

In-line diaphragm seal with sterile connection

For sanitary applications

Model 981.51, aseptic connection per DIN 11864

WIKA data sheet DS 98.51



Applications

- For direct, quickly removable installation in pipelines
- For flowing, pure media
- Food and beverage production
- Pharmaceutical industry, biotechnology industry, production of active ingredients
- Production of aseptic basic materials in the chemical industry

Special features

- Completely round diaphragm (Europ. Pat. No. 0609846) to avoid dead spaces
- Self-draining in all mounting positions
- Quick cleaning of measuring point, without residue
- Suitable for SIP and CIP
- Certified hygienic design

Description

Diaphragm seals are used to protect the pressure measuring instrument from aggressive, adhesive, crystallising, corrosive, highly viscous, environmentally hazardous or toxic media. A diaphragm made of the appropriate material provides for the separation from the medium to be measured. Thus even the most difficult measuring requirements can be met by combining measuring instruments with diaphragm seals.

A fluid inside the system, which can be chosen to suit the particular application, hydraulically transmits the pressure to the measuring instrument.

Almost limitless application possibilities exist due to the large number of available variants, such as diaphragm seal designs or materials. The type of process connection (flange, threaded and sterile connection) and the basic method of manufacture are important design differentiation criteria.

For further technical information on diaphragm seals and diaphragm seal systems see IN 00.06 "Application, operating principle, designs".



In-line diaphragm seal with sterile connection, model 981.51

The model 981.51 in-line diaphragm seal with aseptic connection per DIN 11864 can be mounted directly into the pipeline, meaning no special measuring point connection is required. Through the integration into the process line, turbulences, dead spaces, corners and other obstructions can be avoided. For this diaphragm seal WIKA uses a completely round diaphragm, which, due to the unobstructed flow of the media, produces an automatic cleaning of the chamber.

The diaphragm seal systems can withstand the cleaning vapour temperatures occurring in the SIP processes and thus ensure a sterile connection between the medium to be measured and the diaphragm seal.

Assembly of the diaphragm seal and measuring instrument is made via a direct assembly as standard or optionally via a cooling element or a flexible capillary.

For the material selection WIKA offers a variety of solutions, in which the main body and the diaphragm are made of identical materials. Stainless steel 316L (1.4435) is used as standard material, other special materials are available on request.

Measuring systems with model 981.51 WIKA diaphragm seals are successfully used in the life science industry, in food production, pharmaceutical and biotechnology applications.

Standard version

Type of process connection

Aseptic connection per DIN 11864, sealing form A

- Aseptic threaded pipe connection per DIN 11864-1
- Aseptic flange connection per DIN 11864-2
- Aseptic clamp connection per DIN 11864-3

For pipes per DIN 11866 row A and row B (or DIN 11850 and DIN EN ISO 1127)

For exact designs and nominal widths see tables on page 4 to 6

Nominal pressure

see tables on page 4 to 6

Measuring ranges

Threaded connection: 0 ... 0.6 bar to 0 ... 40 bar (to DN 40)
0 ... 0.6 bar to 0 ... 25 bar (from DN 50)

Flange connection: 0 ... 0.6 bar to 0 ... 25 bar (to DN 40)
0 ... 0.6 bar to 0 ... 16 bar (from DN 50)

Clamp connection: 0 ... 0.6 bar to 0 ... 40 bar (to DN 40)
0 ... 0.6 bar to 0 ... 25 bar (to DN 65)
0 ... 0.6 bar to 0 ... 16 bar (from DN 80)

(also vacuum and +/- measuring ranges)

Material of main body

Stainless steel 1.4435 (316L)

Material of wetted parts

Diaphragm: Stainless steel 1.4435 (316L)

Surface roughness of wetted parts

$R_a \leq 0.76 \mu\text{m}$ per ASME BPE SF3 (except for weld seam)

Level of cleanliness of wetted parts

Oil and grease free per ASTM G93-03 level E (WIKA standard) and ISO 15001 ($< 550 \text{ mg/m}^2$)

Connection to the measuring instrument

Axial weld-in connection

Options

- Other nominal widths and aseptic connections on request
- Surface roughness of wetted parts
 $R_a \leq 0.38 \mu\text{m}$ per ASME BPE SF4, only with electropolished surface (except for weld seam)
- Aseptic connection per DIN 11864, sealing form B
- Connection to the measuring instrument
G 1/2, G 1/4, 1/2 NPT or 1/4 NPT (female)
- Origin of wetted parts (EU, CH, USA)
- Marking of the diaphragm seal with 3-A standard 74-05

