

Certificate of Conformity No.: 28715068

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

Specifications: IEC 61508-1÷7:2010

Product: Top Entry Trunnion Mounted Ball Valves

Type: Series A, B, C

RESULT:

As per the TÜV Rheinland Italia Report No. FS 28715068 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	3,28E-08	2,29E-08	3
Close with Tight Shut Off	7,65E-08	5,36E-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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Specifications: IEC 61508-1÷7:2010

Product: Top Entry Trunnion Mounted Ball Valves

Type: Series A, B, C

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	3,07E-05	5,22E-05	9,53E-05	1,38E-04	1,81E-04
	2	3,91E-05	6,06E-05	1,04E-04	1,47E-04	1,90E-04
	3	4,75E-05	6,90E-05	1,12E-04	1,55E-04	1,98E-04
	6		9,41E-05	1,37E-04	1,80E-04	2,23E-04
	9				2,05E-04	
	12			1,87E-04	2,31E-04	2,74E-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
7,26E-05	1,44E-04	2,88E-04	4,32E-04	5,75E-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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 I-20146 Milano (MI)

Specifications: IEC 61508-1÷7:2010

Product: Top Entry Trunnion Mounted Ball Valves

Type: Series A, B, C

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	7,17E-05	1,22E-04	2,22E-04	3,23E-04	4,24E-04
	2	9,12E-05	1,41E-04	2,42E-04	3,43E-04	4,43E-04
	3	1,11E-04	1,61E-04	2,62E-04	3,62E-04	4,63E-04
	6		2,20E-04	3,20E-04	4,21E-04	5,21E-04
	9				4,79E-04	
	12			4,38E-04	5,38E-04	6,39E-04

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

Test Interval Frequency (months)				
6	12	24	36	48
1,69E-04	3,37E-04	6,72E-04	1,01E-03	1,34E-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, 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.

-----End report

