BADOTHERM®

BRF type seal - flush diaphragm

Diaphragm Seal Type description

The BRF type is a flanged construction with the diaphragm flush in the process. The seal body is made of a blind flange and this design has the diaphragm sheet material covering the complete wetted parts. This design is typically used as a cost effective design with full wetted parts in exotic material compared to a full body in exotic material. BRF is typically used in combination with (differential) pressure transmitters for applications such as level, flow and (absolute) pressure measurement.



Related designs: FSO-BRF

Diaphragm in exotic materials

The unique feature of the BRF 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.

Flange 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 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	-				

Flange 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				
1" to 4" cl. 150 - cl. 2500		SMF	Ra <3.2 µm				

Flange size, rating and facings - EN 1092-1

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

Flange size, rating and facings – JIS B2220

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



Gold Coating

Due to its design, gold coating on the BRF 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, BRF 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 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.

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"

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

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 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

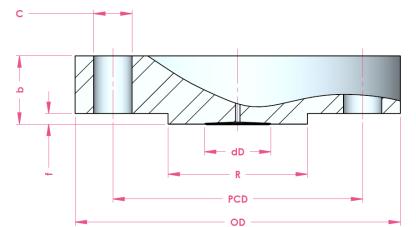
AP/GP	DP
17.5 bar	na
11 bar	1850 mbar
1575 mbar	255 mbar
415 mbar	70 mbar
155 mbar	30 mbar
110 mbar	20 mbar
	17.5 bar 11 bar 1575 mbar 415 mbar 155 mbar

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.

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Dimensions table: ASME 16.5 RF facing

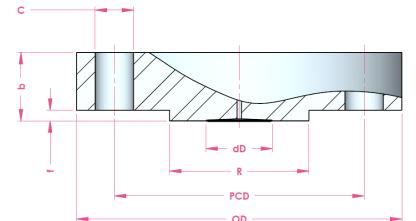


					00				
size	rating	OD	b	PCD	C / pcs	dD	R	f	weight
	cl. 150	110.0	14.7	79.4	15.9 / 4x			2.0	0.9 kg
	cl. 300	125.0	17.9	88.9 19.1 / 4x			2.0	1.4 kg	
1"	cl. 400-600	125.0	24.5	00.9	13.17 48	23.5	50.8		1.6 kg
	cl. 900-1500	150.0	35.6	101.6	25.4 / 4x			7.0	3.6 kg
	cl. 2500	160.0	42.0	108.0	20.4/48				5.0 kg
	cl. 150	115.0	17.9	88.9	15.9 / 4x			2.0	1.2 kg
	cl. 300	135.0	19.5	98.4	19.1 / 4x			2.0	1.8 kg
1.25"	cl. 400-600	155.0	27.7	30.4	13.17 47	32.0	63.5		2.2 kg
	cl. 900-1500	160.0	35.6	111.1	25.4 / 4x			7.0	4.1 kg
	cl. 2500	185.0	45.1	130.2	28.6 / 4x				7.4 kg
	cl. 150	125.0	17.9	98.4	15.9 / 4x			2.0	1.5 kg
1.5"	cl. 300	155.0	21.1	114.3	22.3 / 4x	44.0		2.0	2.7 kg
1.5	cl. 400-600	155.0	29.3	114.5	22.0/ 48		73.0		3.3 kg
	cl. 900-1500	180.0	38.8	123.8	28.6 / 4x	32.0		7.0	5.8 kg
	cl. 2500	205.0	51.5	146.0	31.8 / 4x	52.0			10.4kg
	cl. 150	150.0	19.5	120.7	19.1 / 4x			2.0	2.4 kg
2"	cl. 300	165.0	22.7	127.0	19.1 / 8x	57.0		2.0	3.2 kg
2	cl. 400-600		32.4				92.1	7.0	4.2 kg
	cl. 900-1500	215.0	45.1	165.1	25.4 / 8x	44.0		7.0	10.1 kg
	cl. 2500	235.0	57.9	171.4	28.6 / 8x	0			15.6 kg
	cl. 150	190.0	24.3	152.4	19.1 / 4x			2.0	4.9 kg
	cl. 300	210.0	29.0	168.3	22.3 / 8x			2.0	6.8 kg
3"	cl. 400-600		38.8			81.0	127.0		8.4 kg
	cl. 900	240.0	45.1	190.5	25.4 / 8x	0.110		7.0	13.1 kg
	cl. 1500	265.0	54.7	203.2	31.8 / 8x				19.1 kg
	cl. 2500	305.0	73.7	228.6	34.9 / 8x				34.8 kg
	cl. 150	230.0	24.3	190.5	19.1 / 8x			2.0	7.0 kg
	cl. 300	255.0	32.2	200.0	22.3 / 8x			2.0	11.5 kg
	cl. 400		42.0		25.4 / 8x				14.8 kg
4"	cl. 600	275.0	45.1	215.9		81.0	156.6		17.3 kg
	cl. 900	290.0	51.5	235.0	31.8 / 8x			7.0	26.9 kg
	cl. 1500	310.0	61.0	241.3	34.9 / 8x				29.9 kg
	cl. 2500	355.0	83.2	273.0	41.3 / 8x				53.9 kg

