

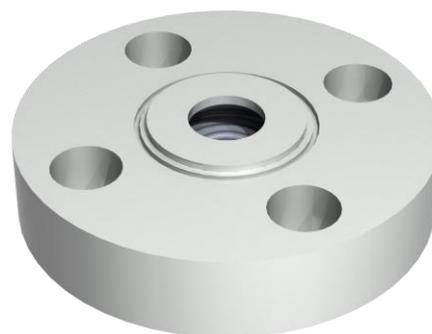
BFS type seal – Flange type, internal diaphragm

Design description

The BFS type diaphragm seal is specially designed for small process connections in aggressive environments. The design has an internal diaphragm construction in order to meet the facing requirements with an enlarged diaphragm compared to the standard BF type.

Flange diaphragm combinations

The diaphragm is TIG-welded to the flange and is designed to have the best performance for the specific size. This means that the flexibility and shape is carefully tested and measured. The standard thickness of diaphragm foil is 0.075mm.



Flange Material	Diaphragm & spacer material		
	General name	UNS	Wst.
AISI 316(L)	AISI 316L	S31603	1.4404
	Alloy C276	N27600	2.4810
	Duplex 2205	S32205	1.4462
	Super Duplex 2507	S32750	1.4410

Flange size, rating and facings - ASME B16.5

ASME B16.5			
Size	Rating	Facing	Roughness
0.5" to 1"	cl. 150 - cl. 300	RF	Ra 3.2-6.3 µm
		RFSF	Ra <1.6 µm

Flange size, rating and facings - EN 1092-1

EN 1092-1			
Size	Rating	Type	Roughness
DN15 to DN25	PN10-40	B1	Ra 3.2-12.5 µm
		B2	Ra <0.8-3.2 µm

Capillary tube and armor (protection)

The standard capillary mounting position is top side (axial) of the seal. Alternatively, the capillary can be placed at the side of the seal (radial). The standard tube material is TP316 (316SS), optionally available in Alloy 400. There are three options in ID of the capillary; 2mm, 1mm, and 0.7mm. Badotherm capillaries are always protected against mechanical forces by armor. This doubled shielded armor consist is standard AISI 304, and optionally AISI 316. Additionally, the armor could be protected with a PVC sleeve in white, black, optionally with ATEX114 approval to protect against dust and water ingress and possibly corrosive ambient atmosphere.

-> See datasheet "Capillary lines"

Design limitations

The BFS is not advised to be used clogging or high viscous processes. Because of the internal diaphragm it could create difficulties. Beware that in combination with flush rings the diaphragm is not flushed and keeps a dead area when mounted vertically.

Gold coatings

Gold coating is not possible on this design. When protection with gold is required a different type of diaphragm seal should be selected.

-> See datasheet "Gold coatings"

Polymer coatings

Polymer coatings are not possible on the BFS type of seal. Find more information on this in the datasheet on polymer solutions.

-> See datasheet "Polymer solutions"

Flush rings and flush flanges

Badotherm offers matching flush rings or flush flanges to their diaphragm seal. On request equipped with blind plugs, vent plug and or flushing / draining needle valves, which can be fitted or welded to the complete construction.

-> See datasheet flush rings

-> See datasheet flush flanges

-> See datasheet reducer flanges

Cooling options

There are several ways to protect the instrument from elevated temperatures, such as the extended direct mount (EDM), a temperature reducer (TR) or by means of capillary.

-> See datasheet "cooling devices"

Testing

All seals are helium tested according the EN 13185 test procedure A.3 up to 10^{-9} mbar l/s before used on a diaphragm seal application.

-> See datasheet "Diaphragm Seal testing"

Cleanliness of the wetted parts

All parts are standard cleaned from excessive oil and grease. When additional requirements are needed, the parts can be cleaned according customer requirements and cleaning specifications.

Gaskets

Sizes of the diaphragm area are designed to match the gaskets used between the process and seal or flush ring. For the ASME B16.5 RF flanges the ASME B16.20 is used for dimension restriction to ensure both the spiral and grooved gaskets are fully supported by the serrated area. For the EN type B1 flanges the gasket dimensions are matching the sizes of the EN 1514-2. The size "G" in the tables refer to the start of the gasket surface.

Material Certification

Material traceability and related certification are applicable for all process wetted parts. Material certification possibilities depend on the type of seal, the assembly construction and the materials used. Material certification is in accordance with EN10204 3.1.

Additional material certification and testing can be provided on request, such as Positive Material Identification (PMI), Intergranular corrosion (IGC) testing, material certification in accordance with EN10204 3.2, NACE conformity for ISO-15156 (MR-0175) and/or ISO-17945 (MR-0103), NORSOK M-630 and many more.

