EXT-UREA type seal –flanged type, extended diaphragm

Design description

The EXT-UREA construction has a seal body that is made of a (forged) blind flange in combination with a welded extension made from bar stock. The EXT-UREA is a typical design according Snamprogetti® specification TB.5002.

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 material		
	General name	UNS	Wst.
AISI 316(L)	AISI 316L	S31603	1.4404
AISI 316L UG	AISI 316 UG	S31603	1.4435
AISI 310 MoLn	25-22-2 LMN	S31050	1.4466
Duplex F51/F60	Duplex 2205	S32205	1.4462
Zirconium 702	Zirconium 702	R60702	-

Flange size, rating and facings - ASME B16.5

ASME B16.5			
Size	Rating	Facing	Roughness
3”	cl. 400-600	RF	Ra 3.2-6.3 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 in Monel 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”

Jacket holes & Tapered extension

IN some cases extended seals get stuck in the nozzle by the crystalized or hardened surrounding process media. There are two option that can be selected to make removal easier. A tapered extension from tip to flange and jacket holes. Jacket holes can be added to the flange for easy removal of extended seals. Standard sizes for jacket holes are 5/8” UNS for ASME flanges and M16 for EN 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”

Lifting handles

Larger sizes and ratings of diaphragm seals can weigh up to 50 kg. Handling and installation can become a challenge. As from 15kg it is recommended to apply a set of lifting handles, welded on the sides of the flange of the seal. This can be used to handle it easier and install it in a safer way or have attach lifting tools to it.

-> See datasheet “diaphragm seal accessories"

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 by the forging shop 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

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.

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
57mm	415 mbar	70 mbar

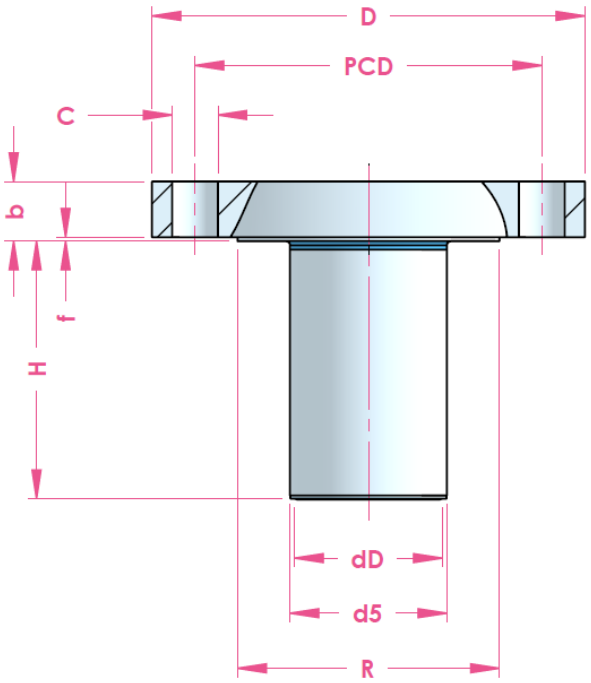
Pressure transmitter; ambient temperature -10…+30°C; process temperature 100°C with BSO 22 fill fluid; 3 meter capillary; ID 1mm, DP both sides mounted with seal

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

Extension length and diameter

Length and diameter can be selected in random dimensions. In the dimension tables the standard diameters are given, however variation can be made upon request. The length of the extension is always customer selected. Most common length of extensions are 50mm, 100mm, and 150mm.

Dimensions table: ASME B16.5 RF facing



size	rating	D	b	H	PCD	C / pcs	dD	d5	R	f	weight
3"	cl. 400-600	210.0	38.8	40.5	168.3	22.3 / 8x	58.0	69.0	127.0	7.0	10.0 kg

All dimensions in mm, weight in kg

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