

The manufacturer  
may use the mark:



**Reports:**

FLO 10-01-53 R007 Mark  
Series Assessment Report  
V1 R1

FLO 10-01-53 R005 V1R1 -  
Flowserve Spring Return  
Actuator FMEDA

**Validity:**

This assessment is valid for  
Spring Cylinder Linear  
Actuator

This assessment is valid until  
July 1, 2013.

Revision 1.0 June 29, 2010



# Certificate / Certificat Zertifikat / 合格証

FLO 10-01-53 C005

*exida* hereby confirms that the:

## Spring Cylinder Linear Actuator

**Flowserve Corporation  
Springville, UT - USA**

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; SIL must be verified for the entire  
final element application**

Safety Function:

The actuator will move to the designed safe position when de-energized / energized within the specified safety time.

Application Restrictions:

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



Product Assessor

Auditor

# Certificate / Certificat / Zertifikat / 合格証

FLO 10-01-53 C005

**Systematic Integrity: SIL 3 Capable**

**Random Integrity:**

**Type A, SIL must be verified for the entire final element application**

Spring Cylinder Linear Actuator

Flowserve Corporation  
Springville, UT - USA

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.

## Failure rates Spring Cylinder Linear Actuator

	$\lambda_{sd}$ (FIT)	$\lambda_{su}^1$ (FIT)	$\lambda_{dd}$ (FIT)	$\lambda_{du}$ (FIT)
Air-to-retract	0 FIT	580 FIT	0 FIT	199 FIT
Air-to-extend	0 FIT	560 FIT	0 FIT	189 FIT
Air-to-retract, PVST	286 FIT	294 FIT	101 FIT	98 FIT
Air-to-extend, PVST	178 FIT	382 FIT	95 FIT	94 FIT

<sup>1</sup> It is important to realize that the "no effect" failures are included in the "safe undetected" failure category according to IEC 61508. Note that these failures on their own will not affect system reliability or safety, and should not be included in spurious trip calculations

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<sup>9</sup> hours



Form	Version	Date
C61508	2.3	May 2010