All dimensions in mm

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Dimensions table: EN 1092-1 B1 type

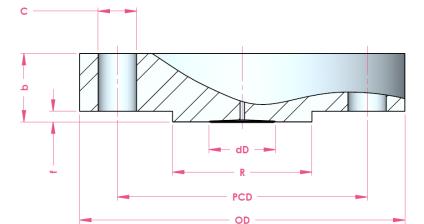


size rating OD b PCD C / pcs dD R f Weight DN20 PN10-40 105.0 18.0 75.0 14.0/4x 23.0 58.0 2.0 20. kg DN26 PN1640 115.0 18.0 85.0 14.0/4x 23.0 58.0 2.0 kg PN160 PN160 140.0 24.0 100.0 18.0/4x 32.0 68.0 2.0 36.kg PN160 160.0 34.0 115.0 22.0/4x 32.0 78.0 2.0 30.kg PN400 160.0 18.0 100.0 18.0/4x 32.0 78.0 2.0 30.kg PN400 150.0 24.0 110.0 18.0/4x 32.0 78.0 2.0 80.kg PN53 165.0 34.0 135.0 22.0/4x 84.0 86.0 67.kg PN450 185.0 34.0 135.0 26.0/4x 75.0 86.0 86.0 86.0		-				- OD				
DN20 PN63-100 130.0 22.0 90.0 18.0 / 4x 23.0 58.0 2.0 2.0 kg PN164 115.0 18.0 85.0 14.0 / 4x	size	rating	OD	b	PCD	C / pcs	dD	R	f	Weight
PN63-100 130.0 22.0 90.0 18.0 / 4x 20.8 g 20.8 g PN16-40 140.0 18.0 85.0 14.0 / 4x 32.0 68.0 2.5 kg 36.8 kg PN250 150.0 28.0 100.0 18.0 / 4x 32.0 68.0 2.0 H 3 36.8 kg PN320 160.0 38.0 130.0 22.0 / 4x 32.0 68.0 75.8 kg PN400 180.0 38.0 130.0 26.0 / 4x 32.0 78.0 2.0 H 3 30.8 kg PN164 140.0 18.0 100.0 18.0 / 4x 32.0 78.0 2.0 H 3 30.8 kg PN164 155.0 24.0 110.0 18.0 / 4x 44.0 44.0 kg 66.7 kg 67.8 kg 60.8 kg 67.8 kg		PN10-40	105.0	18.0	75.0	14.0 / 4x	22.0	FQ O	2.0	1.0 kg
PN63-100 H4.0.0 24.0 100.0 18.0/4x 32.0 68.0 2.5 kg 2.7 kg 36.8 kg <td>DNZU</td> <td>PN63-100</td> <td>130.0</td> <td>22.0</td> <td>90.0</td> <td>18.0 / 4x</td> <td>23.0</td> <td>56.0</td> <td>2.0</td> <td>2.0 kg</td>	DNZU	PN63-100	130.0	22.0	90.0	18.0 / 4x	23.0	56.0	2.0	2.0 kg
DN25 PN160 PN250 140.0 24.0 100.0 18.0 / 4x 32.0 68.0 2.0 36 kg 35 kg 36 kg		PN10-40	115.0	18.0	85.0	14.0 / 4x				1.0 kg
PN160 PN160 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 28.0 105.0 18.0 48.0 38.0 20.		PN63-100	140.0	24.0	100.0	10.0/44		<u> </u>	2.0	2.5 kg
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	DNOF	PN160	140.0	24.0	100.0	10.074X	22.0			2.7 kg
$ \begin{array}{ c c c c c c } \hline c c c c c c c c c c c c c c c c c c $	DINZO	PN250	150.0	28.0	105.0	22.0/4y	32.0	08.0	2.0	3.6 kg
$ \begin{array}{ c c c c c c } \hline PN10-40 & 140.0 & 18.0 & 100.0 & 18.0 / 4x \\ PN63-100 & 155.0 & 24.0 \\ PN10-40 & 150.0 & 18.0 & 110.0 & 22.0 / 4x \\ PN63-100 & 170.0 & 26.0 & 125.0 & 22.0 / 4x \\ PN320 & 195.0 & 34.0 & 135.0 \\ PN400 & 220.0 & 48.0 & 165.0 & 30.0 / 4x \\ PN400 & 220.0 & 48.0 & 165.0 & 30.0 / 4x \\ PN400 & 220.0 & 48.0 & 165.0 & 30.0 / 4x \\ PN10-40 & 165.0 & 20.0 & 125.0 & 18.0 / 4x \\ PN10-40 & 165.0 & 20.0 & 125.0 & 18.0 / 4x \\ PN10-40 & 165.0 & 20.0 & 125.0 & 18.0 / 4x \\ PN10-40 & 165.0 & 20.0 & 125.0 & 18.0 / 4x \\ PN10-40 & 195.0 & 28.0 & 145.0 & 26.0 / 4x \\ PN100 & 195.0 & 28.0 & 145.0 & 26.0 / 4x \\ PN100 & 195.0 & 28.0 & 145.0 & 26.0 / 4x \\ PN100 & 195.0 & 28.0 & 160.0 & 26.0 / 8x \\ PN320 & 210.0 & 42.0 & 160.0 & 18.0 / 8x \\ PN320 & 210.0 & 42.0 & 160.0 & 18.0 / 8x \\ PN400 & 235.0 & 52.0 & 180.0 & 30.0 / 8x \\ PN400 & 235.0 & 52.0 & 180.0 & 30.0 / 8x \\ PN10-40 & 215.0 & 24.0 & 160.0 & 18.0 / 8x \\ PN100 & 230.0 & 36.0 & 180.0 & 26.0 / 8x \\ PN100 & 230.0 & 36.0 & 180.0 & 26.0 / 8x \\ PN100 & 230.0 & 36.0 & 180.0 & 26.0 / 8x \\ PN100 & 230.0 & 36.0 & 180.0 & 26.0 / 8x \\ PN100 & 230.0 & 36.0 & 180.0 & 30.0 / 8x \\ PN100 & 230.0 & 36.0 & 180.0 & 30.0 / 8x \\ PN100 & 230.0 & 36.0 & 180.0 & 30.0 / 8x \\ PN320 & 275.0 & 55.0 & 220.0 & 30.0 / 8x \\ PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ PN400 & 255.0 & 26.0 & 20.0 & 26.0 / 8x \\ PN400 & 255.0 & 26.0 & 20.0 & 26.0 / 8x \\ PN400 & 255.0 & 26.0 & 20.0 & 26.0 / 8x \\ PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ PN400 & 255.0 & 26.0 & 20.0 & 26.0 / 8x \\ PN400 & 255.0 & 26.0 & 20.0 & 26.0 / 8x \\ PN400 & 255.0 & 26.0 & 20.0 & 26.0 / 8x \\ PN400 & 255.0 & 26.0 & 20.0 & 26.0 / 8x \\ PN400 & 255.0 & 26.0 & 26.0 / 8x \\ PN400 & 255.0 & 26.0 & 25.0 & 35.0 / 81.0 \\ PN400 & 255.0 & 26.0 & 25.0 & 35.0 / 81.0 \\ PN400 & 255.0 & 26.0 & 25.0 & 35.0 / 81.0 \\ PN400 & 255.0 & 26.0 & 25.0 & 35.0 / 81.0 \\ PN400 & 255.0 & 26.0 & 25.0 & 35.0 / 81.0 \\ PN400 & 255.0 & 26.0 & $		PN320	160.0	34.0	115.0	22.074X				5.2 kg
DN32 PN63-100 155.0 24.0 110.0 22.0 / 4x 32.0 78.0 2.0 30.kg PN63-100 PN00 150.0 18.0 110.0 18.0 / 4x 4.0 kg 6.7 kg 88.0 6.7 kg 87.7 kg 87.0 kg 6.0 kg		PN400	180.0	38.0	130.0	26.0 / 4x				7.5 kg
PN63-100 155.0 24.0 110.0 22.0 / 4x 18.0 3.0 kg 3.0 kg PN10-40 150.0 18.0 18.0 18.0 / 4x 18.0 / 4x 20.0 kg 4.0 kg 4.0 kg 4.0 kg 4.0 kg 6.7 kg 8.7 kg <td></td> <td>PN10-40</td> <td>140.0</td> <td>18.0</td> <td>100.0</td> <td>18.0 / 4x</td> <td>22.0</td> <td>79.0</td> <td>2.0</td> <td>2.0 kg</td>		PN10-40	140.0	18.0	100.0	18.0 / 4x	22.0	79.0	2.0	2.0 kg
PN10-40 150.0 18.0 18.0/4x 20.0/4x 40.0 40.0g PN63-100 170.0 26.0 125.0 22.0/4x 44.0 44.0g 6.7 kg PN320 195.0 38.0 145.0 26.0/4x 44.0 6.7 kg 88.0 88.0 14.1 kg PN400 220.0 48.0 165.0 30.0/4x 7.00	DNSZ	PN63-100	155.0	24.0	110.0	22.0 / 4x	32.0	70.0	2.0	3.0 kg
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		PN10-40	150.0	18.0	110.0	18.0 / 4x				2.0 kg
$ \begin{array}{ c c c c c c c } \hline PN460 & 28.0 & 28.0 & 26.0 & 4x & 44.0 \\ \hline PN250 & 185.0 & 34.0 & 135.0 & 26.0 & 4x & 44.0 & 88.0 & 3.0 & 44.4 & 67 & 67 & 49 \\ \hline PN400 & 220.0 & 48.0 & 165.0 & 30.0 & 4x & 44.0 & 67 & 44.0 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 67 & 43 & 43 & 43 & 43 & 43 & 43 & 43 & 4$		PN63-100	170.0	26.0	125.0	22.0/4x				4.0 kg
