PRESSURE MEASURING

WITH FFD DIAPHRAGM



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Introduction

The FFD diaphragm is typically used in combination with (differential) pressure transmitters for level, flow and pressure measurement; in those applications where the diaphragm needs to be flush with the vessel wall or where insulation layers need to be passed. The EXT diaphragm is recommended when extended seals are required fully in touch with exotic materials and/or when special grade cover flanges are required for pressure/temperature ratings. The seal body is made of Bar stock or forged material. Its pressure rating is defined by the back-up flange and as such it can be used for pressure ratings determined by the licensor.



Size, rating and Facing

Flange & Diaphragm materials

The flange can be supplied in several materials. Some of the standard materials are:

Flanged Material	Diaphragm Material
AISI 316(L)	AISI 316L
	Alloy C276
	Tantalum
	Monel 400
	Inconel 625
AISI 304L or AISI 316(L)	AISI 316L
AISI 310 or AISI 316(L)	AISI 316L
AISI 321 or AISI 316(L)	AISI 316L
Alloy 625 or AISI 316(L)	Alloy 625
AISI 316(L)	Alloy 625
Alloy C-276 or AISI 316(L)	Alloy C-276
Duplex F51/F60 or AISI 316(L)	AISI 316L
Duplex F53 or AISI 316(L)	AISI 316L
AISI 316(L)	Nickel 200
	Monel 400
	Inconel 625
Titanium Gr. 2	Titanium Gr. 2

Flange size, rating

ASME B16.5		
Size	**Rating**	**Facing**
1" to 4" (DN20 to DN100)	cl. 150 - cl. 2500 (PN10-400)	RF, LMF, FF, SGF RJF, SFF SMF, LTF, STF, LGF, LFF

EN 1092-1 - 2018		
Size	**Rating**	**Type**
DN20 to DN100	PN10-400	A, B1, E, F
		B2, C, D, G, H

API ISO 10423 - 2010		
Size	**Rating**	**Facing**
1-13/16" to 3-1/16"	69 – 138 MPa	6BX – RJF
2-1/16" to 3-1/8"	13.8 – 34.5 MPa	6B-RJF

JIS B2220 – 2012		
Size	**Rating**	**Type**
DN25 to DN100	10-20K	RF

GOST 33259 - 2015		
Size	**Rating**	**Type**
DN20 to DN100	PN10-250	A, B, C, D E, F
		L, M
		J

Specification

Gold coatings

Several types of gold coating can be applied on the seals. The selection possibilities are:

- 25 µm chemical resistance
- 40 µm chemical resistance

Polymer coatings

Polymer coatings come in several types. The technical data on thickness and temperature limitation can be found in datasheet “polymer solutions” The applicable selection on BF seals are:

- PTFE coating
- Ceramic coating

Capillary tube and armor (protection)



The standard capillary tube 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). There are three options in ID of the capillary tube 1mm. Aramak capillary tubes are always protected against mechanical forces by armor. This doubled shielded armor consists with standard AISI 304, and optionally AISI 316. Additionally, the armor could be protected with a PVC sleeve in white, black, optionally with yellow to protect against dust and water ingress and possibly corrosive ambient atmosphere.

Cover Flange

The DFW 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, Aramak 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.

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), NACE conformity for ISO-15156 (MR-0175) and/or ISO-17945 (MR-0103), and many more.

Material limitations

Zirconium and Titanium versions of the FFD cannot be welded with stainless steel. This results in a screwed connection. For this occasion we developed a special connection based on the high pressure connections.

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.

