

Operating Instruction

Diaphragm / In-line Seals

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1. General Information

Please inspect the transport packaging and the delivered goods immediately upon their receipt to determine their integrity and completeness. In case of returns, please use the original packaging.

This operating instruction is only valid combined with the enclosed data sheet and the model overview 7000, which comprises the following information:

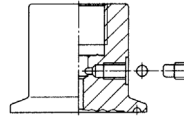
- Construction type
- Allowed medium temperatures (normal use and Ex-application)
- Allowed ambient temperature
- Material chemical seal body / material diaphragm
- Filling fluid
- Nominal pressure level

Please read these instructions carefully before taking the instrument into operation.

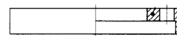
The chemical seals are manufactured in accordance to the norms as amended from time to time. Chemical seals extend the fields of applications of pressure measuring instruments for

- pressure,
- vacuum,
- mano-/vacuum,
- absolute pressure and
- differential pressure,
- of
- bourdon tube pressure gauges,
- pressure switches,
- transmitters and
- transducers.

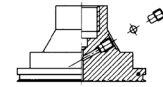
Pressure ranges of just a few mbar up to 1000 bar and higher can be realised with this. They can be mounted directly, via a cooling element or a capillary line. Chemical seals consist of a body with instrument connection, process connection and a diaphragm or an upper part with instrument connection and diaphragm and a lower part with process connection.



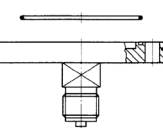
Chemical seal body



Attachment flange



Upper part of the chemical seal with diaphragm



Sealing

Lower part of the chemical seal

Typical examples of applications of chemical seals:

- The medium would clog the inlet port and the bourdon tube.
- The medium is very aggressive.
- Special demanding hygiene requirements have to be met.
- The ambient temperature at the measuring point or the temperature of the medium are too high for the measuring instrument.
- The measuring point is difficult to reach.
- The medium is toxic.
- The measuring instrument has to be extremely overrange protected.
- The chemical seal acts as damping element.
- The measuring point has to be heated.

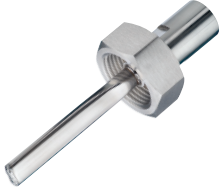


Three construction types meet the different measurement requirements:

A. DIAPHRAGM SEAL



B. CAPSULE SEAL



C. IN-LINE SEAL



In-line seals are integrated directly into the process line. They are less temperature-sensitive than diaphragm seals and are particularly suitable for applications, which are absolutely free of dead space, with circulating, high-viscous media and with media tending to velocity and with frequent changes of the medium.



Further information on the instruments can be found in the data sheets 7000 ff.

Applications that are not explicitly listed as according to regulations, are improper to intended purpose!

The companies ARMATURENBAU GmbH and MANOTHERM Beierfeld GmbH do not assume liability for damages that arise from misuse of the instrument resp. from disregard of the information contained in these operating instructions.

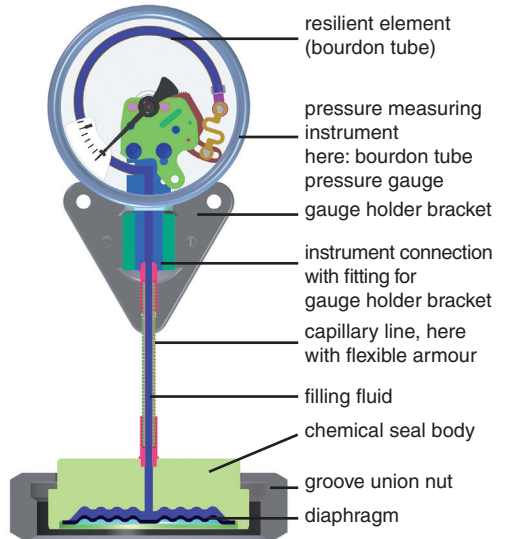
2. Safety Information



Please regard the currently valid national safety regulations during installation, starting up and operation.

- The instructions in this operating instruction have to be understood, regarded and followed.
- Selection
- Installation, putting into operation and monitoring of the operation may only be executed by qualified personnel, i.e. persons that are acquainted with installation, putting into operation and operation of the product as well as with the respective country-specific regulations and who possess the corresponding knowledge resp. qualifications.
- Disregard of the respective regulations can cause severe bodily injuries and / or damage of equipment.
- The instruments have to be protected against coarse contamination and high deviations in ambient temperatures.
- Alterations or other technical changes of the instrument by the customer, are not allowed. By doing so, you lose your warranty.
- Mounting and dismounting may only be executed in depressurised condition.

3. Function



The interior of the chemical seal system, between diaphragm and pressure measuring instrument, is completely filled with a transfer fluid (here marked in blue).

When pressure acts on the resilient diaphragm located at the process, it transfers the pressure to the pressure measuring instrument via the transfer fluid.

If a capillary line is required for an application it can affect the response time of the entire system, depending on the type of pressure measuring instrument, the type of measuring range, the length, the cross section and viscosity of the transfer fluid.

