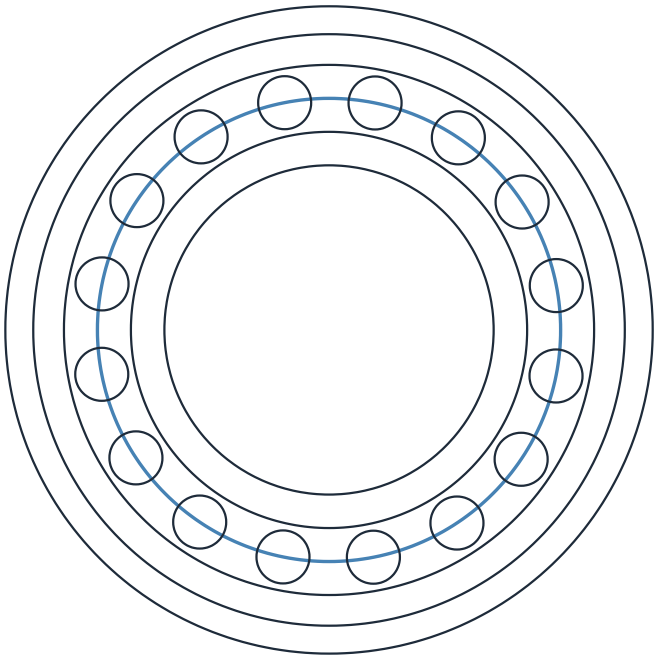


FAG

Rolling Bearings HR 1 — Ball and Roller Bearings

کاتالوگ بلبرینگ و رولبرینگ FAG

استعلام قیمت و خرید بلبرینگ FAG ←

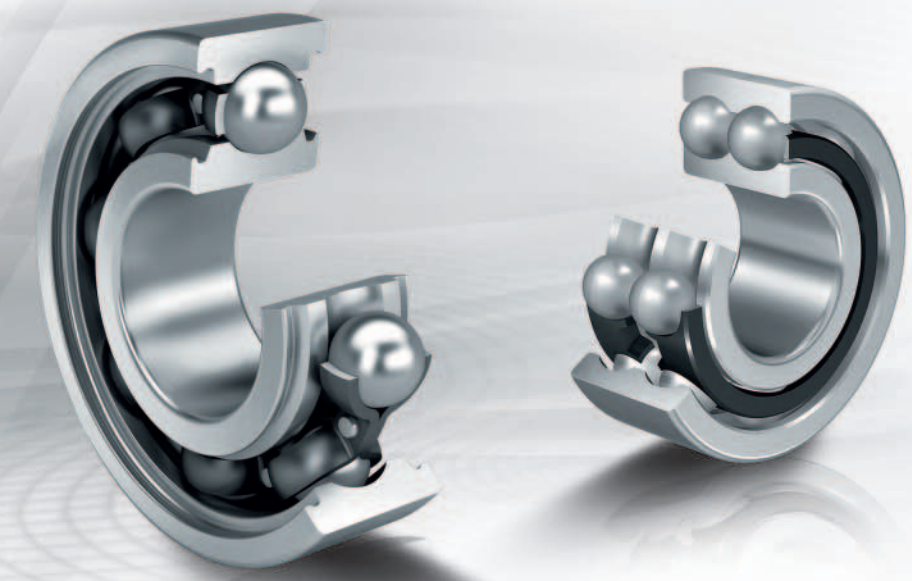
BRAND برند	ORIGIN کشور سازنده	PRODUCTS محصولات	PAGES تعداد صفحات	LANGUAGE زبان
FAG	Germany	Ball & roller bearings	770	German / English

moharekcharkhesh.com
MoharekCharkhesh@proton.me

تأمین‌کننده تخصصی بلبرینگ و رولبرینگ
تهران، خیابان امیرکبیر، کوچه ناظم‌الاطبا شمالی، پاساژ تهران، طبقه سوم، پلاک ۱۴۲

021 3399 8121
021 3399 8100
0912 464 6470

Deep groove ball bearings





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Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

+++ extremely suitable
++ highly suitable
+ suitable
(+) suitable with restrictions
– not suitable/not applicable
✓ available

Design features and suitability			Deep groove ball bearings		
			single row	double row	detailed information ➤ 216
Load carrying capacity	radial		++	++	➤ 220 | 1.2
	axial, one direction		+	++	➤ 220 | 1.2
	axial, both directions		+	++	➤ 220 | 1.2
	moments		(+)	+	➤ 220 | 1.2
Compensation of angular misalignments	static		(+)	–	➤ 221 | 1.3
	dynamic		(+)	–	➤ 221 | 1.3
Bearing design	cylindrical bore		✓	✓	➤ 216 | 1.1
	tapered bore		–	–	
	separable		–	–	➤ 234 | 1.17
Lubrication	greased		✓[1]	✓	➤ 221 | 1.4
Sealing	open		✓	✓	➤ 222 | 1.5
	non-contact		✓	–	➤ 222 | 1.5
	contact		✓	–	➤ 222 | 1.5
Operating temperature in °C	from to		–30 +120[2]	–30 +120	➤ 225 | 1.8
Suitability for	high speeds		+++	+	➤ 224 | 1.6
	high running accuracy		++	+	➤ 228 | 1.11 ➤ 115
	low-noise running		+++	+++	➤ 224 | 1.7 ➤ 232 | 1.16
	high rigidity		+	+	➤ 54
	reduced friction		+++	+++	➤ 56
	length compensation within bearing		–	–	
	non-locating bearing arrangement		+	+	➤ 141
	locating bearing arrangement		++	++	➤ 141
X-life bearings		X-life	–	–	
Bearing bore d in mm	from to		2 260[3]	10 90	➤ 236 ➤ 280
Product tables	from page ➤		236	280	

1) For sealed bearings only
2) Valid for bearings with sheet steel sealing shields
3) Larger catalogue bearings GL 1

1 Deep groove ball bearings

Deep groove ball bearings are available in single row and double row designs.

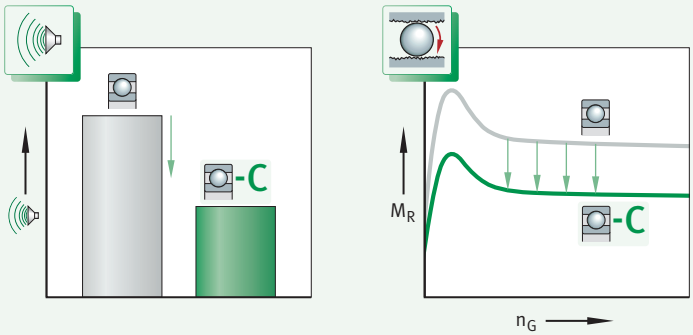
Single row bearings are particularly suitable where:

- high and very high speeds are required
- the bearing arrangement must be operated with very low friction
- very low running noise is required, without reducing the speed, load carrying capacity and operating life of the bearing (Generation C) ➤ *217*
- high demands are made on the sealing of the bearing, without increasing heat generation or limiting the speed (Generation C) ➤ *222* | *1.5*
- the bearing position is to be designed particularly economically

Double row bearings can be considered for bearing arrangements where:

- the load carrying capacity of single row deep groove ball bearings is no longer sufficient ➤ *220*
- axial loads in both directions and/or tilting moments must be supported in addition to radial loads ➤ *220*
- a high load carrying capacity is required and the design envelope available in a radial and axial direction is relatively small

For an overview of other product-specific features, see the Matrix for bearing preselection ➤ *215*.



1
Comparison of standard deep groove ball bearings with bearings of Generation C: running noise, frictional torque

C = *bearings of Generation C*
M_R = *frictional torque*
n_G = *limiting speed*

1.1 Bearing design

✎ *Design variants*

Single row deep groove ball bearings are available as:

- standard bearings ➤ *217* | *2*
- bearings of Generation C ➤ *218* | *3* and ➤ *218* | *4*
- matched bearing sets ➤ *219* | *5*
- corrosion-resistant bearings ➤ *219*

Double row deep groove ball bearings are available as:

- standard bearings ➤ *219* | *6*

Single row deep groove ball bearings are also available in many other designs and sizes, as well as for specific applications, by agreement. Corrosion-resistant bearings TPI 64, larger catalogue bearings GL 1.

Standard bearings

Proven and versatile bearings with high market shares

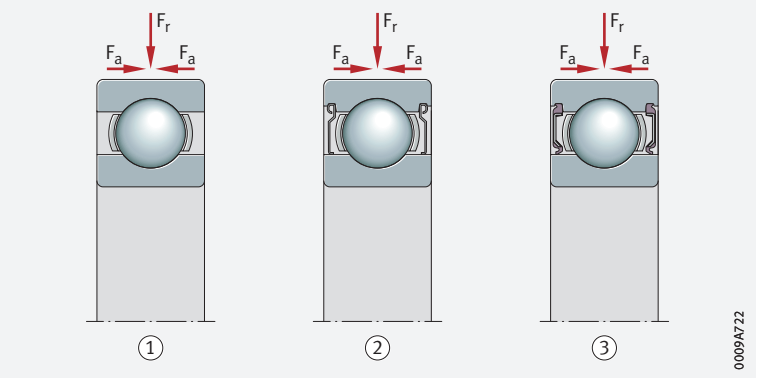
Single row deep groove ball bearings are self-retaining units, which are part of the group of radial ball bearings. The solid outer and inner rings have deep raceway grooves, with shoulders which are not generally interrupted by filling slots ➤217| 2. Solid cages made from polyamide PA66 or brass, and sheet metal cages made from steel or brass, are used as standard cages ➤226| 4. The bearings are open or sealed. Due to the manufacturing processes used, open bearings, which are also available as sealed versions, can have turned recesses in the outer and inner ring for sealing washers or sealing shields.

Single row deep groove ball bearings are particularly versatile, robust in operation, easy to maintain and very economical. Due to their significant advantages, they are the most widely used rolling bearings worldwide. As a result, Schaeffler also manufactures these bearings in a large number of sizes and designs.

2
Single row deep groove ball bearings, open or sealed

F_r = *radial load*
F_a = *axial load*

① *Open*
② *Sealing shield on both sides (non-contact)*
③ *Contact seal on both sides*



Deep groove ball bearings of Generation C

Gen. C = optimised design of standard bearings

Deep groove ball bearings of Generation C correspond in their structure to single row standard deep groove ball bearings, but are specially optimised in relation to:

- significantly quieter running
- even more effective sealing
- a further reduction in the already very low frictional torque

Measures to reduce noise

Schaeffler has analysed the causes of noise generation in deep groove ball bearings using the most advanced methods. On the basis of the findings obtained from these analyses:

- The surface of the raceways has been improved
- The ball quality has been increased
- Osculation has been optimised
- The production tolerances have been reduced
- Deep groove ball bearings have been fitted with new riveted cages made from steel

The result of this is a noise reduction in Generation C bearings over comparable standard deep groove ball bearings.

✎ Gen. C = particularly high sealing effect due to new and improved seals

The quality of the seal not only has a considerable influence on the rating life, but also on the efficiency of a rolling bearing. As a result, the seal must not only protect the running system reliably against contamination, the ingress of moisture and the loss of grease, but also ensure that the total frictional torque and heat generation in the bearing remain low despite the high sealing action. The new sealing shields, non-contact seals and contact seals of Generation C deep groove ball bearings (suffixes Z, BRS, HRS, ELS) demonstrate the success of Schaeffler in performing this difficult technical step effectively ➤*218*| *3* and ➤*218*| *4*. Description of sealing shields and seals ➤*222*| *1.5*.

✎ Gen. C = technical and economical advantages of very low friction

Electric motors, electrical machinery, washing machines, ventilators and electric tools are the preferred application areas of single row deep groove ball bearings. However, in order to facilitate further increases in the efficiency of these motors, machines and tools, the power loss occurring in the bearing arrangements must be reduced.
The above-mentioned measures for reducing noise also resulted, for example, in an approximate reduction in friction of 35%, giving the designer a range of application-specific advantages:

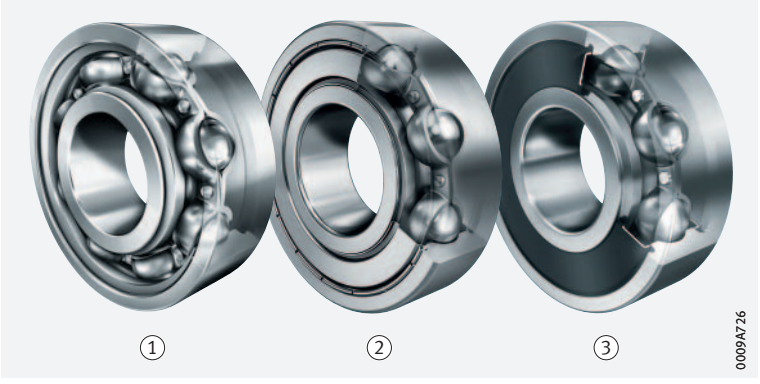
- lower heat generation
- a longer grease operating life
- higher possible speeds
- a longer bearing operating life
- a reduced energy consumption
- lower energy costs
- lower overall cost of the bearing position

✎ Gen. C = a leading player among single row deep groove ball bearings

In summary, this means that, in addition to their technical advantages, bearing positions with deep groove ball bearings of Generation C are also considerably more economical than bearing arrangements with single row standard deep groove ball bearings. Generation C is available in series 60, 62, 63 and 64.

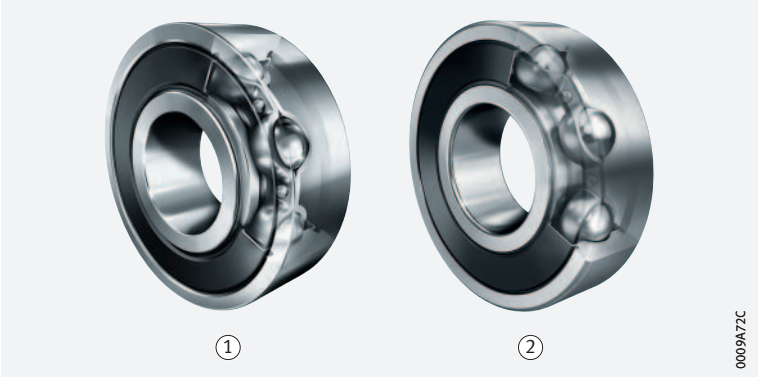
3
Single row deep groove ball bearings, Generation C, open or with non-contact seals

① *Open*
② *Sealing shield on both sides (suffix 2Z)*
③ *Non-contact seal on both sides (suffix 2BRS)*



4
Single row deep groove ball bearings, Generation C, contact seals

① *Contact seal on both sides (suffix 2HRS)*
② *Contact seal on both sides (suffix 2ELS)*



Matched bearing sets

Bearing sets in O, X or tandem arrangements

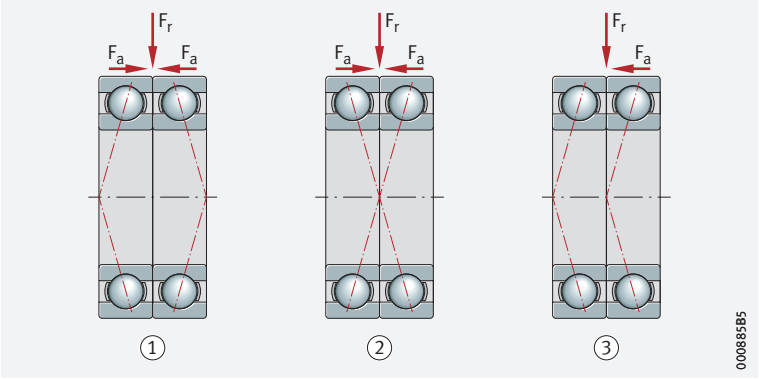
If the load carrying capacity of a single bearing is not sufficient, or the shaft is to be guided axially in both directions with a defined clearance, single row standard deep groove ball bearings are also available as matched bearing sets ➤ *219* | 5.

As the arrangement of the bearing pairs is specific to the application, Schaeffler supplies bearing sets by agreement.

5
Matched bearing sets

F_r = *radial load*
F_a = *axial load*

① *Set in O arrangement*
② *Set in X arrangement*
③ *Set in tandem arrangement*



Corrosion-resistant bearings

Wide product range

Corrosion-resistant bearings are suitable where particular requirements for corrosion protection are present. Schaeffler supplies deep groove ball bearings of this type in open and sealed designs.

The load carrying capacity for bearings made from corrosion-resistant steel is slightly lower than for bearings made from rolling bearing steel.

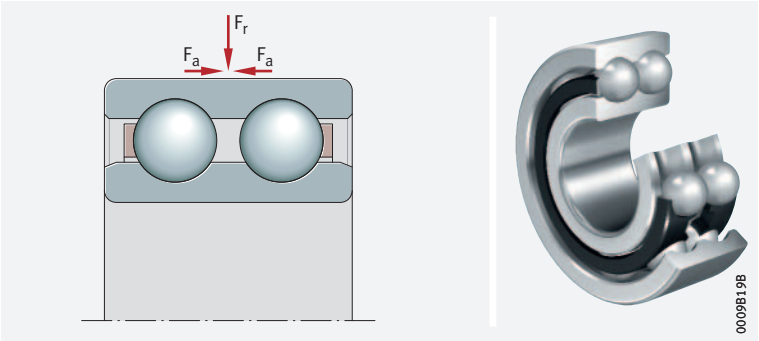
The range of these bearings and housings is described in detail in Technical Product Information TPI 64.

Double row deep groove ball bearings

Double row deep groove ball bearings of series 42 and 43 correspond in their structure and function to single row deep groove ball bearings arranged in pairs ➤ *219* | 6. They have deep raceway grooves in the bearing rings and a narrow osculation between the raceway grooves and balls. However, they are slightly narrower than two single row deep groove ball bearings of the series 62 and 63 with the same bore and outside diameter.

6
Double row deep groove ball bearing, open

F_r = *radial load*
F_a = *axial load*



1.2 Load carrying capacity

Single row deep groove ball bearings – radial load carrying capacity

Suitable for predominantly radial loads

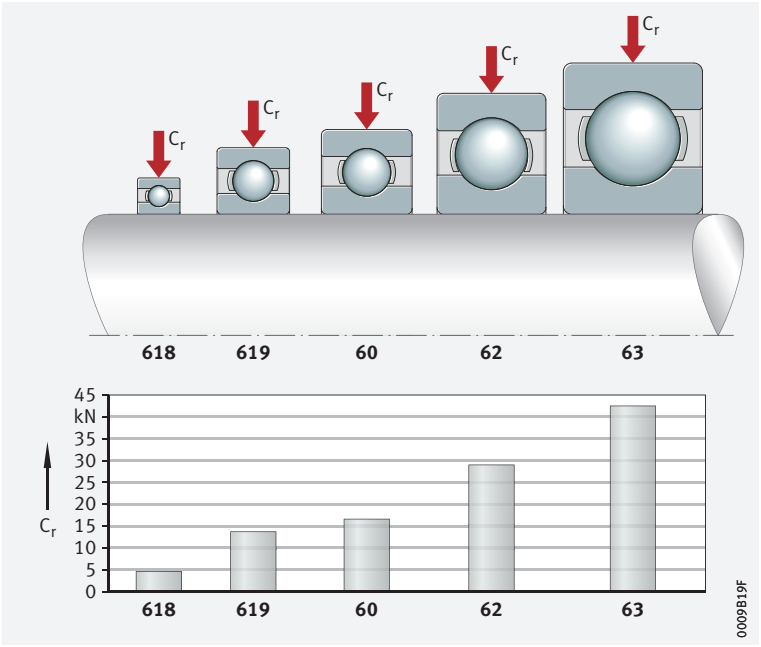
The balls are in contact with the raceways at one point only. Under purely radial load, the contact points between the rolling elements and raceways lie at the centre of the raceway. As a result, the connection between the contact points passes through the radial plane, i.e. the optimum load direction is a purely radial load ➤217|2.

Larger bearing cross-sections permit higher loads

The load carrying capacity is dependent on the bearing series. As a result, deep groove ball bearings of series 618 and 619, with their smaller bearing cross-sections, cannot support loads as high as series 60, 62 and 63 – with identical dimensions relative to bore diameter d – with their larger cross-sections ➤220|7.

7
Single row deep groove ball bearings, comparison of cross-section and load carrying capacity (radial load carrying capacity C_r) for bearings with d = 40 mm

C_r = *basic dynamic load rating*



Single row deep groove ball bearings – axial load carrying capacity

Capable of supporting axial loads in both directions

Due to the deep raceway grooves in the bearing rings and the narrow osculation between the raceway grooves and balls, single row deep groove ball bearings can support axial loads in both directions ➤217|2.
The axial load carrying capacity is dependent, for example, on the bearing size, the internal construction and the operating clearance.
If the axial load is too high, however, this can increase the running noise and considerably reduce the operating life of the bearings.

If there is any uncertainty regarding the axial load carrying capacity of the bearings, please consult Schaeffler.

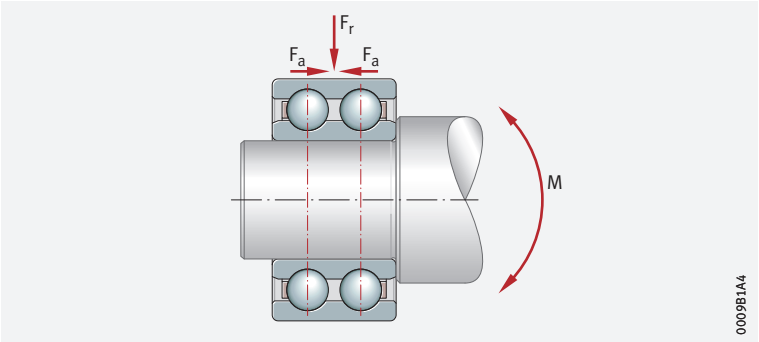
Double row deep groove ball bearings

Considerably higher load carrying capacity than single row bearings

Due to the larger number of rolling elements, double row deep groove ball bearings can be subjected to greater loads than single row deep groove ball bearings with an identical ball set. They can replace two single row deep groove ball bearings if a smaller design envelope width is required.

Also suitable for tilting moment loads

Double row deep groove ball bearings can also support tilting moment loads in addition to radial and axial loads ➤221|8. They are therefore suitable for particularly short shafts that are supported by only one bearing.



8
Unilateral bearing arrangement of a shaft with a double row deep groove ball bearing (flying bearing arrangement)

F_r = *radial load*
F_a = *axial load*
M = *tilting moment load*

1.3 Compensation of angular misalignments

Single row deep groove ball bearings – permissible adjustment angle

The adjustment angle is dependent on the magnitude of the load

Single row deep groove ball bearings are only suitable for compensating static angular misalignments to a very limited extent. As a result, the bearing positions must be well aligned. Misalignments shorten the operating life, as they place an additional strain on the bearing. In order to keep these loads at a low level, only small adjustment angles are permissible – dependent on the load – for deep groove ball bearings ➤*221* | *1*.

1
Permissible adjustment angles

Series	Adjustment angle for	
	low loads	high loads
62, 622, 63, 623, 64	5′ to 10′	8′ to 16′
618, 619, 160, 60	2′ to 6′	5′ to 10′

Double row deep groove ball bearings

Due to their internal construction, double row deep groove ball bearings do not have an angular adjustment facility. When using these bearings, therefore, misalignments are not permissible.

1.4 Lubrication

Single row deep groove ball bearings

Greased bearings are maintenance-free

Deep groove ball bearings sealed on both sides are lubricated with a high quality lithium soap grease with a mineral oil base, which has good anti-corrosion characteristics. The grease filling is measured so that it is sufficient for the entire life of the bearing. As a result, these bearings are generally maintenance-free.

Do not wash greased bearings out prior to mounting. If mounting is carried out using thermal tools, the bearings should not be heated to a temperature in excess of +80 °C, taking account of the grease filling and seal material. If higher heating temperatures are required, it must be ensured that the permissible upper temperature limits for grease and seals are not exceeded.

Schaeffler recommends the use of induction heating devices for heating purposes➤*235*.

Oil or grease lubrication is possible

Open bearings and bearings with seals on one side are not greased as standard. They must be lubricated with oil or grease. Lubrication is carried out via the end faces of the bearings.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

✎ *Observe oil change intervals*

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

Double row deep groove ball bearings

✎ *Open bearings are greased*

As standard, the bearings are lubricated with a high quality lithium soap grease with a mineral oil base and are maintenance-free for most applications.

1.5 Sealing

Single row deep groove ball bearings

✎ *The bearings are available in open and sealed designs*

Single row deep groove ball bearings are available in open designs, as well as with seals on one or both sides ➤*217*|*2*. In the case of sealed bearings, either non-contact or contact seals are used.

✎ *Provide seals in the adjacent construction*

In the case of unsealed bearings, sealing of the bearing position must be carried out by the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

Single row bearings with non-contact seals and sealing shields – standard bearings and Generation C

✎ *For bearing assemblies with high speeds and lower requirements for sealing*

Non-contact seals are particularly suitable for applications with high speeds and high requirements for low inherent heat generation ➤*223*|*2*. They are free from friction, except for a small amount of lubricant friction in the sealing gap. As a rule, non-contact seals do not undergo wear and therefore have an unlimited operating life. Deep groove ball bearings with non-contact seals on one or both sides have the suffixes RZ and 2RZ, or BRS and 2BRS; the suffixes Z and 2Z indicate seals on one or both sides with sealing shields.

✎ *Z sealing shields for standard bearings and for bearings of Gen. C*

Z sealing shields are made from sheet steel. They sit securely in the outer ring and form a narrow, non-contact seal gap relative to the surface of the inner ring ➤*223*|*2*. This sealing arrangement is particularly suitable for applications with a rotating inner ring, high to very high speeds and low contamination impact.

✎ *RZ seals for standard bearings of series 618 and 619*

RZ seals are rubberised sealing washers with a sheet steel reinforcement, which sit securely in the outer ring and form a narrow, non-contact seal gap relative to the surface of the inner ring ➤*223*|*2*.

✎ *BRS seals for bearings of Gen. C*

BRS seals are rubberised sealing washers with a sheet steel reinforcement, which sit securely in the outer ring and form a narrow, non-contact seal gap relative to the surface of the inner ring ➤*223*|*2*. The seal is securely anchored in the outer ring. A recess incorporated in the inner ring forms a labyrinth in conjunction with the seal lip, which is filled with grease. The frictional behaviour of this seal is comparable with that of the Z sealing shield, however, the protection against ingress of dust and egress of lubricant is higher.

Single row bearings with contact seals – standard bearings and Generation C

✎ *For lower speeds and higher requirements for sealing action*

As these seals are in contact with a defined contact pressure against their sliding surface, they provide very good sealing action against the egress of lubricant and ingress of moisture and dust. Attention must, however, be paid to the loss of energy resulting from friction at the sealing contact. Furthermore, in bearings with contact seals, the bearing speed is restricted by the permissible sliding velocity at the seal lip, i. e. the speed suitability of these bearings is lower than for open bearings or bearings with non-contact seals.

✎ *RSR seals, for standard bearings*

RSR seals are elastomer lip seals with a sheet steel reinforcement ➤*223*|*2*. One seal lip is in radial contact with the inner ring.

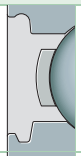
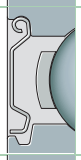
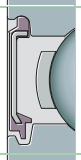
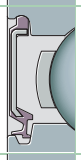
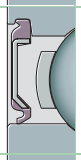
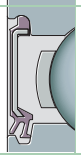
✎ HRS and ELS seals for bearings of Gen. C

HRS and ELS seals are securely anchored in a recess in the outer ring. The sealing material is vulcanised onto a sheet steel reinforcement ➤ *223* | ▦ *2*. The sealing washer, together with the inner ring, forms an axial sealing system. In addition, the outer non-contact lip forms a protective labyrinth with the inner ring. An additional increase in the sealing action is also provided by the film of grease between the two seal lips. With this sealing arrangement, higher speeds can be achieved than with conventional RSR seals, as the frictional torque and thus the heat generation in the bearing is lower.

Generation C deep groove ball bearings with contact seals are supplied with HRS seals as standard. ELS seals are available for these bearings by agreement.

▦ **2**
Seal characteristics – standard bearings and Generation C

+++ = *excellent*
++ = *very good*
\+ = *good*
o = *satisfactory*
– = *unsatisfactory*

Suffix	Type of seal		Seal characteristic				
			low-friction running	high speeds	sealing integrity against ingress of water	sealing integrity against ingress of dust	sealing integrity against loss of grease
–		open (without seals)	+++	+++	–	–	–
Z, 2Z		non-contact (sheet metal), for standard bearings and Gen. C	++	+++	o	o	o
RZ, 2RZ		non-contact (elastomer), for standard bearings	++	+++	o	o	o
BRS, 2BRS		non-contact (elastomer), for Gen. C	++	+++	o	+	+
HRS, 2HRS		contact (elastomer), for Gen. C	o	+	++	++	++
RSR, 2RSR		contact (elastomer), for standard bearings	o	+	+	++	++
ELS, 2ELS		contact (elastomer), for Gen. C	+	++	++	+++	+++

Double row deep groove ball bearings

The bearings are of an open design

Double row deep groove ball bearings are not sealed. As a result, sealing of the bearing position must be carried out by the adjacent construction ➤222|1.5.

1.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

The values given in the product tables are valid for oil lubrication in the case of bearings without seals or shields and for grease lubrication where bearings are supplied greased and with seals or shields.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

Values for grease lubrication

For the grease lubrication of bearings without seals or shields, 85% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 65% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

Bearings with contact seals

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

Speeds for bearing sets

For matched bearing pairs in an O, X or tandem arrangement, the speed must be limited to approx. 80% of the individual bearings. More accurate speed data for a specific application can be requested from Schaeffler.

1.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

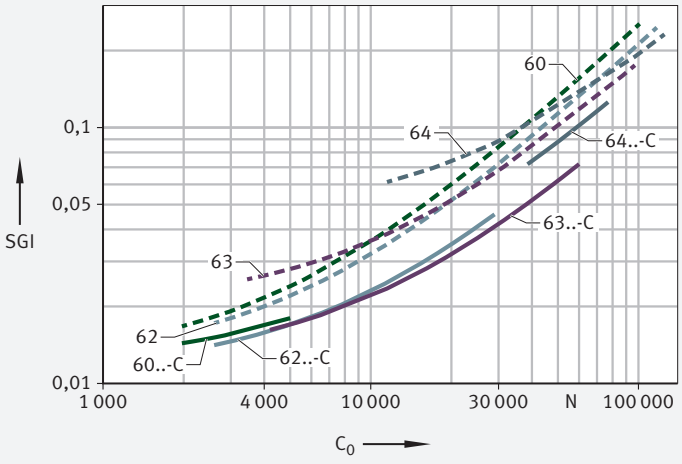
The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:

- ***medias*** *https://medias.schaeffler.com*

9
Schaeffler Noise Index for deep groove ball bearings

SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals

Possible operating temperatures of single row deep groove ball bearings ➤*225*|▦*3*.

3
Permissible temperature ranges

Operating temperature	Open deep groove ball bearings		Sealed deep groove ball bearings	
	with brass or sheet steel cage	with polyamide cage PA66	with seals BRS, 2BRS ELS, 2ELS HRS, 2HRS RSR, 2RSR RZ, 2RZ	with gap seals Z, 2Z
	$D \leqq 90$ mm, −30 °C to +120 °C[1)]	−30 °C to +120 °C	−30 °C to +110 °C, limited by the lubricant, cage material and seal material	−30 °C to +120 °C, limited by the lubricant, cage material and seal material
	90 mm $< D \leqq 240$ mm, −30 °C to +150 °C[1)]			
	$D > 240$ mm, −30 °C to +200 °C[1)]			

[1)] *By agreement, dimensionally stabilised for higher temperatures.*

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Single row bearings: sheet steel or solid brass cages are used as standard

Standard cages for single row deep groove ball bearings are made from sheet steel or brass ➤*226*|▦ *4*. Other cage designs are available ➤*229*|▦ *8*. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

▦ **4**
Cage, cage suffix, bore code for single row deep groove ball bearings

Bearing series	Sheet steel cage	Sheet brass cage Y	Solid brass cage M
	Bore code		
60	up to 34	–	from 36
62	up to 30	–	from 32
63	up to 26, 30	–	28, from 32
64	up to 14	–	from 15
160	up to 52	–	from 56
618	up to 08, 26, 30 to 56	09 to 24, 28	from 60
619	up to 18, 21, 32 to 48	–	26
622	up to 12	–	–
623	up to 10	–	–

Double row bearings

Double row deep groove ball bearings have cages made from glass fibre reinforced polyamide.

For high continuous temperatures and applications with difficult operating conditions, bearings with brass or sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

Cages for bearings of Generation C

Riveted sheet metal cages used as standard

In bearings of Generation C, a noise-optimised, riveted sheet steel cage is used as the standard cage. This cage design does not have a cage suffix in the bearing designation.

The bearings are also available with cages made from glass fibre reinforced polyamide by agreement.

1.10 Internal clearance

Radial internal clearance

The standard is CN

Deep groove ball bearings of basic design and bearings of Generation C are manufactured as standard with radial internal clearance CN (Normal) ➤227|▦5. CN is not stated in the designation.

The bearings are also available with the smaller internal clearance C2 and with the larger internal clearance C3 and C4.

CM also available for smaller bore diameters

Deep groove ball bearings with a bore diameter $10 \leqq d \leqq 50$ are also available with the more closely toleranced bearing internal clearance CM (specifically for use in electric motors) ➤227|▦6.

DIN ISO

The values for radial internal clearance (not CM) correspond to DIN 620-4:2004 (ISO 5753-1:2009). They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦5 *Radial internal clearance of deep groove ball bearings – standard bearings and Gen. C*

Nominal bore diameter d mm		Radial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
1,5	6	0	7	2	13	8	23	–	–
6	10	0	7	2	13	8	23	14	29
10	18	0	9	3	18	11	25	18	33
18	24	0	10	5	20	13	28	20	36
24	30	1	11	5	20	13	28	23	41
30	40	1	11	6	20	15	33	28	46
40	50	1	11	6	23	18	36	30	51
50	65	1	15	8	28	23	43	38	61
65	80	1	15	10	30	25	51	46	71
80	100	1	18	12	36	30	58	53	84
100	120	2	20	15	41	36	66	61	97
120	140	2	23	18	48	41	81	71	114
140	160	2	23	18	53	46	91	81	130
160	180	2	25	20	61	53	102	91	147
180	200	2	30	25	71	63	117	107	163
200	225	2	35	25	85	75	140	125	195
225	250	2	40	30	95	85	160	145	225
250	280	2	45	35	105	90	170	155	245

▦6 *Radial internal clearance CM*

Nominal bore diameter d mm		Radial internal clearance CM µm	
over	incl.	min.	max.
10	18	4	11
18	24	5	12
24	30	5	12
30	40	9	17
40	50	9	17

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of single row deep groove ball bearings correspond to DIN 625-1:2011. Nominal dimensions of single row deep groove ball bearings ➤236|.

The main dimensions of double row deep groove ball bearings correspond to DIN 625-3:2011. Nominal dimensions of double row deep groove ball bearings ➤280|.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤137|7.11. Nominal value of chamfer dimension ➤236|.

Tolerances for standard bearings

The tolerances for the dimensional and running accuracy of single and double row standard bearings correspond to tolerance class Normal in accordance with ISO 492:2014. Bearings with a higher accuracy are available by agreement. Tolerance values in accordance with ISO 492 ➤124|8.

The width tolerance of matched bearings deviates from the values in the above-mentioned standard ➤228|7.

7 *Width tolerance of bearing rings in matched bearings*

Tolerance symbols in accordance with ISO 492 ➤117|6

U = *upper limit deviation*

L = *lower limit deviation*

Nominal bore diameter d mm		Width deviation $t_{\Delta Bs}$ µm	
over	incl.	U	L
–	18	0	−250
18	50	0	−300
50	80	0	−450
80	120	0	−550
120	180	0	−750
180	250	0	−950
250	315	0	−1050

Tolerances for bearings of Generation C

The dimensional and running tolerances correspond to tolerance class 6 in accordance with ISO 492:2014. Bearings with a higher accuracy are available by agreement. Tolerance values in accordance with ISO 492 ➤126|11.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail. Further special designs of deep groove ball bearings are available by agreement.

8 *Suffixes and corresponding descriptions, single row deep groove ball bearings*

Suffix	Description of suffix	
C	Deep groove ball bearing, Generation C	Standard
M	Solid brass cage, ball-guided	
MA	Solid brass cage, guided on outer ring rib	Available by agreement
MB	Solid brass cage, guided on inner ring rib	
TVH	Solid cage made from glass fibre reinforced polyamide PA66	Available by agreement
Y	Sheet brass cage	Available by agreement
C2	Radial internal clearance C2 (smaller than normal)	Available by agreement
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
CM	Radial internal clearance more closely toleranced than normal	
2BRS	Non-contact seal on both sides (labyrinth seal)	Standard for Generation C
BRS	Non-contact seal on one side (labyrinth seal)	Available by agreement
2HRS	Contact seal on both sides (lip seal)	Standard for Generation C
2RSR	Contact seal on both sides (lip seal)	Standard
RSR	Contact seal on one side (lip seal)	Available by agreement
2RZ	Non-contact seal on both sides (rubberised gap seal)	Standard
RZ	Non-contact seal on one side (rubberised gap seal)	Available by agreement
2Z	Non-contact sealing shield on both sides (sheet metal gap seal)	Standard
Z	Non-contact sealing shield on one side (sheet metal gap seal)	Available by agreement
2ELS	Contact seal on both sides (lip seal)	Available by agreement for Generation C
ELS	Contact seal on one side (lip seal)	Available by agreement for Generation C
S0	Dimensionally stabilised bearing for operating temperatures up to +150 °C	Available by agreement
S1	Dimensionally stabilised bearing for operating temperatures up to +200 °C	Available by agreement
S2	Dimensionally stabilised bearing for operating temperatures up to +250 °C	Available by agreement

9 *Suffixes and corresponding descriptions, double row deep groove ball bearings*

Suffix	Description of suffix	
B	Modified internal construction	Standard
BB		
TVH	Solid cage made from glass fibre reinforced polyamide PA66	Standard

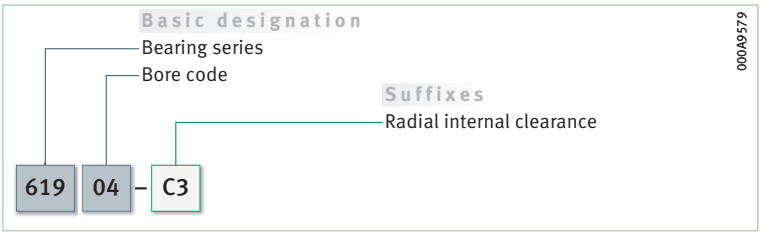
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

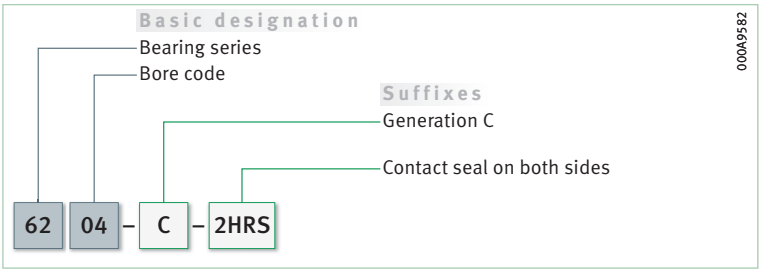
✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤ *230*| *10*, ➤ *230*| *11* and ➤ *230*| *12*. The composition of designations is subject to DIN 623-1 ➤ *102*| *10*.

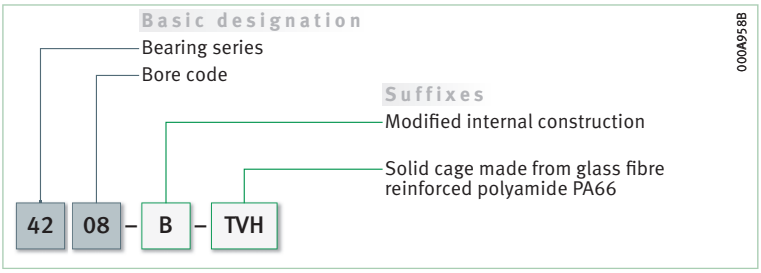
10
Single row deep groove ball bearing, open: designation structure



11
Single row deep groove ball bearing, sealed, Generation C: designation structure



12
Double row deep groove ball bearing, open: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

✎ *P is a substitute force for combined load and various load cases*

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ *$F_a/F_r \leqq e$ or $F_a/F_r > e$*

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factor e ➤ *231*| *1* and ➤ *231*| *2*.

f1 *Equivalent dynamic load*

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r$$

f2 *Equivalent dynamic load*

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = X \cdot F_r + Y \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load
e, X, Y	–	Factors ➤*231*|▦ *10*.

The specified values are valid for normal operating clearance ➤*231*\|▦ *10*.

If the operating clearance differs significantly, the use of BEARINX is recommended for calculation of the rating life. If the calculation values lie between the stated values (such as 0,4), then read off the table values for 0,3 and 0,5 and determine the intermediate values using linear interpolation.

For normal operating clearance, see Recommended fits ➤*148*.

▦ 10 *Factors e, X and Y*

$\frac{f_0 \cdot F_a}{C_{0r}}$	Factor (for normal operating clearance)		
	e	X	Y
0,3	0,22	0,56	2
0,5	0,24	0,56	1,8
0,9	0,28	0,56	1,58
1,6	0,32	0,56	1,4
3	0,36	0,56	1,2
6	0,43	0,56	1

Legend

C_{0r}	N	Basic static load rating ➤*236*|▦
f_0	–	Factor ➤*236*|▦
F_a	N	Axial load.

Equivalent static bearing load

✎ *$F_{0a}/F_{0r} \leqq 0,8$ or $F_{0a}/F_{0r} > 0,8$*

For deep groove ball bearings under static load ➤*231*\|*f3* and ➤*231*\|*f4*. The calculation of P_0 is dependent on the load ratio F_{0a}/F_{0r} and the factor 0,8.

f3 *Equivalent static load*

$$\frac{F_{0a}}{F_{0r}} \leqq 0,8 \quad \Rightarrow \quad P_0 = F_{0r}$$

f4 *Equivalent static load*

$$\frac{F_{0a}}{F_{0r}} > 0,8 \quad \Rightarrow \quad P_0 = 0,6 \cdot F_{0r} + 0,5 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*231*\|*f5*.

f5 *Static load safety factor*

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/100$ is required

In order that no slippage occurs between the contact partners, the deep groove ball bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/100$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and thus also achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤*233*|▦ *11* to ➤*234*|▦ *13*.

Radial location of bearings – fit recommendations

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤*152*|▦ *6* and ➤*160*|▦ *7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤*146*
- conditions of rotation ➤*147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*149*|▦ *2*
- shaft fits ➤*152*|▦ *6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*150*|▦ *4*
- housing fits ➤*160*|▦ *7*

Axial location of bearings – location methods

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable.

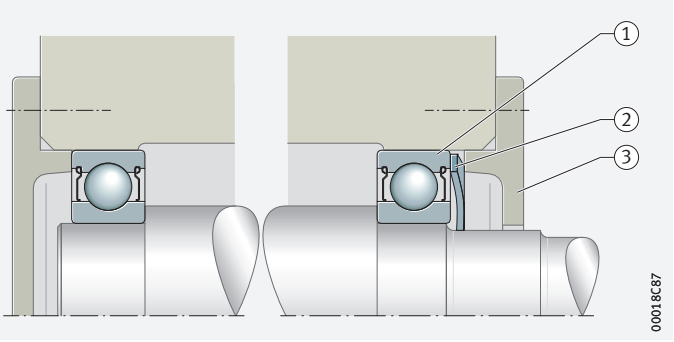
Axial adjustment by means of spring element to reduce noise

Example: single row deep groove ball bearing, bearing arrangement in an electric motor

If the bearing arrangement is to run particularly quietly, this can be achieved economically with commonly available spring elements ➤*233*|*13*. The bearings in the figure must only support guidance forces in an axial direction. The inner rings have a tight fit on the shaft and are abutted on the shaft shoulders. The outer rings are mounted with a sliding seat. A spring washer is fitted between the outer ring of the right hand bearing and the cover collar. The bearings are thus axially adjusted by the tensioned springs. This achieves particularly smooth running.

13
Bearing arrangement axially adjusted with a spring washer

① *Deep groove ball bearing*
② *Spring washer*
③ *Cover*



Dimensional, geometrical and running accuracy of the bearing seats

For bearings with tolerance class Normal, a minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For deep groove ball bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7; with tolerance class 6, the shaft seat should correspond to a minimum of IT5 and the housing seat to a minimum of IT6. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤*233*|▦ *11*. Tolerances t_1 to t_3 in accordance with ➤*170*|*11*. Numerical values for IT grades ➤*234*|▦ *12*.

11
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
6	P6	Shaft	IT5	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	
		Housing	IT6	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	

12 *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm							
	over –	3	6	10	18	30	50	80
	incl. 3	6	10	18	30	50	80	120
	Values in µm							
IT3	2	2,5	2,5	3	4	4	5	6
IT4	3	4	4	5	6	7	8	10
IT5	4	5	6	8	9	11	13	15
IT6	6	8	9	11	13	16	19	22
IT7	10	12	15	18	21	25	30	35

continued ▼

12 *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm							
	over 120	180	250	315	400	500	630	800
	incl. 180	250	315	400	500	630	800	1 000
	Values in µm							
IT3	8	10	12	13	15	16	18	21
IT4	12	14	16	18	20	22	25	28
IT5	18	20	23	25	27	32	36	40
IT6	25	29	32	36	40	44	50	56
IT7	40	46	52	57	63	70	80	90

continued ▲

Roughness of cylindrical bearing seating surfaces

✎ Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤ *234* | **13**.

13 *Roughness values for cylindrical bearing seating surfaces – guide values*

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4
500	1 250	3,2[1)]	1,6	1,6	0,8

1) *For the mounting of bearings using the hydraulic method, a value Ra = 1,6 µm must not be exceeded.*

Mounting dimensions for the contact surfaces of bearing rings

✎ The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders are given in the product tables. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

1.17 Mounting and dismounting

The mounting and dismounting options for deep groove ball bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

✎ Ensure that the bearings are not damaged during mounting.

Deep groove ball bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Schaeffler Mounting Handbook

✎ Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

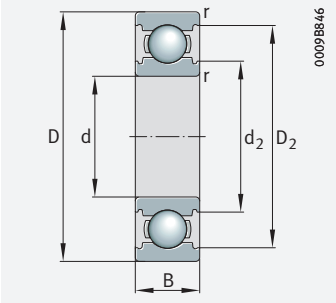
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

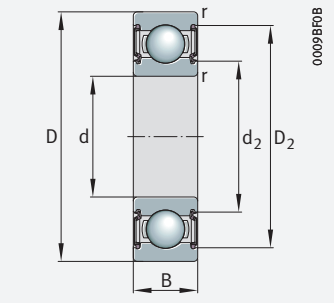
- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *185*
- Design of bearing arrangements ➤ *141*
- Mounting and dismounting ➤ *194*

Deep groove ball bearings

Single row



Generation C, open

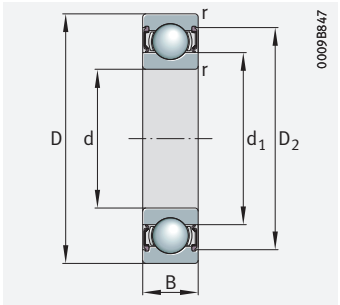


With seal 2BRS, 2HRS, 2Z

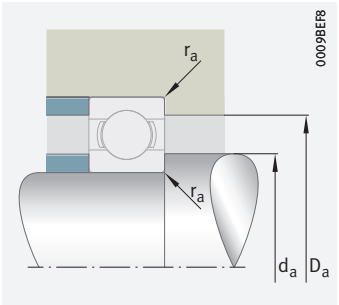
d = 2 – 9 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
2	5	2,3	169	50	1,3	137 000	–	13	0,001	**682-2Z**
	6	3	330	99	2,7	112 000	–	11,5	–	**692-2Z**
	7	3,5	386	128	3,5	102 000	82 000	12,7	0,001	**602-2Z**
3	7	3	311	112	2,95	103 000	–	14	0,001	**683-2Z**
	8	4	559	179	4,8	87 000	–	11,8	0,001	**693-2Z**
	10	4	641	226	11,7	81 000	59 000	12,8	0,002	**623-2Z**
4	9	4	641	226	6	81 000	–	12,8	0,002	**684-2Z**
	12	4	959	347	9,3	69 000	55 000	12,4	0,002	**604-2Z**
	13	5	1 306	487	25,5	61 000	44 500	12,3	0,003	**624-2Z**
	16	5	1 735	671	23	53 000	32 500	12,4	0,006	**634-2Z**
5	11	5	716	283	7,5	71 000	–	14	0,002	**685-2Z**
	14	5	1 330	507	13,8	58 000	45 000	12,8	0,004	**605-2Z**
	16	5	1 735	671	23	53 000	36 000	12,4	0,005	**625-2Z**
	19	6	2 750	1 050	55	45 000	27 500	12,2	0,009	**635-2Z**
6	13	5	1 080	438	11,7	61 000	–	13,7	0,003	**686-2Z**
	17	6	2 260	838	52	48 000	41 000	11,4	0,006	**606-2Z**
	19	6	2 614	1 053	67	45 000	30 500	12,3	0,008	**626-2Z**
7	14	5	1 180	511	13,6	58 000	–	14,2	0,003	**687-2Z**
	19	6	2 340	889	30,5	45 500	37 000	12,1	0,008	**607-2Z**
	22	7	3 297	1 368	74	40 000	28 000	12,4	0,014	**627-2Z**
8	16	5	1 260	590	15,7	53 000	–	14,8	0,004	**688-2Z**
	22	7	3 297	1 368	74	40 000	31 500	12,4	0,012	**608-2Z**
	24	8	3 330	1 410	59	39 000	29 000	12,8	0,018	**628-2Z**
9	17	5	1 330	664	17,6	51 000	–	15,1	0,005	**689-2Z**
	24	7	3 350	1 430	43	38 000	28 500	13	0,016	**609-2Z**
	26	8	5 300	1 970	136	44 500	27 000	12,4	0,019	**629-C**
	26	8	5 300	1 970	136	28 500	–	12,4	0,02	**629-C-2HRS**
	26	8	5 300	1 970	136	38 000	27 000	12,4	0,02	**629-C-2Z**

medias *https://www.schaeffler.de/std/1F9A*



With seal 2Z

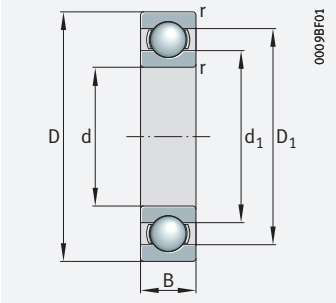


Mounting dimensions

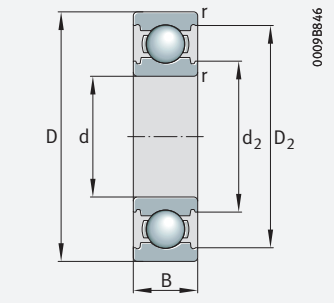
Dimensions						Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a
	min.	≈	≈	≈		min.	max.	max.
2	0,08	–	4,4	2,7	–	2,52	4,48	0,08
	0,15	–	5,4	3	–	2,8	5,2	0,15
	0,15	–	6,2	–	3,15	2,8	6,2	0,15
3	0,1	–	6,35	–	3,85	3,6	6,4	0,1
	0,15	–	7,25	4,35	–	3,8	7,2	0,15
	0,15	–	7,98	–	4,35	4,4	8,6	0,15
4	0,1	–	8,1	5,2	–	4,6	8,4	0,1
	0,2	–	9,85	–	5,6	5,4	10,6	0,2
	0,2	–	11,35	–	6	5,8	11,2	0,2
	0,3	–	13	–	6,7	6,4	13,6	0,3
5	0,15	–	9,9	–	6,2	5,8	10,2	0,15
	0,2	–	12,2	–	6,9	6,4	12,6	0,2
	0,3	–	13,8	–	7,5	7,4	13,6	0,3
	0,3	–	16,5	–	8,5	7,4	16,6	0,3
6	0,15	–	11,7	–	7,4	6,8	12,2	0,15
	0,3	–	14,8	–	8,2	8	15	0,3
	0,3	–	16,5	–	8,5	8,4	16,6	0,3
7	0,15	–	12,7	–	8,5	7,8	13,2	0,15
	0,3	–	16,5	–	9	9	17	0,3
	0,3	–	19,03	–	10,5	9,4	19,6	0,3
8	0,2	–	14,2	–	9,65	9,4	14,6	0,2
	0,3	–	19,03	–	10,5	10	20	0,3
	0,3	–	19,9	–	11,9	10,4	21,6	0,3
9	0,2	–	15,2	–	10,7	10,4	15,6	0,2
	0,3	–	20,48	–	12,1	11	22	0,3
	0,3	–	23,1	–	13,6	11,4	23,6	0,3
	0,3	–	23,1	–	13,6	11,4	23,6	0,3
	0,3	–	23,1	–	13,6	11,4	23,6	0,3

Deep groove ball bearings

Single row



Open

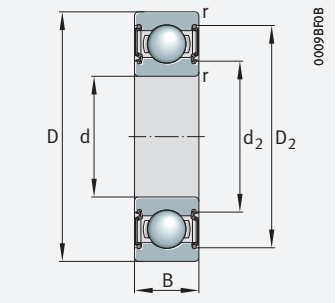


Generation C, open

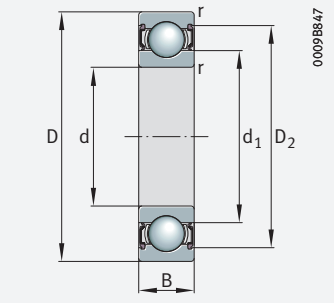
d = 10 – 10 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
10	19	5	1 720	840	58	54 000	27 500	14,8	–	**61800**
	19	5	1 720	840	58	21 000	–	14,8	0,006	**61800-2RSR**
	19	5	1 720	840	58	46 000	27 500	14,8	0,006	**61800-2Z**
	22	6	2 700	1 270	67	48 000	27 000	14	0,01	**61900**
	22	6	2 700	1 270	67	19 200	–	14	0,012	**61900-2RSR**
	22	6	2 700	1 020	67	41 000	27 000	14	0,01	**61900-2Z**
	26	8	5 300	1 970	136	44 500	30 000	12,4	0,017	**6000-C**
	26	8	5 300	1 970	136	28 500	–	12,4	0,018	**6000-C-2HRS**
	26	8	5 300	1 970	136	38 000	30 000	12,4	0,019	**6000-C-2Z**
	30	9	7 000	2 600	181	40 500	26 000	12	0,029	**6200-C**
	30	9	7 000	2 600	181	26 000	–	12	0,03	**6200-C-2HRS**
	30	9	7 000	2 600	181	34 500	26 000	12	0,03	**6200-C-2Z**
	30	14	5 970	2 630	200	16 700	–	12,2	0,044	**62200-2RSR**
	35	11	8 600	3 450	237	31 000	21 100	11,3	0,053	**6300**
	35	11	8 600	3 450	179	14 800	–	11,3	0,057	**6300-2RSR**
	35	11	8 600	3 450	237	26 500	21 100	11,3	0,054	**6300-2Z**
	35	17	8 100	3 440	270	15 000	–	11,2	0,06	**62300-2RSR**

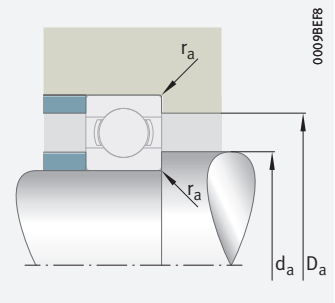
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR

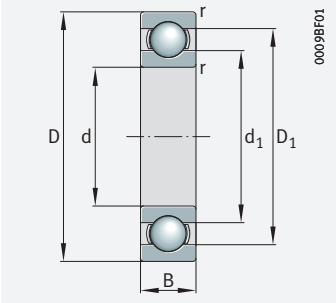


Mounting dimensions

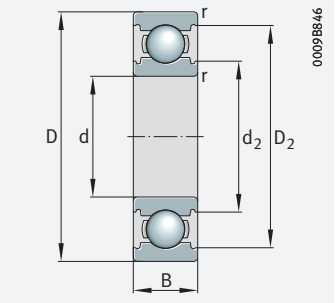
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
10	0,3	–	–	–	–	12	17	0,3
	0,3	–	17,2	–	11,8	12	17	0,3
	0,3	–	17,2	–	11,8	12	17	0,3
	0,3	18,2	–	13,9	–	12	20	0,3
	0,3	–	19,4	–	13,2	12	20	0,3
	0,3	–	19,4	–	13,2	12	20	0,3
	0,3	–	23,09	–	13,69	12	24	0,3
	0,3	–	23,09	–	13,69	12	24	0,3
	0,3	–	23,09	–	13,69	12	24	0,3
	0,6	–	25,64	–	15,14	14,2	25,8	0,6
	0,6	–	25,64	–	15,14	14,2	25,8	0,6
	0,6	–	25,64	–	15,14	14,2	25,8	0,6
	0,6	–	25,75	16	–	14,2	25,8	0,6
	0,6	27,08	–	18,1	–	14,2	30,8	0,6
	0,6	–	29,5	19,4	–	14,2	30,8	0,6
	0,6	–	28,65	18,1	–	14,2	30,8	0,6
	0,6	–	30,2	17,85	–	14,2	30,8	0,6