Flush rings and flush flanges

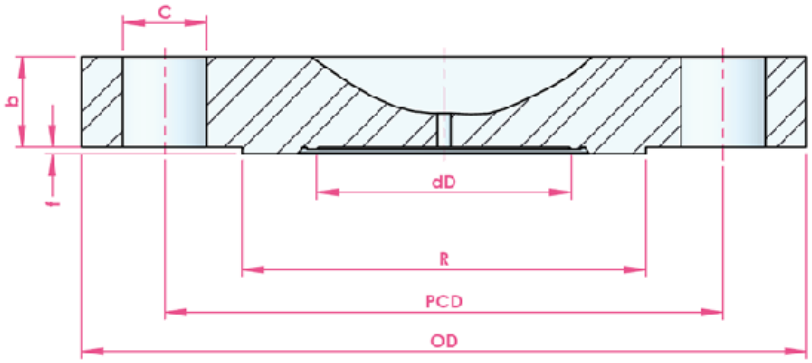
Aramak offers matching flush rings or flush flanges to their diaphragm seal on request; equipped with blind plugs, vent plug and or flushing / draining needle valves, which can be fitted or welded to the complete construction.

Cooling options

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

Dimensions table

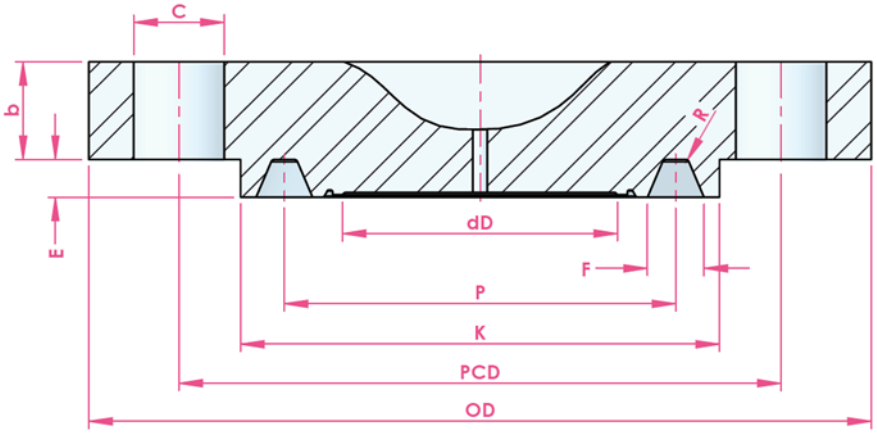
ASME 16.5 RF facing



size	rating	OD	b	PCD	C / pcs	dD	R	f
1"	cl. 150	108.0	12.7	79.2	15.9 / 4x	25	50.8	1.5
	cl. 300 cl. 400-600	124.0	15.7 17.5	88.9	19.1 / 4x			
	cl. 900-1500	149.0	28.4	101.6	25.4 / 4x			6.4
	cl. 2500	159.0	35.1	108.0				
1.25"	cl. 150	117.0	14.2	88.9	15.9 / 4x	35	63.5	1.5
	cl. 300 cl. 400-600	133.0	17.5 20.6	98.6	19.1 / 4x			
	cl. 900-1500	159.0	28.4	111.1	25.4 / 4x			6.4
	cl. 2500	184.0	38.1	130.0	28.6 / 4x			
1.5"	cl. 150	127.0	15.9	98.6	15.9 / 4x	45	73.0	1.5
	cl. 300 cl. 400-600	155.0	19.0 22.4	114.3	22.3 / 4x			
	cl. 900-1500	178.0	31.8	124.0	28.6 / 4x			6.4
	cl. 2500	203.0	44.4	146.0	31.8 / 4x			
2"	cl. 150	152.0	17.5	120.6	19.1 / 4x	54 45	92	1.5
	cl. 300 cl. 400-600	165.0	20.6 25.4	127.0	19.1 / 8x			
	cl. 900-1500	216.0	38.1	165.1	25.4 / 8x			6.4
	cl. 2500	235.0	50.8	171.4	28.6 / 8x			
3"	cl. 150	190.0	22.4	152.4	19.1 / 4x	75 89	127.0	1.5
	cl. 300 cl. 400-600	210.0	26.9 31.8	168.1	22.3 / 8x			
	cl. 900	241.0	38.1	190.5	25.4 / 8x			6.4
	cl. 1500	267.0	24.8	203.2	31.9 / 8x			
	cl. 2500	305.0	66.5	228.6	35.0 / 8x			
4"	cl. 150	229.0	22.4	190.5	19.1 / 8x		157	1.5
	cl. 300 cl. 400	254.0	30.2 35.1	200.2	22.3 / 8x 25.5 / 8x			
	cl. 600	273.0	38.1	215.9				
	cl. 900	292.0	44.5	235.0	31.8 / 8x			6.4
	cl. 1500	311.0	53.8	241.3	34.9 / 8x			
	cl. 2500	356.0	76.2	273.0	41.3 / 8x			

