

INSPECTION CERTIFICATE

Registration No.: 5122113/01/02

Manufacturer: **ABO valve, s.r.o.
Dalimilova 285/54
CZ-783 35 Olomouc**

ID No.: **49609050**

Product: **double eccentricity shut-off (or regulating) flap**

Type designation: **2E5**

Product line: **DN 50-100, PN 6-50;
DN 125-200, PN 6-40
DN 250-800, PN 6-25 for use in the temperature
range from -60°C to +500°C depending on the
material variant intended for gases and liquids**

Technical standard and regulations: **Functional safety acc. to ČSN EN 61508-1, ed. 2,
ČSN EN 61508-2, ed. 2
ČSN EN 61511, ed. 2**

Inspection report No.: **5122113/01/05**

TÜV NORD Czech, s.r.o, as an independent organization (third party) according to ČSN EN 61508-4, article 3.8.13 confirms that the 2E5 valves with actuator modification of the mentioned series together with flanged (or threaded) connection meet the requirements in systems with functional safety **SIL2** (for a separate device without actuator) according to ČSN EN 61508, **type A**.

The product can be used in:

- a) configuration of one channel 1oo1 to SIL2
- b) to SIL 2 without external diagnostic tests, or in configuration of two 1oo2 channels, or in one channel with series products up to SIL 3

This certificate is issued on the request of the manufacturer as voluntary certification; does not include the production supervision.

The certificate is valid until 17.11.2025

Prague, 17.11.2022

Place and date



Libor Laňka
Certification and Inspection Body
TÜV NORD Czech, s.r.o.

Attachment of the inspection certificate no. 5122113/01/02

Member of functional reliability report	Butterfly valve 2E5 with double eccentricity, without limit switch	
Type of subsystem	ČSN EN 61508-2, Article 7.4.3.1.3, type A	
Hardware failure tolerance	HFT	0
Diagnostic coverage	DC	53,8%
Safety functions	Delivery of regulation and shut-off flap without actuator	
Mode of operation	Low Demand Mode	


Systematic Capability	SC3				
1 year	8760 hours				
Architectural constraints	Route 1 _H :	--	Route 2 _H :	Use (reclamations)	Route 2 _S acc to EXIDA
Proven in use	The flaps in operation work for 4.56E09 hours compared to 10E08 hours required by EXIDA.				
	SIL2 can be reached in a 1oo1 architecture and SIL3 in a 1oo2 architecture				
Random failure rates (1FIT=10E-09/hour)					
Configuration 1oo1	Safety function	λ_{DU} [FIT]	λ_{DD} [FIT]	λ_{SD} [FIT]	λ_D [FIT]
	Flats 2E5	54,3	63,3	8,4	117,6
average probability of failure to perform its safety function on demand, $C_{PT}=100\%$			$PFD_{AVG(1oo1)}$	5,15E-04/year	
Series ČSN EN 61511					
$PFD_{AVG}(PVST=2190 \text{ hours; } FVST=1 \text{ year})$			1oo1	2,57E-04/year	
				λ_{DU}	$\lambda_{DD} + \lambda_{DU}$
$PFD_{avg}(TI=1 \text{ year, } C_{PT}=70\%, MT=5 \text{ years})$ Visual test only			1oo1	5,23E-04	1,13E-03
$PFD_{avg}(TI=1 \text{ year, } C_{PT}=95\%, MT=5 \text{ years})$ Visual test and torque, seal tightness and closing time control			1oo1	2,86E-04	6,18E-04
$PFD_{avg}(TI=1 \text{ year, } C_{PT}=70\%, MT=5 \text{ years; } \beta_{1oo2}=10\%)$ Visual test only			1oo2	5,26E-05	1,15E-04
$PFD_{avg}(TI=1 \text{ year, } C_{PT}=95\%, MT=5 \text{ years; } \beta_{1oo2}=10\%)$ Visual test and torque, seal tightness and closing time control			1oo2	2,86E-05	6,22E-05
1oo1=SIL 2; HFT=0, SC3 @ 1oo2=SIL 3; HFT 1; Route 2_H/2_S					

Remarks:: LT- live time, C_{PT} - proof test coverage

For further details, including environmental conditions, limitations of use, lifetime, failure rates traceability, make reference to in the SIL manual (manual for the maintenance of the SIS system) IMS 716 of 4.11.2022.

Certification of flats 2E5 does not include fire resistance and dissipation of static electricity.

END OF THE CERTIFICATE




Elaborated by the inspector: Ing. Oldřich Schieferstein