Deep groove ball bearings

Single row



Open

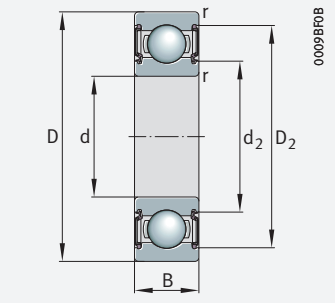


Generation C, open

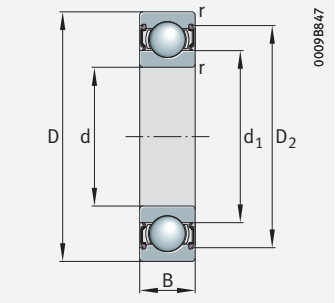
d = 12 – 12 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
12	21	5	1 920	1 040	47,5	50 000	23 500	15,3	0,007	**61801**
	21	5	1 920	1 040	47,5	18 100	–	15,3	0,007	**61801-2RSR**
	21	5	1 920	1 040	47,5	42 500	23 500	15,3	0,006	**61801-2Z**
	24	6	2 890	1 460	77	45 000	23 300	14,5	0,012	**61901**
	24	6	2 890	1 460	77	16 700	–	14,5	0,012	**61901-2RSR**
	24	6	2 890	1 460	77	38 000	23 300	14,5	0,012	**61901-2Z**
	28	8	5 900	2 370	164	42 500	26 000	13,1	0,019	**6001-C**
	28	8	5 900	2 370	164	24 900	–	13,1	0,02	**6001-C-2HRS**
	28	8	5 900	2 370	164	36 000	26 000	13,1	0,021	**6001-C-2Z**
	32	10	8 000	3 100	213	37 000	24 600	12,3	0,037	**6201-C**
	32	10	8 000	3 100	213	22 500	–	12,3	0,036	**6201-C-2HRS**
	32	10	8 000	3 100	213	31 500	24 600	12,3	0,036	**6201-C-2Z**
	32	14	6 890	3 090	243	14 700	–	12,3	0,049	**62201-2RSR**
	37	17	9 710	4 190	330	13 900	–	11,1	0,085	**62301-2RSR**
	37	12	11 500	4 200	290	31 000	21 900	11,1	0,062	**6301-C**
	37	12	11 500	4 200	290	21 700	–	11,1	0,059	**6301-C-2HRS**
	37	12	11 500	4 200	290	26 500	21 900	11,1	0,059	**6301-C-2Z**

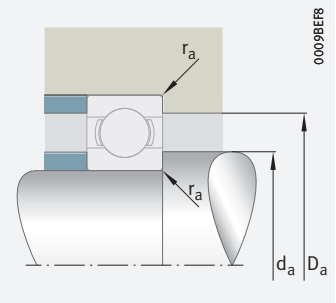
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR

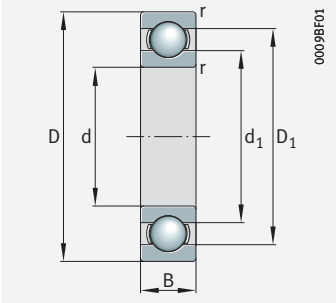


Mounting dimensions

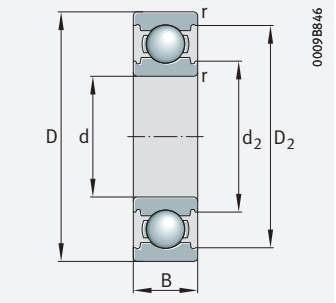
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
12	0,3	18,3	–	14,8	–	14	19	0,3
	0,3	–	19,2	–	13,8	14	19	0,3
	0,3	–	19,2	–	13,8	14	19	0,3
	0,3	20,3	–	16	–	14	22	0,3
	0,3	–	21,4	–	15,4	14	22	0,3
	0,3	–	21,4	–	15,4	14	22	0,3
	0,3	–	25,1	–	15,69	14	26	0,3
	0,3	–	25,1	–	15,69	14	26	0,3
	0,3	–	25,1	–	15,69	14	26	0,3
	0,6	–	27,92	–	17,34	16,2	27,8	0,6
	0,6	–	27,92	–	17,34	16,2	27,8	0,6
	0,6	–	27,92	–	17,34	16,2	27,8	0,6
	0,6	–	27,93	18,25	–	16,2	27,8	0,6
	1	–	32,6	19,25	–	17,6	31,4	1
	1	–	32	–	17,97	17,6	31,4	1
	1	–	32	–	17,97	17,6	31,4	1
	1	–	32	–	17,97	17,6	31,4	1

Deep groove ball bearings

Single row



Open

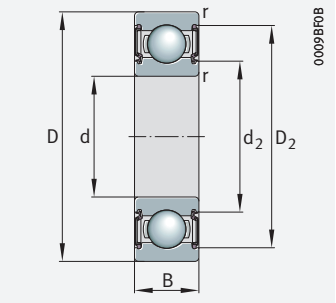


Generation C, open

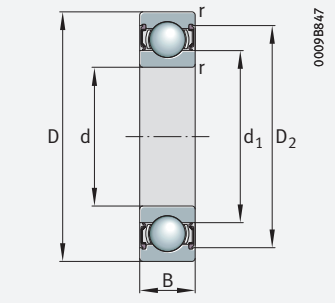
d = 15 – 15 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
15	24	5	2 070	1 260	57	45 000	19 200	15,9	0,008	**61802**
	24	5	2 070	1 260	57	15 000	–	15,9	0,008	**61802-2RSR**
	24	5	2 070	1 260	57	38 000	19 200	15,9	–	**61802-2Z**
	28	7	4 330	2 250	132	38 000	20 600	14,3	0,019	**61902**
	28	7	4 330	2 250	132	14 200	–	14,3	0,019	**61902-2RSR**
	28	7	4 330	2 250	132	32 000	20 600	14,3	0,019	**61902-2Z**
	32	8	5 590	2 840	191	33 500	20 000	13,9	0,025	**16002**
	32	9	6 300	2 850	191	37 000	23 200	14	0,027	**6002-C**
	32	9	6 300	2 850	191	20 300	–	14	0,029	**6002-C-2HRS**
	32	9	6 300	2 850	191	31 500	23 200	14	0,029	**6002-C-2Z**
	35	11	8 900	3 750	260	33 000	21 900	13	0,042	**6202-C**
	35	11	8 900	3 750	260	19 400	–	13	0,044	**6202-C-2HRS**
	35	11	8 900	3 750	260	28 000	21 900	13	0,044	**6202-C-2Z**
	35	14	7 730	3 760	220	12 700	–	13,1	0,056	**62202-2RSR**
	42	17	11 330	5 350	420	11 500	–	12,1	0,106	**62302-2RSR**
	42	13	13 300	5 300	370	27 500	19 200	12	0,081	**6302-C**
	42	13	13 300	5 300	370	17 700	–	12	0,083	**6302-C-2HRS**
	42	13	13 300	5 300	370	23 500	19 200	12	0,084	**6302-C-2Z**

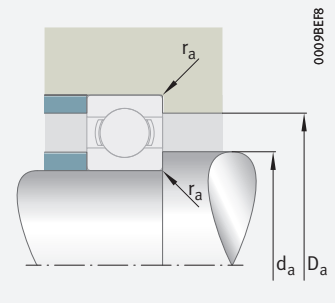
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2Z

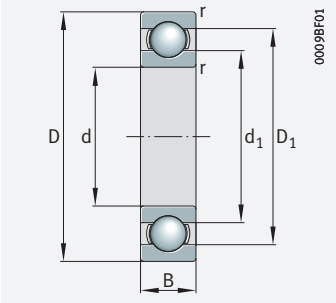


Mounting dimensions

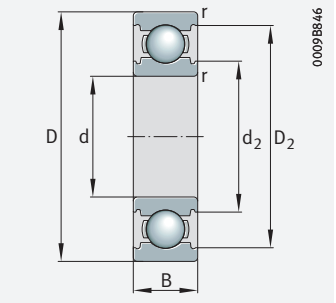
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
15	0,3	21,3	–	17,8	–	17	22	0,3
	0,3	–	22,2	–	16,8	17	22	0,3
	0,3	–	22,2	–	16,8	17	22	0,3
	0,3	24,2	–	18,8	–	17	26	0,3
	0,3	–	25,3	18,8	–	17	26	0,3
	0,3	–	25,3	18,8	–	17	26	0,3
	0,3	26,8	–	20,5	–	17	30	0,3
	0,3	–	28,75	–	19,18	17	30	0,3
	0,3	–	28,75	–	19,18	17	30	0,3
	0,3	–	28,75	–	19,18	17	30	0,3
	0,6	–	30,92	–	20,08	19,2	30,8	0,6
	0,6	–	30,92	–	20,08	19,2	30,8	0,6
	0,6	–	30,92	–	20,08	19,2	30,8	0,6
	0,6	–	30,56	21,05	–	19,2	30,8	0,6
	1	–	36,16	23,2	–	20,6	36,4	1
	1	–	36	–	21,97	20,6	36,4	1
	1	–	36	–	21,97	20,6	36,4	1
	1	–	36	–	21,97	20,6	36,4	1

Deep groove ball bearings

Single row



Open

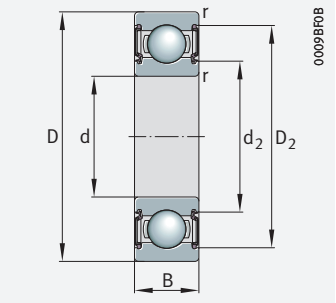


Generation C, open

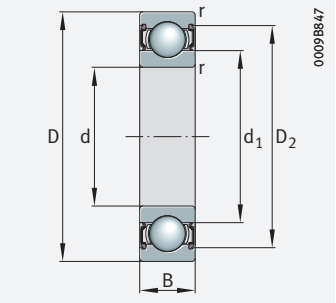
d = 17 – 17 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤ *229* | *1.12* ➤ *230* | *1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
17	26	5	2 230	1 460	67	41 500	17 100	16,1	0,008	**61803**
	26	5	2 230	1 460	67	13 500	–	16,1	0,008	**61803-2RSR**
	26	5	2 230	1 460	67	35 000	17 100	16,1	–	**61803-2Z**
	30	7	4 590	2 560	150	34 500	17 800	14,8	0,014	**61903**
	30	7	4 590	2 560	150	12 700	–	14,8	0,02	**61903-2RSR**
	30	7	4 590	2 560	150	29 000	17 800	14,8	0,017	**61903-2Z**
	35	10	6 400	3 250	162	31 000	20 300	14,3	0,038	**6003**
	35	8	6 000	3 250	207	31 000	17 700	14,3	0,032	**16003**
	35	10	6 400	3 250	162	11 800	–	14,3	0,04	**6003-2RSR**
	35	10	6 400	3 250	162	26 000	20 300	14,3	0,037	**6003-2Z**
	40	12	11 000	4 750	330	29 000	20 100	13	0,061	**6203-C**
	40	12	11 000	4 750	330	16 900	–	13	0,066	**6203-C-2HRS**
	40	12	11 000	4 750	330	24 600	20 100	13	0,067	**6203-C-2Z**
	40	16	9 555	4 760	355	11 100	–	13,1	0,085	**62203-2RSR**
	47	19	13 630	6 620	520	9 700	–	12,4	0,152	**62303-2RSR**
	47	14	15 800	6 500	450	24 500	17 400	12,2	0,114	**6303-C**
	47	14	15 800	6 500	450	15 700	–	12,2	0,118	**6303-C-2HRS**
	47	14	15 800	6 500	450	20 800	17 400	12,2	0,117	**6303-C-2Z**
	62	17	23 800	11 500	780	16 200	11 600	12,4	0,27	**6403**

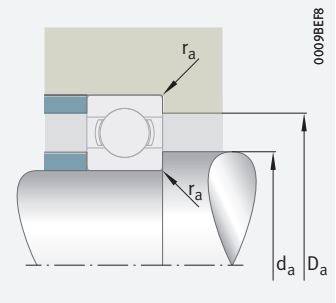
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2Z

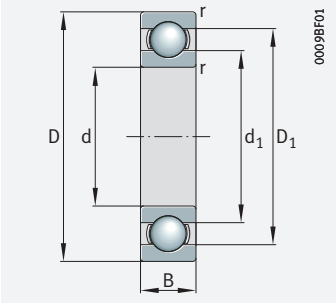


Mounting dimensions

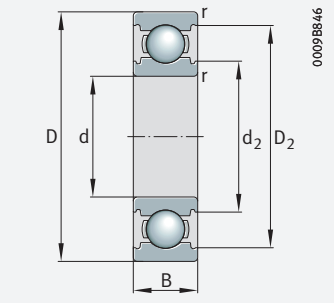
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
17	0,3	23,3	–	19,8	–	19	24	0,3
	0,3	–	24,2	–	18,8	19	24	0,3
	0,3	–	24,2	–	18,8	19	24	0,3
	0,3	26,8	–	21	–	19	28	0,3
	0,3	–	27,8	21	–	19	28	0,3
	0,3	–	27,8	21	–	19	28	0,3
	0,3	29,51	–	22,65	–	19	33	0,3
	0,3	29,46	–	22,8	–	19	33	0,3
	0,3	–	30,81	22,65	–	19	33	0,3
	0,3	–	30,81	22,65	–	19	33	0,3
	0,6	–	34,84	–	22,97	21,2	35,8	0,6
	0,6	–	34,84	–	22,97	21,2	35,8	0,6
	0,6	–	34,84	–	22,97	21,2	35,8	0,6
	0,6	–	35,45	24,1	–	21,2	35,8	0,6
	1	–	41,07	27,45	–	22,6	41,4	1
	1	–	40,07	–	24,77	22,6	41,4	1
	1	–	40,07	–	24,77	22,6	41,4	1
	1	–	40,07	–	24,77	22,6	41,4	1
	1,1	50,18	–	36,4	–	26	53	1

Deep groove ball bearings

Single row



Open

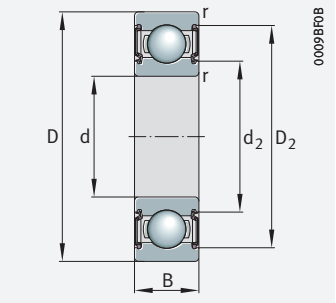


Generation C, open

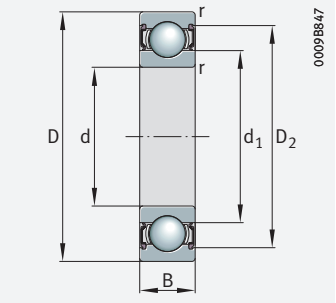
d = 20 – 20 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
20	32	7	4 020	2 460	111	33 500	17 600	15,4	0,018	**61804**
	32	7	4 020	2 460	111	11 500	–	15,4	0,018	**61804-2RSR**
	32	7	4 020	2 460	111	28 500	17 600	15,4	–	**61804-2Z**
	37	9	6 380	3 680	233	28 500	17 000	14,8	0,04	**61904**
	37	9	6 380	3 680	233	10 600	–	14,8	0,037	**61904-2RSR**
	37	9	6 380	3 680	233	24 200	17 000	14,8	0,037	**61904-2Z**
	42	8	7 910	4 480	240	26 000	13 800	16,5	0,048	**16004**
	42	12	10 600	5 000	340	27 500	19 700	13,8	0,062	**6004-C**
	42	12	10 600	5 000	340	15 300	–	13,8	0,066	**6004-C-2HRS**
	42	12	10 600	5 000	340	23 200	19 700	13,8	0,065	**6004-C-2Z**
	47	14	14 700	6 600	455	24 300	18 100	13,1	0,1	**6204-C**
	47	14	14 700	6 600	455	14 500	–	13,1	0,104	**6204-C-2HRS**
	47	14	14 700	6 600	455	20 600	18 100	13,1	0,105	**6204-C-2Z**
	47	18	12 790	6 580	490	9 400	–	13,1	0,14	**62204-2RSR**
	52	15	16 900	7 900	540	19 800	14 400	12,4	0,144	**6304**
	52	21	15 940	7 880	560	8 900	–	12,4	0,2	**62304-2RSR**
	52	15	16 900	7 900	540	8 800	–	12,4	0,155	**6304-2RSR**
	52	15	16 900	7 900	540	16 800	14 400	12,4	0,146	**6304-2Z**
	72	19	30 500	15 000	860	14 000	11 700	11	0,414	**6404**

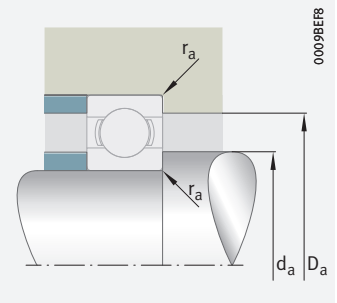
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2Z

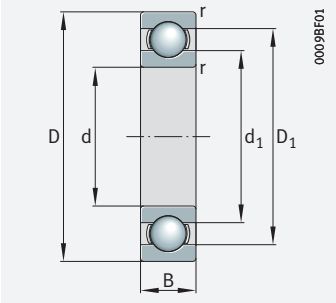


Mounting dimensions

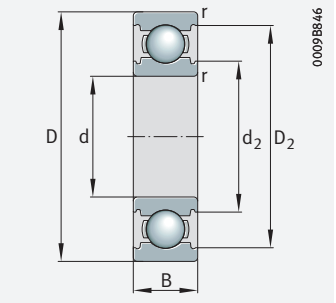
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
20	0,3	28,2	–	23,2	–	22	30	0,3
	0,3	–	29,5	–	22,6	22	30	0,3
	0,3	–	29,5	–	22,6	22	30	0,3
	0,3	32	–	25,2	–	22	35	0,3
	0,3	–	33,5	–	23,7	22	35	0,3
	0,3	–	33,5	–	23,7	22	35	0,3
	0,3	35,04	–	28,4	–	22	40	0,3
	0,6	–	37,38	–	25,38	23,2	38,8	0,6
	0,6	–	37,38	–	25,38	23,2	38,8	0,6
	0,6	–	37,38	–	25,38	23,2	38,8	0,6
	1	–	41	–	26,77	25,6	41,4	1
	1	–	41	–	26,77	25,6	41,4	1
	1	–	41	–	26,77	25,6	41,4	1
	1	–	41,47	28,5	–	25,6	41,4	1
	1,1	41,95	–	30,3	–	27	45	1
	1,1	–	45,1	30	–	27	45	1
	1,1	–	44,4	30,3	–	27	45	1
	1,1	–	44,4	30,3	–	27	45	1
	1,1	55,8	–	37,5	–	29	63	1

Deep groove ball bearings

Single row



Open

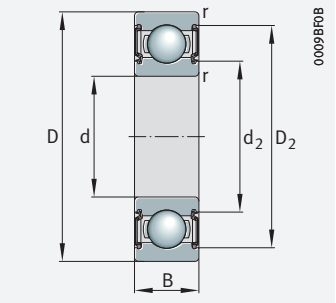


Generation C, open

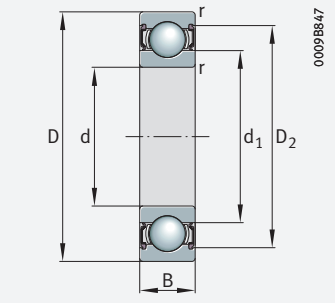
d = 25 – 25 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
25	37	7	4 300	2 940	132	28 000	13 900	16	0,023	**61805**
	37	7	4 300	2 940	132	9 500	–	16	0,021	**61805-2RSR**
	37	7	4 300	2 940	132	24 000	13 900	16	–	**61805-2Z**
	42	9	7 010	4 550	290	24 200	13 500	15,4	0,042	**61905**
	42	9	7 010	4 550	290	8 700	–	15,4	0,047	**61905-2RSR**
	42	9	7 010	4 550	290	20 500	13 500	15,4	0,045	**61905-2Z**
	47	12	12 600	6 500	420	23 700	16 400	14,3	0,07	**6005-C**
	47	8	8 860	5 610	325	22 200	11 600	15,1	0,053	**16005**
	47	12	12 600	6 500	420	12 900	–	14,3	0,075	**6005-C-2HRS**
	47	12	12 600	6 500	420	20 200	16 400	14,3	0,074	**6005-C-2Z**
	52	15	15 900	7 800	530	21 600	16 000	13,8	0,121	**6205-C**
	52	15	15 900	7 800	530	12 200	–	13,8	0,127	**6205-C-2HRS**
	52	15	15 900	7 800	530	18 400	16 000	13,8	0,13	**6205-C-2Z**
	52	18	14 020	7 880	540	7 900	–	13,9	0,155	**62205-2RSR**
	62	24	23 620	12 130	840	7 300	–	12,2	0,316	**62305-2RSR**
	62	17	26 500	11 500	790	17 800	13 500	12,4	0,217	**6305-C**
	62	17	26 500	11 500	790	11 300	–	12,4	0,24	**6305-C-2HRS**
	62	17	26 500	11 500	790	15 100	13 500	12,4	0,224	**6305-C-2Z**
	80	21	36 120	19 450	1 340	12 400	10 100	12,2	0,515	**6405**

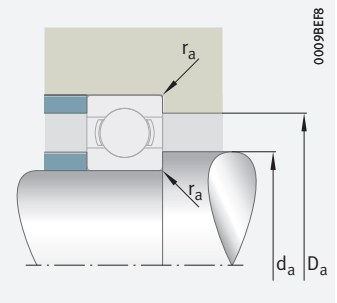
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2Z

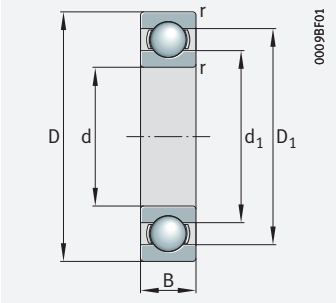


Mounting dimensions

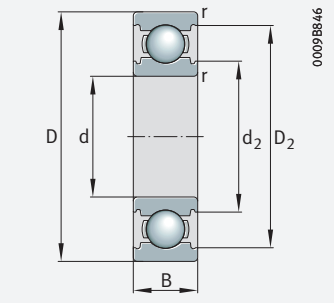
Dimensions						Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a
	min.	≈	≈	≈		min.	max.	max.
25	0,3	33,2	–	28,2	–	27	35	0,3
	0,3	–	34,2	28,2	–	27	35	0,3
	0,3	–	34,2	28,2	–	27	35	0,3
	0,3	37,5	–	30,9	–	27	40	0,3
	0,3	–	39,5	30,9	–	27	40	0,3
	0,3	–	39,5	30,9	–	27	40	0,3
	0,6	–	42,66	–	29,93	28,2	43,8	0,6
	0,3	40,4	–	32,5	–	27	45	0,3
	0,6	–	42,66	–	29,93	28,2	43,8	0,6
	0,6	–	42,66	–	29,93	28,2	43,8	0,6
	1	–	46,01	–	31,61	30,6	46,4	1
	1	–	46,01	–	31,61	30,6	46,4	1
	1	–	46,01	–	31,61	30,6	46,4	1
	1	–	46,3	33,95	–	30,6	46,4	1
	1,1	–	52,75	36,55	–	32	55	1
	1,1	–	53,8	–	34,12	32	55	1
	1,1	–	53,8	–	34,12	32	55	1
	1,1	–	53,8	–	34,12	32	55	1
	1,5	64,25	–	49,3	–	36	69	1,5

Deep groove ball bearings

Single row



Open

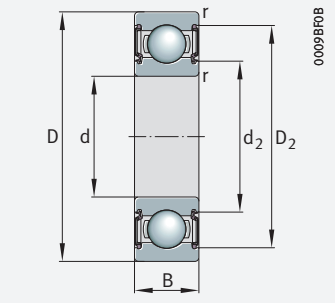


Generation C, open

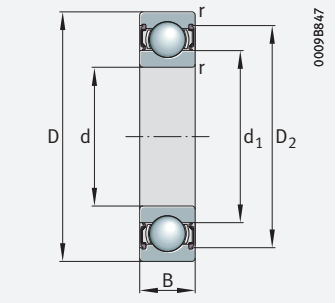
d = 30 – 30 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
30	42	7	4 450	3 440	154	24 500	11 500	16,5	0,027	**61806**
	42	7	4 450	3 440	154	8 100	–	16,5	0,027	**61806-2RSR**
	42	7	4 450	3 440	154	20 800	11 500	16,5	0,027	**61806-2Z**
	47	9	7 240	5 010	320	21 700	11 900	15,8	0,051	**61906**
	47	9	7 240	5 010	320	7 600	–	15,8	0,053	**61906-2RSR**
	47	9	7 240	5 010	320	18 400	11 900	15,8	0,053	**61906-2Z**
	55	13	14 500	8 300	500	20 100	13 800	14,8	0,107	**6006-C**
	55	9	11 220	7 390	470	18 500	10 000	15,3	0,082	**16006**
	55	13	14 500	8 300	500	10 500	–	14,8	0,113	**6006-C-2HRS**
	55	13	14 500	8 300	500	17 100	13 800	14,8	0,113	**6006-C-2Z**
	62	16	22 000	11 300	770	17 800	13 400	13,8	0,186	**6206-C**
	62	16	22 000	11 300	770	10 200	–	13,8	0,201	**6206-C-2HRS**
	62	16	22 000	11 300	770	15 100	13 400	13,8	0,193	**6206-C-2Z**
	62	20	19 450	11 260	780	6 600	–	13,8	0,25	**62206-2RSR**
	72	27	28 160	15 820	1 090	6 000	–	13,1	0,486	**62306-2RSR**
	72	19	32 000	16 200	1 120	15 100	11 500	13	0,328	**6306-C**
	72	19	32 000	16 200	1 120	9 300	–	13	0,343	**6306-C-2HRS**
	72	19	32 000	16 200	1 120	12 800	11 500	13	0,345	**6306-C-2Z**
	90	23	42 500	23 200	1 350	11 000	9 500	11,9	0,721	**6406**

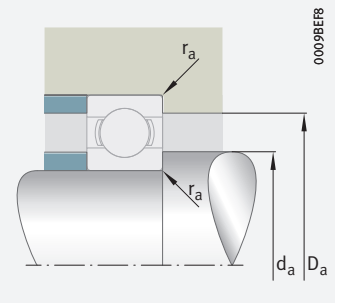
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2Z

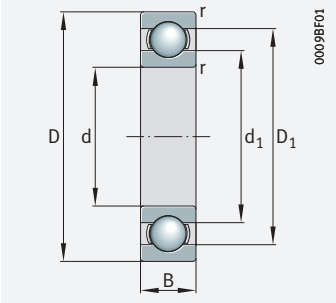


Mounting dimensions

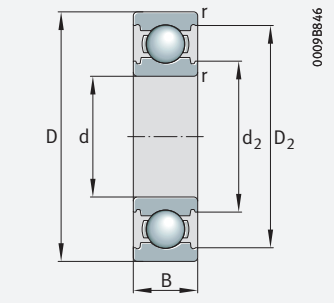
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
30	0,3	38,2	–	33,1	–	32	40	0,3
	0,3	–	39,2	33,1	–	32	40	0,3
	0,3	–	39,2	33,1	–	32	40	0,3
	0,3	42	–	35,1	–	32	45	0,3
	0,3	–	44,1	35,1	–	32	45	0,3
	0,3	–	44,1	35,1	–	32	45	0,3
	1	–	50,22	–	36,67	34,6	50,4	1
	0,3	47,85	–	39,15	–	32	53	0,3
	1	–	50,22	–	36,67	34,6	50,4	1
	1	–	50,22	–	36,67	34,6	50,4	1
	1	–	54,91	–	37,72	35,6	56,4	1
	1	–	54,91	–	37,72	35,6	56,4	1
	1	–	54,91	–	37,72	35,6	56,4	1
	1	–	55,2	40,3	–	35,6	56,4	1
	1,1	–	61,3	44,7	–	37	65	1
	1,1	–	63,29	–	41,44	37	65	1
	1,1	–	63,29	–	41,44	37	65	1
	1,1	–	63,29	–	41,44	37	65	1
	1,5	71,2	–	50,1	–	41	79	1,5

Deep groove ball bearings

Single row



Open

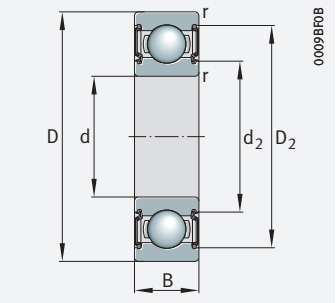


Generation C, open

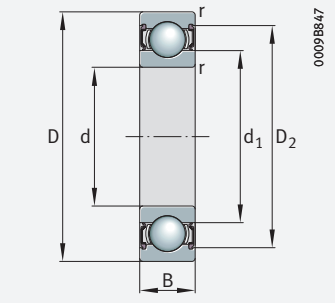
d = 35 – 35 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
35	47	7	4 740	3 820	175	21 600	9 900	16,4	0,032	**61807**
	47	7	4 740	3 820	175	7 000	–	16,4	0,032	**61807-2RSR**
	47	7	4 740	3 820	175	18 300	9 900	16,4	0,032	**61807-2Z**
	55	10	10 900	7 750	520	17 800	10 000	15,6	0,076	**61907**
	55	10	10 900	7 750	520	6 300	–	15,6	0,076	**61907-2RSR**
	55	10	10 900	7 750	520	15 100	10 000	15,6	0,076	**61907-2Z**
	62	14	17 500	10 300	620	17 700	12 600	14,9	0,14	**6007-C**
	62	9	12 260	8 800	540	16 700	8 900	15,6	0,107	**16007**
	62	14	17 500	10 300	620	9 300	–	14,9	0,148	**6007-C-2HRS**
	62	14	17 500	10 300	620	15 000	12 600	14,9	0,148	**6007-C-2Z**
	72	17	28 000	15 400	1 060	15 000	11 300	13,9	0,291	**6207-C**
	72	17	28 000	15 400	1 060	8 600	–	13,9	0,28	**6207-C-2HRS**
	72	17	28 000	15 400	1 060	12 700	11 300	13,9	0,274	**6207-C-2Z**
	72	23	25 670	15 300	1 060	5 700	–	13,8	0,384	**62207-2RSR**
	80	31	33 320	19 150	1 330	5 300	–	13,1	0,65	**62307-2RSR**
	80	21	37 000	19 100	1 330	13 600	10 900	13,1	0,471	**6307-C**
	80	21	37 000	19 100	1 330	8 300	–	13,1	0,49	**6307-C-2HRS**
	80	21	37 000	19 100	1 330	11 500	10 900	13,1	0,488	**6307-C-2Z**
	100	25	56 000	31 500	2 240	9 500	7 900	12,9	0,96	**6407**

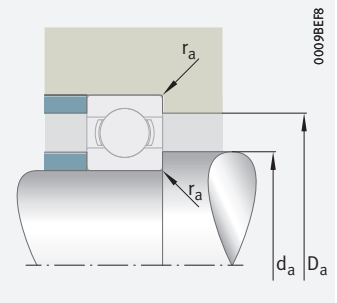
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2Z

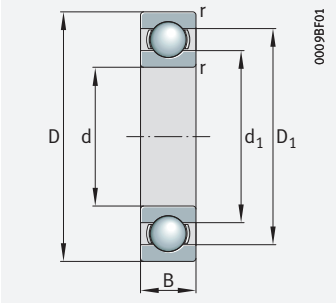


Mounting dimensions

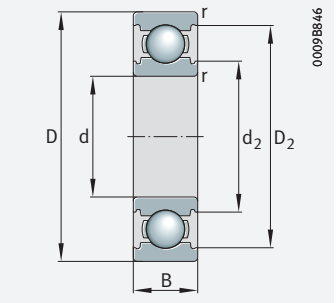
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
35	0,3	42,8	–	38,2	–	37	45	0,3
	0,3	–	44	38,2	–	37	45	0,3
	0,3	–	44	38,2	–	37	45	0,3
	0,6	48,4	–	41,6	–	38,2	51,8	0,6
	0,6	–	50,6	41,6	–	38,2	51,8	0,6
	0,6	–	50,6	41,6	–	38,2	51,8	0,6
	1	–	56,32	–	41,31	39,6	57,4	1
	0,3	52,74	–	44,26	–	37	60	0,3
	1	–	56,32	–	41,31	39,6	57,4	1
	1	–	56,32	–	41,31	39,6	57,4	1
	1,1	–	64,52	–	44,61	42	65	1
	1,1	–	64,52	–	44,61	42	65	1
	1,1	–	64,52	–	44,61	42	65	1
	1,1	–	63,36	47,07	–	42	65	1
	1,5	–	70,1	50,07	–	44	71	1,5
	1,5	–	69,69	–	46,18	44	71	1,5
	1,5	–	69,69	–	46,18	44	71	1,5
	1,5	–	69,69	–	46,18	44	71	1,5
	1,5	83,3	–	62,31	–	46	89	1,5

Deep groove ball bearings

Single row



Open

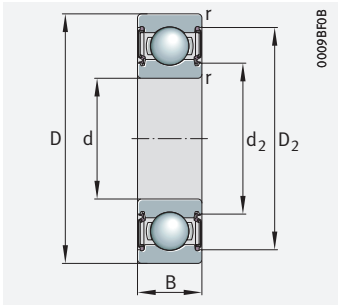


Generation C, open

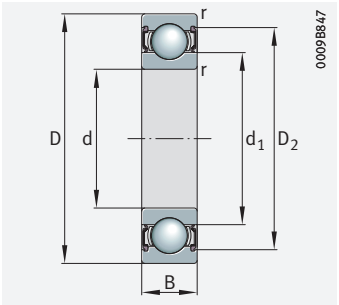
d = 40 – 40 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
40	52	7	4 930	4 180	196	19 300	8 600	16,2	0,035	**61808**
	52	7	4 930	4 180	196	6 200	–	16,2	0,035	**61808-2RSR**
	52	7	4 930	4 180	196	16 400	8 600	16,2	–	**61808-2Z**
	62	12	14 500	9 900	590	15 800	10 000	15,5	0,115	**61908**
	62	12	14 500	9 900	590	5 700	–	15,5	0,11	**61908-2RSR**
	68	15	17 800	11 500	600	14 600	10 600	15,2	0,192	**6008**
	68	9	12 620	9 650	570	15 200	7 800	16	0,127	**16008**
	68	15	17 800	11 500	600	5 400	–	15,2	0,202	**6008-2RSR**
	68	15	17 800	11 500	600	12 400	10 600	15,2	0,2	**6008-2Z**
	80	18	31 500	17 800	1 230	13 600	10 500	14	0,347	**6208-C**
	80	18	31 500	17 800	1 230	7 800	–	14	0,365	**6208-C-2HRS**
	80	18	31 500	17 800	1 230	11 600	10 500	14	0,362	**6208-C-2Z**
	80	23	29 110	17 900	1 230	5 000	–	14	0,46	**62208-2RSR**
	90	33	40 720	23 940	1 780	4 750	–	12	0,864	**62308-2RSR**
	90	23	47 000	25 000	1 740	11 800	9 900	13	0,596	**6308-C**
	90	23	47 000	25 000	1 740	7 400	–	13	0,654	**6308-C-2HRS**
	90	23	47 000	25 000	1 740	10 100	9 900	13	0,665	**6308-C-2Z**
	110	27	68 000	38 000	2 650	9 500	7 700	13,1	1,22	**6408-C**

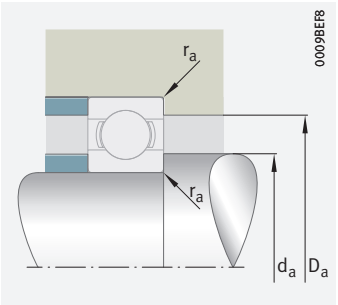
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2Z

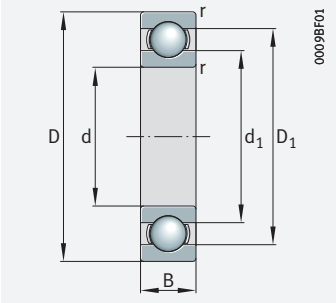


Mounting dimensions

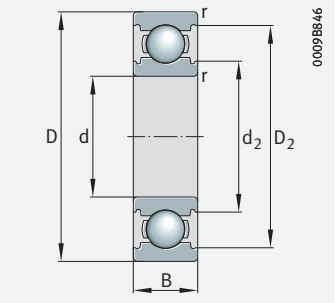
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
40	0,3	48,1	–	43,2	–	42	50	0,3
	0,3	–	48,9	43,2	–	42	50	0,3
	0,3	–	48,9	43,2	–	42	50	0,3
	0,6	55,1	–	46,9	–	43,2	58,8	0,6
	0,6	–	57,3	46,9	–	43,2	58,8	0,6
	1	59,06	–	49,3	–	44,6	63,4	1
	0,3	58,4	–	49,7	–	42	66	0,3
	1	–	61,56	49,3	–	44,6	63,4	1
	1	–	61,56	49,3	–	44,6	63,4	1
	1,1	–	70,57	–	49,3	47	73	1
	1,1	–	70,57	–	49,3	47	73	1
	1,1	–	70,57	–	49,3	47	73	1
	1,1	–	70,4	53	–	47	73	1
	1,5	–	76,4	56,05	–	49	81	1,5
	1,5	–	78,61	–	52,28	49	81	1,5
	1,5	–	78,61	–	52,28	49	81	1,5
	1,5	–	78,61	–	52,28	49	81	1,5
	2	–	95,22	–	66,74	53	97	2

Deep groove ball bearings

Single row



Open

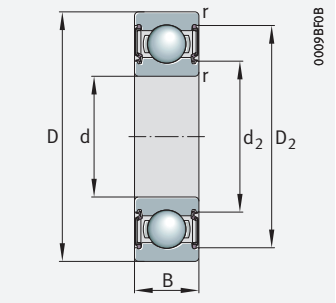


Generation C, open

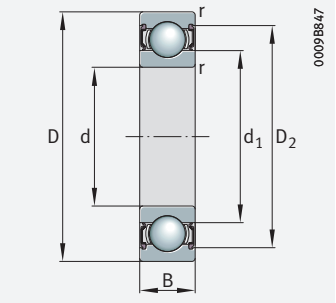
d = 45 – 45 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
45	58	7	7 000	5 900	400	5 400	–	16,3	0,039	**61809-2RSR-Y**
	58	7	7 000	5 900	400	14 300	7 300	16,3	0,039	**61809-2RZ-Y**
	58	7	7 000	5 900	400	21 900	7 300	16,3	0,039	**61809-Y**
	68	12	15 000	10 900	650	14 400	8 800	16	0,12	**61909**
	68	12	15 000	10 900	650	5 100	–	16	0,13	**61909-2RSR**
	68	12	15 000	10 900	650	12 200	8 800	16	0,13	**61909-2RZ**
	75	16	21 200	14 400	750	13 100	9 700	15,3	0,235	**6009**
	75	10	15 540	12 250	720	13 100	6 900	16	0,162	**16009**
	75	16	21 200	14 400	750	4 950	–	15,3	0,257	**6009-2RSR**
	75	16	21 200	14 400	750	11 200	9 700	15,3	0,253	**6009-2Z**
	85	19	33 500	20 300	1 390	12 700	9 900	14,3	0,396	**6209-C**
	85	19	33 500	20 300	1 390	7 100	–	14,3	0,419	**6209-C-2HRS**
	85	19	33 500	20 300	1 390	10 800	9 900	14,3	0,419	**6209-C-2Z**
	85	23	32 710	20 460	1 410	4 650	–	14,1	0,489	**62209-2RSR**
	100	36	56 000	31 500	2 240	4 300	–	12,9	1,2	**62309-2RSR**
	100	25	58 000	31 500	2 200	10 500	9 100	12,9	0,83	**6309-C**
	100	25	58 000	31 500	2 200	6 400	–	12,9	0,85	**6309-C-2HRS**
	100	25	58 000	31 500	2 200	8 900	9 100	12,9	0,846	**6309-C-2Z**
	120	29	83 000	47 500	3 300	8 500	7 100	12,9	1,52	**6409-C**

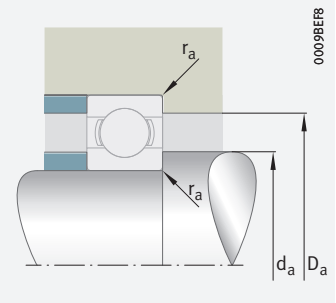
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2RZ, 2Z

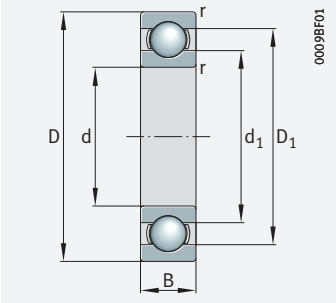


Mounting dimensions

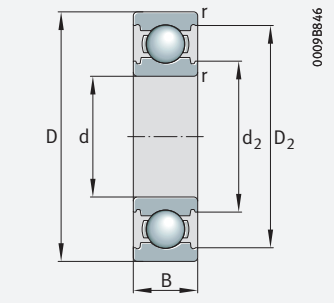
Dimensions						Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a
	min.	≈	≈	≈		min.	max.	max.
45	0,3	–	55,22	49,1	–	47	56	0,3
	0,3	–	55,22	49,1	–	47	56	0,3
	0,3	53,9	–	49,1	–	47	56	0,3
	0,6	60,6	–	52,4	–	48,2	64,8	0,6
	0,6	–	62,8	52,4	–	48,2	64,8	0,6
	0,6	–	62,8	52,4	–	48,2	64,8	0,6
	1	65,6	–	54,2	–	49,6	70,4	1
	0,6	67	–	57	–	48,2	71,8	0,6
	1	–	67,98	54,2	–	49,6	70,4	1
	1	–	67,98	54,2	–	49,6	70,4	1
	1,1	–	75,34	–	54,04	52	78	1
	1,1	–	75,34	–	54,04	52	78	1
	1,1	–	75,34	–	54,04	52	78	1
	1,1	–	76,6	57,55	–	52	78	1
	1,5	–	85,64	62	–	54	91	1,5
	1,5	–	86,37	–	60,33	54	91	1,5
	1,5	–	86,37	–	60,33	54	91	1,5
	1,5	–	86,37	–	60,33	54	91	1,5
	2	–	105,3	–	72,54	58	107	2

Deep groove ball bearings

Single row



Open

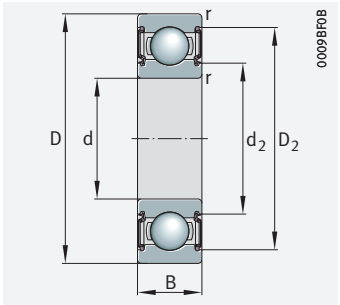


Generation C, open

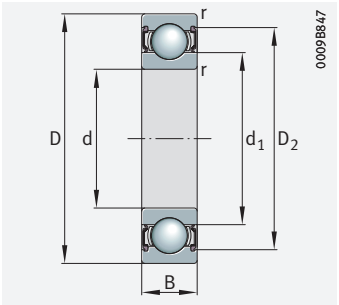
d = 50 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
50	65	7	7 200	6 300	440	4 850	–	16	0,052	**61810-2RSR-Y**
	65	7	7 200	6 300	440	12 900	6 400	16	0,052	**61810-2RZ-Y**
	65	7	7 200	6 300	440	19 700	6 400	16	0,052	**61810-Y**
	72	12	15 400	11 700	700	13 400	8 100	16,1	0,083	**61910**
	72	12	15 400	11 700	700	4 700	–	16,1	0,13	**61910-2RSR**
	72	12	15 400	11 700	700	11 400	8 100	16,1	0,13	**61910-2RZ**
	80	10	15 990	13 230	760	12 200	6 300	16,2	0,175	**16010**
	80	16	22 000	15 800	800	12 200	8 900	15,6	0,272	**6010**
	80	16	22 000	15 800	800	10 400	8 900	15,6	0,282	**6010-2Z**
	80	16	22 000	15 800	800	4 450	–	15,6	0,283	**6010-2RSR**
	90	20	38 000	23 200	1 580	11 700	9 200	14,4	0,432	**6210-C**
	90	20	38 000	23 200	1 580	6 500	–	14,4	0,458	**6210-C-2HRS**
	90	20	38 000	23 200	1 580	9 900	9 200	14,4	0,458	**6210-C-2Z**
	90	23	35 070	23 180	1 610	4 250	–	14,4	0,53	**62210-2RSR**
	110	40	66 000	38 000	2 700	3 950	–	13,1	1,55	**62310-2RSR**
	110	27	68 000	38 000	2 650	9 500	8 400	13,1	1,1	**6310-C**
	110	27	68 000	38 000	2 650	5 800	–	13,1	1,12	**6310-C-2HRS**
	110	27	68 000	38 000	2 650	8 000	8 400	13,1	1,1	**6310-C-2Z**
	130	31	89 000	52 000	3 600	7 900	6 800	13,2	1,91	**6410-C**

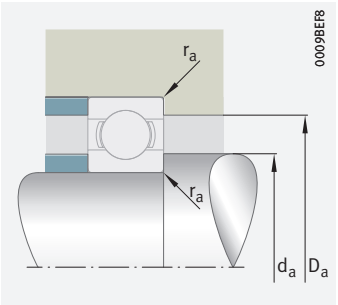
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2RZ, 2Z

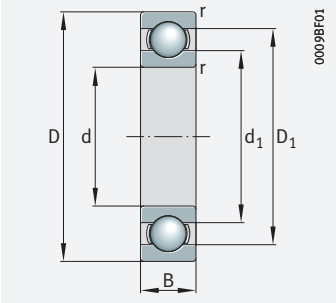


Mounting dimensions

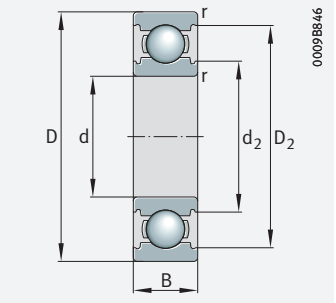
Dimensions						Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a
	min.	≈	≈	≈		min.	max.	max.
50	0,3	–	61,84	55,1	–	52	63	0,3
	0,3	–	61,84	55,1	–	52	63	0,3
	0,3	59,9	–	55,1	–	52	63	0,3
	0,6	65,1	–	56,9	–	53,2	68,8	0,6
	0,6	–	67,3	56,9	–	53,2	68,8	0,6
	0,6	–	67,3	56,9	–	53,2	68,8	0,6
	0,6	72,1	–	61,9	–	53,2	76,8	0,6
	1	70,2	–	59,75	–	54,6	75,4	1
	1	–	72,94	59,75	–	54,6	75,4	1
	1	–	72,94	59,75	–	54,6	75,4	1
	1,1	–	81,65	–	59,23	57	83	1
	1,1	–	81,65	–	59,23	57	83	1
	1,1	–	81,65	–	59,23	57	83	1
	1,1	–	81,54	62,65	–	57	83	1
	2	–	95,14	68	–	61	99	2
	2	–	95,22	–	66,74	61	99	2
	2	–	95,22	–	66,74	61	99	2
	2	–	95,22	–	66,74	61	99	2
	2,1	–	112,14	–	79,58	64	116	2,1

Deep groove ball bearings

Single row



Open

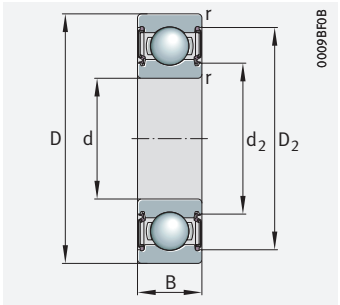


Generation C, open

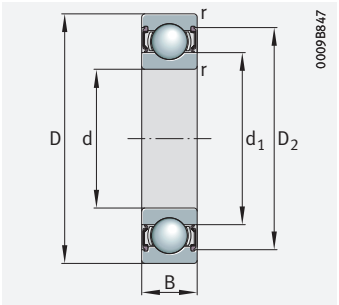
d = 55 – 55 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
55	90	18	30 000	21 200	1 150	10 700	8 300	15,3	0,397	**6011**
	90	18	30 000	21 200	1 150	4 050	–	15,3	0,397	**6011-2RSR**
	90	18	30 000	21 200	1 150	9 100	8 300	15,3	0,409	**6011-2Z**
	72	9	9 600	8 500	520	4 400	–	16,3	0,084	**61811-2RSR-Y**
	72	9	9 600	8 500	520	11 500	6 600	16,3	0,084	**61811-2RZ-Y**
	72	9	9 600	8 500	520	17 500	6 600	16,3	0,085	**61811-Y**
	80	13	17 700	14 100	780	12 100	7 500	16,3	0,18	**61911**
	80	13	17 700	14 100	780	4 250	–	16,3	0,18	**61911-2RSR**
	80	13	17 700	14 100	780	10 300	7 500	16,3	0,18	**61911-2RZ**
	90	11	19 300	16 300	940	10 900	6 000	16,2	0,26	**16011**
	100	21	46 500	29 000	2 030	10 400	8 300	14,2	0,58	**6211-C**
	100	21	46 500	29 000	2 030	5 800	–	14,2	0,6	**6211-C-2HRS**
	100	21	46 500	29 000	2 030	8 800	8 300	14,2	0,58	**6211-C-2Z**
	100	25	44 500	29 000	1 770	3 900	–	14,2	0,737	**62211-2RSR**
	120	29	83 000	47 500	3 300	8 500	7 800	12,9	1,33	**6311-C**
	120	29	83 000	47 500	3 300	5 300	–	12,9	1,37	**6311-C-2HRS**
	120	29	83 000	47 500	3 300	7 200	7 800	12,9	1,37	**6311-C-2Z**
	140	33	101 000	60 000	4 100	7 300	6 500	13,2	2,32	**6411-C**

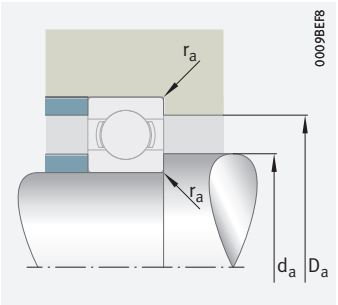
medias *https://www.schaeffler.de/std/1F9A*



With seal 2BRS, 2HRS, 2RSR, 2Z



With seal 2RSR, 2RZ, 2Z

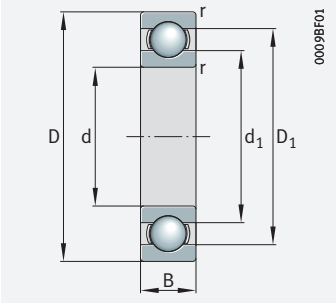


Mounting dimensions

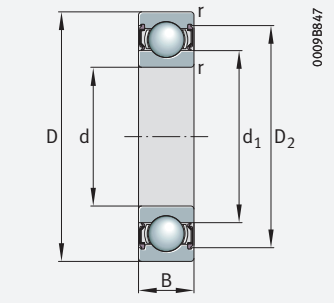
Dimensions						Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a
	min.	≈	≈	≈		min.	max.	max.
55	1,1	78,86	–	66,2	–	61	84	1
	1,1	–	81,54	66,2	–	61	84	1
	1,1	–	81,54	66,2	–	61	84	1
	0,3	–	68,6	60,6	–	57	70	0,3
	0,3	–	68,6	60,6	–	57	70	0,3
	0,3	66,4	–	60,6	–	57	70	0,3
	1	71,8	–	63,2	–	59,6	75,4	1
	1	–	74,2	63,2	–	59,6	75,4	1
	1	–	74,2	63,2	–	59,6	75,4	1
	0,6	78,61	–	69,6	–	58,2	86,8	0,6
	1,5	–	89,72	–	66,69	64	91	1,5
	1,5	–	89,72	–	66,69	64	91	1,5
	1,5	–	89,72	–	66,69	64	91	1,5
	1,5	–	88,2	68,65	–	64	91	1,5
	2	–	105,3	–	72,54	66	109	2
	2	–	105,3	–	72,54	66	109	2
	2	–	105,3	–	72,54	66	109	2
	2,1	–	121,4	–	85,59	69	126	2,1

Deep groove ball bearings

Single row



Open

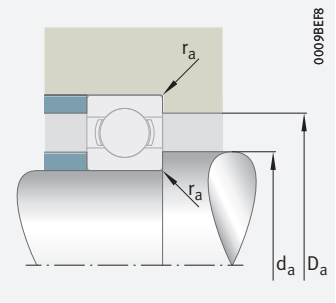


With seal 2RSR, 2RZ, 2Z

d = 60 – 60 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
60	78	10	12 600	11 100	710	4 100	–	16,3	0,105	**61812-2RSR-Y**
	78	10	12 600	11 100	710	10 400	6 300	16,3	0,1	**61812-2RZ-Y**
	78	10	12 600	11 100	710	15 900	6 300	16,3	0,109	**61812-Y**
	85	13	17 400	14 300	790	11 300	6 900	16,5	0,206	**61912**
	85	13	17 400	14 300	790	3 900	–	16,5	0,19	**61912-2RSR**
	95	18	31 500	23 200	1 230	10 100	7 600	15,6	0,419	**6012**
	95	11	21 200	17 500	840	10 500	5 700	16,3	0,283	**16012**
	95	18	31 500	23 200	1 230	3 750	–	15,6	0,432	**6012-2RSR**
	95	18	31 500	23 200	1 230	8 500	7 600	15,6	0,431	**6012-2Z**
	110	22	57 000	36 500	2 550	9 300	6 800	14,5	0,775	**6212**
	110	22	57 000	36 500	2 550	3 550	–	14,5	0,809	**6212-2RSR**
	110	22	57 000	36 500	2 550	7 900	6 800	14,5	0,807	**6212-2Z**
	110	28	56 000	36 000	2 550	3 550	–	14,3	0,998	**62212-2RSR**
	130	31	89 000	52 000	3 600	7 900	7 400	13,2	1,74	**6312-C**
	130	31	89 000	52 000	3 600	4 800	–	13,2	1,75	**6312-C-2HRS**
	130	31	89 000	52 000	3 600	6 700	7 400	13,2	1,74	**6312-C-2Z**
	150	35	115 000	69 000	4 600	6 800	5 900	13,4	2,83	**6412**

medias *https://www.schaeffler.de/std/1F9A*

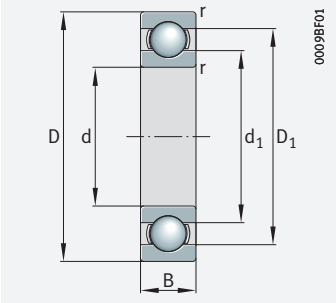


Mounting dimensions

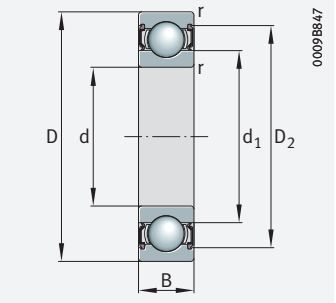
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
60	0,3	–	74,58	65,6	–	62	76	0,3
	0,3	–	74,58	65,6	–	62	76	0,3
	0,3	72,55	–	65,7	–	62	76	0,3
	1	76,8	–	68,2	–	64,6	80,4	1
	1	–	79,2	68,2	–	64,6	80,4	1
	1,1	83,88	–	71,325	–	66	89	1
	0,6	82,98	–	72,12	–	63,2	91,8	0,6
	1,1	–	85,98	71,325	–	66	89	1
	1,1	–	85,98	71,325	–	66	89	1
	1,5	95,82	–	75,75	–	69	101	1,5
	1,5	–	97,68	75,75	–	69	101	1,5
	1,5	–	97,68	75,75	–	69	101	1,5
	1,5	–	97,68	75,75	–	69	101	1,5
	2,1	–	112,14	–	79,58	72	118	2,1
	2,1	–	112,14	–	79,58	72	118	2,1
	2,1	–	112,14	–	79,58	72	118	2,1
	2,1	126,34	–	95,08	–	74	136	2,1