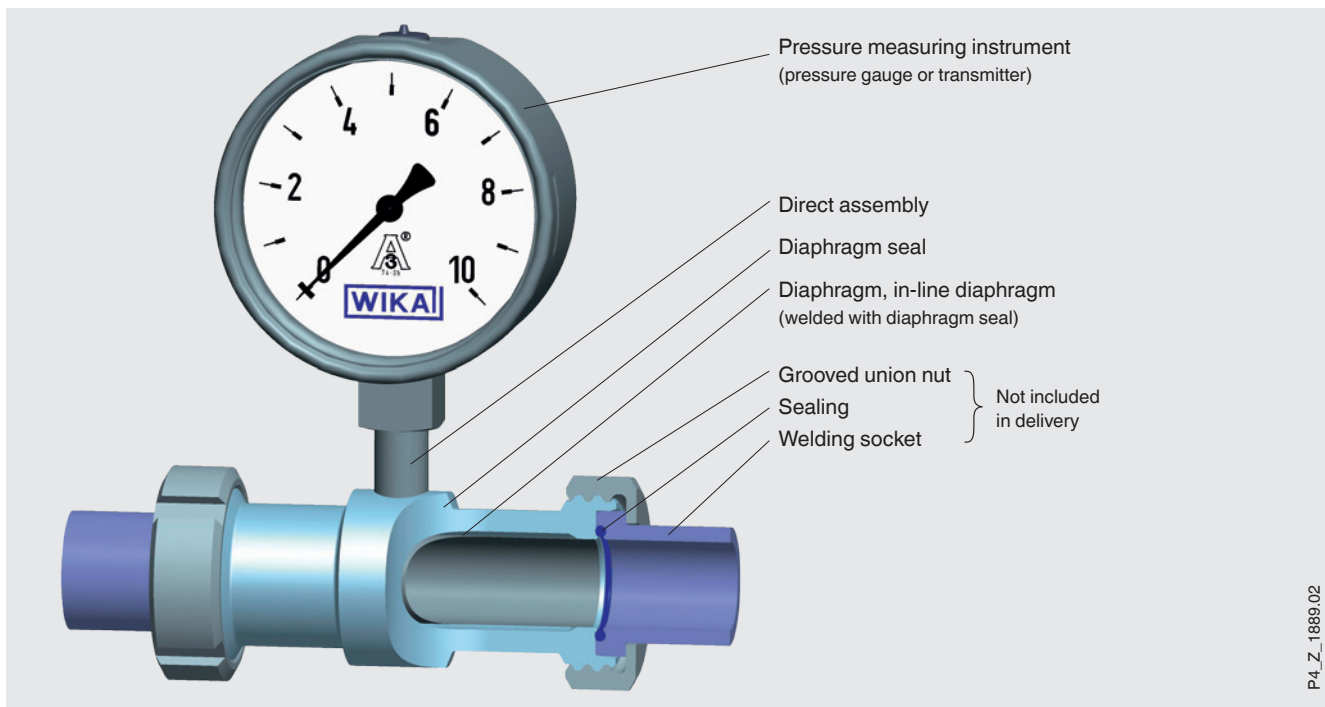
Materials

Upper body	Wetted part Diaphragm
Standard	
Stainless steel 1.4435 (316L)	Stainless steel 1.4435 (316L)
Option	
Stainless steel 1.4435 (316L), electropolished	Stainless steel 1.4435 (316L), electropolished
Stainless steel 1.4539 (904L)	Stainless steel 1.4539 (904L)
Hastelloy C276 (2.4819)	Hastelloy C276 (2.4819)
Hastelloy C22 (2.4602)	Hastelloy C22 (2.4602)

Further material combinations on request

Installation example

In-line diaphragm seal, sterile connection, model 981.51 with directly assembled pressure gauge in a pipeline



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Additional information for diaphragm seal systems

See Technical information IN 00.06 "Diaphragm seals - Diaphragm seal systems, application, operating principle, designs"

