



FP SERIES

Diaphragm seals

Diaphragm seal consists of an elastic element that insulates the process fluid from the sensing element, transmitting pressure through the compression of a liquid in a separation chamber.

It is necessary to adapt this device where there are particular physical and chemical characteristics incompatible with the sensing element. This way the instrument is no more subject to drawbacks caused by particularly aggressive fluids or by highly viscous, crystallizable or solidifiable process fluid.

The diaphragm seal is an integral part of the instrument, so there is no possibility of disassembling.

Diaphragm seals shown below are suitable for SP 200 and SP 300 series (Bourdon tube pressure gauges), for DP series (differential pressure gauges), for TR series (pressure gauges with integrated transmitter) and SE series (transmitters or pressure switches).

Our equipped shop and the filling sophisticated equipments, allow us to also apply the seals to all the electronic field process instrumentations supplied by clients.

TECHNICAL FEATURES

• Mounting

- direct;
- **(identification R)**
- remote by flexible capillary
(identification S followed by the number indicating the capillary length in meters)
note: the remote mounting requires seal and pressure gauge set at the same level to avoid false calibration.

• Capillary material

- AISI 316L stainless steel with flexible armour of AISI 316;
- AISI 316L stainless steel with flexible armour of AISI 316 and PVC protection (option V79).

• Element (see special materials)

- o diaphragm:
 - AISI 316L st. st.
 - AISI 316L st. st. with P.T.F.E. coating;
 - special materials (Monel 400, Hastelloy C276, titanium, tantalum).
 - AISI 316L st. st. 40 micron gold plating.
- o bellows:
 - AISI 304 stainless steel (FP 344).

note: as indicated in the specific models, the separation chamber has a shaped upper part, that allows the diaphragm to stop without damages, in presence of over-pressures.

• Body material

(see specific models)

- o upper part (where scheduled):

- AISI 304 or AISI 316L stainless steel.

- o pressure connection:

- AISI 316L stainless steel;
- AISI 316L stainless steel with P.T.F.E. coating;
- galvanized carbon steel (FP344);
- exotic materials (Monel 400, Hastelloy C276, titanium, tantalum).

• Pressure connection (see specific models)

- threaded;
- flanged;
- sanitary.

• Diaphragm position (see specific models)

- facing;
- back side.

• Filling fluid (see specific models)

- silicone fluid suitable for temperatures $-30 \div +200$ °C (this fluid is food compliant);
- diathermic fluid suitable for temperatures $> +200 \div +400$ °C;
- fluorinated fluid suitable for oxygen service and temperatures $-30 \div +150$ °C.

• Thermal drift

diaphragm seal can affect instrument accuracy according with the service conditions because of the pressure/temperature ratio.

OPTIONS

• Integrated over-pressure protector

this device allows the diaphragm to withstand overpressure temporarily high, according with the units of the used diaphragm seal; the device is available for models FP 337, FP 338 and all flanged models with welded diaphragm.
(identification V28)

• Fluorinated fluid filling (identification V29)

• Flushing ring

AISI 316L stainless steel, for diaphragm inspection,

with double cleaning hole, available for model FP 337.
(identification V62)

• FPM (Viton) gaskets

for models FP 337/437/338/341/441/342/343.
(identification V74)

• PVC protection

PVC coating of capillary flexible armour.
(identification V79)

• Cooling tower

(identification V89)

