Document number:	0776505_CT001 rev. 1
Dated:	21-Nov-25
Expiry date:	21-Nov-28

IEC 61508 Hardware Safety Integrity Assessment

Celeros Flow Technology, Solenoid, Actuator and Valve Assembly (3229107-0010)

Manufacturer:	Celeros Flow Technology 149 Newlands Road, Cathcart, Glasgow G44 4EX, UK
Product:	Solenoid, Actuator and Valve Assembly
Model:	3229107-0010

Application:	Low Demand Mode Safety Instrumented Function
Safety Function:	Upon detection of a fault, globe valve is closed (Sensing, logic solver and additional final element subsystems are not part of this analysis)
Applied standard:	IEC 61508 Ed2 2010 Parts 1-3 (Partial)
Systematic Capability:	Not Assessed
Applicable report:	Environmental Resources Management Ltd Report: 0776505_FM001 rev. 1

Assessment Route:	1_H
Hardware Fault Tolerance:	0
Type:	A
Application restrictions:	If a different solenoid model and application as identified from the Exida certificate is used, that the random hardware reliability and architectural requirements is updated to ensure the overall valve assembly meets its SIL requirements. If any of the elements are required to be configured in a redundant configuration (i.e. 1oo2, 2oo3, etc), the figures within the table below will need to be recalculated to take this into account.

Model No.	λDU (/hr)	λDD (/hr)	λS (/hr)	SFF	SIL AC (HFT = 0)
3229107-0010 (i.e. 1oo1 SOV, 1oo1 actuator and 1oo1 globe valve)	9.4E-07	7.6E-07	1.2E-05	93%	SIL 3

SIL AC (Architectural Constraints): Represents the maximum allowable SIL of each hardware element, assuming Hardware Fault Tolerance (HFT) = 0.

It should be noted that for a device to claim compliance with a specified SIL, the SIL AC and SC of the device needs to both be met. In addition to this, the required Average Probability of Failure on Demand (PFDavg) value for the complete Safety Instrumented Function (SIF) needs to adhere to the SIL PFDavg ranges.

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IMPORTANT: It should be noted that this assessment considers only the Celeros Flow Technology, Solenoid, Actuator and Valve Assembly (3229107-0010) and does not include confirmation of the response time of the device(s).

The Celeros Flow Technology, Solenoid, Actuator and Valve Assembly (3229107-0010) has been assessed and is considered capable for use in a low demand mode safety function up to (and including) SIL 3 with regards to random hardware failures and architectural constraints.

Note 1: The SIL of a complete SIF (sensor, logic solver and final element subsystems) must be verified to calculate the required Probability of Failure on Demand (PFD) / Probability of Failure per Hour (PFH), considering any redundancy, Proof Test Interval (PTI), Proof Test Coverage (PTC), Mission Time and Mean Time To Restoration (MTTR) for all elements included in the SIF. Each subsystem should be verified to ensure compliance with the minimum HFT requirements.

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