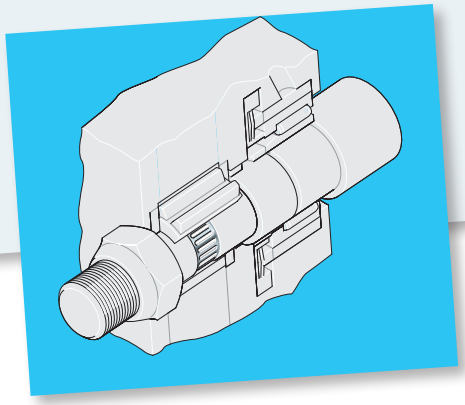
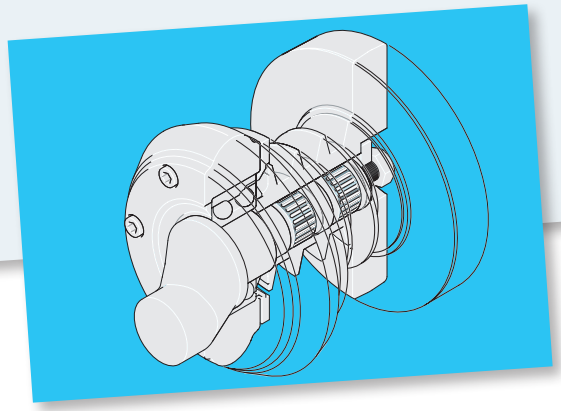
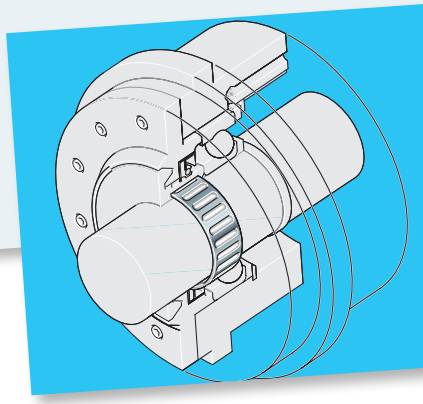
rexroth
A Bosch Company

Tolerance rings







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Tolerance Rings

Product Overview

Tolerance rings are made of hard, embossed spring steel strip and belong to the class of frictionally engaging fasteners. Tolerance rings were designed for especially easy, low-cost fastening of machine parts. They replace complex contour-locking keyways or pinned, wedged and threaded connections and eliminate the need for expensive machining.

Weitere Highlights

- Rapid, cost-saving assembly
- Rigid and secure fastening of machine parts
- Elastic seating for small rolling bearings (Series 0801)
- Compensation of different thermal expansion rates between machine parts made of different materials
- Special sizes on request
- Particularly inexpensive machine element
- Simple design of mating parts
- Resistant to a number of chemical substances
- Wide machining tolerances for parts to be joined
- High temperature resistance
- No need for keyways or other contour-locking joints

Please contact us for samples.

Series R0810 (AN)
The flat edges are at the outer diameter of the tolerance ring. For use with a standard nominal shaft.

Series R0820 (BN)
The flat edges are at the inner diameter of the tolerance ring. For use with a standard nominal bore.

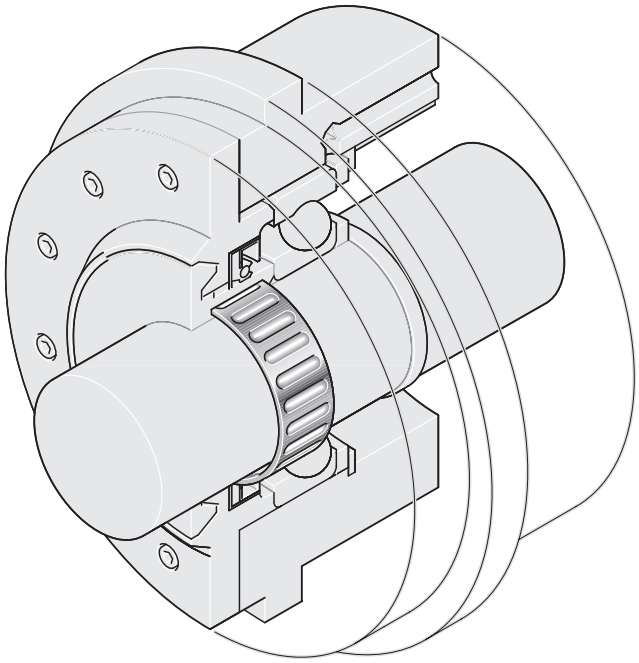
Series R0801 (ANL)
This curved type is specifically designed for mounting small bearings.

Series R0804 (ANS)
This type has a slanting edge and is used for mounting larger rolling bearings, especially in light metal housings.

Application Examples

Tolerance rings for fastening of machine parts without defined force transmission

In many applications there are no defined forces to be transmitted between the parts to be joined. What is generally required in such cases is a fixing device for such simple machine parts as handles, ball knobs, labyrinth rings or bushings.
When Rexroth tolerance rings are used to fasten ball knobs to connecting rods, for example, they eliminate the need for the usual thread on the rod and in the ball knob. Unlike threaded connections, joints made with Rexroth tolerance rings will never loosen.

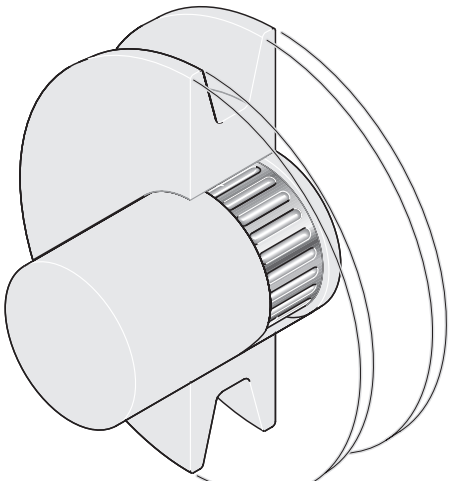


Fastening of a labyrinth ring on a shaft using a Rexroth tolerance ring

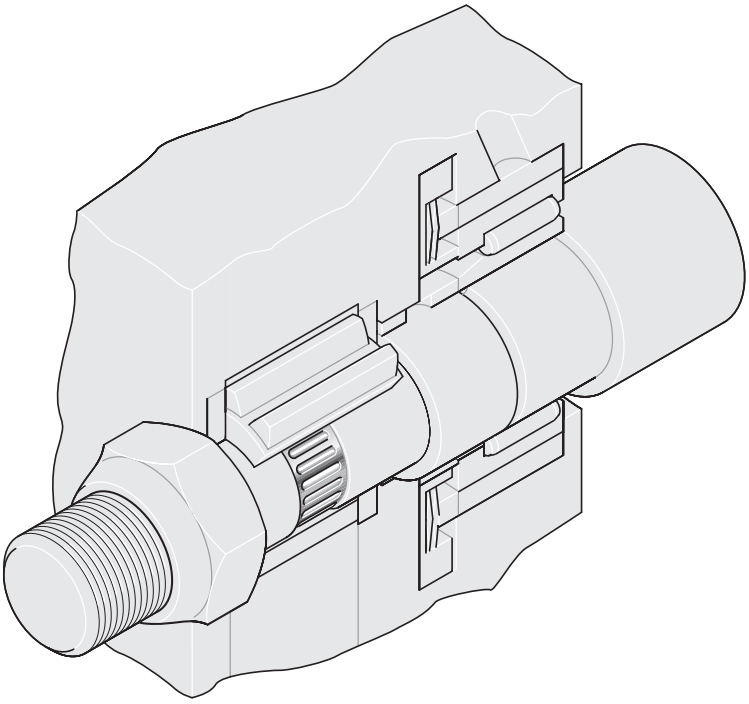
Tolerance rings for fastening of machine parts to transmit torque

The fastening of belt pulleys, flywheels or fan rotors involves transmission of defined axial or circumferential forces.

