

# In-line diaphragm seal with sterile connection With clamp connection (TRI-CLAMP®) Models 981.22, 981.52 and 981.53

WIKA data sheet DS 99.52



for further approvals  
see page 4

## Applications

- Sanitary applications
- Gases, compressed air, vapour; liquid, powdery and crystallising media
- For flowing, pure media
- Ultra-pure steam systems
- Pressure/vacuum monitoring, e.g. filter monitoring

## Special features

- For direct, quickly removable installation in pipelines
- Self-draining in all mounting positions
- Quick cleaning, without residue
- Suitable for SIP and CIP
- Dead-space free installation in pipes



In-line diaphragm seal, model 981.22

## Description

Diaphragm seals are used for the protection of pressure measuring instruments in applications with difficult media. In diaphragm seal systems, the diaphragm of the diaphragm seal effects the separation of the instrument and the medium. The pressure is transmitted to the measuring instrument via the system fill fluid which is inside the diaphragm seal system.

For the implementation of demanding customer applications, there is a wide variety of designs, materials and system fill fluids available.

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

The model 981.22, 981.52 and 981.53 in-line diaphragm seals are suitable for use in the measurement of flowing media. In addition to avoiding potential blockages in the process, inline measurement technology also contributes to

securing product quality, mainly through its perfect cleanability. Due to the continuous cylindrical diaphragm, the measuring locations feature neither dead spaces nor non-flushable branches. The good cleanability of the in-line diaphragm seals has been tested and confirmed by independent institutions (e.g. EHEDG, Bio Processing Institute). The diaphragm seals 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.

Mounting of the diaphragm seal to the measuring instrument may be made via a direct connection, for high temperatures via a cooling element or via a flexible capillary.

The availability of in-line diaphragm seals for common pipe standards and nominal widths simplifies integration into already existing pipe cross-sections.

TRI-CLAMP® is a trademark of the company Alfa Laval AB SE

## Specifications

Models 981.22, 981.52 and 981.53	Standard	Option
<b>Pressure range</b>	0 ... 0,6 bar to 0 ... 40 bar [0 ... 8.7 psi to 0 ... 580 psi] <sup>1)</sup> or all other equivalent vacuum or combined pressure and vacuum ranges	
<b>Level of cleanliness of wetted parts</b>	Oil and grease free per ASTM G93-03 level F WIKA standard (< 1,000 mg/m <sup>2</sup> )	<ul style="list-style-type: none"> <li>■ Oil and grease free per ASTM G93-03 level D and ISO 15001 (&lt; 220 mg/m<sup>2</sup>)</li> <li>■ Oil and grease free per ASTM G93-03 level C and ISO 15001 (&lt; 66 mg/m<sup>2</sup>)</li> </ul>
<b>Origin of wetted parts</b>	International	EU, CH, USA
<b>Surface roughness of wetted parts</b>	Ra ≤ 0.76 µm [30 µin] per ASME BPE SF3 (except for weld seam)	Ra ≤ 0.38 µm [15 µin] per ASME BPE SF4, only with electropolished surface (except for weld seam)
<b>Connection to the measuring instrument</b>	Axial gauge adapter	Axial gauge adapter with G ½, G ¼, ½ NPT or ¼ NPT (female)
<b>Type of mounting</b>	Direct mounting	<ul style="list-style-type: none"> <li>■ Capillary</li> <li>■ Cooling element</li> </ul>
<b>Vacuum service (see IN 00.25)</b>	Basic service	<ul style="list-style-type: none"> <li>■ Premium service</li> <li>■ Advanced service</li> </ul>
<b>Marking of the diaphragm seal</b>	-	Per valid 3-A standard
<b>Instrument mounting bracket (only for capillary option)</b>	-	<ul style="list-style-type: none"> <li>■ Form H per DIN 16281, 100 mm, aluminium, black</li> <li>■ Form H per DIN 16281, 100 mm, stainless steel</li> <li>■ Bracket for pipe mounting, for pipe Ø 20 ... 80 mm, steel (see data sheet AC 09.07)</li> </ul>