Deep groove ball bearings

Single row



Open

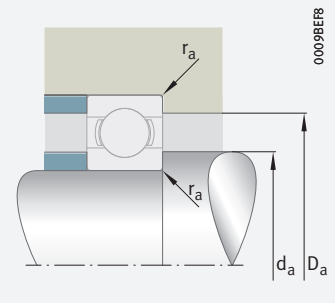


With seal 2RSR, 2RZ, 2Z

d = 65 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
65	85	10	13 000	12 000	780	3 750	–	16,2	0,13	**61813-2RSR-Y**
	85	10	13 000	12 000	780	9 600	5 700	16,2	0,13	**61813-2RZ-Y**
	85	10	13 000	12 000	780	14 700	5 700	16,2	0,136	**61813-Y**
	90	13	18 500	16 100	890	10 600	6 400	16,6	0,212	**61913**
	90	13	18 500	16 100	890	3 650	–	16,6	0,21	**61913-2RSR**
	90	13	18 500	16 100	890	9 000	6 400	16,6	0,212	**61913-2RZ**
	100	18	32 500	25 000	1 300	9 500	7 100	15,7	0,438	**6013**
	100	11	22 500	19 700	940	9 900	5 300	16,5	0,302	**16013**
	100	18	32 500	25 000	1 300	3 500	–	15,7	0,45	**6013-2RSR**
	100	18	32 500	25 000	1 300	8 100	7 100	15,7	0,45	**6013-2Z**
	120	23	63 000	41 500	2 850	8 600	6 300	14,4	1	**6213**
	120	23	63 000	41 500	2 850	3 250	–	14,4	1,03	**6213-2RSR**
	120	23	63 000	41 500	2 850	7 300	6 300	14,4	1,03	**6213-2Z**
	140	33	101 000	60 000	4 100	7 300	7 000	13,2	2,07	**6313-C**
	140	33	101 000	60 000	4 100	4 500	–	13,2	2,13	**6313-C-2HRS**
	140	33	101 000	60 000	4 100	6 200	7 000	13,2	2,12	**6313-C-2Z**
	160	37	123 000	77 000	4 850	6 300	5 600	13,2	3,49	**6413**

medias *https://www.schaeffler.de/std/1F9A*

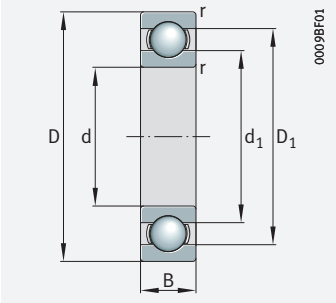


Mounting dimensions

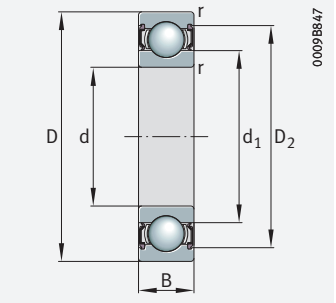
Dimensions						Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2	d_a min.	D_a max.	r_a max.
65	0,6	–	80,5	71,6	–	68,2	81,8	0,6
	0,6	–	80,5	71,6	–	68,2	81,8	0,6
	0,6	78,4	–	71,6	–	68,2	81,8	0,6
	1	81,8	–	73,2	–	69,6	85,4	1
	1	–	84,2	73,2	–	69,6	85,4	1
	1	–	84,2	73,2	–	69,6	85,4	1
	1,1	88,8	–	76,225	–	71	94	1
	0,6	88	–	77,1	–	68,2	96,8	0,6
	1,1	–	91,52	76,225	–	71	94	1
	1,1	–	91,52	76,225	–	71	94	1
	1,5	103,16	–	82,32	–	74	111	1,5
	1,5	–	106,34	82	–	74	111	1,5
	1,5	–	106,34	82	–	74	111	1,5
	2,1	–	121,4	–	85,59	77	128	2,1
	2,1	–	121,4	–	85,59	77	128	2,1
	2,1	–	121,4	–	85,59	77	128	2,1
	2,1	133,34	–	101,72	–	79	146	2,1

Deep groove ball bearings

Single row



Open

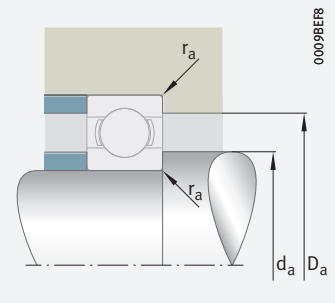


With seal 2RSR, 2RZ, 2Z

d = 70 – 75 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
70	90	10	13 200	12 400	820	3 500	–	16,1	0,14	**61814-2RSR-Y**
	90	10	13 200	12 400	820	9 000	5 300	16,1	0,14	**61814-2RZ-Y**
	90	10	13 200	12 400	820	13 800	5 300	16,1	0,138	**61814-Y**
	100	16	25 000	21 200	1 200	9 500	6 400	16,4	0,348	**61914**
	100	16	25 000	21 200	1 200	3 350	–	16,4	0,35	**61914-2RSR**
	100	16	25 000	21 200	1 200	8 100	6 400	16,4	0,34	**61914-2RZ**
	110	20	40 500	31 000	1 900	8 600	6 800	15,6	0,611	**6014**
	110	13	29 500	25 000	1 260	8 900	5 300	16,2	0,438	**16014**
	110	20	40 500	31 000	1 900	3 250	–	15,6	0,64	**6014-2RSR**
	110	20	40 500	31 000	1 900	7 300	6 800	15,6	0,642	**6014-2Z**
	125	24	66 000	44 000	3 000	8 200	6 100	14,4	1,09	**6214**
	125	24	66 000	44 000	3 000	3 100	–	14,4	1,11	**6214-2RSR**
	125	24	66 000	44 000	3 000	7 000	6 100	14,4	1,09	**6214-2Z**
	150	35	115 000	69 000	4 600	6 800	6 100	13,4	2,55	**6314**
	150	35	115 000	69 000	4 600	2 800	–	13,4	2,6	**6314-2RSR**
	150	35	115 000	69 000	4 600	5 700	6 100	13,4	2,6	**6314-2Z**
	180	42	141 000	97 000	6 000	5 000	5 200	13,3	5,04	**6414**
75	95	10	13 700	13 400	890	3 300	–	16,1	0,15	**61815-2RSR-Y**
	95	10	13 700	13 400	890	8 500	4 950	16,1	0,15	**61815-2RZ-Y**
	95	10	13 700	13 400	890	13 000	4 950	16,1	0,151	**61815-Y**
	105	16	26 000	22 600	1 280	9 000	6 000	16,5	0,36	**61915**
	115	20	42 000	33 500	2 020	8 100	6 300	15,8	0,635	**6015**
	115	13	30 500	27 000	1 330	8 400	4 900	16,5	0,463	**16015**
	115	20	42 000	33 500	2 020	3 050	–	15,8	0,66	**6015-2RSR**
	115	20	42 000	33 500	2 020	6 900	6 300	15,8	0,66	**6015-2Z**
	130	25	70 000	49 000	3 300	7 800	5 900	14,6	1,19	**6215**
	130	25	70 000	49 000	3 300	2 900	–	14,6	1,21	**6215-2RSR**
	130	25	70 000	49 000	3 300	6 600	5 900	14,6	1,21	**6215-2Z**
	160	37	123 000	77 000	4 850	6 300	5 800	13,2	3,18	**6315**
	160	37	123 000	77 000	4 850	2 650	–	13,2	3,18	**6315-2RSR**
	160	37	123 000	77 000	4 850	5 400	5 800	13,2	3,23	**6315-2Z**
	190	45	141 000	97 000	6 000	6 600	5 600	13,3	6,94	**6415-M**

medias *https://www.schaeffler.de/std/1F9A*

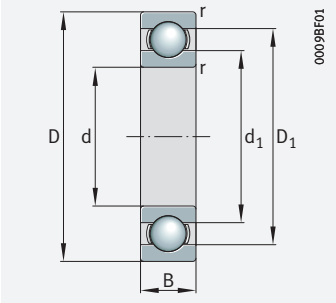


Mounting dimensions

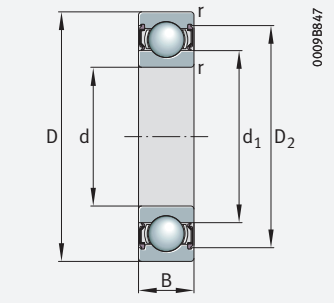
Dimensions					Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_a min.	D_a max.	r_a max.
70	0,6	–	85,5	76,6	73,2	86,8	0,6
	0,6	–	85,5	76,6	73,2	86,8	0,6
	0,6	83,4	–	76,6	73,2	86,8	0,6
	1	90,45	–	79,7	74,6	95,4	1
	1	–	93,3	79,7	74,6	95,4	1
	1	–	93,3	79,7	74,6	95,4	1
	1,1	97,28	–	82,75	76	104	1
	0,6	96,24	–	83,7	73,2	106,8	0,6
	1,1	–	100,04	82,75	76	104	1
	1,1	–	100,04	82,75	76	104	1
	1,5	108,21	–	86,75	79	116	1,5
	1,5	–	110,72	86,75	79	116	1,5
	1,5	–	110,72	86,75	79	116	1,5
	2,1	126,34	–	95,08	82	138	2,1
	2,1	–	130,18	94,75	82	138	2,1
	2,1	–	130,18	94,75	82	138	2,1
	3	151,58	–	114,38	86	164	2,5
75	0,6	–	90,5	81,6	78,2	91,8	0,6
	0,6	–	90,5	81,6	78,2	91,8	0,6
	0,6	88,57	–	81,6	78,2	91,8	0,6
	1	95,3	–	84,7	79,6	100,4	1
	1,1	102,58	–	88,05	81	109	1
	0,6	101,22	–	88,7	78,2	111,8	0,6
	1,1	–	105,34	88,05	81	109	1
	1,1	–	105,34	88,05	81	109	1
	1,5	113	–	92,1	84	121	1,5
	1,5	–	115,5	92,1	84	121	1,5
	1,5	–	115,5	92,1	84	121	1,5
	2,1	133,34	–	101,77	87	148	2,1
	2,1	–	137,22	101,4	87	148	2,1
	2,1	–	137,22	101,4	87	148	2,1
	3	151,58	–	114,38	91	174	2,5

Deep groove ball bearings

Single row



Open

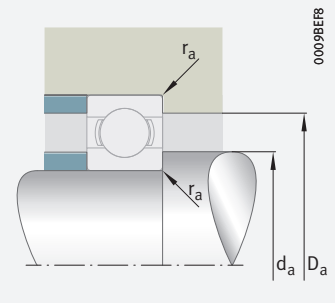


With seal 2RSR, 2RZ, 2Z

d = 80 – 85 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
80	100	10	13 800	13 800	930	3 100	–	16	0,159	**61816-2RSR-Y**
	100	10	13 800	13 800	930	8 000	4 600	16	0,15	**61816-2RZ-Y**
	100	10	13 800	13 800	930	12 300	4 600	16	0,16	**61816-Y**
	110	16	26 500	24 000	1 360	8 500	5 600	16,6	0,394	**61916**
	125	22	51 000	40 000	2 410	7 500	6 100	15,7	0,843	**6016**
	125	14	34 000	31 500	1 560	7 700	4 600	16,6	0,609	**16016**
	125	22	51 000	40 000	2 410	2 850	–	15,7	0,895	**6016-2RSR**
	125	22	51 000	40 000	2 410	6 300	6 100	15,7	0,893	**6016-2Z**
	140	26	77 000	55 000	3 650	7 300	5 500	15	1,46	**6216**
	140	26	77 000	55 000	3 650	2 700	–	15	1,49	**6216-2RSR**
	140	26	77 000	55 000	3 650	6 200	5 500	15	1,48	**6216-2Z**
	170	39	131 000	87 000	5 400	5 400	5 500	13,3	3,76	**6316**
	170	39	131 000	87 000	5 400	2 470	–	13,3	3,82	**6316-2RSR**
	170	39	131 000	87 000	5 400	4 550	5 500	13,3	3,82	**6316-2Z**
	200	48	173 000	125 000	7 100	5 900	5 400	12,3	8,21	**6416-M**
85	110	13	20 400	19 800	1 160	2 850	–	16,2	0,275	**61817-2RSR-Y**
	110	13	20 400	19 800	1 160	7 200	4 900	16,2	0,275	**61817-2RZ-Y**
	110	13	20 400	19 800	1 160	11 100	4 900	16,2	0,28	**61817-Y**
	120	18	34 000	31 500	1 690	7 700	5 400	16,6	0,557	**61917**
	130	22	53 000	43 000	2 500	7 100	5 800	15,7	0,919	**6017**
	130	14	36 000	33 500	1 900	7 400	4 400	16,6	0,637	**16017**
	130	22	53 000	43 000	2 500	2 700	–	15,7	0,92	**6017-2RSR**
	130	22	53 000	43 000	2 500	6 100	5 800	15,7	0,92	**6017-2Z**
	150	28	89 000	64 000	4 050	6 700	5 300	14,8	1,91	**6217**
	150	28	89 000	64 000	4 050	2 500	–	14,8	1,87	**6217-2RSR**
	150	28	89 000	64 000	4 050	5 700	5 300	14,8	1,91	**6217-2Z**
	180	41	141 000	97 000	6 000	5 000	5 300	13,3	4,34	**6317**
	180	41	141 000	97 000	6 000	2 350	–	13,3	4,41	**6317-2RSR**
	180	41	141 000	97 000	6 000	4 300	5 300	13,3	4,39	**6317-2Z**
	210	52	184 000	136 000	7 700	5 600	5 300	12,3	9,52	**6417-M**

medias *https://www.schaeffler.de/std/1F9A*

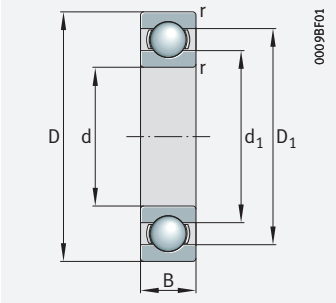


Mounting dimensions

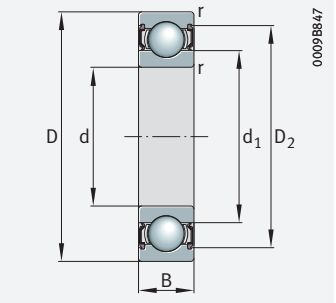
Dimensions					Mounting dimensions		
d	r	D_1	D_2	d_1	d_a	D_a	r_a
	min.	≈	≈	≈	min.	max.	max.
80	0,6	–	95,5	86,6	83,2	96,8	0,6
	0,6	–	95,5	86,6	83,2	96,8	0,6
	0,6	93,57	–	86,6	83,2	96,8	0,6
	1	100,5	–	89,7	84,6	105,4	1
	1,1	110,98	–	94,04	86	119	1
	0,6	110,72	–	96,84	83,2	121,8	0,6
	1,1	–	113,7	93,7	86	119	1
	1,1	–	113,7	93,7	86	119	1
	2	121,48	–	98,84	91	129	2
	2	–	124,38	98,5	91	129	2
	2	–	124,38	98,5	91	129	2
	2,1	141,92	–	108,56	92	158	2,1
	2,1	–	145,48	108,2	92	158	2,1
	2,1	–	145,48	108,2	92	158	2,1
	3	162,14	–	117,94	96	184	2,5
85	1	–	104,2	93,2	89,6	105,4	1
	1	–	104,2	93,2	89,6	105,4	1
	1	101,97	–	93,2	89,6	105,4	1
	1,1	110,02	–	97,14	91	114	1
	1,1	116,04	–	99,54	91	124	1
	0,6	114,7	–	100,9	88,2	126,8	0,6
	1,1	–	119,24	99,2	91	124	1
	1,1	–	119,24	99,2	91	124	1
	2	129,79	–	106,58	96	139	2
	2	–	133,8	106,2	96	139	2
	2	–	133,8	106,2	96	139	2
	3	151,58	–	114,36	99	166	2,5
	3	–	154,9	114	99	166	2,5
	3	–	154,9	114	99	166	2,5
	4	173,14	–	123,36	105	190	3

Deep groove ball bearings

Single row



Open

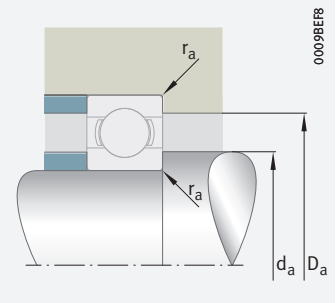


With seal 2RSR, 2RZ, 2Z

d = 90 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
90	115	13	20 700	20 600	1 200	2 700	–	16,1	0,293	**61818-2RSR-Y**
	115	13	20 700	20 600	1 200	6 900	4 600	16,1	0,31	**61818-2RZ-Y**
	115	13	20 700	20 600	1 200	10 500	4 600	16,1	0,292	**61818-Y**
	125	18	33 500	30 500	1 540	7 400	5 200	15,1	0,583	**61918**
	140	24	62 000	49 500	3 000	6 600	5 600	15,5	1,19	**6018**
	140	16	44 000	39 500	2 080	6 800	4 400	16,4	0,86	**16018**
	140	24	62 000	49 500	3 000	2 500	–	15,5	1,2	**6018-2RSR**
	140	24	62 000	49 500	3 000	5 600	5 600	15,5	1,2	**6018-2Z**
	160	30	102 000	74 000	4 500	6 300	5 100	14,6	2,189	**6218**
	160	30	102 000	74 000	4 500	2 380	–	14,6	2,21	**6218-2RSR**
	160	30	102 000	74 000	4 500	5 400	5 100	14,6	2,216	**6218-2Z**
	190	43	142 000	102 000	5 900	4 900	5 100	13,9	5,34	**6318**
	190	43	142 000	102 000	5 900	2 170	–	13,9	5,396	**6318-2RSR**
	190	43	142 000	102 000	5 900	4 150	5 100	13,9	5,36	**6318-2Z**
	225	54	209 000	162 000	9 100	5 200	4 950	12,1	11,6	**6418-M**
95	120	13	21 000	21 300	1 230	2 600	–	16,1	0,295	**61819-2RSR-Y**
	120	13	21 000	21 300	1 230	6 600	4 350	16,1	0,32	**61819-2RZ-Y**
	120	13	21 000	21 300	1 230	10 000	4 350	16,1	0,31	**61819-Y**
	145	24	64 000	54 000	3 150	6 300	5 300	15,8	1,25	**6019**
	145	16	42 500	41 000	2 050	6 600	4 150	16,6	0,917	**16019**
	145	24	64 000	54 000	3 150	2 420	–	15,8	1,28	**6019-2RSR**
	145	24	64 000	54 000	3 150	5 400	5 300	15,8	1,25	**6019-2Z**
	170	32	116 000	82 000	4 800	5 300	4 950	14,5	2,69	**6219**
	170	32	116 000	82 000	4 800	2 260	–	14,5	2,7	**6219-2RSR**
	170	32	116 000	82 000	4 800	4 550	4 950	14,5	2,7	**6219-2Z**
	200	45	154 000	113 000	6 600	4 600	4 950	13,8	6,07	**6319**
	200	45	154 000	113 000	6 600	2 080	–	13,8	6,19	**6319-2RSR**
	200	45	154 000	113 000	6 600	3 900	4 950	13,8	6,12	**6319-2Z**

medias *https://www.schaeffler.de/std/1F9A*

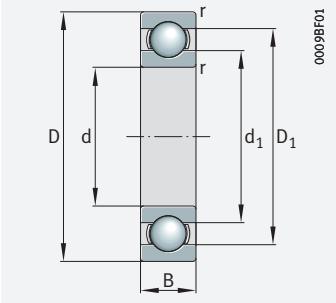


Mounting dimensions

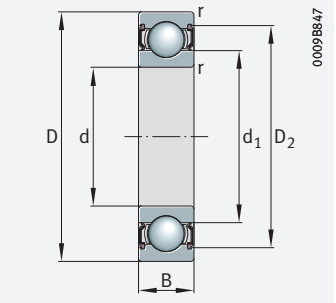
Dimensions					Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_a min.	D_a max.	r_a max.
90	1	–	109,2	98,2	94,6	110,4	1
	1	–	109,2	98,2	94,6	110,4	1
	1	106,97	–	98,2	94,6	110,4	1
	1,1	113,78	–	101,64	96	119	1
	1,5	124,48	–	106,56	97	133	1,5
	1	122,72	–	107,56	94,6	135,4	1
	1,5	–	126,8	106,2	97	133	1,5
	1,5	–	126,8	106,2	97	133	1,5
	2	138,84	–	112,6	101	149	2
	2	–	143,42	112,25	101	149	2
	2	–	143,42	112,25	101	149	2
	3	157,18	–	123,66	104	176	2,5
	3	–	160,74	123,3	104	176	2,5
	3	–	160,74	123,3	104	176	2,5
	4	184,14	–	132,1	110	205	3
95	1	–	114,2	103,2	99,6	115,4	1
	1	–	114,2	103,2	99,6	115,4	1
	1	111,97	–	103,2	99,6	115,4	1
	1,5	129,12	–	110,98	102	138	1,5
	1	128,28	–	113,78	99,6	140,4	1
	1,5	–	131,84	110,6	102	138	1,5
	1,5	–	131,84	110,6	102	138	1,5
	2,1	146,72	–	118,66	107	158	2,1
	2,1	–	150,86	118,3	107	158	2,1
	2,1	–	150,86	118,3	107	158	2,1
	3	166,88	–	129,08	109	186	2,5
	3	–	170,36	128,7	109	186	2,5
	3	–	170,36	128,7	109	186	2,5

Deep groove ball bearings

Single row



Open

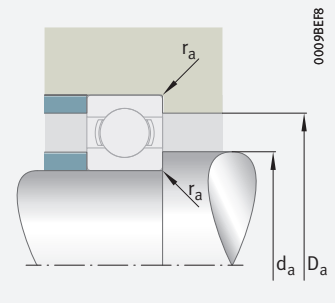


With seal 2RSR, 2RZ, 2Z

d = 100 – 105 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
100	125	13	21 300	22 100	1 250	2 470	–	16	0,34	**61820-2RSR-Y**
	125	13	21 300	22 100	1 250	6 300	4 150	16	0,33	**61820-2RZ-Y**
	125	13	21 300	22 100	1 250	9 600	4 150	16	0,316	**61820-Y**
	150	24	64 000	54 000	3 050	6 100	5 100	15,8	1,29	**6020**
	150	16	46 500	44 500	2 210	6 300	4 000	16,5	0,938	**16020**
	150	24	64 000	54 000	3 050	2 300	–	15,8	1,32	**6020-2RSR**
	150	24	64 000	54 000	3 050	5 200	5 100	15,8	1,29	**6020-2Z**
	180	34	130 000	93 000	5 500	5 000	4 800	14,4	3,27	**6220**
	180	34	130 000	93 000	5 500	2 140	–	14,4	3,34	**6220-2RSR**
	180	34	130 000	93 000	5 500	4 250	4 800	14,4	3,29	**6220-2Z**
	215	47	177 000	137 000	7 400	4 250	4 600	13,7	7,51	**6320**
	215	47	177 000	137 000	7 400	1 940	–	13,7	7,53	**6320-2RSR**
	215	47	177 000	137 000	7 400	3 600	4 600	13,7	7,54	**6320-2Z**
105	130	13	22 100	23 600	1 320	2 360	–	15,9	0,331	**61821-2RSR-Y**
	130	13	22 100	23 600	1 320	6 000	3 900	15,9	0,35	**61821-2RZ-Y**
	130	13	22 100	23 600	1 320	9 200	3 900	15,9	0,33	**61821-Y**
	145	20	46 500	44 500	2 210	6 300	4 600	16,5	0,847	**61921**
	160	26	75 000	64 000	3 550	5 700	4 950	15,7	1,62	**6021**
	160	18	57 000	54 000	2 460	5 900	3 950	16,5	1,23	**16021**
	160	26	75 000	64 000	3 550	2 200	–	15,7	1,6	**6021-2RSR**
	160	26	75 000	64 000	3 550	4 850	4 950	15,7	1,66	**6021-2Z**
	190	36	141 000	105 000	5 800	4 750	4 650	14,4	3,9	**6221**
	190	36	141 000	105 000	5 800	2 030	–	14,4	3,97	**6221-2RSR**
	190	36	141 000	105 000	5 800	4 000	4 650	14,4	3,9	**6221-2Z**
	225	49	188 000	150 000	8 100	4 050	4 450	13,7	8,7	**6321**

medias *https://www.schaeffler.de/std/1F9A*

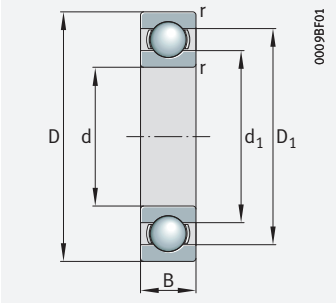


Mounting dimensions

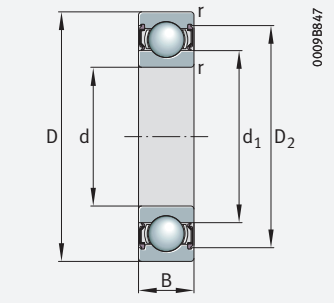
Dimensions					Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_a min.	D_a max.	r_a max.
100	1	–	119,2	108,2	104,6	120,4	1
	1	–	119,2	108,2	104,6	120,4	1
	1	117,07	–	108,2	104,6	120,4	1
	1,5	134,12	–	116,58	107	143	1,5
	1	132,72	–	117,58	104,6	145,4	1
	1,5	–	137,3	116,2	107	143	1,5
	1,5	–	137,3	116,2	107	143	1,5
	2,1	155,45	–	125,08	112	168	2,1
	2,1	–	158,9	124,7	112	168	2,1
	2,1	–	158,9	124,7	112	168	2,1
	3	179,14	–	138,5	114	201	2,5
	3	–	184,58	138,1	114	201	2,5
	3	–	184,58	138,1	114	201	2,5
105	1	–	124,2	113,2	109,6	125,4	1
	1	–	124,2	113,2	109,6	125,4	1
	1	122,11	–	113,2	109,6	125,4	1
	1,1	132,72	–	117,62	111	139	1
	2	142,52	–	122,12	113,8	151,2	2
	1	141,32	–	124,12	109,6	155,4	1
	2	–	145,28	121,7	113,8	151,2	2
	2	–	145,28	121,7	113,8	151,2	2
	2,1	163,28	–	131,9	117	178	2,1
	2,1	–	168,06	131,5	117	178	2,1
	2,1	–	168,06	131,5	117	178	2,1
	3	187,92	–	144,3	119	211	2,5

Deep groove ball bearings

Single row



Open

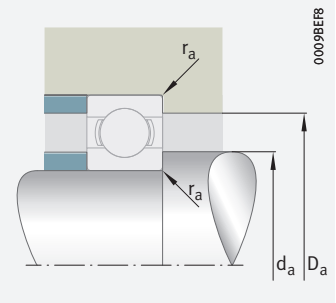


With seal 2RSR, 2RZ, 2Z

d = 110 – 130 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
110	140	16	30 000	30 500	1 650	2 230	–	16	0,54	**61822-2RSR-Y**
	140	16	30 000	30 500	1 650	5 600	4 100	16	0,54	**61822-2RZ-Y**
	140	16	30 000	30 500	1 650	8 500	4 100	16	0,52	**61822-Y**
	170	28	85 000	71 000	3 550	5 300	4 850	15,7	2,03	**6022**
	170	19	61 000	57 000	2 850	5 500	3 850	16,4	1,49	**16022**
	170	28	85 000	71 000	3 550	2 080	–	15,7	2,03	**6022-2RSR**
	170	28	85 000	71 000	3 550	4 550	4 850	15,7	2,03	**6022-2Z**
	200	38	153 000	117 000	6 500	4 450	4 500	14,3	4,58	**6222**
	200	38	153 000	117 000	6 500	3 800	4 500	14,3	4,58	**6222-2Z**
	240	50	201 000	165 000	8 800	3 800	4 150	13,8	10,2	**6322**
	240	50	201 000	165 000	8 800	1 750	–	13,8	10,4	**6322-2RSR**
	240	50	201 000	165 000	8 800	3 250	4 150	13,8	10,2	**6322-2Z**
120	150	16	30 500	33 000	1 730	2 060	–	16	0,52	**61824-2RSR-Y**
	150	16	30 500	33 000	1 730	5 100	3 750	16	0,52	**61824-2RZ-Y**
	150	16	30 500	33 000	1 730	7 900	3 750	16	0,55	**61824-Y**
	180	28	88 000	77 000	3 650	5 000	4 450	15,8	2,18	**6024**
	180	19	65 000	64 000	3 100	5 200	3 550	16,5	1,61	**16024**
	180	28	88 000	77 000	3 650	1 920	–	15,8	2,21	**6024-2RSR**
	180	28	88 000	77 000	3 650	4 250	4 450	15,8	2,17	**6024-2Z**
	215	40	154 000	123 000	6 400	4 200	4 250	14,8	5,58	**6224**
	215	40	154 000	123 000	6 400	1 770	–	14,8	5,72	**6224-2RSR**
	260	55	225 000	195 000	9 800	3 500	3 800	13,8	12,8	**6324**
130	165	18	37 700	43 000	1 840	5 500	3 600	16,2	0,775	**61826**
	180	24	77 000	74 000	3 300	6 400	3 900	16,3	1,88	**61926-M**
	200	33	113 000	101 000	5 000	4 500	4 350	15,8	3,32	**6026**
	200	22	84 000	82 000	3 750	4 650	3 450	16,4	2,37	**16026**
	200	33	113 000	101 000	5 000	1 750	–	15,8	3,38	**6026-2RSR**
	200	33	113 000	101 000	5 000	3 800	4 350	15,8	3,31	**6026-2Z**
	230	40	177 000	146 000	7 700	3 850	3 900	14,5	6,11	**6226**
	230	40	177 000	146 000	7 700	3 250	3 900	14,5	6,12	**6226-2Z**
	280	58	244 000	214 000	10 100	3 200	3 500	13,5	15,4	**6326**

medias *https://www.schaeffler.de/std/1F9A*

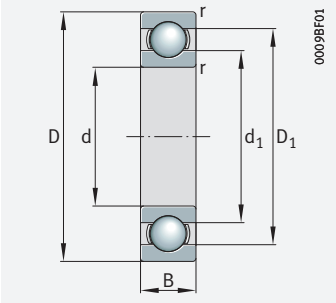


Mounting dimensions

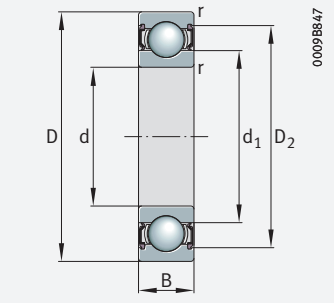
Dimensions					Mounting dimensions		
d	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_a min.	D_a max.	r_a max.
110	1	–	133,3	119,7	114,6	135,4	1
	1	–	133,3	119,7	114,6	135,4	1
	1	130,61	–	119,7	114,6	135,4	1
	2	151,02	–	129,12	118,8	161,2	2
	1	149,52	–	130,68	114,6	165,4	1
	2	–	154,96	128,7	118,8	161,2	2
	2	–	154,96	128,7	118,8	161,2	2
	2,1	171,68	–	138,42	122	188	2,1
	2,1	–	177,2	138	122	188	2,1
	3	197,54	–	153,26	124	226	2,5
	3	–	203,14	152,85	124	226	2,5
	3	–	203,14	152,85	124	226	2,5
120	1	–	143,3	129,7	124,6	145,4	1
	1	–	143,3	129,7	124,6	145,4	1
	1	140,61	–	129,7	124,6	145,4	1
	2	161,38	–	139,82	128,8	171,2	2
	1	159,48	–	140,72	124,6	175,4	1
	2	–	165,36	139,4	128,8	171,2	2
	2	–	165,36	139,4	128,8	171,2	2
	2,1	185,04	–	151,46	132	203	2,1
	2,1	–	190,5	151,05	132	203	2,1
	3	215,6	–	165,8	134	246	2,5
130	1,1	154,7	–	140	136	159	1
	1,5	164,7	–	145,72	137	173	1,5
	2	177,92	–	153,26	138,8	191,2	2
	1,1	176,74	–	154,72	136	194	1
	2	–	182,08	152,85	138,8	191,2	2
	2	–	182,08	152,85	138,8	191,2	2
	3	198,64	–	161,42	144	216	2,5
	3	–	203,46	161	144	216	2,5
	4	231,25	–	178,88	147	263	3

Deep groove ball bearings

Single row



Open

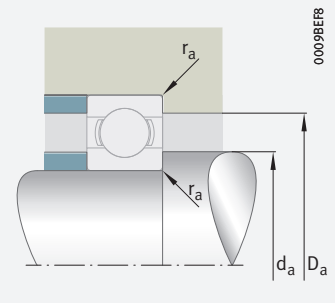


With seal 2RSR, 2RZ, 2Z

d = 140 – 170 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
140	210	33	117 000	109 000	5 100	4 250	4 050	16	3,51	**6028**
	210	22	86 000	87 000	3 850	4 400	3 200	16,5	2,54	**16028**
	210	33	117 000	109 000	5 100	1 650	–	16	3,51	**6028-2RSR**
	210	33	117 000	109 000	5 100	3 600	4 050	16	3,49	**6028-2Z**
	250	42	188 000	165 000	8 400	3 600	3 600	14,9	7,94	**6228**
	300	62	270 000	246 000	11 500	3 850	3 250	13,6	22	**6328-M**
150	190	20	54 000	60 000	2 490	4 700	3 200	16	1,15	**61830**
	225	35	131 000	124 000	5 600	3 950	3 850	16	4,26	**6030**
	225	24	98 000	99 000	4 400	4 050	3 100	16,5	3,17	**16030**
	225	35	131 000	124 000	5 600	1 540	–	16	4,38	**6030-2RSR**
	225	35	131 000	124 000	5 600	3 350	3 850	16	4,3	**6030-2Z**
	270	45	187 000	168 000	8 100	3 350	3 350	15,2	10,2	**6230**
	320	65	300 000	290 000	13 500	3 600	3 000	13,7	26,14	**6330-M**
160	200	20	55 000	62 000	2 500	4 450	3 000	15,9	1,22	**61832**
	220	28	98 000	99 000	4 400	4 050	3 450	16,5	2,7	**61932**
	240	38	142 000	136 000	6 000	3 700	3 750	16	5,2	**6032**
	240	25	109 000	114 000	4 750	3 800	2 950	16,5	3,75	**16032**
	240	38	142 000	136 000	6 000	1 440	–	16	5,27	**6032-2RSR**
	240	38	142 000	136 000	6 000	3 150	3 750	16	5,31	**6032-2Z**
	290	48	212 000	203 000	9 100	4 050	3 100	15,2	14,6	**6232-M**
170	215	22	65 000	73 000	2 900	4 100	2 950	16	1,63	**61834**
	230	28	109 000	114 000	4 750	3 800	3 150	16,5	2,75	**61934**
	260	42	179 000	172 000	7 600	3 400	3 550	15,7	7,1	**6034**
	260	28	131 000	136 000	5 600	3 500	2 850	16,5	5,1	**16034**
	260	42	179 000	172 000	7 600	1 340	–	15,7	7,12	**6034-2RSR**
	310	52	225 000	224 000	9 600	3 800	2 950	15,3	18,2	**6234-M**

medias *https://www.schaeffler.de/std/1F9A*

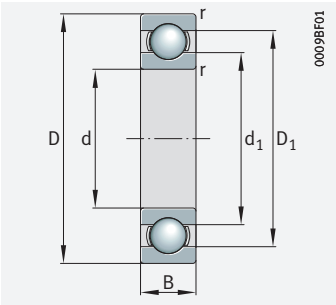


Mounting dimensions

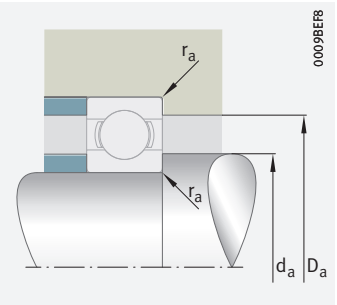
Dimensions					Mounting dimensions		
d	r	D_1	D_2	d_1	d_a	D_a	r_a
	min.	≈	≈	≈	min.	max.	max.
140	2	187,54	–	162,28	148,8	201,2	2
	1,1	186,72	–	164,72	146	204	1
	2	–	191,28	161,85	148,8	201,2	2
	2	–	191,28	161,85	148,8	201,2	2
	3	213,8	–	175,9	154	236	2,5
	4	248,8	–	191,2	157	283	3
150	1,1	177,9	–	162,7	156	184	1
	2,1	201,42	–	174,36	160,2	214,8	2,1
	1,1	199,04	–	175,96	156	219	1
	2,1	–	205,96	173,9	160,2	214,8	2,1
	2,1	–	205,96	173,9	160,2	214,8	2,1
	3	229,15	–	191,6	164	256	2,5
	4	266,2	–	205,5	167	303	3
160	1,1	187,32	–	172,7	166	194	1
	2	199,04	–	176	168,8	211,2	2
	2,1	214,64	–	186,2	170,2	229,8	2,1
	1,5	212,4	–	187,28	167	233	1,5
	2,1	–	219,68	185,75	170,2	229,8	2,1
	2,1	–	219,68	185,75	170,2	229,8	2,1
	3	244,95	–	204,94	174	276	2,5
170	1,1	200,78	–	184,4	176	209	1
	2	212,62	–	187,2	178,8	221,2	2
	2,1	231,4	–	199,4	180,2	249,8	2,1
	1,5	228,6	–	202,28	177	253	1,5
	2,1	–	236,45	198,9	180,2	249,8	2,1
	4	260,85	–	219,04	187	293	3

Deep groove ball bearings

Single row



Open



Mounting dimensions

d = 180 – 260 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤*229*|*1.12* ➤*230*|*1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
180	225	22	66 000	76 000	2 950	3 900	2 750	16,1	1,72	**61836**
	250	33	131 000	136 000	5 600	3 500	3 200	16,5	4,17	**61936**
	280	31	140 000	146 000	5 300	3 350	2 950	16,4	6,86	**16036**
	280	46	201 000	199 000	8 400	4 050	3 300	15,6	10,6	**6036-M**
	320	52	240 000	244 000	10 600	3 650	2 750	15,3	18,8	**6236-M**
190	240	24	73 000	85 000	3 400	3 650	2 700	16	2,22	**61838**
	260	33	140 000	146 000	5 300	3 350	3 000	16,4	4,32	**61938**
	290	31	158 000	168 000	6 400	3 100	2 650	16,5	7,04	**16038**
	290	46	216 000	220 000	9 400	3 850	3 100	15,6	11,3	**6038-M**
200	250	24	74 000	88 000	3 450	3 500	2 550	16	2,28	**61840**
	280	38	158 000	168 000	6 400	3 100	2 950	16,5	6,27	**61940**
	310	34	186 000	202 000	7 500	2 850	2 470	16,4	8,97	**16040**
	310	51	231 000	243 000	9 900	3 650	3 000	15,6	14,4	**6040-M**
220	270	24	78 000	97 000	3 650	3 200	2 320	15,8	2,5	**61844**
	300	38	186 000	202 000	7 100	2 850	2 600	16,4	6,56	**61944**
240	300	28	100 000	124 000	4 500	2 900	2 260	15,9	4,8	**61848**
	320	38	211 000	240 000	8 600	2 600	2 330	16,3	6,78	**61948**
260	320	28	102 000	132 000	4 650	2 700	2 070	15,8	4,15	**61852**

medias *https://www.schaeffler.de/std/1F9A*

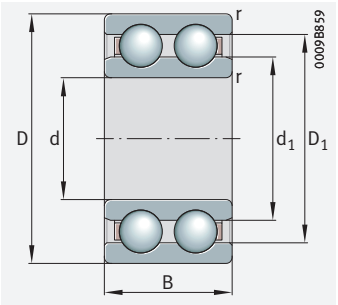


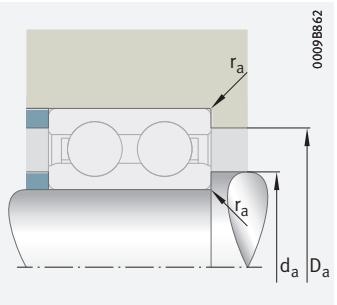


	Dimensions				Mounting dimensions		
	d	r min.	D_1 ≈	d_1 ≈	d_a min.	D_a max.	r_a max.
	180	1,1	211,4	194,4	186	219	1
		2	228,8	202,16	188,8	241,2	2
		2	238,95	211,88	188,8	271,2	2
		2,1	249,25	211,8	190,2	269,8	2,1
		4	272,1	228,6	197	303	3
	190	1,5	223,78	206,1	197	233	1,5
		2	238,75	211,92	198,8	251,2	2
		2	255,15	225,74	198,8	281,2	2
		2,1	260,25	220,82	200,2	279,8	2,1
	200	1,5	233,75	216,74	207	243	1,5
		2,1	255,25	225,7	210,2	269,8	2,1
		2	276,5	244,35	208,8	301,2	2
		2,1	276,25	234,84	210,2	299,8	2,1
	220	1,5	255	235,85	227	263	1,5
		2,1	276,45	244,35	230,2	289,8	2,1
	240	2	281,6	259,3	248,8	291,2	2
		2,1	298	262,85	250,2	309,8	2,1
	260	2	301,7	279,3	268,8	311,2	2

Deep groove ball bearings

Double row





Mounting dimensions

d = 10 – 90 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Factor	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	f_0	m	➤ *229* | *1.12* ➤ *230* | *1.13*
			N	N	N	min^{-1}	min^{-1}		≈ kg	
10	30	14	8 300	4 750	247	21 800	21 600	13,1	0,051	**4200-BB-TVH**
12	32	14	11 100	6 100	320	19 000	19 100	12,3	0,051	**4201-BB-TVH**
15	35	14	12 400	7 400	385	17 100	16 400	13,1	0,08	**4202-BB-TVH**
	42	17	15 600	9 500	495	14 900	11 600	13	0,125	**4302-BB-TVH**
17	40	16	15 600	9 500	495	14 900	15 100	13	0,1	**4203-BB-TVH**
	47	19	20 900	13 200	690	12 500	9 800	13,1	0,178	**4303-BB-TVH**
20	47	18	20 900	13 200	690	12 500	13 300	13,1	0,14	**4204-BB-TVH**
	52	21	26 000	16 800	870	11 100	9 300	13	0,19	**4304-BB-TVH**
25	52	18	22 900	15 700	820	11 100	11 200	13,8	0,19	**4205-BB-TVH**
	62	24	34 500	22 900	1 190	9 400	8 500	13	0,28	**4305-BB-TVH**
30	62	20	29 000	21 600	1 130	9 400	9 600	14,2	0,28	**4206-BB-TVH**
	72	27	44 000	30 000	1 570	8 000	7 500	13	0,5	**4306-BB-TVH**
35	72	23	39 500	30 000	1 570	7 900	8 700	14,1	0,45	**4207-BB-TVH**
	80	31	58 000	40 500	2 120	6 900	6 900	12,9	0,59	**4307-BB-TVH**
40	80	23	42 000	34 500	1 790	7 200	7 500	14,7	0,45	**4208-BB-TVH**
	90	33	67 000	48 000	2 500	6 100	6 300	13,2	0,83	**4308-BB-TVH**
45	85	23	44 500	38 000	1 990	6 700	6 900	14,9	0,54	**4209-BB-TVH**
	100	36	75 000	60 000	3 700	5 400	5 300	13,9	1,23	**4309-B-TVH**
50	90	23	46 500	42 000	2 200	6 300	6 300	15,2	0,68	**4210-BB-TVH**
	110	40	92 000	76 000	4 600	4 800	5 000	13,8	1,62	**4310-B-TVH**
55	100	25	43 000	42 500	2 200	5 700	5 900	15,4	0,808	**4211-B-TVH**
	120	43	111 000	90 000	5 600	4 350	4 650	13,8	2,06	**4311-B-TVH**
60	110	28	56 000	56 000	2 900	5 000	5 400	15	1,09	**4212-B-TVH**
	130	46	128 000	106 000	6 400	3 950	4 350	13,8	2,58	**4312-B-TVH**
65	120	31	67 000	67 000	3 450	4 650	5 400	15,3	1,44	**4213-B-TVH**
	140	48	137 000	114 000	7 000	3 850	4 500	13,8	3,49	**4313-B-TVH**
70	125	31	70 000	71 000	3 700	4 300	4 800	15	1,5	**4214-B-TVH**
	150	51	156 000	131 000	7 900	3 550	4 200	13,7	3,99	**4314-B-TVH**
75	130	31	72 000	76 000	3 850	4 100	4 450	14,9	1,58	**4215-B-TVH**
80	140	33	81 000	90 000	4 500	3 800	4 200	15,7	1,98	**4216-B-TVH**
85	150	36	94 000	106 000	5 100	3 500	4 100	15,8	2,5	**4217-B-TVH**
90	160	40	113 000	123 000	6 100	3 300	4 100	15,5	3,15	**4218-B-TVH**

medias *https://www.schaeffler.de/std/1F9A*

Dimensions				Mounting dimensions		
d	r min.	D_1 ≈	d_1 ≈	d_a min.	D_a max.	r_a max.
10	0,6	23	16,6	14,2	25,8	0,6
12	0,6	25,8	17,8	16,2	27,8	0,6
15	0,6	28,8	21,4	19,2	30,8	0,6
	0,6	32,9	23,8	20,6	36,4	0,6
17	0,6	32,9	23,8	21,2	35,8	0,6
	1	38,5	28,4	22,6	41,4	1
20	1	38,5	28,4	25,6	41,4	1
	1,1	42,3	31,5	27	45	1
25	1	43,6	33,6	30,6	46,4	1
	1,1	49,9	37	32	55	1
30	1	51,8	39,9	35,6	56,4	1
	1,1	59,4	42,6	37	65	1
35	1,1	60,4	46,3	42	65	1
	1,5	68	48,2	44	71	1,5
40	1,1	67,2	53	47	73	1
	1,5	75,6	54,5	49	81	1,5
45	1,1	72,2	58,1	52	78	1
	1,5	86,8	66,7	54	91	1,5
50	1,1	76,9	62,8	57	83	1
	2	96,2	73,6	61	99	2
55	1,5	84,7	71,4	64	91	1,5
	2	105,3	80,4	66	109	2
60	1,5	95,3	79,8	69	101	1,5
	2,1	113,8	87,7	72	118	2,1
65	1,5	101,9	84,2	74	111	1,5
	2,1	116,2	89,2	77	128	2,1
70	1,5	109,4	91,7	79	116	1,5
	2,1	127,1	97,3	82	138	2,1
75	1,5	115	97,6	84	121	1,5
80	2	124	105,2	91	129	2
85	2	132,8	112,7	96	139	2
90	2	140,2	117,6	101	149	2

Angular contact ball bearings



Matrix for bearing preselection 284

1 Single row angular contact ball bearings 286

1.1 Bearing design 286
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Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Single row angular contact ball bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable ✓ available			single row	detailed information ➤ 286
Load carrying capacity	radial		++	➤ 290 | 1.2
	axial, one direction		++	➤ 290 | 1.2
	axial, both directions		++[1]	➤ 290 | 1.2
	moments		++[1]	➤ 290 | 1.2
Compensation of angular misalignments	static		–	➤ 291 | 1.3
	dynamic		–	➤ 291 | 1.3
Bearing design	cylindrical bore		✓	➤ 286 | 1.1
	tapered bore		–	
	separable		–	➤ 306 | 1.17
Lubrication	greased		✓[3]	➤ 291 | 1.4 ➤ 70
Sealing	open		✓	➤ 292 | 1.5 ➤ 185
	non-contact		✓	➤ 292 | 1.5
	contact		✓	➤ 292 | 1.5
Operating temperature in °C	from to		–30 +150[4]	➤ 294 | 1.8
Suitability for	high speeds		+++	➤ 292 | 1.6
	high running accuracy		+	➤ 115
	low-noise running		++	➤ 293 | 1.7 ➤ 286
	high rigidity		++	➤ 54
	reduced friction		++	➤ 56
	length compensation within bearing		–	
	non-locating bearing arrangement		+[1]	➤ 141
	locating bearing arrangement		+++[1]	➤ 141
X-life design		X-life	✓	➤ 289
Bearing bore d in mm	from to		10 180[5]	➤ 308
Product tables	from page ➤		308	

1) For mounting in pairs only, O or X arrangement

2) Valid for bearings with split inner ring

3) Valid for bearings sealed on both sides

4) Valid for open, ungreased bearings with sheet steel or brass cage

5) Larger catalogue bearings GL 1

	Double row angular contact ball bearings	
	double row	detailed information
		➤ 318
	++	➤ 321|2.2
	++	➤ 321|2.2
	++	➤ 321|2.2
	+	➤ 321|2.2
	–	➤ 321|2.3
	–	➤ 321|2.3
	✓	➤ 318|2.1
	–	
	✓[2]	➤ 331|2.17
	✓[3]	➤ 321|2.4 ➤ 70
	✓	➤ 321|2.5 ➤ 185
	✓	➤ 321|2.5
	✓	➤ 321|2.5
	–30 +150[4]	➤ 323|2.8
	+	➤ 322|2.6
	++	➤ 115
	++	➤ 322|2.7 ➤ 319
	++	➤ 54
	++	➤ 56
	–	
	+	➤ 141
	++	➤ 141
	✓	➤ 320
	5 110[5]	➤ 334
	334	

1 Single row angular contact ball bearings

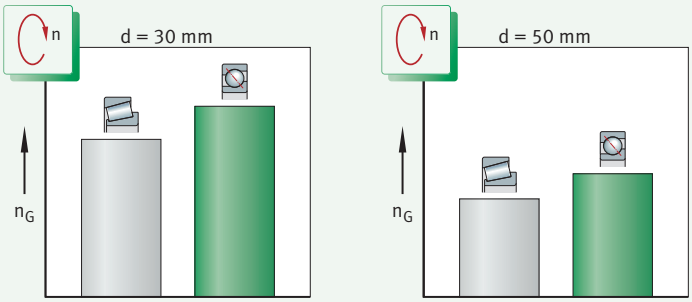
Single row angular contact ball bearings are particularly suitable where:

- bearing arrangements must support combined loads, i. e. radial and axial loads acting simultaneously ➤*287*|*2*
- moderate to high axial loads are present on one side
- rigid axial guidance is required
- the bearing arrangement must be axially clearance-free or preloaded
- high speeds are required under higher radial and axial loads
- the bearing arrangement is to run quietly in addition to meeting the requirements stated above

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*284*.

1
Angular contact ball bearings: speed comparison with tapered roller bearings

n_G = *limiting speed*



1.1 Bearing design

Design variants

The standard product range comprises bearings of series 718..-B, 70..-B(-2RS), 72..-B(-2RS), 73..-B(-2RS) and 74..-B.
These bearings are also available for various applications as:

- bearings of basic design for bearing arrangements with single bearings ➤*287*|*2*
- universal bearings for installation in sets in a tandem, O or X arrangement ➤*288*|*3*, ➤*288*|*4*, ➤*289*|*5*
- X-life bearings ➤*289*

Single row angular contact ball bearings are also available in other dimension series, designs and sizes. Information on these bearings is available from Schaeffler on request. Larger catalogue bearings GL 1.

Bearings of basic design for bearing arrangements with single bearings

The forces are transmitted oblique to the radial plane

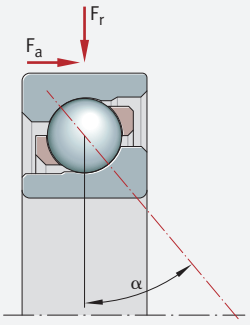
Single row angular contact ball bearings are part of the group of radial ball bearings. These self-retaining units have solid outer and inner rings. The rolling elements are guided by cages made from polyamide, sheet steel, or brass. The bearing rings are designed with one high shoulder and one low shoulder ➤287|2. As a result of the different shoulder heights, the mounting method differs from that of deep groove ball bearings. The possible number of balls for angular contact ball bearings with identical dimensions is higher than for deep groove ball bearings. In contrast to deep groove ball bearings, the raceways on the inner and outer rings are arranged obliquely to each other in the direction of the bearing axis. As a result, the forces are transmitted from one raceway to the other at a defined contact angle (oblique to the radial plane) ➤291|7.

For bearing positions with only one bearing each

These angular contact ball bearings can be considered when only one bearing is used per bearing position. As the bearings have standard bearing ring tolerances (they are manufactured to tolerance class Normal), they are not suitable for mounting directly adjacent to each other.
In such cases, universal bearings should be used.

2
Single row angular contact ball bearing of basic design

F_r = *radial load*
F_a = *axial load*
α = *nominal contact angle*



Universal bearings for mounting in sets

Bearings can be mounted in pairs in any arrangement required

Single row angular contact ball bearings, which are intended for mounting in pairs (in sets) directly adjacent to each other, are manufactured in the so-called universal design ➤288|3, ➤288|4, ➤289|5. These bearings can be used in pairs in any arrangement without shims. Depending on the design selected, the mounted bearing pair has the required axial clearance, freedom from clearance or preload. This gives easier design of the bearing arrangement and mounting of the bearings.

When ordering, please state the number of bearings, not the number of bearing pairs.

Suffixes: UA, UB, UO, UL, UM, UH

Bearings of a universal design are indicated by the suffix UA, UB, UO, UL, UM or UH ➤297|6. If bearings of the universal design are arranged in sets, this gives a defined axial clearance or an axial preload:

- UA = bearing set with small axial internal clearance
- UB = bearing set with smaller axial internal clearance than UA
- UO = bearing set clearance-free in O or X arrangement
- UL = bearing set with light preload
- UM = bearing set with moderate preload
- UH = bearing set with high preload

✎ *Reasons for mounting in sets*

Single row angular contact ball bearings are mounted in sets if:

- the load carrying capacity of one bearing is not sufficient (bearing set in a tandem arrangement)
- combined or axial loads occur in both directions and the bearing arrangement must have a defined axial clearance (bearing set in O or X arrangement)

The following arrangements are possible for mounting in sets:

- tandem arrangement ➤*288*| *3*
- O arrangement ➤*288*| *4*
- X arrangement ➤*289*| *5*

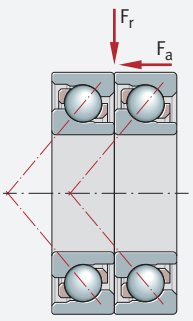
Bearing sets in tandem arrangement

✎ *Tandem arrangement*

In a tandem arrangement, the contact lines run parallel to each other ➤*288*| *3*. Axial forces are distributed equally over both bearings, but can only be supported by the bearing set from one direction. In order to support axial forces from the opposing direction, as well as combined loads, the bearing set is always adjusted against a further bearing.

3
Universal bearings, mounted in set in a tandem arrangement

Bearing set in tandem arrangement



0009A7DC

Bearing sets in O arrangement

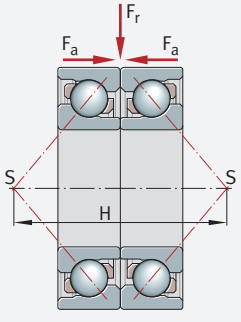
✎ *O arrangement*

In an O arrangement, the apexes of the cones formed by the contact lines point outwards, i. e. they diverge relative to the bearing axis ➤*288*| *4*. Bearing sets in an O arrangement support axial forces from both directions, but only ever with one bearing. Due to the large support spacing (i. e. the spacing between the contact cone apexes), these give relatively rigid bearing arrangements (small tilting clearance) and are also suitable for supporting tilting moments.

4
Universal bearings, mounted in set in an O arrangement

Bearing set in O arrangement

S = *contact cone apex*
H = *support spacing*



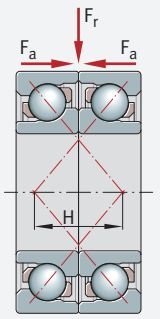
0009A7E0

Bearing sets in X arrangement

✎ *X arrangement*

In an X arrangement, the apexes of the cones formed by the contact lines point inwards, i.e. they converge relative to the bearing axis ➤*289*|🗀*5*. Once again, bearing sets of this type support axial forces from both directions, but also only ever with one bearing. The support base is, however, smaller than in an O arrangement. As a result, the sets are not as rigid as in an O arrangement. Furthermore, they are less suitable for supporting tilting moments.

🗀*5*
Universal bearings, mounted in set in an X arrangement



Bearing set in X arrangement

H = *support spacing*

X-life premium quality

Many sizes in series 70..-B, 72..-B, 73..-B and 74..-B are available as X-life bearings ➤*308*|▦. These bearings exhibit considerably higher performance than standard single row angular contact ball bearings ➤*290*|🗀*6*. This is achieved, for example, through the modified internal construction, higher surface quality of the contact surfaces and optimised cage design, as well as through the improved quality of the steel and rolling elements.

