

BRC type seal - flush diaphragm - Wafer type

Design description

The BRC construction has a seal body that is made of bar stock or forged material and is designed to obtain a diaphragm seal with full wetted parts in exotic materials. With Badotherm unique resistance weld technology, a stainless steel body (non-wetted) has its wetted parts (diaphragm and raised face area) covered by sheet material in the required exotic material. This is more economic than producing the full body in exotic material. BRC is typically used in combination with (differential) pressure transmitters for applications such as level, flow and (absolute) pressure measurement.

Diaphragm in exotic materials

The unique feature of the BRC is the Badotherm resistance-weld technology. The stainless steel body (non-wetted) has its wetted parts (diaphragm and raised face area) covered by sheet material in the required exotic material. The standard thickness of diaphragm foil is 0.075mm, for some materials other thickness may be available.

Body Material	Diaphragm material		
	General name	UNS	Wst.
AISI 316(L)	AISI 304L	S30400	1.4306
	AISI 321	S32100	1.4541
	AISI 316 UG	S31603	1.4435
	AISI 304L	S30400	1.4306
	25-22-2 LMN	S31050	1.4466
	AISI 316 UG	S31600	1.4435
	AISI 904L	N08904	1.4539
	Alloy 20	N08020	2.4660
	Alloy 400	N04400	2.4360
	Alloy 600	N06600	2.4816
	Alloy 625	N06625	2.4856
	Alloy 825	N08825	2.4858
	Alloy B2	N10665	2.4617
	Alloy C-22	N06022	2.4602
	Alloy C-276	N10276	2.4810
	254 SMO (6Mo)	S31254	1.4547
	Duplex 2205	S32205	1.4462
	Super Duplex 2507	S32750	1.4410
	Nickel 201	N02201	2.4068
	Tantalum	R05200	-
	Titanium Gr. 1	R50250	2.7025
	Zirconium 702	R60702	-



Seal size, rating and facings - ASME B16.5

ASME B16.5			
Size	Rating	Facing	Roughness
1" to 4"	cl. 150 - cl. 2500	RF, LMF, FF	Ra 3.2-6.3 µm
		SMF	Ra <3.2 µm

Seal size, rating and facings - EN 1092-1

EN 1092-1			
Size	Rating	Type	Roughness
DN20 to DN100	PN10-400	A, B1, F	Ra 3.2-12.5 µm
		B2	Ra <0.8-3.2 µm

Seal size, rating and facings – JIS B2220

JIS B2220			
Size	Rating	Type	Roughness
DN25 to DN100	10-20K	RF	Ra 3.2-12.5 µm

Gold Coating

Due to its design, gold coating on the BRC designed is not recommended.

-> See datasheet "Gold coatings"

Polymer Coatings

Polymer solutions come in several types. Additional specifications of the polymer solutions (thickness, temperature limitation, and more) can be found in datasheet "polymer solutions". Due to its design, BRC has only a few options available:

- PTFE coating (low temp applied)
- PTFE sheet

-> See datasheet "Polymer solutions"

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"

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

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"

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.

Marking & Traceability

All flanges and diaphragm seals 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.

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

For the BRF soft gaskets are advised, such as camprofil (grooved) 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 diaphragm seals 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 diaphragm seals 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.

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
23.5mm	17.5 bar	na
32mm	11 bar	1850 mbar
44mm	1575 mbar	255 mbar
57mm	415 mbar	70 mbar
72mm	155 mbar	30 mbar
81mm	110 mbar	20 mbar

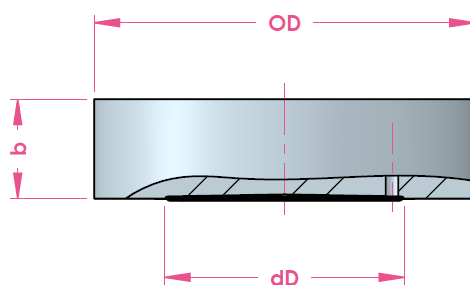
Pressure transmitter; ambient temperature -10...+30°C; process temperature 100°C with BSO 22 fill fluid; 3 meter capillary; ID 1mm, DP both sides mounted with seal

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

Cover Flange

The BRC will be clamped to the process. This can be done with a standard blind flange. However positioning the seal in line with the flange and gasket will be challenging. Therefore Badotherm offers the option for a cover flange. This flange has a groove to fit the seal part and fixing holes to fix the seal into the flange. Details can be found in the dimensions section.

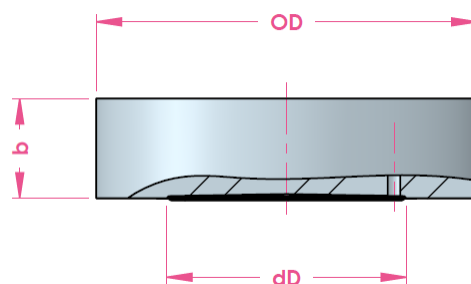
Dimensions table: ASME 16.5 RF facing



size	rating	OD	dD	b	weight
1"	cl. 150-2500	50.8	23.5	24.0	0.4 kg
1.5"	cl. 150-600	73.0	44.0		0.8 kg
	cl. 900-2500		32.0		0.8 kg
2"	cl. 150-600	92.1	57.0		1.3 kg
	cl. 900-2500		44.0		1.3 kg
3"	cl. 150-2500	127.0	81.0		2.4 kg
4"	cl. 150-2500	157.2			3.7 kg

All dimensions in mm

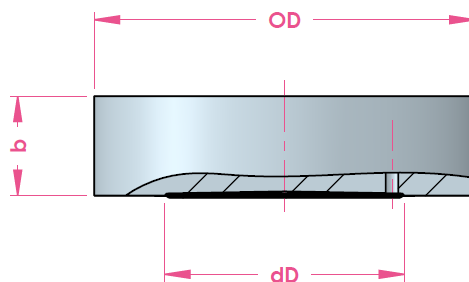
Dimensions table: EN 1092-1 B1 type



size	rating	OD	dD	b	weight
DN20	PN10-400	58.0	23.5	24.0	0.5 kg
DN25		68.0	32.0		0.7 kg
DN32		78.0	32.0		0.9 kg
DN40		88.0	44.0		1.2 kg
DN50		102.0	57.0		1.5 kg
DN80		138.0	81.0		2.9 kg
DN100	PN10-16	158.0		3.8 kg	
	PN25-400	162.0		3.9 kg	

All dimensions in mm

Dimensions table: JIS 2220 RF



size	rating	OD	dD	b	weight
25	10K – 20K	67.0	32.0	24.0	0.7 kg
32	10K – 20K	76.0	44.0		0.9 kg
40	10K – 20K	81.0			1.0 kg
50	10K – 20K	96.0	57.0		1.4 kg
80	10K	126.0	81.0	24.0	2.4 kg
	16-20K	132.0			2.6 kg
90	10K	136.0			2.7 kg
	16-20K	145.0			3.2 kg
100	10K	151.0			3.4 kg
	16-20K	160.0			3.8 kg

All dimensions in mm

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