



Certificate / Certificat Zertifikat / 合格証

CRA 2003035 C001

exida hereby confirms that the:

Lined Plug Valves

**CRANE ChemPharma Flow Solutions
Cincinnati, OH USA**

The manufacturer
may use the mark:



Have been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-2

and meets requirements providing a level of integrity to:

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

**PFH/PFD_{avg} and Architecture Constraints
must be verified for each application**

Revision 1.0 January 23, 2022

Surveillance Audit Due
February 1, 2025

Safety Function:

The Lined Plug 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.



Ch.O.B.

Evaluating Assessor

Gregory Saut

Certifying Assessor

CRA 2003035 C001

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

PFH/PFD_{avg} and Architecture Constraints must be verified for each application

Systematic Capability :

These products have 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.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element. This device meets *exida* criteria for Route 2_H.

Versions:

Valve Series	Sizes	Pressures
Family 061, 2-Way Lined Plug Valve	1/2" to 12"	ASME Class 150
Family 361, 2-Way Lined Plug Valve	1" to 6"	ASME Class 300
Family 031, 3-Way Lined Plug Valve	1" to 4"	ASME Class 150

IEC 61508 Failure Rates in FIT¹ Static Applications

Application/Device/Configuration	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
2-Way Full Stroke, Clean Service	0	0	0	428
2-Way Tight Shut-Off, Clean Service	0	0	0	765
2-Way Open on Trip, Clean Service	0	129	0	299
3-Way Full Stroke, Clean Service	0	0	0	481
3-Way Tight Shut-Off, Clean Service	0	0	0	985
3-Way Open on Trip, Clean Service	0	182	0	299

¹FIT – 1 failure/10⁹ hours

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/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 element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: CRA 2003035 R002 V1R1 (or later)

Safety Manual: Lined Plug Valve Safety Manual Rev 0 (or later)

Lined Plug Valves



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