Advantages

✎ *Increased customer benefits due to X-life*

The technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings ➤*290*|🗀*6*
- quieter running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and, consequently, longer maintenance intervals
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements

✎ *Lower operating costs, higher machine availability*

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

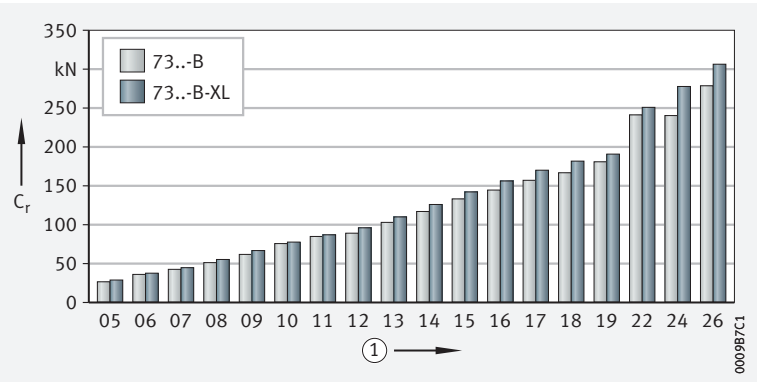
✎ *Suffix XL*

Single row X-life angular contact ball bearings include the suffix XL in the designation ➤*297*| 9, ➤*298*| 10 and ➤*308*|.

6
Comparison of basic dynamic load rating C_r – bearing series 73..-B-XL, bore code 05 to 26, with a bearing which is not of X-life quality (73..-B)

C_r = basic dynamic load rating

① Bore code



Areas of application

✎ *Wide application range*

Due to their special technical features, single row X-life angular contact ball bearings are highly suitable for bearing arrangements in:

- compressors
- fluid and hydraulic pumps
- automotive chassis and gearboxes
- industrial gearboxes
- electric motors
- industrial ventilators
- machine tools
- textile machinery

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

1.2 Load carrying capacity

✎ *Radial load*

Single row angular contact ball bearings can support high radial forces. Pure radial loads are also possible, if the bearings are adjusted.

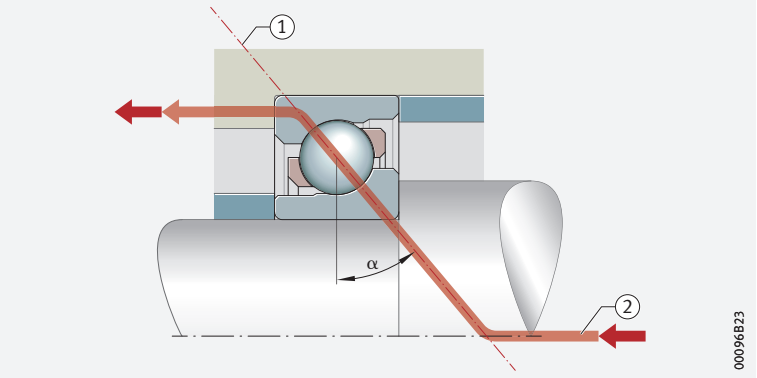
✎ *Axial loading is only possible on one side*

Due to the geometry and position of the raceway shoulders, axial loads are only transmitted from one direction ➤*287*| 2. If these angular contact ball bearings are required to support axial forces from both directions, they are adjusted against a second bearing in a mirror image arrangement ➤*299*| 11 and ➤*300*| 12.

✎ *The axial load carrying capacity of the bearings increases with the size of the contact angle*

The contact angle α is the angle encompassed by the contact line and the radial plane, under which the load is transmitted from one raceway to the other ➤*291*| 7. The axial load carrying capacity of the bearing increases with the value of α, i. e. the greater the angle, the higher the axial load to which the bearing can be subjected. As a result, angular contact ball bearings are more suitable than deep groove ball bearings for supporting higher axial forces. Due to the nominal contact angle of $\alpha = 40°$, single row angular contact ball bearings can support high axial loads on one side.

For information on angular contact ball bearings available with contact angles other than $\alpha = 40°$, please consult Schaeffler.



7 *Contact angle and force flow*

α = *contact angle*

① *Contact line*
② *Force flow*

Load carrying capacity of bearing sets

The basic dynamic and static load ratings C_r and C_{0r} in the product tables always refer to the single bearing. If two bearings of the same size and design are arranged immediately adjacent to each other in an O or X arrangement, the following will apply to the bearing pairs:

- $C_r = 1{,}625 \cdot C_{r\ \text{single bearing}}$
- $C_{0r} = 2 \cdot C_{0r\ \text{single bearing}}$

1.3 Compensation of angular misalignments

The angular adjustment facility of the bearings is very limited

Single row angular contact ball bearings are not suitable for the compensation of angular misalignments. In addition, misalignments induce internal forces in the bearing, which not only lead to higher temperatures, but also to a reduction in the bearing rating life.

Angular contact ball bearings arranged in sets

Misalignments in angular contact ball bearings mounted in sets lead – particularly with a small internal clearance and an O arrangement – to increased loads on the balls and cage, as the angular misalignments are supported under constraint between the balls and raceways. This can, in turn, have a negative effect on the operating life of the bearings. In addition, it should be noted that running noise is increased by a misalignment of the bearing rings.

1.4 Lubrication

Greased bearings are maintenance-free

Angular contact ball bearings sealed on both sides are greased with a high quality grease and do not require relubrication.

Ungreased bearings must be lubricated

Open bearings and bearings with seals on one side are not greased. These bearings must be lubricated with oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

Sealing with contact seals 2RS

Bearings with the suffix 2RS have lip seals on both sides ➤*297*|▦*6*. Due to their good sealing action, they are suitable for use in dusty, contaminated or damp environments.

Open bearings

In the case of unsealed bearings, sealing of the bearing position must be carried out by the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

1.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

The values given in the product tables are valid for oil lubrication in the case of bearings without seals or shields and for grease lubrication where bearings are supplied greased and with seals or shields.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

Values for grease lubrication

For the grease lubrication of bearings without seals or shields, 75% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 58% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

Bearings with contact seals

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

Bearing sets of universal design

Bearing pairs usually operate at lower speeds than single bearings

Angular contact ball bearings of universal design can be used in an X, O or tandem arrangement ➤*288*|*3* to ➤*289*|*5*. The thermally safe operating speed of the bearing pair is then approximately 20% below the calculated permissible operating speed of the single bearing.

1.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

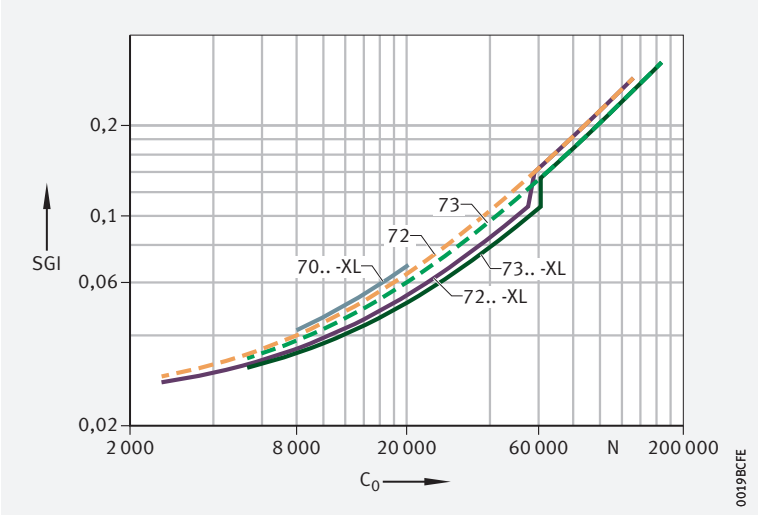
This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:

- ***medias*** *https://medias.schaeffler.com*



8 *Schaeffler Noise Index for single row angular contact ball bearings*

SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals

Possible operating temperatures of single row angular contact ball bearings ➤*294*|▦ *1*.

▦ **1**
Permissible temperature ranges

Operating temperature	Single row angular contact ball bearings, open		Single row angular contact ball bearings, sealed
	with sheet steel or brass cage	with polyamide cage PA66	
	–30 °C to +150 °C, for D > 240 mm up to +200 °C	–30 °C to +120 °C	–30 °C to +110 °C, limited by the lubricant and seal material

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Solid cages made from brass and PA66, as well as sheet steel cages, are used as standard

Standard cages and additional cage designs for single row angular contact ball bearings are made from brass, polyamide or steel ➤*294*|▦ *2*. Other cages are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with brass or sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

▦ **2**
Cage, cage suffix, bore code

Bearing series	Solid cage made from polyamide PA66 TVH, TVP		Solid brass cage MP		Sheet steel cage JP
	standard	also available for	standard	also available for	also available for
	Bore code				
718	06 to 16	–	–	–	–
70	04 to 08	–	–	–	–
72	up to 20, 22 to 26	–	21, from 28	00, 03, from 05	up to 20, 22
73	up to 20, 22 to 26	–	21, from 28	from 04	up to 20, 22
74	–	07 to 15	05 to 16	–	07 to 15

1.10 Internal clearance

Axial internal clearance, preload and preload force of bearing sets with universal bearings in O or X arrangement

✎ Valid for bearing sets in O or X arrangement

Values for axial internal clearance, preload and preload force of bearings of universal design ➤*295*|▦*3*. The values for axial internal clearance are valid for unmounted bearing sets in an O or X arrangement, which are free from load and measurement forces (without elastic deformation).

The angular contact ball bearings can also be supplied with a different internal clearance. Please consult Schaeffler in this case.

▦*3*
Axial internal clearance, preload and preload force of bearing sets with universal bearings in O or X arrangement for tolerance classes Normal, 6, 5

UA = *bearing with small axial internal clearance*
UB = *bearing with smaller axial internal clearance than UA*
UO = *bearing clearance-free in O or X arrangement*
UL = *bearing with light preload*

Bore code	Axial internal clearance or preload of bearing pair Nominal dimension µm							Preload force $F_{V\,max}$ N			
	UA	UB	UO	UL				UL			
	Bearing series										
	70..-B, 72..-B, 73..-B, 74..-B			70..-B	72..-B	73..-B	74..-B	70..-B	72..-B	73..-B	74..-B
00	22	14	0	–	−3	–	–	–	38	–	–
01	24	15	0	–	−4	−5	–	–	53	82	–
02	24	15	0	–	−4	−5	–	–	62	99	–
03	24	15	0	–	−4	−6	–	–	77	123	–
04	28	16	0	−4	−5	−6	−8	103	103	146	258
05	34	19	0	−4	−4	−6	−8	115	112	200	300
06	34	19	0	−5	−5	−7	−8	141	157	250	365
07	40	22	0	−5	−6	−7	−9	172	208	300	462
08	40	22	0	−5	−6	−8	−10	200	246	385	535
09	44	24	0	–	−6	−9	−10	–	277	462	600
10	44	24	0	–	−6	−10	−10	–	288	535	692
11	46	25	0	–	−7	−10	−11	–	358	600	785
12	46	25	0	–	−7	−10	−11	–	431	692	877
13	46	25	0	–	−8	−11	−12	–	492	785	977
14	50	27	0	–	−8	−11	−12	–	535	877	1 154
15	50	27	0	–	−8	−12	−13	–	523	977	1 154
16	50	27	0	–	−8	−12	−16	–	615	1 077	1 385
17	54	31	0	–	−8	−13	–	–	692	1 154	–
18	54	31	0	–	−9	−13	–	–	815	1 231	–
19	54	31	0	–	−10	−14	–	–	892	1 331	–
20	54	31	0	–	−11	−14	–	–	992	1 485	–
21	58	34	0	–	−11	−14	–	–	1 100	1 538	–
22	58	34	0	–	−12	−15	–	–	1 177	1 723	–
24	58	34	0	–	−12	−16	–	–	1 277	1 923	–
26	60	34	0	–	−12	−17	–	–	1 431	2 115	–
28	60	34	0	–	−12	−17	–	–	1 508	2 308	–
30	60	34	0	–	−13	−18	–	–	1 723	2 500	–
32	60	34	0	–	−13	−18	–	–	1 815	2 769	–
34	70	40	0	–	−14	−19	–	–	2 038	3 115	–

✎ Tolerances for axial internal clearance and preload

Tolerances for axial internal clearance and preload of bearing sets with universal bearings in O and X arrangement ➤*296*|▦*4*.

4
Tolerances for axial internal clearance and preload of bearing sets with universal bearings in O or X arrangement

Bore code	Tolerances µm					
	Bearing series					
	70..-B, 72..-B		73..-B		74..-B	
	Tolerance class					
	Normal, 6	5	Normal, 6	5	Normal, 6	5
00 to 07	+8 0	+6 0	+8 0	+6 0	+8 0	+6 0
08 to 09	+8 0	+6 0	+8 0	+6 0	+12 0	+10 0
10 to 11	+8 0	+6 0	+12 0	+10 0	+12 0	+10 0
12 to 34	+12 0	+10 0	+12 0	+10 0	+12 0	+10 0

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of angular contact ball bearings of the basic design correspond to DIN 628-1:2008 and ISO 12044:2014.
Nominal dimensions of angular contact ball bearings ➤*308*.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137*|*7.11*.
Nominal value of chamfer dimension ➤*308*.

Tolerances

The tolerances for the dimensional and running accuracy of single row angular contact ball bearings correspond to tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*124*|*8*.

Tolerances for bearings of universal design

Single row bearings are also available in tolerance class 5

In addition to the tolerance class Normal (no tolerance suffix), angular contact ball bearings of universal designs UA, UB, UO and UL are also available by agreement in tolerance class 5 and, in some cases, in tolerance class 6. Tolerance values in accordance with ISO 492 ➤*124*|*8* to ➤*129*|*16*. The tolerance suffix for bearings of universal design in tolerance class 5 is then:

- P5-UA, P5-UB, P5-UO, P5-UL

The bores of bearings of universal design for all tolerance classes are uniformly toleranced to tolerance class 5 (no special suffix).
The bearing width for universal bearings is toleranced to ISO 492:2014.
For width tolerances ➤*296*|*5*.

5
Tolerance for ring width in bearings of universal design

Tolerance symbols in accordance with ISO 492 ➤*117*|*6*
U = *upper limit deviation*
L = *lower limit deviation*

Nominal bore diameter d mm		Width deviation $t_{\Delta Bs}$ µm			
		Bearings in tolerance class			
		Normal, 6		5	
over	incl.	U	L	U	L
–	50	0	−250	0	−250
50	80	0	−380	0	−250
80	120	0	−380	0	−380
120	180	0	−500	0	−380
180	315	0	−500	0	−500

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

6 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
B	Modified internal construction, nominal contact angle $\alpha = 40°$	Standard
JP	Sheet steel cage	Standard, dependent on bore code
MP	Solid brass cage	
TVH, TVP	Solid cage made from glass fibre reinforced polyamide PA66	
P5	Bearing in tolerance class 5	Special design, available by agreement
2RS	Contact seal on both sides (lip seal)	Standard
UA	Universal design for fitting in pairs, bearing pair has a small axial internal clearance in O and X arrangement	
UB	Universal design for fitting in pairs, bearing pair has a smaller axial internal clearance in O and X arrangement than in UA	
UH	Universal design for fitting in pairs, bearing pair has a high preload in O and X arrangement	Available by agreement
UL	Universal design for fitting in pairs, bearing pair has a light preload in O and X arrangement	Standard
UM	Universal design for fitting in pairs, bearing pair has a moderate preload in O and X arrangement	Available by agreement
UO	Universal design for fitting in pairs, bearing pair is clearance-free in O and X arrangement	Standard
XL	X-life bearing, dependent on bore code and bearing type	Standard

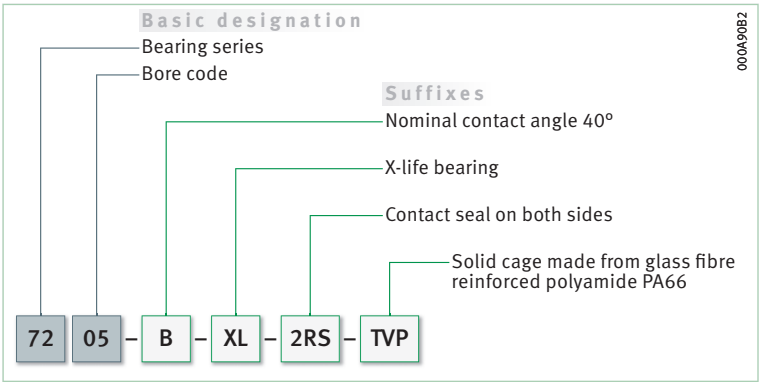
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

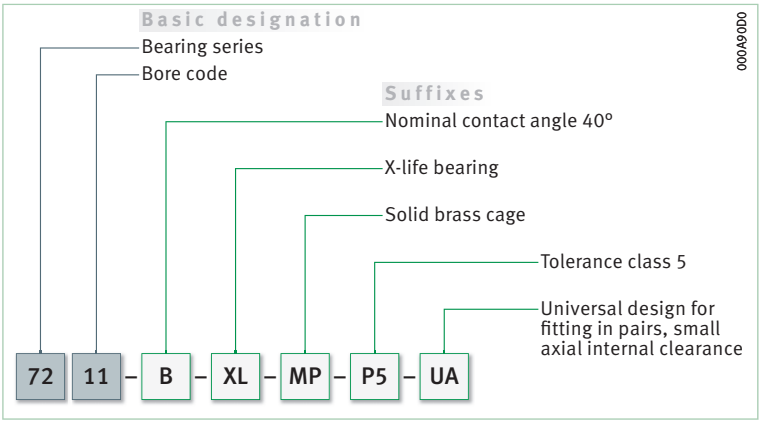
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ➤*297*|*9* and ➤*298*|*10*. The composition of designations is subject to DIN 623-1 ➤*102*|*10*.

9 *Single row angular contact ball bearing of basic design: designation structure*



10
Single row angular contact ball bearing of universal design: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *P = F_r under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used directly in the rating life equation for P ($P = F_r$).

✎ *P is a substitute force for combined load and various load cases*

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ *$F_a/F_r \leqq 1,14$ or $F_a/F_r > 1,14$*

The calculation of P is dependent on the load ratio F_a/F_r and the factor 1,14.

✎ *Tandem arrangement*

For single bearings under dynamic load and bearing pairs in a tandem arrangement ➤*298*| *1* and ➤*298*| *2*.

1
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq 1,14 \quad \Rightarrow \quad P = F_r$$

2
Equivalent dynamic load

$$\frac{F_a}{F_r} > 1,14 \quad \Rightarrow \quad P = 0,35 \cdot F_r + 0,57 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Resulting axial force ➤*299*| *7*. The information in the section “Calculation of internal resulting axial force F_a for single bearings and for bearings in a tandem arrangement” must be taken into consideration when calculating F_a ➤*299*.

Bearing pairs in O or X arrangement

For bearing pairs under dynamic load in O or X arrangement ➤299| 𝑓1 3 and ➤299| 𝑓1 4.

𝑓1 3
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq 1{,}14 \quad \Rightarrow \quad P = F_r + 0{,}55 \cdot F_a$$

𝑓1 4
Equivalent dynamic load

$$\frac{F_a}{F_r} > 1{,}14 \quad \Rightarrow \quad P = 0{,}57 \cdot F_r + 0{,}93 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Resulting axial force ➤298| 𝑓1 2 and ➤299| ▦ 7.

Calculation of internal resulting axial force F_a for single bearings and for bearings in a tandem arrangement

Equations for calculation of internal resulting axial force F_a

Single row angular contact ball bearings transmit radial forces from one raceway to the other oblique to the bearing axis. In the case of a shaft supported by two single row angular contact ball bearings of identical or different size, the radial load on bearing A therefore leads, due to the inclination of the raceways ($\alpha \neq 0°$), to an axial load on bearing B. The radial load on bearing B also has the effect of an axial load on bearing A; external forces in bearing systems of this type ➤299| 11 and ➤300| 12. This internal resulting axial force F_a must be taken into consideration in the calculation of the equivalent dynamic bearing load P. Equations for calculation of resulting axial force F_a ➤299| ▦ 7. The table shows the magnitude of the resulting axial force – that is the sum of or the difference between the internal and external axial force – for bearing arrangements in accordance with ➤299| 11 and ➤300| 12. The following applies to the table: the bearing aligned to the external axial force K_a is marked A and the opposing bearing is marked B.

Preconditions for calculation

Bearing A is subjected to a radial load F_{rA}, bearing B to a radial load F_{rB} ➤299| 11 and ➤300| 12. F_{rA} and F_{rB} act at the central pressure points of the bearings (dimension a in the product tables) and are always regarded as positive. The bearings are clearance-free, but without preload.

▦ 7
Equations for calculation of the internal resulting axial force F_a

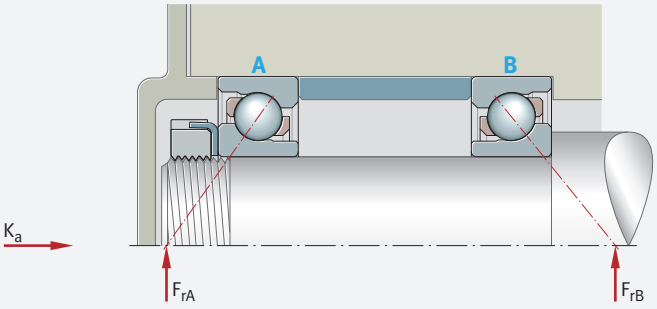
Parameters ➤298| 𝑓1 2, ➤299| 11 and ➤300| 12

$Y_A = Y_B = 0{,}57$

Case	Load ratio	External axial force	Resulting axial force F_a	
			Bearing A	Bearing B
1	$\frac{F_{rA}}{Y_A} \leqq \frac{F_{rB}}{Y_B}$	$K_a \geqq 0$	$F_{aA} = K_a + 0{,}5 \cdot \frac{F_{rB}}{Y_B}$	F_a is not taken into consideration in the calculation
2	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$	$K_a > 0{,}5 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$	$F_{aA} = K_a + 0{,}5 \cdot \frac{F_{rB}}{Y_B}$	F_a is not taken into consideration in the calculation
3	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$	$K_a \leqq 0{,}5 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$	F_a is not taken into consideration in the calculation	$F_{aB} = 0{,}5 \cdot \frac{F_{rA}}{Y_A} - K_a$

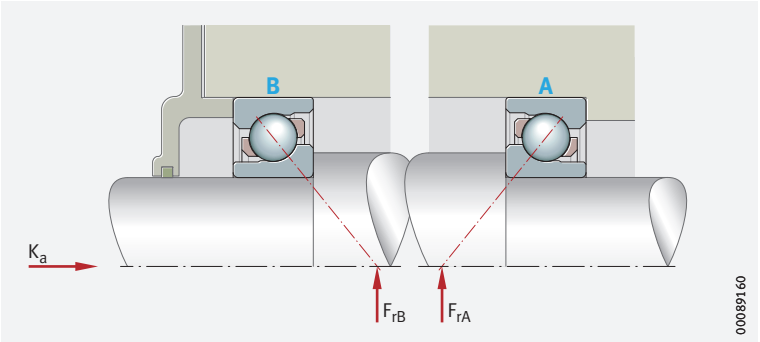
11
Adjusted bearing arrangement with two single row angular contact ball bearings in O arrangement, external forces

K_a = *external axial force acting on the shaft*
F_{rA} = *radial load, bearing A*
F_{rB} = *radial load, bearing B*



12
Adjusted bearing arrangement with two single row angular contact ball bearings in X arrangement, external forces

K_a = *external axial force acting on the shaft*
F_{rA} = *radial load, bearing A*
F_{rB} = *radial load, bearing B*



Example of calculation of internal resulting axial force F_a

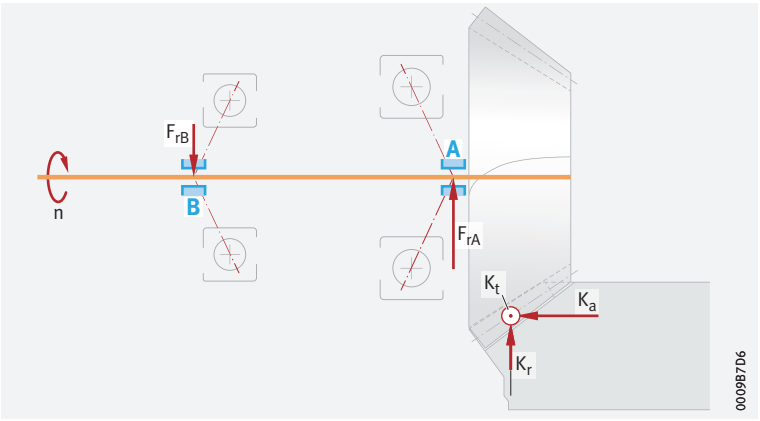
Bearing arrangement for pinion shaft

Single row angular contact ball bearings are used for the bearing arrangement of a pinion shaft ➤*300*| *13*. The bearing arrangement should be adjusted and in an O arrangement. In order to calculate the basic rating life, the equivalent dynamic bearing load P must be determined.

13
Load scheme for pinion shaft

K_a = *external axial force = 6,52 kN*
K_r = *external radial force = 0,82 kN*
K_t = *tangential force = 5,88 kN*

Resulting radial forces F_r
Bearing A, F_{rA} = 7,30 kN
Bearing B, F_{rB} = 2,20 kN



In a bearing arrangement with two single bearings, the resulting axial force F_a must be taken into consideration

Bearing A supports the external axial force K_a. Since this is an adjusted bearing arrangement with two single bearings, the internal resulting axial force F_a in the bearing system must be taken into consideration in the bearing calculation in accordance with ➤*299*| *7*. For both angular contact ball bearings $Y_A = Y_B = 0,57$. Loads ➤*300*| *13*.

Step 1

Calculate the load ratio using ➤*300*| *5*.

5
Load ratio

$$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$$

$$\frac{7,30\ \text{kN}}{0,57} > \frac{2,20\ \text{kN}}{0,57}$$

Step 2

Compare the result with possible cases ➤299| 7. Case 2 or case 3 can be considered ➤301| 8.

8 *Calculation of internal resulting axial force F_a*

Parameters ➤298| 2
$Y_A = Y_B = 0,57$

Case	Load ratio	External axial force	Resulting axial force F_a	
			Bearing A	Bearing B
2	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$	$K_a > 0,5 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$	$F_{aA} = K_a + 0,5 \cdot \frac{F_{rB}}{Y_B}$	–
3		$K_a \leqq 0,5 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$	–	$F_{aB} = 0,5 \cdot \frac{F_{rA}}{Y_A} - K_a$

Step 3

Using ➤301| 6, check whether case 2 applies ➤301| 8.

6 *External axial force in relation to load ratio*

$$K_a > 0,5 \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$$

$$6,52\,\text{kN} > 0,5 \left(\frac{7,30\,\text{kN}}{0,57} - \frac{2,20\,\text{kN}}{0,57}\right)$$
$$> 0,5\,(12,807\,\text{kN} - 3,859\,\text{kN})$$
$$6,52\,\text{kN} > 4,474\,\text{kN}$$

Case 2 applies ➤301| 8. This means that bearing A supports the external axial force K_a.

Step 4

Calculating F_a

Using ➤301| 7, calculate the internal resulting axial force F_a for bearing A. The calculations are in accordance with ➤301| 8, case 2.

7 *Internal resulting axial force*

$$F_{aA} = K_a + 0,5 \cdot \frac{F_{rB}}{Y_B}$$

$$F_{aA} = 6,52\,\text{kN} + 0,5 \cdot \frac{2,20\,\text{kN}}{0,57}$$
$$= 8,45\,\text{kN}$$

Using value F_a in the calculation of P

For calculation of the equivalent dynamic bearing load P, the calculated value for F_a in ➤298| 2 is then used for bearing A, since $F_a/F_{rA} > 1,14$ ($8,45\,\text{kN}/7,30\,\text{kN} > 1,14$).

Equivalent static bearing load

Tandem arrangement

For single bearings under static load and bearing pairs in a tandem arrangement ➤301| 8 and ➤301| 9.

8 *Equivalent static load*

$$\frac{F_{0a}}{F_{0r}} \leqq 1,9 \quad \Rightarrow \quad P_0 = F_{0r}$$

9 *Equivalent static load*

$$\frac{F_{0a}}{F_{0r}} > 1,9 \quad \Rightarrow \quad P_0 = 0,5 \cdot F_{0r} + 0,26 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

For bearing pairs under static load in an O or X arrangement ➤302| 𝑓 10.

𝑓 10
Equivalent static load

$$P_0 = F_{0r} + 0{,}52 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤302| 𝑓 11.

𝑓 11
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/100$ is required*

In order that no slippage occurs between the contact partners, the angular contact ball bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/100$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

✎ *Support bearing rings over their entire circumference and width*

In order to allow full utilisation of the load carrying capacity of the bearings and thus also achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤303| ▦ 9 to ➤304| ▦ 11.

Radial location of bearings – fit recommendations

✎ *For secure radial location, tight fits are necessary*

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤152| ▦ 6 and ➤160| ▦ 7.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤*146*
- conditions of rotation ➤*147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*149*|▦*2*
- shaft fits ➤*152*|▦*6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*150*|▦*4*
- housing fits ➤*160*|▦*7*

Axial location of bearings – location methods

✎*The bearings must also be securely located in an axial direction*

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable ➤*299*|⧉*11* and ➤*300*|⧉*12*.

Dimensional, geometrical and running accuracy of the bearing seats

✎*A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat*

The accuracy of the bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For single row angular contact ball bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7; with tolerance class 6, the shaft seat should correspond to a minimum of IT5 and the housing seat to IT6. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤*303*|▦*9*. Tolerances t_1 to t_3 in accordance with ➤*170*|⧉*11*. Numerical values for IT grades ➤*304*|▦*10*.

▦ **9**
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
6	P6	Shaft	IT5	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	
		Housing	IT6	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	

10
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm							
	over 3	6	10	18	30	50	80	120
	incl. 6	10	18	30	50	80	120	180
	Values in µm							
IT3	2,5	2,5	3	4	4	5	6	8
IT4	4	4	5	6	7	8	10	12
IT5	5	6	8	9	11	13	15	18
IT6	8	9	11	13	16	19	22	25
IT7	12	15	18	21	25	30	35	40

Roughness of cylindrical bearing seats

✎ Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*304*|▦ *11*.

11
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Mounting dimensions for the contact surfaces of bearing rings

✎ The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of abutment shoulders ➤*308*|▦. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

If single row angular contact bearings are mounted in a tandem arrangement, it must be ensured that the end faces of the outer rings in contact with each other have sufficient overlap. In case of doubt, please consult Schaeffler.

Adjustment of bearings

✎ Always adjust single bearings against a second bearing

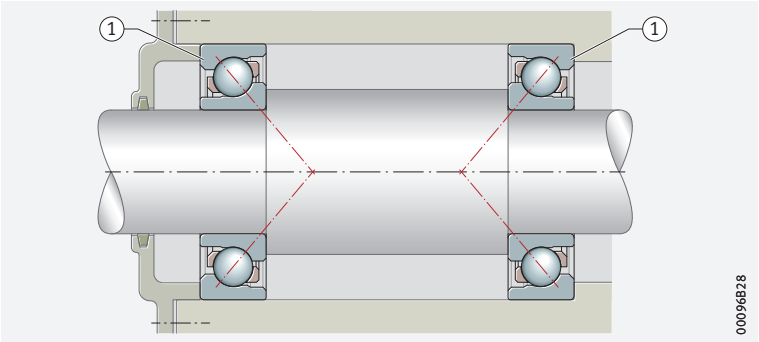
Single row angular contact ball bearings must always be used with a second bearing or as a bearing set ➤*305*|◯ *14*. If two individual single row angular contact ball bearings are used, these must be adjusted against each other until the requisite preload or desired clearance is achieved.

✎ Select the adjustment such that full function and operational reliability of the bearings is ensured

The correct adjustment of the bearings has a considerable influence on the function and operational reliability of the bearing arrangement. If the clearance is too large, the load carrying capacity of the bearings will not be fully utilised; if the preload is too high, the increased friction losses will give rise to higher operating temperatures, which will, in turn, have a negative effect on the rating life of the bearings.

14
Adjusted bearing arrangement with two single row angular contact ball bearings

① *Angular contact ball bearings mounted in X arrangement*



Adjustment not required for bearing sets

Universal bearings arranged immediately adjacent to each other, or matched bearings, do not need to be adjusted. In such cases, the desired operating clearance or required preload is achieved by selecting the internal clearance or preload class in conjunction with the suitable shaft and housing fits. As a result, particular attention must be paid to the correct selection of internal clearance or preload for these bearing sets.

1.17 Mounting and dismounting

The mounting and dismounting options for angular contact ball bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

✎ Ensure that the bearings are not damaged during mounting

Single row angular contact ball bearings are not separable. In the mounting of such bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Schaeffler Mounting Handbook

✎ Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

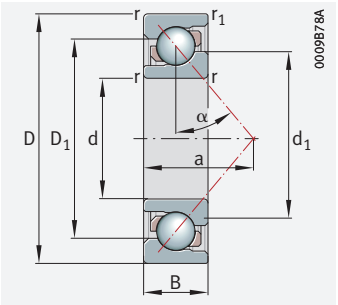
1.19 Further information

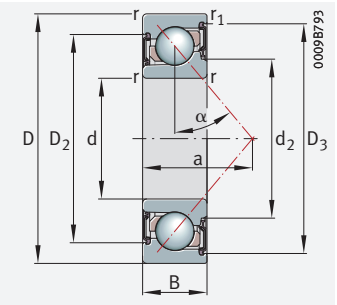
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

Angular contact ball bearings

Single row



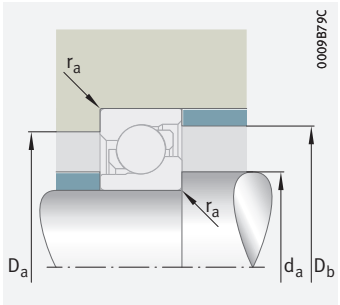


With seal 2RS

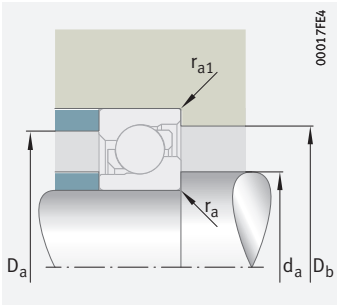
d = 10 – 20 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤297 | 1.12 ➤297 | 1.13 X-life ➤289
			N	N	N	min^{-1}	min^{-1}	≈ kg	
10	30	9	5 300	2 600	179	34 500	22 600	0,033	**7200-B-XL-JP**
	30	9	5 300	2 600	179	34 500	22 600	0,032	**7200-B-XL-TVP**
	30	9	5 300	2 600	179	16 100	–	0,037	**7200-B-XL-2RS-TVP**
12	32	10	7 400	3 550	248	30 000	21 100	0,037	**7201-B-XL-JP**
	32	10	7 400	3 550	248	30 000	21 100	0,038	**7201-B-XL-TVP**
	32	10	7 400	3 550	248	14 800	–	0,037	**7201-B-XL-2RS-TVP**
	37	12	11 400	5 300	365	25 500	16 300	0,066	**7301-B-XL-JP**
	37	12	11 400	5 300	365	25 500	16 300	0,06	**7301-B-XL-TVP**
15	35	11	8 400	4 450	305	27 000	19 100	0,045	**7202-B-XL-JP**
	35	11	8 400	4 450	305	27 000	19 100	0,044	**7202-B-XL-TVP**
	35	11	8 400	4 450	305	12 800	–	0,048	**7202-B-XL-2RS-TVP**
	42	13	14 200	7 200	495	22 200	14 200	0,084	**7302-B-XL-JP**
	42	13	14 200	7 200	495	22 200	14 200	0,081	**7302-B-XL-TVP**
	42	13	14 200	7 200	495	11 100	–	0,082	**7302-B-XL-2RS-TVP**
17	40	12	10 500	5 700	395	23 400	17 100	0,067	**7203-B-XL-JP**
	40	12	10 500	5 700	395	23 400	17 100	0,065	**7203-B-XL-TVP**
	40	12	10 500	5 700	395	11 100	–	0,068	**7203-B-XL-2RS-TVP**
	47	14	17 600	9 000	620	19 600	12 800	0,117	**7303-B-XL-JP**
	47	14	17 600	9 000	620	19 600	12 800	0,11	**7303-B-XL-TVP**
	47	14	17 600	9 000	620	9 800	–	0,112	**7303-B-XL-2RS-TVP**
20	42	12	14 500	8 000	560	20 500	14 400	0,061	**7004-B-XL-TVP**
	42	12	14 500	8 000	560	9 800	–	0,061	**7004-B-XL-2RS-TVP**
	47	14	14 000	7 800	540	19 700	15 400	0,106	**7204-B-XL-JP**
	47	14	14 000	7 800	540	19 700	15 400	0,103	**7204-B-XL-TVP**
	47	14	14 000	7 800	540	9 500	–	0,107	**7204-B-XL-2RS-TVP**
	52	15	20 400	11 100	770	17 600	11 500	0,149	**7304-B-XL-JP**
	52	15	20 400	11 100	770	17 600	11 500	0,147	**7304-B-XL-TVP**
	52	15	20 400	11 100	770	8 600	–	0,147	**7304-B-XL-2RS-TVP**

medias *https://www.schaeffler.de/std/1F9A*



Mounting dimensions

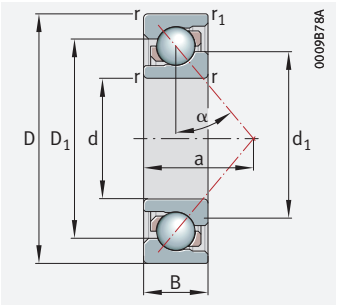


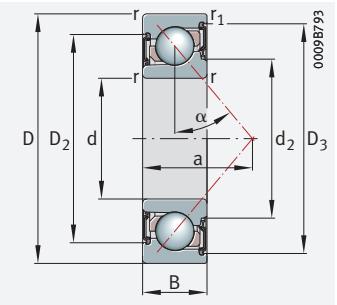
Mounting dimensions

Dimensions									Nominal contact angle	Mounting dimensions				
d	r	r_1	D_1	D_2	D_3	d_1	d_2	a	α	d_a	D_a	D_b	r_a	r_{a1}
	min.	min.	≈	≈	≈	≈	≈	≈	°	min.	max.	max.	max.	max.
10	0,6	0,3	22	–	–	18,3	–	13	40	14,2	25,8	27,6	0,6	0,3
	0,6	0,3	22	–	–	18,3	–	13	40	14,2	25,8	27,6	0,6	0,3
	0,6	0,3	22	23,2	25,4	–	15,5	13	40	14,2	25,8	27,6	0,6	0,3
12	0,6	0,3	24,6	–	–	19,8	–	14	40	16,2	27,8	29,6	0,6	0,3
	0,6	0,3	24,6	–	–	19,8	–	14	40	16,2	27,8	29,6	0,6	0,3
	0,6	0,3	24,6	25,9	28,8	–	17	14	40	16,2	27,8	29,6	0,6	0,3
	1	0,6	27,2	–	–	22,3	–	16	40	17,6	31,4	32,8	1	0,6
	1	0,6	27,2	–	–	22,3	–	16	40	17,6	31,4	32,8	1	0,6
15	0,6	0,3	27,6	–	–	22,8	–	16	40	19,2	30,8	32,6	0,6	0,3
	0,6	0,3	27,6	–	–	22,8	–	16	40	19,2	30,8	32,6	0,6	0,3
	0,6	0,3	27,6	29,2	32,1	–	19,7	16	40	19,2	30,8	32,6	0,6	0,3
	1	0,6	31,7	–	–	26	–	18	40	20,6	36,4	37,8	1	0,6
	1	0,6	31,7	–	–	26	–	18	40	20,6	36,4	37,8	1	0,6
	1	0,6	31,7	33,3	38,1	–	22,9	18	40	20,6	36,4	37,8	1	0,6
17	0,6	0,3	31,5	–	–	26	–	18	40	21,2	35,8	37,6	0,6	0,6
	0,6	0,3	31,5	–	–	26	–	18	40	21,2	35,8	37,6	0,6	0,6
	0,6	0,3	31,5	33,1	36,3	–	22,9	18	40	21,2	35,8	37,6	0,6	0,6
	1	0,6	35,5	–	–	29,2	–	20	40	22,6	41,4	42,8	1	0,6
	1	0,6	35,5	–	–	29,2	–	20	40	22,6	41,4	42,8	1	0,6
	1	0,6	35,5	37,2	42,6	–	26,1	20	40	22,6	41,4	42,8	1	0,6
20	0,6	0,3	34,8	–	–	28,9	–	19,4	40	23,2	38,8	40	0,6	0,3
	0,6	0,3	34,8	35,5	39,8	–	26,5	19,4	40	23,2	38,8	40	0,6	0,3
	1	0,6	37	–	–	30,5	–	21	40	25,6	41,4	42,8	1	0,6
	1	0,6	37	–	–	30,5	–	21	40	25,6	41,4	42,8	1	0,6
	1	0,6	37	39,2	43	–	26,8	21	40	25,6	41,4	42,8	1	0,6
	1,1	0,6	39,7	–	–	33	–	23	40	27	45	47,8	1	0,6
	1,1	0,6	39,7	–	–	33	–	23	40	27	45	47,8	1	0,6
	1,1	0,6	39,7	41,4	47,1	–	30	23	40	27	45	47,8	1	0,6

Angular contact ball bearings

Single row



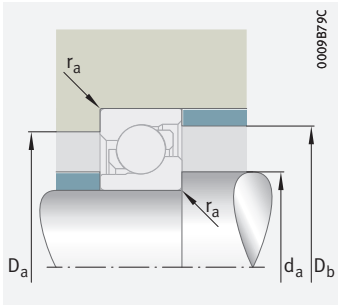


With seal 2RS

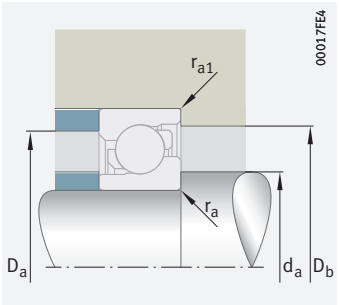
d = 25 – 35 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤297|1.12 ➤297|1.13 X-life ➤289
			N	N	N	min^{-1}	min^{-1}	≈ kg	
25	47	12	16 000	9 900	690	18 100	12 000	0,071	**7005-B-XL-TVP**
	47	12	16 000	9 900	690	7 900	–	0,071	**7005-B-XL-2RS-TVP**
	52	15	15 300	9 000	620	17 400	13 700	0,13	**7205-B-XL-JP**
	52	15	15 300	9 000	620	17 400	13 700	0,127	**7205-B-XL-TVP**
	52	15	15 300	9 000	620	8 000	–	0,132	**7205-B-XL-2RS-TVP**
	62	17	28 000	15 800	1 100	14 300	9 800	0,242	**7305-B-XL-JP**
	62	17	28 000	15 800	1 100	14 300	9 800	0,223	**7305-B-XL-TVP**
	62	17	28 000	15 800	1 100	7 100	–	0,231	**7305-B-XL-2RS-TVP**
	80	21	43 500	26 000	1 800	15 100	7 500	0,585	**7405-B-XL-MP**
30	42	7	5 600	4 550	300	20 600	9 600	0,026	**71806-B-TVH**
	55	13	19 900	13 400	930	15 200	10 200	0,109	**7006-B-XL-TVP**
	55	13	19 900	13 400	930	6 500	–	0,109	**7006-B-XL-2RS-TVP**
	62	16	21 700	14 100	980	14 400	11 200	0,203	**7206-B-XL-JP**
	62	16	21 700	14 100	980	14 400	11 200	0,197	**7206-B-XL-TVP**
	62	16	21 700	14 100	980	6 500	–	0,204	**7206-B-XL-2RS-TVP**
	72	19	35 500	22 100	1 530	12 300	8 600	0,362	**7306-B-XL-JP**
	72	19	35 500	22 100	1 530	12 300	8 600	0,341	**7306-B-XL-TVP**
	72	19	35 500	22 100	1 530	6 000	–	0,341	**7306-B-XL-2RS-TVP**
	90	23	51 000	30 500	2 110	13 100	6 800	0,791	**7406-B-XL-MP**
35	47	7	6 000	5 300	360	18 100	8 200	0,029	**71807-B-TVH**
	62	14	24 300	17 200	1 200	13 400	9 000	0,14	**7007-B-XL-TVP**
	62	14	24 300	17 200	1 200	6 000	–	0,14	**7007-B-XL-2RS-TVP**
	72	17	28 000	19 000	1 320	12 200	9 600	0,29	**7207-B-XL-JP**
	72	17	28 000	19 000	1 320	12 200	9 600	0,282	**7207-B-XL-TVP**
	72	17	28 000	19 000	1 320	5 600	–	0,292	**7207-B-XL-2RS-TVP**
	80	21	43 000	27 500	1 910	10 800	7 900	0,48	**7307-B-XL-JP**
	80	21	43 000	27 500	1 910	10 800	7 900	0,48	**7307-B-XL-TVP**
	80	21	43 000	27 500	1 910	5 300	–	0,477	**7307-B-XL-2RS-TVP**
	100	25	65 000	43 000	3 000	11 000	5 400	1,01	**7407-B-XL-MP**

medias *https://www.schaeffler.de/std/1F9A*



Mounting dimensions

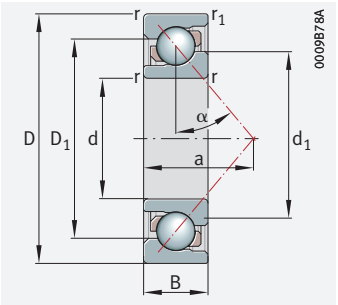


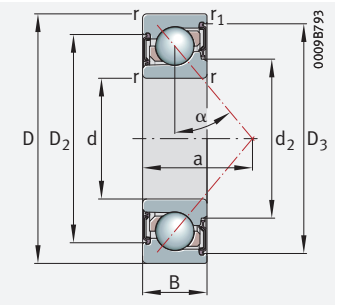
Mounting dimensions

Dimensions									Nominal contact angle	Mounting dimensions				
d	r	r_1	D_1	D_2	D_3	d_1	d_2	a	α	d_a	D_a	D_b	r_a	r_{a1}
	min.	min.	≈	≈	≈	≈	≈	≈	°	min.	max.	max.	max.	max.
25	0,6	0,3	39,8	–	–	33,9	–	21	40	28,2	43,8	45	0,6	0,3
	0,6	0,3	39,8	40,5	44,8	–	31,5	21	40	28,2	43,8	45	0,6	0,3
	1	0,6	42	–	–	35,5	–	24	40	30,6	46,4	47,8	1	0,6
	1	0,6	42	–	–	35,5	–	24	40	30,6	46,4	47,8	1	0,6
	1	0,6	42	44,1	48	–	31,8	24	40	30,6	46,4	47,8	1	0,6
	1,1	0,6	48	–	–	39,9	–	27	40	32	55	57,8	1	0,6
	1,1	0,6	48	–	–	39,9	–	27	40	32	55	57,8	1	0,6
	1,1	0,6	48	50,3	57,1	–	36,2	27	40	32	55	57,8	1	0,6
	1,5	1	57,9	–	–	48,2	–	33	40	36	69	74,4	1,5	1
30	0,3	0,2	37,3	–	–	34,7	–	18,6	40	32	40	40	0,3	0,2
	1	0,6	47,1	–	–	41,3	–	24	40	34,6	50,4	51,8	1	0,6
	1	0,6	47,1	47,7	51,9	–	38	24	40	34,6	50,4	51,8	1	0,6
	1	0,6	49,5	–	–	43,2	–	27	40	35,6	56,4	57,8	1	0,6
	1	0,6	49,5	–	–	43,2	–	27	40	35,6	56,4	57,8	1	0,6
	1	0,6	49,5	51,7	57,1	–	39,5	27	40	35,6	56,4	57,8	1	0,6
	1,1	0,6	55,9	–	–	47,1	–	31	40	37	65	67,8	1	0,6
	1,1	0,6	55,9	–	–	47,1	–	31	40	37	65	67,8	1	0,6
	1,1	0,6	55,9	58,5	65,9	–	42,7	31	40	37	65	67,8	1	0,6
	1,5	1	66	–	–	55,3	–	37	40	41	79	84,4	1,5	1
35	0,3	0,2	42,3	–	–	39,7	–	20,7	40	37	45	45,6	0,3	0,2
	1	0,6	53,4	–	–	47	–	27	40	39,6	57,4	58,8	1	0,6
	1	0,6	53,4	54	58,9	–	43,6	27	40	39,6	57,4	58,8	1	0,6
	1,1	0,6	57,6	–	–	50,2	–	31	40	42	65	67,8	1	0,6
	1,1	0,6	57,6	–	–	50,2	–	31	40	42	65	67,8	1	0,6
	1,1	0,6	57,6	60,2	66,5	–	45,8	31	40	42	65	67,8	1	0,6
	1,5	1	63	–	–	53,1	–	35	40	44	71	74,4	1,5	1
	1,5	1	63	–	–	53,1	–	35	40	44	71	74,4	1,5	1
	1,5	1	63	65,6	73,9	–	48,7	35	40	44	71	74,4	1,5	1
	1,5	1	79,8	–	–	66,7	–	41	40	46	94,4	100	1,5	1

Angular contact ball bearings

Single row



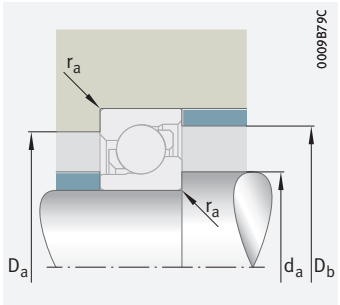


With seal 2RS

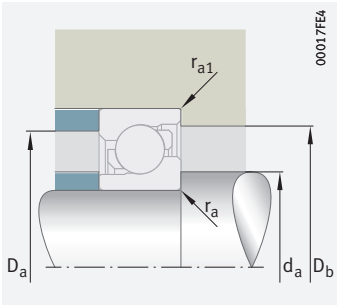
d = 40 – 55 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤297 | 1.12 ➤297 | 1.13 X-life ➤289
			N	N	N	min^{-1}	min^{-1}	≈ kg	
40	52	7	6 300	5 800	405	16 200	7 200	0,033	**71808-B-TVH**
	68	15	28 000	20 300	1 410	12 100	8 400	0,176	**7008-B-XL-TVP**
	68	15	28 000	20 300	1 410	5 200	–	0,17	**7008-B-XL-2RS-TVP**
	80	18	34 000	23 500	1 630	10 900	8 600	0,372	**7208-B-XL-JP**
	80	18	34 000	23 500	1 630	10 900	8 600	0,367	**7208-B-XL-TVP**
	80	18	34 000	23 500	1 630	5 000	–	0,379	**7208-B-XL-2RS-TVP**
	90	23	53 000	34 500	2 390	9 500	7 100	0,646	**7308-B-XL-JP**
	90	23	53 000	34 500	2 390	9 500	7 100	0,61	**7308-B-XL-TVP**
	90	23	53 000	34 500	2 390	4 650	–	0,61	**7308-B-XL-2RS-TVP**
	110	27	75 000	50 000	3 500	9 900	5 000	1,34	**7408-B-XL-MP**
45	58	7	6 600	6 500	465	14 500	6 300	0,041	**71809-B-TVH**
	85	19	37 500	27 000	1 870	10 000	8 000	0,411	**7209-B-XL-JP**
	85	19	37 500	27 000	1 870	10 000	8 000	0,405	**7209-B-XL-TVP**
	85	19	37 500	27 000	1 870	4 550	–	0,405	**7209-B-XL-2RS-TVP**
	100	25	65 000	43 000	3 000	8 400	6 500	0,937	**7309-B-XL-JP**
	100	25	65 000	43 000	3 000	8 400	6 500	0,937	**7309-B-XL-TVP**
	120	29	86 000	61 000	4 250	9 100	4 650	1,68	**7409-B-XL-MP**
50	65	7	7 000	7 400	540	12 900	5 400	0,058	**71810-B-TVH**
	90	20	39 000	28 500	1 970	9 300	7 600	0,466	**7210-B-XL-JP**
	90	20	39 000	28 500	1 970	9 300	7 600	0,456	**7210-B-XL-TVP**
	90	20	39 000	28 500	1 970	4 200	–	0,468	**7210-B-XL-2RS-TVP**
	110	27	75 000	50 000	3 500	7 600	6 100	1,13	**7310-B-XL-JP**
	110	27	75 000	50 000	3 500	7 600	6 100	1,05	**7310-B-XL-TVP**
	130	31	96 000	69 000	4 750	8 300	4 400	2,05	**7410-B-XL-MP**
55	72	9	11 800	11 800	780	11 400	5 600	0,084	**71811-B-TVH**
	100	21	49 000	38 500	2 650	8 300	6 800	0,645	**7211-B-XL-JP**
	100	21	49 000	38 500	2 650	8 300	6 800	0,604	**7211-B-XL-TVP**
	120	29	86 000	61 000	4 250	7 000	5 600	1,46	**7311-B-XL-JP**
	120	29	86 000	61 000	4 250	7 000	5 600	1,38	**7311-B-XL-TVP**
	140	33	110 000	82 000	5 600	7 700	4 150	2,64	**7411-B-XL-MP**

medias *https://www.schaeffler.de/std/1F9A*



Mounting dimensions

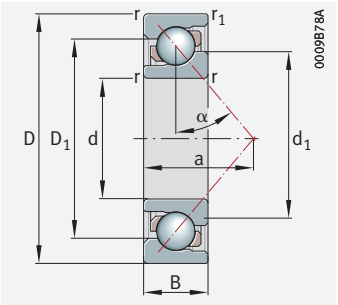


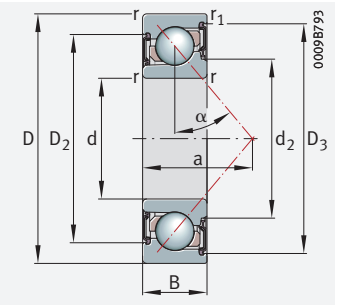
Mounting dimensions

Dimensions									Nominal contact angle	Mounting dimensions				
d	r	r_1	D_1	D_2	D_3	d_1	d_2	a	α	d_a	D_a	D_b	r_a	r_{a1}
	min.	min.	≈	≈	≈	≈	≈	≈	°	min.	max.	max.	max.	max.
40	0,3	0,2	47,3	–	–	44,7	–	22,8	40	42	50	50	0,3	0,2
	1	0,6	58,8	–	–	51,9	–	30	40	44,6	63,4	64,8	1	0,6
	1	0,6	58,8	59,4	65	–	48,3	30	40	44,6	63,4	64,8	1	0,6
	1,1	0,6	64,4	–	–	56,4	–	34	40	47	73	75,8	1	0,6
	1,1	0,6	64,4	–	–	56,4	–	34	40	47	73	75,8	1	0,6
	1,1	0,6	64,4	67	73,8	–	52	34	40	47	73	75,8	1	0,6
	1,5	1	71,3	–	–	60	–	39	40	49	81	84,4	1,5	1
	1,5	1	71,3	–	–	60	–	39	40	49	81	84,4	1,5	1
	1,5	1	71,3	73,9	83,3	–	55,6	39	40	49	81	84,4	1,5	1
	2	1	87,6	–	–	73,1	–	45	40	53	97	104,4	2	1
45	0,3	0,2	52,8	–	–	50,2	–	25,1	40	47	56	56	0,3	0,2
	1,1	0,6	69,8	–	–	61,2	–	37	40	52	78	80,8	1	0,6
	1,1	0,6	69,8	–	–	61,2	–	37	40	52	78	80,8	1	0,6
	1,1	0,6	69,8	72,4	79,6	–	56,8	37	40	52	78	80,8	1	0,6
	1,5	1	79,8	–	–	66,7	–	43	40	54	91	94,4	1,5	1
	1,5	1	79,8	–	–	66,7	–	43	40	54	91	94,4	1,5	1
	2	1	95,3	–	–	80,3	–	49	40	58	107	114,4	2	1
50	0,3	0,2	59,3	–	–	56,7	–	27,8	40	52	63	63	0,3	0,2
	1,1	0,6	74,8	–	–	66,3	–	39	40	57	83	85,8	1	0,6
	1,1	0,6	74,8	–	–	66,3	–	39	40	57	83	85,8	1	0,6
	1,1	0,6	74,8	77,4	84,6	–	61,8	39	40	57	83	85,8	1	0,6
	2	1	87,6	–	–	73,1	–	47	40	61	99	104,4	2	1
	2	1	87,6	–	–	73,1	–	47	40	61	99	104,4	2	1
	2,1	1,1	103,4	–	–	87,3	–	53	40	64	116	121	2,1	1
55	0,3	0,2	65,3	–	–	61,7	–	31,1	40	57	70	70	0,3	0,2
	1,5	1	83	–	–	72,6	–	43	40	64	91	94,4	1,5	1
	1,5	1	83	–	–	72,6	–	43	40	64	91	94,4	1,5	1
	2	1	95,3	–	–	80,3	–	51	40	66	109	114,4	2	1
	2	1	95,3	–	–	80,3	–	51	40	66	109	114,4	2	1
	2,1	1,1	111,5	–	–	95,3	–	57	40	69	126	131	2,1	1