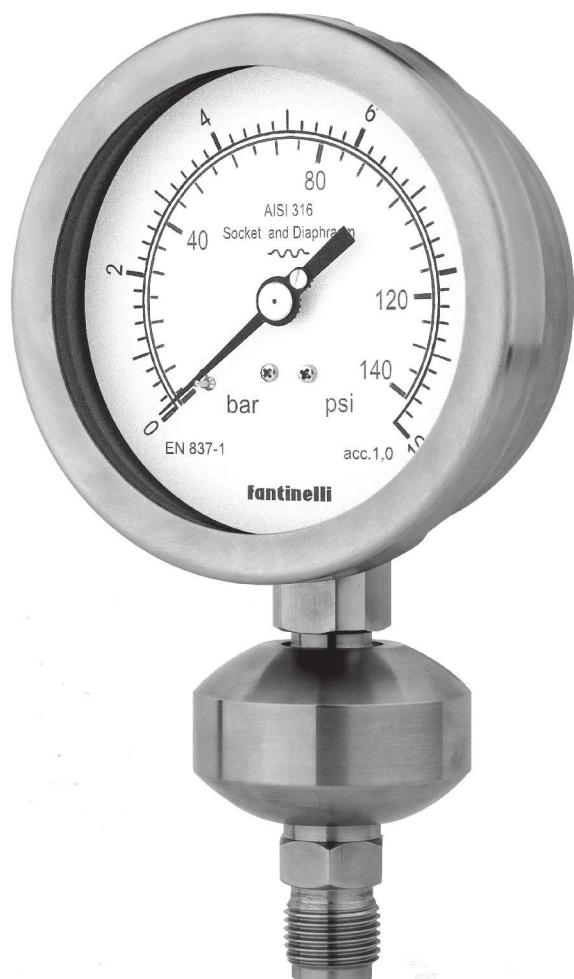



Table FP 1

Model of available diaphragm seal according with flange size - as per EN 1092

DN \ PN	6	10	16	25	40	64	100	160
15	FP 341 FP 342	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...
20	FP 341 FP 342	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...
25	FP 341 FP 342	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...
40	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341	FP 339 FP 340 FP 341	FP 339 FP 340
50	FP 339 FP 340 FP 341 FP 343	FP 339 FP 340 FP 343 FP 350	FP 339 FP 340 FP 343 FP 350	FP 339 FP 340 FP 343 FP 350	FP 339 FP 340 FP 343 FP 350	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340
80	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340

Table FP 2

Model of available diaphragm seal according with flange size - as per ASME standards

DN \ CLASS	150	300	600	900	1500	2500		
1/2"	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...	...	...
3/4"	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...	...	...
1"	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...	...	...
1" 1/2	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341	FP 339 FP 340 FP 341	FP 339 FP 340	...	...
2"	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 342 FP 343 FP 350	FP 339 FP 340 FP 342 FP 343 FP 350	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340	...	...
2" 1/2	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340	...	...
3"	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340	...	...

note: above models makes reference to Bourdon tube pressure gauges

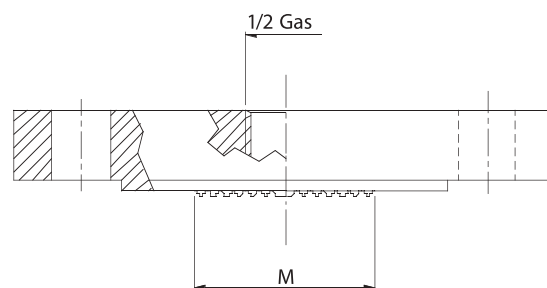


FP 340

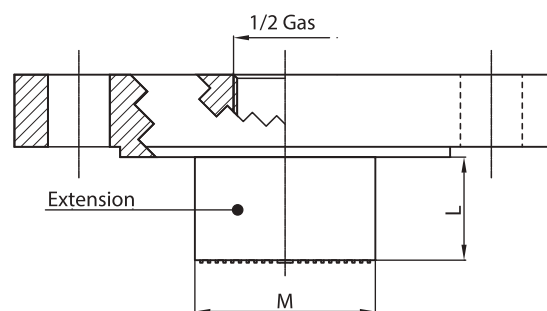
Facing diaphragm seal with flanged connection also available with extension

- **Mounting**
 - direct;
 - remote.
- **Element**
 - facing welded diaphragm in AISI 316L st. st.
 - note:** the separation chamber has a shaped upper part, that allows the diaphragm to stop without damages, in presence of over-pressures, according with the limit of diaphragm seal.
- **Body**
 - AISI 316L stainless steel.
- **Flanged pressure connection**
 - as per EN and ASME (see tables FP 1 and 2 at page FP03).
- **Extension (if required)**
 - to a max of 150 mm, in AISI 316L st. st. or exotic materials.
- **Filling liquid**
 - silicone fluid for operating temperaure included between - 30 and +200 °C;
 - diathermic fluid for operating temperature > +200 °C.
- **Service conditions**
 - pressure -1 ÷ 160 bar;
 - temperature -30 ÷ +350 °C.

FP 340



Weight kg ~ 2,5
(ref. to DN 40 PN 16)



DN	PN	M	DN	CLASS	M
40	4÷160	36	1"1/2	150 ÷ 2500	36
50	2,5÷160	48	2"	150 ÷ 2500	48
65	≤2,5÷160	58	2"1/2	150 ÷ 2500	58
80	≤2,5÷160	75	3"	150 ÷ 2500	75

note: informations shown in this series may be changed at any time without prior notice.



