

# Certificate



**No.: 968/V 1097.00/19**

**Product tested** Pneumatic quarter turn actuators **Certificate holder** AMG - Pesch GmbH  
Adam-Riese-Str. 1  
50996 Köln  
Germany

**Type designation** SAF (single acting)  
SAD (double acting)  
series: BR03, BR16, BR03C  
size: 10, 15, 20, 25, 30, 33, 35, 40, 42, 43, 45, 50  
  
PGF (single acting)  
PGD (double acting)  
size: 7, 10, 15, 20, 25, 30, 33, 35, 40  
  
SADF (single acting)  
SADT (double acting)  
series: BR03, BR16, BR03C  
size: 45-60, 50-70

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

**Intended application** Safety Function: Move to fail-safe-position  
  
The actuators are suitable for use in a safety instrumented system up to SIL 2 (low demand mode) acc. IEC 61508. Under consideration of the minimum required hardware fault tolerance HFT = 1 the actuators may be used in a redundant architecture up to SIL 3 acc. to IEC 61508 and IEC 61511.

**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 2024-10-01

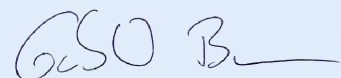
The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/V 1097.00/19 dated 2019-10-01.

This certificate is valid only for products which are identical with the product tested.

**TÜV Rheinland Industrie Service GmbH**  
Bereich Automation  
Funktionale Sicherheit  
Am Grauen Stein, 51105 Köln

Köln, 2019-10-01

Certification Body Safety & Security for Automation & Grid

  
Dipl.-Ing. Gebhard Bouwer

**Holder: AMG Pesch GmbH**  
Adam-Riese-Straße 1  
50996 Köln

**Product tested: Pneumatische Schwenkantriebe**  
**Pneumatic Actuator**  
SAF, PGF, SADF (einfachwirkend / single acting)  
SAD, PGD, SADT (doppeltwirkend / double acting)

### Results of Assessment

Route of Assessment		2 <sub>H</sub> / 1 <sub>S</sub>
Type of Sub-system		Type A
Mode of Operation		Low Demand Mode
Hardware Fault Tolerance	HFT	0
Systematic Capability		<b>SC 3</b>

#### SAD, PGD (doppeltwirkend / double acting)

Dangerous Failure Rate	$\lambda_D$	2.74 E-07 / h	<b>274 FIT</b>
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.20 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.22 E-04	

#### SAF, PGF (einfachwirkend / single acting)

Dangerous Failure Rate	$\lambda_D$	1.85 E-07 / h	<b>185 FIT</b>
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	8.10 E-04	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	8.18 E-05	

#### SADT (doppeltwirkend / double acting)

Dangerous Failure Rate	$\lambda_D$	3.90 E-07 / h	<b>390 FIT</b>
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.71 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.74 E-04	

#### SADF (einfachwirkend / single acting)

Dangerous Failure Rate	$\lambda_D$	2.91 E-07 / h	<b>291 FIT</b>
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.27 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.29 E-04	

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

### Origin of values

The stated values are the results of extensive qualification tests and FMEDA analysis on the reliability of the safety function under critical conditions. In addition, the failure rate was verified by the analysis of field feedback of the last five years. Random and systematic failures which are the responsibility of the manufacturer were examined.

### Systematic Capability

The development and manufacturing process and the functional safety management applied by the manufacturer in the relevant lifecycle phases of the product have been audited and assessed as suitable for the manufacturing of products for use in applications with a maximum Safety Integrity Level of 3 (SC 3).

### 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.