg}	1,18 E-04		7,13E-04	

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.

Quality Management

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