4. Description

Chemical seal systems are closed systems consisting of the components chemical seal with or without capillary line and pressure measuring instrument.

The connections should under no circumstances be disconnected or opened in any way.

Slightest leakages cause loss of transfer fluid, which again leads to measuring errors resp. impairment of the function.

Because of their slight thickness of just a few μm , the diaphragms are very delicate and should not be damaged.

Please consider the advice in this operating instruction, as well as the advice given in the operating instructions of the respective pressure measuring instruments mounted.

5. Mounting

- Please check if you have the suitable instrument for the case of application.
- Chemical seals should remain in their original packaging until mounting and be stored protected against damages caused through external influences.
- Sealed filling ports or screw fittings should not be damaged.
- Any damage to the diaphragm has to be avoided. Remove the protection cap immediately before mounting.
- To ensure the required density and a perfect functioning, proper sealings have to be used for mounting.
- For mounting, proper screws, nuts etc. according to the respective screwing norm have to be used.

For capillary lines:

- Do not buckle capillary lines.
- Min. bending radius 150 mm (5.91").
- Fasten capillary lines free of vibration.
- Max. difference in height 7 m (22.96 ft), with halocarbon 4 m (13.12 ft).

With vacuum applications the max. difference in height is accordingly smaller.

- With differential pressure versions with 2 capillary lines, consider the symmetry during installation. For versions see check list for chemical seals.

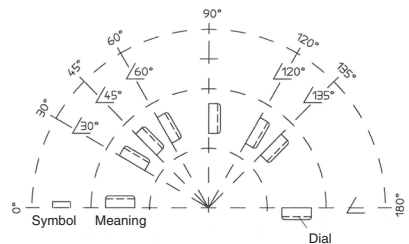
Storage and Transport

- During storage, the chemical seal should remain in its original packaging and be stored protected against damages caused through external influences until mounted.

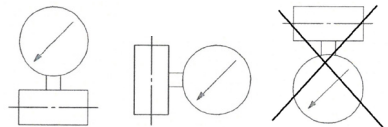
- The packing can be disposed of as waste paper. For further transport or returns the instrument has to be protected sufficiently against damages.

6. Description 3A-Approval

- For clamp chemical seals as well as chemical seals according to DIN 11851 only sealings with 3A- and EHEDG-approval may be used (information on the data sheet with asterisked text). The used sealings need to be self-centering and substantially flush with the medium side. Rubber sealings for CIP applications according to 3-A need to comply with Class I or Class II.
- Determination of the installation position:
 - The installation position of the pressure gauges is indicated by the position symbol on the dial. If there is no position symbol on the dial, the pressure gauges shall be installed vertically (according to EN 837).



- The medium shall be able to drain. Please do not install pressure gauge and chemical seal upside down.



Parts welded to the tank need to be flush-mounted to the inner wall of the tank. The maximum surface roughness of the weld seam is $R_a = 0.8$.

- Cleaning recommendation:
Cleaning-Out-Of-Place (COP) or
Cleaning-In-Place (CIP)

COP: Chemical seal:
MDM 7335

In-line seal
RDM 7633

Homogenizers:
MDM 7390, MDM 7390.23, MDM 7390.39,
MDM 7390.43, MDM 7390.46, MDM 7390.54,
MDM 7390.55, MDM 7390.56, MDM 7390.57,
MDM 7390.61, MDM 7390.76

CIP: Chemical seals:

MDM 7310, MDM 7350, MDM 7315,
MDM 7355, MDM 7340, MDM 7340.1,
MDM 7340.6, MDM 7311, MDM 7319,
MDM 7391, MDM 7313, MDM 7310.1,
MDM 7310.2, MDM 7310.3, MDM 7315.1,
MDM 7315.2, MDM 7315.3, MDM 7393,
MDM 7393.12, MDM 7393.13, MDM 7393.1,
MDM 7393.2, MDM 7393.3, MDM 7340.48,
MDM 7340.61, MDM 7340.62, MDM 7340.58,
MDM 7340.63, MDM 7340.64, MDM 7317,
MDM 7317.1, MDM 7317.2, MDM 7317.10,
MDM 7317.11, MDM 7317.12, MDM 7394.1,
MDM 7394.11, MDM 7394.12, MDM 7394,
MDM 7394.21, MDM 7394.22, MDM 7340.44,
MDM 7340.45, MDM 7340.46, MDM 7340.5,
MDM 7340.9, MDM 7340.15

In-line seals:

RDM 7631, RDM 7634, RDM 7635, RDM 7636,
RDM 7631.1, RDM 7639, RDM 7635.1,
RDM 7639.4, RDM 7635.4

- Please note for transmitters and pressure gauges: The 3A-approval only applies with attached chemical seal.
- Basically, the 3A-approval of a chemical seal only applies if a corresponding 3A-approved counter fitting is used.

7. Allowed Ambient and Operating Temperature

Please take into consideration for the version of a chemical seal system that the allowed ambient and process temperatures do not exceed the maximum or fall below the minimum temperature.

