

Certificate



No.: 968/V 1237.00/21

Product tested Top Entry Double Eccentric C-Ball Valves

Certificate holder AE Valves
Rue de Gelée, 20
4800 Verviers
Belgium

Type designation ²XC-Ball Valve
1/2" - 36"

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

Intended application Safety Function:
- Close on demand and keep up the external tightness
- Open on demand and keep up the external tightness

The valves are suitable for use in a safety instrumented system in low demand applications up to SIL 2.
Under consideration of the minimum required hardware fault tolerance HFT=1 the valves may be used in a redundant structure 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 2026-05-14

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 1237.00/21 dated 2021-05-12. This certificate is valid only for products, which are identical with the product tested.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit

Köln, 2021-05-14

Certification Body Safety & Security for Automation & Grid


Dipl.-Ing. (FH) Wolf Rückwart

Holder: Advanced Engineering Valves
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 B-4800 Verviers
 Belgium

**Product tested: Top Entry double eccentric ball valves
 2XC-Ball Valves**

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 |

Close on demand and keep up the external tightness

| | | | |
|---|------------------|---------------|----------------|
| Dangerous Failure Rate | λ_D | 1.96 E-07 / h | 196 FIT |
| Average Probability of Failure on Demand 1oo1 | $PFD_{avg}(T_1)$ | 8.73 E-04 | |
| Average Probability of Failure on Demand 1oo2 | $PFD_{avg}(T_1)$ | 8.81 E-05 | |

Open on demand and keep up the external tightness

| | | | |
|---|------------------|---------------|----------------|
| Dangerous Failure Rate | λ_D | 1.64 E-07 / h | 164 FIT |
| Average Probability of Failure on Demand 1oo1 | $PFD_{avg}(T_1)$ | 7.30 E-04 | |
| Average Probability of Failure on Demand 1oo2 | $PFD_{avg}(T_1)$ | 7.36 E-05 | |

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.

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.

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.