

Certificate



No.: 968/V 1281.00/22

Product tested Gate Valves **Certificate holder** Ace Valve CO., LTD.
1-12, Somang-gil
Juchon-myeon, Gimhae-si
Gyeongsangnam-do
Republic of Korea

Type designation AV-S

Codes and standards IEC 61508 Parts 1-2 and 4-7:2010

Intended application Safety Function: Upon demand the valve operation system drives the valve into the safe state. The fail position may be defined as closed or open.

The valves are suitable for use in a safety instrumented system up to SIL 2 (low demand mode). Under consideration of the minimum required hardware fault tolerance HFT = 1 for the complete final element the valves may be used up to SIL 3.

Specific requirements 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 2027-07-12

The issue of this certificate is based upon an evaluation in accordance with the Certification Program CERT FSP1 V1.0:2017 in its actual version, whose results are documented in Report No. 968/V 1281.00/22 dated 2022-06-30. This certificate is valid only for products, which are identical with the product tested.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit

Köln, 2022-07-12

Certification Body Safety & Security for Automation & Grid


Dipl.-Ing. (FH) Wolf Rückwart

Holder: ACE VALVE CO., LTD.
 1-12, Somang-gil, Juchon-myeon, Gimhae-si
 Gyeongsangnam-do
 Republic of Korea

Product tested: Gate Valve
Type: AV-S

Results of Assessment

Route of Assessment		$2_H / 1_S$
Type of Sub-system		Type A
Mode of Operation		Low Demand Mode
Hardware Fault Tolerance	HFT	0
Systematic Capability		SC 3

**Upon demand the valve operation system drives the valve into the safe state.
 The fail position may be defined as closed or open.**

Dangerous Failure Rate	λ_D	2.79 E-07 / h	279 FIT
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.24 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.26 E-04	

Assumptions for the calculations above: DC = 0 %, $T_1 = 1$ year, MRT = 72 h, $\beta_{1oo2} = 10$ %

Origin of failure rates

The stated failure rates for low demand are the result of an FMEDA with tailored failure rates for the design and manufacturing process. Furthermore the results have been verified by field-feedback data. Failure rates include failures that occur at a random point in time and are due to degradation mechanisms such as ageing. The stated failure rates do not release the end-user from collecting and evaluating application-specific reliability data.

Useful Lifetime

A time of usage of more than 5 years (+ 1.5 years of storage) can only be favored under responsibility of the operator, consideration of specific external conditions (securing of required quality of media, max. temperature, time of impact), and adequate test cycles. Please consider the references in the Safety Manual according to test intervals and procedures as well as maintenance in respect with the useful lifetime, including the possibility of longer periods of use.

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, time of impact), and adequate test cycles.