FP 341 / 441

Flanged connection diaphragm seal with back side diaphragm and threaded blind holes

• Application

- FP 341 for Bourdon tube pressure gauges;
- FP 441 for differential pressure gauges.

• Mounting

- direct;
- remote.

• Element

- o back side welded diaphragm to the upper part, in:
 - AISI 316L stainless steel, standard;
 - AISI 316L st. st. P.T.F.E. coated (**M3**);
 - Monel 400 (**M4**);
 - Hastelloy C276 (**M6**);
 - titanium (**M7**);
 - tantalum (**M8**);
 - AISI 316L st. st. 40 micron gold plating (**M01**);
 - other exotic materials (**M...**).

note 1: the diaphragm of exotic materials, for vacuum gauges or compound gauges, is installed with gasket.

note 2: the separation chamber has a shaped upper part, that allows the diaphragm to stop without damages, in presence of over-pressures, according with the limit of diaphragm seal.

• Body

- o AISI 316L st. st. upper part.
- o pressure connection in:
 - AISI 316L st. st., standard;
 - AISI 316L st. st. P.T.F.E. coated (**W3**);
 - AISI 316L st. st. with Monel 400 wetted parts (**W4**);
 - AISI 316L st. st. with Hastelloy C276 wetted parts (**W6**).



• Sealing gasket

- nitrilic rubber (NBR), standard;
- FPM (Viton) (on request - option V74).

• Flanged pressure connection

- as per EN and ASME (see tables FP 1 and FP 2 at page FP03).

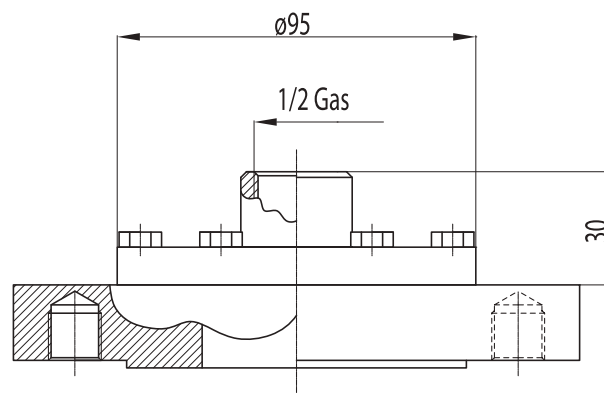
• Filling liquid

- silicone fluid.

• Service conditions

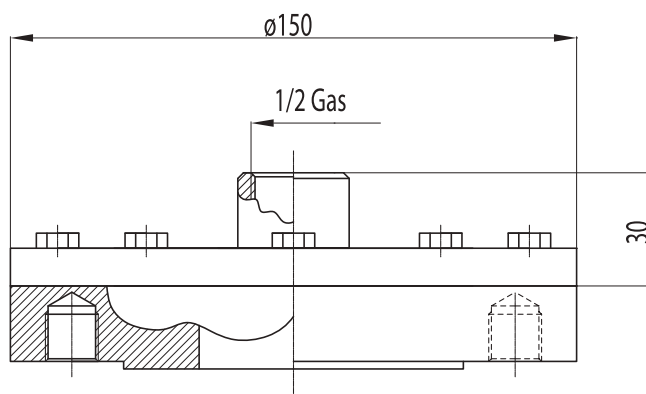
- pressure $-1 \div 100$ bar for FP 341
($-1 \div 40$ bar with P.T.F.E. coating);
- temperature $-30 \div +200$ °C for FP 341
($-20 \div +150$ °C with P.T.F.E. coating);
- pressure $60 \text{ mbar} \div 25$ bar for FP 441;
- temperature $-20 \div +120$ °C for FP 441.

FP 341



Diaphragm diameter mm 75
Weight ~ kg 3,80
(ref. to DN 40 PN 16)

FP 441



Diaphragm diameter mm 130
Weight ~ kg 5,30
(ref. to DN 40 PN 16)

note: informations shown in this series may be changed at any time without prior notice.



FP 342

Diaphragm seal with back side diaphragm and through fixing hole on lower flange

- **Mounting**

- direct;
- remote.