1) Higher nominal pressures on request (for maximum pressure range consider pressure rating of clamp closure)

### Installation example, model 981.22 directly mounted to model PSD-4 pressure switch

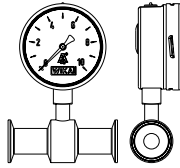


## Mounting variants for pressure gauges

### For horizontal pipelines

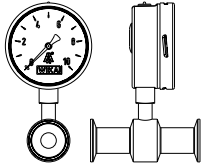
#### Variant 1

- Connection: Lower mount
- Pointer shaft: Crosswise to flow direction
- Mounting: Direct mounting, horizontal pipeline



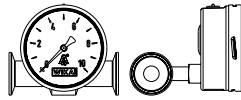
#### Variant 2

- Connection: Lower mount
- Pointer shaft: Parallel to flow direction
- Mounting: Direct mounting, horizontal pipeline



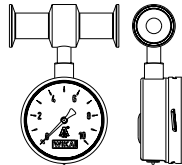
#### Variant 3

- Connection: Lower back mount
- Pointer shaft: Crosswise to flow direction
- Mounting: Direct mounting, horizontal pipeline



#### Variant 4

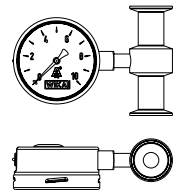
- Connection: "At 12 o'clock"
- Pointer shaft: Crosswise to flow direction
- Mounting: Direct mounting, horizontal pipeline



### For vertical pipelines

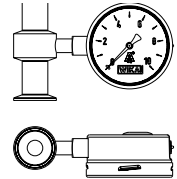
#### Variant 1

- Connection: "At 3 o'clock"
- Pointer shaft: Crosswise to flow direction
- Mounting: Direct mounting, vertical pipeline



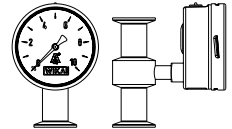
#### Variant 2

- Connection: "At 9 o'clock"
- Pointer shaft: Crosswise to flow direction
- Mounting: Direct mounting, vertical pipeline



#### Variant 3

- Connection: Lower back mount
- Pointer shaft: Crosswise to flow direction
- Mounting: Direct mounting, vertical pipeline







## Material combinations

Upper body of diaphragm seal	Wetted parts (diaphragm) <sup>1)</sup>
Stainless steel 1.4435 (316L)	Stainless steel 1.4435 (316L)
Stainless steel 1.4435 (316L), electropolished <sup>2)</sup>	Stainless steel 1.4435 (316L), electropolished <sup>2)</sup>
Hastelloy C22 (2.4602)	Hastelloy C22 (2.4602)
Hastelloy C276 (2.4819)	Hastelloy C276 (2.4819)

1) Marking of the parts with the material code guarantees 100 % material traceability  
 2) Only in connection with a surface roughness of  $R_a \leq 0.38 \mu\text{m}$  for the wetted parts

Further material combinations for special process temperatures on request.

## Approvals

Logo	Description	Country
	<b>EU declaration of conformity</b> Pressure equipment directive	European Union
	<b>EAC (option)</b> Pressure equipment directive	Eurasian Economic Community
	<b>3-A</b> Sanitary Standard	USA
	<b>EHEDG <sup>1)</sup></b> Hygienic Equipment Design	European Union
-	<b>CRN</b> Safety (e.g. electr. safety, overpressure, ...)	Canada
-	<b>MTSCHS (option)</b> Permission for commissioning	Kazakhstan