Angular contact ball bearings

Single row



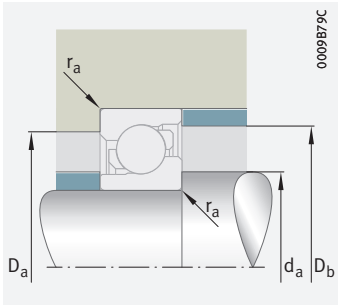


With seal 2RS

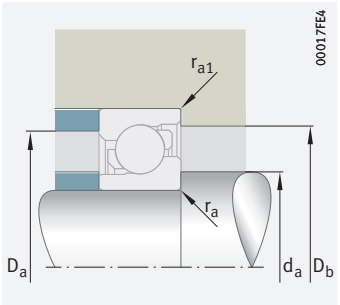
d = 60 – 80 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤297|1.12 ➤297|1.13 X-life ➤289
			N	N	N	min^{-1}	min^{-1}	≈ kg	
60	78	10	12 300	12 800	870	10 500	5 400	0,11	**71812-B-TVH**
	110	22	59 000	45 000	3 150	7 500	6 200	0,782	**7212-B-XL-JP**
	110	22	59 000	45 000	3 150	7 500	6 200	0,808	**7212-B-XL-TVP**
	110	22	59 000	45 000	3 150	3 450	–	0,78	**7212-B-XL-2RS-TVP**
	130	31	96 000	69 000	4 750	6 400	5 300	1,74	**7312-B-XL-JP**
	130	31	96 000	69 000	4 750	6 400	5 300	1,71	**7312-B-XL-TVP**
	150	35	126 000	93 000	6 200	7 100	3 950	3,1	**7412-B-XL-MP**
65	85	10	15 200	15 800	1 000	9 600	4 850	0,13	**71813-B-TVH**
	120	23	67 000	55 000	3 850	6 900	5 700	1,08	**7213-B-XL-JP**
	120	23	67 000	55 000	3 850	6 900	5 700	1	**7213-B-XL-TVP**
	140	33	110 000	82 000	5 600	5 900	5 000	2,22	**7313-B-XL-JP**
	140	33	110 000	82 000	5 600	5 900	5 000	2,12	**7313-B-XL-TVP**
	160	37	140 000	107 000	6 900	6 600	3 800	3,71	**7413-B-XL-MP**
70	90	10	15 800	17 200	1 100	9 000	4 500	0,14	**71814-B-TVH**
	125	24	74 000	62 000	4 300	6 500	5 400	1,17	**7214-B-XL-JP**
	125	24	74 000	62 000	4 300	6 500	5 400	1,08	**7214-B-XL-TVP**
	125	24	74 000	62 000	4 300	3 000	–	1,08	**7214-B-XL-2RS-TVP**
	150	35	126 000	93 000	6 200	5 500	4 750	2,76	**7314-B-XL-JP**
	150	35	126 000	93 000	6 200	5 500	4 750	2,58	**7314-B-XL-TVP**
	180	42	167 000	138 000	8 300	5 800	3 450	5,39	**7414-B-XL-MP**
75	95	10	16 200	18 100	1 170	8 500	4 150	0,15	**71815-B-TVH**
	130	25	73 000	62 000	4 250	6 300	5 300	1,25	**7215-B-XL-JP**
	130	25	73 000	62 000	4 250	6 300	5 300	1,16	**7215-B-XL-TVP**
	160	37	140 000	107 000	6 900	5 100	4 500	3,29	**7315-B-XL-JP**
	160	37	140 000	107 000	6 900	5 100	4 500	3,1	**7315-B-XL-TVP**
	190	45	167 000	138 000	8 300	5 800	3 750	6,7	**7415-B-XL-MP**
80	100	10	16 500	19 100	1 240	8 000	3 900	0,155	**71816-B-TVH**
	140	26	85 000	72 000	4 800	5 800	4 950	1,53	**7216-B-XL-JP**
	140	26	85 000	72 000	4 800	5 800	4 950	1,42	**7216-B-XL-TVP**
	170	39	155 000	124 000	7 700	4 750	4 250	3,86	**7316-B-XL-JP**
	170	39	155 000	124 000	7 700	4 750	4 250	3,66	**7316-B-XL-TVP**
	200	48	200 000	169 000	9 900	5 300	3 600	7,48	**7416-B-XL-MP**

medias *https://www.schaeffler.de/std/1F9A*



Mounting dimensions

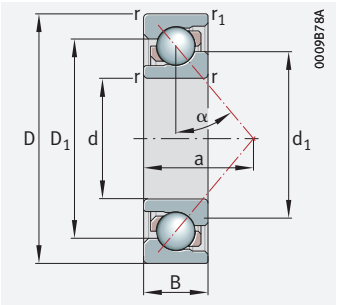


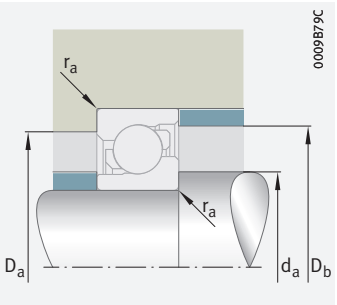
Mounting dimensions

Dimensions									Nominal contact angle	Mounting dimensions				
d	r	r_1	D_1	D_2	D_3	d_1	d_2	a	α	d_a	D_a	D_b	r_a	r_{a1}
	min.	min.	≈	≈	≈	≈	≈	≈	°	min.	max.	max.	max.	max.
60	0,3	0,2	70,8	–	–	67,2	–	33,9	40	62	76	76,6	0,3	0,2
	1,5	1	90,8	–	–	80,3	–	47	40	69	101	104,4	1,5	1
	1,5	1	90,8	–	–	80,3	–	47	40	69	101	104,4	1,5	1
	1,5	1	90,8	94,4	103,4	–	75,3	47	40	69	101	104,4	1,5	1
	2,1	1,1	103,4	–	–	87,3	–	55	40	72	118	123	2,1	1
	2,1	1,1	103,4	–	–	87,3	–	55	40	72	118	123	2,1	1
	2,1	1,1	119,6	–	–	102,3	–	62	40	74	136	141	2,1	1
65	0,6	0,3	77	–	–	73	–	36,5	40	68,2	81,8	83	0,6	0,3
	1,5	1	98,9	–	–	86,3	–	51	40	74	111	114,4	1,5	1
	1,5	1	98,9	–	–	86,3	–	51	40	74	111	114,4	1,5	1
	2,1	1,1	111,5	–	–	95,3	–	60	40	77	128	133	2,1	1
	2,1	1,1	111,5	–	–	95,3	–	60	40	77	128	133	2,1	1
	2,1	1,1	128	–	–	109,2	–	66	40	79	146	151	2,1	1
70	0,6	0,3	82	–	–	78	–	38,5	40	73,2	86,8	88	0,6	0,3
	1,5	1	104	–	–	92,3	–	53	40	79	116	119,4	1,5	1
	1,5	1	104	–	–	92,3	–	53	40	79	116	119,4	1,5	1
	1,5	1	104	107,6	117,9	–	87,3	53	40	79	116	119,4	1,5	1
	2,1	1,1	119,6	–	–	102,3	–	64	40	82	138	143	2,1	1
	2,1	1,1	119,6	–	–	102,3	–	64	40	82	138	143	2,1	1
	3	1,1	144,3	–	–	123,1	–	73	40	86	164	171	2,5	1
75	0,6	0,3	87	–	–	83	–	40,7	40	78,2	91,8	93	0,6	0,3
	1,5	1	109,2	–	–	96,5	–	56	40	84	121	124,4	1,5	1
	1,5	1	109,2	–	–	96,5	–	56	40	84	121	124,4	1,5	1
	2,1	1,1	128	–	–	109,2	–	68	40	87	148	153	2,1	1
	2,1	1,1	128	–	–	109,2	–	68	40	87	148	153	2,1	1
	3	1,1	144,3	–	–	123,1	–	78	40	91	174	181	2,5	1
80	0,6	0,3	92	–	–	88	–	42,8	40	85,2	96,8	98	0,6	0,3
	2	1	117,2	–	–	102,9	–	59	40	91	129	134,4	2	1
	2	1	117,2	–	–	102,9	–	59	40	91	129	134,4	2	1
	2,1	1,1	136,7	–	–	115,7	–	72	40	92	158	163	2,1	1
	2,1	1,1	136,7	–	–	115,7	–	72	40	92	158	163	2,1	1
	3	1,1	153,9	–	–	129	–	83	40	96	184	191	2,5	1

Angular contact ball bearings

Single row



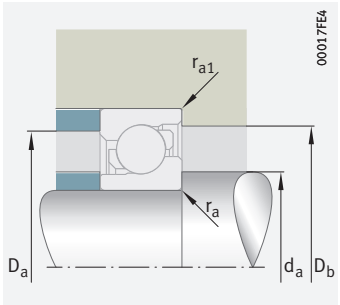


Mounting dimensions

d = 85 – 180 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤297 | 1.12 ➤297 | 1.13 X-life ➤289
			N	N	N	min^{-1}	min^{-1}	≈ kg	
85	150	28	97 000	86 000	5 500	5 400	4 750	1,94	**7217-B-XL-JP**
	150	28	97 000	86 000	5 500	5 400	4 750	1,82	**7217-B-XL-TVP**
	180	41	167 000	138 000	8 300	4 450	4 100	4,4	**7317-B-XL-JP**
	180	41	167 000	138 000	8 300	4 450	4 100	4,26	**7317-B-XL-TVP**
90	160	30	114 000	98 000	6 100	5 000	4 550	2,38	**7218-B-XL-JP**
	160	30	114 000	98 000	6 100	5 000	4 550	2,21	**7218-B-XL-TVP**
	190	43	180 000	155 000	9 100	4 200	3 900	5,14	**7318-B-XL-JP**
	190	43	180 000	155 000	9 100	4 200	3 900	5	**7318-B-XL-TVP**
95	170	32	123 000	106 000	6 400	4 700	4 450	2,64	**7219-B-XL-TVP**
	200	45	189 000	167 000	9 600	4 000	3 800	5,93	**7319-B-XL-JP**
	200	45	189 000	167 000	9 600	4 000	3 800	5,78	**7319-B-XL-TVP**
100	180	34	148 000	132 000	7 800	4 400	4 200	3,45	**7220-B-XL-JP**
	180	34	142 000	124 000	7 300	4 400	4 250	3,17	**7220-B-XL-TVP**
	215	47	214 000	197 000	10 900	3 700	3 550	7,38	**7320-B-XL-JP**
	215	47	214 000	197 000	10 900	3 700	3 550	7,16	**7320-B-XL-TVP**
105	190	36	155 000	142 000	8 100	5 400	4 100	4,18	**7221-B-XL-MP**
	225	49	225 000	214 000	11 500	4 600	3 400	9,3	**7321-B-XL-MP**
110	200	38	167 000	154 000	8 600	3 950	3 950	4,7	**7222-B-XL-JP**
	200	38	167 000	154 000	8 600	3 950	3 950	4,44	**7222-B-XL-TVP**
	240	50	250 000	245 000	12 800	3 300	3 150	9,97	**7322-B-XL-JP**
	240	50	250 000	245 000	12 800	3 300	3 150	9,74	**7322-B-XL-TVP**
120	215	40	182 000	178 000	9 600	3 650	3 700	5,4	**7224-B-XL-TVP**
	260	55	275 000	285 000	14 300	3 050	2 850	12,5	**7324-B-XL-TVP**
130	230	40	200 000	204 000	10 600	3 400	3 350	6,12	**7226-B-XL-TVP**
	280	58	305 000	325 000	15 900	2 800	2 600	15,1	**7326-B-XL-TVP**
140	250	42	214 000	231 000	11 500	4 050	3 100	8,55	**7228-B-XL-MP**
	300	62	310 000	375 000	13 100	3 350	2 400	20,5	**7328-B-MP**
150	270	45	245 000	275 000	13 200	3 750	2 850	10,9	**7230-B-XL-MP**
	320	65	340 000	430 000	14 600	3 150	2 200	24,8	**7330-B-MP**
160	290	48	241 000	305 000	10 700	3 500	2 650	13,5	**7232-B-MP**
170	310	52	270 000	355 000	11 900	3 250	2 440	16,7	**7234-B-MP**
180	320	52	280 000	380 000	12 500	3 100	2 290	17,5	**7236-B-MP**

medias *https://www.schaeffler.de/std/1F9A*



Mounting dimensions

Dimensions						Nominal contact angle	Mounting dimensions				
d	r	r_1	D_1	d_1	a	α	d_a	D_a	D_b	r_a	r_{a1}
	min.	min.	≈	≈	≈	°	min.	max.	max.	max.	max.
85	2	1	125	110,6	63	40	96	139	144,4	2	1
	2	1	125	110,6	63	40	96	139	144,4	2	1
	3	1,1	144	122	76	40	99	166	173	2,5	1
	3	1,1	144	122	76	40	99	166	173	2,5	1
90	2	1	133,4	117,5	67	40	101	149	154,4	2	1
	2	1	133,4	117,5	67	40	101	149	154,4	2	1
	3	1,1	152,4	130,1	80	40	104	176	183	2,5	1
	3	1,1	152,4	130,1	80	40	104	176	183	2,5	1
95	2,1	1,1	141,5	125,3	72	40	107	158	163	2,1	1
	3	1,1	159,5	137,1	84	40	109	186	193	2,5	1
	3	1,1	159,5	137,1	84	40	109	186	193	2,5	1
100	2,1	1,1	149,6	132,3	76	40	112	168	173	2,1	1
	2,1	1,1	149,6	132,3	76	40	112	168	173	2,1	1
	3	1,1	171,7	146,3	90	40	114	201	208	2,5	1
	3	1,1	171,7	146,3	90	40	114	201	208	2,5	1
105	2,1	1,1	157,7	138,2	80	40	117	178	183	2,1	1
	3	1,1	178,9	154	94	40	119	211	218	2,5	1
110	2,1	1,1	165,7	144,9	84	40	122	188	193	2,1	1
	2,1	1,1	165,7	144,9	84	40	122	188	193	2,1	1
	3	1,1	190,9	162,3	98	40	124	226	233	2,5	1
	3	1,1	190,9	162,3	98	40	124	226	233	2,5	1
120	2,1	1,1	178,9	157,2	90	40	132	203	208	2,1	1
	3	1,1	207,1	176,4	107	40	134	246	253	2,5	1
130	3	1,1	191,8	169,6	96	40	144	216	223	2,5	1
	4	1,5	222,5	188,5	115	40	147	263	271	3	1,5
140	3	1,1	207,5	183,5	103	40	154	236	243	2,5	1
	4	1,5	239,5	204,4	123	40	157	283	291	3	1,5
150	3	1,1	223,5	197,5	111	40	164	256	263	2,5	1
	4	1,5	255,8	218,3	131	40	167	303	311	3	1,5
160	3	1,1	238	212	118	40	174	276	283	2,5	1
170	4	1,5	255,8	227,4	127	40	187	293	301	3	1,5
180	4	1,5	265,8	237,4	131	40	197	303	311	3	1,5

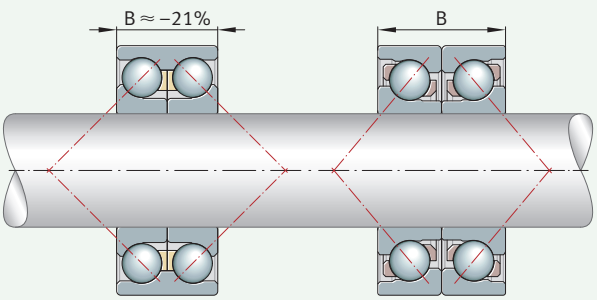
2 Double row angular contact ball bearings

Double row angular contact ball bearings are particularly suitable where:

- the design envelope is not sufficient under high loads for a pair of single row angular contact ball bearings
- high radial and axial loads are acting simultaneously
- tilting moments must also be supported
- a relatively rigid bearing arrangement is required
- the bearing arrangement is to run quietly in addition to meeting the requirements stated above

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*284*.





1 *Double row angular contact ball bearing – comparison of design envelope with bearing set composed of single row angular contact ball bearings*

B = *total width of bearing or bearing set*

2.1 Bearing design

✎ *Design variants*

Double row angular contact ball bearings are available as:

- bearings of basic design ➤*319*|*2*
- bearings with filling slot ➤*319*|*3*
- bearings with split inner ring ➤*320*|*4*
- X-life bearings ➤*320*

Larger catalogue bearings and other bearing designs GL 1.

Bearings of basic design

✎ *Comparable with a pair of single row angular contact ball bearings*

Double row bearings correspond in their structure to a pair of single row angular contact ball bearings in an O arrangement, but they are narrower to a certain extent. They differ in the size of the contact angle α and the design of the bearing rings. Due to the manufacturing processes used, open bearings, which are also available with sealing washers or sealing shields, can have turned recesses in the outer and/or inner ring for sealing washers or sealing shields.

✎ *Extensive and versatile range of product variants*

Bearings of series 38..-B(-2RSR, -2Z), 30..-B(-2RSR, -2Z), 32..-B(-2RSR, -2Z), 32..-BD(-2HRS), 33..-B(-2RSR, -2Z), 33..BD(-2HRS) are self-retaining. They do not have filling slots in the end faces of the bearings rings ➤*319*|*2*. Bearings of series 32..-BD and 33..-BD have an optimised internal construction.

In design terms, double row angular contact ball bearings thus fulfil the requirements for:

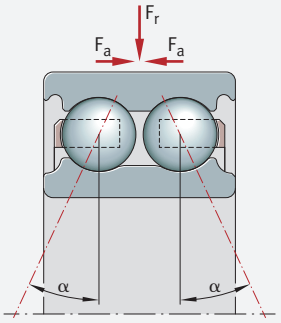
- supporting axial loads in both directions and high radial loads
- low-noise running
- versatile application

✎ *Nominal contact angle $\alpha = 25°$ or $30°$*

The nominal contact angle α in B designs is 25°, in the case of the BD variant, this is 30°.

2 *Double row angular contact ball bearing of basic design*

F_r = *radial load*
F_a = *axial load*
α = *nominal contact angle*



Bearings with filling slot

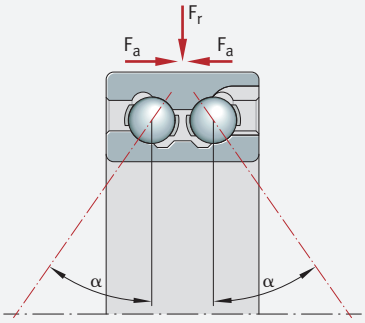
✎ *Nominal contact angle $\alpha = 35°$*

Angular contact ball bearings of series 32 and 33 are self-retaining. They have filling slots on one end face of the bearing ring for filling the bearings with rolling elements ➤*319*|*3*. The nominal contact angle is $\alpha = 35°$.

These series must be fitted such that the main load direction is supported by the row of balls without filling slots under axial load.

3 *Double row angular contact ball bearing with filling slot*

F_r = *radial load*
F_a = *axial load*
α = *nominal contact angle*

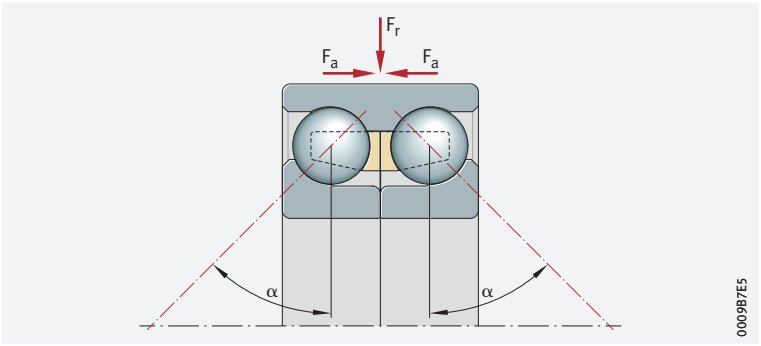


Bearings with split inner ring

✎ *Nominal contact angle $\alpha = 45°$*

In angular contact ball bearings of series 33..-DA, the inner ring is split ➤*320*|*4*. The inner rings are not self-retaining. Filling the bearings with a large number of balls – in conjunction with the internal design of the bearing and the contact angle of 45° – allows high alternating axial loads to be supported.

The inner ring halves are matched to the particular bearing and must not be interchanged with those of other bearings of the same size.



4
Double row angular contact ball bearing with split inner ring

F_r = *radial load*
F_a = *axial load*
α = *nominal contact angle*

X-life premium quality

Bearings of series 32..-BD and 33..-BD are X-life bearings ➤*334*. These bearings exhibit considerably higher performance than standard double row angular contact ball bearings ➤*320*| *5*. This is achieved, for example, through the modified internal construction, higher surface quality of the contact surfaces and optimised cage design, as well as through the improved quality of the steel and rolling elements.

Advantages

Increased customer benefits due to X-life

The technical enhancements offer a range of advantages, such as:

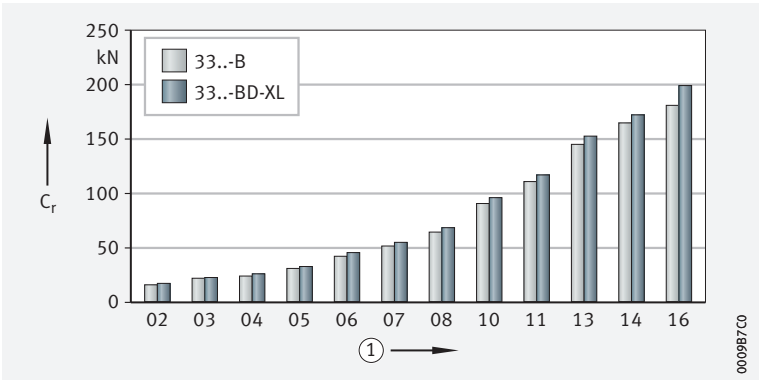
- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings ➤*320*| *5*
- quieter running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and, consequently, longer maintenance intervals
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life angular contact ball bearings include the suffix XL in the designation ➤*327*| *7*, ➤*327*| *8* and ➤*334*|.



5
Comparison of basic dynamic load rating C_r – bearing series 33..-BD-XL, bore code 02 to 16, with a bearing which is not of X-life quality (33..-B)

C_r = *basic dynamic load rating*
① *Bore code*

Areas of application

✎ *Wide application range*

Due to their special technical features, double row X-life angular contact ball bearings are highly suitable for bearing arrangements in:

- compressors
- fluid and hydraulic pumps
- automotive chassis and gearboxes
- industrial gearboxes
- agricultural vehicles
- elevators and packaging equipment
- heavy motorbikes
- machine tools
- textile machinery

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

2.2 Load carrying capacity

✎ *Capable of supporting axial loads in both directions and radial loads*

In addition to high radial loads, double row angular contact ball bearings can also support axial forces in both directions and tilting moments ➤*319*|*2*. They are highly suitable for bearing arrangements with rigid axial guidance.

✎ *Contact angle and axial load carrying capacity*

The bearings are available with α = 25°, 30°, 35° and 45° ➤*319*|*2* to ➤*320*|*4*. The axial load carrying capacity increases with the size of the contact angle. In bearings without filling slots, it is the same in both directions.

2.3 Compensation of angular misalignments

✎ *The angular adjustment facility is very limited*

The bearings are not suitable for the compensation of angular misalignments. In addition, misalignments induce internal forces, which not only lead to higher temperatures, but also to a reduction in the bearing rating life.

2.4 Lubrication

✎ *Angular contact ball bearings sealed on both sides are maintenance-free*

Open bearings and bearings with seals on both sides are greased using a high quality grease. Bearings sealed on both sides are maintenance-free for many applications, i. e. they do not require relubrication.

✎ *Open bearings must be lubricated*

Angular contact ball bearings without seals and with seals on one side of series 32.., 33.., 33..-DA, 32..-BD and 33..-BD are preserved and not greased. These bearings must be lubricated with oil or grease.

✎ *Compatibility with plastic cages*

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

✎ *Observe oil change intervals*

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

2.5 Sealing

✎ *2RS, 2RSR and 2HRS seals are contact designs*

Series 38..-B, 30..-B, 32..-B and 33..-B with the suffix 2RS, 2RSR and 2HRS have lip seals in axial contact on both sides and in radial contact ➤*326*|*5*. Bearings with the suffix RS, HRS and RSR are sealed on one side with lip seals in axial and radial contact.

✎ *2Z sealing shields and 2RZ seals are non-contact designs*

Bearing series with the suffix 2Z have sheet steel sealing shields on both sides. Bearings with the suffix 2RZ are fitted with rubberised gap seals on both sides.

Open bearings

In the case of unsealed bearings, sealing must be carried out by the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

2.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

The values given in the product tables are valid for oil lubrication in the case of bearings without seals or shields and for grease lubrication where bearings are supplied greased and with seals or shields.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

Values for grease lubrication

For the grease lubrication of bearings without seals or shields, 75% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 58% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

Bearings with contact seals

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

2.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

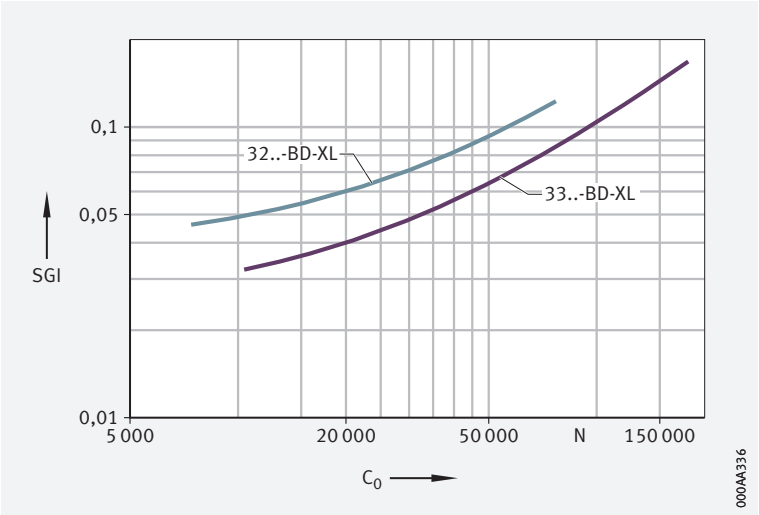
The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:

- ***medias*** *https://medias.schaeffler.com*

6
Schaeffler Noise Index for double row angular contact ball bearings

SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



2.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:
- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals

Possible operating temperatures of double row angular contact ball bearings ➤*323*| ▦ *1*.

1
Permissible temperature ranges

Operating temperature	Double row angular contact ball bearings, open		Double row angular contact ball bearings, sealed
	with sheet steel or brass cage	with polyamide cage PA66	
	ungreased –30 °C to +150 °C	–30 °C to +120 °C, limited by the cage material	–30 °C to +110 °C, limited by the lubricant and seal material
	series 30, 38, 32..-BD and 33..-BD, D ≦ 90 mm, –30 °C to +120 °C		

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

2.9 Cages

Solid cages made from brass and PA66, as well as sheet steel cages, are used as standard

Standard cages and additional cage designs for double row angular contact ball bearings are made from brass, polyamide or steel ➤ *324* | *2*. Other cages are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with brass or sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

2
Cage, cage suffix, bore code

Bearing series	Solid cage made from polyamide PA66 TVH, TVP		Solid brass cage M, MA		Sheet steel cage –	
	standard	also available for	standard	also available for	standard	also available for
	Bore code					
32	–	–	19, 21, 22	18, 20	17, 18, 20	–
33	–	–	17, 19, 20, 22	18	14 to 16, 18	20
30..-B	up to 08	–	–	–	–	–
32..-B	00, 01, 14 to 18, 20	–	–	–	–	–
33..-B	01, 12	–	–	–	–	–
38..-B	00 to 12, 14, 16, 18, 20	–	–	–	–	–
32..-BD	–	02 to 13	–	–	02 to 13	–
33..-BD	–	02 to 11, 13, 14, 16	–	–	04 to 11, 13, 14	–
33..-DA	05	–	08, 10, 11, 15 to 22	05, 06, 07, 09, 12, 13, 14	06, 07, 09, 12, 13, 14	05

2.10 Internal clearance

Axial internal clearance – bearings with unsplit inner ring

Double row angular contact ball bearings with unsplit inner ring of the basic design have the axial internal clearance CN (group N) in accordance with DIN 628-3:2008 ➤ *325* | *3*.

Bearings can also be supplied with an axial internal clearance which is larger or smaller than CN (C3, C4 or C2). In this case, please contact Schaeffler.

3
Axial internal clearance of double row angular contact ball bearings with unsplit inner ring

Nominal bore diameter d mm		Axial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	10	1	11	5	21	12	28	25	45
10	18	1	12	6	23	13	31	27	47
18	24	2	14	7	25	16	34	27	47
24	30	2	15	8	27	18	37	30	50
30	40	2	16	9	29	21	40	33	54
40	50	2	18	11	33	23	44	36	58
50	65	3	22	13	36	26	48	40	63
65	80	3	24	15	40	30	54	46	71
80	100	3	26	18	46	35	63	55	83
100	120	4	30	22	53	42	73	65	96
120	140	4	34	25	59	48	82	74	108

Axial internal clearance – bearings with split inner ring

Standard corresponds approximately to C3 for unsplit bearings

Bearings with a split inner ring are intended for higher axial loads. As a result, they generally also have a tighter fit than unsplit bearings. Their normal internal clearance corresponds approximately to the internal clearance group C3 for unsplit bearings ➤*325*|▦*4*.

4
Axial internal clearance of double row angular contact ball bearings with split inner ring

Nominal bore diameter d mm		Axial internal clearance					
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm	
over	incl.	min.	max.	min.	max.	min.	max.
24	30	8	27	16	35	27	46
30	40	9	29	18	38	30	50
40	50	11	33	22	44	36	58
50	65	13	36	25	48	40	63
65	80	15	40	29	54	46	71

2.11 Dimensions, tolerances

Dimension standards

DIN ISO

The main dimensions of double row angular contact ball bearings correspond to DIN 628-3:2008. Nominal dimensions of double row angular contact ball bearings ➤*334*|▦.

Chamfer dimensions

DIN ISO

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137*|*7.11*. Nominal value of chamfer dimension ➤*334*|▦.

Tolerances

DIN ISO

The tolerances for the dimensional and running accuracy of double row angular contact ball bearings correspond to tolerance class Normal in accordance with ISO 492:2014; the dimensional and running tolerances of bearings with the suffix BD correspond to the tolerance class 6 in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*124*|▦*8* and ➤*126*|▦*11*.

2.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

5 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
B	Modified internal construction, nominal contact angle $\alpha = 25°$, without filling slot	Standard
BD	Modified internal construction, nominal contact angle $\alpha = 30°$, without filling slot	
C2	Axial internal clearance C2 (smaller than normal)	Available by agreement
C3	Axial internal clearance C3 (larger than normal)	
C4	Axial internal clearance C4 (larger than C3)	
DA	Inner ring split, nominal contact angle $\alpha = 45°$	Standard
M	Solid brass cage, ball-guided	Standard, dependent on bore code
MA	Solid brass cage, guided on outer ring	
TVH	Solid cage made from glass fibre reinforced polyamide PA66, ball-guided	
2HRS	Contact seal on both sides, axial contact (lip seal)	Standard
2RS	Contact seal on both sides, axial contact (lip seal)	
2RSR	Contact seal on both sides, radial contact (lip seal)	
2RZ	Non-contact seal on both sides (rubberised gap seal)	
2Z	Non-contact sealing shield on both sides (sheet metal gap seal)	
HRS	Contact seal on one side, axial contact (lip seal)	Special design, available by agreement
RS	Contact seal on one side, axial contact (lip seal)	
RSR	Contact seal on one side, radial contact (lip seal)	
RZ	Non-contact seal on one side (rubberised gap seal)	
Z	Non-contact sealing shield on one side (sheet metal gap seal)	
XL	X-life bearing, dependent on bore code and bearing type	

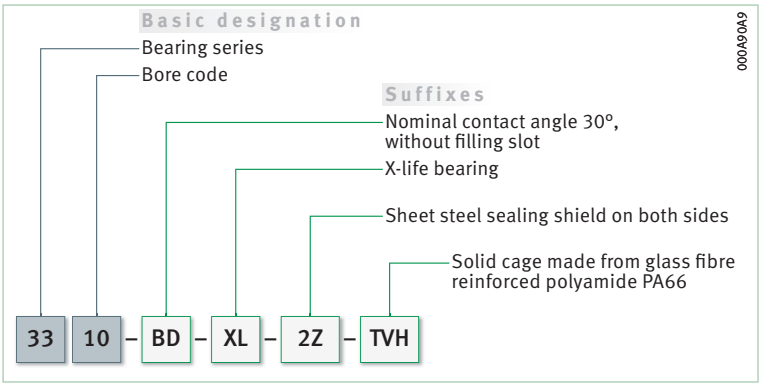
2.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

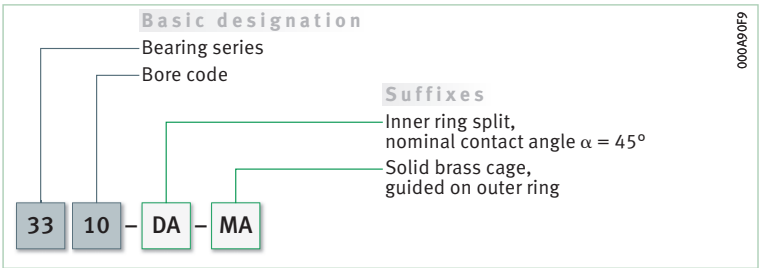
✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*327*|🗇*7* and ➤*327*|🗇*8*. The composition of designations is subject to DIN 623-1 ➤*102*|🗇*10*.

🗇**7**
Double row angular contact ball bearing of basic design: designation structure



🗇**8**
Double row angular contact ball bearing with split inner ring: designation structure



2.14 Dimensioning

Equivalent dynamic bearing load

✎ *Valid for* $\alpha = 25°, 30°, 35°, 45°$

The calculation of P is dependent on the nominal contact angle α of the bearing, the load ratio F_a/F_r and the calculation factors from ➤*327*|*f1* to ➤*328*|*f8*.

The further fundamental information on the calculation of the equivalent dynamic bearing load must be observed ➤*298*|*1.14*.

*f***1**
Equivalent dynamic load $\alpha = 25°$

$$\frac{F_a}{F_r} \leqq 0{,}68 \quad \Rightarrow \quad P = F_r + 0{,}92 \cdot F_a$$

*f***2**
Equivalent dynamic load $\alpha = 25°$

$$\frac{F_a}{F_r} > 0{,}68 \quad \Rightarrow \quad P = 0{,}67 \cdot F_r + 1{,}41 \cdot F_a$$

*f***3**
Equivalent dynamic load $\alpha = 30°$

$$\frac{F_a}{F_r} \leqq 0{,}8 \quad \Rightarrow \quad P = F_r + 0{,}78 \cdot F_a$$

*f***4**
Equivalent dynamic load $\alpha = 30°$

$$\frac{F_a}{F_r} > 0{,}8 \quad \Rightarrow \quad P = 0{,}63 \cdot F_r + 1{,}24 \cdot F_a$$

Equivalent dynamic load
α = 35°

$$\frac{F_a}{F_r} \leqq 0{,}95 \quad \Rightarrow \quad P = F_r + 0{,}66 \cdot F_a \qquad (5)$$

Equivalent dynamic load
α = 35°

$$\frac{F_a}{F_r} > 0{,}95 \quad \Rightarrow \quad P = 0{,}6 \cdot F_r + 1{,}07 \cdot F_a \qquad (6)$$

Equivalent dynamic load
α = 45°

$$\frac{F_a}{F_r} \leqq 1{,}34 \quad \Rightarrow \quad P = F_r + 0{,}47 \cdot F_a \qquad (7)$$

Equivalent dynamic load
α = 45°

$$\frac{F_a}{F_r} > 1{,}34 \quad \Rightarrow \quad P = 0{,}54 \cdot F_r + 0{,}81 \cdot F_a \qquad (8)$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load.

Equivalent static bearing load

✎ *Valid for α = 25°, 30°, 35°, 45°*

The calculation of the equivalent static bearing load P_0 is dependent on the nominal contact angle α and the calculation factors ➤*328*| *9* to ➤*328*| *12*.

Equivalent static load
α = 25°

$$P_0 = F_{0r} + 0{,}76 \cdot F_{0a} \qquad (9)$$

Equivalent static load
α = 30°

$$P_0 = F_{0r} + 0{,}66 \cdot F_{0a} \qquad (10)$$

Equivalent static load
α = 35°

$$P_0 = F_{0r} + 0{,}58 \cdot F_{0a} \qquad (11)$$

Equivalent static load
α = 45°

$$P_0 = F_{0r} + 0{,}44 \cdot F_{0a} \qquad (12)$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*328*| *13*.

Static load safety factor

$$S_0 = \frac{C_0}{P_0} \qquad (13)$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

2.15 Minimum load

In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/100$ is required

In order that no slippage occurs between the contact partners, the double row angular contact ball bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/100$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

2.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and thus also achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤330|⊞6 to ➤331|⊞8.

Radial location of bearings – fit recommendations

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤152|⊞6 and ➤160|⊞7.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤146
- conditions of rotation ➤147
- tolerance classes for cylindrical shaft seats (radial bearings) ➤149|⊞2
- shaft fits ➤152|⊞6
- tolerance classes for bearing seats in housings (radial bearings) ➤150|⊞4
- housing fits ➤160|⊞7

Axial location of bearings – location methods

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable.

Dimensional, geometrical and running accuracy of the bearing seats

✎ For bearings with tolerance class Normal, a minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For double row angular contact ball bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7; with tolerance class 6, the shaft seat should correspond to a minimum of IT5 and the housing seat to a minimum of IT6. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤*330* | ▦ *6*. Tolerances t_1 to t_3 in accordance with ➤*170* | ⧉ *11*. Numerical values for IT grades ➤*330* | ▦ *7*.

▦ **6**
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
6	P6	Shaft	IT5	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	
		Housing	IT6	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	

▦ **7**
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm							
	over	**3**	**6**	**10**	**18**	**30**	**50**	**80**	**120**
	incl.	**6**	**10**	**18**	**30**	**50**	**80**	**120**	**180**
	Values in µm							
IT3	2,5		2,5	3	4	4	5	6	8
IT4	4		4	5	6	7	8	10	12
IT5	5		6	8	9	11	13	15	18
IT6	8		9	11	13	16	19	22	25
IT7	12		15	18	21	25	30	35	40

Roughness of cylindrical bearing seats

✎ Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*331* | ▦ *8*.

8
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of abutment shoulders ➤ *334*. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

2.17 Mounting and dismounting

The mounting and dismounting options for angular contact ball bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Ensure that the bearings are not damaged during mounting

In the mounting of non-separable (self-retaining) angular contact ball bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Bearings with split inner ring

Simplified mounting of bearings due to split inner ring

These angular contact ball bearings are not self-retaining. As a result, the outer ring with the ball and cage assembly can be mounted separately from the two inner ring halves. This gives simplified mounting of the bearings.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

2.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

2.19 Further information

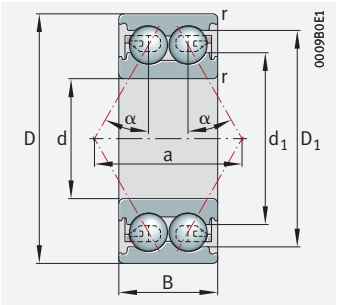
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

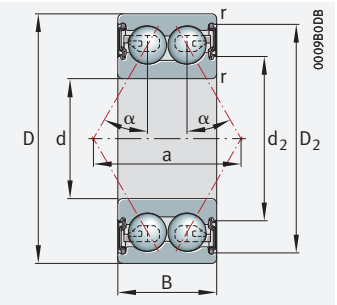


Angular contact ball bearings

Double row



38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD, 32, 33

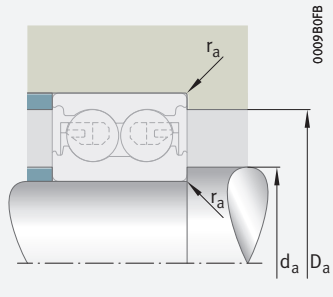


38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD; with seal 2HRS, 2RS, 2RSR, 2RZ, 2Z

d = 5 – 12 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*326* | *2.12* ➤*327* | *2.13* X-life ➤*320*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
5	14	7	1 780	940	49	51 000	31 500	0,005	**30/5-B-TVH**
	14	7	1 780	940	49	38 000	31 500	0,006	**30/5-B-2Z-TVH**
	14	7	1 780	940	49	30 500	–	0,006	**30/5-B-2RSR-TVH**
6	17	9	3 050	1 400	74	42 000	32 000	0,011	**30/6-B-TVH**
	17	9	3 050	1 400	74	31 500	32 000	0,011	**30/6-B-2Z-TVH**
	17	9	3 050	1 400	74	28 000	–	0,011	**30/6-B-2RSR-TVH**
7	19	10	3 650	1 690	88	39 500	31 500	0,01	**30/7-B-TVH**
	19	10	3 650	1 690	88	29 500	31 500	0,01	**30/7-B-2Z-TVH**
	19	10	3 650	1 690	88	25 500	–	0,01	**30/7-B-2RSR-TVH**
8	22	11	5 100	2 600	136	34 500	26 000	0,018	**30/8-B-TVH**
	22	11	5 100	2 600	136	26 000	26 000	0,018	**30/8-B-2Z-TVH**
	22	11	5 100	2 600	136	25 500	–	0,018	**30/8-B-2RSR-TVH**
10	19	7	2 080	1 370	72	40 500	21 000	0,008	**3800-B-TVH**
	19	7	2 080	1 370	72	30 500	21 000	0,008	**3800-B-2RZ-TVH**
	19	7	2 080	1 370	72	21 100	–	0,008	**3800-B-2RS-TVH**
	26	12	5 700	3 200	198	31 000	21 900	0,022	**3000-B-TVH**
	26	12	5 700	3 200	166	23 400	21 900	0,022	**3000-B-2RZ-TVH**
	26	12	5 700	3 200	166	18 100	–	0,022	**3000-B-2RS-TVH**
	30	14	7 800	4 450	233	21 100	21 000	0,052	**3200-B-TVH**
	30	14	7 800	4 450	233	21 100	21 000	0,05	**3200-B-2Z-TVH**
	30	14	7 800	4 450	233	16 100	–	0,053	**3200-B-2RS-TVH**
12	21	7	2 150	1 520	79	37 500	18 100	0,009	**3801-B-TVH**
	21	7	2 150	1 520	79	28 000	18 100	0,01	**3801-B-2RZ-TVH**
	21	7	2 150	1 520	79	17 500	–	0,01	**3801-B-2RS-TVH**
	28	12	6 100	3 700	193	29 500	19 300	0,025	**3001-B-TVH**
	28	12	6 100	3 700	193	22 000	19 300	0,032	**3001-B-2RZ-TVH**
	28	12	6 100	3 700	193	15 800	–	0,032	**3001-B-2RS-TVH**
	32	15,9	10 500	5 800	300	18 400	20 000	0,051	**3201-B-TVH**
	32	15,9	10 500	5 800	300	18 400	20 000	0,06	**3201-B-2Z-TVH**
	32	15,9	10 500	5 800	300	15 000	–	0,057	**3201-B-2RS-TVH**
	37	19	14 600	8 300	430	20 400	13 000	0,093	**3301-B-TVH**
	37	19	14 600	8 300	430	15 300	13 000	0,093	**3301-B-2Z-TVH**
	37	19	14 600	8 300	430	14 100	–	0,093	**3301-B-2RS-TVH**

medias *https://www.schaeffler.de/std/1F9A*

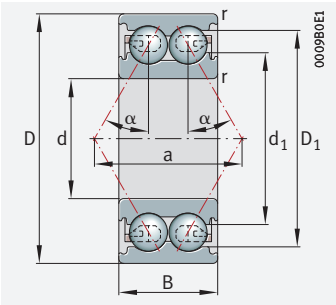


Mounting dimensions

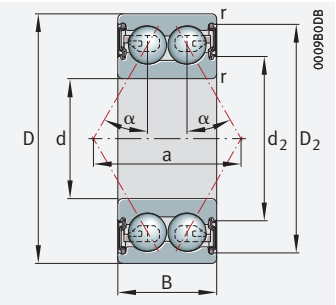
Dimensions							Nominal contact angle	Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	a	α	d_a	D_a	r_a
	min.	≈	≈	≈	≈	≈	°	min.	max.	max.
5	0,2	11,2	–	8,8	–	6,9	25	6,4	12,6	0,2
	0,2	–	12,7	–	8,5	6,9	25	6,4	12,6	0,2
	0,2	–	12,7	–	8,5	6,9	25	6,4	12,6	0,2
6	0,3	13,4	–	9,6	–	8,8	25	8	15	0,3
	0,3	–	14,8	–	8,3	8,8	25	8	15	0,3
	0,3	–	14,8	–	8,3	8,8	25	8	15	0,3
7	0,3	14,6	–	10,4	–	9,6	25	9	17	0,3
	0,3	–	16,5	–	9	9,6	25	9	17	0,3
	0,3	–	16,5	–	9	9,6	25	9	17	0,3
8	0,3	17,6	–	12,6	–	11,2	25	10	20	0,3
	0,3	–	19	–	10,5	11,2	25	10	20	0,3
	0,3	–	19	–	10,5	11,2	25	10	20	0,3
10	0,3	15,9	–	13,3	–	9	25	12	17	0,3
	0,3	–	16,7	–	12,2	9	25	12	17	0,3
	0,3	–	16,7	–	12,2	9	25	12	17	0,3
	0,3	20,6	–	15,8	–	12,6	25	12	24	0,3
	0,3	–	21,2	–	14,2	12,6	25	12	24	0,3
	0,3	–	21,2	–	14,2	12,6	25	12	24	0,3
	0,6	23	–	16,6	–	14,8	25	14,2	25,8	0,6
	0,6	–	24,9	–	15,5	14,8	25	14,2	25,8	0,6
	0,6	–	24,9	–	15,5	14,8	25	14,2	25,8	0,6
12	0,3	18	–	15,3	–	9,9	25	14	19	0,3
	0,3	–	18,9	–	14,2	9,9	25	14	19	0,3
	0,3	–	18,9	–	14,2	9,9	25	14	19	0,3
	0,3	22,5	–	17,6	–	13,5	25	14	26	0,3
	0,3	–	23,2	–	16,4	13,5	25	14	26	0,3
	0,3	–	23,2	–	16,4	13,5	25	14	26	0,3
	0,6	26	–	17,8	–	16,5	25	16,2	27,8	0,6
	0,6	–	27,8	–	17,1	16,5	25	16,2	27,8	0,6
	0,6	–	27,8	–	17,1	16,5	25	16,2	27,8	0,6
	1	30,5	–	21,7	–	19,8	25	17,6	31,4	1
	1	–	32,1	–	18,7	19,8	25	17,6	31,4	1
	1	–	32,1	–	18,7	19,8	25	17,6	31,4	1

Angular contact ball bearings

Double row



38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD, 32, 33

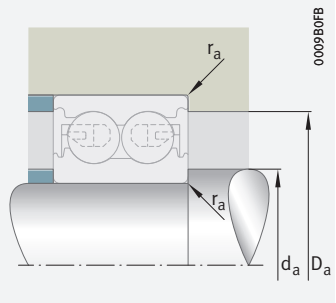


38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD; with seal 2HRS, 2RS, 2RSR, 2RZ, 2Z

d = 15 – 17 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*326*|*2.12* ➤*327*|*2.13* X-life ➤*320*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
15	24	7	2 080	1 560	81	33 500	14 900	0,01	**3802-B-TVH**
	24	7	2 080	1 560	81	25 000	14 900	0,012	**3802-B-2RZ-TVH**
	24	7	2 080	1 560	81	14 600	–	0,012	**3802-B-2RS-TVH**
	32	13	8 500	5 400	290	23 900	15 700	0,042	**3002-B-TVH**
	32	13	8 500	5 400	290	17 900	15 700	0,05	**3002-B-2RZ-TVH**
	32	13	8 500	5 400	290	13 000	–	0,05	**3002-B-2RS-TVH**
	35	15,9	12 600	7 400	520	22 300	18 500	0,066	**3202-BD-XL-TVH**
	35	15,9	12 600	7 400	520	16 700	18 500	0,065	**3202-BD-XL-2Z-TVH**
	35	15,9	12 600	7 400	520	16 700	–	0,065	**3202-BD-XL-2HRS-TVH**
	42	19	17 000	10 400	720	18 400	12 100	0,124	**3302-BD-XL-TVH**
	42	19	17 000	10 400	720	13 800	12 100	0,122	**3302-BD-XL-2Z-TVH**
	42	19	17 000	10 400	720	13 800	–	0,122	**3302-BD-XL-2HRS-TVH**
17	26	7	2 430	2 020	108	30 500	13 200	0,011	**3803-B-TVH**
	26	7	2 430	2 020	108	23 000	13 200	0,013	**3803-B-2RZ-TVH**
	26	7	2 430	2 020	108	13 200	–	0,013	**3803-B-2RS-TVH**
	35	14	9 100	6 100	315	22 500	15 300	0,042	**3003-B-TVH**
	35	14	9 100	6 100	315	16 800	15 300	0,057	**3003-B-2RZ-TVH**
	35	14	9 100	6 100	315	12 300	–	0,055	**3003-B-2RS-TVH**
	40	17,5	15 500	9 500	660	19 400	16 600	0,095	**3203-BD-XL-TVH**
	40	17,5	15 500	9 500	660	14 600	16 600	0,094	**3203-BD-XL-2Z-TVH**
	40	17,5	15 500	9 500	660	14 600	–	0,093	**3203-BD-XL-2HRS-TVH**
	47	22,2	22 500	13 100	910	16 600	12 600	0,177	**3303-BD-XL-TVH**
	47	22,2	22 500	13 100	910	12 400	12 600	0,176	**3303-BD-XL-2Z-TVH**
	47	22,2	22 500	13 100	910	12 400	–	0,176	**3303-BD-XL-2HRS-TVH**

medias *https://www.schaeffler.de/std/1F9A*

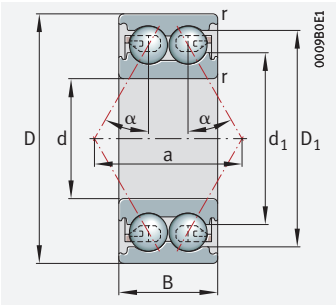


Mounting dimensions

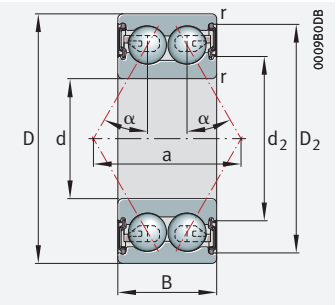
Dimensions							Nominal contact angle	Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	a	α	d_a	D_a	r_a
	min.	≈	≈	≈	≈	≈	°	min.	max.	max.
15	0,3	20,9	–	18,3	–	11,3	25	17	22	0,3
	0,3	–	21,8	–	17,2	11,3	25	17	22	0,3
	0,3	–	21,8	–	17,2	11,3	25	17	22	0,3
	0,3	27,2	–	21,3	–	18,4	25	17	30	0,3
	0,3	–	27,9	–	19,7	18,4	25	17	30	0,3
	0,3	–	27,9	–	19,7	18,4	25	17	30	0,3
	0,6	29,4	–	22,2	–	20,7	30	19,2	30,8	0,6
	0,6	–	31,1	–	21	20,7	30	19,2	30,8	0,6
	0,6	–	31,1	–	21	20,7	30	19,2	30,8	0,6
	1	35,7	–	27,2	–	24,8	30	20,6	36,4	1
	1	–	37,9	–	25,8	24,8	30	20,6	36,4	1
	1	–	37,9	–	25,8	24,8	30	20,6	36,4	1
17	0,3	22,9	–	20,3	–	12,3	25	19	24	0,3
	0,3	–	23,8	–	19,2	12,3	25	19	24	0,3
	0,3	–	23,8	–	19,2	12,3	25	19	24	0,3
	0,3	29,1	–	23,1	–	17,1	25	19	33	0,3
	0,3	–	29,8	–	21	17,1	25	19	33	0,3
	0,3	–	29,8	–	21	17,1	25	19	33	0,3
	0,6	33,9	–	25,8	–	23,5	30	21,2	35,8	0,6
	0,6	–	36,1	–	24,4	23,5	30	21,2	35,8	0,6
	0,6	–	36,1	–	24,4	23,5	30	21,2	35,8	0,6
	1	39	–	28,5	–	27,5	30	22,6	41,4	1
	1	–	41,1	–	27,1	27,5	30	22,6	41,4	1
	1	–	41,1	–	27,1	27,5	30	22,6	41,4	1

Angular contact ball bearings

Double row



38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD, 32, 33

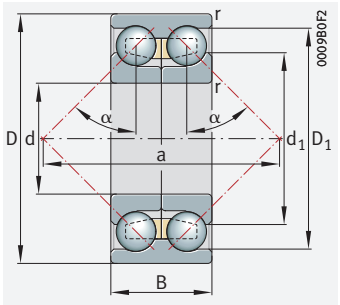


38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD; with seal 2HRS, 2RS, 2RSR, 2RZ, 2Z

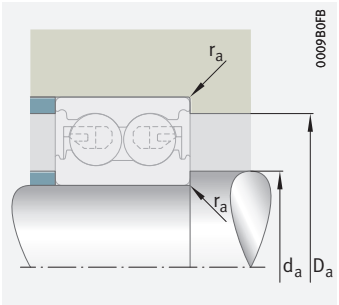
d = 20 – 25 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*326*|*2.12* ➤*327*|*2.13* X-life ➤*320*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
20	32	10	5 600	4 750	247	23 200	11 800	0,024	**3804-B-TVH**
	32	10	5 600	4 750	247	17 400	11 800	0,026	**3804-B-2RZ-TVH**
	32	10	5 600	4 750	247	10 700	–	0,026	**3804-B-2RS-TVH**
	42	16	14 300	9 400	490	18 100	13 200	0,08	**3004-B-TVH**
	42	16	14 300	9 400	490	13 600	13 200	0,094	**3004-B-2RZ-TVH**
	42	16	14 300	9 400	490	10 500	–	0,094	**3004-B-2RS-TVH**
	47	20,6	20 600	12 900	900	16 100	14 700	0,154	**3204-BD-XL-TVH**
	47	20,6	20 600	12 900	900	12 100	14 700	0,153	**3204-BD-XL-2Z-TVH**
	47	20,6	20 600	12 900	900	12 100	–	0,149	**3204-BD-XL-2HRS-TVH**
	52	22,2	24 600	15 900	1 100	14 700	10 400	0,215	**3304-BD-XL-TVH**
	52	22,2	24 600	15 900	1 100	11 000	10 400	0,214	**3304-BD-XL-2Z-TVH**
	52	22,2	24 600	15 900	1 100	11 000	–	0,217	**3304-BD-XL-2HRS-TVH**
25	37	10	5 900	5 500	285	20 400	10 300	0,034	**3805-B-TVH**
	37	10	5 900	5 500	285	15 300	10 300	0,036	**3805-B-2RZ-TVH**
	37	10	5 900	5 500	285	9 300	–	0,036	**3805-B-2RS-TVH**
	47	16	15 200	10 900	570	15 900	11 100	0,1	**3005-B-TVH**
	47	16	15 200	10 900	570	11 900	11 100	0,1	**3005-B-2RZ-TVH**
	47	16	15 200	10 900	570	8 800	–	0,1	**3005-B-2RS-TVH**
	52	20,6	22 000	15 200	1 050	14 300	12 500	0,174	**3205-BD-XL-TVH**
	52	20,6	22 000	15 200	1 050	10 700	12 500	0,175	**3205-BD-XL-2Z-TVH**
	52	20,6	22 000	15 200	1 050	10 700	–	0,176	**3205-BD-XL-2HRS-TVH**
	62	25,4	30 000	23 200	1 440	13 100	8 400	0,341	**3305-DA-TVP**
	62	25,4	31 500	21 000	1 460	12 400	9 400	0,352	**3305-BD-XL-TVH**
	62	25,4	31 500	21 000	1 460	9 300	9 400	0,348	**3305-BD-XL-2Z-TVH**
	62	25,4	31 500	21 000	1 460	9 300	–	0,352	**3305-BD-XL-2HRS-TVH**

medias *https://www.schaeffler.de/std/1F9A*



33..-DA;
split inner ring

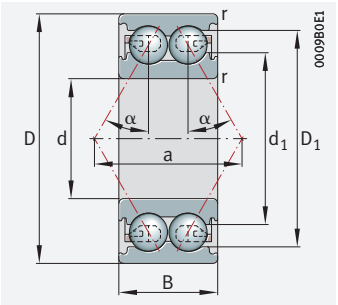


Mounting dimensions

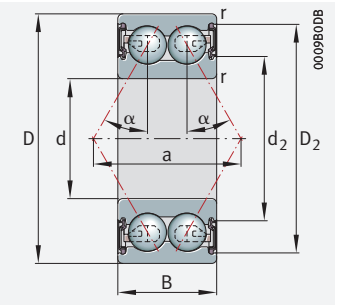
Dimensions							Nominal contact angle	Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	a	α	d_a	D_a	r_a
	min.	≈	≈	≈	≈	≈	°	min.	max.	max.
20	0,3	29,2	–	25,1	–	16,1	25	22	30	0,3
	0,3	–	30,1	–	23,9	16,1	25	22	30	0,3
	0,3	–	30,1	–	23,9	16,1	25	22	30	0,3
	0,6	35	–	27,1	–	21,1	25	23,2	38,8	0,6
	0,6	–	36,4	–	25,3	21,1	25	23,2	38,8	0,6
	0,6	–	36,4	–	25,3	21,1	25	23,2	38,8	0,6
	1	40,1	–	30,8	–	27,9	30	25,6	41,4	1
	1	–	42,2	–	29,2	27,9	30	25,6	41,4	1
	1	–	42,2	–	29,2	27,9	30	25,6	41,4	1
	1,1	44	–	33,5	–	30,4	30	27	45	1
	1,1	–	46,1	–	31,9	30,4	30	27	45	1
	1,1	–	46,1	–	31,9	30,4	30	27	45	1
25	0,3	33,2	–	29,1	–	17,9	25	27	35	0,3
	0,3	–	34,1	–	27,9	17,9	25	27	35	0,3
	0,3	–	34,1	–	27,9	17,9	25	27	35	0,3
	0,6	40,1	–	32,1	–	23,4	25	28,2	43,8	0,6
	0,6	–	41,8	–	30,3	23,4	25	28,2	43,8	0,6
	0,6	–	41,8	–	30,3	23,4	25	28,2	43,8	0,6
	1	45,1	–	35,8	–	30,8	30	30,6	46,4	1
	1	–	47,6	–	34,2	30,8	30	30,6	46,4	1
	1	–	47,6	–	34,2	30,8	30	30,6	46,4	1
	1,1	51,8	–	41	–	56	45	32	55	1
	1,1	51,5	–	39,5	–	35,4	30	32	55	1
	1,1	–	53,7	–	37,6	35,4	30	32	55	1
	1,1	–	53,7	–	37,6	35,4	30	32	55	1