Dimensions table

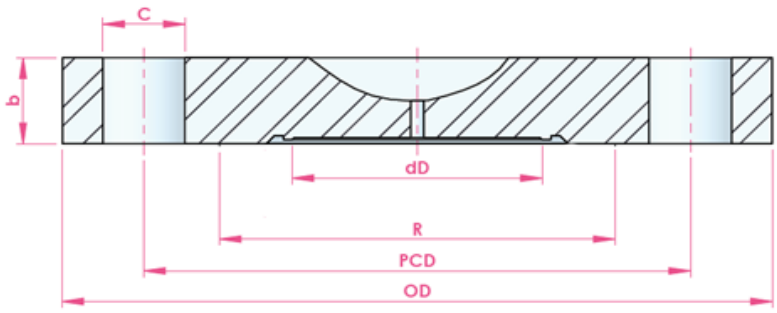
ASME 16.5 RJF facing



size	rating	OD	b	PCD	C/pcs	dD	K	E	F	P	R	Ring #
1"	cl. 150	108.0	12.7	79.2	15.9 / 4x	35	63.5	6.35	8.74	47.62	0.8	15
	cl. 300	124.0	15.7	88.9	19.1 / 4x		69.8			50.80		16
	cl. 400-600		17.5									
	cl. 900-1500	149.0	28.4	101.6	25.4 / 4x		71.4					
	cl. 2500	159.0	35.1	108.0	25.4 / 4x		82.6			60.33		18
1.25"	cl. 150	117.0	14.2	88.9	15.9 / 4x	45 54	73..2	7.92	11.91	57.15		17
	cl. 300	133.0	17.5	98.6	19.1 / 4x		79.2			60.33		18
	cl. 400-600		20.6									
	cl. 900-1500	159.0	28.4	111.1	25.4 / 4x		81.0					
	cl. 2500	184.0	38.1	130.0	28.6 / 4x		102.0			72.24		21
1.5"	cl. 150	127.0	15.9	98.6	15.9 / 4x		82.6			65.07		19
	cl. 300	155.0	19.0	114.3	22.3 / 4x		90.4	6.35	8.74	68.28		20
	cl. 400-600		22.4									
	cl. 900-1500	178.0	31.8	124.0	28.6 / 4x		91.9					
	cl. 2500	203.0	44.4	146.0	31.8 / 4x		114.0	7.92	11.91			23
2"	cl. 150	152.0	17.5	120.6	19.1 / 8x	54 60	102.0	6.35	8.74	82.55		22
	cl. 300	165.0	20.6	127.0	19.1 / 8x		108.0	7.92	11.91			23
	cl. 400-600		25.4									
	cl. 900-1500	216.0	38.1	165.1	25.4 / 8x		124.0			95.25		24
	cl. 2500	235.0	50.8	171.4	28.6 / 8x		133.0			101.60		26
3"	cl. 150	190.0	22.4	152.4	19.1 / 4x			6.35	8.74	114.30		29
	cl. 300	210.0	26.9	168.1	22.3 / 8x		146.0	7.92	11.91	123.82		31
	cl. 400-600		31.8									
	cl. 900	241.0	38.1	190.5	25.4 / 8x		156.0					
	cl. 1500	267.0	24.8	203.2	31.8 / 8x		168.0	9.522	13.49	136.52		35
	cl. 2500	305.0	66.5	228.6	34.9 / 8x					127.00		32
4"	cl. 150	229.0	22.4	190.5	19.1 / 8x	75 89	171.0	6.35	8.74		1.5	36
	cl. 300	254.0	30.2	200.2	22.3 / 8x		175.0	7.92	11.91	149.22	0.8	37
	cl. 400		35.1									
	cl. 600	273.0	38.1	215.9	25.4 / 8x							
	cl. 900	292.0	44.5	235.0	31.8 / 8x		181.0					
	cl. 1500	311.0	53.8	241.3	34.9 / 8x		194.0			161.92		39
	cl. 2500	356.0	76.2	273.0	41.3 / 8x		203.0	11.13	16.66	157.18	1.5	38

