

# Certificate



No.: 968/V 1122.03/24

|                       |                                              |                           |                                                               |
|-----------------------|----------------------------------------------|---------------------------|---------------------------------------------------------------|
| <b>Product tested</b> | Solenoid valves for gas with safety function | <b>Certificate holder</b> | Elster GmbH<br>Strotheweg 1<br>49504 Lotte (Büren)<br>Germany |
|-----------------------|----------------------------------------------|---------------------------|---------------------------------------------------------------|

|                         |                                                               |  |  |
|-------------------------|---------------------------------------------------------------|--|--|
| <b>Type designation</b> | VAS 1-3, VAS 6-9, VAD 1-3, VAG 1-3, VAV 1-3, VAH 1-3, VCS 6-9 |  |  |
|-------------------------|---------------------------------------------------------------|--|--|

|                            |                       |                       |
|----------------------------|-----------------------|-----------------------|
| <b>Codes and standards</b> | EN 13611-Annex K:2019 | EN 13611-Annex J:2019 |
|----------------------------|-----------------------|-----------------------|

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| <b>Intended application</b> | 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.<br>The valves of the type series VAS, VAD, VAG, VAV, VAH are suitable for use in a safety-related system in single-channel application up to SIL 2 (high demand rate) / PL d. Taking into account the minimum required hardware fault tolerance of HFT = 1, the valves can also be used in redundant architecture up to SIL 3 / PL e. Due to their integrated redundancy, the valves of the VCS series can be used in single-channel applications up to and including SIL 3 / PL e. |  |  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

|                              |                                                                                                   |  |  |
|------------------------------|---------------------------------------------------------------------------------------------------|--|--|
| <b>Specific requirements</b> | The instructions of the associated Installation, Operating and Safety Manual shall be considered. |  |  |
|------------------------------|---------------------------------------------------------------------------------------------------|--|--|

Summary of test results see back side of this certificate.

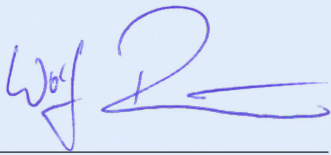
Valid until 2029-10-29

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  
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Funktionale Sicherheit  
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Köln, 2024-10-29

Certification Body Safety & Security for Automation & Grid

  
Dipl.-Ing. (FH) Wolf Rückwart

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**Holder: Elster GmbH**

Strotheweg 1  
 49504 Lotte (Büren)  
 Germany

**Product tested: Solenoid valves for gas with safety function**

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

|                                      |                    | VAS 1-3<br>VAS 6-8      | VA(D, G, V, H)1<br>VA(D, G, V, H)2<br>VA(D, G, V, H)3 | VCS 6-8   |
|--------------------------------------|--------------------|-------------------------|-------------------------------------------------------|-----------|
| B <sub>10d</sub>                     | B <sub>10d</sub>   | 15,800,000<br>6,700,000 | 11,100,000<br>8,300,000<br>6,400,000                  | 6,700,000 |
| Hardware Fault Tolerance             | HFT <sub>int</sub> | 0                       | 0                                                     | 1         |
| Safe Failure Fraction <sup>(1)</sup> | SFF                | > 90 %                  |                                                       |           |
| Diagnostic Coverage                  | DC <sub>int</sub>  | 0                       |                                                       |           |
| Common Cause Failures <sup>(2)</sup> | β <sub>int</sub>   | -                       | -                                                     | 2 %       |

|                                                  |     |             |
|--------------------------------------------------|-----|-------------|
| Achievable Safety Integrity Level <sup>(3)</sup> | SIL | 1, 2, 3     |
| Demand Mode                                      |     | High Demand |
| Type of Subsystem                                |     | Type A      |

|                                             |    |               |
|---------------------------------------------|----|---------------|
| Achievable Performance Level <sup>(3)</sup> | PL | a, b, c, d, e |
| Use of basic and proven safety requirements |    | fulfilled     |

|                                |                   |           |
|--------------------------------|-------------------|-----------|
| Mean time to dangerous failure | MTTF <sub>D</sub> | see below |
| Dangerous Failure rate         | λ <sub>D</sub>    | see below |

(1): The mentioned SFF was derived acc. EN 13611, Annex K.4.5.

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

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

**Determination of MTTF<sub>D</sub> and λ<sub>D</sub>**

The PFH<sub>D</sub> value required for the determination of suitability of the tested series depends on the frequency of requirements n<sub>op</sub> of the safety-related system in which the tested series are used. The PFH<sub>D</sub> value shall be calculated using the following equation:

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

The resulting PFH<sub>D</sub> 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.