Angular contact ball bearings

Double row



38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD, 32, 33

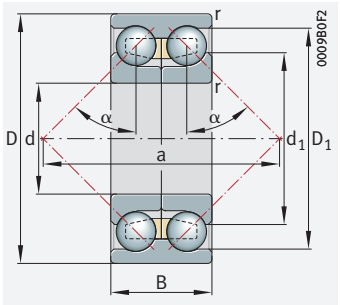


38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD; with seal 2HRS, 2RS, 2RSR, 2RZ, 2Z

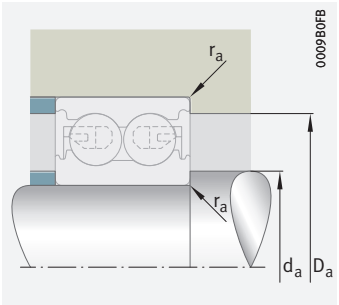
d = 30 – 35 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*326|2.12* ➤*327|2.13* X-life ➤*320*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
30	42	10	6 100	6 000	320	17 700	8 700	0,035	**3806-B-TVH**
	42	10	6 100	6 000	320	13 300	8 700	0,037	**3806-B-2RZ-TVH**
	42	10	6 100	6 000	320	8 100	–	0,037	**3806-B-2RS-TVH**
	55	19	19 900	15 400	800	13 500	10 100	0,16	**3006-B-TVH**
	55	19	19 900	15 400	800	10 100	10 100	0,16	**3006-B-2RZ-TVH**
	55	19	19 900	15 400	800	7 400	–	0,16	**3006-B-2RS-TVH**
	62	23,8	31 000	22 200	1 540	11 900	11 100	0,288	**3206-BD-XL-TVH**
	62	23,8	31 000	22 200	1 540	9 000	11 100	0,283	**3206-BD-XL-2Z-TVH**
	62	23,8	31 000	22 200	1 540	9 000	–	0,29	**3206-BD-XL-2HRS-TVH**
	72	30,2	41 500	34 500	1 870	10 900	7 500	0,657	**3306-DA**
	72	30,2	43 000	29 500	2 050	10 400	8 500	0,543	**3306-BD-XL-TVH**
	72	30,2	43 000	29 500	2 050	7 800	8 500	0,54	**3306-BD-XL-2Z-TVH**
	72	30,2	43 000	29 500	2 050	7 800	–	0,549	**3306-BD-XL-2HRS-TVH**
35	47	10	6 500	6 800	375	15 500	7 400	0,039	**3807-B-TVH**
	47	10	6 500	6 800	375	11 700	7 400	0,041	**3807-B-2RZ-TVH**
	47	10	6 500	6 800	375	7 000	–	0,041	**3807-B-2RS-TVH**
	62	20	24 000	19 100	1 000	11 700	8 800	0,2	**3007-B-TVH**
	62	20	24 000	19 100	1 000	8 800	8 800	0,224	**3007-B-2RZ-TVH**
	62	20	24 000	19 100	1 000	6 400	–	0,224	**3007-B-2RS-TVH**
	72	27	41 000	30 000	2 090	10 100	9 900	0,436	**3207-BD-XL-TVH**
	72	27	41 000	30 000	2 090	7 600	9 900	0,432	**3207-BD-XL-2Z-TVH**
	72	27	41 000	30 000	2 090	7 600	–	0,44	**3207-BD-XL-2HRS-TVH**
	80	34,9	50 000	41 000	2 650	9 600	7 100	0,889	**3307-DA**
	80	34,9	55 000	36 500	2 550	9 000	8 100	0,706	**3307-BD-XL-TVH**
	80	34,9	55 000	36 500	2 550	6 800	8 100	0,702	**3307-BD-XL-2Z-TVH**
	80	34,9	55 000	36 500	2 550	6 800	–	0,717	**3307-BD-XL-2HRS-TVH**

medias *https://www.schaeffler.de/std/1F9A*



33..-DA;
split inner ring

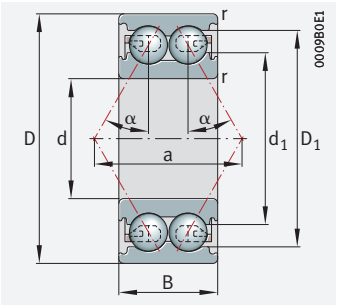


Mounting dimensions

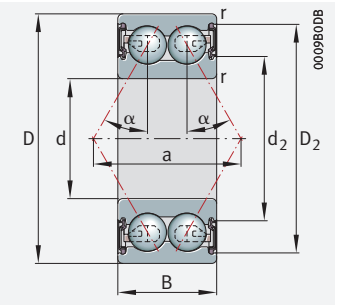
Dimensions							Nominal contact angle	Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	a	α	d_a	D_a	r_a
	min.	≈	≈	≈	≈	≈	°	min.	max.	max.
30	0,3	38	–	34	–	20,2	25	32	40	0,3
	0,3	–	39	–	32,9	20,2	25	32	40	0,3
	0,3	–	39	–	32,9	20,2	25	32	40	0,3
	1	46,7	–	37,3	–	27,4	25	34,6	50,4	1
	1	–	49,1	–	35,6	27,4	25	34,6	50,4	1
	1	–	49,1	–	35,6	27,4	25	34,6	50,4	1
	1	53,3	–	42,2	–	36,4	30	35,6	56,4	1
	1	–	55,8	–	40,3	36,4	30	35,6	56,4	1
	1	–	55,8	–	40,3	36,4	30	35,6	56,4	1
	1,1	61,5	–	48,2	–	67	45	37	65	1
	1,1	60,5	–	46,3	–	41,9	30	37	65	1
	1,1	–	63,5	–	44,4	41,9	30	37	65	1
	1,1	–	63,5	–	44,4	41,9	30	37	65	1
35	0,3	43	–	39	–	22,6	25	37	45	0,3
	0,3	–	44,1	–	37,6	22,6	25	37	45	0,3
	0,3	–	44,1	–	37,6	22,6	25	37	45	0,3
	1	53,3	–	43,7	–	30,9	25	39,6	57,4	1
	1	–	55,3	–	40,5	30,9	25	39,6	57,4	1
	1	–	55,3	–	40,5	30,9	25	39,6	57,4	1
	1,1	62,4	–	49,1	–	42,5	30	42	65	1
	1,1	–	65,4	–	46,9	42,5	30	42	65	1
	1,1	–	65,4	–	46,9	42,5	30	42	65	1
	1,5	69,5	–	55,2	–	75	45	44	71	1,5
	1,5	68,9	–	51,8	–	48	30	44	71	1,5
	1,5	–	71,9	–	49,6	48	30	44	71	1,5
	1,5	–	71,9	–	49,6	48	30	44	71	1,5

Angular contact ball bearings

Double row



38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD, 32, 33

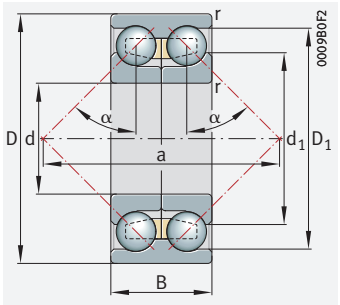


38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD; with seal 2HRS, 2RS, 2RSR, 2RZ, 2Z

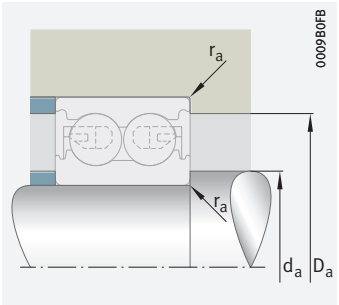
d = 40 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*326*|*2.12* ➤*327*|*2.13* X-life ➤*320*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
40	52	10	6 900	7 600	430	13 700	6 300	0,044	**3808-B-TVH**
	52	10	6 900	7 600	430	10 300	6 300	0,046	**3808-B-2RZ-TVH**
	52	10	6 900	7 600	430	6 100	–	0,046	**3808-B-2RS-TVH**
	68	21	25 000	21 300	1 110	10 600	8 000	0,25	**3008-B-TVH**
	68	21	25 000	21 300	1 110	8 000	8 000	0,25	**3008-B-2RZ-TVH**
	68	21	25 000	21 300	1 110	5 600	–	0,25	**3008-B-2RS-TVH**
	80	30,2	51 000	38 000	2 650	8 900	9 100	0,591	**3208-BD-XL-TVH**
	80	30,2	51 000	38 000	2 650	6 700	9 100	0,58	**3208-BD-XL-2Z-TVH**
	80	30,2	51 000	38 000	2 650	6 700	–	0,597	**3208-BD-XL-2HRS-TVH**
	90	36,5	62 000	52 000	3 300	10 700	6 000	1,2	**3308-DA-MA**
	90	36,5	67 000	48 500	3 350	8 000	7 000	0,969	**3308-BD-XL-TVH**
	90	36,5	67 000	48 500	3 350	6 000	7 000	0,967	**3308-BD-XL-2Z-TVH**
	90	36,5	67 000	48 500	3 350	6 000	–	0,985	**3308-BD-XL-2HRS-TVH**
45	58	10	7 000	8 100	465	12 400	5 700	0,055	**3809-B-TVH**
	58	10	7 000	8 100	465	9 300	5 700	0,058	**3809-B-2RZ-TVH**
	58	10	7 000	8 100	465	5 500	–	0,058	**3809-B-2RS-TVH**
	85	30,2	50 000	39 000	2 700	8 300	8 400	0,622	**3209-BD-XL-TVH**
	85	30,2	50 000	39 000	2 700	6 300	8 400	0,618	**3209-BD-XL-2Z-TVH**
	85	30,2	50 000	39 000	2 700	6 300	–	0,626	**3209-BD-XL-2HRS-TVH**
	100	39,7	71 000	64 000	3 600	7 500	5 800	1,55	**3309-DA**
	100	39,7	72 000	54 000	3 700	7 300	6 700	1,34	**3309-BD-XL-TVH**
	100	39,7	72 000	54 000	3 700	5 500	6 700	1,32	**3309-BD-XL-2Z-TVH**
	100	39,7	72 000	54 000	3 700	5 500	–	1,31	**3309-BD-XL-2HRS-TVH**
50	65	12	8 500	10 200	590	10 900	5 400	0,09	**3810-B-TVH**
	65	12	8 500	10 200	590	8 100	5 400	0,093	**3810-B-2RZ-TVH**
	65	12	8 500	10 200	590	4 800	–	0,093	**3810-B-2RS-TVH**
	90	30,2	53 000	44 000	3 050	7 800	7 600	0,672	**3210-BD-XL-TVH**
	90	30,2	53 000	44 000	3 050	5 900	7 600	0,667	**3210-BD-XL-2Z-TVH**
	90	30,2	53 000	44 000	3 050	5 900	–	0,668	**3210-BD-XL-2HRS-TVH**
	110	44,4	90 000	84 000	5 300	8 700	5 300	2,24	**3310-DA-MA**
	110	44,4	93 000	70 000	4 850	6 500	6 300	1,75	**3310-BD-XL-TVH**
	110	44,4	93 000	70 000	4 850	4 900	6 300	1,75	**3310-BD-XL-2Z-TVH**
	110	44,4	93 000	70 000	4 850	4 900	–	1,75	**3310-BD-XL-2HRS-TVH**

medias *https://www.schaeffler.de/std/1F9A*



33..-DA;
split inner ring

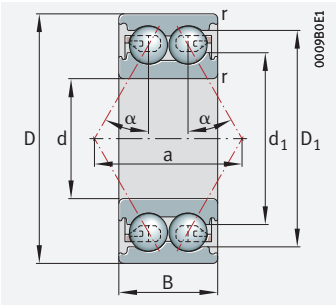


Mounting dimensions

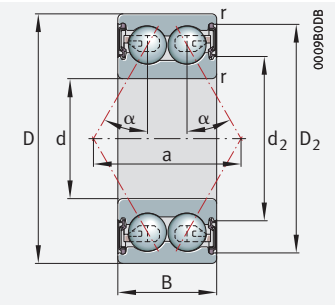
Dimensions							Nominal contact angle	Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	a	α	d_a	D_a	r_a
	min.	≈	≈	≈	≈	≈	°	min.	max.	max.
40	0,3	48,5	–	44,6	–	25,2	25	42	50	0,3
	0,3	–	49,6	–	43,5	25,2	25	42	50	0,3
	0,3	–	49,6	–	43,5	25,2	25	42	50	0,3
	1	58,8	–	49,2	–	33,4	25	44,6	63,4	1
	1	–	61,2	–	46,7	33,4	25	44,6	63,4	1
	1	–	61,2	–	46,7	33,4	25	44,6	63,4	1
	1,1	69,6	–	54,9	–	47,4	30	47	73	1
	1,1	–	72,6	–	52,8	47,4	30	47	73	1
	1,1	–	72,6	–	52,8	47,4	30	47	73	1
	1,5	79,7	–	61,7	–	85	45	49	81	1,5
	1,5	77	–	59	–	53,1	30	49	81	1,5
	1,5	–	79,9	–	56,8	53,1	30	49	81	1,5
	1,5	–	79,9	–	56,8	53,1	30	49	81	1,5
45	0,3	53,6	–	49,6	–	27,5	25	47	56	0,3
	0,3	–	54,6	–	48,1	27,5	25	47	56	0,3
	0,3	–	54,6	–	48,1	27,5	25	47	56	0,3
	1,1	75,1	–	59,9	–	50,3	30	52	78	1
	1,1	–	78,1	–	57,7	50,3	30	52	78	1
	1,1	–	78,1	–	57,7	50,3	30	52	78	1
	1,5	86,7	–	68,3	–	93	45	54	91	1,5
	1,5	84,4	–	65,5	–	57,8	30	54	91	1,5
	1,5	–	87,3	–	63,3	57,8	30	54	91	1,5
	1,5	–	87,3	–	63,3	57,8	30	54	91	1,5
50	0,3	60,7	–	56,3	–	31	25	52	63	0,3
	0,3	–	61,7	–	55,2	31	25	52	63	0,3
	0,3	–	61,7	–	55,2	31	25	52	63	0,3
	1,1	80,1	–	64,9	–	53,2	30	57	83	1
	1,1	–	82,9	–	62,8	53,2	30	57	83	1
	1,1	–	82,9	–	62,8	53,2	30	57	83	1
	2	96,9	–	77,3	–	104	45	61	99	2
	2	93,3	–	71,5	–	64,2	30	61	99	2
	2	–	96,8	–	69,1	64,2	30	61	99	2
	2	–	96,8	–	69,1	64,2	30	61	99	2

Angular contact ball bearings

Double row



38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD, 32, 33

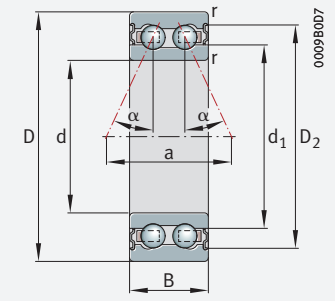


38..-B, 30..-B, 32..-BD, 33..-BD; with seal 2HRS, 2RS, 2RZ, 2Z

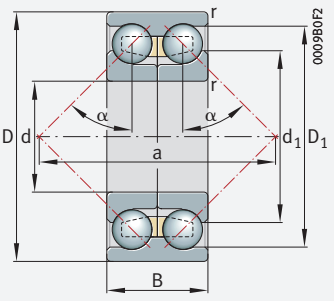
d = 55 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*326|2.12* ➤*327|2.13* X-life ➤*320*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
55	72	13	10 700	13 100	760	9 600	4 850	0,13	**3811-B-TVH**
	72	13	10 700	13 100	760	7 200	4 850	0,134	**3811-B-2RZ-TVH**
	72	13	10 700	13 100	760	4 300	–	0,134	**3811-B-2RS-TVH**
	100	33,3	61 000	51 000	3 550	7 100	7 200	0,94	**3211-BD-XL-TVH**
	100	33,3	61 000	51 000	3 550	5 300	7 200	0,93	**3211-BD-XL-2Z-TVH**
	100	33,3	61 000	51 000	3 550	5 300	–	0,933	**3211-BD-XL-2HRS-TVH**
	120	49,2	105 000	101 000	5 600	8 000	5 200	2,85	**3311-DA-MA**
	120	49,2	116 000	88 000	6 100	5 800	5 900	2,28	**3311-BD-XL-TVH**
	120	49,2	116 000	88 000	6 100	4 350	5 900	2,27	**3311-BD-XL-2Z-TVH**
	120	49,2	116 000	88 000	6 100	4 350	–	2,26	**3311-BD-XL-2HRS-TVH**
60	78	14	14 200	17 100	970	8 800	4 700	0,161	**3812-B-TVH**
	78	14	14 200	17 100	970	6 600	4 700	0,166	**3812-B-2RZ-TVH**
	78	14	14 200	17 100	970	4 050	–	0,166	**3812-B-2RS-TVH**
	110	36,5	75 000	64 000	4 400	6 300	6 700	1,25	**3212-BD-XL-TVH**
	110	36,5	75 000	64 000	4 400	4 750	6 700	1,24	**3212-BD-XL-2Z-TVH**
	110	36,5	75 000	64 000	4 400	4 750	–	1,25	**3212-BD-XL-2HRS-TVH**
	130	54	121 000	118 000	6 700	5 500	4 850	3,39	**3312-DA**
	130	54	126 000	103 000	5 300	3 950	5 000	2,85	**3312-B-TVH**
	130	54	126 000	103 000	5 300	3 950	5 000	2,92	**3312-B-2Z-TVH**
	130	54	126 000	103 000	5 300	3 300	–	2,92	**3312-B-2RSR-TVH**
65	120	38,1	86 000	77 000	5 300	5 700	6 000	1,6	**3213-BD-XL-TVH**
	120	38,1	86 000	77 000	5 300	4 300	6 000	1,6	**3213-BD-XL-2Z-TVH**
	120	38,1	86 000	77 000	5 300	4 300	–	1,6	**3213-BD-XL-2HRS-TVH**
	140	58,7	139 000	137 000	7 400	5 100	4 650	4,38	**3313-DA**
	140	58,7	150 000	119 000	8 100	4 900	5 300	4,1	**3313-BD-XL-TVH**
	140	58,7	150 000	119 000	8 100	3 650	5 300	4,1	**3313-BD-XL-2Z-TVH**

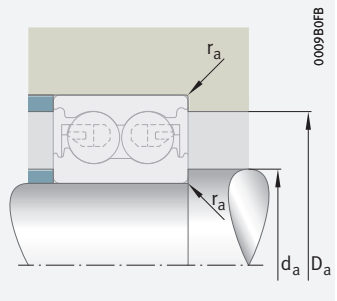
medias *https://www.schaeffler.de/std/1F9A*



32..-B, 33..-B;
with seal 2RSR, 2Z



33..-DA;
split inner ring

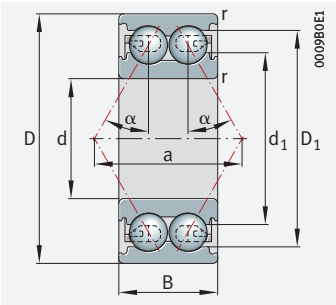


Mounting dimensions

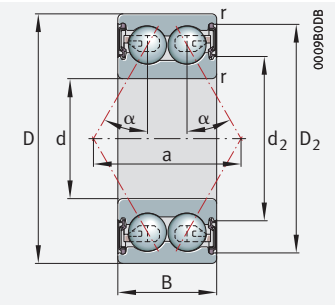
Dimensions							Nominal contact angle	Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	a	α	d_a	D_a	r_a
	min.	≈	≈	≈	≈	≈	°	min.	max.	max.
55	0,3	68	–	63,1	–	34,9	25	57	70	0,3
	0,3	–	69,1	–	61,4	34,9	25	57	70	0,3
	0,3	–	69,1	–	61,4	34,9	25	57	70	0,3
	1,5	87,8	–	71,6	–	58,4	30	64	91	1,5
	1,5	–	90,8	–	69,2	58,4	30	64	91	1,5
	1,5	–	90,8	–	69,2	58,4	30	64	91	1,5
	2	105,3	–	81,6	–	111	45	66	109	2
	2	103,3	–	78,8	–	71,4	30	66	109	2
	2	–	106,8	–	76,4	71,4	30	66	109	2
	2	–	106,8	–	76,4	71,4	30	66	109	2
60	0,3	73	–	67,1	–	38,1	25	62	76	0,3
	0,3	–	74,8	–	67,3	38,1	25	62	76	0,3
	0,3	–	74,8	–	67,3	38,1	25	62	76	0,3
	1,5	97	–	79	–	64,7	30	69	101	1,5
	1,5	–	100,5	–	76,6	64,7	30	69	101	1,5
	1,5	–	100,5	–	76,6	64,7	30	69	101	1,5
	2,1	115,8	–	91,9	–	122	45	72	118	2,1
	2,1	108,7	–	81,6	–	67,3	25	72	118	2,1
	2,1	–	113,1	81,3	–	67,3	25	72	118	2,1
	2,1	–	113,1	81,3	–	67,3	25	72	118	2,1
65	1,5	106,6	–	87,7	–	70,6	30	74	111	1,5
	1,5	–	110,1	–	85,3	70,6	30	74	111	1,5
	1,5	–	110,1	–	85,3	70,6	30	74	111	1,5
	2,1	124,1	–	98,4	–	131	45	77	128	2,1
	2,1	120,5	–	93,4	–	83,5	30	77	128	2,1
	2,1	–	125	–	90,6	83,5	30	77	128	2,1

Angular contact ball bearings

Double row



38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD, 32, 33

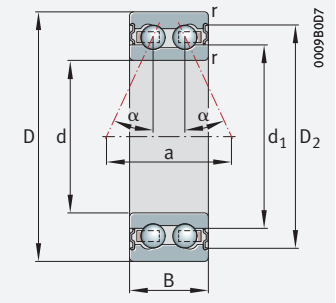


38..-B, 30..-B, 32..-BD, 33..-BD; with seal 2HRS, 2RS, 2RZ, 2Z

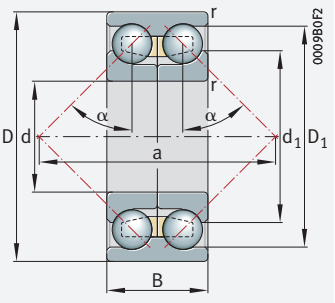
d = 70 – 85 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*326*|*2.12* ➤*327*|*2.13* X-life ➤*320*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
70	90	15	18 800	23 200	1 310	7 500	4 050	0,2	**3814-B-TVH**
	90	15	18 800	23 200	1 310	5 700	4 050	0,205	**3814-B-2RZ-TVH**
	90	15	18 800	23 200	1 310	3 450	–	0,205	**3814-B-2RS-TVH**
	125	39,7	82 000	79 000	4 100	4 150	5 600	1,78	**3214-B-TVH**
	125	39,7	82 000	79 000	4 100	4 150	5 600	1,78	**3214-B-2Z-TVH**
	125	39,7	82 000	79 000	4 100	3 100	–	1,78	**3214-B-2RSR-TVH**
	150	63,5	157 000	157 000	8 500	4 800	4 550	5,36	**3314-DA**
	150	63,5	172 000	135 000	8 900	4 550	5 100	4,5	**3314-BD-XL-TVH**
	150	63,5	172 000	135 000	8 900	3 400	5 100	4,5	**3314-BD-XL-2Z-TVH**
	150	63,5	167 000	176 000	8 700	4 750	4 500	4,89	**3314**
75	130	41,3	88 000	85 000	4 350	3 900	5 300	1,91	**3215-B-TVH**
	130	41,3	88 000	85 000	4 350	3 900	5 300	1,94	**3215-B-2Z-TVH**
	130	41,3	88 000	85 000	4 350	2 900	–	1,94	**3215-B-2RSR-TVH**
	160	68,3	184 000	179 000	10 200	5 800	4 350	5,9	**3315-DA-MA**
	160	68,3	192 000	209 000	10 000	4 400	4 250	6,16	**3315**
80	100	15	19 200	24 800	1 430	6 800	3 650	0,22	**3816-B-TVH**
	100	15	19 200	24 800	1 430	5 100	3 650	0,23	**3816-B-2RZ-TVH**
	100	15	19 200	24 800	1 430	3 100	–	0,23	**3816-B-2RS-TVH**
	140	44,4	99 000	102 000	5 100	3 650	5 100	2,4	**3216-B-TVH**
	140	44,4	99 000	102 000	5 100	3 650	5 100	2,48	**3216-B-2Z-TVH**
	140	44,4	99 000	102 000	5 100	2 700	–	2,48	**3216-B-2RSR-TVH**
	170	68,3	192 000	196 000	9 900	5 400	3 900	7,88	**3316-DA-MA**
	170	68,3	199 000	180 000	11 100	3 950	4 300	6,4	**3316-BD-XL-TVH**
	170	68,3	199 000	180 000	11 100	2 950	–	6,3	**3316-BD-XL-2HRS-TVH**
	170	68,3	208 000	226 000	10 600	4 150	3 900	6,79	**3316**
85	150	49,2	135 000	127 000	6 100	3 350	4 900	3	**3217-B-TVH**
	150	49,2	135 000	127 000	6 100	3 350	4 900	3,3	**3217-B-2Z-TVH**
	150	49,2	135 000	127 000	6 100	2 600	–	3,3	**3217-B-2RS-TVH**
	150	49,2	128 000	154 000	7 400	4 650	4 700	3,32	**3217**
	180	73	229 000	255 000	11 400	5 000	3 600	8,46	**3317-M**
	180	73	209 000	221 000	11 000	5 200	3 750	9,39	**3317-DA-MA**

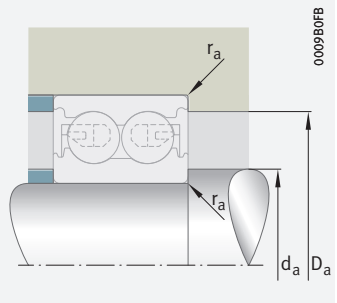
medias *https://www.schaeffler.de/std/1F9A*



32..-B, 33..-B;
with seal 2RSR, 2Z



33..-DA;
split inner ring

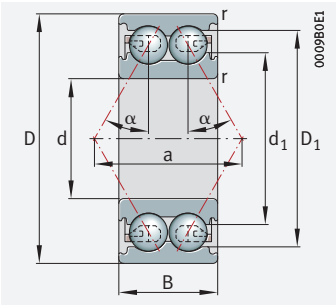


Mounting dimensions

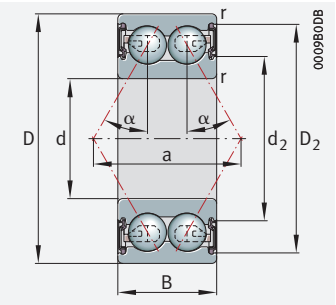
Dimensions							Nominal contact angle	Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	a	α	d_a	D_a	r_a
	min.	≈	≈	≈	≈	≈	°	min.	max.	max.
70	0,6	84,5	–	77,7	–	43,6	25	73,2	86,8	0,6
	0,6	–	86,3	–	76,6	43,6	25	73,2	86,8	0,6
	0,6	–	86,3	–	76,6	43,6	25	73,2	86,8	0,6
	1,5	106,3	–	87	–	61,6	25	79	116	1,5
	1,5	–	110,7	86,8	–	61,6	25	79	116	1,5
	1,5	–	110,7	86,8	–	61,6	25	79	116	1,5
	2,1	132,4	–	103,4	–	141	45	82	138	2,1
	2,1	129,2	–	100,3	–	89,4	30	82	138	2,1
	2,1	–	133,7	–	96,9	89,4	30	82	138	2,1
	2,1	131,9	–	98,5	–	109	35	82	138	2,1
75	1,5	112,6	–	92,4	–	65,2	25	84	121	1,5
	1,5	–	115,5	92,1	–	65,2	25	84	121	1,5
	1,5	–	115,5	92,1	–	65,2	25	84	121	1,5
	2,1	141,3	–	109,3	–	150	45	87	148	2,1
	2,1	141,2	–	105,5	–	116,6	35	87	148	2,1
80	0,6	93,5	–	86,7	–	47,8	25	83,2	96,8	0,6
	0,6	–	95,3	–	85,5	47,8	25	83,2	96,8	0,6
	0,6	–	95,3	–	85,5	47,8	25	83,2	96,8	0,6
	2	120,3	–	98,8	–	69,1	25	91	129	2
	2	–	124,5	98,5	–	69,1	25	91	129	2
	2	–	124,5	98,5	–	69,1	25	91	129	2
	2,1	149,9	–	118,7	–	159	45	92	158	2,1
	2,1	148	–	116,7	–	100,8	30	92	158	2,1
	2,1	–	151,9	–	114	100,8	30	92	158	2,1
	2,1	149,7	–	111,8	–	122,5	35	92	158	2,1
85	2	130,4	–	105	–	75,9	25	96	139	2
	2	–	135,1	–	102,3	75,9	25	96	139	2
	2	–	135,1	–	102,3	75,9	25	96	139	2
	2	135,1	–	108,5	–	106,3	35	96	139	2
	3	160	–	119,6	–	131,5	35	99	166	2,5
	3	156,5	–	124,3	–	167	45	99	166	2,5

Angular contact ball bearings

Double row



38..-B, 30..-B, 32..-B, 33..-B, 32..-BD, 33..-BD, 32, 33

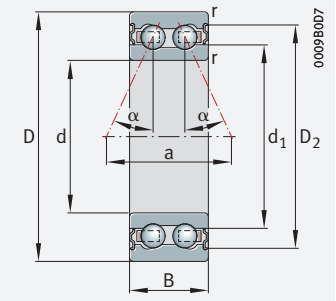


38..-B, 30..-B, 32..-BD, 33..-BD; with seal 2HRS, 2RS, 2RZ, 2Z

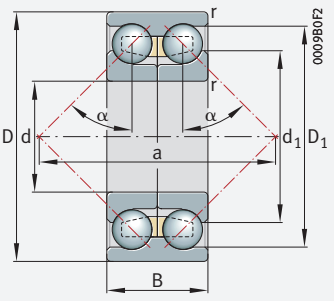
d = 90 – 110 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*326* | *2.12* ➤*327* | *2.13* X-life ➤*320*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
90	115	19	27 000	35 500	2 000	5 900	3 550	0,41	**3818-B-TVH**
	115	19	27 000	35 500	2 000	2 750	–	0,422	**3818-B-2RS-TVH**
	160	52,4	142 000	142 000	6 500	4 100	4 500	3,8	**3218-B-TVH**
	160	52,4	142 000	142 000	6 500	2 370	–	4	**3218-B-2RS-TVH**
	160	52,4	143 000	172 000	8 000	4 350	4 550	4,14	**3218**
	190	73	226 000	247 000	11 600	4 850	3 450	10,4	**3318-DA-MA**
	190	73	260 000	295 000	13 000	3 650	3 350	9,14	**3318**
95	170	55,6	161 000	193 000	8 800	5 300	4 350	5,06	**3219-M**
	200	77,8	270 000	315 000	13 500	4 450	3 200	11,2	**3319-M**
100	125	19	28 000	39 000	2 120	5 300	3 100	0,45	**3820-B-TVH**
	125	19	28 000	39 000	2 120	2 470	–	0,463	**3820-B-2RS-TVH**
	180	60,3	185 000	173 000	7 600	3 650	4 400	5,4	**3220-B-TVH**
	180	60,3	185 000	173 000	7 600	2 750	4 400	5,5	**3220-B-2Z-TVH**
	180	60,3	185 000	173 000	7 600	2 210	–	5,5	**3220-B-2RS-TVH**
	180	60,3	186 000	235 000	10 300	3 750	4 050	5,98	**3220**
	215	82,6	285 000	340 000	14 100	4 200	3 000	14	**3320-M**
	215	82,6	260 000	305 000	13 600	4 300	3 050	15,6	**3320-DA-MA**
105	190	65,1	215 000	270 000	11 400	4 600	3 850	7,4	**3221-M**
110	200	69,8	236 000	290 000	12 200	4 400	3 750	9,03	**3222-M**
	240	92,1	330 000	425 000	16 800	3 750	2 650	20	**3322-M**
	240	92,1	310 000	385 000	17 400	3 800	2 700	21,8	**3322-DA-MA**

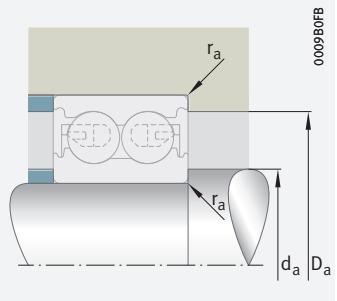
medias *https://www.schaeffler.de/std/1F9A*



32..-B, 33..-B;
with seal 2RSR, 2Z



33..-DA;
split inner ring



Mounting dimensions

Dimensions							Nominal contact angle	Mounting dimensions		
d	r	D_1	D_2	d_1	d_2	a	α	d_a	D_a	r_a
	min.	≈	≈	≈	≈	≈	°	min.	max.	max.
90	1	106,6	–	98,4	–	55	25	94,6	110,4	1
	1	–	107,2	–	96,2	55	25	94,6	110,4	1
	2	141,6	–	116,4	–	81,4	25	104	146	2
	2	–	145,2	–	112,1	81,4	25	104	146	2
	2	143,7	–	115,6	–	112,5	35	104	146	2
	3	166,2	–	131,9	–	177	45	104	176	2,5
	3	168,2	–	126,1	–	136	35	104	176	2,5
95	2,1	152,8	–	122,2	–	119,8	35	107	158	2,1
	3	177,3	–	133	–	143,3	35	109	186	2,5
100	1	117,9	–	109,5	–	60,2	25	104,6	120,4	1
	1	–	118,5	–	107,3	60,2	25	104,6	120,4	1
	2,1	155,7	–	124,7	–	91,3	25	112	168	2,1
	2,1	–	157,4	–	121,3	91,3	25	112	168	2,1
	2,1	–	157,4	–	121,3	91,3	25	112	168	2,1
	2,1	163,7	–	131	–	127,4	35	112	168	2,1
	3	188,7	–	142,5	–	153,3	35	114	201	2,5
	3	187,1	–	147,5	–	197,5	45	114	201	2,5
105	2,1	172,1	–	138	–	134,7	35	117	178	2,1
110	2,1	180,1	–	143,3	–	143,5	35	122	188	2,1
	3	209,6	–	161,5	–	170,5	35	124	226	2,5
	3	207,3	–	164,5	–	221	45	124	226	2,5

Four point contact bearings



Matrix for bearing preselection ____ 353

1 Four point contact bearings ____ 354

1.1 Bearing design ____ 354
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FAG

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Four point contact bearings _____ *366*

Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Four point contact bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			with/without retaining slots	detailed information ➤ 354
Load carrying capacity	radial		(+)	➤ 356 | 1.2
	axial, one direction		++	➤ 356 | 1.2
	axial, both directions		++	➤ 356 | 1.2
	moments		(+)	➤ 356 | 1.2
Compensation of angular misalignments	static		–	➤ 356 | 1.3
	dynamic		–	➤ 356 | 1.3
Bearing design	cylindrical bore		✓	➤ 354 | 1.1
	tapered bore		–	
	separable		✓	➤ 364 | 1.17
Lubrication	greased		–	➤ 357 | 1.4
Sealing	open		✓	➤ 357 | 1.5
	non-contact		–	➤ 357 | 1.5
	contact		–	➤ 357 | 1.5
Operating temperature in °C	from to		–30 +150[1]	➤ 358 | 1.8
Suitability for	high speeds		(+)	➤ 357 | 1.6
	high running accuracy		(+)	➤ 360 | 1.11 ➤ 115
	low-noise running		(+)	➤ 357 | 1.7
	high rigidity		+	➤ 54
	reduced friction		+	➤ 56
	length compensation within bearing		–	
	non-locating bearing arrangement		–	➤ 141
	locating bearing arrangement		++	➤ 141
X-life bearings		X-life	✓	➤ 355
Bearing bore d in mm	from to		17 200[2]	➤ 366
Product tables	from page ➤		366	

1) Valid for bearings with brass cages, D ≦ 240 mm

2) Larger catalogue bearings GL 1

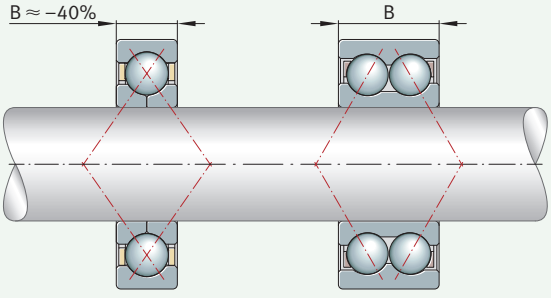
1 Four point contact bearings

Four point contact bearings are particularly suitable where:
- predominantly axial loads must be supported ➤*356|1.2*
- the axial design envelope is not sufficient for double row radial angular contact ball bearings
- radial forces must be supported by a separate radial bearing ➤*355|3*
- axial forces occur in both directions and a close axial guidance is required in conjunction with a small bearing width, e.g. in gearbox engineering

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*353*.

1 *Four point contact bearing and double row angular contact ball bearing – comparison of design envelope*

B = *bearing width*



1.1 Bearing design

✎ *Design variants*

Four point contact bearings are available as:
- bearings of basic design ➤*355|2*
- bearings with retaining slots in the outer ring ➤*355|3*
- X-life bearings ➤*355*

Bearings of basic design

✎ *Comparable, in terms of product design, with single row radial angular contact ball bearings*

Four point contact bearings are single row, non-self-retaining radial ball bearings. They are similar in their structure to single row radial angular contact ball bearings; the raceways on the inner rings are, however, designed such that they can support axial loads in both directions ➤*355|2* and ➤*356|1.2*. The centre points of curvature of the arc-shaped raceways on the inner and outer ring are offset relative to each other in such a way that the balls are in contact with the bearing rings at four points under radial load ➤*355|2* and ➤*356|1.2*.

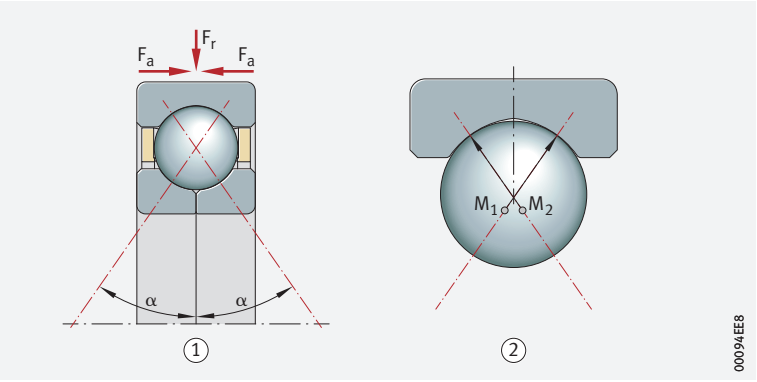
✎ *Smaller axial section height than double row angular contact ball bearings*

These bearings have solid outer rings, split inner rings and ball and cage assemblies with brass or polyamide cages ➤*359|1.9*. The two-piece inner ring allows a large complement of balls to be accommodated in the bearing. The inner ring halves are matched to the particular bearing and must not be interchanged with those of other bearings of the same size. In an axial direction, four point contact bearings are considerably narrower than, for example, double row angular contact ball bearings.

2
Four point contact bearing of basic design

- α = *nominal contact angle*
- M_1, M_2 = *centres of curvature of outer ring raceway*
- F_r = *radial load*
- F_a = *axial load*

① *Four point contact bearing, split inner ring, without retaining slots in the outer ring*
② *Raceway geometry*



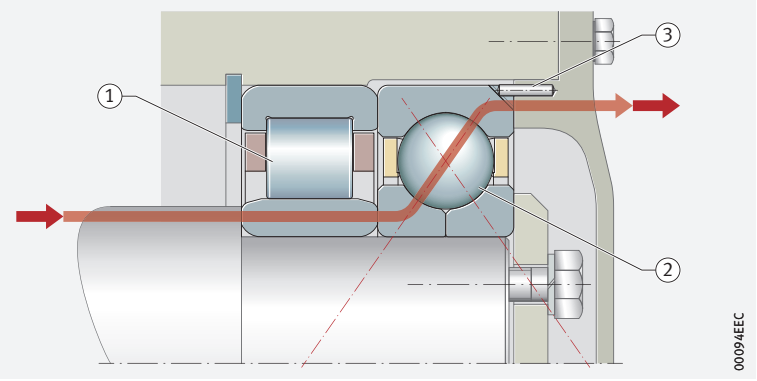
Bearings with retaining slots in the outer ring

The retaining slots allow simple location of the bearing in the housing

Four point contact bearings are often combined with a radial bearing and used as an axial bearing with radial clearance in a housing ➤*355*|*3*, ➤*362*|*1.16*. For quick and secure location of the bearings in the housing, larger bearings therefore have two retaining slots in one end face of the outer ring offset by 180° ➤*355*|*3*. Locking pins engage in these retaining slots and locate the outer ring in the housing.

3
Four point contact bearing used as an axial bearing, radial clearance on outer ring, axial force flow

① *Cylindrical roller bearing (radial bearing)*
② *Four point contact bearing with retaining slots in outer ring (axial bearing, outer ring not radially retained)*
③ *Locking pin for location of outer ring*



X-life premium quality

Four point contact bearings are available in certain sizes as X-life bearings. These bearings exhibit considerably higher performance than standard four point contact bearings ➤*356*|*4*. This is achieved, for example, through the modified internal construction, higher surface quality of the contact surfaces and optimised cage design, as well as through the improved quality of the steel and rolling elements.

Advantages

Increased customer benefits due to X-life

The technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings ➤*290*|*6*
- quieter running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and, consequently, longer maintenance intervals
- a measurably longer operating life
- high operational security
- compact, environmentally-friendly bearing arrangements

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

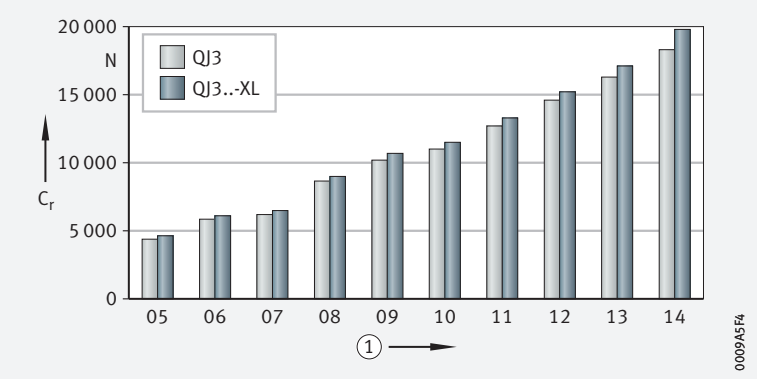
Suffix XL

X-life four point contact bearings include the suffix XL in the designation ➤*360*| 4, ➤*360*| 6 and ➤*366*|.

4
Comparison of basic dynamic load rating C_r – bearing series QJ3..-XL, bore code 5 to 14, with a bearing which is not of X-life quality

C_r = *basic dynamic load rating*

① *Bore code*



Areas of application

Wide application range

Due to their special technical features, X-life four point contact bearings are highly suitable for bearing arrangements in:

- compressors
- fluid and hydraulic pumps
- automotive chassis and gearboxes
- gearboxes for industrial, rail and wind turbine applications
- agricultural vehicles and equipment

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

1.2 Load carrying capacity

Capable of supporting high axial loads in both directions

Due to the design of the raceways with their high shoulders, the large nominal contact angle of $\alpha_0 = 35°$ and the large number of rolling elements, four point contact bearings have a very high axial load carrying capacity. They are suitable for alternating, purely axial loads or predominantly axial load. The balls are in contact with the inner ring and outer ring each at one point only, as is the case with a single row angular contact ball bearing under axial load ➤*355*| 2.

The radial load carrying capacity of the bearings is low. If predominantly radial load is present, four point contact bearings should not be used due to the higher friction in the four point contact.

1.3 Compensation of angular misalignments

Four point contact bearings cannot compensate misalignments

Four point contact bearings are not suitable for the compensation of angular misalignments due to housing deformations or shaft deflections. The possible skewing of the inner ring in relation to the outer ring depends, for example, on the bearing load, the operating clearance and the bearing size, and is very small.

Skewing of the bearing rings increases the running noise, places increased strain on the cages and has a harmful influence on the operating life of the bearings.

1.4 Lubrication

Oil or grease lubrication

The bearings are not greased. They must be lubricated with oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

The bearings are of an open design

Four point contact bearings are supplied without seals. As a result, sealing of the bearing position must be carried out in the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

1.6 Speeds

Higher speeds are only possible under purely axial load

Due to the four point contact and resulting higher level of friction, the speed suitability of the bearings is heavily restricted under radial load. Higher speeds can only be achieved if four point contact ball bearings are subjected to purely axial load.

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

The values in the product tables are valid for oil lubrication.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

Values for grease lubrication

For grease lubrication, 75% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 58% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_{ϑ}

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_{ϑ} ➤64.

1.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

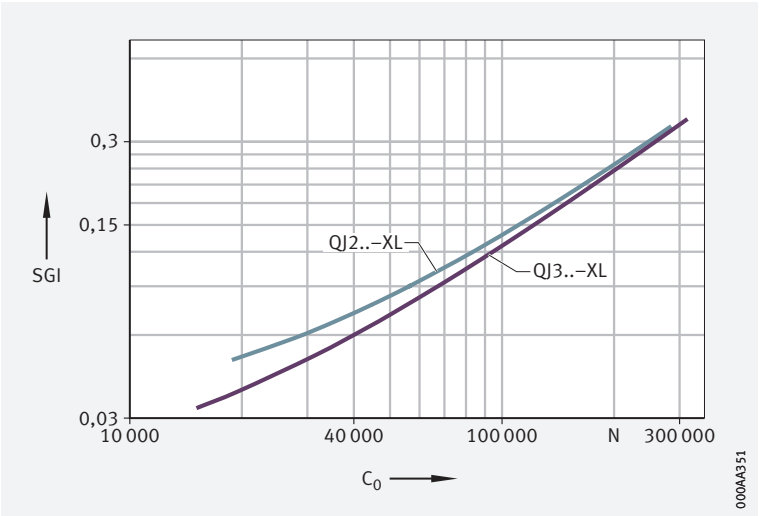
The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:

- ***medias*** *https://medias.schaeffler.com*

5
Schaeffler Noise Index for four point contact bearings

SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant

Possible operating temperatures of four point contact bearings ➤*358*| ▦ *1*.

1
Permissible temperature ranges

Operating temperature	Four point contact bearings	
	with brass cage	with polyamide cage PA66
	–30 °C to +150 °C, for D > 240 mm up to +200 °C	–30 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *Solid cages made from brass and polyamide PA66 are used as standard*

Standard cages and additional designs for four point contact bearings ➤*359*|▦*2*. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with brass or sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

▦*2*
Cage, cage suffix, bore code

Bearing series	Solid brass cage MPA		Solid cage made from polyamide PA66 TVP	
	standard	also available for	standard	also available for
	Bore code			
QJ10	12, 17, 19, 21, 22, 24, 26, 30 to 40	–	–	–
QJ2	up to 08, 10, 13, 16, 17, from 19	09, 11, 12, 14, 15, 18	09, 11,12, 14, 15, 18	08
QJ3	03, 04, from 10	05 to 09	05 to 09	–

1.10 Internal clearance

Axial internal clearance

✎ *The standard is CN*

Four point contact bearings are manufactured as standard with axial internal clearance CN (normal) ➤*359*|▦*3*. CN is not stated in the designation.

Certain sizes are also available by agreement with the smaller internal clearance C2 and with the larger internal clearance C3 and C4.

The values for axial internal clearance correspond to DIN 628-4:2008 (ISO 5753-2:2010) ➤*359*|▦*3*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦*3*
Axial internal clearance of four point contact bearings

Nominal bore diameter d mm		Axial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
10	18	15	65	50	95	85	130	120	165
18	40	25	75	65	110	100	150	135	185
40	60	35	85	75	125	110	165	150	200
60	80	45	100	85	140	125	175	165	215
80	100	55	110	95	150	135	190	180	235
100	140	70	130	115	175	160	220	205	265
140	180	90	155	135	200	185	250	235	300
180	220	105	175	155	225	210	280	260	330

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of four point contact bearings correspond to DIN 628-4:2008. Nominal dimensions of four point contact bearings ➤366|.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤137|7.11. Nominal value of chamfer dimension ➤366|.

Tolerances

The tolerances for the dimensional and running accuracy of four point contact bearings correspond to tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤124|8.

Retaining slots

The dimensions and tolerances of the retaining slots are based on ISO 20515:2021 bzw. DIN 628-4:2008.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

4 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
C2	Axial internal clearance C2 (smaller than normal)	Special design, available by agreement
C3	Axial internal clearance C3 (larger than normal)	
C4	Axial internal clearance C4 (larger than C3)	
MPA	Solid brass cage, guided on outer ring	Standard, cage material dependent on bearing series and bore code
TVP	Solid cage made from glass fibre reinforced polyamide PA66	
XL	X-life bearing	Standard, dependent on bore code and bearing type
N2	Two retaining slots in outer ring	Standard for larger bearings

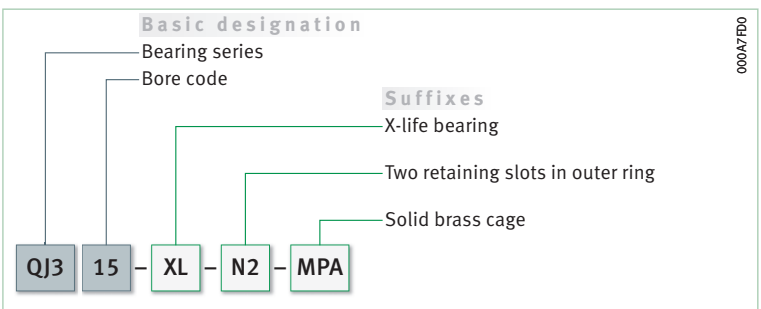
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

Example of composition of bearing designation

The designation of bearings follows a set model. For an example ➤360|6. The composition of designations is subject to DIN 623-1 ➤102|10.

6 *Four point contact bearing with two retaining slots in the outer ring: designation structure*



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

✎ *P is a substitute force for combined load and various load cases*

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ *$F_a/F_r \leqq 0{,}95$ or $F_a/F_r > 0{,}95$*

The calculation of P is dependent on the load ratio F_a/F_r and the factor 0,95 ➤*361*| *1* and ➤*361*| *2*.

1
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq 0{,}95 \quad \Rightarrow \quad P = F_r + 0{,}66 \cdot F_a$$

2
Equivalent dynamic load

$$\frac{F_a}{F_r} > 0{,}95 \quad \Rightarrow \quad P = 0{,}6 \cdot F_r + 1{,}07 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load.

Equivalent static bearing load

For four point contact bearings under static load ➤*361*| *3*.

3
Equivalent static load

$$P_0 = F_{0r} + 0{,}58 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*361*| *4*.

4
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum axial load of $F_a \geqq 1{,}2 \cdot F_r$ is required*

In order to ensure low friction in the bearing, especially at high speeds, a minimum axial load is required. In order to prevent an excessive increase in friction in the bearing, the axial force should be sufficiently high that the rolling elements are in contact with the inner and outer ring raceway at only one point. This is ensured if $F_a \geqq 1{,}2 \cdot F_r$.

1.16 Design of bearing arrangements

Used as axial bearing

If a four point contact bearing is used as a pure axial bearing, the outer ring must have a large radial clearance in the housing, in order that the bearing is not subjected to radial load ➤355|3.

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and thus also achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway (not applicable to bearings with radially relieved outer rings). The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤363|5 to ➤363|7.

Radial location of bearings – fit recommendations

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤152|6 and ➤160|7.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤146
- conditions of rotation ➤147
- tolerance classes for cylindrical shaft seats (radial bearings) ➤149|2
- shaft fits ➤152|6
- tolerance classes for bearing seats in housings (radial bearings) ➤150|4
- housing fits ➤160|7

Location of the outer ring by means of retaining slots

For location of the bearings in the housing by means of retaining slots and locking pin ➤355|3.

Axial location of bearings – location methods

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable ➤355|3.

Dimensional, geometrical and running accuracy of the bearing seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For four point contact bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤363|5. Tolerances t_1 to t_3 in accordance with ➤170|11. Numerical values for IT grades ➤363|6.

5 *Guide values for the geometrical and positional tolerances of bearing seating surfaces*

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	

6 *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm							
	over	**10**	**18**	**30**	**50**	**80**	**120**	**180**	**250**
	incl.	**18**	**30**	**50**	**80**	**120**	**180**	**250**	**315**
	Values in µm								
IT4		5	6	7	8	10	12	14	16
IT5		8	9	11	13	15	18	20	23
IT6		11	13	16	19	22	25	29	32
IT7		18	21	25	30	35	40	46	52

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*363*| 7.

7 *Roughness values for cylindrical bearing seating surfaces – guide values*

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders ➤*366*|. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

1.17 Mounting and dismounting

The mounting and dismounting options for four point contact bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

✎As the bearings are not self-retaining, they are easy to mount

Four point contact bearings are not self-retaining. As a result, the outer ring with the ball and cage assembly can be mounted separately from the two inner ring halves ➤*354|1.1*. This gives simplified mounting of the bearings.