Dimensions table

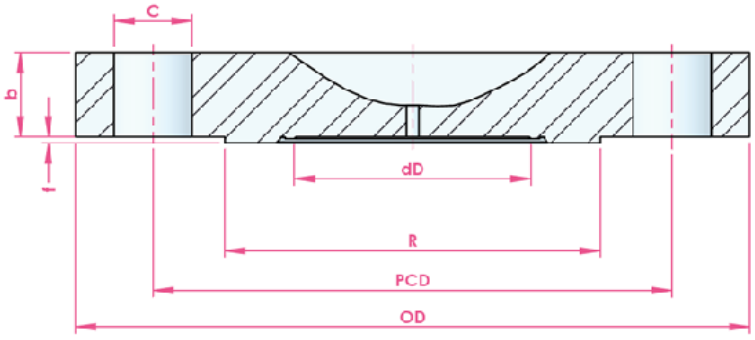
ASME 16.5 FF facing



size	rating	OD	b	PCD	C / pcs	dD	G	R+1	G
1"	cl. 150	108.0	12.7	79.2	15.9 / 4x	25	31.7	50.8	31.8
	cl. 300 cl. 400-600	124.0	15.7 17.5	88.9	19.1 / 4x				
	cl. 900-1500	149.0	28.4	101.6	25.4 / 4x				
	cl. 2500	159.0	35.1	108.0					
1.25"	cl. 150	117.0	14.2	88.9	15.9 / 4x	35	40.1	63.5	41.5
	cl. 300 cl. 400-600	133.0	17.5 20.6	98.6	19.1 / 4x				
	cl. 900-1500	159.0	28.4	111.1	25.4 / 4x				39.8
	cl. 2500	184.0	38.1	130.0	28.6 / 4x				
1.5"	cl. 150	127.0	15.9	98.6	15.9 / 4x	45	51.6	73.0	52.4
	cl. 300 cl. 400-600	155.0	19.0 22.4	114.3	22.3 / 4x				
	cl. 900-1500	178.0	31.8	124.0	28.6 / 4x	35	40.1		41.5
	cl. 2500	203.0	44.4	146.0	31.8 / 4x				
2"	cl. 150	152.0	17.5	120.6	19.1 / 4x	54 60	66.4	91.9	70.2
	cl. 300 cl. 400-600	165.0	20.6 25.4	127.0	19.1 / 8x				
	cl. 900-1500	216.0	38.1	165.1	25.4 / 8x	45 54	51.6		55.4
	cl. 2500	235.0	50.8	171.4	28.6 / 8x				
3"	cl. 150	190.0	22.4	152.4	19.1 / 4x	75 89	89.2	127.0	93.0
	cl. 300 cl. 400-600	210.0	26.9 31.8	168.1	22.3 / 8x				
	cl. 900	241.0	38.1	190.5	25.4 / 8x				
	cl. 1500	267.0	24.8	203.2	31.9 / 8x				
	cl. 2500	305.0	66.5	228.6	35.0 / 8x				
4"	cl. 150	229.0	22.4	190.5	19.1 / 8x				
	cl. 300	254.0	30.2	200.2	22.3 / 8x				
	cl. 400 cl. 600	273.0	35.1 38.1	215.9	25.5 / 8x			157.2	
	cl. 900	292.0	44.5	235.0	31.8 / 8x				
	cl. 1500	311.0	53.8	241.3	34.9 / 8x				
	cl. 2500	356.0	76.2	273.0	41.3 / 8x				