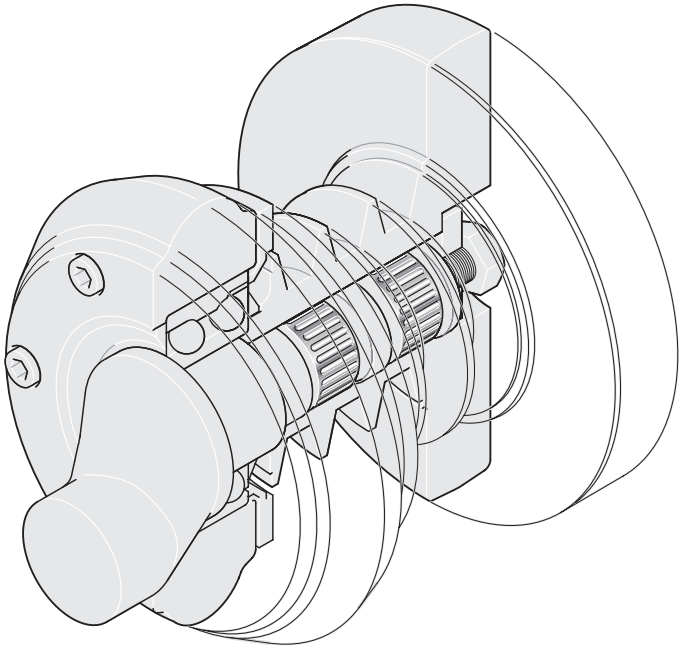
The assembly forces and transmittable torque depend very much on the design and finish of the parts to be joined and can differ greatly in practice from the values given in the tables.



Fastening of a V-belt pulley on a shaft (instead of a contour-locking joint with keyway).



Pinion fastening with Rexroth tolerance ring in turbomolecular pumps.



Tandem mounting of Rexroth tolerance rings in a mowing machine drive.

General

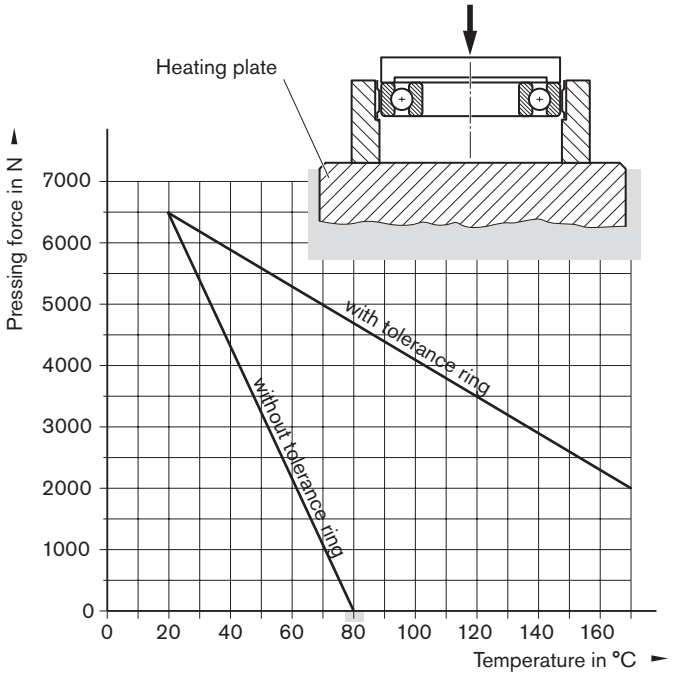
Materials

Top-quality spring steel strip made from
carbon steel or stainless steel (austenitic)

Temperature resistance

Tolerance rings made from carbon steel
up to 200°C continuous; brief peaks up to 250°C
(no deterioration of spring qualities).

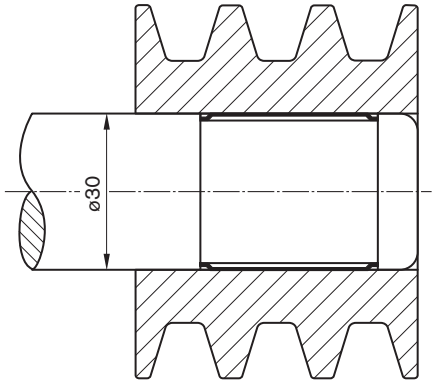
Tolerance rings made from stainless steel
up to 250°C continuous; brief peaks up to 300°C
(no deterioration of spring qualities).



The graph shows the mounting of rolling bearings of 200 mm diameter at a temperature of 20°C with and without a tolerance ring. In both cases the pressing force is initially 6500 N. As the temperature rises, the pressing force falls. For rolling bearings mounted without a tolerance ring, the pressing force falls to zero at a temperature of 80°C, whereas with a tolerance ring there is still a small pressure force of 2000 N at a temperature of 170°C.

Tolerance ring joints for transmission of torque

Very often, an axial or circumferential force of known magnitude is to be transmitted.
Examples include the mounting of pulleys, flywheels or fan rotors, to name but a few.



This figure shows a V-belt pulley fastened to a shaft by means of a tolerance ring 0820-030-08. The connection transfers a torque M of at least 88 Nm.
This corresponds to an
E-motor output of P = 4.3 kW
at a speed n = 1400min-1 and
a safety factor of S = 3 for the starting torque

Transmission of torque

Polar moment of inertia

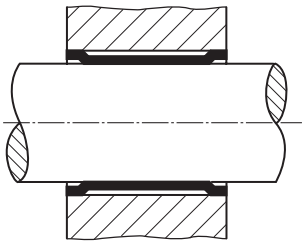
$$W_p = \frac{d^3 \cdot \pi}{16} \ [cm^3]$$

The figures below show tolerance ring joints in **free** and **centered arrangements** as compared with a **conventional contour-locking** connection for the same shaft diameters.

Conventional fastening methods necessitate the machining of keyways into the shafts and bores of the mating parts. These keyways weaken the shaft and thus reduce the polar moment of inertia W_p. This disadvantage does not apply when Rexroth tolerance rings are used.

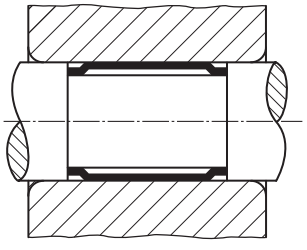
The polar moment of inertia W_p remains constant in the free arrangement and is reduced only very slightly in the centered arrangement.

Free arrangement, series R0810



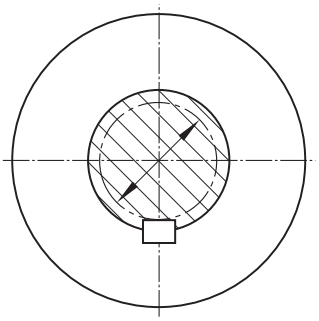
Shaft diameter = 30 mm
Polar moment of inertia W_p = 5.3 cm^3

Centered arrangement, series R0820



Shaft diameter = 30 mm
Polar moment of inertia W_p = 4.3 cm^3

Conventional connection



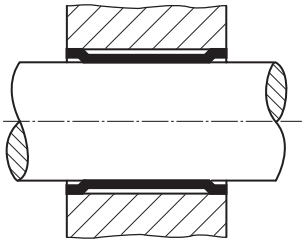
Shaft diameter = 30 mm
Polar moment of inertia W_p = 2.0 cm^3

General

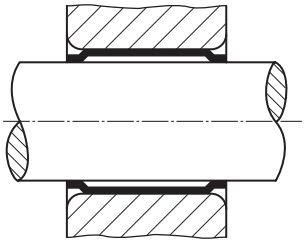
Design hints

Free arrangement
This arrangement is suitable for series R0810 and R0820 rings. It is extremely economical because the ring is simply placed between the straight, cylindrical surfaces of the bore and shaft. However, the assembly may be slightly off-center, and allowance must be made for a reduction of about 20% in the torques M given in the tables.

Free arrangement, series R0810

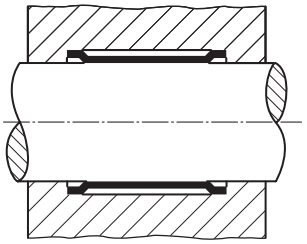


Free arrangement, series R0820

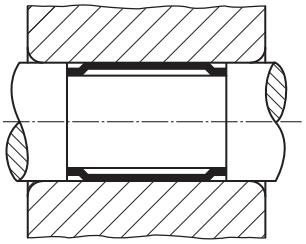


Centered arrangement
This arrangement is used when perfect concentricity is required or when circumferential or major radial impact loads are to be expected. Selection of the appropriate fit between shaft and bore keeps run-out within the required tolerance limits, at the same time providing shock absorption to protect the tolerance rings from damage.

