

FS Functional Safety



No.SAMPLE certificate

CERTIFICATE

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certified: 1125/08

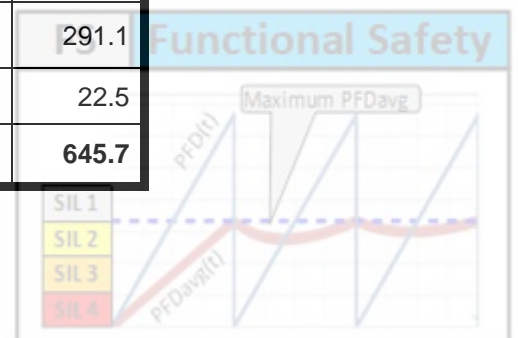
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Target System	APV arrangement
Certificate Owner	Customer
Target System description	Actuator-Positioner-Valve (APV) arrangement to be used with clean liquid process fluid, “Fail Close” manufacture, Close to Trip implementation, with associated “Full Valve Stroke Test” (FVST) <u>functionality</u> in Safety/Control system connected to “Positioner”. NOTE: without associated FVST the Actuator-Positioner-Valve (APV) arrangement loses certification.
Codes, Standards	IEC-61508
Certified Application	APV arrangement is suitable to use as “Final Safety Element” (FSE) in a “Safety Instrumented Function” (SIF) up to SIL 1, with minimum requirement of hardware fault tolerance HFT=0. SIL 2 applies if HFT=1 SIL 3 applies if HFT=2

Calculated Failure rates for 1oo1 Safety Channel Architecture

	Failure Rate Description	Failure Rate value	
		[1 / h]	[FIT]
1	Safe Detected (SD) Failure rate	1.19E-08	11.9
2	Safe UnDetected (SU) Failure rate	2.22E-07	221.6
3	Dangerous Detected (DD) Failure rate	9.86E-08	98.6
4	Dangerous UnDetected (DU) Failure rate	2.91E-07	291.1
5	Residual Failure rate	2.25E-08	22.5
6	Total Failure rate	6.46E-07	645.7



Reliability Index values related to “SIL rating” according to assessment scenario for APV arrangement

	Index Description	Eng.Unit	Index value
1	SFF Safe Failure Fraction	%	53.3%
2	Device Type (IEC-61508-4 2010, section 3.6.15)	-----	Type A
3	Maximum SIL to CLAIM by SFF. Fault Tolerance 0. (IEC-61508-4 2010, section 3.6.15. “Route 1H”)	%	SIL 1
4	PFDavg (NOTE 1) Probability of	1 year	1 / year
5	Failure on Demand. (1oo1)	2 years	1 / year
			1.26E-03
			2.52E-03

NOTE 1: PFDavg calculation with NO Maintenance effect (TD=0, MTTR=0, MRT=0).

Other Reliability Index values according to assessment scenario for APV arrangement

	Index Description	Eng.Unit	Index value
1	Et Proof Test Effectiveness PTC Proof Test Coverage	%	92.4%
2	DCs Diagnostic Coverage Safe	%	5.1%
3	DCd Diagnostic Coverage Dangerous	%	25.3%
4	MTTF	hour	1.60E+06
5	Mean Time to Failure	year	185.7
6	MTTFd	hour	2.57E+06
7	Mean Time to Failure Dangerously	year	297.0