Dimensions table

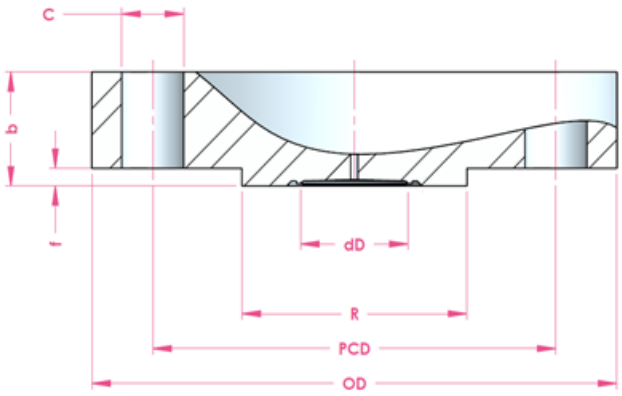
EN 1092-1 type B1/B2: Raised face



size	rating	OD	b	PCD	C / pcs	dD	R	f	G
DN25	PN10-40	115.0	18.0	85.0	14.0 / 4x	35	68.0	2.0	40.1
	PN63-100 PN160	140.0	24.0	100.0	18.0 / 4x				
	PN250	150.0	28.0	105.0	22.0 / 4x				
	PN320	160.0	34.0	115.0					
	PN400	180.0	38.0	130.0	26.0 / 4x				
DN40	PN10-40	150.0	18.0	110.0	18.0 / 4x	45 54	88.0		51.6
	PN63-100 PN160	170.0	26.0 28.0	125.0	22.0 / 4x				
	PN250	185.0	34.0	135.0	26.0 / 4x				
	PN320	195.0	38.0	145.0					
	PN400	220.0	48.0	165.0	30.0 / 4x				
DN50	PN10-40	165.0	20.0	125.0	18.0 / 4x	54 60	102.0	3.0	66.4
	PN63	180.0	26.0	135.0	22.0 / 4x				
	PN100 PN160	195.0	28.0 30.0	145.0	26.0 / 4x				
	PN250	200.0	38.0	150.0	26.0 / 8x				
	PN320	210.0	42.0	160.0					
	PN400	235.0	52.0	180.0	30.0 / 8x				
DN80	PN10-40	200.0	24.0	160.0	18.0 / 8x		138.0		
	PN63	215.0	28.0	170.0	22.0 / 8x				
	PN100 PN160	230.0 230.0	32.0 36.0	180.0	26.0 / 8x				
	PN250	255.0	46.0	200.0	30.0 / 8x				
	PN320	275.0	55.0	220.0					
	PN400	305.0	68.0	240.0	33.0 / 8x				
DN100	PN10-16	220.0	20.0	180.0	18.0 / 8x	75 89	158.0		89.2
	PN25-40	235.0	24.0	190.0	22.0 / 8x				
	PN63	250.0	30.0	200.0	26.0 / 8x				
	PN100 PN160	265.0	36.0 40.0	210.0	30.0 / 8x		162.0		
	PN250	300.0	54.0	235.0	33.0 / 8x				
	PN320	335.0	65.0	265.0	36.0 / 8x				
	PN400	370.0	80.0	295.0	39.0 / 8x				