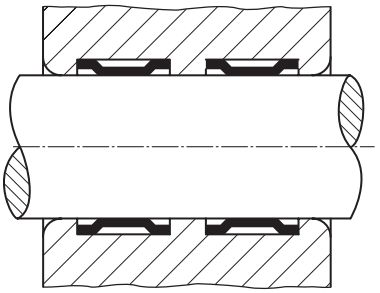
Centered arrangement, series R0810

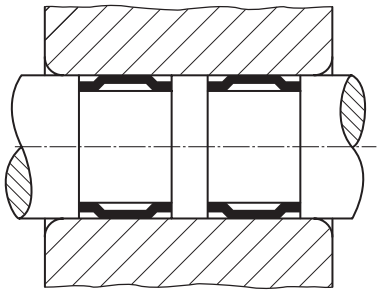


Centered arrangement, series R0820



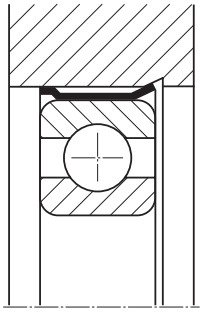
Tandem mounting of tolerance rings
If the load permissible on one tolerance ring is exceeded in a given application, it is possible to fit two or more tolerance rings end to end until the sum of their load ratings exceeds the load to be carried. However, it is important to ensure that the individual tolerance rings of the assembly are separated by webs to prevent adjacent tolerance rings from slipping over each other during mounting.





Note: The shaft tips should not be aligned.

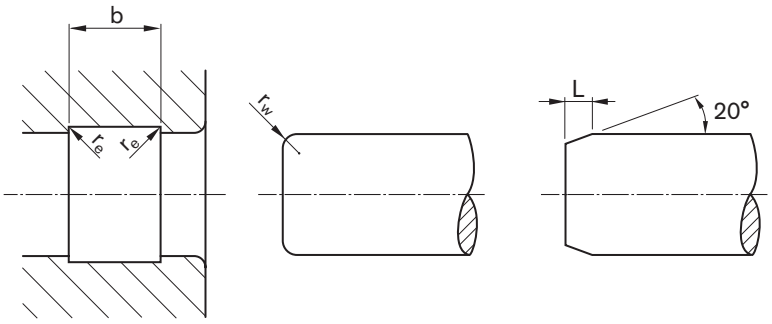
Tolerance rings with slanting edge
The slanting edge keeps the tolerance ring fixed in place. This version is mainly used to mount large rolling bearings in light metal housings.



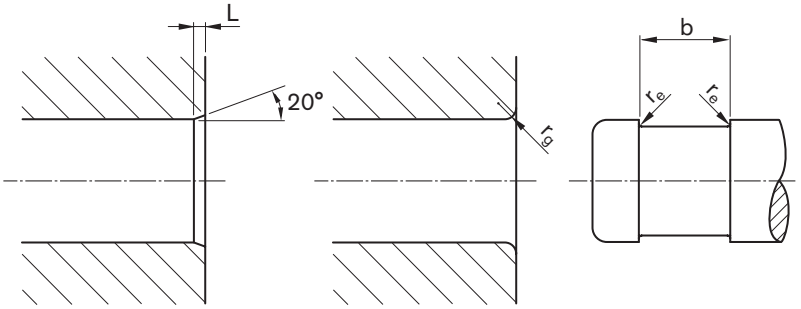
Design of mating parts

In order to ensure maximum effect and long life and to prevent damage to the tolerance rings, the following must be observed in the design of the mating parts:
When series R0810 tolerance rings are to be used, the leading edge of the shaft must be rounded to radius r_w;
series R0820 requires a radius r_g at the leading edge of the bore.
When the centered arrangement is to be used, the transition radii re at the walls of the retaining grooves in the bore and shaft should be as small as possible to ensure that the tolerance rings sit firmly against the walls of the grooves.
Retaining groove b requires a C13 fit.
Details concerning the correct radius and groove width tolerance limits are given in the tables.
If the radii indicated cannot be made, we recommend a chamfer of 20°.

Required radii, series R0810



Required radii, series R0820



Size of radii r_e, r_g and r_w

Dimensions (mm)		
Bore or shaft diameter (mm)	r_g, r_w	Chamfer 20° L
≤ 16	1,0	1,5
> 16 ≤ 48	1,25	2,0
> 48 ≤ 120	1,5 ≤ 2,0	2,5
> 120 ≤ 240	3,0 ≤ 4,0	3,5
> 240	4,0 ≤ 5,0	4,5
r_e ≤ to 0,2 r_g		

C13 tolerance limits for groove width b

Nominal dimension	C13 tolerance limit
mm	µm
≤ 10	+300
	+80
> 10 ≤ 18	+365
	+95
> 18 ≤ 30	+440
	+110
> 30 ≤ 40	+510
	+120
> 40 ≤ 50	+520
	+130
> 50 ≤ 65	+600
	+140
> 65 ≤ 80	+610
	+150

General

Shaft and bore tolerances

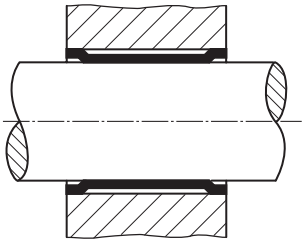
The tolerance limits chosen for shaft and bore diameters determine the fit between the two elements and thus the holding capacity of the tolerance ring assembly. See tolerance ring tables for dimensions.

Please note the following:

1. Shaft tolerances are permissible up to ISO h9, bore tolerances up to ISO H9, in exceptional cases up to ISO h11 resp. H11.
2. The tolerances quoted for the mounting of rolling bearings and for torque transfer refer to the combinations steel on steel or steel on many nonferrous metals. They apply to temperatures up to 100°C. Applications should be tested if they involve materials that differ considerably from steel in their strength properties.
3. The torque capacities given in the tables apply to the centered arrangement. If the free arrangement is used, a reduction of 20% must be allowed for.

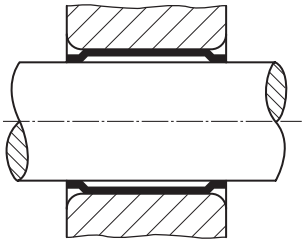
Free arrangement, series R0810

Standard shaft system



Free arrangement, series R0820

Standard bore system



Calculation

Guide values

With the aid of the formulas given below you can approximately calculate the values that determine the size of tolerance ring required for your application.
If you prefer, Rexroth can do this for you.
In this case, please use the form on page 30.

Known:

Output	P [kW] [1 HP = 0.736 kW]
Speed	n [min^{-1}]
Max. radial load	F [N]

Selected:

Safety factor S		
Guide values:	for fastening pulleys	2.5 - 3
	reversible motion	6

Torque calculation

$$M = \frac{9550 \cdot P}{n} \cdot S$$

M = torque [Nm]

Calculation of mounting force:[1)]

$$\frac{7 \cdot M\ (catalog)}{d}\ (N)$$

d = tolerance ring diameter in m

Calculation of axial seating capacity:[1)]

$$\frac{2 \cdot M\ (catalog)}{d}\ (N)$$

1) These values to be taken as guide values only.

Selection criteria

For radial and circumferential radial loads, choose the centered arrangement.

C **The transferable torque capacities and radial loads indicated in the tables are standard values only. These values may be influenced by the strength, surface hardness, surface roughness and lubrication of mounting parts and can thus vary greatly.**

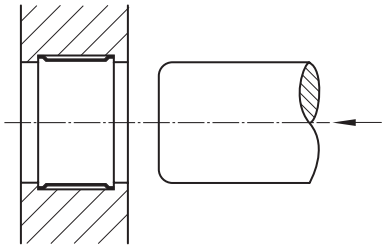
Mounting Instructions

Mounting

Always use a new tolerance ring when assembling parts!

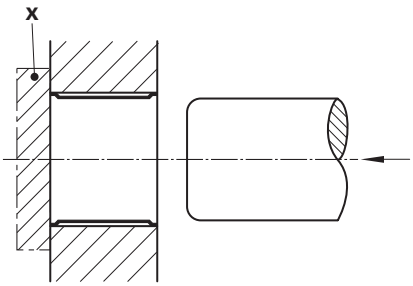
Centered arrangement, series R0810

The tolerance ring is placed in the housing, then the shaft pressed into the ring.



