



The manufacturer
may use the mark:



Revision 6.0 September 26, 2024
Surveillance Audit Due
October 1, 2027



Certificate / Certificat Zertifikat / 合格証

MAR 091051 C001

exida hereby confirms that the:

**Series 99, 91D, 90D, 90, 88, 83, 77, 22,
88X, 90DX, 90X, 55, 88AB, 83B & 83BR
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 1-2

and meets requirements providing a level of integrity to:

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

**PFD_{avg} 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.



Jack Gao

Evaluating Assessor

Diamond Lee

Certifying Assessor

MAR 091051 C001

Systematic Capability: SC 3 (SIL 3 Capable)**Random Capability: Type A, Route 2_H Device****PFD_{avg} and Architecture Constraints
must be verified for each application****Systematic 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.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element. This device meets *exida* criteria for Route 2_H.

IEC 61508 Failure Rates in FIT*

Application	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
Full Stroke, Clean Service	0	0	0	373
Tight Shut-Off, Clean Service	0	0	0	1109
Open on Trip, Clean Service	0	121	0	252
Full Stroke, Severe Service	0	0	0	698
Tight Shut-Off, Severe Service	0	0	0	2170
Open on Trip, Severe Service	0	241	0	457

* FIT = 1 failure / 10⁹ hours

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 element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: MAR Q091051 R004 V6 R1 (or later)

Safety Manual: 250406-Safety Manual 2-Way Ball Valves Rev.5



80 N Main St
Sellersville, PA 18960

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Valves**