

Inspection Certificate



Certificate No **968/INS 471.00/21**

Client / Certificate Owner Endress+Hauser SE + Co. KG
Hauptstraße 1
79689 Maulburg
Germany

Product Diaphragm Seal

Type designation Diaphragm seals for pressure and differential pressure Transmitters
PMP55, PMP75, PMP51B, PMP71B, FMD77, FMD78 and PMD78B

Standards applied for inspection IEC 61508 Parts 1-2 and 4-7:2010

Inspection Results Safety Function: Transmit the pressure from process to a pressure transmitter

The diaphragm seals meet the applicable requirements of IEC 61508:2010 and can be used with a systematic capability of SC 3 in safety-related systems.
The applicable Safety Integrity Level depends on the used pressure transmitter or differential pressure transmitter and their individual hardware fault tolerance.

The instructions of the associated installation, operating and safety manual must be observed.

Inspection Period 2020-10-11 - 2021-06-11

Validity 2026-06-11

Cologne, 2021-06-22

TÜV Rheinland Industrie Service GmbH
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Inspection Body of TÜV Rheinland Industrie Service GmbH

Automation - Functional Safety, www.tuvasi.com

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Am Grauen Stein, 51105 Köln

Holder: Endress + Hauser
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Results of Inspection

Type of Sub-system		Type A
Mode of Operation		High Demand Mode
Hardware Fault Tolerance	HFT	0
Systematic Capability		SC 3

Transfer of Pressure

Dangerous Failure Rate	λ_D	4.70 E-08 / h	47 FIT
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	2.09 E-04	
Average Frequency of a dangerous Failure per Hour	PFH	4.70 E-08	

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 are the result of an FMEDA with tailored failure rates for the design and manufacturing process.

Furthermore the results have been verified by field-feedback 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.