

Certificate of Compliance

No. 8114962007/100-01

Manufacturer	Oswal Industries Limited Block No. 258, Ahmedabad -Mehsana Expressway, Village - Ola, Post - Isand , Taluka - Kalol, Distt. Gandhinagar 382 740 Gujarat , INDIA
Product	TRUNNION MOUNTED BALL VALVES, Bare Valves 2" to 48" Class 150 to 2500
Type	<ul style="list-style-type: none">• TYPE A - Standard (SOFT Seated)• TYPE B- High & Low pressure and zero leakage• TYPE C- High temperature (Metal Seated)/ Low temperature• Cryogenic• Underground
SIL compatibility study results	<p>The Trunnion Mounted Ball Valves are suitable for use in safety related systems in low demand and high/continuous modes of operation as a single safety related subsystem according to IEC 61508 /61511 up to and including SIL 3</p> <p>For detailed results see test report No. 8114962007/100-01 Dated: 15 February 2018 A short summary of test results is filled up on the Annexure – 1 of this certificate</p> <p>The suitability for certain fields of application can only be assessed by additional evaluation of further components of the subsystem</p>


This certificate remains valid until 02/2021

Subject to satisfactory Annual Surprise / Surveillance Audit

Date: 15 February 2018


K. P. S. IYER
Team Leader




V. Viswanathan
Head of Certifying Services

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Systematic Capability:	Low Demand SC 3 (SIL3 Capable) High/ Continuous Demand SC3 (SIL3 Capable)

Appliance-specific values determined:		Bare Valve		
Type of sub system	IEC 61508 -2 7.4.4.1.2	type A		
Assumed Demand of operation		Low High/ Continuous		
Confidence level		95 %		
Hardware Fault Tolerance	HFT	Route 1 _H	SIL 3 = 1	
		Route 2 _H	SIL 3 = 0	
Derived Values		Min.	Avg.	Max.
Safe undetected failure rate	$\lambda_{SU, FIT}^*$	8.78E-08	1.20E-07	1.60E-07
Dangerous Undetected failure rate	$\lambda_{DU, FIT}$	5.32E-08	8.70E-08	1.21E-07
Safe failure rate	λ_s, FIT	2.15E-07	3.07E-07	3.82E-07
Total failure rate	$\lambda_s + \lambda_D, FIT$	4.92E-07	6.53E-07	8.78E-07
MTBF total	Hours	2.03E+15	1.53E+15	1.14E+15
Diagnostic coverage	DC %	--	75%	--
Safe Failure Fraction	SFF %	--	87%	--
Probability of Failure on Demand, Average (Dangerous)	PFD _{avg}		2.54E-04	

*1 FIT = 1 failure in 1x10⁹ hours

The Trunnion Mounted Ball Valves are suitable for use in safety related systems in low demand mode of operation as a single safety related subsystem according to IEC 61508 up to and including SIL 3 (according to table 2 of IEC 61508-1: $10^{-4} \leq PFD < 10^{-3}$) subject to the installation conditions in the Safety manual.

Conditions for Application:

- i. The valve is only to be used within its specified design and operating conditions
 - ii. The valve is not to be used for a Safety function other than its designed purpose.
 - iii. The valve is not to be used under a high demand or continuous process unless due measures are taken.
 - iv. The valves can be applied as a final element for any SIS system equal to/ less than its own SIL compatibility level. However, the final SIL must be established independently on the basis of the entire SIS.
 - v. The valve is not to be modified or tampered with in any way.
 - vi. A minimum Proof test period of 1 year should be ensured for the valves to maintain SIL 3 compatibility.
 - vii. The prescribed HFT requirement should be maintained to ensure SIL class 3 compatibility of the final element in the SIS
- The report may be referred for FIT and SIL parameters for individual applications

Reference Documentation:

SIL ASSESSMENT report: <8114962007/100-01 Dated: 15 February 2018.>

Safety Manual: FSMS Manual # OIL –FSM-01 Rev 0