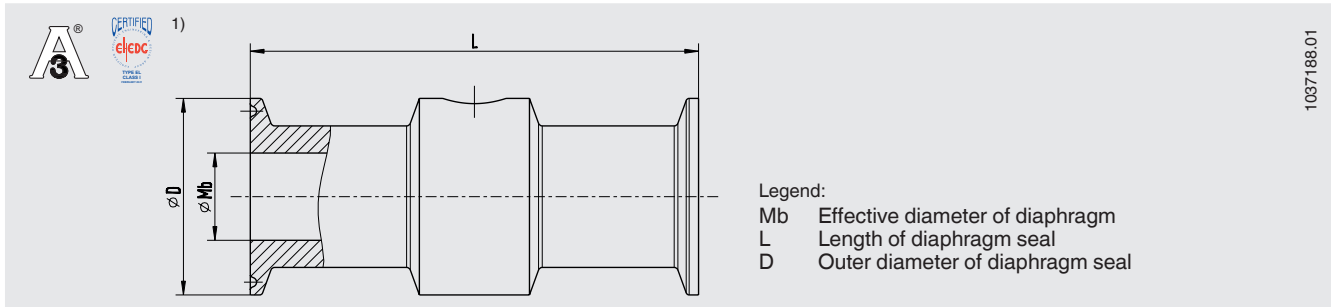
1) EHEDG conformity only in combination with ASEPTO-STAR k-flex upgrade, sealing from Kieselmann GmbH.

## Certificates (option)

- 2.2 test report per EN 10204
  - State-of-the-art manufacturing, material proof, 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
  - Manufacturer's declaration for food contact materials regarding regulation (EC) No. 1935/2004
- 3.1 inspection certificate per EN 10204
  - Material proof, wetted metal parts
  - Indication accuracy for diaphragm seal systems
- Manufacturer's declaration for food contact materials regarding regulation (EC) No. 1935/2004
- Others on request

Approvals and certificates, see website

## Model 981.22



### Process connection: Clamp connection per DIN 32676

Pipe standard per DIN 11866 row B and ISO 1127 row 1

DN	PN <sup>2)</sup>	Dimensions in mm [in]			
		For pipe outer Ø x wall thickness	L	D	Mb
13.5	40	13.5 x 1.6 [0.531 x 0.063]	96 [3.78]	25 [0.984]	10.3 [0.406]
17.2	40	17.2 x 1.6 [0.677 x 0.063]	114 [4.488]	25 [0.984]	14.0 [0.551]
21.3	40	21.3 x 1.6 [0.839 x 0.063]	114 [4.488]	50.5 [1.988]	18.1 [0.713]
26.9	40	26.9 x 1.6 [1.059 x 0.063]	114 [4.488]	50.5 [1.988]	23.7 [0.933]
33.7	40	33.7 x 2 [1.327 x 0.079]	114 [4.488]	50.5 [1.988]	29.7 [1.169]
42.4	40	42.4 x 2 [1.669 x 0.079]	146 [5.748]	64 [2.52]	38.4 [1.512]
48.3	40	48.3 x 2 [1.902 x 0.079]	114 [4.488]	64 [2.52]	44.3 [1.744]
60.3	40	60.3 x 2 [2.374 x 0.079]	156 [6.142]	77.5 [3.051]	56.3 [2.217]
76.1	25	76.1 x 2 [2.996 x 0.079]	156 [6.142]	91 [3.583]	72.1 [2.839]

### Process connection: Clamp connection per DIN 32676

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

DN	PN <sup>2)</sup>	Dimensions in mm [in]			
		For pipe outer Ø x wall thickness	L	D	Mb
½"	40	12.7 x 1.65 [0.5 x 0.065]	114 [4.488]	25 [0.984]	9.4 [0.37]
¾"	40	19.05 x 1.65 [0.75 x 0.065]	114 [4.488]	25 [0.984]	15.75 [0.62]
1"	40	25.4 x 1.65 [1 x 0.065]	114 [4.488]	50.5 [1.988]	22.1 [0.87]
1 ½"	40	38.1 x 1.65 [1.5 x 0.065]	146 [5.748]	50.5 [1.988]	34.8 [1.37]
2"	40	50.8 x 1.65 [2 x 0.065]	156 [6.142]	64 [2.52]	47.5 [1.87]
2 ½"	40	63.5 x 1.65 [2.5 x 0.065]	156 [6.142]	77.5 [3.051]	60.2 [2.37]
3"	25	76.2 x 1.65 [3 x 0.065]	156 [6.142]	91 [3.583]	72.9 [2.87]