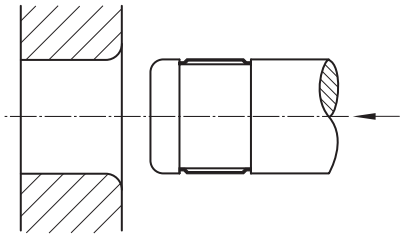
Free arrangement, series R0810

The tolerance ring is placed in the bore and a piece of flat stock (x) used to support it while the shaft is pressed into place.



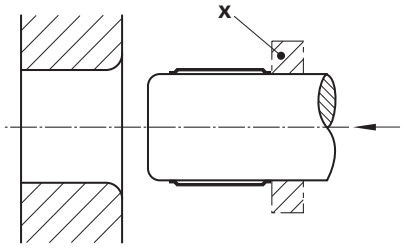
Centered arrangement, series R0820

The tolerance ring is first placed in the shaft groove, then the shaft with the ring in place is pressed into the bore.



Free arrangement, series R0820

The tolerance ring is placed around the straight shaft and a piece of flat stock (x) is used to brace the ring as the shaft is pressed into place.



Part Number / Ordering Example

Part number		R08 . .	. . .	. .
Series	10 = Series R0810 (AN 20 = Series R0820 (BN) 01 = Series R0801 (ANL) only available in stainless steel 04 = Series R0804 (ANS)			
Tolerance ring diameter (d)				
Code for tolerance ring width (b) / material	from 01 to 49 = carbon steel from 51 to 99 = carbon steel			

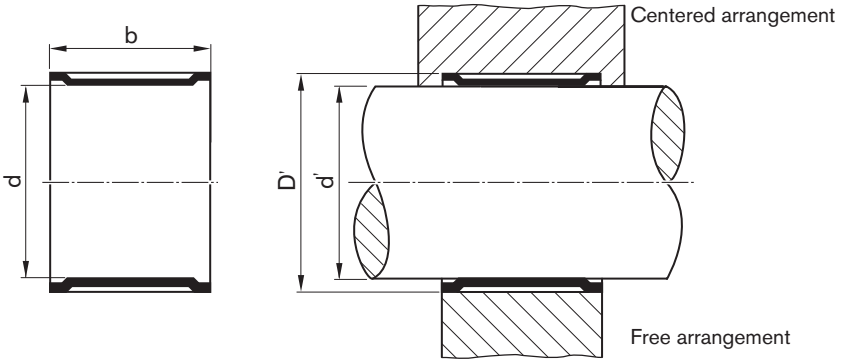
Ordering Example		R08810	010	54
Series	10 = Series R0810 (AN)			
Tolerance ring diameter (d)	d = 10			
Tolerance ring width (b) / material	b = 12 / stainless steel			

Please always use the nine-digit part number when ordering.
We have listed the part numbers in full in the following tables to make your choice easier.

For large quantities, many different special versions are available on request.

Dimensions

Tolerance ring series R0810 (AN)

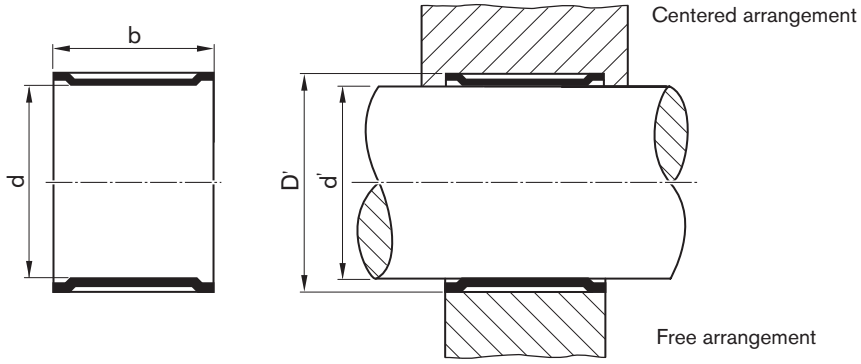


Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0810 006 51	AN 6 x 6		●	6	6	6	6,985 6,93	6,86 6,82	0,5	600	0,16
R0810 010 51	AN 10 x 4		●	10	4	10	11,48	11,30	1,0	1000	0,25
R0810 010 52	AN 10 x 6				6		11,41	11,23	2,0	1500	0,35
R0810 010 53	AN 10 x 10				10				3,0	2100	0,60
R0810 010 54	AN 10 x 12				12				3,5	2600	0,78
R0810 012 52	AN 12 x 6		●	12	6	12	13,48	13,30	2,0	1800	0,40
R0810 012 53	AN 12 x 10				10		13,41	13,23	3,5	2400	0,70
R0810 012 54	AN 12 x 12				12				4,2	2900	0,80
R0810 014 51	AN 14 x 8		●	14	8	14	15,48	15,30	5,5	2000	0,65
R0810 014 52	AN 14 x 12				12		15,41	15,23	7,5	3700	0,95
R0810 014 53	AN 14 x 14				14				8,0	4200	1,10
R0810 015 51	AN 15 x 8		●	15	8	15	16,48	16,30	6,5	2200	0,70
R0810 015 52	AN 15 x 12				12		16,41	16,23	8,5	4000	1,00
R0810 015 53	AN 15 x 14				14				10,0	4700	1,25
R0810 016 52	AN 16 x 8		●	16	8	16	17,48	17,30	7,0	2400	0,70
R0810 016 53	AN 16 x 10				10		17,41	17,23	8,0	2800	0,90
R0810 016 54	AN 16 x 12				12				9,5	3500	1,05
R0810 018 01	AN 18 x 6	●		18	6	18	19,98	19,75	6,0	1900	0,90
R0810 018 02	AN 18 x 10				10		19,89	19,67	11,0	4300	1,50
R0810 018 03	AN 18 x 16				16				17,0	8000	2,40

1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.



Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0810 019 01	AN 19 x 6	●		19	6	19	20,98	20,75	7	1900	0,95
R0810 019 02	AN 19 x 10				10		20,89	20,67	13	4500	1,60
R0810 019 03	AN 19 x 16				16				21	8500	2,50
R0810 020 01	AN 20 x 12	●		20	12	20	21,98	21,75	18	6100	2,05
R0810 020 03	AN 20 x 16				16		21,89	21,67	24	8500	2,65
R0810 020 04	AN 20 x 20				20				30	12000	3,30
R0810 022 01	AN 22 x 7	●		22	7	22	23,98	23,75	16	3000	1,30
R0810 022 02	AN 22 x 10				10		23,89	23,67	17	5400	1,80
R0810 022 03	AN 22 x 16				16				28	9000	2,90
R0810 022 04	AN 22 x 20				20				35	11000	3,75
R0810 024 01	AN 24 x 16	●		24	16	24	25,98	25,75	32	11000	3,15
R0810 024 02	AN 24 x 20				20		25,89	25,67	45	15000	3,70
R0810 024 03	AN 24 x 7				7				18	3600	1,45
R0810 025 01	AN 25 x 10	●		25	10	25	26,98	26,75	24	6200	2,05
R0810 025 02	AN 25 x 16				16		26,89	26,67	35	12000	3,20
R0810 025 03	AN 25 x 20				20				47	15000	4,05
R0810 028 01	AN 28 x 10	●		28	10	28	29,98	29,75	30	7200	2,20
R0810 028 02	AN 28 x 12				12		29,89	29,67	36	10000	1,70
R0810 028 03	AN 28 x 20				20				57	17000	4,50
R0810 028 04	AN 28 x 30				30				86	26000	6,80
R0810 030 01	AN 30 x 12	●		30	12	30	31,98	31,75	45	10000	3,00
R0810 030 02	AN 30 x 16				16		31,89	31,67	51	14000	3,90
R0810 030 03	AN 30 x 30				30				97	27000	7,25

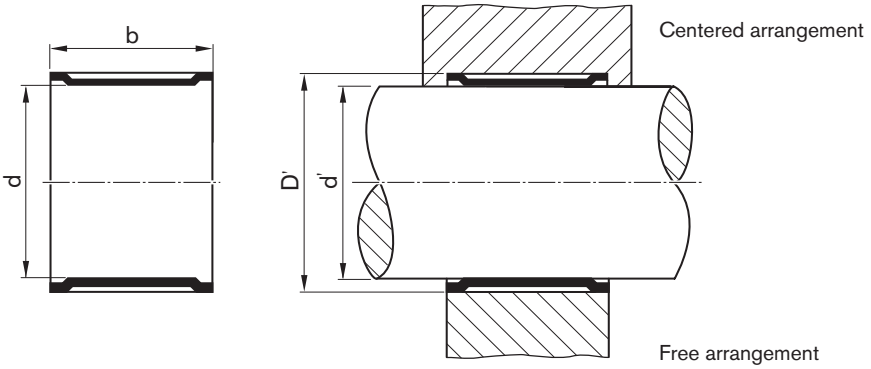
1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.