$ \begin{array}{ c c c c c c c } \hline P 250 & 185.0 & 34.0 & 135.0 \\ P 320 & 195.0 & 38.0 & 145.0 \\ P 320 & 195.0 & 38.0 & 145.0 \\ P 320 & 220.0 & 48.0 & 165.0 & 30.0 / 4x \\ P 353 & 180.0 & 26.0 & 135.0 & 22.0 / 4x \\ P 353 & 180.0 & 26.0 & 135.0 & 22.0 / 4x \\ P 100 & 195.0 & 28.0 & 145.0 & 26.0 / 4x \\ P 320 & 210.0 & 42.0 & 160.0 & 26.0 / 8x \\ P 320 & 210.0 & 42.0 & 160.0 & 26.0 / 8x \\ P 320 & 210.0 & 42.0 & 160.0 & 18.0 / 8x \\ P 320 & 210.0 & 42.0 & 160.0 & 18.0 / 8x \\ P 320 & 210.0 & 42.0 & 160.0 & 18.0 / 8x \\ P 320 & 210.0 & 215.0 & 28.0 & 170.0 & 22.0 / 8x \\ P 320 & 210.0 & 32.0 & 32.0 & 180.0 & 30.0 / 8x \\ P 320 & 215.0 & 28.0 & 170.0 & 22.0 / 8x \\ P 320 & 25.0 & 46.0 & 200.0 & 30.0 / 8x \\ P 320 & 25.0 & 46.0 & 200.0 & 30.0 / 8x \\ P 320 & 25.0 & 46.0 & 200.0 & 30.0 / 8x \\ P 320 & 25.0 & 46.0 & 200.0 & 30.0 / 8x \\ P 320 & 25.0 & 46.0 & 200.0 & 30.0 / 8x \\ P 320 & 25.0 & 46.0 & 200.0 & 30.0 / 8x \\ P 320 & 25.0 & 46.0 & 200.0 & 30.0 / 8x \\ P 320 & 25.0 & 46.0 & 200.0 & 30.0 / 8x \\ P 320 & 25.0 & 30.0 & 68.0 & 240.0 & 33.0 / 8x \\ P 320 & 25.0 & 30.0 & 26.0 / 8x \\ P 320 & 25.0 & 30.0 & 20.0 & 26.0 / 8x \\ P 320 & 25.0 & 30.0 & 20.0 & 26.0 / 8x \\ P 320 & 25.0 & 30.0 & 20.0 & 26.0 / 8x \\ P 320 & 25.0 & 30.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 54.0 & 235.0 & 33.0 / 8x \\ P 320 & 35.0 & 55.0 & 225.0 & 35.0 / 25.0 & 35.0 / 25.0 & 35.0 / 25.0 / 35.0 / $		PN160	170.0	28.0	125.0	22.0/4X	44.0	00 0	3.0	4.4 kg
$ \begin{array}{ c c c c c c } \hline PN320 & 195.0 & 38.0 & 145.0 \\ \hline PN400 & 220.0 & 48.0 & 165.0 & 30.0 / 4x \\ \hline PN400 & 165.0 & 20.0 & 125.0 & 18.0 / 4x \\ \hline PN10-40 & 165.0 & 20.0 & 125.0 & 18.0 / 4x \\ \hline PN63 & 180.0 & 26.0 & 135.0 & 22.0 / 4x \\ \hline PN100 & 195.0 & 28.0 & 145.0 & 26.0 / 4x \\ \hline PN250 & 200.0 & 38.0 & 150.0 \\ PN320 & 210.0 & 42.0 & 160.0 & 26.0 / 8x \\ \hline PN400 & 235.0 & 52.0 & 180.0 & 30.0 / 8x \\ \hline PN63 & 125.0 & 24.0 & 160.0 & 26.0 / 8x \\ \hline PN400 & 235.0 & 52.0 & 180.0 & 30.0 / 8x \\ \hline PN63 & 215.0 & 28.0 & 170.0 & 22.0 / 8x \\ \hline PN100 & 230.0 & 32.0 & 28.0 & 170.0 & 22.0 / 8x \\ \hline PN160 & 230.0 & 36.0 & 180.0 & 26.0 / 8x \\ \hline PN160 & 230.0 & 36.0 & 180.0 & 30.0 / 8x \\ \hline PN160 & 230.0 & 36.0 & 180.0 & 30.0 / 8x \\ \hline PN160 & 230.0 & 36.0 & 200.0 & 30.0 / 8x \\ \hline PN160 & 230.0 & 36.0 & 200.0 & 30.0 / 8x \\ \hline PN160 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN100 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN100 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN100 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN100 & 305.0 & 68.0 & 240.0 & 30.0 / 8x \\ \hline PN100 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN100 & 255.0 & 30.0 & 20.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 25.0 & 30.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 255.0 & 36.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 265.0 & 36.0 / 8x$	DIN40	PN250	185.0	34.0	135.0	26.0/47	44.0	00.0		6.7 kg
