


Inspection Certificate



Certificate No **968/INS 471.02/25**

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, PMD78B and PMP50
Standards applied for inspection	IEC 61508 Parts 1-2 and 4-7:2010
Inspection Results	<p>Safety Function: Transmit the pressure from process to a pressure transmitter</p> <p>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.</p> <p>The instructions of the associated installation, operating and safety manual must be observed.</p>
Inspection Period	2024-11-06 - 2025-03-14
Validity	This inspection certificate is valid only for products, which are identical with the product tested.
Cologne, 2025-04-03	 Dipl.-Ing. (FH) Wolf Rückwart

TÜV Rheinland Industrie Service GmbH
Am Grauen Stein,
51105 Cologne - Germany

Inspection Body of TÜV Rheinland Industrie Service GmbH, Automation - Functional Safety, www.tuvasi.com
The issue of this inspection certificate is based upon an inspection in accordance with the Inspection Programs
INS FSP1 V1.0:2017, INS FSP1 V1.0:2017 in their actual version, whose results are documented in
Report No. 968/INS 471.02/25 dated 2025-03-12. Issued by the inspection body accredited by DAkkS according to
DIN EN ISO/IEC 17020. The accreditation is only valid for the scope listed in the annex to the accreditation
certificate D-IS-11052-04-03.

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

Holder: Endress + Hauser
 Hauptstr. 1
 79689 Maulburg
 Germany

Product tested: Diaphragm seals for pressure and differential pressure Transmitters
PMP55, PMP75, PMP51B, PMP71B, FMD77, FMD78, PMD78B and PMP50

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

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.