Dimensions

Tolerance ring series R0810 (AN)

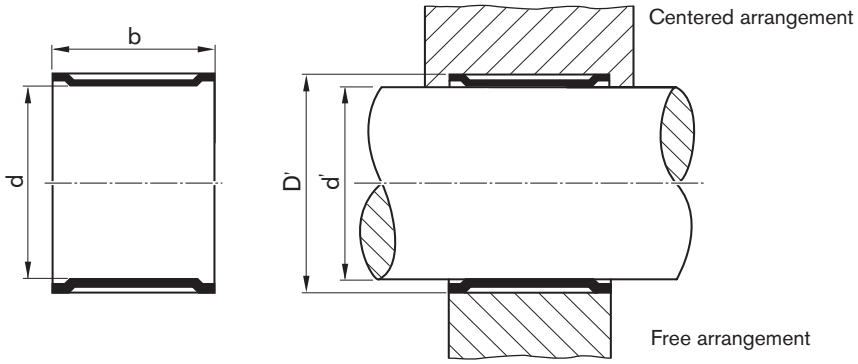


Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0810 032 01	AN 32 x 8	●		32	8	32	33,98	33,75	33	3000	3,00
R0810 032 02	AN 32 x 10				10		33,89	33,67	39	4300	3,45
R0810 032 03	AN 32 x 14				14				55	6800	4,80
R0810 035 01	AN 35 x 10	●		35	10	35	36,98	36,75	44	4800	3,75
R0810 035 02	AN 35 x 14				14		36,89	36,67	64	7500	5,25
R0810 040 01	AN 40 x 10	●		40	10	40	41,98	41,75	60	5400	4,25
R0810 040 02	AN 40 x 12				12		41,89	41,67	74	6900	5,10
R0810 040 03	AN 40 x 16				16				93	11000	6,80
R0810 040 04	AN 40 x 30				30				180	20000	12,85
R0810 045 01	AN 45 x 12	●		45	12	45	46,98	46,75	90	11000	55,75
R0810 045 02	AN 45 x 20				20		46,89	46,67	155	16000	9,55
R0810 047 01	AN 47 x 8	●		47	8	47	48,98	48,75	70	4500	4,00
R0810 047 02	AN 47 x 14				14		48,89	48,67	120	10000	7,00
R0810 047 04	AN 47 x 20				20				200	16000	9,95
R0810 047 05	AN 47 x 22				22				220	18000	10,95
R0810 050 01	AN 50 x 15	●		50	15	50	52,47	52,15	150	11000	10,20
R0810 050 02	AN 50 x 20				20		52,35	52,03	200	17000	13,30

1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.

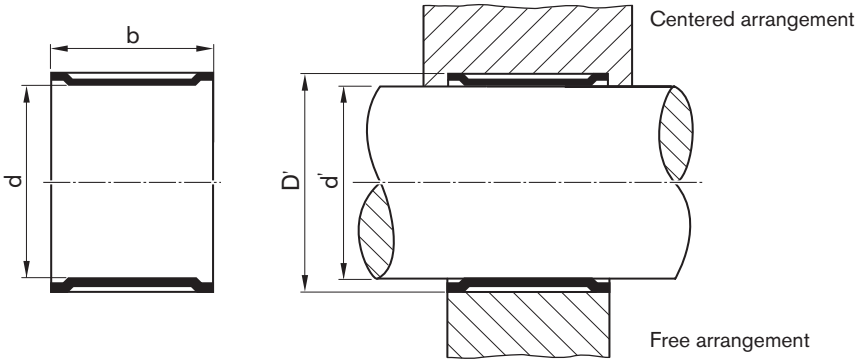


Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0810 052 01	AN 52 x 8	●		52	8	52	54,47	54,15	90	5000	5,50
R0810 052 02	AN 52 x 15				15		54,35	54,03	170	12000	10,40
R0810 052 03	AN 52 x 20				20				230	18000	13,80
R0810 055 01	AN 55 x 15	●		55	15	55	57,47	57,15	210	14000	11,20
R0810 055 02	AN 55 x 20				20		57,35	57,03	260	19000	14,60
R0810 060 01	AN 60 x 15	●		60	15	60	62,47	62,15	270	15000	12,20
R0810 060 02	AN 60 x 25				25		62,35	62,03	440	25000	19,90
R0810 062 01	AN 62 x 9	●		62	9	62	64,47	64,15	190	7100	7,45
R0810 062 02	AN 62 x 10				10		64,35	64,03	200	8200	8,20
R0810 062 03	AN 62 x 15				15				300	14000	12,60
R0810 062 04	AN 62 x 20				20				400	21000	16,40
R0810 065 01	AN 65 x 25	●		65	25	65	67,47	67,15	520	26000	21,50
R0810 065 03	AN 65 x 63				63		67,35	67,03	850	66000	54,20
R0810 070 01	AN 70 x 15	●		70	15	70	72,47	72,15	400	16000	13,85
R0810 070 02	AN 70 x 25				25		72,35	72,03	550	29000	23,10
R0810 070 03	AN 70 x 48				48				800	55000	45,50
R0810 072 01	AN 72 x 10	●		72	10	72	74,47	74,15	230	9500	9,50
R0810 072 02	AN 72 x 20				20		74,35	74,03	490	25000	19,00

1) Please refer to the sections „General“ and „Calculation“.
2) Severely reduced in pulsating and alternating load applications. Please inquire.
3) For guide values, see „Calculation“ section, 20% lower in free arrangement.

Dimensions

Tolerance ring series R0810 (AN)

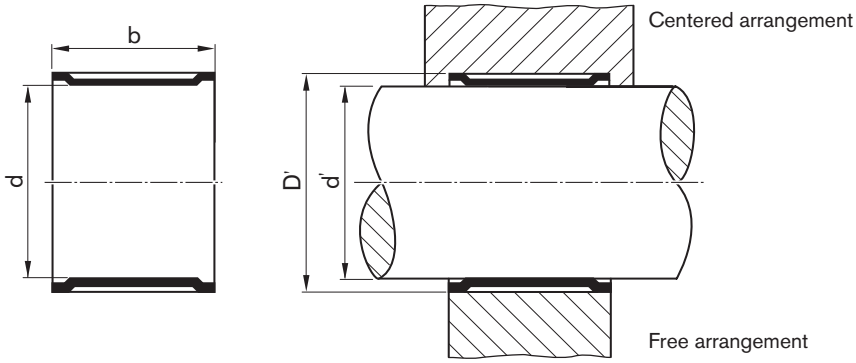


Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0810 075 01	AN 75 x 20	●		75	20	75	77,47	77,15	600	25000	20,10
R0810 075 02	AN 75 x 30				30		77,35	77,03	800	36000	29,70
R0810 080 01	AN 80 x 10	●		80	10	80	82,47	82,15	240	10000	10,60
R0810 080 02	AN 80 x 12				12		82,35	82,03	280	13000	12,65
R0810 080 03	AN 80 x 20				20				630	28000	21,20
R0810 080 04	AN 80 x 25				25				750	35000	26,35
R0810 080 05	AN 80 x 30				30				900	40000	31,60
R0810 090 01	AN 90 x 15	●		90	15	90	92,96	92,56	560	22000	21,40
R0810 090 02	AN 90 x 23				23		92,82	92,42	870	35000	32,80
R0810 090 03	AN 90 x 32				32				1250	50000	45,60
R0810 095 01	AN 95 x 19	●		95	19	95	97,96 97,82	97,56 97,42	960	30000	27,00
R0810 100 01	AN 100 x 15	●		100	15	100	102,96	102,56	950	25000	24,50
R0810 100 02	AN 100 x 19				19		102,82	102,42	1050	30000	30,50
R0810 100 03	AN 100 x 25				25				1300	43000	39,40
R0810 110 01	AN 110 x 15	●		110	15	110	112,96	112,56	1150	28000	26,00
R0810 110 02	AN 110 x 19				19		112,82	112,42	1350	35000	33,00
R0810 110 03	AN 110 x 28				28				1750	52000	48,50
R0810 120 01	AN 120 x 19	●		120	19	120	122,96 122,82	122,56 122,42	1300	36000	35,80

1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.



Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0810 125 01	AN 125 x 22	●		125	22	125	128,96 128,80	128,48 128,32	1300	40000	50,80
R0810 140 01	AN 140 x 24	●		140	24	140	143,96 143,80	143,48 143,32	1800	51000	61,80
R0810 145 01	AN 145 x 24	●		145	24	145	148,96 148,80	148,48 148,32	1950	53000	64,00
R0810 150 02	AN 150 x 42	●		150	42	150	153,96 153,80	153,96 153,32	2800 3400	70000 92000	91,00 116,00
R0810 160 01	AN 160 x 24	●		160	24	160	163,96	163,48	2400	60000	70,50
R0810 160 04	AN 160 x 26				26		163,80	163,32	2550	64000	76,50
R0810 200 03	AN 200 x 31	●		200	31	200	204,95 204,77	204,40 204,22	4100	92000	130,00
R0810 210 01	AN 210 x 33	●		210	33	210	214,95 214,77	214,40 214,22	4900	99000	145,00

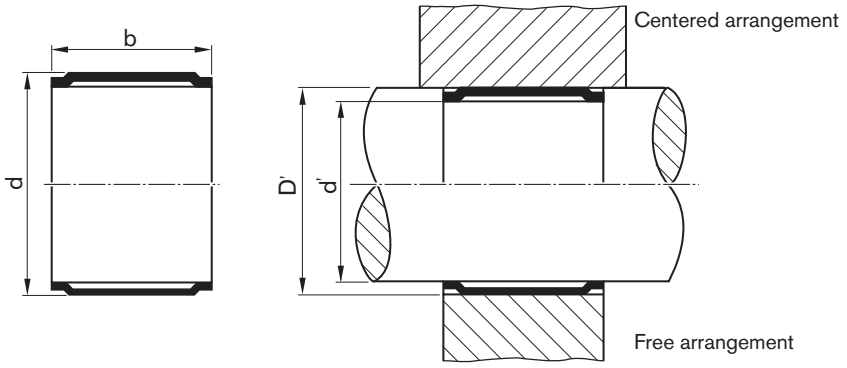
1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.

Dimensions

Tolerance ring series R0820 (BN)

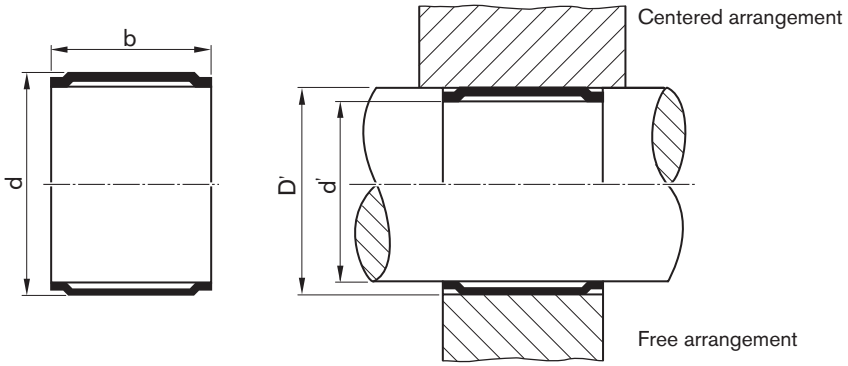


Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0820 005 51	BN 5 x 5		●	5	5	5	4,06	4,18	0,20	250	0,09
R0820 005 52	BN 5 x 6				6		4,01	4,14	0,25	300	0,13
R0820 005 53	BN 5 x 8				8				0,35	400	0,14
R0820 006 51	BN 6 x 6		●	6	6	6	5,06	5,18	0,40	400	0,15
R0820 006 52	BN 6 x 8				8		5,01	5,14	0,55	500	0,16
R0820 006 53	BN 6 x 10				10				0,70	700	0,26
R0820 008 51	BN 8 x 7		●	8	7	8	6,75	6,71	0,75	800	0,28
R0820 008 52	BN 8 x 8				8		6,51	6,65	0,90	1000	0,33
R0820 008 53	BN 8 x 10				10				1,30	1400	0,42
R0820 010 51	BN 10 x 10		●	10	10	10	8,57	8,71	3,0	1800	0,50
R0820 010 52	BN 10 x 12				12		8,51	8,65	3,6	2100	0,60
R0820 010 53	BN 10 x 14				14				4,2	2500	0,70
R0820 011 52	BN 11 x 10		●	11	10	11	9,57	9,71	3,5	2000	0,55
R0820 011 53	BN 11 x 14				14		9,51	9,65	5,0	2800	0,70
R0820 012 51	BN 12 x 6		●	12	6	12	10,59	10,77	2,0	900	0,40
R0820 012 52	BN 12 x 8				8		10,52	10,70	3,0	1600	0,50
R0820 012 53	BN 12 x 10				10				3,5	2300	0,60
R0820 012 54	BN 12 x 12				12				4,5	2900	0,70
R0820 012 55	BN 12 x 14				14				5,0	3600	0,85
R0820 012 56	BN 12 x 18				18				7,0	5000	1,10

1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.



Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0820 014 52	BN 14 x 10		●	14	10	14	12,59	12,77	5	2500	0,75
R0820 014 53	BN 14 x 14				14		12,52	12,70	7	4100	1,00
R0820 014 54	BN 14 x 15				15				7,5	4500	1,20
R0820 014 55	BN 14 x 20				20				10	5000	1,65
R0820 015 51	BN 15 x 6		●	15	6	15	13,59	13,77	3,5	1100	0,50
R0820 015 52	BN 15 x 8				8		13,52	13,70	5	2000	0,60
R0820 015 53	BN 15 x 10				10				6	2800	0,75
R0820 015 54	BN 15 x 12				12				7	3500	0,90
R0820 015 55	BN 15 x 14				14				8	4300	1,05
R0820 016 51	BN 16 x 10		●	16	10	16	14,59	14,77	6,5	3100	0,80
R0820 016 53	BN 16 x 16				16		14,52	14,70	11	6000	1,30
R0820 017 51	BN 17 x 6		●	17	6	17	15,59	15,77	4,5	1300	0,60
R0820 017 52	BN 17 x 8				8		15,52	15,70	6	2300	0,70
R0820 017 53	BN 17 x 10				10				8	3200	0,85
R0820 017 54	BN 17 x 2				12				9	4100	1,05
R0820 017 55	BN 17 x 14				14				11	5100	1,20
R0820 018 51	BN 18 x 10		●	18	10	18	16,95	16,77	9	3400	0,90
R0820 018 53	BN 18 x 22				22		16,52	16,70	20	9500	2,00

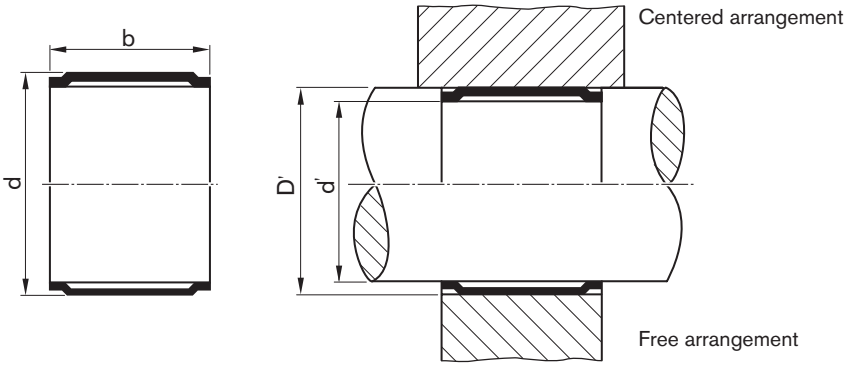
1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.