- Pressure measuring instrument model
- Connection to the measuring instrument: Direct assembly (for types of instrument connection see below, calibrated in the mounting position selected for the in-line diaphragm seal)
- Process temperature
- Ambient temperature
- System fill fluid
 - Recommendation for the food and beverage production: Neobee® KN 59 (FDA 21 CFR 172.856, 21 CFR 174.5)
 - Recommendation for pharmaceutical and cosmetics applications: Medicinal white mineral oil KN 92 (FDA 21 CFR 172.878, 21 CFR 178.3620(a); USP, EP, JP)

Options for diaphragm seal systems

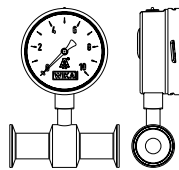
- Connection to the measuring instrument via cooling element or capillary
- Further pressure measuring instruments possible
- Vacuum service (suitable for vacuum operation)
- Higher level of cleanliness of wetted parts
 - Oil and grease free per ASTM G93-03 level C and ISO 15001 (< 66 mg/m²)
- Height difference between measuring point and pressure measuring instrument with capillary in metre increments (max. 7 m with silicone oils/edible oils)
- Mounting bracket (required for connection to the measuring instrument via capillary, model 910.16, data sheet AC 09.07)
 - Form H per DIN 16281, 100 mm, aluminium, black
 - Form H per DIN 16281, 100 mm, stainless steel
 - Bracket for pipe mounting, for pipe Ø 20 ... 80 mm, steel
- Special version
 - Complete measuring assembly autoclavable, on request

Assembly of the pressure measuring instrument

■ For horizontal pipelines

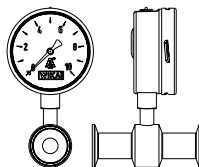
Variant 1

- Pressure measuring instrument: Lower mount (LM)
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, horizontal pipeline



Variant 2

- Pressure measuring instrument: Lower mount (LM)
- Pointer shaft: Parallel to flow direction
- Assembly: Direct assembly, horizontal pipeline



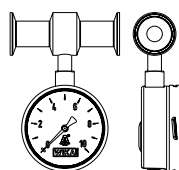
Variant 3

- Pressure measuring instrument: Lower back mount (LBM)
- Pointer shaft: Parallel to flow direction
- Assembly: Direct assembly, horizontal pipeline



Variant 4

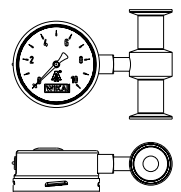
- Pressure measuring instrument: Connection location at 12 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, horizontal pipeline



■ For vertical pipelines

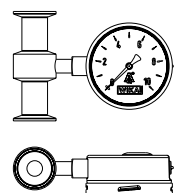
Variant 1

- Pressure measuring instrument: Connection location at 3 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline



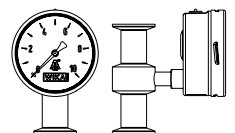
Variant 2

- Pressure measuring instrument: Connection location at 9 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline



Variant 3

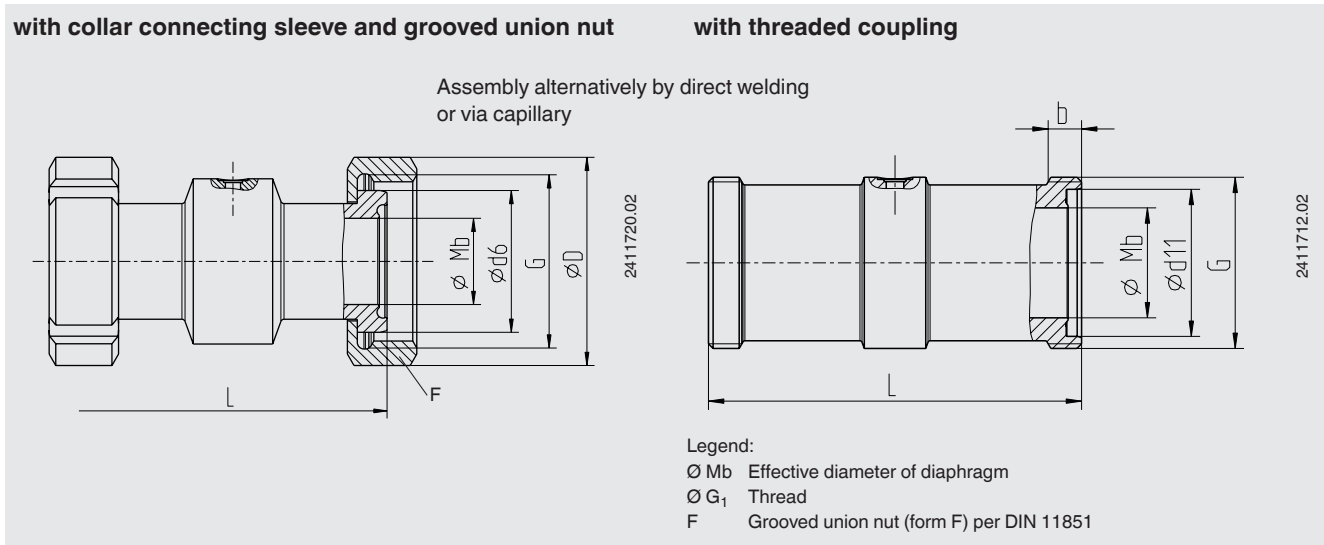
- Pressure measuring instrument: Lower back mount (LBM)
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline



