The manufacturer may use the mark:

Certificate / Certificat
Zertifikat / 合格証

VIR 080821 C003

exida hereby confirms that the:

Series P Metal Seated Floating Ball Valve

Virgo Engineers Ltd. / Virgo Valves and Controls Ltd.
Pune, India

Has been assessed per the relevant requirements of:

IEC 61508 Parts 1, 2

and meets requirements providing a level of integrity to:

Systematic Integrity: SIL 3 Capable

Random Integrity: Type A 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.

Evaluating Assessor

Certifying Assessor

Certificate / Certificat / Zertifikat / 合格証

VIR 080821 C003

Systematic Integrity: SIL 3 Capable

Random Integrity: Type A Device

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

Series P Metal Seated Floating Ball Valve

Virgo Engineers Ltd. / Virgo Valves and Controls Ltd. Pune, India

SIL 3 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 without "prior use" justification by end user or diverse technology redundancy in the design.

IEC 61508, ed2, 2010, Failure Rates, clean service, in FIT*

Device	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
Fail Closed – Full Stroke	0	0	0	569
Fail Closed – Tight Shutoff	0	0	0	1440
Fail Open	0	226	0	343
Fail Closed – Full Stroke, PVST	0	0	194	375
Fail Closed – Tight Shutoff, PVST	0	0	194	1246
Fail Open – PVST	226	0	194	149

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.

* FIT = 1 failure / 10^9 hours

exida
Certification Services

64 N Main St
Sellersville, PA 18960

Form	Version	Date
C61508	2.5-3	Aug 2010