



# Certificate / Certificat Zertifikat / 合格証

MAR 091051 C002

exida hereby confirms that the:

## Series 33 3-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 Capability: SC 3 (SIL 3 Capable)**

**Random Capability: Type A, Route 2<sub>H</sub> 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.



*Deymond Lee*  
Evaluating Assessor

*Steva J. Chase*  
Certifying Assessor

The manufacturer  
may use the mark:



Revision 4.2 May 11, 2020  
Surveillance Audit Due  
May 1, 2023



ISO/IEC 17065  
PRODUCT CERTIFICATION BODY  
#1004

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**Systematic Capability: SC 3 (SIL 3 Capable)****Random Capability: Type A, Route 2<sub>H</sub> Device**

**PFD<sub>avg</sub> 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<sub>H</sub>.

**IEC 61508 Failure Rates in FIT\***

Application/Configuration	$\lambda_{SD}$	$\lambda_{SU}$	$\lambda_{DD}$	$\lambda_{DU}$
Full Stroke, Clean Service, Floating	0	0	0	451
Tight Shut-Off, Clean Service, Floating	0	0	0	1199
Open on Trip, Clean Service, Floating	0	128	0	323
Full Stroke, Severe Service, Floating	0	0	0	845
Tight Shut-Off, Severe Service, Floating	0	0	0	2329
Open on Trip, Severe Service, Floating	0	249	0	596
Full Stroke, Clean Service, Trunnion	0	0	0	502
Tight Shut-Off, Clean Service, Trunnion	0	0	0	1266
Open on Trip, Clean Service, Trunnion	0	132	0	370
Full Stroke, Severe Service, Trunnion	0	0	0	947
Tight Shut-Off, Severe Service, Trunnion	0	0	0	2464
Open on Trip, Severe Service, Trunnion	0	257	0	690

\* FIT = 1 failure / 10<sup>9</sup> hours

**SIL Verification:**

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD<sub>AVG</sub> 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.

The following documents are a mandatory part of certification:

**Assessment Report:** MAR\_Q091051\_R004\_V4R1 (or later)

**Safety Manual:** 25-04-07 Safety Manual 3-Way Ball Valve



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