Dimensions in mm

Type of process connection: Aseptic threaded pipe connection DIN 11864-1 form A (O-ring)

Specification of the process connection: With collar connecting sleeve and grooved union nut or with threaded coupling



Pipe standard: Pipes per DIN 11866 row A or DIN 11850 row 2

DN	For pipe Outer \varnothing x wall thickness	PN	Dimensions in mm							Aseptic O-ring
			L	Mb	d_6	d_{11}	G	D	b	
25	29 x 1.5	40	128	26	42.9	43	RD 52 x 1/6	63	14	28 x 3.5
32	35 x 1.5	40	128	32	48.9	49	RD 58 x 1/6	70	14	34 x 5
40	41 x 1.5	40	160	38	54.9	55	RD 65 x 1/6	78	14	40 x 5
50	53 x 1.5	25	170	50	66.9	67	RD 78 x 1/6	92	14	52 x 5
65	70 x 2	25	182	66	84.9	85	RD 95 x 1/6	112	16	68 x 5
80	85 x 2	25	182	81	98.9	99	RD 110 x 1/4	127	20	83 x 5
100	104 x 2	25	182	100	118.9	119	RD 130 x 1/4	148	20	102 x 5

Pipe standard: Pipes per DIN 11866 row B or DIN ISO 1127 row 1

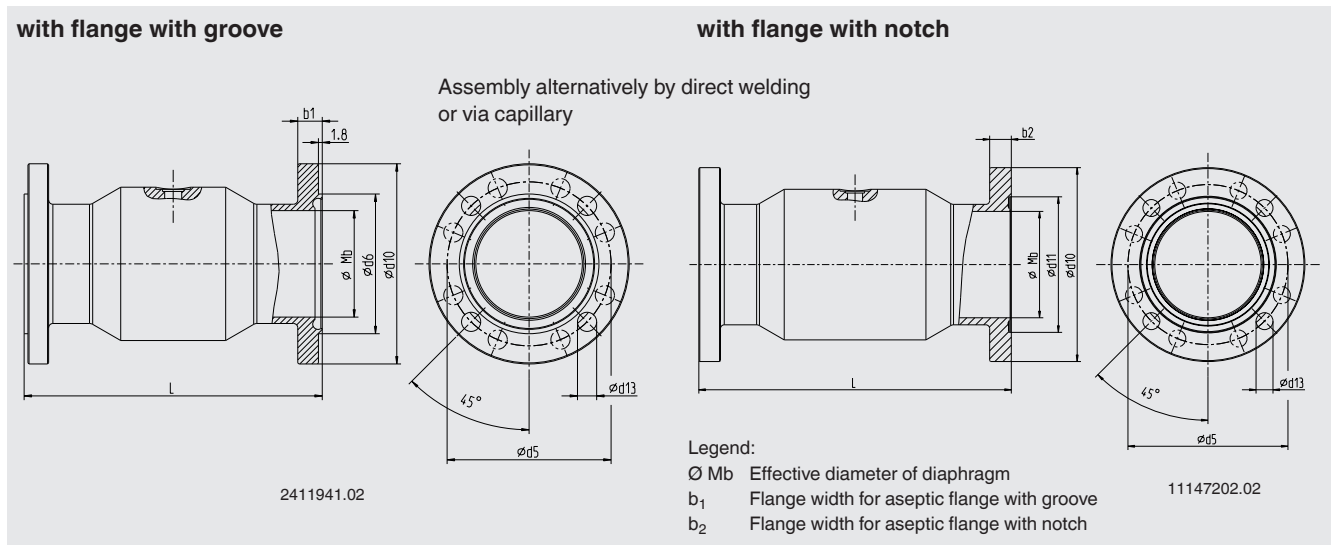
DN	For pipe Outer \varnothing x wall thickness	PN	Dimensions in mm							Aseptic O-ring
			L	Mb	d_6	d_{11}	G	D	b	
26.9	26.9 x 1.6	40	128	23.7	42.9	43	RD 52 x 1/6	63	14	26 x 3.5
33.7	33.7 x 2.0	40	128	29.7	48.9	49	RD 58 x 1/6	70	14	32 x 5
42.4	42.4 x 2.0	25	160	38.4	54.9	55	RD 65 x 1/6	78	14	40.5 x 5
48.3	48.3 x 2.0	25	170	44.3	66.9	67	RD 78 x 1/6	92	14	46.5 x 5
60.3	60.3 x 2.0	25	182	56.3	84.9	85	RD 95 x 1/6	112	16	58.5 x 5
76.1	76.1 x 2.0	25	182	72.1	98.9	99	RD 110 x 1/4	127	20	73.5 x 5
88.9	88.9 x 2.3	25	182	84.3	118.9	119	RD 130 x 1/4	148	20	86.5 x 5

