

Certificate



No.: 968/V 1122.04/24

Product tested Solenoid valves for gas with safety function
Certificate holder Elster GmbH
Strotheweg 1
49504 Lotte (Büren)
Germany

Type designation VAS 1-3, VAS 6-9, VAD 1-3, VAG 1-3, VAV 1-3, VAH 1-3, VCS 6-9

Codes and standards ISO 13849-1:2023

Intended application Safety function: Shutting off gas flows by assuming the safety position with the help of the internal energy storage and ensuring internal and external tightness. The valves of the VAS, VAD, VAG, VAV, VAH series are suitable for use in a safety-related system in single-channel applications up to and including PL d. In redundant architectures they can be used up to PL e. Due to their integrated redundancy, the valves of the type series VCS can be used in single-channel applications up to and including PL e. If diagnostic measures of the safety-related system are required at the application level (e.g. in accordance with EN 746-2 or ISO 13849-1), they must be implemented by means of sensors and plausibility checks (DC none for PL c, DC low for PL d, redundant with DC medium for PL e in accordance with ISO 13849-1).

Specific requirements See Installation, Operating and Safety Manual

Summary of test results see back side of this certificate.

Valid until 2029-10-29

The issue of this certificate is based upon an evaluation in accordance with the Certification Program CERT FSP1 V3.0:2020 in its actual version, whose results are documented in Report No. 968/V 1122.03/24 dated 2024-08-30. This certificate is valid only for products, which are identical with the product tested. Issued by the certification body accredited by DAkkS according to DIN EN ISO/IEC 17065. The accreditation is only valid for the scope listed in the annex to the accreditation certificate D-ZE-11052-02-00.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln

Köln, 2024-10-29

Certification Body Safety & Security for Automation & Grid

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VAS 1-3, VAS 6-9
 VAD 1-3, VAG 1-3, VAV 1-3, VAH 1-3
 VCS 6-9

		VAS 1-3 VAS 6-8	VA(D, G, V, H)1 VA(D, G, V, H)2 VA(D, G, V, H)3	VCS 6-8
B _{10d}	B _{10d}	15,800,000 6,700,000	11,100,000 8,300,000 6,400,000	6,700,000
Hardware Fault Tolerance	HFT _{int}	0	0	1
Diagnostic Coverage	DC _{int}	0		
Common Cause Failures ⁽¹⁾	β _{int}	-	-	2 %

Achievable Performance Level ⁽²⁾	PL	a, b, c, d, e
possible categories ⁽²⁾		B, 1, 2, 3, 4
Use of basic and proven safety requirements		fulfilled
Mean time to dangerous failure	MTTF _D	see below
Dangerous Failure rate	λ _D	see below

(1): The β factor has to be verified for the final application.

(2): During application, a sufficient HFT and DC of the safety-related system must be ensured.

Determination of MTTF_D and λ_D

The PFH_D value required for the determination of suitability of the tested series depends on the frequency of requirements n_{op} of the safety-related system in which the tested series are used. The PFH_D value shall be calculated using the following equation:

$$\lambda_D = \frac{1}{MTTF_D} = \frac{0.1}{B_{10D}} \times n_{op}$$

The resulting PFH_D must not be less than 10 FIT. If the calculation results in a lower value, 10 FIT shall be used for further investigations.

Origin of values

The specified values are the result of extensive qualification tests on the reliability of the safety function under critical conditions. In addition, the failure rate was verified by analyzing the field feedback of the last ten years. Random and systematic failures, which are the responsibility of the manufacturer, were investigated.

Periodic Tests and Maintenance

The given values require periodic tests and maintenance as described in the Safety Manual.

The operator is responsible for the consideration of specific external conditions (e.g. ensuring of required quality of media, max. temperature, max. pressure, time of impact), and adequate test cycles.