

The manufacturer  
may use the mark:



#### Reports:

VIR 06-09-10 R007 V3 R1  
Assessment Report

VIR 09-12-21 R001 V2 R2  
FMEDA Report

#### Validity:

This assessment is valid for  
the Series TriTork Triple  
Offset Valve

This assessment is valid until  
January 1, 2014.

Revision 2.0 December 6 2010



# Certificate / Certificat Zertifikat / 合格証

VIR 091221 C002

*exida* hereby confirms that the:

**Series TriTork Triple Offset 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<sub>AVG</sub> 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

VIR 091221 C002

**Systematic Integrity: SIL 3 Capable****Random Integrity: Type A Device**

**PFD<sub>AVG</sub> and Architecture Constraints  
must be verified for each application**

**Series TriTork Triple  
Offset Valves**

**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\***

<b>Application</b>	$\lambda_{SD}$	$\lambda_{SU}$	$\lambda_{DD}$	$\lambda_{DU}$
Full Stroke, Clean Service	0	0	0	680
Tight Shut-Off, Clean Service	0	0	0	1478
Open to Trip, Clean Service	0	214	0	466
Full Stroke with PVST, Clean Service	0	0	234	446
Tight Shut-Off with PVST, Clean Service	0	0	221	1257
Open to Trip with PVST, Clean Service	214	0	234	232

**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 subsystem must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

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



Form	Version	Date
C61508	2.5-3	Aug 2010