Schaeffler Mounting Handbook

✎Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

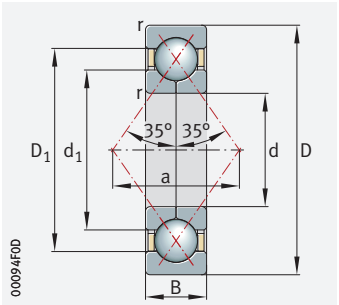
The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

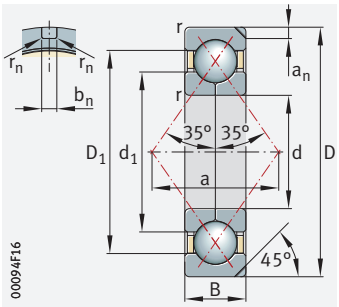
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

Four point contact bearings



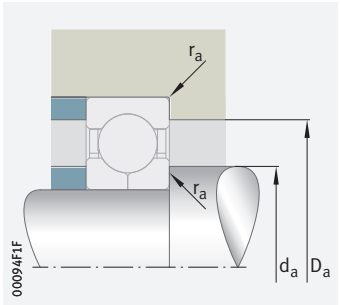


N2 variant

d = 17 – 85 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤360|1.12 ➤360|1.13 X-life ➤355
			N	N	N	min^{-1}	min^{-1}	≈ kg	
17	47	14	24 500	15 100	1 130	29 500	12 000	0,148	**QJ303-XL-MPA**
20	52	15	31 000	19 600	1 360	26 000	10 700	0,184	**QJ304-XL-MPA**
25	52	15	26 000	18 800	1 300	25 500	12 300	0,171	**QJ205-XL-MPA**
	62	17	46 500	31 500	2 180	14 100	8 800	0,256	**QJ305-XL-TVP**
30	62	16	37 500	27 500	1 930	21 100	10 200	0,254	**QJ206-XL-MPA**
	72	19	61 000	43 000	3 000	11 900	7 600	0,379	**QJ306-XL-TVP**
35	72	17	45 000	35 500	2 470	18 000	8 500	0,359	**QJ207-XL-MPA**
	80	21	65 000	51 000	3 500	10 800	7 000	0,516	**QJ307-XL-TVP**
40	80	18	58 000	46 500	3 250	10 600	7 500	0,399	**QJ208-XL-TVP**
	90	23	90 000	69 000	4 750	9 300	6 200	0,695	**QJ308-XL-TVP**
45	85	19	66 000	57 000	4 000	9 800	6 900	0,467	**QJ209-XL-TVP**
	100	25	107 000	83 000	6 200	8 300	5 700	0,934	**QJ309-XL-TVP**
50	90	20	62 000	56 000	3 950	13 900	6 700	0,609	**QJ210-XL-MPA**
	110	27	115 000	92 000	6 800	11 300	5 400	1,39	**QJ310-XL-MPA**
55	100	21	81 000	76 000	5 300	8 200	5 800	0,697	**QJ211-XL-TVP**
	120	29	133 000	108 000	8 100	10 300	5 000	1,76	**QJ311-XL-MPA**
60	95	18	51 000	52 000	3 600	13 100	5 800	0,42	**QJ1012-XL-MPA**
	110	22	98 000	93 000	6 600	7 400	5 300	0,889	**QJ212-XL-TVP**
	130	31	152 000	126 000	9 200	9 500	4 700	2,2	**QJ312-XL-MPA**
65	120	23	106 000	104 000	7 200	10 300	4 900	1,27	**QJ213-XL-MPA**
	140	33	171 000	145 000	10 800	8 700	4 450	2,71	**QJ313-XL-MPA**
70	125	24	123 000	122 000	9 300	6 500	4 600	1,19	**QJ214-XL-TVP**
	150	35	198 000	165 000	11 800	8 100	4 200	3,29	**QJ314-XL-MPA**
75	130	25	129 000	130 000	9 300	6 200	4 450	1,34	**QJ215-XL-TVP**
	160	37	229 000	204 000	14 400	7 600	3 900	3,95	**QJ315-XL-N2-MPA**
80	140	26	136 000	137 000	9 700	8 600	4 250	1,84	**QJ216-XL-MPA**
	170	39	226 000	220 000	11 100	7 000	3 750	4,65	**QJ316-N2-MPA**
85	130	22	86 000	95 000	6 400	9 200	4 250	1,11	**QJ1017-XL-N2-MPA**
	150	28	158 000	160 000	11 100	8 000	4 050	2,3	**QJ217-XL-MPA**
	180	41	248 000	255 000	12 800	6 600	3 550	5,53	**QJ317-N2-MPA**

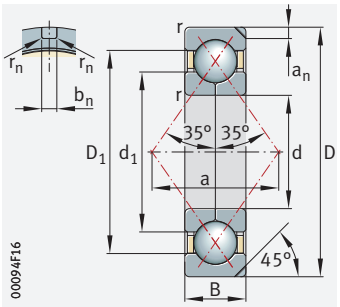
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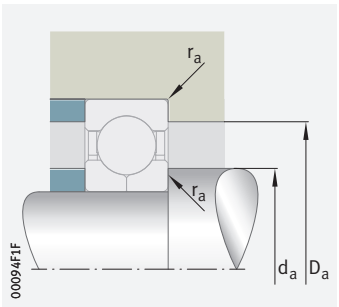
Mounting dimensions

Dimensions								Mounting dimensions		
d	r min.	D_1 ≈	d_1 ≈	a ≈	a_n	b_n	r_n	d_a min.	D_a max.	r_a max.
17	1	36,4	27,8	22	–	–	–	22,6	41,4	1
20	1,1	41,4	30,6	26	–	–	–	27	45	1
25	1	43,1	33,9	27	–	–	–	31	46	1
	1,1	49,5	37,5	31	–	–	–	32	55	1
30	1	50,7	40,4	32	–	–	–	36	56	1
	1,1	58	44	36	–	–	–	37	65	1
35	1,1	59,1	48	38	–	–	–	42	65	1
	1,5	64,8	50,8	41	–	–	–	44	71	1,5
40	1,1	66,8	53,7	42	–	–	–	47	73	1
	1,5	73,4	56,7	46	–	–	–	49	81	1,5
45	1,1	72	58,5	45	–	–	–	52	78	1
	1,5	81,7	63,4	51	–	–	–	54	91	1,5
50	1,1	76,4	63,7	49	–	–	–	57	83	1
	2	89,6	70,5	56	–	–	–	61	99	2
55	1,5	84,7	70,4	54	–	–	–	64	91	1,5
	2	97,8	77,2	61	–	–	–	66	109	2
60	1,1	83,1	72,4	54	–	–	–	66	89	1
	1,5	93	77,1	60	–	–	–	69	101	1,5
	2,1	106,9	84,2	67	–	–	–	72	118	2,1
65	1,5	101,5	84,2	65	–	–	–	74	111	1,5
	2,1	114,4	91	72	–	–	–	77	128	2,1
70	1,5	106,3	89,1	68	–	–	–	79	116	1,5
	2,1	123,6	97,7	77	–	–	–	82	138	2,1
75	1,5	111,5	93,9	72	–	–	–	84	121	1,5
	2,1	131	104,4	82	10,1	8,5	2	87	148	2,1
80	2	119,6	100,9	77	–	–	–	91	129	2
	2,1	140,8	110,7	88	10,1	8,5	2	92	158	2,1
85	1,1	114,8	101,1	75	5	6,5	0,5	91	124	1
	2	128,6	107,6	82	–	–	–	96	139	2
	3	148,7	117,9	93	11,7	10,5	2	99	166	2,5

Four point contact bearings



N2 variant



Mounting dimensions

d = 90 – 200 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤360|1.12 ➤360|1.13 X-life ➤355
			N	N	N	min^{-1}	min^{-1}	≈ kg	
90	160	30	189 000	198 000	12 900	4 950	3 750	2,35	**QJ218-XL-N2-TVP**
	190	43	265 000	285 000	13 300	6 300	3 350	6,31	**QJ318-N2-MPA**
95	145	24	106 000	121 000	7 600	8 200	3 850	1,56	**QJ1019-XL-N2-MPA**
	170	32	190 000	212 000	10 400	7 000	3 700	3,41	**QJ219-N2-MPA**
	200	45	285 000	315 000	14 500	5 900	3 250	7,45	**QJ319-N2-MPA**
100	180	34	224 000	241 000	11 500	6 600	3 550	4,02	**QJ220-N2-MPA**
	215	47	325 000	365 000	16 800	5 400	3 000	9,04	**QJ320-N2-MPA**
105	160	26	126 000	145 000	8 700	7 400	3 550	2,04	**QJ1021-XL-N2-MPA**
	190	36	233 000	255 000	12 000	6 200	3 450	4,81	**QJ221-N2-MPA**
110	170	28	138 000	184 000	8 100	6 900	3 350	2,52	**QJ1022-N2-MPA**
	200	38	249 000	285 000	12 700	5 900	3 350	5,66	**QJ222-N2-MPA**
	240	50	345 000	415 000	18 000	4 950	2 700	12,2	**QJ322-N2-MPA**
120	180	28	145 000	200 000	8 500	6 500	3 100	2,71	**QJ1024-N2-MPA**
	215	40	285 000	340 000	15 100	5 400	3 050	6,74	**QJ224-N2-MPA**
	260	55	385 000	485 000	19 900	4 550	2 480	15,6	**QJ324-N2-MPA**
130	230	40	295 000	370 000	15 800	5 100	2 800	7,66	**QJ226-N2-MPA**
	280	58	425 000	570 000	22 200	4 200	2 220	19,2	**QJ326-N2-MPA**
140	250	42	315 000	420 000	16 900	4 700	2 600	9,69	**QJ228-N2-MPA**
	300	62	470 000	660 000	25 500	3 900	2 030	23,2	**QJ328-N2-MPA**
150	225	35	205 000	295 000	11 200	5 100	2 650	6,17	**QJ1030-N2-MPA**
	270	45	350 000	485 000	18 900	4 350	2 360	12,2	**QJ230-N2-MPA**
	320	65	510 000	730 000	26 000	3 650	1 870	28	**QJ330-N2-MPA**
160	240	38	231 000	335 000	12 300	4 750	2 600	6,35	**QJ1032-N2-MPA**
	290	48	370 000	530 000	20 500	4 050	2 200	15,3	**QJ232-N2-MPA**
170	260	42	280 000	430 000	15 200	4 350	2 340	8,79	**QJ1034-N2-MPA**
	310	52	420 000	630 000	23 500	3 750	2 010	18,6	**QJ234-N2-MPA**
180	280	46	340 000	510 000	19 200	4 050	2 140	11,4	**QJ1036-N2-MPA**
	320	52	435 000	680 000	24 600	3 600	1 870	19,6	**QJ236-N2-MPA**
190	290	46	345 000	540 000	19 800	3 900	2 010	11,4	**QJ1038-N2-MPA**
200	310	51	390 000	620 000	22 000	3 600	1 890	15	**QJ1040-N2-MPA**

medias *https://www.schaeffler.de/std/1F9A*

Dimensions								Mounting dimensions		
d	r min.	D_1 ≈	d_1 ≈	a ≈	a_n	b_n	r_n	d_a min.	D_a max.	r_a max.
90	2	136,1	114,3	88	8,1	6,5	1	101	149	2
	3	157,1	124,5	98	11,7	10,5	2	104	176	2,5
95	1,5	128,1	112,9	84	5	6,5	0,5	102	138	1,5
	2,1	144,4	121	93	8,1	6,5	1	107	158	2,1
	3	165,4	131,2	103	11,7	10,5	2	109	186	2,5
100	2,1	153,6	127,7	98	10,1	8,5	2	112	168	2,1
	3	176,6	139	110	11,7	10,5	2	114	201	2,5
105	2	141,5	124,6	93	6,5	6,5	0,5	114	151	2
	2,1	161,6	134,8	103	10,1	8,5	2	117	178	2,1
110	2	149,8	131,3	98	6,5	6,5	0,5	119	161	2
	2,1	169,8	141,7	109	10,1	8,5	2	122	188	2,1
	3	195,5	156,5	123	11,7	10,5	2	124	226	2,5
120	2	159,2	141,3	105	6,5	6,5	0,5	129	171	2
	2,1	183,7	152,8	117	11,7	10,5	2	132	203	2,1
	3	210,6	169,9	133	11,7	10,5	2	134	246	2,5
130	3	196,2	165,4	127	11,7	10,5	2	144	216	2,5
	4	228	184,1	144	12,7	10,5	2	147	263	3
140	3	210,5	180	137	11,7	10,5	2	154	236	2,5
	4	243	197,5	154	12,7	10,5	2	157	283	3
150	2,1	199,4	176,8	131	8,1	6,5	1	160,2	214,8	2,1
	3	226,7	193,8	147	11,7	10,5	2	164	256	2,5
	4	261	211,2	165	12,7	10,5	2	167	303	3
160	2,1	212,8	188,5	140	10,1	8,5	2	170	230	2,1
	3	240	208,1	158	12,7	10,5	2	174	276	2,5
170	2,1	229,5	201,9	151	11,7	10,5	2	180,2	249,8	2,1
	4	260,5	221,5	168	12,7	10,5	2	187	293	3
180	2,1	245	215,5	161	11,7	10,5	2	190,2	269,8	2,1
	4	269	231	175	12,7	10,5	2	197	303	3
190	2,1	256,2	225,3	168	11,7	10,5	2	200,2	279,8	2,1
200	2,1	271,5	238,9	179	12,7	10,5	2	210,2	299,8	2,1

Self-aligning ball bearings



Matrix for bearing preselection 373

1 Self-aligning ball bearings 374

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Self-aligning ball bearings with cylindrical or tapered bore _____ *390*
Self-aligning ball bearings with extended inner ring _____ *404*
Self-aligning ball bearings with adapter sleeve _____ *406*

Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

+++ extremely suitable
++ highly suitable
+ suitable
(+) suitable with restrictions
– not suitable/not applicable
✓ available

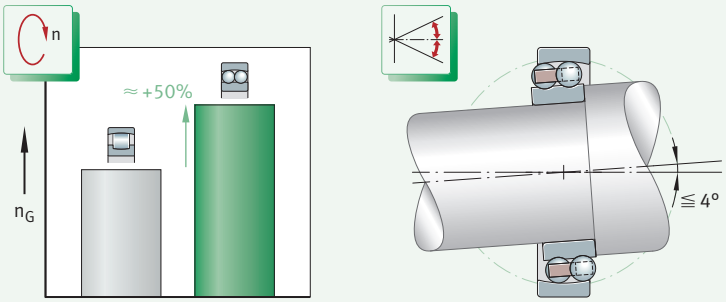
Design features and suitability			Self-aligning ball bearings			
			cylindrical or tapered bore	with extended inner ring	with adapter sleeve	detailed information ➤ 374
Load carrying capacity	radial		++	++	++	➤ 376|1.2
	axial, one direction		(+)	(+)	(+)	➤ 376|1.2
	axial, both directions		(+)	(+)	(+)	➤ 376|1.2
	moments		–	–	–	
Compensation of angular misalignments	static		+++	+++	+++	➤ 376|1.3
	dynamic		+++	+++	+++	➤ 376|1.3
Bearing design	cylindrical bore		✓	✓	✓	➤ 374|1.1
	tapered bore		✓	–	–	➤ 374|1.1
	separable		–	–	–	➤ 387|1.17
Lubrication	greased		✓[1]	–	✓[1]	➤ 377|1.4
Sealing	open		✓	✓	✓	➤ 377|1.5
	non-contact		–	–	–	
	contact		✓	–	✓	➤ 377|1.5
Operating temperature in °C	from to		–30 +150[2]	–30 +150	–30 +150[2]	➤ 378|1.8
Suitability for	high speeds		+	+	+	➤ 378|1.6
	high running accuracy		–	–	–	➤ 380|1.11 ➤ 115
	low-noise running		(+)	(+)	(+)	➤ 378|1.7 ➤ 27
	high rigidity		(+)	(+)	(+)	➤ 54
	reduced friction		++	++	++	➤ 56
	length compensation within bearing		–	–	–	
	non-locating bearing arrangement		+	+	+	➤ 141
	locating bearing arrangement		+	+	+	➤ 141
X-life design			–	–	–	
Bearing bore[3] d in mm	from to		5 150	20 60	17 100	➤ 390
Product tables	from page ➤		390	404	406	

1) Sealed bearings only
2) Valid for open bearings with brass cage
3) For bearings with adapter sleeve: inside diameter of adapter sleeve

1 Self-aligning ball bearings

Self-aligning ball bearings are particularly suitable:
- if there is skewing between the outer and inner ring (for the compensation of angular misalignments) ➤*376|1.3*
- for bearing arrangements with high radial loads ➤*376|1.2*
- for higher speeds on account of their point contact, than barrel roller bearings with line contact
- where bearings with the above-mentioned characteristics are expected to run more quietly and at lower temperatures, even at high speeds

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*373*.



1 *Self-aligning ball bearing: speed comparison with barrel roller bearing, compensation of misalignments*

n_G = *limiting speed*

1.1 Bearing design

✎ *Design variants*

Self-aligning ball bearings are available as:
- bearings of basic design ➤*375|2*
- bearings with extended inner ring and locating slot ➤*375|3*
- bearings with adapter sleeve ➤*375|4*
- bearings with ball projection ➤*376|5*

Bearings of basic design

✎ *The outer ring has a curved raceway*

Self-aligning ball bearings are double row, self-retaining radial ball bearings, which are part of the group of self-aligning bearings. The outer ring has a single concave raceway for the two rows of balls. As a result, the bearings permit the compensation of static and dynamic angular misalignments (skewing between the inner and outer ring) within certain limits ➤*376|1.3*. The inner ring has two formed raceway grooves in which the rolling elements run. Solid cages made from polyamide PA66 or brass are used ➤*379|2*.

✎ *The bore is cylindrical or tapered*

Bearings of basic design are supplied with a cylindrical bore; self-aligning ball bearings of series 12, 13, 22 and 23 are also available with a tapered bore ➤*375|2*.

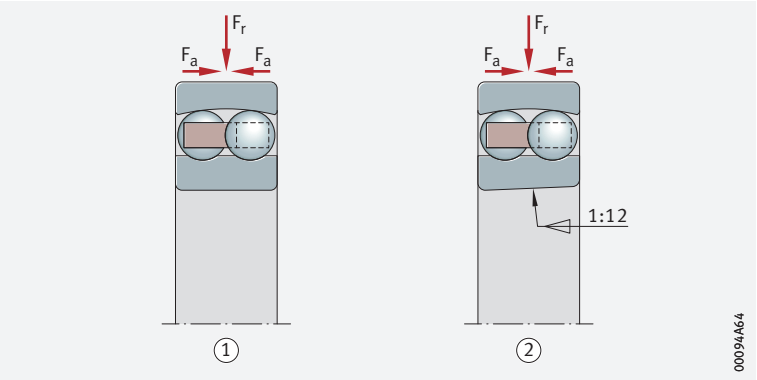
DIN ISO

Bearings with a tapered bore have a bore taper of 1:12 and the suffix K ➤*381|5*.

2
Self-aligning ball bearings of basic design

F_r = *radial load*
F_a = *axial load*

① *Self-aligning ball bearing with cylindrical bore, open*
② *Self-aligning ball bearing with tapered bore, open, bore taper 1:12*



Bearings with extended inner ring and locating slot

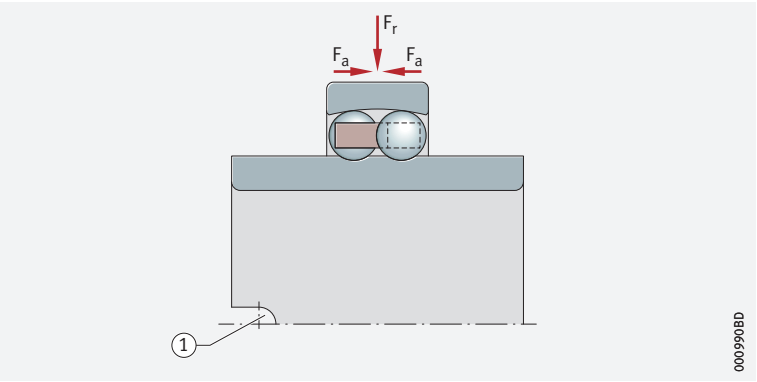
Suitable for simple bearing arrangements

Self-aligning ball bearings of series 112 have an extended inner ring with cylindrical bore on both sides and a slot on one side of the inner ring ➤*375*|*3*. These bearings are particularly suitable for simple bearing arrangements with conventional shafts. Due to the bearing bore tolerance J7, mounting and dismounting of this type is very simple. The slot is used to locate the bearings in an axial direction by means of a grub screw; ➤*384*|*8*.

3
Self-aligning ball bearing with extended inner ring and locating slot

F_r = *radial load*
F_a = *axial load*

① *Locating slot*



Bearings with adapter sleeve

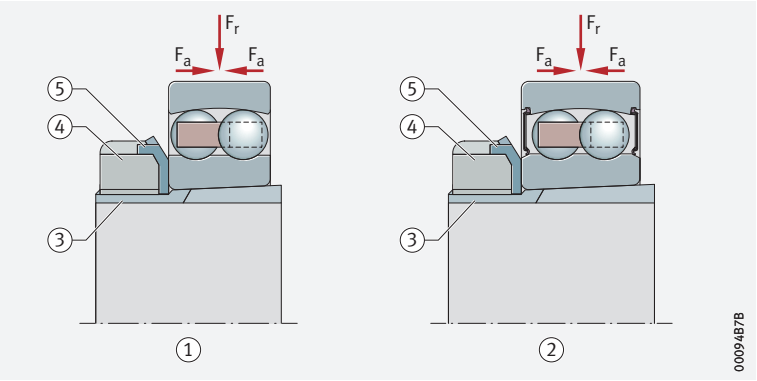
Ready-to-fit bearing mounting kits facilitate the ordering and mounting of self-aligning ball bearings

Complete bearing mounting kits are also available for use in locating self-aligning ball bearings with a tapered bore on a cylindrical shaft journal. These units comprise the bearing, slotted adapter sleeve, tab washer and locknut (series 12..-K + H, 13..-K + H, 22..-K + H, 23..-K + H, 22..-K-2RS + H) ➤*375*|*4*. Adapter sleeves allow bearings to be located on smooth and stepped shafts. The adapter sleeves must also be stated when placing the order. Ordering example ➤*381*|*7*.

4
Self-aligning ball bearings with adapter sleeve

F_r = *radial load*
F_a = *axial load*

① *Self-aligning ball bearing, open*
② *Self-aligning ball bearing, lip seal on both sides*
③ *Adapter sleeve*
④ *Locknut*
⑤ *Tab washer*

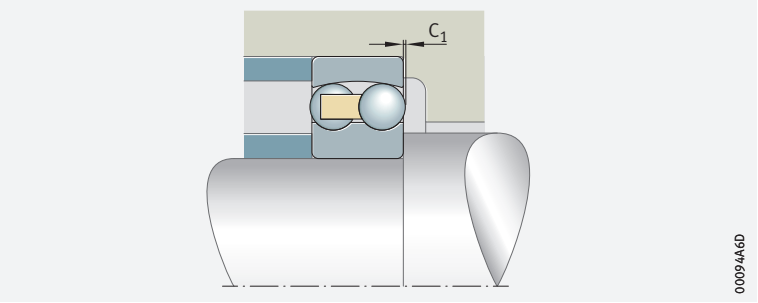


Bearings with ball projection

✎ The dimension C_1 must be observed

In some self-aligning ball bearings with a brass cage (bearings with the suffix M), the balls project to a certain extent at the sides ➤376|5.

The projection is marked C_1 in the product tables. This must be taken into consideration when defining the dimensions for the adjacent parts.



5
Self-aligning ball bearing with ball projection

C_1 = *ball projection*

1.2 Load carrying capacity

✎ Suitable for high radial and low axial loads

In addition to high radial forces, self-aligning ball bearings also support low axial forces from both directions ➤375|2 to ➤375|4. Due to the point contact with which the rolling elements are in contact with the raceways, the radial load carrying capacity of the bearings is lower than for barrel roller bearings with line contact.

Axial load carrying capacity of bearings with adapter sleeve

Where bearings with adapter sleeves are located on a smooth shaft without a fixed stop (e.g. rigid shoulder), their axial load carrying capacity is dependent on the friction between the shaft and the sleeve.

If there is any doubt about the axial load carrying capacity of the location method, please consult Schaeffler.

1.3 Compensation of angular misalignments

✎ Self-aligning ball bearings compensate dynamic and static angular misalignments

Due to the concave rolling element raceway in the outer ring, self-aligning ball bearings are capable of angular adjustment. As a result, they permit skewing between the outer and inner ring within certain limits, without causing damage to the bearings, and can thus compensate misalignments, shaft deflections and housing deformations.

Permissible adjustment angle

With a rotating inner ring, self-aligning ball bearings can swivel up to 4° from their central position

Under normal operating conditions and with a rotating inner ring, self-aligning ball bearings can swivel up to 4° from their central position, whereas sealed bearings can swivel up to 1,5°. The extent to which these values can be used in practice is, however, essentially dependent on the design of the bearing arrangement.

If the outer ring rotates or the inner ring undergoes tumbling motion, the angular adjustment facility is considerably smaller. In such cases, please consult Schaeffler.

1.4 Lubrication

Greased bearings are maintenance-free

Sealed self-aligning ball bearings are lubricated with a high quality lithium soap grease with a mineral oil base, which has good anti-corrosion characteristics. The grease filling is measured so that it is sufficient for the entire life of the bearing. As a result, these bearings are maintenance-free.

Do not wash greased bearings out prior to mounting. If mounting is carried out using thermal tools, the bearings should not be heated to a temperature in excess of +80 °C, taking account of the grease filling and seal material. If higher heating temperatures are required, it must be ensured that the permissible upper temperature limits for grease and seals are not exceeded.

Schaeffler recommends the use of induction heating devices for heating purposes ➤*388*.

Lubrication for ungreased bearings

Open bearings are not greased. They can be lubricated from the end faces using oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

Also available with lip seals

Self-aligning ball bearings of series 22 and 23 are also available with contact seals on both sides of the bearing ➤*375*|*4*. The integration of such seals into the bearing provides a compact, economical and reliable solution for the sealing of bearing arrangements. In order that the highest possible sealing effect can still be achieved with minimum friction, the seal lips are in contact with the ground opposing running surface of the inner ring under light pressure. The sealing material used is the proven, oil-resistant and wear-resistant elastomer material NBR. Sealed self-aligning ball bearings have the suffix 2RS ➤*381*|*5*.

Sealing can be achieved in the adjacent construction, if the bearings are open

In the case of unsealed bearings, sealing of the bearing position must be carried out in the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

1.6 Speeds

✎ *Speeds in the product tables*

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

The values given in the product tables are valid for oil lubrication in the case of bearings without seals and for grease lubrication where bearings are supplied greased and with seals.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

✎ *Values for grease lubrication*

For the grease lubrication of bearings without seals or shields, 85% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 65% of the value stated in the product tables is permissible in each case.

Reference speeds

✎ *$n_{\vartheta r}$ is used to calculate n_ϑ*

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

✎ *Bearings with contact seals*

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** *https://medias.schaeffler.com*

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals

Possible operating temperatures of self-aligning ball bearings ➤*378* | ▦ *1*.

▦ ***1***
Permissible temperature ranges

Operating temperature	Open self-aligning ball bearings		Sealed self-aligning ball bearings
	with brass cage	with polyamide cage PA66	
	–30 °C to +150 °C	–30 °C to +120 °C	–30 °C to +100 °C, limited by the lubricant and seal material

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Solid cages made from brass and polyamide PA66 are used as standard

Standard cages and additional cage designs for self-aligning ball bearings ➤*379*|▦*2*. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with brass or sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

▦*2*
Cage, cage suffix, bore code

Bearing series	Solid cage made from polyamide PA66	Solid brass cage	
	TVH	M	
	standard	standard	also available for
	Bore code		
10	8	–	–
12	up to 18	from 19	–
13	up to 13	from 14	03
22	up to 16, 18	17, from 19	12, 14
23	up to 13	from 14	05 to 10, 12, 13
112	04 to 12	–	–

1.10 Internal clearance

Radial internal clearance – bearings with cylindrical bore

The standard is CN

Self-aligning ball bearings with cylindrical bore are manufactured as standard with radial internal clearance CN (normal) ➤*379*|▦*3*. CN is not stated in the designation.

Certain sizes are also available by agreement with the larger internal clearance C3.

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤*379*|▦*3*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦*3*
Radial internal clearance of self-aligning ball bearings with cylindrical bore

Nominal bore diameter d mm		Radial internal clearance CN (Group N) µm		C3 (Group 3) µm	
over	incl.	min.	max.	min.	max.
–	6	5	15	10	20
6	10	6	17	12	25
10	14	6	19	13	26
14	18	8	21	15	28
18	24	10	23	17	30
24	30	11	24	19	35
30	40	13	29	23	40
40	50	14	31	25	44
50	65	16	36	30	50
65	80	18	40	35	60
80	100	22	48	42	70
100	120	25	56	50	83
120	140	30	68	60	100
140	160	35	80	70	120

Radial internal clearance – bearings with tapered bore

✎ *The standard is C3*

Self-aligning ball bearings with tapered bore are manufactured as standard with the larger radial internal clearance C3 ➤*380*|▦*4*.

Certain sizes are also available by agreement with internal clearance CN (normal).

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤*380*|▦*4*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦ **4**
Radial internal clearance of self-aligning ball bearings with tapered bore

Nominal bore diameter d mm		Radial internal clearance			
		CN (Group N) µm		C3 (Group 3) µm	
over	incl.	min.	max.	min.	max.
18	24	13	26	20	33
24	30	15	28	23	39
30	40	19	35	29	46
40	50	22	39	33	52
50	65	27	47	41	61
65	80	35	57	50	75
80	100	42	68	62	90
100	120	50	81	75	108
120	140	60	98	90	130
140	160	65	110	100	150

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of self-aligning ball bearings correspond to DIN 630:2011, with the exception of bearing series 112. Nominal dimensions of self-aligning ball bearings ➤*390*|▦.

✎ *Series 112*

The dimensions of self-aligning ball bearings with extended inner ring (bearing series 112) correspond to DIN 630-2, which was withdrawn in 1993. Nominal dimensions of bearings ➤*404*|▦.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137*|*7.11*. Nominal value of chamfer dimension ➤*390*|▦.

Tolerances

The tolerances for the dimensional and running accuracy of self-aligning ball bearings correspond to tolerance class Normal in accordance with ISO 492:2014, except for the bearing bore of bearing series 112, which is manufactured to tolerance class J7. Tolerance values in accordance with ISO 492 ➤*124*|▦*8*.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

5
Suffixes and corresponding descriptions

Suffix	Description of suffix	
C3	Radial internal clearance C3 (larger than normal)	Standard for bearings with tapered bore
CN	Radial internal clearance CN (normal)	Special design for bearings with tapered bore, available by agreement
K	Tapered bore	Standard
M	Solid brass cage	Standard, cage material dependent on bearing series and bore code
TVH	Solid cage made from glass fibre reinforced polyamide PA66	
2RS	Contact seal on both sides	Dependent on bearing series

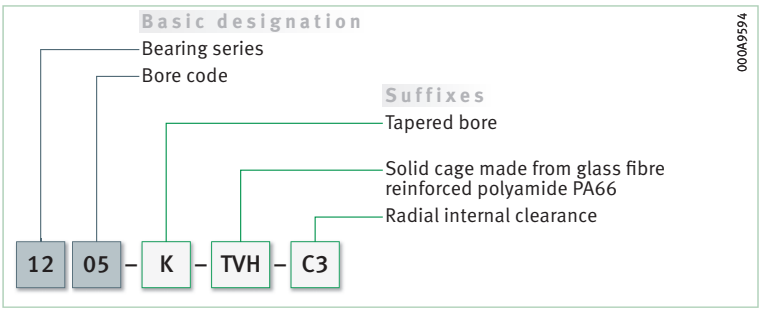
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

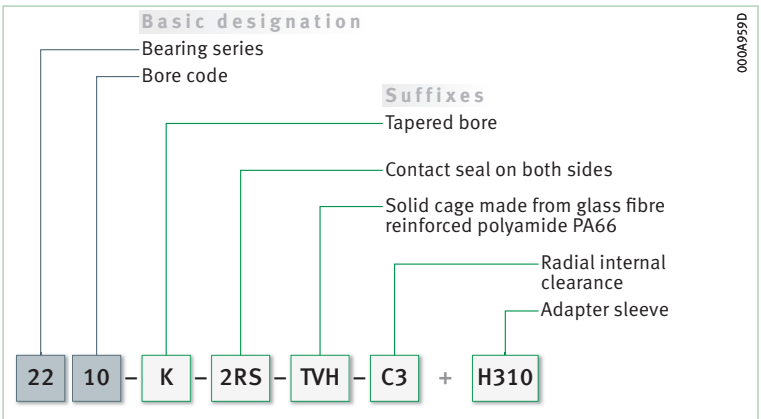
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ➤*381*|*6* and ➤*381*|*7*. The composition of designations is subject to DIN 623-1 ➤*102*|*10*.

6
Self-aligning ball bearing with tapered bore: designation structure



7
Self-aligning ball bearing with tapered bore and adapter sleeve: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

✎ *P is a substitute force for combined load and various load cases*

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ *$F_a/F_r \leqq e$ or $F_a/F_r > e$*

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factor e ➤*382*| *1* and ➤*382*| *2*.

1 Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r + Y_1 \cdot F_a$$

2 Equivalent dynamic load

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}65 \cdot F_r + Y_2 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load
e, Y_1, Y_2	–	Factors ➤*390*|

Equivalent static bearing load

For self-aligning ball bearings subjected to static load ➤*382*| *3*.

3 Equivalent static load

$$P_0 = F_{0r} + Y_0 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load)
Y_0	–	Axial load factor ➤*390*|

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*382*| *4*.

4 Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/100$ is required*

In order that no slippage occurs between the contact partners, the self-aligning ball bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/100$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical or tapered seating surface ➤*384*|*8* to ➤*385*|*11*. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤*385*|*6* to ➤*386*|*8*.

Radial location – fit recommendations for bearings with cylindrical bore

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤*152*|*6* and ➤*160*|*7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤*146*
- conditions of rotation ➤*147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*149*|*2*
- shaft fits ➤*152*|*6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*150*|*4*
- housing fits ➤*160*|*7*
- shaft tolerances for adapter sleeves and withdrawal sleeves ➤*168*|*8*

Axial location – location methods for bearings with cylindrical bore

The bearings must also be securely located in an axial direction

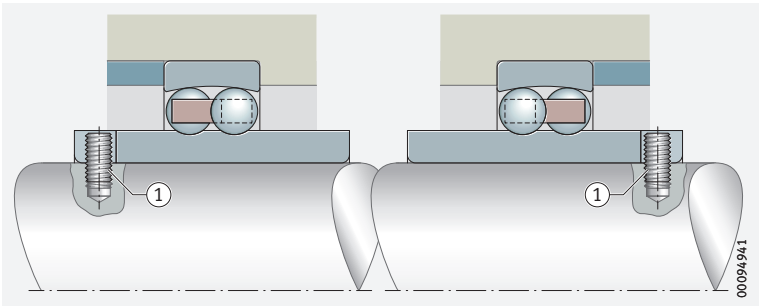
As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings, retaining rings, adapter and withdrawal sleeves etc., are fundamentally suitable.

Axial location – bearing series 112

Simple location by means of a grub screw

Bearings of series 112 are axially located by means of a grub screw, which engages in the slot in the bearing inner ring ➤*384*|*8*. The grub screw also prevents the inner ring creeping on the shaft.

If a shaft is to be supported by two bearings, the slots in the inner ring must either be arranged on the sides of the bearings facing towards or away from each other ➤*384*|*8*.



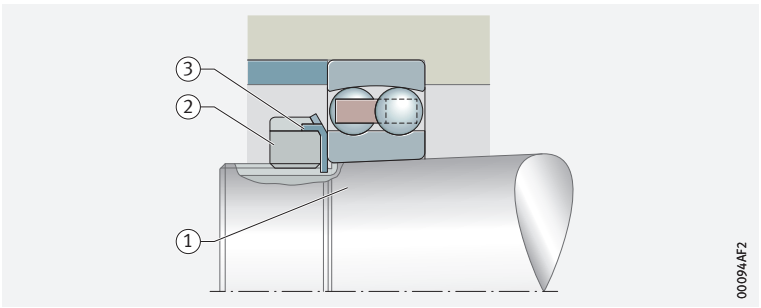
8
Axial location of bearing series 112 using grub screw and arrangement of self-aligning ball bearings, where a shaft is supported by two bearings

① *Grub screw*

Axial location – bearings with tapered bore

Location by means of locknut and tab washer

If a bearing with a tapered bore is mounted directly on a tapered journal, the bearing can be axially located with ease using a locknut and tab washer ➤*384*|*9*.



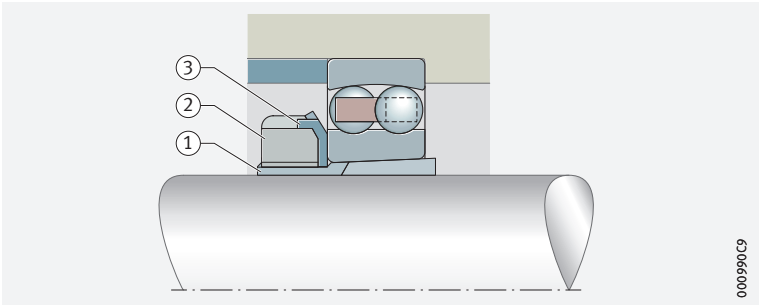
9
Self-aligning ball bearing with tapered bore, mounted directly on the tapered shaft journal

① *Tapered journal with fixing thread*
② *Locknut*
③ *Tab washer*

Location of bearings by means of adapter sleeve

Mounting can be carried out quickly and reliably by means of wrench sets from Schaeffler

Self-aligning ball bearings with a tapered bore can be located easily and with operational liability on smooth or stepped cylindrical shafts by means of an adapter sleeve ➤*384*|*10*. The adapter sleeve does not need to be secured on the shaft by any additional means. The bearings can be positioned at any point on smooth shafts. Axial load carrying capacity of bearing arrangements by means of adapter sleeve connection ➤*376*|*1.2*.



10
Self-aligning ball bearing with adapter sleeve located on smooth shaft

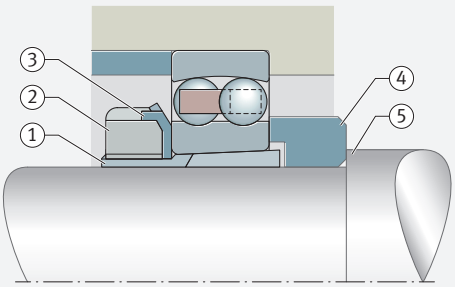
① *Adapter sleeve*
② *Locknut*
③ *Tab washer*

Location by means of adapter sleeve, axial abutment by means of a support ring

If very high axial forces are present, a support ring can also be used to provide axial abutment ➤*385*|◻*11*. In this instance, the mounting dimensions of the support ring B_a and d_b in the product tables must be observed ➤*390*|▦.

◻*11*
Stepped shaft, axial abutment by means of a support ring

① *Adapter sleeve*
② *Locknut*
③ *Tab washer*
④ *Support ring*
⑤ *Shaft shoulder*



Dimensional, geometrical and running accuracy of cylindrical bearing seats

✎*A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat*

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For self-aligning ball bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤*385*|▦*6*. Tolerances t_1 to t_3 in accordance with ➤*170*|◻*11*. Numerical values for IT grades ➤*385*|▦*7*.

▦*6*
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	

▦*7*
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm						
	over	**18**	**30**	**50**	**80**	**120**	**180**	**250**
	incl.	**30**	**50**	**80**	**120**	**180**	**250**	**315**
	Values in µm							
IT4	6		7	8	10	12	14	16
IT5	9		11	13	15	18	20	23
IT6	13		16	19	22	25	29	32
IT7	21		25	30	35	40	46	52

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*386*|▦*8*.

▦*8*
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Tolerances for tapered bearing seats

Specifications for tapered bearing seats

For bearings located directly on a tapered shaft journal, the further information in Technical principles must be observed ➤*173*|🗗*12*.

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders ➤*390*|▦. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Suitable bearing housings for self-aligning ball bearings

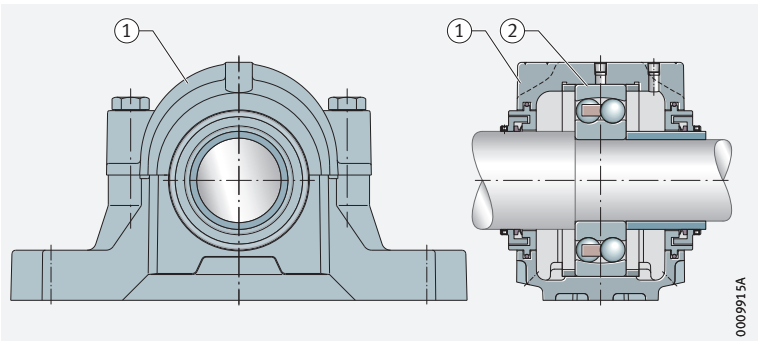
A large range of housings is available

For economical, operationally reliable and easily interchangeable bearing arrangement units, the self-aligning ball bearings can also be combined with Schaeffler bearing housings ➤*386*|🗗*12*. These easy-to-fit units fulfil all of the requirements for modern machine and plant designs with favourable maintenance-related characteristics.

Due to the large number of application areas, an extensive range of bearing housings is available for bearings with cylindrical and tapered bores. These include split and unsplit plummer block housings, take-up housings, flanged housings and housings for specific industrial and railway applications. Detailed information on bearing housings can be found in publication GK 1 *https://www.schaeffler.de/std/1D54*. This book can be ordered from Schaeffler.

🗗*12*
Split plummer block housing with a self-aligning ball bearing

① *Split plummer block housing*
② *Self-aligning ball bearing*



1.17 Mounting and dismounting

The mounting and dismounting options for self-aligning ball bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Ensure that the bearings are not damaged during mounting

Self-aligning ball bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Mounting of bearings with a tapered bore

Suitable methods

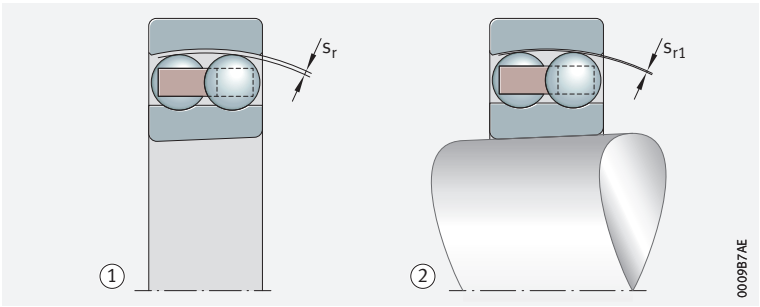
Bearings with a tapered bore are mounted with a tight fit on the shaft or adapter and withdrawal sleeve. The measurement of the reduction in radial internal clearance or of the axial drive-up distance of the inner ring on the tapered bearing seat serves as an indication of the tight fit.

Measuring the reduction in radial internal clearance

The measurement is usually carried out with a feeler gauge

The reduction in radial internal clearance is the difference between the radial internal clearance before mounting and the bearing clearance after mounting of the bearing ➤387|13. The radial internal clearance must be measured first. During pressing on, the radial clearance (bearing clearance) must be checked until the necessary reduction in the radial internal clearance and thus the required tight fit is achieved.

13 *Reduction in radial internal clearance*



s_r = *radial internal clearance before mounting*

s_{r1} = *radial internal clearance after mounting*

$s_r - s_{r1}$ = *reduction in radial internal clearance*

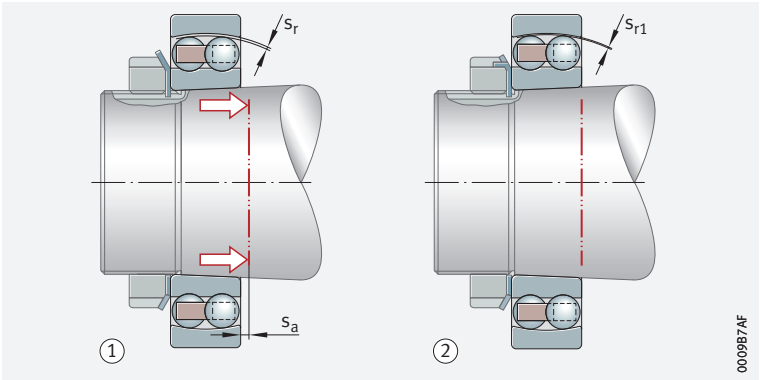
① *Before mounting*

② *After mounting*

Measuring the axial drive-up distance

The axial drive-up distance can also be measured in place of the reduction in radial internal clearance ➤387|14.

14 *Axial drive-up distance*



s_a = *axial press-on distance (axial drive-up distance of the bearing)*

s_r = *radial internal clearance*

s_{r1} = *radial internal clearance after pressing on*

$s_r - s_{r1}$ = *reduction in radial internal clearance*

① *Before pressing on*

② *After pressing on*

The malfunction-free operation of bearings presupposes that these have been mounted correctly. An insufficient operating clearance or inadequately tight fit on the shaft generally leads to bearing damage.

If there is any uncertainty regarding the practical application of both methods, Schaeffler must always be consulted.

The mounting of self-aligning ball bearings is also described in the Schaeffler publication BA 28. This BA publication can be requested from Schaeffler.

✎ Rolling bearings must be handled with great care

Schaeffler Mounting Handbook

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

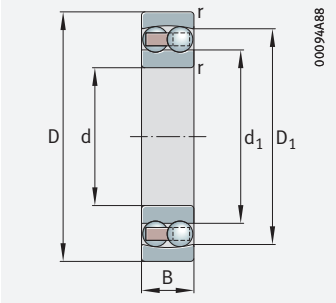
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

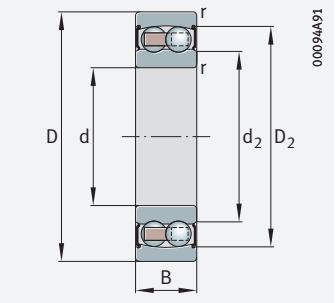
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

Self-aligning ball bearings

With cylindrical or tapered bore



Cylindrical bore

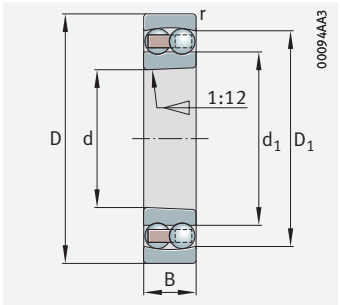


Cylindrical bore with seal 2RS

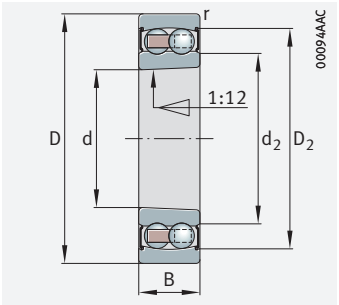
d = 5 – 20 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*381|1.12* ➤*381|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
5	19	6	2 600	480	30,5	41 500	24 500	0,01	**135-TVH**
6	19	6	2 600	480	30,5	41 500	30 500	0,009	**126-TVH**
7	22	7	2 750	560	35,5	39 000	26 500	0,014	**127-TVH**
8	22	7	2 750	560	35,5	39 000	27 000	0,014	**108-TVH**
9	26	8	3 950	810	51	33 500	24 100	0,022	**129-TVH**
10	30	9	5 700	1 190	76	29 500	22 100	0,034	**1200-TVH**
	30	14	5 700	1 190	76	16 500	–	0,053	**2200-2RS-TVH**
	30	14	8 800	1 740	111	25 500	26 000	0,045	**2200-TVH**
12	32	10	5 700	1 270	80	28 000	21 300	0,041	**1201-TVH**
	32	14	5 700	1 270	80	14 700	–	0,058	**2201-2RS-TVH**
	32	14	9 400	1 940	123	24 200	23 300	0,05	**2201-TVH**
	37	12	9 800	2 160	137	22 300	16 200	0,067	**1301-TVH**
15	35	11	7 700	1 750	111	23 800	19 100	0,048	**1202-TVH**
	35	14	7 700	1 750	111	13 300	–	0,061	**2202-2RS-TVH**
	35	14	9 600	2 100	133	22 200	19 600	0,057	**2202-TVH**
	42	17	9 800	2 280	145	11 200	–	0,114	**2302-2RS-TVH**
	42	17	17 400	3 850	244	17 200	15 600	0,111	**2302-TVH**
17	40	12	8 100	2 010	128	21 800	17 400	0,073	**1203-TVH**
	40	16	8 100	2 010	128	11 300	–	0,098	**2203-2RS-TVH**
	40	16	11 800	2 750	176	19 100	17 400	0,088	**2203-TVH**
	47	14	12 900	3 200	202	17 800	13 300	0,065	**1303-TVH**
	47	19	12 900	3 200	202	10 100	–	0,175	**2303-2RS-TVH**
	47	19	13 900	3 200	203	17 000	14 900	0,155	**2303-TVH**
20	47	14	10 100	2 600	166	18 100	15 300	0,116	**1204-K-TVH-C3**
	47	14	10 100	2 600	166	18 100	15 300	0,118	**1204-TVH**
	47	18	10 100	2 600	166	9 400	–	0,151	**2204-2RS-TVH**
	47	18	14 700	3 550	225	16 300	15 600	0,134	**2204-TVH**
	52	15	12 700	3 350	212	16 100	11 600	0,163	**1304-TVH**
	52	21	12 700	3 350	212	8 500	–	0,23	**2304-2RS-TVH**
	52	21	17 600	4 300	270	15 000	13 800	0,206	**2304-TVH**

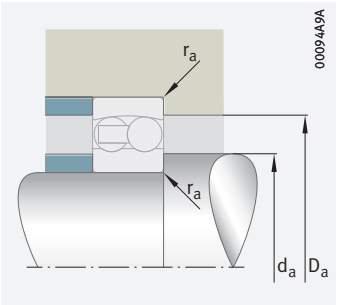
medias *https://www.schaeffler.de/std/1F9A*



Tapered bore



Tapered bore with seal 2RS

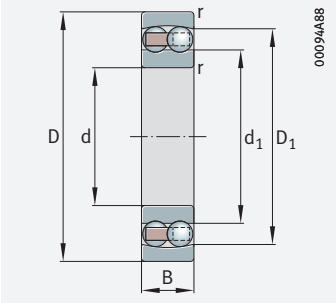


Mounting dimensions

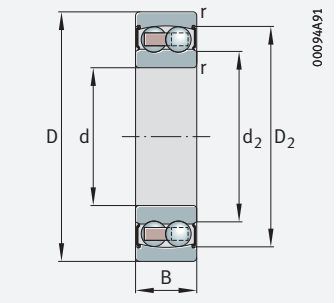
Dimensions						Mounting dimensions			Calculation factors			
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈	≈	≈	min.	max.	max.				
5	0,3	14,5	–	10,1	–	7,4	16,6	0,3	0,35	1,82	2,82	1,91
6	0,3	14,7	–	10,1	–	8,4	16,6	0,3	0,35	1,82	2,82	1,91
7	0,3	17,1	–	12,4	–	9,4	19,6	0,3	0,33	1,92	2,97	2,01
8	0,3	16,8	–	12,4	–	10,6	19,4	0,3	0,33	1,92	2,97	2,01
9	0,6	20	–	14,5	–	13,2	21,8	0,6	0,32	1,95	3,01	2,04
10	0,6	23,3	–	16,3	–	14,2	25,8	0,6	0,32	1,95	3,02	2,05
	0,6	–	25,2	–	14,1	14,2	25,8	0,6	0,32	1,95	3,02	2,05
	0,6	24	–	15,1	–	14,2	25,8	0,6	0,58	1,09	1,69	1,14
12	0,6	25,1	–	18,2	–	16,2	27,8	0,6	0,37	1,69	2,62	1,77
	0,6	–	27,2	–	16,2	16,2	27,8	0,6	0,37	1,69	2,62	1,77
	0,6	25,9	–	17,1	–	16,2	27,8	0,6	0,53	1,2	1,85	1,25
	1	29,7	–	20,3	–	17,6	31,4	1	0,35	1,8	2,79	1,89
15	0,6	28,8	–	20,2	–	19,2	30,8	0,6	0,34	1,86	2,88	1,95
	0,6	–	30,2	–	19	19,2	30,8	0,6	0,34	1,86	2,88	1,95
	0,6	29,2	–	20,3	–	19,2	30,8	0,6	0,46	1,37	2,13	1,44
	1	–	34,9	–	23,9	20,6	36,4	1	0,35	1,79	2,77	1,88
	1	34,4	–	22,5	–	20,6	36,4	1	0,51	1,23	1,91	1,29
17	0,6	32	–	23,7	–	21,2	35,8	0,6	0,33	1,93	2,99	2,03
	0,6	–	34,3	–	21,6	21,2	35,8	0,6	0,33	1,93	2,99	2,03
	0,6	33,9	–	23,9	–	21,2	35,8	0,6	0,46	1,37	2,12	1,43
	1	37	–	26,7	–	22,6	41,4	1	0,32	1,94	3	2,03
	1	–	39,4	–	23,9	22,6	41,4	1	0,32	1,94	3	2,03
	1	37,3	–	26,2	–	22,6	41,4	1	0,53	1,19	1,85	1,25
20	1	37,8	–	29,2	–	25,6	41,4	1	0,28	2,24	3,46	2,34
	1	37,8	–	29,2	–	25,6	41,4	1	0,28	2,24	3,46	2,34
	1	–	41	–	25,8	25,6	41,4	1	0,28	2,24	3,46	2,34
	1	39,1	–	28	–	25,6	41,4	1	0,44	1,45	2,24	1,51
	1,1	41,5	–	31,6	–	27	45	1	0,29	2,17	3,35	2,27
	1,1	–	44,4	–	27,2	27	45	1	0,29	2,17	3,35	2,27
	1,1	41,2	–	29,1	–	27	45	1	0,51	1,23	1,9	1,29

Self-aligning ball bearings

With cylindrical or tapered bore



Cylindrical bore

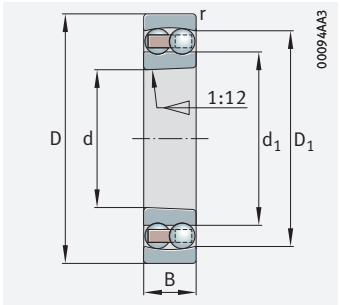


Cylindrical bore with seal 2RS

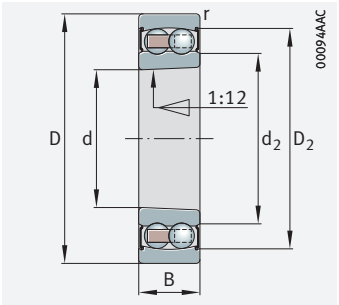
d = 25 – 35 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*381|1.12* ➤*381|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
25	52	15	12 300	3 300	209	15 500	13 400	0,135	**1205-K-TVH-C3**
	52	15	12 300	3 300	209	15 500	13 400	0,138	**1205-TVH**
	52	18	12 300	3 300	209	8 100	–	0,161	**2205-2RS-TVH**
	52	18	12 300	3 300	209	8 100	–	0,157	**2205-K-2RS-TVH-C3**
	52	18	17 300	4 450	285	14 400	13 400	0,152	**2205-K-TVH-C3**
	52	18	17 300	4 450	285	14 400	13 400	0,156	**2205-TVH**
	62	17	18 300	5 000	320	12 900	10 000	0,254	**1305-K-TVH-C3**
	62	17	18 300	5 000	320	12 900	10 000	0,258	**1305-TVH**
	62	24	18 300	5 000	320	7 000	–	0,367	**2305-2RS-TVH**
	62	24	25 000	6 600	420	12 200	11 900	0,328	**2305-K-TVH-C3**
	62	24	25 000	6 600	420	12 200	11 900	0,335	**2305-TVH**
30	62	16	15 900	4 650	295	13 100	11 400	0,217	**1206-K-TVH-C3**
	62	16	15 900	4 650	295	13 100	11 400	0,221	**1206-TVH**
	62	20	15 900	4 650	295	6 800	–	0,274	**2206-2RS-TVH**
	62	20	15 900	4 650	295	6 800	–	0,268	**2206-K-2RS-TVH-C3**
	62	20	26 000	6 900	440	11 500	11 400	0,246	**2206-K-TVH-C3**
	62	20	26 000	6 900	440	11 500	11 400	0,252	**2206-TVH**
	72	19	21 700	6 300	400	11 100	8 700	0,379	**1306-K-TVH-C3**
	72	19	21 700	6 300	400	11 100	8 700	0,384	**1306-TVH**
	72	27	21 700	6 300	400	5 900	–	0,554	**2306-2RS-TVH**
	72	27	32 500	8 800	560	10 200	10 400	0,476	**2306-K-TVH-C3**
	72	27	32 500	8 800	560	10 200	10 400	0,488	**2306-TVH**
35	72	17	16 000	5 100	325	11 600	9 800	0,319	**1207-K-TVH-C3**
	72	17	16 000	5 100	325	11 600	9 800	0,324	**1207-TVH**
	72	23	16 000	5 100	325	5 600	–	0,442	**2207-2RS-TVH**
	72	23	16 000	5 100	325	5 600	–	0,432	**2207-K-2RS-TVH-C3**
	72	23	33 000	9 000	570	9 800	10 300	0,38	**2207-K-TVH-C3**
	72	23	33 000	9 000	570	9 800	10 300	0,389	**2207-TVH**
	80	21	25 500	7 900	500	9 700	7 800	0,5	**1307-K-TVH-C3**
	80	21	25 500	7 900	500	9 700	7 800	0,507	**1307-TVH**
	80	31	25 500	7 900	500	5 200	–	0,744	**2307-2RS-TVH**
	80	31	40 500	11 200	710	8 900	9 800	0,657	**2307-K-TVH-C3**
	80	31	40 500	11 200	710	8 900	9 800	0,675	**2307-TVH**

