

# Certificate



**No.: 968/V 1301.00/23**

<b>Product tested</b>	Hydraulic spring return actuators	<b>Certificate holder</b>	Cameron, A Schlumberger Company 3505 W Sam Houston Parkway N Houston, TX 77043 USA
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<b>Type designation</b>	MH70, MHCS70 MHW70, MHWCS70 MHQD & MHWQD
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<b>Codes and standards</b>	IEC 61508 Parts 1-2 and 4-7:2010
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<b>Intended application</b>	Safety Function: Take up safe position on demand by built-in spring and maintain valve bore pressure during and after actuator closure
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The actuators are suitable for use in a safety instrumented system up to SIL 2 (low demand mode). Under consideration of the minimum required hardware fault tolerance HFT = 1 for the complete final element the actuators may be used up to SIL 3.

<b>Specific requirements</b>	The instructions of the associated Installation, Operating and Safety Manual shall be considered.
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Summary of test results see back side of this certificate.


Valid until 2028-04-19

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 1301.00/23 dated 2023-04-18. This certificate is valid only for products, which are identical with the product tested. Issued by the certification body accredited by DAkkS according to DIN EN ISO/IEC 17065. The accreditation is only valid for the scope listed in the annex to the accreditation certificate D-ZE-11052-02-01.

**TÜV Rheinland Industrie Service GmbH**  
Bereich Automation  
Funktionale Sicherheit

Köln, 2023-04-19

Certification Body Safety & Security for Automation & Grid

  
Dipl.-Ing. (FH) Wolf Rückwart

**Holder:** Cameron, a Schlumberger Company  
 5950 North Course Dr,  
 Houston, TX 77072  
 USA

**Product tested:** Hydraulic actuators of type  
**MH70, MHCS70**  
**MHW70, MHWCS70**  
**MHQD & MHWQD**

**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		<b>SC 3</b>

**Take up safe position on demand by built-in spring and maintain valve bore pressure during and after actuator closure**

Dangerous Failure Rate	$\lambda_D$	2.21 E-07 / h	<b>221 FIT</b>
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	9.84 E-04	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	9.94 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. Furthermore the results have been verified by evaluation of the field data. 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.