The manufacturer may use the mark:

Certificate / Certificat
Zertifikat / 合格証

FLO 10-01-53 C001

exida hereby confirms that the:

Mark One valve

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 valve 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.

Reports:
FLO 10-01-53 R007 Mark Series Assessment Report V1 R3
FLO 10-01-53 R001 V1R2 - Flowserve Mark One FMEDA Report

Validity:
This assessment is valid for Mark One valve

This assessment is valid until July 1, 2013.

Revision 1.0 June 29, 2010

Product Assessor

Auditor

Certificate / Certificat / Zertifikat / 合格証

FLO 10-01-53 C001

Systematic Integrity: SIL 3 Capable

Random Integrity:

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

Mark One valve

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 Mark One valve (Clean Service)

	λ_{sd} (FIT)	λ_{su} [1] (FIT)	λ_{dd} (FIT)	λ_{du} (FIT)
Full Stroke	0	804	0	542
Tight Shutoff	0	53	0	1293
Open to Trip	0	1039	0	307
Full Stroke with PVST	0	804	164	378
Tight Shutoff with PVST	0	53	164	1129
Open to Trip with PVST	235	804	164	143

[1] 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 / 10^9 hours

exida® Certification Services
64 N Main St
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Form	Version	Date
C61508	2.3	May 2010