Dimensions

Tolerance ring series R0820 (BN)

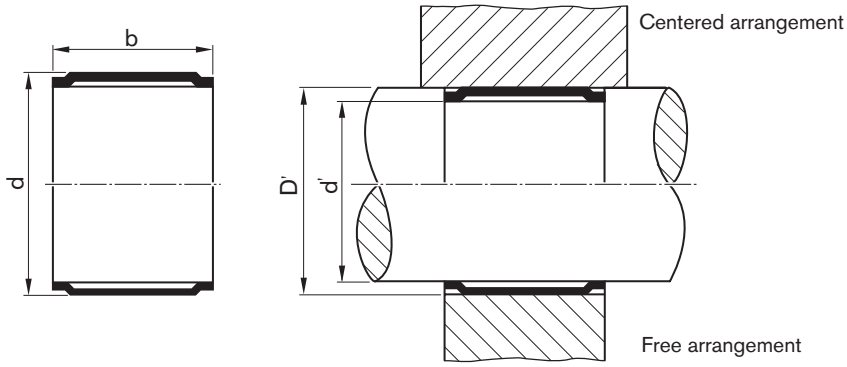


Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0820 019 51	BN 19 x 10		●	19	10	19	17,59	17,77	9,5	3000	0,95
R0820 019 52	BN 19 x 19				19		17,52	17,70	20	8500	1,80
R0820 019 53	BN 19 x 22				22				23	9900	2,10
R0820 020 01	BN 20 x 6	●		20	6	20	18,11	18,33	6,5	1900	0,90
R0820 020 02	BN 20 x 8				8		18,02	18,25	9	3200	1,20
R0820 020 03	BN 20 x 10				10				11	4500	1,50
R0820 020 04	BN 20 x 12				12				13	5800	1,70
R0820 020 06	BN 20 x 15				15				17	7900	2,25
R0820 020 08	BN 20 x 20				20				23	11000	3,00
R0820 020 09	BN 20 x 22				22				25	12500	3,25
R0820 022 01	BN 22 x 12	●		22	12	22	20,11	20,33	18	6000	2,00
R0820 022 02	BN 22 x 15				15		20,02	20,25	25	8000	2,40
R0820 022 03	BN 22 x 22				22				33	13000	3,60
R0820 024 01	BN 24 x 15	●		24	15	24	22,11 22,02	22,33 22,25	27	8400	2,35
R0820 025 01	BN 25 x 8	●		25	8	25	23,11	23,33	14	4000	1,50
R0820 025 02	BN 25 x 10				10		23,02	23,25	20	5700	2,00
R0820 025 03	BN 25 x 12				12				24	7200	2,25
R0820 025 04	BN 25 x 14				14				28	8900	2,62
R0820 025 05	BN 25 x 15				15				30	10000	2,80
R0820 025 06	BN 25 x 18				18				35	12000	3,40
R0820 025 07	BN 25 x 20				20				39	14000	3,75
R0820 025 08	BN 25 x 21				21				41	15000	3,95
R0820 025 09	BN 25 x 25				25				50	18000	4,70

1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.



Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0820 028 01	BN 28 x 12	●		28	12	28	26,11	26,33	28	8000	2,25
R0820 028 02	BN 28 x 20				20		26,02	26,25	50	16000	4,20
R0820 028 04	BN 28 x 25				25				64	20000	5,10
R0820 030 01	BN 30 x 8	●		30	8	30	28,11	28,33	27	4900	1,85
R0820 030 02	BN 30 x 10				10		28,02	28,25	30	7000	2,30
R0820 030 03	BN 30 x 12				12				37	9000	2,80
R0820 030 04	BN 30 x 15				15				47	14000	2,85
R0820 030 06	BN 30 x 20				20				58	17000	4,35
R0820 030 08	BN 30 x 30				30				88	26000	6,80
R0820 032 01	BN 32 x 12	●		32	12	32	30,11	30,33	40	9200	2,90
R0820 032 02	BN 32 x 16				16		30,02	30,25	52	14000	3,90
R0820 032 03	BN 32 x 23				23				75	21000	5,50
R0820 032 04	BN 32 x 30				30				100	27000	7,17
R0820 035 01	BN 35 x 8	●		35	8	35	33,13	33,40	35	3200	2,85
R0820 035 02	BN 35 x 10				10		33,03	33,30	41	4500	3,20
R0820 035 03	BN 35 x 12				12				48	5800	3,35
R0820 035 04	BN 35 x 15				15				60	7900	3,92
R0820 035 05	BN 35 x 17				17				68	9200	6,00
R0820 035 06	BN 35 x 23				23				95	13000	8,10
R0820 035 07	BN 35 x 25				25				100	14000	8,80
R0820 035 08	BN 35 x 30				30				120	15500	10,60

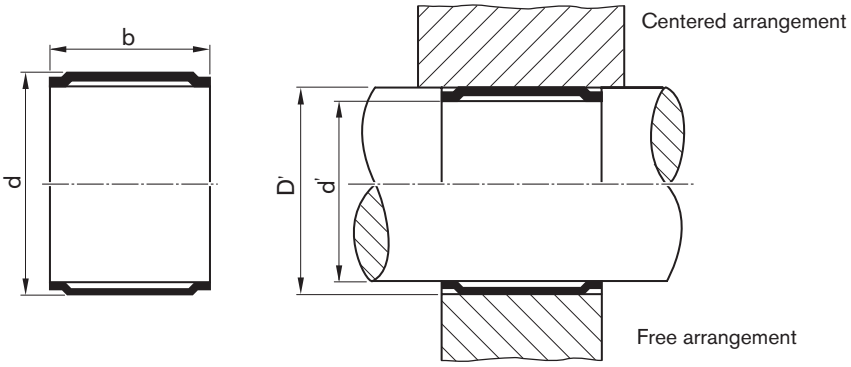
1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.

Dimensions

Tolerance ring series R0820 (BN)

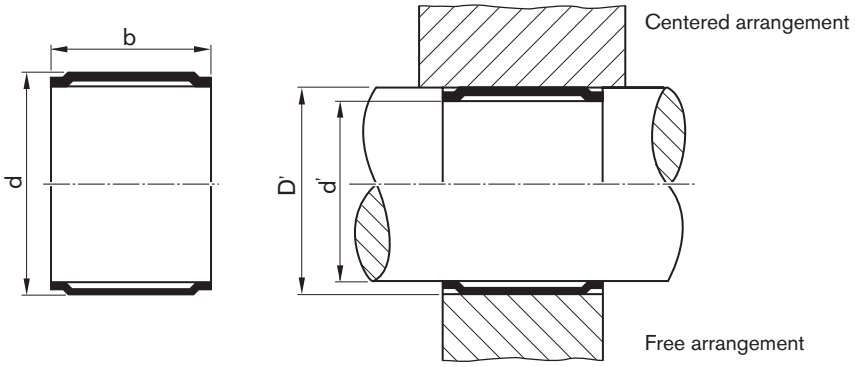


Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0820 040 01	BN 40 x 10	●		40	10	40	38,13	38,40	57	5200	4,25
R0820 040 02	BN 40 x 15				15		38,03	38,30	80	9000	5,50
R0820 040 03	BN 40 x 23				23				130	15000	9,30
R0820 040 04	BN 40 x 30				30				176	20000	12,15
R0820 040 06	BN 40 x 40				40				200	24000	16,20
R0820 045 01	BN 45 x 10	●		45	10	45	43,13	43,40	75	6500	5,00
R0820 045 02	BN 45 x 15				15		43,03	43,30	110	10000	6,85
R0820 045 03	BN 45 x 23				23				170	17000	10,50
R0820 045 04	BN 45 x 25				25				180	18000	11,40
R0820 045 05	BN 45 x 30				30				210	23000	13,70
R0820 050 02	BN 50 x 16	●		50	16	50	48,13	48,40	150	13000	8,15
R0820 050 03	BN 50 x 23				23		48,03	48,30	220	19000	11,70
R0820 050 06	BN 50 x 40				40				380	32000	20,35
R0820 055 01	BN 55 x 14	●		55	14	55	52,65	52,97	160	11000	10,00
R0820 055 02	BN 55 x 29				29		52,53	52,85	340	25000	20,20
R0820 060 01	BN 60 x 22	●		60	22	60	57,65	57,97	320	21000	16,80
R0820 060 02	BN 60 x 28				28		57,53	57,85	420	27000	21,35
R0820 075 01	BN 75 x 31	●		75	31	75	72,65	72,97	780	37000	29,65
R0820 075 02	BN 75 x 37				37		72,53	72,85	950	37000	35,40

1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.