- **Element**

- o back side welded diaphragm to the upper part, in:
 - AISI 316L stainless steel, standard;
 - AISI 316L st. st. P.T.F.E. coated (**M3**);
 - Monel 400 (**M4**);
 - Hastelloy C276 (**M6**);
 - titanium (**M7**);
 - tantalum (**M8**);
 - AISI 316L st. st. 40 micron gold plating (**M01**);
 - other exotic materials (**M...**);

note 1: the diaphragm of exotic materials, for vacuum gauges or compound gauges, is installed with gasket.

note 2: the separation chamber has a shaped upper part, that allows the diaphragm to stop without damages, in presence of over-pressures.

- **Body**

- o AISI 316L st. st. upper part.
- o a pressure connection in:
 - AISI 316L st. st., standard;
 - AISI 316L st. st. P.T.F.E. coated (**W3**).

- **Sealing gasket**

- nitrilic rubber (NBR), standard;
- FPM (Viton) (on request - option V74).

- **Flanged pressure connection**

- as per EN and ASME (see tables FP 1/2).

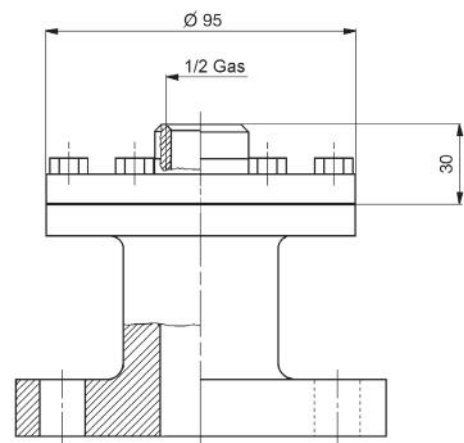
- **Filling liquid**

- silicone fluid.

- **Service conditions**

- pressure $-1 \div 100$ bar
($-1 \div 40$ bar with P.T.F.E. coating);
- temperature $-30 \div +200$ °C
($-20 \div +150$ °C with P.T.F.E. coating).

FP 342



Diaphragm diameter mm 75
Weight ~ kg 4,00
(ref. to DN 40 PN 16)

note: informations shown in this series may be changed at any time without prior notice.



FP 343

Flanged connection diaphragm seal with back side diaphragm and through holes

- **Mounting**

- direct;
- remote.

- **Element**

- o back side welded diaphragm to the upper part, in:
 - AISI 316L stainless steel, standard;
 - AISI 316L st. st. P.T.F.E. coated (**M3**);
 - Monel 400 (**M4**);
 - Hastelloy C276 (**M6**);
 - titanium (**M7**);
 - tantalum (**M8**);
 - AISI 316L st. st. 40 micron gold plating (**M01**);
 - other exotic materials (**M...**).

note 1: the diaphragm of exotic materials, for vacuum gauges or compound gauges, is installed with gasket.

note 2: the separation chamber has a shaped upper part, that allows the diaphragm to stop without damages, in presence of over-pressures, according with the limit of diaphragm seal.

- **Body**

- o AISI 316L st. st. upper part.
- o pressure connection in:
 - AISI 316L st. st., standard;
 - AISI 316L st. st. P.T.F.E. coated (W3).

- **Sealing gasket**

- nitrilic rubber (NBR), standard;
- FPM (Viton) (on request - option V74).

- **Flanged pressure connection**

- as per EN and ASME (see tables FP 1 and FP 2 at page FP03).

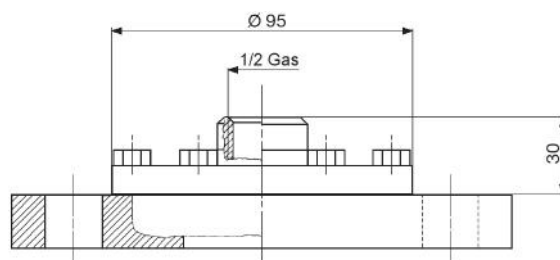
- **Filling liquid**

- silicone fluid.

- **Service conditions**

- pressure -1 ÷ 100 bar
(-1 ÷ 40 bar with P.T.F.E. coating);
- temperature -30 ÷ +200 °C
(-20 ÷ +150 °C with P.T.F.E. coating).

FP 343



Diaphragm diameter mm 75
Weight ~ kg 3,80



FP 350

Diaphragm seal with flanged connection

- **Mounting**

- direct;
- remote.

