



Certificate / Certificat Zertifikat / 合格証

VIR 060919 C001

exida hereby confirms that the:

S Series Floating Ball Valve

The manufacturer
may use the mark:

Virgo Valves and Controls Private Limited Pune, India

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**

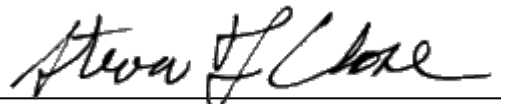
Safety Function:

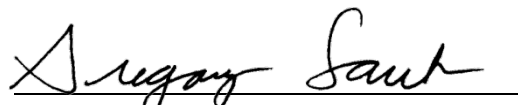
The Ball Valve will move to the designed safe position per the actuator design within the specified safety time.

Application Restrictions:

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




Evaluating Assessor


Certifying Assessor



Valid until July 1, 2017
Revision 3.0 June 30, 2014



ANSI Accredited Program
PRODUCT CERTIFICATION
#1004

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, clean service in FIT*

Device	λ_{sd}	λ_{su}	λ_{dd}	λ_{du}
<i>Two Piece</i>				
Full Stroke	0	0	0	532
Tight Shutoff	0	0	0	1398
Open to Trip	0	145	0	388
Full Stroke with PVST**	0	0	172	360
Tight Shutoff with PVST	0	0	172	1226
Open to Trip with PVST	145	0	182	206
<i>Three Piece</i>				
Full Stroke	0	0	0	475
Tight Shutoff	0	0	0	1341
Open to Trip	0	145	0	330
Full Stroke with PVST	0	0	138	337
Tight Shutoff with PVST	0	0	138	1203
Open to Trip with PVST	145	0	150	180

*FIT = 1 failure / 10⁹ hours

**PVST = Automatic Partial Valve Stroke Test

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.

The following documents are a mandatory part of certification:

Assessment Report: VIR 06-09-10 R007 V4R1

Safety Manual: N & S Series Safety Manual SM-003

S Series Ball Valves



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Sellersville, PA 18960