

Certificate of Conformity No.: 28715067

Manufacturer: Dafram S.p.A.
Via Tito Vignoli, 9
I-20146 Milano (MI)

Specifications: IEC 61508-1÷7:2010

Product: Side Entry Trunnion Mounted Ball Valves

Type: Series S, P, D, H

RESULT:

As per the TÜV Rheinland Italia Report No. FS 28715067 Rev. 0, we declare that the product meets the below requirements:

IEC 61508: 2010, part 1 to 7

Functional Safety of electrical/electronic/programmable electronic safety related systems; Type A, Low Demand Mode, HFT=0

Safety Action	λ_D [1/h]	$\lambda_{DD(PS)}$ [1/h]	Systematic Capability
Close / Open	3,03E-08	2,12E-08	3
Close with Tight Shut Off	6,96E-08	4,87E-08	3

The above values are compatible with SIL 3.

For SFF values with external diagnostic tests, carried out according to definition 3.8.7 of IEC 61508-4, see what written in the Safety Manual.

The requirements of minimum hardware fault tolerance (HFT) according to table 6 of IEC 61511-1 have to be observed.

Expiry date: 2018-03-31

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Location **Milan**
Date **2015-03-20**



Attachment 1 to
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Product: Side Entry Trunnion Mounted Ball Valves

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		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	2,84E-05	4,84E-05	8,82E-05	1,28E-04	1,68E-04
	2	3,62E-05	5,61E-05	9,60E-05	1,36E-04	1,76E-04
	3	4,39E-05	6,39E-05	1,04E-04	1,44E-04	1,84E-04
	6		8,71E-05	1,27E-04	1,67E-04	2,07E-04
	9				1,90E-04	
	12			1,74E-04	2,13E-04	2,53E-04

PFD_{AVG} values according to IEC 61508 for different values of TI and TI_{PS}: Safety Action: Close / Open

Test Interval Frequency (months)				
6	12	24	36	48
6,72E-05	1,34E-04	2,67E-04	4,00E-04	5,32E-04

PFD_{AVG} values according to IEC 61508 for different values of TI (no Partial Stroke Test): Safety Action: Close / Open

NOTES:

- The above values of PFD_{AVG} are calculated for MRT=24 h and Proof Test Coverage=100%. For other values of MRT, TI, TI_{PS} and/or non-perfect Proof Test, the PFD_{AVG} values must be re-calculated.
- The PFD_{AVG} values including Partial Stroke Test are calculated considering the use of a commercial automatic Partial Stroking Test System: for further details, see the Safety Manual.

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Attachment 2 to

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Specifications: IEC 61508-1÷7:2010

Product: Side Entry Trunnion Mounted Ball Valves

Type: Series S, P, D, H

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	6,52E-05	1,11E-04	2,02E-04	2,94E-04	3,85E-04
	2	8,30E-05	1,29E-04	2,20E-04	3,12E-04	4,03E-04
	3	1,01E-04	1,46E-04	2,38E-04	3,29E-04	4,21E-04
	6		2,00E-04	2,91E-04	3,83E-04	4,74E-04
	9				4,36E-04	
	12			3,98E-04	4,89E-04	5,81E-04

PFD_{AVG} values according to IEC 61508 for different values of TI and T_{IPs}: Safety Action: Close with Tight Shut Off

Test Interval Frequency (months)					
	6	12	24	36	48
	1,54E-04	3,07E-04	6,11E-04	9,16E-04	1,22E-03

PFD_{AVG} values according to IEC 61508 for different values of TI (no Partial Stroke Test): Safety Action: Close with Tight Shut Off

NOTES:

- The above values of PFD_{AVG} are calculated for MRT=24 h and Proof Test Coverage=100%. For other values of MRT, T_{IPs} and/or non-perfect Proof Test, the PFD_{AVG} values must be re-calculated.
- The PFD_{AVG} values including Partial Stroke Test are calculated considering the use of a commercial automatic Partial Stroking Test System: for further details, see the Safety Manual.

-----End report