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		PN320	195.0	38.0	145.0	20.074X				8.7 kg
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		PN400	220.0	48.0	165.0	30.0 / 4x				14.1 kg
$ \begin{array}{ c c c c c } \hline PN100 & 195.0 & 28.0 \\ \hline PN160 & 195.0 & 30.0 & 145.0 \\ \hline PN250 & 200.0 & 38.0 & 150.0 \\ \hline PN250 & 201.0 & 42.0 & 160.0 & 26.0 / 8x \\ \hline PN320 & 210.0 & 42.0 & 160.0 & 26.0 / 8x \\ \hline PN400 & 235.0 & 52.0 & 180.0 & 30.0 / 8x \\ \hline PN400 & 235.0 & 52.0 & 180.0 & 30.0 / 8x \\ \hline PN10 & 215.0 & 24.0 & 160.0 & 18.0 / 8x \\ \hline PN100 & 230.0 & 32.0 & 180.0 & 22.0 / 8x \\ \hline PN100 & 230.0 & 32.0 & 180.0 & 26.0 / 8x \\ \hline PN100 & 230.0 & 32.0 & 180.0 & 26.0 / 8x \\ \hline PN100 & 230.0 & 32.0 & 180.0 & 22.0 / 8x \\ \hline PN100 & 230.0 & 36.0 & 180.0 & 26.0 / 8x \\ \hline PN250 & 255.0 & 46.0 & 200.0 & \\ \hline PN250 & 255.0 & 46.0 & 200.0 & \\ \hline PN250 & 255.0 & 46.0 & 200.0 & \\ \hline PN320 & 275.0 & 55.0 & 220.0 & \\ \hline PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN25-40 & 235.0 & 24.0 & 190.0 & 22.0 / 8x \\ \hline PN63 & 250.0 & 30.0 & 200.0 & 26.0 / 8x \\ \hline PN63 & 250.0 & 30.0 & 200.0 & 26.0 / 8x \\ \hline PN100 & 265.0 & 36.0 & 200.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 36.0 & 200.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 200.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 235.0 & 33.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 235.0 & 33.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 33.0 / 8x \\ \hline PN250 & 300.0 & 54.0 & 235.0 & 36.0 / 8x $		PN10-40	165.0	20.0	125.0	18.0 / 4x				3.0 kg
$ \begin{array}{ c c c c c c c } \hline \text{PN160} & 195.0 & 30.0 & 145.0 & 26.0 / 4x & 57.0 & 102.0 & 3.0 & 6.4 \text{kg} \\ \hline \text{PN250} & 200.0 & 38.0 & 150.0 & 26.0 / 8x & 57.0 & 102.0 & 3.0 & 6.4 \text{kg} \\ \hline \text{PN250} & 210.0 & 42.0 & 160.0 & 26.0 / 8x & 10.7 \text{kg} \\ \hline \text{PN320} & 210.0 & 42.0 & 160.0 & 18.0 / 8x & 16.7 \text{kg} \\ \hline \text{PN400} & 235.0 & 52.0 & 180.0 & 30.0 / 8x & 16.7 \text{kg} \\ \hline \text{PN63} & 215.0 & 215.0 & 28.0 & 170.0 & 22.0 / 8x & 180.0 & 30.0 / 8x & 10.3 \text{kg} \\ \hline \text{PN100} & 230.0 & 32.0 & 180.0 & 26.0 / 8x & 138.0 & 3.0 & 10.3 \text{kg} \\ \hline \text{PN100} & 230.0 & 32.0 & 180.0 & 