

HTDS type seal – High temperature diaphragm seal

Design description

The HTDS construction is designed for those applications where the process temperature exceeds the limits of the BSO fill fluids. The patented design can withstand temperatures up to 600°C. All materials used in this design are carefully selected to have maximum performance under these extreme temperatures.

Housing / diaphragm combinations

Body Material	Diaphragm material		
(Lower part)	General name	UNS	Wst.
AISI 321H	AISI 321	S32100	1.4541

Flange size, rating and facings

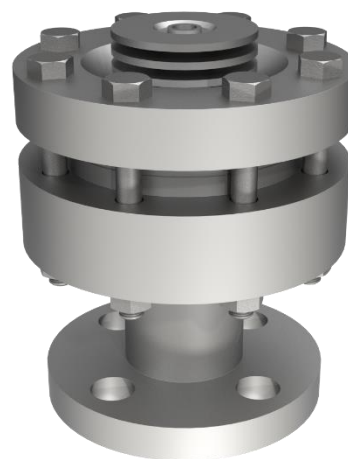
Flange sizes and ratings are limited to the most common Due to the high temperatures the

ASME B16.5

ASME B16.5			
Size	Rating	Facing	Roughness
1/2" to 2"	cl. 150 - cl. 1500	RF,	Ra 3.2-6.3 µm
		RJF	Ra <1.6 µm

EN 1092-1

EN 1092-1			
Size	Rating	Type	Roughness
DN15 to DN50	PN10-100	B1	Ra 3.2-12.5 µm



Pressure

The maximum working pressure of the HDTS is limited by the ASME and material specification.

Material		cl. 150*	cl. 300	cl. 400	cl. 600
S32109	AISI 321 H	1.4 bar	20.3	27.0	40.5

Maximum working temperature based on ASTM A182 at a maximum temperature of 600°C. Max working pressure cl.150 is based on 538°C. Above this temperature cl. 150 is not allowed.

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"

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.

Retaining bolts & nuts

The retaining bolts between upper and lower part are made of a special alloy to withstand the high temperatures.

Grade bolt	Grade nut	Material
ISO 4014	ISO 4042	Alloy A286

Torque

The closing between upper part and lower part is done with 8 bolts. The torque of the M10 bolts is 23 Nm (19.96 ft-lb) and is tensioned at the Badotherm facility.

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.

Performance specification

The table below presents the accuracy specifications of GP and DP HTDS, as well as the temperature effects, and pressure details.

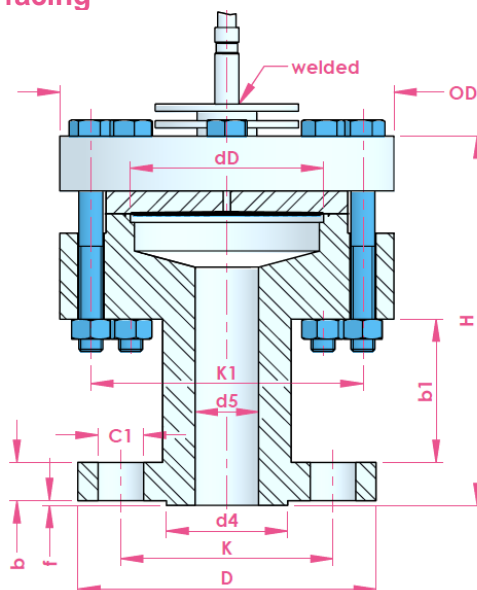
	GP	DP
Min span required	1000 mbar	250 mbar
Transmitter overpressure required	40 bar	

Accuracy	GP	DP
250 <Span < 500 mbar	na	2%
500 <Span < 1000 mbar	na	1%
Span > 1000 mbar		
0 – 25%	2%	1.5%**
25 – 100%	0.5%	0.5%**

**Based on static pressure ≥ 1000 mbar

Temperature effect per 10°C	GP	DP
Process temperature	3.21 mbar	0.64 mbar
Ambient temperature	1.68 mbar / mtr	0.34 mbar / mtr
Transmitter	0.65 mbar	0.13 mbar

