



# Certificate / Certificat Zertifikat / 合格証

MOG 1610021 C002

*exida* hereby confirms that the:

## T-Series Trunnion Ball Valve

**MOGAS Industries, Inc.  
Houston, TX USA**

The manufacturer  
may use the mark:



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**

Revision 1.4 April 6, 2023  
Surveillance Audit Due  
May 15, 2023

### Safety Function:

The 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.



ISO/IEC 17065  
PRODUCT CERTIFICATION BODY  
#1004



Evaluating Assessor

Certifying Assessor

**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<sup>1</sup>**

Device	$\lambda_{SD}$	$\lambda_{SU}$	$\lambda_{DD}$	$\lambda_{DU}$
Full Stroke, Clean Service	0	0	0	549
Tight Shut-Off, Clean Service	0	0	0	1118
Open on Trip, Clean Service	0	131	0	418
Full Stroke w/automated PVST <sup>2</sup> , Clean Service	0	0	236	313
Tight Shut-Off w/automated PVST, Clean Service	0	0	236	882
Open on Trip w/automated PVST, Clean Service	130	1	236	182
Full Stroke, Severe Service	0	0	0	941
Tight Shut-Off, Severe Service	0	0	0	2012
Open on Trip, Severe Service	0	253	0	689
Full Stroke w/automated PVST, Severe Service	0	0	388	554
Tight Shut-Off w/automated PVST, Severe Service	0	0	388	1625
Open on Trip w/automated PVST, Severe Service	250	3	388	301

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

<sup>2</sup> PVST = Partial Valve Stroke Test of a final element Device

**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 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:** MOG 16-10-021 R003 V1R2 (or later)

**Safety Manual:** T-Series Safety Manual



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