Dimensions table

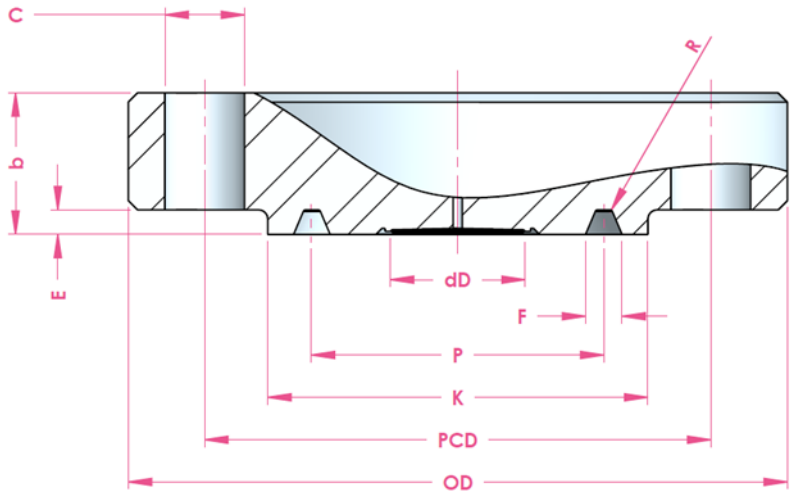
EN 1092-1 type E: Spigot



size	rating	OD	b	PCD	C / pcs	dD	R	f	G
DN25	PN10-40	115.0	18.0	85.0	14.0 / 4x	35.0	57.0	2.0	40.1
	PN63-100		24.0	100.0	18.0 / 4x				
	PN160								
	PN250	150.0	28.0	105.0	22.0 / 4x				
	PN320	160.0	34.0	115.0					
	PN400	180.0	38.0	130.0	26.0 / 4x				
DN40	PN10-40	150.0	18.0	110.0	18.0 / 4x	45.0 54.0	75.0	3.0	51.6
	PN63-100	170.0	26.0	125.0	22.0 / 4x				
	PN160		28.0						
	PN250	185.0	34.0	135.0	26.0 / 4x				
	PN320	195.0	38.0	145.0					
	PN400	220.0	48.0	165.0	30.0 / 4x				
DN50	PN10-40	165.0	20.0	125.0	18.0 / 4x	54.0 75.0	87.0		66.4
	PN63	180.0	26.0	135.0	22.0 / 4x				
	PN100	195.0	28.0	145.0	26.0 / 4x				
	PN160		30.0						
	PN250	200.0	38.0	150.0	26.0 / 8x				
	PN320	210.0	42.0	160.0					
	PN400	235.0	52.0	180.0	30.0 / 8x				
DN80	PN10-40	200.0	24.0	160.0	18.0 / 8x	75.0 90.0	120.0		89.2
	PN63	215.0	28.0	170.0	22.0 / 8x				
	PN100	230.0	32.0	180.0	26.0 / 8x				
	PN160	230.0	36.0						
	PN250	255.0	46.0	200.0	30.0 / 8x				
	PN320	275.0	55.0	220.0					
	PN400	305.0	68.0	240.0	33.0 / 8x				
DN100	PN10-16	220.0	20.0	180.0	18.0 / 8x		149.0		
	PN25-40	235.0	24.0	190.0	22.0 / 8x				
	PN63	250.0	30.0	200.0	26.0 / 8x				
	PN100	265.0	36.0	210.0	30.0 / 8x				
	PN160		40.0						
	PN250	300.0	54.0	235.0	33.0 / 8x				
	PN320	335.0	65.0	265.0	36.0 / 8x				
	PN400	370.0	80.0	295.0	39.0 / 8x				

Dimensions table

API 6A 10423 – Type 6B



size	rating	OD	b	PCD	C / pcs	dD	K	E	F	P	ring
2-1/16"	13.8MPa	165.0	33.4	127.0	20.0 / 8x	45	108.0		11.9	82.6	R or RX-23
	20.7MPa	215.0	46.1	165.1	26.0 / 8x		124.0			95.2	R or RX-24
	34.5MPa										
2-9/16"	13.8MPa	190.0	36.6	149.2	23.0 / 8x	54 60	127.0	7.9		101.6	R or RX-26
	20.7MPa	245.0	49.3	190.5	29.0 / 8x		137.0			107.9	R or RX-27
	34.5MPa	245.0	49.3	190.5							
3-1/8"	13.8MPa	210.0	39.7	168.3	23.0 / 8x	75 89	146.0			123.8	R or RX-31
	20.7Mpa	240.0	46.1	190.5	26.0 / 8x		156.0				
	34.5MPa	265.0	55.6	203.2	32.0 / 8x		168.0			136.5	R or RX-35

Ordering Code Information

Please check the order code in our website. (Click here)

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