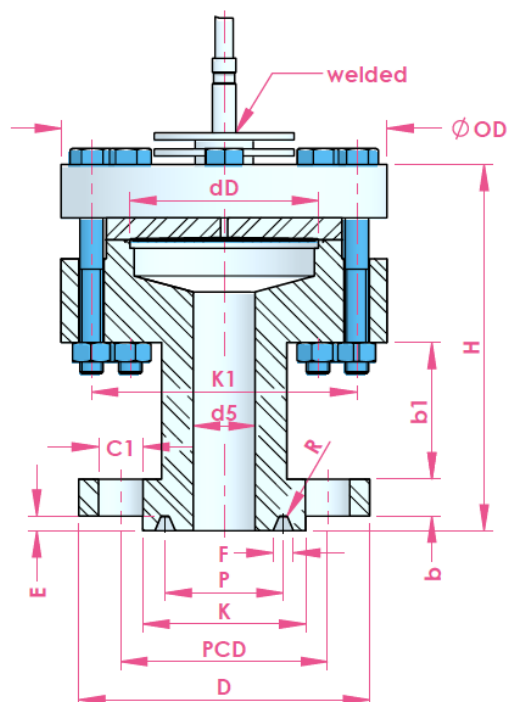
Dimensions table: ASME 16.5 RF facing



size	rating	D	OD	d5	b	b1	d4	f	H	K	K1	C1 / pcs	Weight	
1/2"	cl. 150	89.0	140.0	15.8	9.7	60.0	35.1	1.5	147.7	60.5	114.0	15.9 / 4x	7.9 kg	
	cl. 300	95.0			12.7				150.7	66.5				
	cl. 400-600				14.2				157.1	66.7				
3/4"	cl. 150	99.0		21.0	11.2		42.9	1.5	149.2	69.8		82.6	15.9 / 4x	7.9 kg
	cl. 300	117.0			14.2				152.2	19.1 / 4x				
	cl. 400-600				15.7				158.7					
1"	cl. 150	108.0		26.6	12.7		50.8	1.5	150.7	79.2		88.9	15.9 / 4x	7.9 kg
	cl. 300	124.0			15.7				153.7	19.1 / 4x				
	cl. 400-600				17.5				160.4					
1.5"	cl. 150	127.0		40.9	15.9		73.0	1.5	153.9	98.6		114.3	15.9 / 4x	7.9 kg
	cl. 300	155.0			19.0				157.0	22.3 / 4x				
	cl. 400-600				22.4				165.3	8.5 kg				
2"	cl. 150	152.0		52.5	17.5		91.9	1.5	155.5	120.6		127.0	19.1 / 4x	7.0 kg
	cl. 300	165.0			20.6				158.6	19.1 / 8x			8.0 kg	
	cl. 400-600				25.4				168.3					

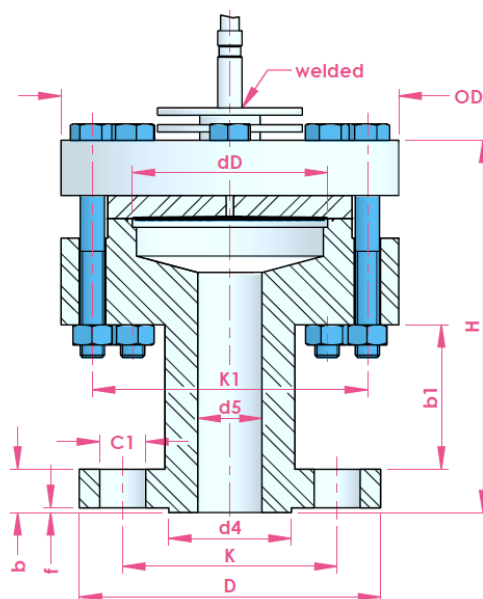
All dimensions in mm, weight in kg; H is excluding flush connection

