Certificate

SIL/PL Capability

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ID 0600000000

No.: V 523.01/16

Product tested	Gate Valves	**Certificate holder**	Vastas Valf Armatur Sanayi Ticaret Anonom Sirketi OSB Sabanci Caddesi No: 22 Cerkezkoy 59500 Tekirdag Turkey
Type designation	E50B (4" to 72"), E50D (4" to 72"), E500 cast steel (2" to 72"), E500 bolted bonnet (2" to 72")		
Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010	IEC 61511 Parts 1-3:2004	
Intended application	Safety Function: 1. Opening and closing via actuators upon safety request 2. Keep up external tightness at any time. The gate valves are suitable for use in a safety instrumented system 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 must be considered.		

Summary of test results see back side of ths certificate.

Valid until 2021-03-11

The issue of this certificate is based upon an examination, whose results are documented in Report No. V 523.01/16 dated 2016-03-11.
This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the codes and standards forming the basis of testing for the intended application.

Köln, 2016-03-11

TÜV Rheinland Industrie Service GmbH
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Certification Body Safety & Security for Automation & Grid

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Manufacturer	**Vastas Valf Armatur Sanayi Ticaret Anonom Sirketi** **OSB Sabancı Caddesi No 22** **Cerkezkoy Tekirdag** **Turkey**
Product tested	**Gate Valves** **E50B (4" - 72", slab gate), E50D (4" - 72", expanding gate)** **E500 (2" - 72", cast steel, bolted bonnet)**

Device-Specific Values

Probability of Dangerous Failure on Demand	PFD_{spec}	1.62 E-03
Test Interval	Ti	1 a
Confidence Level	1-α	95 %
Safe Failure Fraction	SFF	77 %
Hardware Fault Tolerance	HFT	0
Diagnostic Coverage	DC	0 %
Type of Sub System		Type A
Mode of Operation		Low Demand
Proof Test Coverage	PTC	not considered
Partial Stroke Test Coverage	PSTC	not considered

Derived Values for 1oo1-Architecture

Assumed Demands per Year	0	1 / a	1.14 E-04 / h
Total Failure Rate	$\lambda_S + \lambda_D$	8.20 E-07 / h	820 FIT
Lambda Dangerous Detected	λ_{DD}	0.00 E+00 / h	0 FIT
Lambda Dangerous Undetected	λ_{DU}	1.85 E-07 / h	185 FIT
Lambda Safe	λ_S	6.35 E-07 / h	635 FIT
Mean Time To Failures	MTTF	1.22 E+06 h	139 a
Mean Time To Dangerous Failures	$MTTF_D$	5.41 E+06 h	618 a
Average Probability of Failure on Demand	**PFD_{avg}**	**8.09 E-04**	

Time of Usage

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 as described in the SIL handbook.