

# Valve Specification Sheet



MANUFACTURER : **MARS**

VALVE TYPE	Series 91D (Direct mount) Floating Ball,						
CLASS RATING	ANSI 150						
BODY CONSTRUCTION	One piece, flanged ends. ASME B16.34, ASME B16.5, ASME B16.10, API.6D, BS5351, MSS.SP55, MSS.SP25						
BORE	Reduced Bore						
VALVE OPERATOR	Lever operated, Lockable						
END CONNECTIONS	Raised Face						
BODY MATERIAL	(Casting) ASTM A352 LCC						
TRIM MATERIAL	Ball & Stem: ASTM A276 F316ss						
SEAT MATERIAL	RPTFE (Soft Seats)						
SEAL MATERIAL	Graphite & 25% Glass Filled PTFE						
BOLTING MATERIAL	B7M / 2HM						
OTHER DETAILS	<ol style="list-style-type: none"> <li>1. Firesafe Certified According to API 607/API 6FA/ISO 10497</li> <li>2. Materials of Construction According to NACE MR-01-75</li> <li>3. Certification According to BS/EN 10204 3.1.B.</li> <li>4. Pressure Tested According to API.598</li> <li>5. Face to Face According to ASME B16.34, ASME B16.5</li> <li>6. Design According to API 6D and ANSI B16.34</li> <li>7. Manufactured under API 6D Monogram</li> <li>8. Manufactured under an ISO 9001 Certified Quality Assurance System.</li> <li>9. ISO 5211 Actuator Mounting Pad</li> <li>10. CE/PED Compliant (1.1/4" and above) SEP all others.</li> <li>11. Anti-static &amp; Anti-blow out.</li> </ol> <p><i>*Where attached, please refer to drawing for design purposes only. Materials identified on this VDS supersede those of the drawing unless otherwise stated.</i></p>						
REVISION	0	1	2	3	4	5	6
BY	KRF						
APP'D	BW						
DATE	13/09/13						

The manufacturer  
may use the mark



**Reports**

MAR 09/10-51 R004 V1 R1  
Assessment Report

MAR 09/10-51 R001 V1 R3  
FMEDA Report

**Validity:**

This assessment is valid for  
the Series 99, 91D, 90D, 90,  
96D, 88, 83, 77 & 22, 2-Way  
Ball Valves

This assessment is valid until  
April 1, 2014.

Revision 1.0 March 23, 2011



# Certificate / Certificat Zertifikat / 合格証

MAR 091051 C001

*exida* hereby confirms that the:

**Series 99, 91D, 90D, 90, 96D, 88, 83, 77 & 22  
2-Way Ball Valves**

**Mars Valve Co., Ltd.  
Taichung, Taiwan – R.O.C.**

Has been assessed per the relevant requirements of:

**IEC 61508 : 2010 Parts 1 - 7**

and meets requirements providing a level of integrity to:

**Systematic Integrity: SIL 3 Capable**

**Random Integrity: Type A Device**

**PFD<sub>AVG</sub> and Architecture Constraints  
must be verified for each application**

**Safety Function:**

The Ball Valve will move to the designed safe position per the actuator design within the specified safety time.

**Application Restrictions:**

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.



*Steva J. Chase*

Evaluating Assessor

*Dregory Saut*

Certifying Assessor



# Certificate / Certificat / Zertifikat / 合格証

MAR 091051 C001

## Systematic Integrity: SIL 3 Capable

## Random Integrity: Type A Device

$PFD_{AVG}$  and Architecture Constraints  
must be verified for each application

Series 99, 91D, 90D,  
90, 96D, 88, 83, 77 & 22,  
2-Way Ball Valves

Mars Valve Co., Ltd.  
Taichung, Taiwan –  
R.O.C.

### SIL 3 Capability:

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated without "prior use" justification by end user or diverse technology redundancy in the design.

### IEC 61508 Failure Rates in FIT\*, Clean Service

Application	$\lambda_{SD}$	$\lambda_{SU}$	$\lambda_{DD}$	$\lambda_{DU}$
Full Stroke	0	0	0	472
Tight Shut-Off	0	0	0	1338
Open on Trip	0	144	0	327
Full Stroke with PVST**	0	0	158	314
Tight Shut-Off with PVST	0	0	158	1180
Open on Trip with PVST	144	0	158	169

### SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of  $PFD_{AVG}$  considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each subsystem must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

\*FIT = 1 failure /  $10^9$  hours

\*\*PVST = Automated Partial Valve Stroke Test



Form	Version	Date
C61508	2.7-3	Mar 2011