

exida[®]

The manufacturer
may use the mark:

Certificate / Certificat
Zertifikat / 認証

VIR 060919 C002

exida hereby confirms that the:

N Series Trunnion 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

**PFDavg and Architecture Constraints must
be verified for each application**

Safety Function:

The N Series Trunnion Ball Valve will move to the designed safe position per the actuator design.

Application Restrictions:

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

Reports:

VIR 06-09-19 R002 FMEDA
Report V1 R1

VIR 06-09-10 R007
Assessment Report V1 R1

Validity:

This assessment is valid for
the N Series Trunnion Ball
Valves: 2" – 24".

This assessment is valid until
July 30, 2010.

Revision 1.2 July 16, 2007



TD Bredemeyer
Product Assessor

William M. Holt
Auditor

Form	Version	Date
C61508	1.9	June 2007

N Series Trunnion Ball Valve

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

Systematic Integrity: SIL 3 Capable

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.

Random Integrity: Type A. PFD_{avg} and Architecture Constraints must be confirmed per application.

Summary for N Series Trunnion Ball Valve failure rates in FITS*

Failure category	Failure rate (in FIT)		
	Full Stroke	Tight-Shutoff	Open to Trip
Fail Safe	0	0	0
Fail Dangerous Undetected	604	1269	392
No Effect	1585	920	120

Refer to the FMEDA report for details.

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 / 10⁹ hours