

Flush accessory – Eccentric reducer flange

Design description

The eccentric reducer flange is the variant on the standard reducer flange. The biggest advantage is that the process media does not get trapped in the dead area of the flange. This allows a 100% drain of the assembly and thus a safe situation during removal of the diaphragm seal. The eccentric reducer flange solution is used when the process nozzle is too small for an accurate measurement. With this solution you can enlarge the process nozzle to the needed size, and include flush and purge ports to the flange as well. There are two different types; the centric and the eccentric reducer flange. The biggest advantage of the eccentric is that there no dead spaces in the reducer part. The draining of the set can be done completely.

Eccentric reducer flange materials

The eccentric reducer flange can be made in several materials. In the table below is a selection of materials.

Material		
tradename	UNS	Wst.
AISI 316(L)	S31603	1.4404
AISI 304L	S30400	1.4306
AISI 310 MoLn	S31050	1.4466
AISI 316 UG	S31600	1.4435
AISI 321	S32100	1.4541
AISI 904(L)	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
Duplex F44	S31254	1.4547
Duplex F51/F60	S32205	1.4462
Duplex F53	S32750	1.4410
Duplex F55	S32750	1.4410
Nickel 201	N02201	2.4068
Titanium Gr. 2	R50400	3.7035



Size, rating and facings - ASME B16.5

ASME B16.5			
Size	Rating	Facing	Roughness
1" to 4"	cl. 150 - cl. 2500	RF, LMF, FF, SGF	Ra 3.2-6.3 µm
		RJF, SFF	Ra <1.6 µm
		SMF, LTF, STF, LGF, LFF	Ra <3.2 µm

Size, rating and facings - EN 1092-1

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

Flush connections

Flush ports can be made in all kind of variations both threaded as weld connection.

Flush size (C3)	following standard
G 1/4", G 1/2", G 3/4"	ISO 228 thread (acc DIN 3852-2 / ISO 1179-4)
1/4", 1/2", 3/4" NPT	ASME B1.20.1
Butt weld 1/2" / 20mm	ASME B16.9 / EN 12627
Butt weld 3/4" / 28mm	
Socket weld 1/2"	ASME B16.11 / EN 12760
Socket weld 3/4"	

Material Certification

Material traceability and related certification are applicable for all process wetted parts. Material certification possibilities depend on the type of flange, 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 reducer 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 reducers 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.

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 eccentric reducer flange. 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 "A" in the tables refer to the start of the gasket surface.

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Socket weld 3/4"	

Assemblies

The eccentric reducer flanges are typical used for reducing the instrument connection to the process connection. The secondary purpose is vent or drain the process when installed under a pressure instrument like a pressure gauge or pressure transmitter. Venting the process can be made easy by installing a needle valve, extension pipe or welding neck flange to the eccentric reducer flange. These assemblies are common practice for Badotherm and can be welded, tested and assembled in advance.

Pressure testing

All assembled eccentric reducer flanges are pressure tested. The methods are described below.

Standard testing

In line with the EN 12266-1 each sealing point will be 100% tested with leak detection fluid under standard test pressure. The test medium is a gas. At leaking point, after application of the leak detection fluid, bubbles become visible. This bubble detection method can detect leak rates of approximately 1×10^{-3} mbar l/s. Assemblies with plugs or valves are leak tested by this method. During the leak test all fittings and welds are tested at 6 bar for 30 seconds after application of the leak detection fluid.

Optional test method

Additionally to the standard method the assemblies combined with plugs or valves can be tested at customer determined pressure values with a maximum of 150% of the MWP. The 6 bar of air in the standard method will be changed to the customer value of 150% of the MWP. Above 150 bar the test medium will be changed from gas to liquid.

Flange thickness

Thickness of the eccentric reducer flange is a complex set of rules. Next to the flange and thread standards the flush holes positions and FEM outcomes are taken into account as well. This combination leads to a variations in thickness. Main goal is a strong and durable product keeping the weight as low as possible.

Assemblies

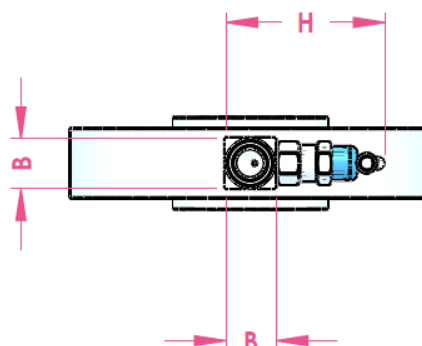
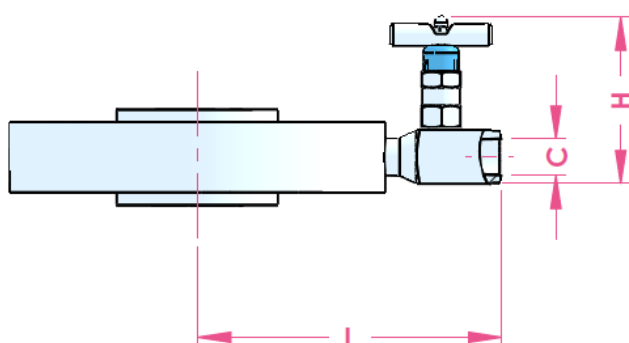
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Orientation

Mounting flush devices vertical or horizontal can results in difficulties in orientation. There are two main positions of the valve operating handle.