20.0 & 30.0 / 8x & 158.0 & 25.4 \text{kg} \\ \hline \text{PN250} & 255.0 & 46.0 & 200.0 & 30.0 / 8x & 158.0 & 165. \text{kg} \\ \hline \text{PN320} & 275.0 & 55.0 & 220.0 & 30.0 / 8x & 158.0 & 165. \text{kg} \\ \hline \text{PN400} & 305.0 & 68.0 & 240.0 & 33.0 / 8x & 158.0 & 3.4 \text{kg} \\ \hline \text{PN2540} & 235.0 & 24.0 & 190.0 & 22.0 / 8x & 158.0 & 4.5 \text{kg} \\ \hline \text{PN63} & 250.0 & 30.0 & 200.0 & 26.0 / 8x & 158.0 & 4.5 \text{kg} \\ \hline \text{PN100} & 265.0 & 36.0 & 200.0 & 26.0 / 8x & 158.0 & 4.5 \text{kg} \\ \hline \text{PN160} & 265.0 & 30.0 & 200.0 & 26.0 / 8x & 158.0 & 130.0 \text{kg} \\ \hline \text{PN250} & 300.0 & 54.0 & 235.0 & 33.0 / 8x & 162.0 & 162.0 & 3.0 & 130.0 \text{kg} \\ \hline \text{PN250} & 300.0 & 54.0 & 235.0 & 33.0 / 8x & 162.0 & 162.0 & 3.0 & 162.0 $		PN63	180.0	26.0	135.0	22.0 / 4x				4.5 kg
DN50 PN160 Control 30.0 Control 57.0 102.0 3.0 6.4 kg 8.2 kg 8.2 kg 8.2 kg 107. kg		PN100	105.0	28.0	145.0	26.0/42				6.0 kg
$ \begin{array}{ c c c c c c } \hline PN320 & 210.0 & 42.0 & 160.0 & 26.0 / 8x \\ \hline PN400 & 235.0 & 52.0 & 180.0 & 30.0 / 8x \\ \hline PN400 & 235.0 & 52.0 & 180.0 & 30.0 / 8x \\ \hline PN10-40 & 215.0 & 215.0 & 28.0 & 170.0 & 22.0 / 8x \\ \hline PN100 & 230.0 & 32.0 & 180.0 & 20.0 / 8x \\ \hline PN100 & 230.0 & 36.0 & 180.0 & 20.0 / 8x \\ \hline PN250 & 255.0 & 46.0 & 200.0 & 30.0 / 8x \\ \hline PN320 & 275.0 & 55.0 & 220.0 & 30.0 / 8x \\ \hline PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN400 & 305.0 & 68.0 & 240.0 & 33.0 / 8x \\ \hline PN10-16 & 220.0 & 20.0 & 180.0 & 18.0 / 8x \\ \hline PN25-40 & 235.0 & 24.0 & 190.0 & 22.0 / 8x \\ \hline PN63 & 250.0 & 30.0 & 200.0 & 26.0 / 8x \\ \hline PN63 & 250.0 & 30.0 & 200.0 & 26.0 / 8x \\ \hline PN100 & 265.0 & 36.0 & 200.0 & 26.0 / 8x \\ \hline PN100 & 265.0 & 30.0 & 200.0 & 26.0 / 8x \\ \hline PN160 & 205.0 & 30.0 & 200.0 & 26.0 / 8x \\ \hline PN160 & 205.0 & 30.0 & 200.0 & 26.0 / 8x \\ \hline PN160 & 265.0 & 30.0 & 235.0 & 33.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 335.0 & 65.0 & 265.0 & 36.0 / 8x \\ \hline PN320 & 200$	DN50	PN160	195.0	30.0	145.0	20.074X	57.0	102.0	3.0	6.4 kg
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		PN250	200.0	38.0	150.0	26.0/97				8.2 kg
PN10-40 PN63 215.0 24.0 160.0 18.0/8x 5.0 kg 5.0 kg 6.5 kg 9.0		PN320	210.0	42.0	160.0	20.07 0X				10.7 kg
PN63 215.0 28.0 170.0 22.0 / 8x 5.5 kg 9.0 kg <td></td> <td>PN400</td> <td>235.0</td> <td>52.0</td> <td>180.0</td> <td>30.0 / 8x</td> <td></td> <td></td> <td></td> <td>16.7 kg</td>		PN400	235.0	52.0	180.0	30.0 / 8x				16.7 kg
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		PN10-40	215.0	24.0	160.0	18.0 / 8x				5.0 kg