Fluctuating temperatures, especially when using a capillary line, affect the accuracy of the measuring unit.

8. Application of Chemical Seals in Potentially Explosive Areas

Basically, chemical seals are suitable for the installation in potentially explosive areas.

But they do not fall under the field of application of the regulation 2014/34/EC, as they do not contain any own potential ignition sources.

For the use of chemical seals in potentially explosive areas, the following points have to be regarded in each case:

- The resilient elements (pressure gauges) that are used with the chemical seals have to be approved for the corresponding connected zone (process) and for the ambient zone (environment).
- The allowed ambient temperatures of pressure transmitters or pressure gauges must not be exceeded.

Electrostatic charges at the chemical seal must be avoided:

- Chemical seals made of plastic or with plastic coating / lining are not allowed.
- The chemical seal as well as the tank or the tube have to be earthed.

To ensure the density of the chemical seal and to avoid zone entrainment, please consider the following:

- The mounting of a chemical seal to the tank / tube has to be permanently technically dense. This has to be ensured through measures according to TRBS 2152 part 2.
- The chemical seal with its diaphragm has to be chemically and mechanically resistant against the process media.
- The chemical seal must have at least the same mechanical stability (pressure range) as the tank or the tube.

Further requirements for the application in particular zones:

Application in or at potentially explosive areas of zones 20, 21 or 22:

The maximum medium temperature should not exceed 2/3 of the ignition point (dust cloud) of the potentially explosive dusts and has to lie at least 75 °C (167 °F) below the glow temperature (ignition point of a 5 mm dust layer). Furthermore, the maximum operating temperature has to be lower than the volume dependent self ignition point of the dust.

Application in potentially explosive areas of zone 0:

The mounting to zone 0 may only be executed with a flame arrester and may not exceed the operating temperature of 60 °C (140 °F) for pressure measuring instruments (see also operating instructions for flame arrester).

9. Maintenance, Repair

The instruments are free of maintenance.

A moist cloth can be used for cleaning. Before switching the instrument on again, make sure that all parts have properly dried.

To ensure measurement accuracy and reliability of functioning, we recommend to regularly check the instruments. For this, the instrument must be separated from the process and checked by using a pressure test device.

Any repairs may only be conducted by the manufacturer.

10. Decommissioning

For decommissioning, remove the instrument completely from its application area.



The chemical seal system may only be deinstalled after the line is depressurised.

11. Disposal



Please help us protect our environment and dispose of or recycle the used materials according to the respective and valid regulations.

EU-Konformitätserklärung EC-Declaration of Conformity



nach DIN EN ISO / IEC 17 050-1
according to DIN EN ISO / IEC 17 050-1

Für die nachfolgend bezeichneten Erzeugnisse
We hereby declare for the following named goods

DRUCKMITTLER CHEMICAL SEALS

Typen <i>Models</i>	Datenblätter <i>Data sheets</i>
MDM 7190	7190
MDM 72..	7210, 7211, 7280
MDM 73..	7300, 7301, 7302, 7303, 7390
MDM 74..	7400
MDM 75..	7500, 7501, 7502, 7505, 7590
MDM 79..	7935, 7952
RDM 76..	7600, 7630, 7680

wird hiermit bestätigt, dass sie den jeweils gültigen Normen entsprechen und gemäß den Bestimmungen folgender Richtlinie gefertigt werden:

that they meet the valid standards and are produced following the requirements of the directive:

2014/68/EU (Druckgeräte-Richtlinie)
2014/68/EC (Pressure Equipment Directive)

Druckmittler mit Anschlussnennweiten > DN 25 / 1" bzw. Gewindeanschlüssen > 1" werden in Verbindung mit einem angebauten Druckmessgerät (mechanisch oder elektronisch) folgendem Konformitätsbewertungsverfahren unterzogen:

Chemical seals with process connections > DN 25 / 1" or thread connections > 1" attached to a pressure instrument (mechanical or electronical) has been subjected to the following conformity assessment process:

Modul A2
„Interne Fertigungskontrolle mit Überwachung der Abnahme“
Module A2
„Internal Production Control with Surveillance of Final Assessment“

Benannte Stelle:
Notified body:

TÜV NORD Systems GmbH & Co. KG
Meidericher Straße 16
D-47058 Duisburg
Nummer der benannten Stelle: 0045
Number of the notified body: 0045

Die CE-Kennzeichnung erfolgt mittels Aufkleber auf dem Messgerätegehäuse.
The CE-marking is made with a sticker on the instrument case.

Diese Erklärung wird verantwortlich für die Hersteller
This declaration will be given responsible for the manufacturers

ARMATURENBAU GmbH
MANOTHERM Beierfeld GmbH

abgegeben durch / by

Bernd Vetter

Geschäftsführer / *Managing Director*

WESEL 2017-02-03
(Ort / *Location*) (Datum / *Date*)

(rechtsgültige Unterschrift / *Legal signature*)