- **Element**

- o facing welded diaphragm, in:
 - AISI 316L st. st., standard;
 - AISI 316L st. st. P.T.F.E. coated (**M03**);
 - Monel 400 (**M04**);
 - Hastelloy C276 (**M06**);
 - titanium (**M07**);
 - tantalum (**M08**);
 - AISI 316L st. st. 40 micron gold plating (**M01**);
 - other exotic materials (**M...**).

note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without damages, in presence of over-pressures, according with the limit of diaphragm seal.

- **Wetted parts**

- o pressure connection in:
 - AISI 316L st. st., standard;
 - AISI 316L st. st. P.T.F.E. coated (**W03**);
 - Monel 400 (**W04**);
 - Hastelloy C276 (**W06**);
 - titanium (**W07**);
 - tantalum (**W08**);
 - other exotic materials (**W...**).

- **Flanged pressure connection**

- as per EN and ASME (see tables FP 1 and FP 2 at page FP04).

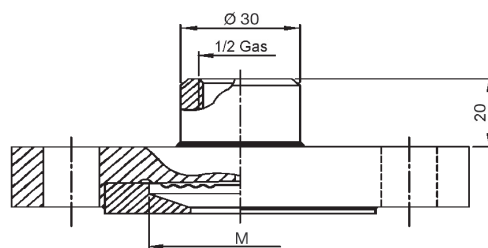
- **Filling fluid**

- silicone fluid, standard;
- diathermic fluid for operating temperature $> +200\text{ }^{\circ}\text{C}$;
- fluorinated fluid (on request - option V29).

- **Service conditions**

- pressure $-1 \div 100\text{ bar}$ ($1 \div 40\text{ bar}$ for P.T.F.E.);
- temperature $-30 \div +350\text{ }^{\circ}\text{C}$ for stainless steel;
- temperature $-30 \div +120\text{ }^{\circ}\text{C}$ for P.T.F.E., exotic materials and vacuum gauges.

FP 350



Weight ~ kg 2,20
(ref. to DN 40 PN 16)

DN	PN	M
15	10÷40	36
20	10÷40	36
25	10÷40	48
40	10÷40	48
50	10÷40	48

DN	CLASS	M
1/2"	150 ÷ 600	30
3/4"	150 ÷ 600	36
1"	150 ÷ 600	36
1" 1/2	150 ÷ 600	48
2"	150 ÷ 600	48



FP 339

Full covering flanged diaphragm seal - exotic materials

Mounting

- direct;
- remote.

• Element

exotic material diaphragm fully covers the facing of the cell:

- Monel 400 (**W04**);
- Hastelloy C276 (**W06**);
- titanium (**W07**);
- tantalum (**W08**);
- other exotic materials (**W...**).

note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without damages, in presence of over-pressures, according with the limit of diaphragm seal.

• Body

- AISI 316L stainless steel.

note: the requirement for exotic materials is guaranteed by the diaphragm according to the above indicated specifications.

• Flanged pressure connection

- as per EN and ASME (see tables FP 1 and FP 2 at page FP03).

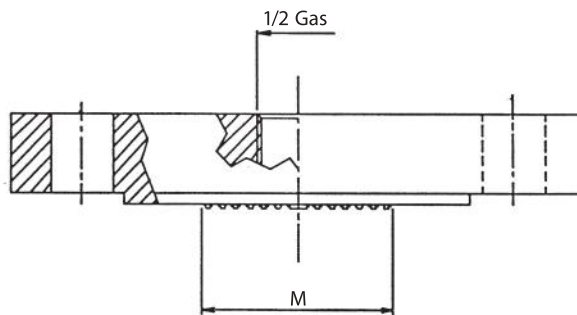
• Filling liquid

- silicone fluid.

• Service conditions

- pressure $-1 \div 160$ bar;
- temperature $-30 \div +350$ °C for pressure gauges;
- temperature $-30 \div +120$ °C for vacuum gauges and compound gauges.

FP 339



Weight ~Kg 2,90
(ref.to DN50 PN16)

DN	PN	M
40	4÷160	36
50	2,5÷160	48
65	≤2,5÷160	58
80	≤2,5÷160	75

DN	CLASS	M
1" 1/2	150÷2500	36
2"	150÷2500	48
2" 1/2	150÷2500	58
3"	150÷2500	75

note: informations shown in this series may be changed at any time without prior notice.