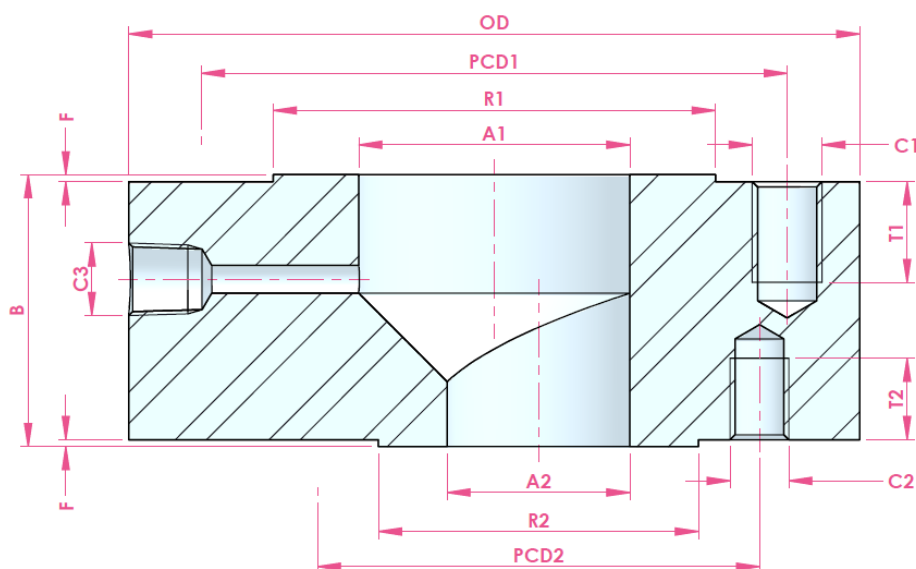
Position 1: this is the default position of the valve and most commonly used in vertical setup. This way the valve faces forward for easy operating.

Position 2: The valve handle are rotated 90° so the valve handles are facing forward in case of horizontal assembly.



size	rating	L	H	B	C
1" – 4"	cl. 150-2500	OD + 65.0	102.3	30.0	½" NPT
DN20 - DN100	PN10-PN400				

Dimensions table: ASME 16.5 RF facing



Proc.	Instr.	rating	B	F	OD	PCD1	PCD2	R1	R2	A1	A2	C1	T1	C2	T2
1/2"	2"	cl. 150	56.0	1.5	152.0	120.6	60.5	91.9	34.9	52.5	15.8	5/8" UNC / 4x	23.8	1/2" UNC / 4x	19.1
		cl. 300			165.0	127.0	66.7					5/8" UNC / 8x			
		cl. 400-600	63.0	6.4	216.0	165.1	82.6					7/8" UNC / 8x			
		cl. 900-1500	106.0		235.0	171.4	88.9					1" UNC / 8x			
		cl. 2500	115.0		152.0	120.6	79.2					5/8" UNC / 4x			
1"	2"	cl. 150	72.0	1.5	165.0	127.0	88.9	91.9	50.8	52.5	26.6	5/8" UNC / 8x	23.8	5/8" UNC / 4x	23.8
		cl. 300	79.0		216.0	165.1	88.9					7/8" UNC / 8x			
		cl. 400-600	106.0	6.4	235.0	171.4	108.0					1" UNC / 8x			
		cl. 900-1500	115.0		152.0	120.6	79.2					5/8" UNC / 4x			
		cl. 2500	126.0		210.0	168.1	66.7					3/4" UNC / 8x			
1/2"	3"	cl. 150	56.0	1.5	190.0	152.4	60.3	127.0	34.9	77.9	15.8	5/8" UNC / 4x	23.8	1/2" UNC / 4x	19.1
		cl. 300	72.0		210.0	168.1	66.7					3/4" UNC / 8x			
		cl. 400-600	90.0	6.4	241.0	190.5	82.6					7/8" UNC / 8x			
		cl. 900	100.0		267.0	203.2	88.9					1 1/8" UNC / 8x			
		cl. 1500	106.0		305.0	228.6	108.0					1 1/4" UNC / 8x			
1"	3"	cl. 150	56.0	1.5	190.0	152.4	79.2	127.0	50.8	77.9	26.6	5/8" UNC / 4x	23.8	1/2" UNC / 4x	19.1
		cl. 300	79.0		210.0	168.3	88.9					3/4" UNC / 8x			
		cl. 400-600	90.0	6.4	241.0	190.5	101.6					7/8" UNC / 8x			
		cl. 900	106.0		267.0	203.2	88.9					1 1/8" UNC / 8x			
		cl. 1500	120.0		305.0	228.6	108.0					1 1/4" UNC / 8x			
2"	3"	cl. 150	72.0	1.5	190.0	152.4	120.7	127.0	91.9	77.9	52.5	5/8" UNC / 8x	23.8	5/8" UNC / 4x	23.8
		cl. 300	79.0		210.0	168.3	127.0					3/4" UNC / 8x			
		cl. 400-600	90.0	6.4	241.0	190.5	165.1					7/8" UNC / 8x			
		cl. 900	106.0		267.0	203.2	88.9					1 1/8" UNC / 8x			
		cl. 1500	120.0		305.0	228.6	171.4					1 1/4" UNC / 8x			

All dimensions in mm

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Change log

Date	Change

Holland – Romania – India – Thailand – Dubai – USA

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