Pipe standard: Pipes per DIN 11866 row C or ASME BPE 1997

DN	For pipe Outer \varnothing x wall thickness	PN	Dimensions in mm							Aseptic O-ring
			L	Mb	d_6	d_{11}	G	D	b	
1"	25.4 x 1.65	40	128	22.1	42.9	43	RD 52 x 1/6	63	14	24 x 3.5
1 1/2"	42.4 x 1.65	40	160	34.8	54.9	55	RD 65 x 1/6	78	14	37 x 5
2"	48.3 x 1.65	25	170	47.5	66.9	67	RD 78 x 1/6	92	14	50 x 5
2 1/2"	60.3 x 1.65	25	182	60.2	84.9	85	RD 95 x 1/6	112	16	62 x 5
3"	76.1 x 1.65	25	182	72.9	98.9	99	RD 110 x 1/4	127	20	75 x 5
4"	88.9 x 2.11	25	182	97.4	118.9	119	RD 130 x 1/4	148	20	100 x 5

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature from -10 to +140 °C.

Type of process connection: Aseptic flange connection DIN 11864-2 form A (O-ring)
 Specification of the process connection: With aseptic flange with groove or with flange with notch



Pipe standard: Pipes per DIN 11866 row A or DIN 11850 row 2

DN	For pipe Outer Ø x wall thickness ¹⁾	PN	Dimensions in mm									Aseptic O-ring
			L	Mb	d ₅	d ₆	d ₁₃	d ₁₁	d ₁₀	b ₁	b ₂	
25	29 x 1.5	40	128	26	53	38.3	4 x Ø 9	38.4	70	11.5	10	28 x 3.5
32	35 x 1.5	40	128	32	59	47.6	4 x Ø 9	47.7	76	11.5	10	34 x 5
40	41 x 1.5	40	160	38	65	53.6	4 x Ø 9	53.7	82	11.5	10	40 x 5
50	53 x 1.5	25	170	50	77	65.6	4 x Ø 9	65.7	94	11.5	10	52 x 5
65	70 x 2	25	182	66	95	81.6	8 x Ø 9	81.7	113	11.5	10	68 x 5
80	85 x 2	25	182	81	112	97.6	8 x Ø 11	97.7	133	13.5	12	83 x 5
100	104 x 2	25	182	100	137	116.6	8 x Ø 11	116.7	159	13.5	14	102 x 5