DN80 PN160 230.0 36.0 180.0 26.0 / 8x 81.0 138.0 3.0 10.3 kg PN250 255.0 46.0 200.0 30.0 / 8x 138.0 3.0 10.3 kg PN320 275.0 55.0 220.0 30.0 / 8x 165.5 kg 254 kg PN400 305.0 68.0 240.0 33.0 / 8x 158.0 45.5 kg PN400 305.0 28.0 180.0 180.0 / 8x 158.0 45.5 kg PN52-40 235.0 24.0 190.0 22.0 / 8x 9.0 kg 9.0 kg PN63 250.0 30.0 200.0 26.0 / 8x 9.0 kg 130.0 kg 130.0 kg PN100 265.0 36.0 210.0 30.0 / 8x 81.0 162.0 3.0 153.8 kg PN250 300.0 54.0 235.0 33.0 / 8x 81.0 162.0 3.0 153.8 kg PN320 335.0 65.0 265.0 36.0 / 8x 81.0 162.0		PN63	215.0	28.0	170.0	22.0 / 8x				6.5 kg
DN80 PN160 230.0 36.0		PN100	230.0	32.0	190.0	26.0/87				9.0 kg
PN320 275.0 55.0 220.0 30.0 / 8x 25.4 kg 38.4 kg 30.4 kg 30.6 kg 30.0	DN80	PN160	230.0	36.0	100.0	20.07 0X	81.0	138.0	3.0	10.3 kg
PN320 275.0 55.0 220.0 PN400 305.0 68.0 240.0 33.0 / 8x 38.4 kg 38.4 kg 38.4 kg 38.4 kg 38.4 kg 38.4 kg 56.0 25.0 g 20.0 g 158.0 4.5 kg 6.5 kg 9.0 kg 6.5 kg 9.0 kg		PN250	255.0	46.0	200.0	20.0/87				16.5 kg
PN10-16 220.0 20.0 180.0 18.0/8x 158.0 4.5 kg PN25-40 235.0 24.0 190.0 22.0/8x 5.0 kg 9.0 kg PN63 250.0 30.0 200.0 26.0/8x 9.0 kg 13.0 kg PN100 265.0 40.0 210.0 30.0/8x 81.0 162.0 3.0 15.3 kg PN250 300.0 54.0 235.0 33.0/8x 162.0 162.0 15.3 kg PN320 335.0 65.0 265.0 36.0/8x 162.0 162.0 15.3 kg		PN320	275.0	55.0	220.0	30.07 ox				25.4 kg
PN25-40 235.0 24.0 190.0 22.0 / 8x 5.5 kg 9.0 kg 13.0 kg 13.0 kg 13.0 kg 13.0 kg 13.0 kg 15.3 kg 27.2 kg 42.5 kg <td></td> <td>PN400</td> <td>305.0</td> <td>68.0</td> <td>240.0</td> <td>33.0 / 8x</td> <td></td> <td></td> <td></td> <td>38.4 kg</td>		PN400	305.0	68.0	240.0	33.0 / 8x				38.4 kg
PN63 250.0 30.0 200.0 26.0 / 8x 9.0 kg 13.0 kg PN100 265.0 36.0 210.0 30.0 / 8x 81.0 162.0 13.0 kg PN250 300.0 54.0 235.0 33.0 / 8x 81.0 162.0 27.2 kg PN320 335.0 65.0 265.0 36.0 / 8x 42.5 kg		PN10-16	220.0	20.0	180.0	18.0 / 8x		158.0		4.5 kg
PN100 265.0 36.0 210.0 30.0 / 8x 81.0 162.0 13.0 kg PN160 200.0 54.0 235.0 33.0 / 8x 162.0 162.0 15.3 kg PN320 335.0 65.0 265.0 36.0 / 8x 162.0 140.0		PN25-40	235.0	24.0	190.0	22.0 / 8x				6.5 kg
DN100 PN160 265.0 40.0 210.0 30.0 / 8x 81.0 162.0 3.0 15.3 kg PN250 300.0 54.0 235.0 33.0 / 8x 162.0 15.3 kg 27.2 kg PN320 335.0 65.0 265.0 36.0 / 8x 42.5 kg 42.5 kg		PN63	250.0	30.0	200.0	26.0 / 8x				9.0 kg
PN160 40.0 162.0 15.3 kg PN250 300.0 54.0 235.0 33.0 / 8x 27.2 kg PN320 335.0 65.0 265.0 36.0 / 8x 42.5 kg	DN100	PN100	265.0	36.0	210.0	20.0/97	91.0		2.0	13.0 kg
PN320 335.0 65.0 265.0 36.0 / 8x 42.5 kg	DIVIOU	PN160	205.0	40.0	210.0	30.07 8X	81.0	162.0	3.0	15.3 kg
		PN250	300.0	54.0	235.0	33.0 / 8x				27.2 kg
PN400 370.0 80.0 295.0 39.0 / 8x 67.3 kg		PN320	335.0	65.0	265.0	36.0 / 8x				42.5 kg
		PN400	370.0	80.0	295.0	39.0 / 8x				67.3 kg