-> Please note that the responsibility for material selection always rests with the user.

Flange Marking & Traceability

All flanges are marked with heat number, material designation, size, and rating. Badotherm adds a Badotherm reference number and the manufacturers name to the flange for traceability purposes.

Flanges and origin

The seal parts are made from forged materials according to the applicable standards. The standard sourcing of flanges is of international origin. Optionally regional preference can be requested, for example materials from EU origin.

Example performance calculation

Whether a diaphragm seal can be used for a specific measurement, depends on the size of the diaphragm. That size is restricted by the size of the diaphragm seal.

For pressure transmitters, Badotherm offers an online performance calculation tool to calculate its performance and to ensure that the diaphragm size is suitable for your measurement.

The table below presents the minimum span of the respective diaphragm sizes with standard process conditions. As rule of thumb, a TPE of max 5% is often considered acceptable, but it depends per situation.

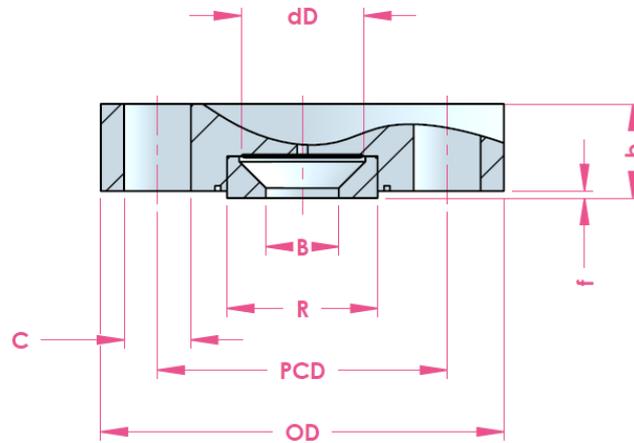
Minimum span table

dD	AP/GP	DP
32mm	11 bar	1850 mbar
35mm	7.5 bar	1715 mbar
44mm	1575 mbar	255 mbar

Pressure transmitter; ambient temperature $-10...+30^{\circ}\text{C}$; process temperature 100°C with BSO 22 fill fluid; 3 meter capillary; ID 1mm

See the general overview of all diaphragm sizes with several standard situations and in combination with Badotherm pressure gauges.

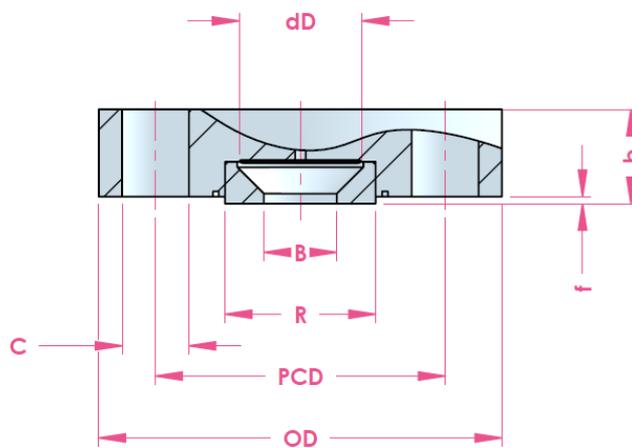
Dimensions table: ASME 16.5 RF facing



size	rating	OD	b	PCD	C / pcs	dD	R	f	B	weight
0.5"	cl. 150	90.0	27	60.3	16.0 / 4x	32.0	34.9	2.0	15.8	1.0 kg
	cl. 300	95.0		66.7						1.1 kg
0.75"	cl. 150	100.0		69.9	19.0 / 4x	35.0	42.9		21.0	1.3 kg
	cl. 300	115.0		82.6						1.7 kg
1"	cl. 150	110.0		79.4	16.0 / 4x	44.0	50.8		26.6	1.6 kg
	cl. 300	125.0		88.9						19.0 / 4x

All dimensions in mm, weight in kg

Dimensions table: EN 1092-1 B1 type



size	rating	OD	b	PCD	C / pcs	dD	R	f	B	weight
DN15	PN10-40	95.0	27	65.0	14.0 / 4x	32.0	45.0	2.0	15.0	1.0 kg
DN20		105.0		75.0		35.0	58.0		20.0	1.3 kg
DN25		115.0		85.0		44.0	68.0		25.0	1.7 kg

All dimensions in mm

Holland – United Kingdom – Romania – India – Thailand – Dubai – USA

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