Part number		Carbon steel	Stainless steel	Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]		
						Shaft	Bore for mounting rolling bearings	Bore for torque transfer	Torque capacity[3]	Permissible radial load[2]	Weight kg/1000 pieces approx.
	old			d	b	d' h9	D'	D'	M Nm	F N	
R0820 080 01	BN 80 x 39	●		80	39	80	77,65 77,53	77,97 77,85	1120	51000	39,80
R0820 085 01	BN 85 x 22	●		85	22	85	82,18 82,04	82,58 82,44	800	31000	28,55
R0820 090 01	BN 90 x 24	●		90	24	90	87,18	87,58	850	37000	33,00
R0820 090 02	BN 90 x 30				30		87,04	87,44	1100	46000	41,20
R0820 120 01	BN 120 x 28	●		120	28	120	117,18 117,04	117,58 117,44	2300	56000	51,60
R0820 140 01	BN 140 x 22	●		140	22	140	136,20 136,04	136,68 136,52	1250	44000	58,50

1) Please refer to the sections „General“ and „Calculation“.

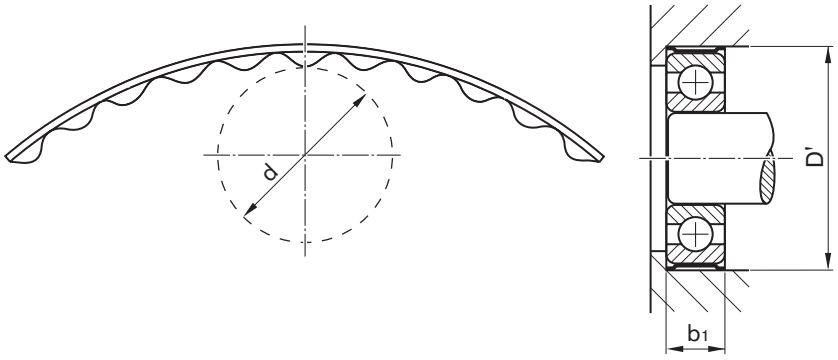
2) Severely reduced in pulsating and alternating load applications. Please inquire.

3) For guide values, see „Calculation“ section, 20% lower in free arrangement.

Dimensions

Tolerance ring series R0801 (ANL)

Available in stainless steel only

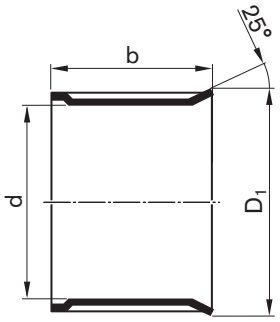


Part number		Tolerance ring dimensions (mm)		Shaft or bore diameter[1] (mm)			Load[1]	Weight kg/1000 pieces approx.
				Rolling bearing diameter	Bore	Working width	Permissible radial load[2]	
	old	d	b		D'	b_1^{C13}	F (N)	
R0801 013 51	ANL 13 x 5	13	5	13 = 624 (EL 4)	13,65 13,60	5	125	0,20
R0801 016 51	ANL 16 x 5	16	5	13 = 625 (EL 5)	16,65 16,60	5	150	0,21
R0801 019 51	ANL 19 x 6	19	6	19 = 626 (EL 6) 604 (EL 7) 635 (R 5)	19,65 19,60	6	220	0,35
R0801 022 52	ANL 22 x 7	22	7	22 = 608 (EL 8) 627 (R 7)	22,65 22,60	7	300	0,37
R0801 024 51	ANL 24 x 7	24	7	24 = 609 (EL 9)	24,65 24,60	7	330	0,50
R0801 026 51	ANL 26 x 8	26	8	26 = 629 (R 9) 6000	26,65 26,60	8	400	0,55
R0801 028 51	ANL 28 x 8	28	8	28 = 6001	28,65 28,60	8	440	0,62
R0801 030 51	ANL 30 x 9	30	9	30 = 6200	30,65 30,60	9	520	0,70
R0801 032 52	ANL 32 x 9	32	9	32 = 6002	32,65 32,60	9	560	0,84
R0801 032 53	ANL 32 x 10	32	10	32 = 6201	32,65 32,60	10	620	0,88
R0801 040 52	ANL 40 x 12	40	12	40 = 6203	40,65 40,60	12	810	1,31

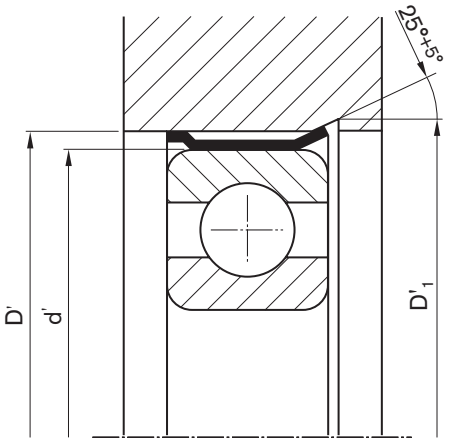
1) Please refer to the sections „General“ and „Calculation“.

2) Severely reduced in pulsating and alternating load applications. Please inquire.

Tolerance ring series R0804 (ANS)



$D'_{1\ min} = D_1 + 1$ (mm)



Part number		Carbon steel	Stainless steel	Tolerance ring dimension (mm)			Shaft or bore diameter[1] (mm)		Load	Weight
							Rolling bearing diameter	Bore	Permissible radial load[2]	kg/1000 pieces approx.
	old			d	b	D_1	d'	D´	F (N)	
R0804 090 01	ANS 90 x 18	●		90	18	94,1	90	92,96 92,82	2600	25,60
R0804 110 01	ANS 110 x 19	●		110	19	114,1	110	112,96 112,82	3500	34,70
R0804 140 01	ANS 140 x 24	●		140	24	145,3	140	143,96 143,80	5100	61,80
R0804 160 02	ANS 160 x 26	●		160	26	165,3	160	163,96 163,80	6500	87,50
R0804 180 01	ANS 180 x 28	●		180	28	185,3	180	183,96 183,80	7000	92,40
R0804 200 01	ANS 200 x 31	●		200	31	206,4	200	204,95 204,77	9000	132,00
R0804 225 01	ANS 225 x 31	●		225	31	231,6	225	229,95 229,77	10000	148,00

1) Please refer to the sections „General“ and „Calculation“.
2) Severely reduced in pulsating and alternating load applications. Please inquire.

Inquiry/Specification

Bosch Rexroth AG
Linear Motion Technology
D-97424 Schweinfurt

Telefon (0 97 21) 9 37-0
Telefax (0 97 21) 9 37-465
(direct)

Tolerance rings

Operating conditions:			
Corrosion due to moisture or other media		☐ yes	☐ no
		which	
Operating temperatures			
Continuous temperature	°C		
Peak temperature	°C	how long	hrs.
Drive output power	kW		
Drive speed	min^{-1}		
Reversing motion		☐ no	☐ yes
Torque level to be transmitted?	Nm		
Radial load	N		
Axial load	N	☐ no	☐ yes
Additional data for rolling bearing mounting			
Type of bearing			
What is to be fixed?		☐ inner race	☐ outer race
What moves?		☐ inner race	☐ outer race
Only low circumferential load possible with centered arrangement.			
Arrangement		☐ free	☐ centered

Mating parts:

				Dimensions (mm)		
	Material / strength	Surface	Heat treatment	Diameter / tolerance	Wall thickness	Possible TR width
Housing						
Shaft						

Additional information:

If you have a drawing (sketch) of your application, please attach it with this inquiry.

Quantities

Samples _____ **pcs.** _____ **Serial production** _____ **Quantity** _____

Delivery date _____ **Delivery date** _____

From

Company: _____ **Name:** _____

Address: _____ **Department:** _____

_____ **Phone:** _____

_____ **Fax:** _____

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Find your local contact person here:
www.boschrexroth.com/contact

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