All dimensions in mm



Dimensions table: JIS 2220 RF



Size	rating	OD	dD	b	PCD	Cb / pcs	R	f	Weight
	10K 25 16K 125.0 20K		32.0	15.0	15.0 90.0			1.0	1.2 kg
25		125.0		15.0			67.0	1.0	1.3 kg
				17.0				1.0	1.4 kg
	10K			18.0				2.0	1.7 kg
32	16K	135.0	44.0	10.0	100.0	19.0 / 4x	76.0	2.0	1.7 kg
	20K			20.0		19.074X		2.0	1.7 kg
	10K		44.0	18.0				2.0	1.8 kg
40	16K	K 140.0		10.0	105.0		81.0	2.0	1.8 kg
	20K			20.0				2.0	1.9 kg
	10K		57.0	18.0 120. 20.0		19.0 / 8x	96.0	2.0	2.2 kg
50	16K	155.0			120.0			2.0	2.2 kg
	20K							2.0	2.2 kg
	10K	185.0		20.0	150.0		126.0	2.0	3.5 kg
80	16K	200.0		22.0		23.0 / 8x	132.0	2.0	4.4 kg
	20K	200.0		24.0	160.0	23.0/ 0X	132.0	2.0	4.6 kg
	10K	195.0		20.0		19.0 / 8x	136.0	2.0	3.9 kg
90	16K		81.0	22.0	170.0	23.0 / 8x	145.0	2.0	4.9 kg
	20K	210.0		26.0	170.0	23.0 / 8X	145.0	2.0	5.7 kg
	10K			20.0	175.0	19.0 / 8x	151.0	2.0	4.6 kg
100	16K	225.0		24.0	105.0	22.0 / 84	100.0	2.0	6.3 kg
	20K	225.0		26.0 185.0 23.0/	23.0 / 8x	160.0	2.0	6.6 kg	

20K All dimensions in mm



DSS 7002.02 February 19

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