Dimensions table: ASME 16.5 RJF facing



size	rating	D	OD	d5	b	b1	H	K	K1	E	F	P	R	Ring #	PCD	C1 / pcs
1/2"	cl. 300	95.0	140	15.8	12.7	60	154.7	51.0	114	5.54	7.14	34.14	0.8	11	66.5	15.9 / 4x
	cl. 400 - 600				14.2		156.2							12		22.3 / 4x
	cl. 900 - 1500	121.0			22.4		165.3	60.5				39.67		13	82.6	19.1 / 4x
3/4"	cl. 300	117.0		21.0	14.2		157.0	63.5		6.35	8.74	42.88		14	88.9	
	cl. 400 - 600				15.7		158.6					44.45		15	79.2	15.9 / 4x
	cl. 900 - 1500	130.0			25.4		168.3	66.5				47.62		16	88.9	19.1 / 4x
1"	cl. 150	108.0		26.6	12.7		155.6	63.5				50.8		17	88.9	15.9 / 4x
	cl. 300				15.7		158.6							18	98.6	19.1 / 4x
	cl. 400 - 600	124.0			17.5		160.4	70.0				57.15		19	98.6	15.9 / 4x
1.25"	cl. 900 - 1500	149.0		35.1	28.4		171.3	71.5				60.33		20	114.3	22.3 / 4x
	cl. 150	117.0			14.2		157	73.2				65.07		21	124.0	28.6 / 4x
	cl. 300	133.0			17.5		160.4	79.5				68.28		22	120.6	19.1 / 4x
1.5"	cl. 400 - 600			40.9	20.6		163.5			7.92	11.91	82.55		23	127.0	19.1 / 8x
	cl. 900 - 1500	159.0			28.4		171.3	81.0				95.25		24	165.1	25.4 / 8x
	cl. 150	127.0			15.9		158.8	82.6								
2"	cl. 300	155.0		52.5	19.0		161.9	90.5								
	cl. 400 - 600				22.4		165.3									
	cl. 900 - 1500	178.0			31.8		174.7	92.0								
2"	cl. 150	152.0		52.5	17.5		160.4	102.0								
	cl. 300				20.6		165.0									
	cl. 400 - 600	165.0			25.4		169.9	108.0								
2"	cl. 900 - 1500	216.0			38.1		182.52	124.0								

Dimensions table: EN 1092-1 B1 type



size	rating	D	d5	b	b1	d4	f	H	K	C1 / pcs	Weight
DN15	PN10-40	95.0	17.3	16.0	60.0	45.0	2.0	152.5	65.0	14.0 / 4x	7.9 kg
	PN63-100	105.0		20.0				58.0	156.5		
PN10-40	22.3		18.0	68.0		154.5			90.0		
PN63-100	130.0	21.7	22.0			158.5		85.0	14.0 / 4x		
DN20	PN10-40	115.0	28.5	18.0				68.0	154.5	100.0	
	PN63-100	140.0		24.0		110.0					
DN25	PN10-40	150.0	43.1	18.0		88.0	3.0	162.5	125.0	22.0 / 4x	8.5 kg
	PN63-100	170.0	42.5	26.0					156.5	18.0 / 4x	
DN40	PN10-40	165.0	54.5	20.0		102.0		162.5	135.0	22.0 / 4x	7.0 kg
	PN63	180.0	26.0	164.5					145.0	26.0 / 4x	7.9 kg
	PN100	195.0	53.9	28.0							

All dimensions in mm, weight in kg

Authorised Distributor:

**NATIONWIDE
OIL & GAS**

46, Jalan SS 22/21, Damansara Jaya,
47400 Petaling Jaya,
Selangor Darul Ehsan, Malaysia.

Email: nog@nog.com.my

Website: www.nog.com.my

DSS 7040 – 15th of July 2022

Change log

Date	Change

Holland – Romania – India – Thailand – Dubai – USA

To our knowledge, the information contained herein is accurate as of the date of this document. However neither Badotherm, nor its affiliates makes any warranty, express or limited, or accepts any liability in connection with this information or its use. This information is for technical skilled persons at their own discretion and risk and does not relate to the use of this product in combination with any other product. The user alone finally determines suitability of any information or material in contemplated use, the manner of use and whether any patents are infringed. This information gives typical properties only. Badotherm reserves the right to make changes to the specifications any materials without prior notice. The latest version of the datasheet can be found on www.badotherm.com.

© 2015 Badotherm, all rights reserved. Trademarks and/or other products referenced herein are either trademarks or registered trademarks of Badotherm.