Dipl.- Eng. Stefan Dick • Official expert for industrial valves & actuators in piping systems
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SAMPLE

Certificate of conformity No.: **SIL - 2018 – xxx (Customer)**
Project: **Name of Project**
Customer PO: **10005678**

Based on the single SIL-Results of all components we can confirm, that the complete system fulfills the requirements and that all components of the series shown in this certificate can be used in safety based systems.

Detection was based on the proven-in-use combined with FMEDA. The results of the research is shown in the below listed individual reports & tables.

The unit was considerated as "type A Device" with HFT = 0. SFF - Values in % are taken into account in the overall assessment. It is based on the IEC / EN 61508-1 and -2.

Components:	**Valve:**	**MFG, Type, xxx Series**
	Actuator:	**MFG, Type / Model**
	Solenoid Valve	**MFG, Type xxxxxxxxxxx**

1. Certificates of Suppliers

Component	Type	Manufacturer	Cert.-No.	Cert. Type	Supplier of document	Date	Valid until:
Valve	Series xxx	xx	ROT 0503208	SIL	Lloyds Register	30.05.2005	./.
Actuator	123-0000-xxxL	xx	28716068	Certificate	TÜV	2016-04-08	2019-04-30
3/2 Solenoid	456-0000-xxxL	xx	RD08012	$MTTF_d$ Data	xx	08-2014	./.

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2. Consideration of Components

Months	T_{PST} [h]
6	4380
Years	T [h]
4	35040
4	

MTTR [h]	MRT [h]		DC	t_{CE}	λ_S	λ_D	λ_{DU}	λ_{DD}	PFD_{AVG}	$t_{CE\ PST}$	$PFD_{AVG\ PST}$
8	8	Components / Description	0,00%	1,75E+04	0,00E+00	9,79E-08	9,79E-08	0,00E+00	1,72E-03	2,20E+03	2,15E-04
MTTR [h]	MRT [h]		DC	t_{CE}	λ_S	λ_D	λ_{DU}	λ_{DD}	PFD_{AVG}	$t_{CE\ PST}$	$PFD_{AVG\ PST}$
8	8		90,99%	1,59E+03	0,00E+00	2,22E-08	2,00E-09	2,02E-08	3,52E-05	2,05E+02	4,11E-07
MTTR [h]	MRT [h]		DC	t_{CE}	λ_S	λ_D	λ_{DU}	λ_{DD}	PFD_{AVG}	$t_{CE\ PST}$	$PFD_{AVG\ PST}$
8	8		0,00%	1,75E+04	3,31E-08	7,42E-09	7,42E-09	0,00E+00	1,30E-04	2,20E+03	1,63E-05

3. Classification of complete Units

Component	DC	λ_S	λ_D	λ_{DU}	λ_{DD}	PFD_{AVG}	$PFD_{AVG\ PST}$
Components / Description	0,00%	0,00E+00	9,79E-08	9,79E-08	0,00E+00	1,72E-03	2,15E-04
	90,99%	0,00E+00	2,22E-08	2,00E-09	2,02E-08	3,52E-05	4,11E-07
	0,00%	3,31E-08	7,42E-09	7,42E-09	0,00E+00	1,30E-04	1,63E-05
Total Value Of Calculation	15,84%	3,31E-08	1,28E-07	1,07E-07	2,02E-08	1,88E-03	2,32E-04
						1oo1	1oo1
This unit fulfils the following requirement adapted from Tab 2. DIN EN 61508-1 PFD AVG / PFD AVG PST:						SIL2	SIL3

This unit fulfils the following requirement adapted from IEC/EN 61508 subsystems type A, part 2 (SFF in %):	33,18%	SIL1

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4. Table of SIL Classifications

Safety Integrity level	Security level Functional failure annual probability	
	Continual Operation	Operation on demand
	Hourly failure rate	Failure probability at Moment of use
SIL 4	$10^{-9} < \lambda < 10^{-8}$	$10^{-5} <$ PFD avg. $< 10^{-4}$
SIL 3	$10^{-8} < \lambda < 10^{-7}$	$10^{-4} <$ PFD avg. $< 10^{-3}$
SIL 2	$10^{-7} < \lambda < 10^{-6}$	$10^{-3} <$ PFD avg. $< 10^{-2}$
SIL 1	$10^{-6} < \lambda < 10^{-5}$	$10^{-2} <$ PFD avg. $< 10^{-1}$

Due to the single-channel structure (single device), the complete system is limited to the usability in safety-related circuits regarding the usability on **"SIL 2 systems".**

The specified period of use can be recognized by appropriate test cycles only in the responsibility of the operator and taking into account the particular conditions of use and application.

The intended use of the components is provided.

There are pressure/temperature-rating & limits according manufacturer's instructions must be observed.

All calculations done by the expert are based on existing values done by third parties (see page 1 and 2) under aspect of different assumptions (page 2). The different values in the case under consideration were taken as shown in the valid certificates of the suppliers of the components.

Generally expert's assumptions are based on 4 year(s) = 35.040 hours.

Restrictions:
The complete units must be considered under the complete aspect of the safety loop and Mounting & Safety Instructions of the single manufacturers. The technical informations and restrictions given in the technical specifications of the components-manufacturers have to be considered.

The value for SFF was not taken into account because for Route 2H it is not under scope.

City: Kaltenborn-Hochacht
Date: September 23-rd, 2018
Cert.-No.: 2018 – Customer – xxx Project

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