

Certificate of Conformity No.: 28716067

Manufacturer: Biffi Italia S.r.l.
 Loc. Caselle S. Pietro
 I-29017 Fiorenzuola d'Arda (PC)

Specifications: IEC 61508-1÷7:2010

Product: Spring return pneumatic actuator

Type: Series ALGAS / ALGAS-QA

RESULT:

As per the TÜV Rheinland Italia Report No. FS 28716067 Rev. 0, we declare that the product meets the below requirements:

IEC 61508: 2010, part 1 to 7

Functional Safety of electrical/electronic/programmable electronic safety related systems; Type A, Low Demand Mode, HFT=0

Model	Safety Action	λ_D [1/h]	$\lambda_{DD(PS)}$ [1/h]	Systematic Capability
ALGAS	Close / Open	1,96E-08	1,78E-08	3
ALGAS-QA	Close / Open	2,06E-08	1,87E-08	3

The above values are compatible with SIL 3.

For SFF values with external diagnostic tests, carried out according to definition 3.8.7 of IEC 61508-4, see what written in the Safety Manual.

The requirements of minimum hardware fault tolerance (HFT) according to table 6 of IEC 61511-1 have to be observed.

The product can be used up to SIL 2 without external diagnostics.

Expiry date: 2019-04-30

--- End page

Location **Milan**
 Date **2016-04-08**

Diego Sirtori
 Business Stream Manager



Attachment 1 to
 Certificate of Conformity No.: 28716067



Manufacturer: Biffi Italia S.r.l.
 Loc. Caselle S. Pietro
 I-29017 Fiorenzuola d'Arda (PC)

Specifications: IEC 61508-1÷7:2010

Product: Spring return pneumatic actuator

Type: Series ALGAS

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	1,12E-05	1,55E-05	2,41E-05	3,27E-05	4,12E-05
	2	1,76E-05	2,19E-05	3,05E-05	3,91E-05	4,77E-05
	3	2,41E-05	2,84E-05	3,69E-05	4,55E-05	5,41E-05
	6		4,77E-05	5,63E-05	6,48E-05	7,34E-05
	9				8,42E-05	
	12			9,49E-05	1,03E-04	1,12E-04

PFD_{AVG} values according to IEC 61508 for different values of TI and TI_{PS}

Test Interval Frequency (months)				
6	12	24	36	48
4,34E-05	8,63E-05	1,72E-04	2,58E-04	3,44E-04

PFD_{AVG} values according to IEC 61508 for different values of TI (no Partial Stroke Test)

NOTES:

- The above values of PFD_{AVG} are calculated for MRT=24 h and Proof Test Coverage=100%. For other values of MRT, TI, TI_{PS} and/or non-perfect Proof Test, the PFD_{AVG} values must be re-calculated.
- The PFD_{AVG} values including Partial Stroke Test are calculated considering the use of a commercial automatic Partial Stroking Test System: for further details, see the Safety Manual.

--- End page



Attachment 2 to
 Certificate of Conformity No.: 28716067



Manufacturer: Biffi Italia S.r.l.
 Loc. Caselle S. Pietro
 I-29017 Fiorenzuola d'Arda (PC)

Specifications: IEC 61508-1÷7:2010

Product: Spring return pneumatic actuator

Type: Series ALGAS-QA

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	1,18E-05	1,63E-05	2,53E-05	3,43E-05	4,33E-05
	2	1,85E-05	2,30E-05	3,21E-05	4,11E-05	5,01E-05
	3	2,53E-05	2,98E-05	3,88E-05	4,79E-05	5,69E-05
	6		5,01E-05	5,91E-05	6,82E-05	7,72E-05
	9				8,84E-05	
	12			9,97E-05	1,09E-04	1,18E-04

PFD_{AVG} values according to IEC 61508 for different values of TI and TI_{PS}

Test Interval Frequency (months)				
6	12	24	36	48
4,56E-05	9,07E-05	1,81E-04	2,71E-04	3,61E-04

PFD_{AVG} values according to IEC 61508 for different values of TI (no Partial Stroke Test)

NOTES:

- The above values of PFD_{AVG} are calculated for MRT=24 h and Proof Test Coverage=100%. For other values of MRT, TI, TI_{PS} and/or non-perfect Proof Test, the PFD_{AVG} values must be re-calculated.
- The PFD_{AVG} values including Partial Stroke Test are calculated considering the use of a commercial automatic Partial Stroking Test System: for further details, see the Safety Manual.

-----End certificate