Pipe standard: Pipes per DIN 11866 row B or DIN ISO 1127 row 1

DN	For pipe Outer Ø x wall thickness ¹⁾	PN	Dimensions in mm									Aseptic O-ring
			L	Mb	d ₅	d ₆	d ₁₃	d ₁₁	d ₁₀	b ₁	b ₂	
26.9	26.9 x 1.6	40	128	23.7	52	36	4 x Ø 9	36.1	69	11.5	10	26 x 3.5
33.7	33.7 x 2.0	40	128	29.7	57	45.3	4 x Ø 9	45.4	74	11.5	10	32 x 5
42.4	42.4 x 2.0	25	160	38.4	65	54	4 x Ø 9	54.1	82	11.5	10	40.5 x 5
48.3	48.3 x 2.0	25	170	44.3	71	59.9	4 x Ø 9	60	88	11.5	10	46.5 x 5
60.3	60.3 x 2.0	25	182	56.3	85	71.9	4 x Ø 9	72	103	11.5	10	58.5 x 5
76.1	76.1 x 2.0	25	182	72.1	104	88.1	8 x Ø 11	88.2	125	13.5	12	73.5 x 5
88.9	88.9 x 2.3	25	182	84.3	116	100.9	8 x Ø 11	101	137	13.5	12	86.5 x 5

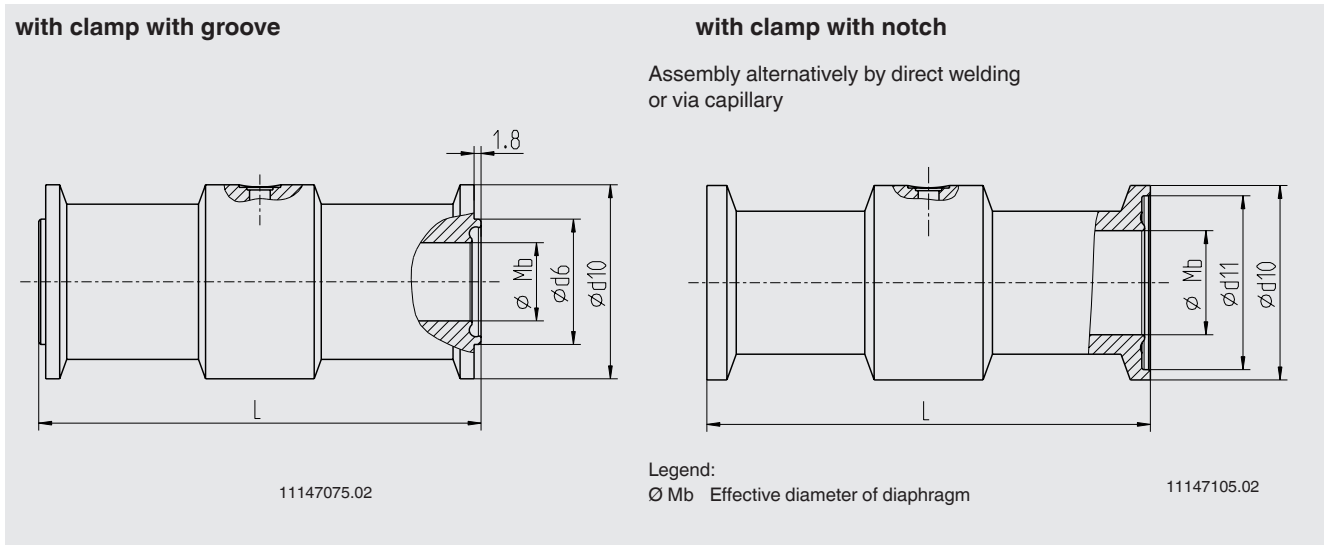
Pipe standard: Pipes per DIN 11866 row C or ASME BPE 1997

DN	For pipe Outer Ø x wall thickness ¹⁾	PN	Dimensions in mm									Aseptic O-ring
			L	Mb	d ₅	d ₆	d ₁₃	d ₁₁	d ₁₀	b ₁	b ₂	
1"	25.4 x 1.65	40	128	22.1	49	34.3	4 x Ø 9	34.4	66	11.5	10	24 x 3.5
1 ½"	42.4 x 1.65	40	160	34.8	62	50.4	4 x Ø 9	50.5	79	11.5	10	37 x 5
2"	48.3 x 1.65	25	170	47.5	75	63.4	4 x Ø 9	63.5	92	11.5	10	50 x 5
2 ½"	60.3 x 1.65	25	182	60.2	89	75.8	8 x Ø 9	75.9	107	11.5	10	62 x 5
3"	76.1 x 1.65	25	182	72.9	104	89.5	8 x Ø 11	89.6	125	13.5	12	75 x 5
4"	88.9 x 2.11	25	182	97.4	135	114.2	8 x Ø 11	114.3	157	13.5	14	100 x 5

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature from -10 to +140 °C.

