Certificate / Certificat
Zertifikat / 合格証

MOG 1610021 C001

exida hereby confirms that the:

C-Series Floating Ball Valve

MOGAS Industries, Inc.
Houston, TX USA

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_H Device

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

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.

The manufacturer may use the mark:

Revision 1.3 April 6, 2023
Surveillance Audit Due
May 15, 2023

Evaluating Assessor

Certifying Assessor

ISO/IEC 17065
PRODUCT CERTIFICATION BODY
#1004

Certificate / Certificat / Zertifikat / 合格証

MOG 1610021 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

C-Series Floating Ball Valve

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[1]

Device	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
Full Stroke, Clean Service	0	0	0	442
Tight Shut-Off, Clean Service	0	0	0	1207
Open on Trip, Clean Service	0	154	0	288
Full Stroke w/automated PVST[2], Clean Service	0	0	162	280
Tight Shut-Off w/automated PVST, Clean Service	0	0	162	1045
Open on Trip w/automated PVST, Clean Service	152	2	162	126
Full Stroke, Severe Service	0	0	0	809
Tight Shut-Off, Severe Service	0	0	0	2693
Open on Trip, Severe Service	0	344	0	465
Full Stroke w/automated PVST, Severe Service	0	0	257	552
Tight Shut-Off w/automated PVST, Severe Service	0	0	257	2436
Open on Trip w/automated PVST, Severe Service	341	3	257	208

[1] FIT = 1 failure / 10^9 hours

[2] 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_{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: MOG 16-10-021 R003 V1R2 (or later)

Safety Manual: C-Series Safety Manual

80 N Main St
Sellersville, PA 18960