### Process connection: Clamp connection per DIN 32676

Pipe standard per BS4825 part 3 and O.D. tube

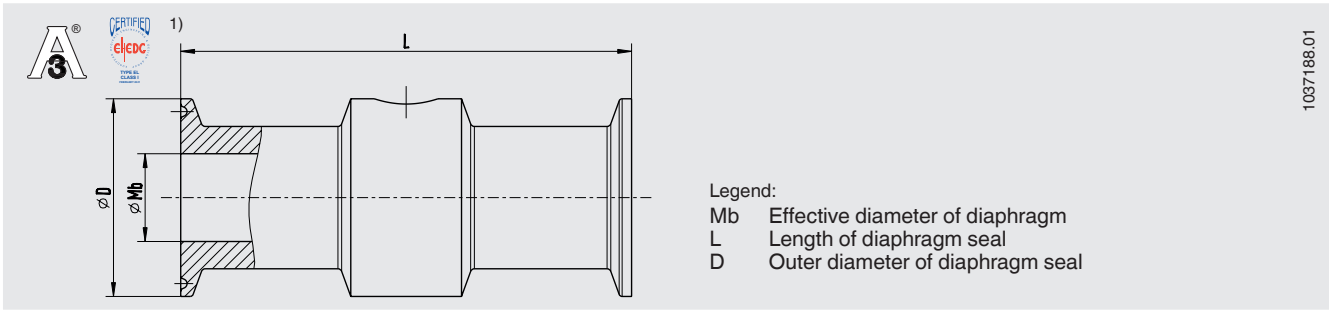
DN	PN <sup>2)</sup>	Dimensions in mm [in]			
		For pipe outer Ø x wall thickness	L	D	Mb
25.4	40	25.4 x 1.6 [1 x 0.063]	114 [4.488]	50.5 [1.988]	22.2 [0.874]
38.1	40	38.1 x 1.6 [1.5 x 0.063]	146 [5.748]	50.5 [1.988]	34.9 [1.374]
50.8	40	50.8 x 1.6 [2 x 0.063]	156 [6.142]	64 [2.52]	47.6 [1.874]
63.5	40	63.5 x 1.6 [2.5 x 0.063]	156 [6.142]	77.5 [3.051]	60.3 [2.374]
76.2	25	76.2 x 1.6 [3 x 0.063]	156 [6.142]	91 [3.583]	73 [2.874]

1) EHEDG conformity only in combination with ASEPTO-STAR k-flex upgrade, sealing from Kieselmann GmbH.

2) For maximum pressure range consider pressure rating of clamp.

Further dimensions and higher nominal pressures on request

## Model 981.52



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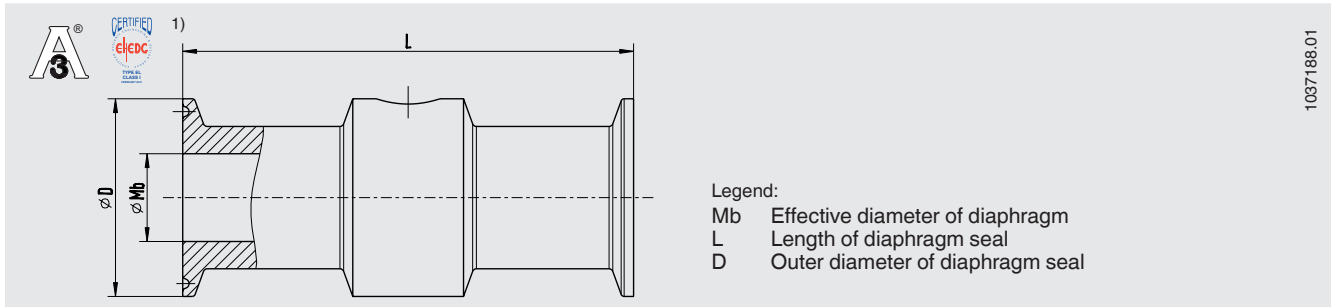
**Process connection: Clamp connection per DIN 32676**  
**Pipe standard per DIN 11866 row A and DIN 11850 row 2**