Type of process connection: Aseptic flange connection DIN 11864-2 form A (O-ring)

Specification of the process connection: With clamp with groove or with clamp with notch



Pipe standard: Pipes per DIN 11866 row A or DIN 11850 row 2

DN	For pipe Outer Ø x wall thickness	PN 1)	Dimensions in mm					Aseptic O-ring
			L	Mb	d ₆	d ₁₁	d ₁₀	
25	29 x 1.5	40	114	26	38.3	38.4	50.5	28 x 3.5
32	35 x 1.5	40	146	32	47.6	47.7	50.5	34 x 5
40	41 x 1.5	40	146	38	53.6	53.7	64	40 x 5
50	53 x 1.5	25	156	50	65.6	65.7	77.5	52 x 5
65	70 x 2	25	156	66	81.6	81.7	91	68 x 5
80	85 x 2	16	156	81	97.6	97.7	106	83 x 5
100	104 x 2	16	156	100	116.6	116.7	130	102 x 5

Pipe standard: Pipes per DIN 11866 row B or DIN ISO 1127 row 1

DN	For pipe Outer Ø x wall thickness	PN 1)	Dimensions in mm					Aseptic O-ring
			L	Mb	d ₆	d ₁₁	d ₁₀	
26.9	26.9 x 1.6	40	114	23.7	36	36.1	50.5	26 x 3.5
33.7	33.7 x 2.0	40	114	29.7	45.3	45.4	50.5	32 x 5
42.4	42.4 x 2.0	25	146	38.4	54	54.1	64	40.5 x 5
48.3	48.3 x 2.0	25	146	44.3	59.9	60	64	46.5 x 5
60.3	60.3 x 2.0	25	156	56.3	71.9	72	91	58.5 x 5
76.1	76.1 x 2.0	25	156	72.1	88.1	88.2	106	73.5 x 5
88.9	88.9 x 2.3	25	156	84.3	100.9	101	119	86.5 x 5

Pipe standard: Pipes per DIN 11866 row C or ASME BPE 1997

DN	For pipe Outer Ø x wall thickness	PN 1)	Dimensions in mm					Aseptic O-ring
			L	Mb	d ₆	d ₁₁	d ₁₀	
1"	25.4 x 1.65	40	114	22.1	34.3	34.4	50.5	24 x 3.5
1 ½"	42.4 x 1.65	40	145	34.8	50.4	50.5	64	37 x 5
2"	48.3 x 1.65	25	156	47.5	63.4	63.5	77.5	50 x 5
2 ½"	60.3 x 1.65	25	156	60.2	75.8	75.9	91	62 x 5
3"	76.1 x 1.65	25	156	72.9	89.5	89.6	106	75 x 5
4"	88.9 x 2.11	25	156	97.4	114.2	114.3	130	100 x 5

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature from -10 to +140 °C.

Approvals

- GOST-R, import certificate, Russia

Certificates ¹⁾

- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy for diaphragm seal systems)
- 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metallic parts, indication accuracy for diaphragm seal systems)
- FDA conformity of the system fill fluid
- 3-A conformity of the diaphragm seal, based on a third party verification, in accordance with 3-A standard 74-05
- EHEDG conformity of the diaphragm seal
- Manufacturer's declaration regarding EU regulation 1935/2004 EC
- Others on request

1) Option

Approvals and certificates, see website

Ordering information

Diaphragm seal:

Diaphragm seal model / Process connection (type and specification of process connection, pipe standard, pipe dimension) / Material (base body, diaphragm) / Surface roughness of wetted parts / Sealing form / Zero point stabilisation (ZPS) / Connection to the measuring instrument / Level of cleanliness of wetted parts / Origin of wetted parts / Certificates

Diaphragm seal system:

Diaphragm seal model / Process connection (type and specification of process connection, pipe standard, pipe dimension) / Material (base body, diaphragm) / Surface roughness of wetted parts / Sealing form / Zero point stabilisation (ZPS) / Pressure measuring instrument model (per data sheet) / Assembly (direct assembly horizontal/vertical, cooling element horizontal/vertical, capillary) / min. and max. process temperature / min. and max. ambient temperature / Vacuum service / System fill fluid / Certificates / Height difference / Level of cleanliness of wetted parts / Origin of wetted parts / Mounting bracket

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