

Certificate of Conformity No.: 28714132

Manufacturer: Z.A.VE.RO. S.r.l.
Via dei Martiri, 121/B
I-28078 Romagnano Sesia (NO)

Specifications: IEC 61508-1+7:2010

Product: Trunnion Side Entry Ball Valves

Type: Series 85-185-285

RESULT:

As per the TÜV Rheinland Italia Report No. FS 28714132 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	2,82E-07	1,97E-07	3
Close with Tight Shut Off	4,53E-07	3,17E-07	3

The above values are compatible with SIL 2, and with SIL 3 with specific values of Partial Stroke and Full Stroke Test Intervals (see Attachments).

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 table 6 of IEC 61511-1 have to be observed.

Expiry date: 2017-04-30

Location: **Milan**

Date: **2014-04-16**

TÜV Rheinland Italia S.r.l.
Via Enrico Mattei, 3
I - 20010 Pogliano Milanese

Giovanni De Felippis
Operational Manager




TÜV Rheinland Italia
TÜV Rheinland Group
- Industrie Service -

**Attachment 1 to
Certificate of Conformity No.: 28714132**



Manufacturer: Z.A.VE.RO. S.r.l.
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Specifications: IEC 61508-1+7:2010

Product: Trunnion Side Entry Ball Valves

Type: Series 85-185-285

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	2,64E-04	4,49E-04	8,19E-04	1,19E-03	1,56E-03
	2	3,36E-04	5,21E-04	8,90E-04	1,26E-03	1,63E-03
	3	4,08E-04	5,92E-04	9,62E-04	1,33E-03	1,70E-03
	6		8,08E-04	1,18E-03	1,55E-03	1,92E-03
	9				1,76E-03	
	12			1,61E-03	1,98E-03	2,35E-03

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
6,23E-04	1,24E-03	2,47E-03	3,71E-03	4,94E-03

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

Location: **Milan**

Date: **2014-04-16**

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**Attachment 2 to
Certificate of Conformity No.: 28714132**



Manufacturer: ZA.VE.RO. S.r.l.
Via dei Martiri, 121/B
I-28078 Romagnano Sesia (NO)

Specifications: IEC 61508-1+7:2010

Product: Trunnion Side Entry Ball Valves

Type: Series 85-185-285

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	4,24E-04	7,22E-04	1,32E-03	1,91E-03	2,51E-03
	2	5,40E-04	8,38E-04	1,43E-03	2,03E-03	2,62E-03
	3	6,56E-04	9,54E-04	1,55E-03	2,14E-03	2,74E-03
	6		1,30E-03	1,90E-03	2,49E-03	3,09E-03
	9				2,84E-03	
	12			2,59E-03	3,19E-03	3,78E-03

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
1,00E-03	2,00E-03	3,98E-03	5,96E-03	7,95E-03

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

Location: **Milan**

Date: **2014-04-16**

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