DN	PN <sup>2)</sup>	Dimensions in mm [in]			
		For pipe outer Ø x wall thickness	L	D	Mb
25	40	29 x 1.5 [1.142 x 0.059]	114 [4.488]	50.5 [1.988]	26 [1.024]
32	40	35 x 1.5 [1.378 x 0.059]	146 [5.748]	50.5 [1.988]	32 [1.26]
40	40	41 x 1.5 [1.614 x 0.059]	146 [5.748]	50.5 [1.988]	38 [1.496]
50	40	53 x 1.5 [2.087 x 0.059]	156 [6.142]	64 [2.52]	50 [1.969]
65	25	70 x 2 [2.756 x 0.079]	156 [6.142]	91 [3.583]	66 [2.598]
80	25	85 x 2 [3.346 x 0.079]	156 [6.142]	106 [4.173]	81 [3.189]
100	25	104 x 2 [4.094 x 0.079]	156 [6.142]	119 [4.685]	100 [3.937]

1) EHEDG conformity only in combination with ASEPTO-STAR k-flex upgrade, sealing from Kieselmann GmbH.  
 2) For maximum pressure range consider pressure rating of clamp.

Further dimensions and higher nominal pressures on request

## Model 981.53



Process connection: Clamp connection per ISO 2852  
 Pipe standard per ISO 2037 and BS 4825 part 1

DN	PN <sup>2)</sup>	Dimensions in mm [in]			
		For pipe outer Ø x wall thickness	L	D	Mb
25	40	25 x 1.2 [0.984 x 0.047]	114 [4.488]	50.5 [1.988]	22.6 [0.89]
33.7	40	33.7 x 1.2 [1.327 x 0.047]	146 [5.748]	50.5 [1.988]	31.3 [1.232]
38	40	38 x 1.2 [1.496 x 0.047]	146 [5.748]	50.5 [1.988]	35.6 [1.402]
40	40	40 x 1.2 [1.575 x 0.047]	146 [5.748]	64 [2.52]	37.6 [1.48]
51	40	51 x 1.2 [2.008 x 0.047]	156 [6.142]	64 [2.52]	48.6 [1.912]
63.5	40	63.5 x 1.6 [2.5 x 0.063]	156 [6.142]	77.5 [3.051]	60.3 [2.374]
70	25	70 x 1.6 [2.756 x 0.063]	156 [6.142]	91 [3.583]	66.8 [2.63]
76.1	25	76.1 x 1.6 [2.996 x 0.063]	156 [6.142]	91 [3.583]	72.9 [2.87]
88.9	25	88.9 x 2 [3.5 x 0.079]	156 [6.142]	106 [4.173]	84.9 [3.343]
101.6	25	101.6 x 2 [4 x 0.079]	156 [6.142]	119 [4.685]	97.6 [3.843]

1) EHEDG conformity only in combination with ASEPTO-STAR k-flex upgrade, sealing from Kieselmann GmbH.

2) For maximum pressure range consider pressure rating of clamp.

Further dimensions and higher nominal pressures on request

## Ordering information

Diaphragm seal:

Diaphragm seal model / Process connection (type of process connection, pipe standard, pipe dimension) / Material (main body, diaphragm) / Surface roughness of wetted parts / Sealing / 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 of process connection, pipe standard, pipe dimension) / Material (main body, diaphragm) / Surface roughness of wetted parts / Sealing / Zero point stabilisation (ZPS) / Pressure measuring instrument model (per data sheet) / Mounting (direct mounting 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 / Instrument mounting bracket

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