The manufacturer
may use the mark:

Reports:
ASCO 08/12-44 R001 V1 R2
FMEDA Report
ASCO 08/12-44 R002 V1 R1
IEC 61508 Assessment

Validity:
This assessment is valid for RCS 1oo1HS and 2oo2 versions.

This assessment is valid until June 30, 2012.
Revision 1.0 Jun, 2009

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Certificate / Certificat
Zertifikat / 合格証

ASCO 08/12-44 C001

exida hereby confirms that the:

RCS 1oo1HS, 2oo2

ASCO Valve, Inc.
Florham Park, NJ, USA

Have 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 RCS Solenoid Valve will move to the safe state, normally open or normally closed, within the specified safety time when de-energized.

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

ASCO 08/12-44 C001

RCS 1oo1HS, 2oo2

ASCO Valve, Inc.
Florham Park, NJ
USA

Systematic Integrity: SIL 3 Capable

Random Integrity: Type A Device

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

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 Failure Rates

For valves used in a final element assembly, SIL must be verified for the specific application using the following failure rate data.

Failure rates according to IEC 61508 for RCS with Automated Diagnostic Tests*

Device	λ_{sd}	λ_{su}	λ_{dd}	λ_{du}
Solenoid Valve	594 FIT	261 FIT	502 FIT	10 FIT
Bypass Valve	57 FIT	88 FIT	7 FIT	0 FIT
Pressure Switch	444 FIT	5 FIT	0 FIT	0 FIT

Failure rates according to IEC 61508 for RCS with Manually Initiated Diagnostic Tests*

Device	λ_{sd}	λ_{su}	λ_{dd}	λ_{du}
Solenoid Valve	0 FIT	855 FIT	0 FIT	512 FIT
Bypass Valve	0 FIT	145 FIT	0 FIT	7 FIT
Pressure Switch	0 FIT	449 FIT	0 FIT	0 FIT

SIL Verification:

The RCS is an assembly of components with fault tolerant options. Therefore the above failure rates must be used in a probabilistic model to determine PFDavg and other safety metrics for each specific model. Example Markov models are provided in the FMEDA report for each architecture.

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

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Form	Version	Date
C61508	2.03	Mar 2009