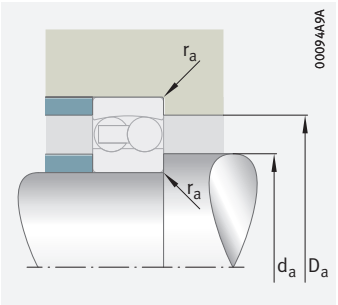
medias *https://www.schaeffler.de/std/1F9A*



Tapered bore



Tapered bore with seal 2RS

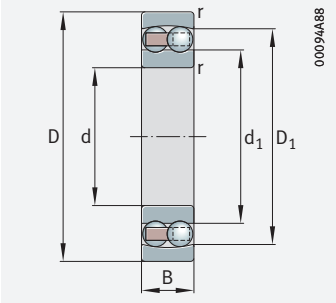


Mounting dimensions

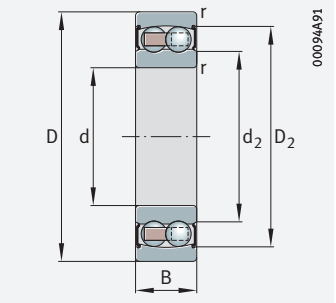
Dimensions						Mounting dimensions			Calculation factors			
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈	≈	≈	min.	max.	max.				
25	1	43,6	–	33,3	–	30,6	46,4	1	0,27	2,37	3,66	2,48
	1	43,6	–	33,3	–	30,6	46,4	1	0,27	2,37	3,66	2,48
	1	–	45,3	–	30,7	30,6	46,4	1	0,27	2,37	3,66	2,48
	1	–	45,3	–	30,7	30,6	46,4	1	0,27	2,37	3,66	2,48
	1	44,4	–	32,3	–	30,6	46,4	1	0,35	1,78	2,75	1,86
	1	44,4	–	32,3	–	30,6	46,4	1	0,35	1,78	2,75	1,86
	1,1	50,4	–	38,1	–	32	55	1	0,28	2,29	3,54	2,4
	1,1	50,4	–	38,1	–	32	55	1	0,28	2,29	3,54	2,4
	1,1	–	52,4	–	33,5	32	55	1	0,28	2,29	3,54	2,4
	1,1	49,9	–	35,5	–	32	55	1	0,48	1,32	2,04	1,38
	1,1	49,9	–	35,5	–	32	55	1	0,48	1,32	2,04	1,38
30	1	51,6	–	40,1	–	35,6	56,4	1	0,25	2,53	3,91	2,65
	1	51,6	–	40,1	–	35,6	56,4	1	0,25	2,53	3,91	2,65
	1	–	53,3	–	37,3	35,6	56,4	1	0,25	2,53	3,91	2,65
	1	–	53,3	–	37,3	35,6	56,4	1	0,25	2,53	3,91	2,65
	1	53,7	–	38,5	–	35,6	56,4	1	0,3	2,13	3,29	2,23
	1	53,7	–	38,5	–	35,6	56,4	1	0,3	2,13	3,29	2,23
	1,1	58,9	–	45,1	–	37	65	1	0,26	2,39	3,71	2,51
	1,1	58,9	–	45	–	37	65	1	0,26	2,39	3,71	2,51
	1,1	–	62,3	–	40,6	37	65	1	0,26	2,39	3,71	2,51
	1,1	58,8	–	41,5	–	37	65	1	0,45	1,4	2,17	1,47
	1,1	58,8	–	41,5	–	37	65	1	0,45	1,4	2,17	1,47
35	1,1	59,1	–	47,7	–	42	65	1	0,22	2,8	4,34	2,94
	1,1	59,1	–	47,7	–	42	65	1	0,22	2,8	4,34	2,94
	1,1	–	63,4	–	43,5	42	65	1	0,22	2,8	4,34	2,94
	1,1	–	63,4	–	43,5	42	65	1	0,22	2,8	4,34	2,94
	1,1	62,4	–	45,7	–	42	65	1	0,3	2,13	3,29	2,23
	1,1	62,4	–	45,7	–	42	65	1	0,3	2,13	3,29	2,23
	1,5	70,1	–	51,3	–	44	71	1,5	0,26	2,47	3,82	2,59
	1,5	70,1	–	51,3	–	44	71	1,5	0,26	2,47	3,82	2,59
	1,5	–	68,4	–	44,9	44	71	1,5	0,26	2,47	3,82	2,59
	1,5	66,1	–	46,9	–	44	71	1,5	0,47	1,35	2,1	1,42
	1,5	66,1	–	46,9	–	44	71	1,5	0,47	1,35	2,1	1,42

Self-aligning ball bearings

With cylindrical or tapered bore



Cylindrical bore

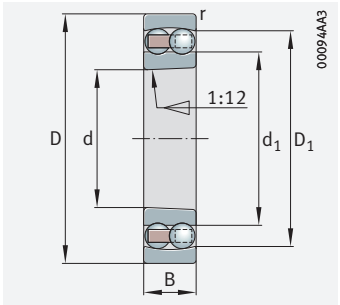


Cylindrical bore with seal 2RS

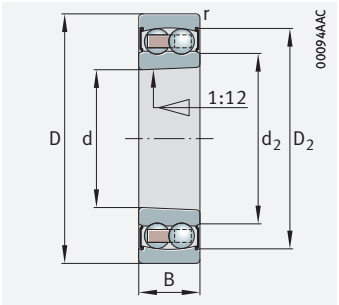
d = 40 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*381|1.12* ➤*381|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
40	80	18	19 400	6 500	415	10 100	8 600	0,408	**1208-K-TVH-C3**
	80	18	19 400	6 500	415	10 100	8 600	0,414	**1208-TVH**
	80	23	19 400	6 500	415	4 950	–	0,528	**2208-2RS-TVH**
	80	23	19 400	6 500	415	4 950	–	0,517	**2208-K-2RS-TVH-C3**
	80	23	32 500	9 500	600	8 900	8 700	0,465	**2208-K-TVH-C3**
	80	23	32 500	9 500	600	8 900	8 700	0,476	**2208-TVH**
	90	23	30 000	9 700	610	8 600	7 200	0,698	**1308-K-TVH-C3**
	90	23	30 000	9 700	610	8 600	7 200	0,708	**1308-TVH**
	90	33	30 000	9 700	610	4 650	–	1,01	**2308-2RS-TVH**
	90	33	46 000	13 500	860	7 900	8 700	0,899	**2308-K-TVH-C3**
	90	33	46 000	13 500	860	7 900	8 700	0,922	**2308-TVH**
45	85	19	22 000	7 300	465	9 300	8 200	0,454	**1209-K-TVH-C3**
	85	19	22 000	7 300	465	9 300	8 200	0,462	**1209-TVH**
	85	23	22 000	7 300	465	4 650	–	0,548	**2209-2RS-TVH**
	85	23	22 000	7 300	465	4 650	–	0,535	**2209-K-2RS-TVH-C3**
	85	23	28 500	9 000	570	8 600	7 800	0,505	**2209-K-TVH-C3**
	85	23	28 500	9 000	570	8 600	7 800	0,517	**2209-TVH**
	100	25	38 500	12 700	810	7 500	6 700	0,939	**1309-K-TVH-C3**
	100	25	38 500	12 700	810	7 500	6 700	0,953	**1309-TVH**
	100	36	38 500	12 700	810	4 200	–	1,34	**2309-2RS-TVH**
	100	36	55 000	16 600	1 060	7 000	8 000	1,19	**2309-K-TVH-C3**
	100	36	55 000	16 600	1 060	7 000	8 000	1,22	**2309-TVH**
50	90	20	22 900	8 100	520	8 700	7 700	0,516	**1210-K-TVH-C3**
	90	20	22 900	8 100	520	8 700	7 700	0,526	**1210-TVH**
	90	23	22 900	8 100	520	4 250	–	0,606	**2210-2RS-TVH**
	90	23	22 900	8 100	520	4 250	–	0,593	**2210-K-2RS-TVH-C3**
	90	23	28 500	9 500	600	8 100	7 100	0,543	**2210-K-TVH-C3**
	90	23	28 500	9 500	600	8 100	7 100	0,556	**2210-TVH**
	110	27	42 000	14 200	900	6 900	6 300	1,19	**1310-K-TVH-C3**
	110	27	42 000	14 200	900	6 900	6 300	1,21	**1310-TVH**
	110	40	42 000	14 200	900	3 750	–	1,82	**2310-2RS-TVH**
	110	40	66 000	20 200	1 280	6 300	7 600	1,64	**2310-TVH**

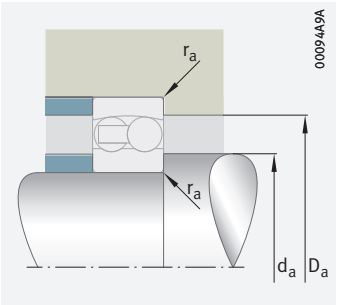
medias *https://www.schaeffler.de/std/1F9A*



Tapered bore



Tapered bore with seal 2RS

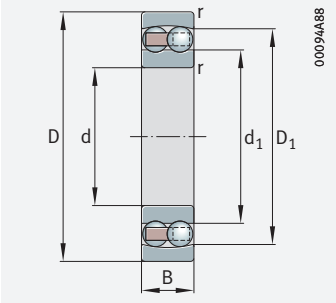


Mounting dimensions

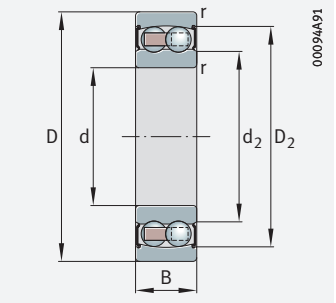
Dimensions						Mounting dimensions			Calculation factors			
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈	≈	≈	min.	max.	max.				
40	1,1	67,3	–	54	–	47	73	1	0,22	2,9	4,49	3,04
	1,1	67,3	–	54	–	47	73	1	0,22	2,9	4,49	3,04
	1,1	–	70,3	–	49,2	47	73	1	0,22	2,9	4,49	3,04
	1,1	–	70,3	–	49,2	47	73	1	0,22	2,9	4,49	3,04
	1,1	70,2	–	52,5	–	47	73	1	0,26	2,43	3,76	2,54
	1,1	70,2	–	52,5	–	47	73	1	0,26	2,43	3,76	2,54
	1,5	74,7	–	57,8	–	49	81	1,5	0,25	2,52	3,9	2,64
	1,5	74,7	–	57,8	–	49	81	1,5	0,25	2,52	3,9	2,64
	1,5	–	77,3	–	51	49	81	1,5	0,25	2,52	3,9	2,64
	1,5	74,5	–	53,7	–	49	81	1,5	0,43	1,45	2,25	1,52
	1,5	74,5	–	53,7	–	49	81	1,5	0,43	1,45	2,25	1,52
45	1,1	72,1	–	57,7	–	52	78	1	0,21	3,04	4,7	3,18
	1,1	72,1	–	57,7	–	52	78	1	0,21	3,04	4,7	3,18
	1,1	–	76	–	53,8	52	78	1	0,21	3,04	4,7	3,18
	1,1	–	76	–	53,8	52	78	1	0,21	3,04	4,7	3,18
	1,1	75,4	–	59	–	52	78	1	0,26	2,43	3,76	2,54
	1,1	75,4	–	59	–	52	78	1	0,26	2,43	3,76	2,54
	1,5	83,5	–	64,1	–	54	91	1,5	0,25	2,5	3,87	2,62
	1,5	83,5	–	64,1	–	54	91	1,5	0,25	2,5	3,87	2,62
	1,5	–	85,8	–	57,5	54	91	1,5	0,25	2,5	3,87	2,62
	1,5	83,6	–	60,1	–	54	91	1,5	0,43	1,48	2,29	1,55
	1,5	83,6	–	60,1	–	54	91	1,5	0,43	1,48	2,29	1,55
50	1,1	77,1	–	62,7	–	57	83	1	0,2	3,17	4,9	3,32
	1,1	77,1	–	62,7	–	57	83	1	0,2	3,17	4,9	3,32
	1,1	–	79	–	60,5	57	83	1	0,2	3,17	4,9	3,32
	1,1	–	79	–	60,5	57	83	1	0,2	3,17	4,9	3,32
	1,1	80,5	–	64	–	57	83	1	0,24	2,61	4,05	2,74
	1,1	80,5	–	64	–	57	83	1	0,24	2,61	4,05	2,74
	2	91,7	–	71,2	–	61	99	2	0,24	2,6	4,03	2,73
	2	91,7	–	71,2	–	61	99	2	0,24	2,6	4,03	2,73
	2	–	95,1	–	65,9	61	99	2	0,24	2,6	4,03	2,73
	2	91,4	–	65,9	–	61	99	2	0,43	1,47	2,27	1,54

Self-aligning ball bearings

With cylindrical or tapered bore



Cylindrical bore

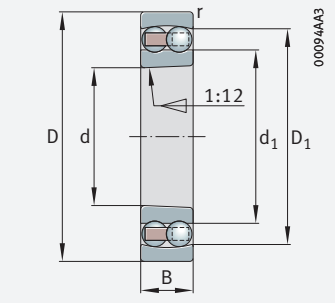


Cylindrical bore with seal 2RS

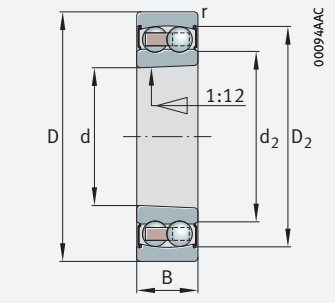
d = 55 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*381|1.12* ➤*381|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
55	100	21	27 000	10 000	630	7 700	6 900	0,682	**1211-K-TVH-C3**
	100	21	27 000	10 000	630	7 700	6 900	0,693	**1211-TVH**
	100	25	27 000	10 000	630	3 850	–	0,825	**2211-2RS-TVH**
	100	25	27 000	10 000	630	3 850	–	0,808	**2211-K-2RS-TVH-C3**
	100	25	39 000	12 500	790	7 000	6 700	0,73	**2211-K-TVH-C3**
	100	25	39 000	12 500	790	7 000	6 700	0,746	**2211-TVH**
	120	29	52 000	17 900	1 130	6 100	5 800	1,55	**1311-K-TVH-C3**
	120	29	52 000	17 900	1 130	6 100	5 800	1,57	**1311-TVH**
	120	43	52 000	17 900	1 130	3 450	–	2,28	**2311-2RS-TVH**
	120	43	77 000	24 000	1 520	5 700	7 100	2,02	**2311-K-TVH-C3**
	120	43	77 000	24 000	1 520	5 700	7 100	2,07	**2311-TVH**
60	110	22	30 500	11 500	730	6 900	6 300	0,88	**1212-K-TVH-C3**
	110	22	30 500	11 500	730	6 900	6 300	0,894	**1212-TVH**
	110	28	30 500	11 500	730	3 450	–	1,13	**2212-2RS-TVH**
	110	28	30 500	11 500	730	3 450	–	1,13	**2212-K-2RS-TVH-C3**
	110	28	48 000	16 500	1 040	6 300	6 400	1,03	**2212-K-TVH-C3**
	110	28	48 000	16 500	1 040	6 300	6 400	1,06	**2212-TVH**
	130	31	58 000	20 800	1 320	5 500	5 200	1,94	**1312-K-TVH-C3**
	130	31	58 000	20 800	1 320	5 500	5 200	1,97	**1312-TVH**
	130	46	89 000	28 000	1 790	5 200	6 700	2,52	**2312-K-TVH-C3**
	130	46	89 000	28 000	1 790	5 200	6 700	2,58	**2312-TVH**
65	120	23	31 000	12 500	790	6 500	5 800	1,13	**1213-K-TVH-C3**
	120	23	31 000	12 500	790	6 500	5 800	1,14	**1213-TVH**
	120	31	31 000	12 500	790	3 150	–	1,53	**2213-2RS-TVH**
	120	31	31 000	12 500	790	3 150	–	1,5	**2213-K-2RS-TVH-C3**
	120	31	58 000	19 200	1 220	5 600	6 200	1,33	**2213-K-TVH-C3**
	120	31	58 000	19 200	1 220	5 600	6 200	1,36	**2213-TVH**
	140	33	63 000	22 900	1 420	5 200	5 100	2,41	**1313-K-TVH-C3**
	140	33	63 000	22 900	1 420	5 200	5 100	2,44	**1313-TVH**
	140	48	98 000	32 500	2 040	4 750	6 100	3,16	**2313-K-TVH-C3**
	140	48	98 000	32 500	2 040	4 750	6 100	3,23	**2313-TVH**

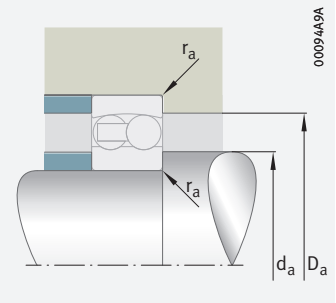
medias *https://www.schaeffler.de/std/1F9A*



Tapered bore



Tapered bore with seal 2RS

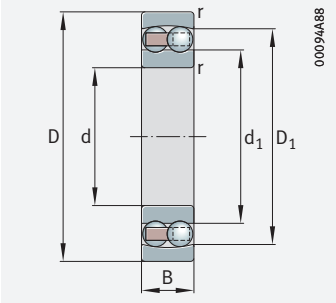


Mounting dimensions

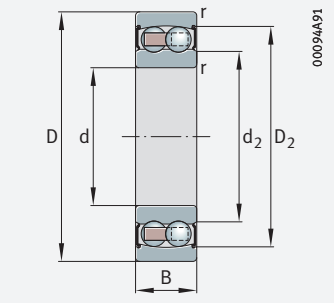
Dimensions						Mounting dimensions			Calculation factors			
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈	≈	≈	min.	max.	max.				
55	1,5	86,4	–	69,5	–	64	91	1,5	0,19	3,31	5,12	3,47
	1,5	86,4	–	69,5	–	64	91	1,5	0,19	3,31	5,12	3,47
	1,5	–	88,2	–	68	64	91	1,5	0,19	3,31	5,12	3,47
	1,5	–	88,2	–	68	64	91	1,5	0,19	3,31	5,12	3,47
	1,5	89,8	–	69,6	–	64	91	1,5	0,22	2,92	4,52	3,06
	1,5	89,8	–	69,6	–	64	91	1,5	0,22	2,92	4,52	3,06
	2	101	–	78	–	66	109	2	0,24	2,66	4,12	2,79
	2	101	–	78	–	66	109	2	0,24	2,66	4,12	2,79
	2	–	106,4	–	70,5	66	109	2	0,24	2,66	4,12	2,79
	2	100,2	–	71,7	–	66	109	2	0,42	1,51	2,33	1,58
	2	100,2	–	71,7	–	66	109	2	0,42	1,51	2,33	1,58
60	1,5	95,2	–	78	–	69	101	1,5	0,18	3,47	5,37	3,64
	1,5	95,2	–	78	–	69	101	1,5	0,18	3,47	5,37	3,64
	1,5	–	99,5	–	70,4	69	101	1,5	0,18	3,47	5,37	3,64
	1,5	–	99,5	–	70,4	69	101	1,5	0,18	3,47	5,37	3,64
	1,5	98,2	–	76,6	–	69	101	1,5	0,23	2,69	4,16	2,82
	1,5	98,2	–	76,6	–	69	101	1,5	0,23	2,69	4,16	2,82
	2,1	112,2	–	87	–	72	118	2,1	0,23	2,77	4,28	2,9
	2,1	112,2	–	87	–	72	118	2,1	0,23	2,77	4,28	2,9
	2,1	108,5	–	77	–	72	118	2,1	0,41	1,55	2,4	1,62
	2,1	108,5	–	77	–	72	118	2,1	0,41	1,55	2,4	1,62
65	1,5	102,7	–	85,2	–	74	111	1,5	0,18	3,57	5,52	3,74
	1,5	102,7	–	85,2	–	74	111	1,5	0,18	3,57	5,52	3,74
	1,5	–	107,8	–	78	74	111	1,5	0,18	3,57	5,52	3,74
	1,5	–	107,8	–	78	74	111	1,5	0,18	3,57	5,52	3,74
	1,5	106,9	–	82,4	–	74	111	1,5	0,23	2,78	4,31	2,92
	1,5	106,9	–	82,4	–	74	111	1,5	0,23	2,78	4,31	2,92
	2,1	118,2	–	92,7	–	77	128	2,1	0,23	2,75	4,26	2,88
	2,1	118,2	–	92,7	–	77	128	2,1	0,23	2,75	4,26	2,88
	2,1	118,3	–	85,6	–	77	128	2,1	0,39	1,62	2,51	1,7
	2,1	118,3	–	85,6	–	77	128	2,1	0,39	1,62	2,51	1,7

Self-aligning ball bearings

With cylindrical or tapered bore



Cylindrical bore

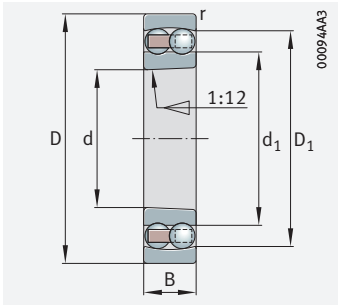


Cylindrical bore with seal 2RS

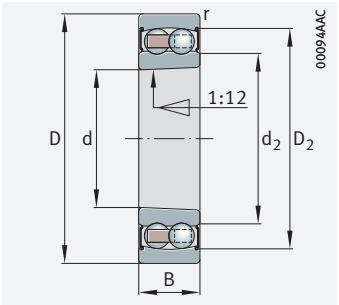
d = 70 – 85 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*381|1.12* ➤*381|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
70	125	24	35 000	13 800	880	6 200	5 900	1,23	**1214-K-TVH-C3**
	125	24	35 000	13 800	880	6 200	5 900	1,25	**1214-TVH**
	125	31	35 000	13 800	880	3 050	–	1,59	**2214-2RS-TVH**
	125	31	44 000	17 100	1 080	8 800	5 900	1,69	**2214-M**
	150	35	75 000	27 500	1 670	7 200	4 950	3,11	**1314-M**
	150	51	112 000	37 500	2 270	6 600	5 800	4,38	**2314-M**
75	130	25	39 000	15 700	980	5 700	5 500	1,32	**1215-K-TVH-C3**
	130	25	39 000	15 700	980	5 700	5 500	1,34	**1215-TVH**
	130	31	44 500	17 800	1 110	5 600	5 600	1,6	**2215-K-TVH-C3**
	130	31	44 500	17 800	1 110	5 600	5 600	1,6	**2215-TVH**
	160	37	80 000	30 000	1 740	6 700	4 750	3,52	**1315-K-M-C3**
	160	37	80 000	30 000	1 740	6 700	4 750	3,56	**1315-M**
	160	55	125 000	42 500	2 490	6 100	5 600	5,21	**2315-K-M-C3**
	160	55	125 000	42 500	2 490	6 100	5 600	5,33	**2315-M**
80	140	26	40 000	17 000	1 020	5 300	5 100	1,62	**1216-K-TVH-C3**
	140	26	40 000	17 000	1 020	5 300	5 100	1,65	**1216-TVH**
	140	33	49 500	19 900	1 210	5 300	5 400	1,97	**2216-K-TVH-C3**
	140	33	49 500	19 900	1 210	5 300	5 400	2,01	**2216-TVH**
	170	39	89 000	33 000	1 870	6 200	4 500	4,5	**1316-K-M-C3**
	170	39	89 000	33 000	1 870	6 200	4 500	4,56	**1316-M**
	170	58	139 000	48 500	2 750	5 700	5 400	6,05	**2316-K-M-C3**
	170	58	139 000	48 500	2 750	5 700	5 400	6,2	**2316-M**
85	150	28	49 500	20 800	1 210	4 900	4 950	2,03	**1217-K-TVH-C3**
	150	28	49 500	20 800	1 210	4 900	4 950	2,07	**1217-TVH**
	150	36	59 000	23 600	1 380	7 200	5 200	2,73	**2217-K-M-C3**
	150	36	59 000	23 600	1 380	7 200	5 200	2,79	**2217-M**
	180	41	99 000	38 000	2 070	5 800	4 300	5,32	**1317-K-M-C3**
	180	41	99 000	38 000	2 070	5 800	4 300	5,39	**1317-M**
	180	60	143 000	51 000	2 850	5 400	5 200	7,04	**2317-K-M-C3**
	180	60	143 000	51 000	2 850	5 400	5 200	7,2	**2317-M**

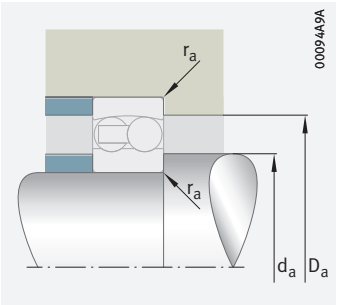
medias *https://www.schaeffler.de/std/1F9A*



Tapered bore



Tapered bore with seal 2RS

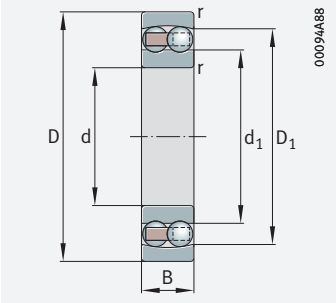


Mounting dimensions

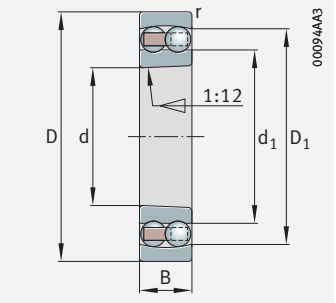
Dimensions						Mounting dimensions			Calculation factors			
d	r	D_1	D_2	d_1	d_2	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈	≈	≈	min.	max.	max.				
70	1,5	106,1	–	87,2	–	79	116	1,5	0,19	3,36	5,21	3,52
	1,5	106,1	–	87,2	–	79	116	1,5	0,19	3,36	5,21	3,52
	1,5	–	110,8	–	84,7	79	116	1,5	0,19	3,36	5,21	3,52
	1,5	108,9	–	87,6	–	79	116	1,5	0,27	2,34	3,62	2,45
	2,1	126,4	–	97,7	–	82	138	2,1	0,23	2,79	4,32	2,93
	2,1	127,2	–	91,9	–	82	138	2,1	0,38	1,65	2,55	1,73
75	1,5	113,6	–	93,7	–	84	121	1,5	0,19	3,32	5,15	3,48
	1,5	113,6	–	93,7	–	84	121	1,5	0,19	3,32	5,15	3,48
	1,5	114,3	–	93,3	–	84	121	1,5	0,26	2,47	3,82	2,59
	1,5	114,3	–	93,3	–	84	121	1,5	0,26	2,47	3,82	2,59
	2,1	134,8	–	104,8	–	87	148	2,1	0,23	2,77	4,29	2,9
	2,1	134,8	–	104,8	–	87	148	2,1	0,23	2,77	4,29	2,9
	2,1	135,2	–	100,5	–	87	148	2,1	0,38	1,64	2,54	1,72
	2,1	135,2	–	100,5	–	87	148	2,1	0,38	1,64	2,54	1,72
80	2	122,1	–	101,8	–	91	129	2	0,16	3,9	6,03	4,08
	2	122,1	–	102	–	91	129	2	0,16	3,9	6,03	4,08
	2	121	–	99,2	–	91	129	2	0,25	2,48	3,84	2,6
	2	121	–	99,2	–	91	129	2	0,25	2,48	3,84	2,6
	2,1	144,3	–	110,6	–	92	158	2,1	0,22	2,87	4,44	3
	2,1	144,3	–	110,6	–	92	158	2,1	0,22	2,87	4,44	3
	2,1	144,1	–	107,6	–	92	158	2,1	0,37	1,7	2,62	1,78
	2,1	144,1	–	107,6	–	92	158	2,1	0,37	1,7	2,62	1,78
85	2	130,4	–	107,5	–	96	139	2	0,17	3,73	5,78	3,91
	2	130,4	–	107,5	–	96	139	2	0,17	3,73	5,78	3,91
	2	130	–	105,2	–	96	139	2	0,26	2,46	3,81	2,58
	2	130	–	105,2	–	96	139	2	0,26	2,46	3,81	2,58
	3	151,9	–	117,2	–	99	166	2,5	0,22	2,88	4,46	3,02
	3	151,9	–	117,2	–	99	166	2,5	0,22	2,88	4,46	3,02
	3	152,2	–	114,4	–	99	166	2,5	0,37	1,68	2,61	1,76
	3	152,2	–	114,4	–	99	166	2,5	0,37	1,68	2,61	1,76

Self-aligning ball bearings

With cylindrical or tapered bore



Cylindrical bore



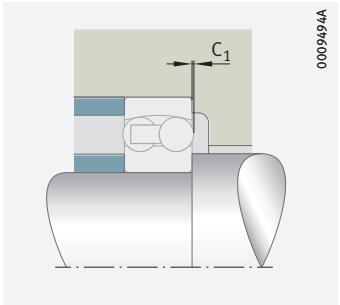
Tapered bore

d = 90 – 105 mm

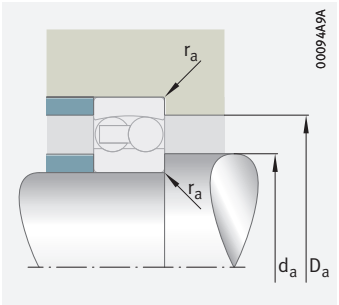
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*381|1.12* ➤*381|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
90	160	30	57 000	23 500	1 330	4 550	4 850	2,48	**1218-K-TVH-C3**
	160	30	57 000	23 500	1 330	4 550	4 850	2,52	**1218-TVH**
	160	40	71 000	28 500	1 630	4 400	5 200	3,18	**2218-K-TVH-C3**
	160	40	71 000	28 500	1 630	4 400	5 200	3,18	**2218-TVH**
	190	43	109 000	43 000	2 300	5 500	4 200	6,27	**1318-K-M-C3**
	190	43	109 000	43 000	2 300	5 500	4 200	6,35	**1318-M**
	190	64	156 000	58 000	3 100	5 100	5 000	8,38	**2318-K-M-C3**
	190	64	156 000	58 000	3 100	5 100	5 000	8,58	**2318-M**
95	170	32	64 000	27 000	1 490	6 300	4 600	3,28	**1219-K-M-C3**
	170	32	64 000	27 000	1 490	6 300	4 600	3,32	**1219-M**
	170	43	84 000	34 500	1 890	6 100	5 000	4,24	**2219-K-M-C3**
	170	43	84 000	34 500	1 890	6 100	5 000	4,33	**2219-M**
	200	45	134 000	51 000	2 650	5 100	4 050	7,2	**1319-K-M-C3**
	200	45	134 000	51 000	2 650	5 100	4 050	7,29	**1319-M**
	200	67	167 000	64 000	3 350	4 800	4 750	9,97	**2319-K-M-C3**
	200	67	167 000	64 000	3 350	4 800	4 750	10,2	**2319-M**
100	180	34	70 000	29 500	1 590	6 000	4 500	3,94	**1220-K-M-C3**
	180	34	70 000	29 500	1 590	6 000	4 500	3,99	**1220-M**
	180	46	98 000	40 500	2 180	5 700	4 900	5,1	**2220-K-M-C3**
	180	46	98 000	40 500	2 180	5 700	4 900	5,21	**2220-M**
	215	47	145 000	57 000	2 900	4 700	3 850	8,95	**1320-K-M-C3**
	215	47	145 000	57 000	2 900	4 700	3 850	9,06	**1320-M**
	215	73	196 000	79 000	4 000	4 300	4 350	12,7	**2320-K-M-C3**
	215	73	196 000	79 000	4 000	4 300	4 350	12,9	**2320-M**
105	190	36	75 000	32 500	1 690	5 700	4 350	4,75	**1221-M**
	225	49	158 000	64 000	3 150	4 450	3 750	10,3	**1321-M**

medias *https://www.schaeffler.de/std/1F9A*

[1] The ball projection must be taken into consideration when designing the adjacent construction.



Ball projection C_1

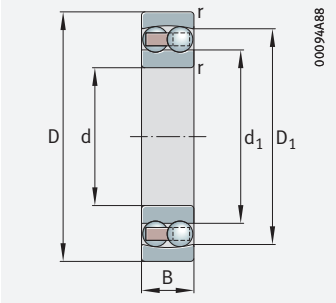


Mounting dimensions

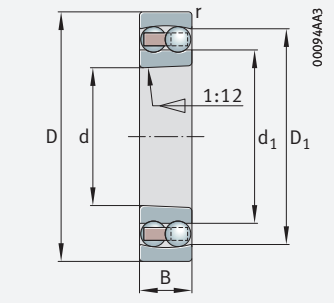
Dimensions					Mounting dimensions			Calculation factors			
d	r	D_1	d_1	C_1 [1)]	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈	≈	min.	max.	max.				
90	2	138,7	112,7	–	101	149	2	0,17	3,74	5,79	3,92
	2	138,7	112,7	–	101	149	2	0,17	3,74	5,79	3,92
	2	139,4	111,5	–	101	149	2	0,27	2,33	3,61	2,44
	2	139,4	111,5	–	101	149	2	0,27	2,33	3,61	2,44
	3	159,8	124,4	–	104	176	2,5	0,22	2,83	4,38	2,97
	3	159,8	124,4	–	104	176	2,5	0,22	2,83	4,38	2,97
	3	159,8	115,7	–	104	176	2,5	0,39	1,63	2,53	1,71
	3	159,8	115,7	–	104	176	2,5	0,39	1,63	2,53	1,71
95	2,1	148,2	120,5	–	107	158	2,1	0,17	3,73	5,78	3,91
	2,1	148,2	120,5	–	107	158	2,1	0,17	3,73	5,78	3,91
	2,1	147,9	118,9	–	107	158	2,1	0,27	2,32	3,59	2,43
	2,1	147,9	118,9	–	107	158	2,1	0,27	2,32	3,59	2,43
	3	169,9	127,6	1,6	109	186	2,5	0,23	2,73	4,23	2,86
	3	169,9	127,6	1,6	109	186	2,5	0,23	2,73	4,23	2,86
	3	167,7	121,6	–	109	186	2,5	0,38	1,66	2,57	1,74
	3	167,7	121,6	–	109	186	2,5	0,38	1,66	2,57	1,74
100	2,1	155,2	127,3	–	112	168	2,1	0,18	3,58	5,53	3,75
	2,1	155,2	127,3	–	112	168	2,1	0,18	3,58	5,53	3,75
	2,1	156,9	124,4	–	112	168	2,1	0,27	2,33	3,61	2,44
	2,1	156,9	124,4	–	112	168	2,1	0,27	2,33	3,61	2,44
	3	181,3	135,9	2,4	114	201	2,5	0,24	2,68	4,15	2,81
	3	181,3	135,9	2,4	114	201	2,5	0,24	2,68	4,15	2,81
	3	182,7	130,8	–	114	201	2,5	0,38	1,67	2,58	1,75
	3	182,7	130,8	–	114	201	2,5	0,38	1,67	2,58	1,75
105	2,1	155,2	133,9	–	117	178	2,1	0,18	3,54	5,48	3,71
	3	190,5	143,2	2,5	119	211	2,5	0,23	2,75	4,25	2,88

Self-aligning ball bearings

With cylindrical or tapered bore



Cylindrical bore



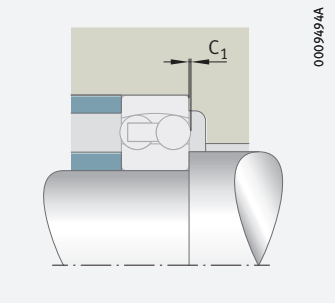
Tapered bore

d = 110 – 150 mm

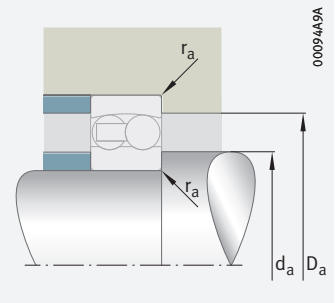
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*381|1.12* ➤*381|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
110	200	38	89 000	38 500	1 960	5 300	4 200	5,49	**1222-K-M-C3**
	200	38	89 000	38 500	1 960	5 300	4 200	5,57	**1222-M**
	200	53	126 000	52 000	2 650	5 000	4 700	7,27	**2222-K-M-C3**
	200	53	126 000	52 000	2 650	5 000	4 700	7,45	**2222-M**
	240	50	165 000	72 000	3 400	4 200	3 400	12,2	**1322-K-M-C3**
	240	50	165 000	72 000	3 400	4 200	3 400	12,3	**1322-M**
	240	80	221 000	95 000	4 550	3 850	3 900	17,5	**2322-K-M-C3**
	240	80	221 000	95 000	4 550	3 850	3 900	18,1	**2322-M**
120	215	42	121 000	53 000	2 600	4 750	4 200	7,13	**1224-M**
130	230	46	125 000	56 000	2 650	4 450	4 000	8,67	**1226-M**
140	250	50	163 000	74 000	3 350	3 900	3 650	11,2	**1228-M**
150	270	54	180 000	87 000	3 800	3 600	3 400	14,6	**1230-M**

medias *https://www.schaeffler.de/std/1F9A*

[1] The ball projection must be taken into consideration when designing the adjacent construction.



Ball projection C_1

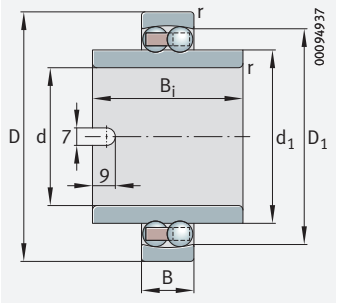


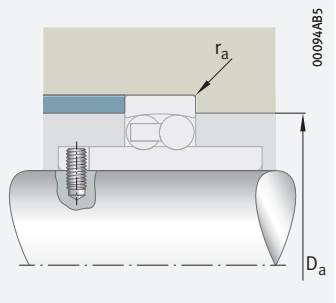
Mounting dimensions

Dimensions					Mounting dimensions			Calculation factors			
d	r	D_1	d_1	C_1 [1]	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈	≈	min.	max.	max.				
110	2,1	173,2	140,2	–	122	188	2,1	0,17	3,61	5,59	3,78
	2,1	173,2	140,2	–	122	188	2,1	0,17	3,61	5,59	3,78
	2,1	174,1	136,9	–	122	188	2,1	0,28	2,23	3,45	2,33
	2,1	174,1	136,9	–	122	188	2,1	0,28	2,23	3,45	2,33
	3	202,5	154,5	2,7	124	226	2,5	0,23	2,79	4,32	2,92
	3	202,5	154,5	2,7	124	226	2,5	0,23	2,79	4,32	2,92
	3	201,8	145,5	–	124	226	2,5	0,37	1,69	2,62	1,77
	3	201,8	145,5	–	124	226	2,5	0,37	1,69	2,62	1,77
120	2,1	187,3	149	1,8	132	203	2,1	0,2	3,11	4,81	3,25
130	3	200	161,5	0,6	144	216	2,5	0,19	3,24	5,02	3,4
140	3	220,5	175	2,7	154	236	2,5	0,21	3,05	4,71	3,19
150	3	237,9	186,7	3,8	164	256	2,5	0,22	2,9	4,49	3,04

Self-aligning ball bearings

With extended inner ring





Mounting dimensions

d = 20 – 60 mm

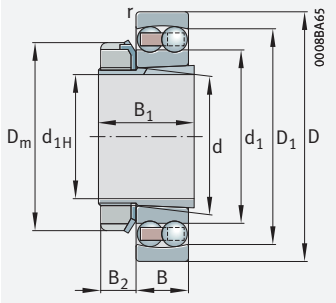
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*381|1.12* ➤*381|1.13*
			N	N	N	min^{-1}	≈ kg	
20	47	14	10 100	2 600	166	18 100	0,186	**11204-TVH**
25	52	15	12 300	3 300	209	15 500	0,22	**11205-TVH**
30	62	16	15 900	4 650	295	13 100	0,35	**11206-TVH**
35	72	17	16 000	5 100	325	11 600	0,54	**11207-TVH**
40	80	18	19 400	6 500	415	10 100	0,72	**11208-TVH**
45	85	19	22 000	7 300	465	9 300	0,77	**11209-TVH**
50	90	20	22 900	8 100	520	8 700	0,85	**11210-TVH**
55	100	21	27 000	10 000	630	7 700	1,17	**11211-TVH**
60	110	22	30 500	11 500	730	6 900	1,5	**11212-TVH**

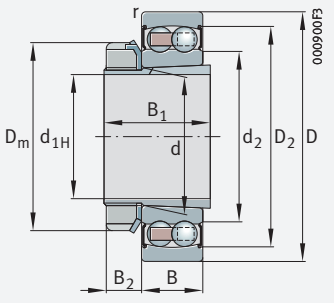
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions		Calculation factors			
d	r min.	B_i ≈	D_1 ≈	d_1 ≈	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
20	1	40	37,8	29,2	41,4	1	0,28	2,24	3,46	2,34
25	1	44	43,6	33,3	46,4	1	0,27	2,37	3,66	2,48
30	1	48	51,6	40,1	56,4	1	0,25	2,53	3,91	2,65
35	1,1	52	59,1	47,7	65	1	0,22	2,8	4,34	2,94
40	1,1	56	67,3	54	73	1	0,22	2,9	4,49	3,04
45	1,1	58	72,1	57,7	78	1	0,21	3,04	4,7	3,18
50	1,1	58	77,1	62,7	83	1	0,2	3,17	4,9	3,32
55	1,5	60	86,4	69,5	91	1,5	0,19	3,31	5,12	3,47
60	1,5	62	95,2	78	101	1,5	0,18	3,47	5,37	3,64

Self-aligning ball bearings

With adapter sleeve



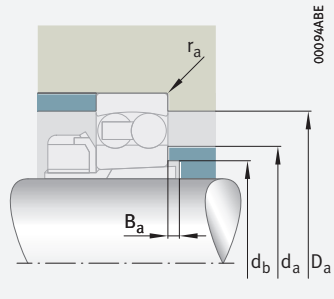


With seal 2RS

d_{1H} = 17 – 45 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤381|1.12 ➤381|1.13	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
17	20	47	14	10 100	2 600	166	18 100	15 300	0,116	0,04	**1204-K-TVH-C3**	**H204**
20	25	52	15	12 300	3 300	209	15 500	13 400	0,135	0,07	**1205-K-TVH-C3**	**H205**
	25	52	18	12 300	3 300	209	8 100	–	0,157	0,07	**2205-K-2RS-TVH-C3**	**H305**
	25	52	18	17 300	4 450	285	14 400	13 400	0,152	0,07	**2205-K-TVH-C3**	**H305**
	25	62	17	18 300	5 000	320	12 900	10 000	0,254	0,07	**1305-K-TVH-C3**	**H305**
	25	62	24	25 000	6 600	420	12 200	11 900	0,328	0,09	**2305-K-TVH-C3**	**H2305**
25	30	62	16	15 900	4 650	295	13 100	11 400	0,217	0,1	**1206-K-TVH-C3**	**H206**
	30	62	20	15 900	4 650	295	6 800	–	0,268	0,11	**2206-K-2RS-TVH-C3**	**H306**
	30	62	20	26 000	6 900	440	11 500	11 400	0,246	0,11	**2206-K-TVH-C3**	**H306**
	30	72	19	21 700	6 300	400	11 100	8 700	0,379	0,11	**1306-K-TVH-C3**	**H306**
	30	72	27	32 500	8 800	560	10 200	10 400	0,476	0,13	**2306-K-TVH-C3**	**H2306**
30	35	72	17	16 000	5 100	325	11 600	9 800	0,319	0,136	**1207-K-TVH-C3**	**H207**
	35	72	23	16 000	5 100	325	5 600	–	0,432	0,153	**2207-K-2RS-TVH-C3**	**H307**
	35	72	23	33 000	9 000	570	9 800	10 300	0,38	0,153	**2207-K-TVH-C3**	**H307**
	35	80	21	25 500	7 900	500	9 700	7 800	0,5	0,153	**1307-K-TVH-C3**	**H307**
	35	80	31	40 500	11 200	710	8 900	9 800	0,657	0,16	**2307-K-TVH-C3**	**H2307**
35	40	80	18	19 400	6 500	415	10 100	8 600	0,408	0,177	**1208-K-TVH-C3**	**H208**
	40	80	23	19 400	6 500	415	4 950	–	0,517	0,192	**2208-K-2RS-TVH-C3**	**H308**
	40	80	23	32 500	9 500	600	8 900	8 700	0,465	0,192	**2208-K-TVH-C3**	**H308**
	40	90	23	30 000	9 700	610	8 600	7 200	0,698	0,192	**1308-K-TVH-C3**	**H308**
	40	90	33	46 000	13 500	860	7 900	8 700	0,899	0,23	**2308-K-TVH-C3**	**H2308**
40	45	85	19	22 000	7 300	465	9 300	8 200	0,454	0,23	**1209-K-TVH-C3**	**H209**
	45	85	23	22 000	7 300	465	4 650	–	0,535	0,253	**2209-K-2RS-TVH-C3**	**H309**
	45	85	23	28 500	9 000	570	8 600	7 800	0,505	0,253	**2209-K-TVH-C3**	**H309**
	45	100	25	38 500	12 700	810	7 500	6 700	0,939	0,253	**1309-K-TVH-C3**	**H309**
	45	100	36	55 000	16 600	1 060	7 000	8 000	1,19	0,298	**2309-K-TVH-C3**	**H2309**
45	50	90	20	22 900	8 100	520	8 700	7 700	0,516	0,276	**1210-K-TVH-C3**	**H210**
	50	90	23	22 900	8 100	520	4 250	–	0,593	0,306	**2210-K-2RS-TVH-C3**	**H310**
	50	90	23	28 500	9 500	600	8 100	7 100	0,543	0,306	**2210-K-TVH-C3**	**H310**
	50	110	27	42 000	14 200	900	6 900	6 300	1,19	0,306	**1310-K-TVH-C3**	**H310**

medias *https://www.schaeffler.de/std/1F9A*

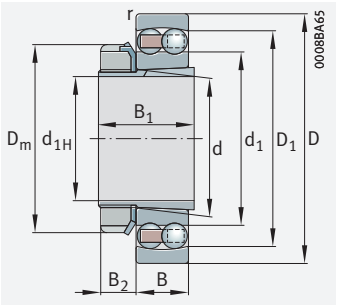


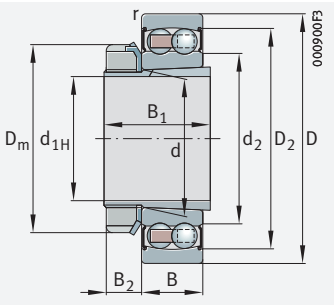
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2 ≈	D_m	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
17	1	37,8	–	29,2	–	32	24	7	27	41,4	23	5	1	0,28	2,24	3,46	2,34
20	1	43,6	–	33,3	–	38	26	8,25	32	46,4	28	5	1	0,27	2,37	3,66	2,48
	1	–	45,3	–	30,7	38	29	8,25	32	46,4	28	5	1	0,27	2,37	3,66	2,48
	1	44,4	–	32,3	–	38	29	8,25	32	46,4	28	5	1	0,35	1,78	2,75	1,86
	1,1	50,4	–	38,1	–	38	29	8,25	35	55	28	6	1	0,28	2,29	3,54	2,4
	1,1	49,9	–	35,5	–	38	35	8,25	34	55	30	5	1	0,48	1,32	2,04	1,38
25	1	51,6	–	40,1	–	45	27	8,25	38	56,4	33	5	1	0,25	2,53	3,91	2,65
	1	–	53,3	–	37,3	45	31	8,25	38	56,4	33	5	1	0,25	2,53	3,91	2,65
	1	53,7	–	38,5	–	45	31	8,25	38	56,4	33	5	1	0,3	2,13	3,29	2,23
	1,1	58,9	–	45,1	–	45	31	8,25	42	65	33	6	1	0,26	2,39	3,71	2,51
	1,1	58,8	–	41,5	–	45	38	8,25	40	65	35	5	1	0,45	1,4	2,17	1,47
30	1,1	59,1	–	47,7	–	52	29	9,25	45	65	38	5	1	0,22	2,8	4,34	2,94
	1,1	–	63,4	–	43,5	52	35	9,25	45	65	38	5	1	0,22	2,8	4,34	2,94
	1,1	62,4	–	45,7	–	52	35	9,25	44	65	39	5	1	0,3	2,13	3,29	2,23
	1,5	70,1	–	51,3	–	52	35	9,25	49	71	39	8	1,5	0,26	2,47	3,82	2,59
	1,5	66,1	–	46,9	–	52	43	9,25	45	71	40	5	1,5	0,47	1,35	2,1	1,42
35	1,1	67,3	–	54	–	58	31	10,25	52	73	43	5	1	0,22	2,9	4,49	3,04
	1,1	–	70,3	–	49,2	58	36	10,25	52	73	43	5	1	0,22	2,9	4,49	3,04
	1,1	70,2	–	52,5	–	58	36	10,25	50	73	44	5	1	0,26	2,43	3,76	2,54
	1,5	74,7	–	57,8	–	58	36	10,25	55	81	44	5	1,5	0,25	2,52	3,9	2,64
	1,5	74,5	–	53,7	–	58	46	10,25	51	81	45	5	1,5	0,43	1,45	2,25	1,52
40	1,1	72,1	–	57,7	–	65	33	11,25	57	78	48	5	1	0,21	3,04	4,7	3,18
	1,1	–	76	–	53,8	65	39	11,25	57	78	48	5	1	0,21	3,04	4,7	3,18
	1,1	75,4	–	59	–	65	39	11,25	56	78	50	8	1	0,26	2,43	3,76	2,54
	1,5	83,5	–	64,1	–	65	39	11,25	61	91	50	5	1,5	0,25	2,5	3,87	2,62
	1,5	83,6	–	60,1	–	65	50	11,25	57	91	50	5	1,5	0,43	1,48	2,29	1,55
45	1,1	77,1	–	62,7	–	70	35	12,25	62	83	53	5	1	0,2	3,17	4,9	3,32
	1,1	–	79	–	60,5	70	42	12,25	62	83	53	5	1	0,2	3,17	4,9	3,32
	1,1	80,5	–	64	–	70	42	12,25	61	83	55	10	1	0,24	2,61	4,05	2,74
	2	91,7	–	71,2	–	70	42	12,25	68	99	55	5	2	0,24	2,6	4,03	2,73

Self-aligning ball bearings

With adapter sleeve



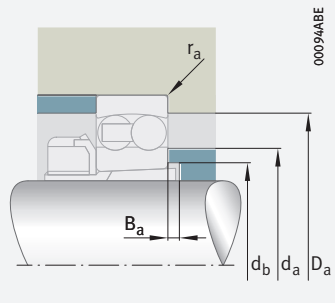


With seal 2RS

d_{1H} = 50 – 75 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤381|1.12 ➤381|1.13	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
50	55	100	21	27 000	10 000	630	7 700	6 900	0,682	0,319	**1211-K-TVH-C3**	**H211**
	55	100	25	27 000	10 000	630	3 850	–	0,808	0,358	**2211-K-2RS-TVH-C3**	**H311**
	55	100	25	39 000	12 500	790	7 000	6 700	0,73	0,358	**2211-K-TVH-C3**	**H311**
	55	120	29	52 000	17 900	1 130	6 100	5 800	1,55	0,358	**1311-K-TVH-C3**	**H311**
	55	120	43	77 000	24 000	1 520	5 700	7 100	2,02	0,435	**2311-K-TVH-C3**	**H2311**
55	60	110	22	30 500	11 500	730	6 900	6 300	0,88	0,35	**1212-K-TVH-C3**	**H212**
	60	110	28	30 500	11 500	730	3 450	–	1,13	0,401	**2212-K-2RS-TVH-C3**	**H312**
	60	110	28	48 000	16 500	1 040	6 300	6 400	1,03	0,401	**2212-K-TVH-C3**	**H312**
	60	130	31	58 000	20 800	1 320	5 500	5 200	1,94	0,401	**1312-K-TVH-C3**	**H312**
	60	130	46	89 000	28 000	1 790	5 200	6 700	2,52	0,493	**2312-K-TVH-C3**	**H2312**
60	65	120	23	31 000	12 500	790	6 500	5 800	1,13	0,4	**1213-K-TVH-C3**	**H213**
	65	120	31	31 000	12 500	790	3 150	–	1,5	0,471	**2213-K-2RS-TVH-C3**	**H313**
	65	120	31	58 000	19 200	1 220	5 600	6 200	1,33	0,471	**2213-K-TVH-C3**	**H313**
	65	140	33	63 000	22 900	1 420	5 200	5 100	2,41	0,471	**1313-K-TVH-C3**	**H313**
	65	140	48	98 000	32 500	2 040	4 750	6 100	3,16	0,57	**2313-K-TVH-C3**	**H2313**
	70	125	24	35 000	13 800	880	6 200	5 900	1,23	0,63	**1214-K-TVH-C3**	**H214**
65	75	130	25	39 000	15 700	980	5 700	5 500	1,32	0,71	**1215-K-TVH-C3**	**H215**
	75	130	31	44 500	17 800	1 110	5 600	5 600	1,6	0,86	**2215-K-TVH-C3**	**H315**
	75	160	37	80 000	30 000	1 740	6 700	4 750	3,52	1,06	**1315-K-M-C3**	**H315**
	75	160	55	125 000	42 500	2 490	6 100	5 600	5,21	0,89	**2315-K-M-C3**	**H2315**
70	80	140	26	40 000	17 000	1 020	5 300	5 100	1,62	0,89	**1216-K-TVH-C3**	**H216**
	80	140	33	49 500	19 900	1 210	5 300	5 400	1,97	1,06	**2216-K-TVH-C3**	**H316**
	80	170	39	89 000	33 000	1 870	6 200	4 500	4,5	1,06	**1316-K-M-C3**	**H316**
	80	170	58	139 000	48 500	2 750	5 700	5 400	6,05	1,31	**2316-K-M-C3**	**H2316**
75	85	150	28	49 500	20 800	1 210	4 900	4 950	2,03	1,03	**1217-K-TVH-C3**	**H217**
	85	150	36	59 000	23 600	1 380	7 200	5 200	2,73	1,21	**2217-K-M-C3**	**H317**
	85	180	41	99 000	38 000	2 070	5 800	4 300	5,32	1,21	**1317-K-M-C3**	**H317**
	85	180	60	143 000	51 000	2 850	5 400	5 200	7,04	1,47	**2317-K-M-C3**	**H2317**

medias *https://www.schaeffler.de/std/1F9A*

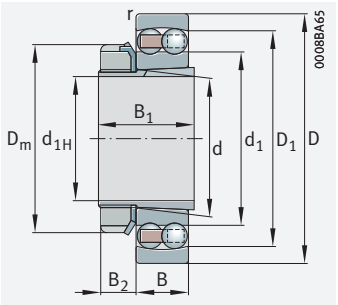


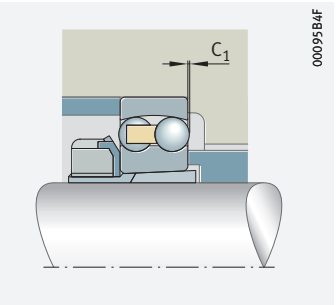
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	D_2 ≈	d_1 ≈	d_2 ≈	D_m	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
50	1,5	86,4	–	69,5	–	75	37	12,5	69	91	60	6	1,5	0,19	3,31	5,12	3,47
	1,5	–	88,2	–	68	75	45	12,5	69	91	60	6	1,5	0,19	3,31	5,12	3,47
	1,5	89,8	–	69,6	–	75	45	12,5	68	91	60	10	1,5	0,22	2,92	4,52	3,06
	2	101	–	78	–	75	45	12,5	74	109	60	6	2	0,24	2,66	4,12	2,79
	2	100,2	–	71,7	–	75	59	12,5	69	109	61	6	2	0,42	1,51	2,33	1,58
55	1,5	95,2	–	78	–	80	38	12,5	75	101	64	5	1,5	0,18	3,47	5,37	3,64
	1,5	–	99,5	–	70,4	80	47	12,5	75	101	64	5	1,5	0,18	3,47	5,37	3,64
	1,5	98,2	–	76,6	–	80	47	12,5	73	101	65	8	1,5	0,23	2,69	4,16	2,82
	2,1	112,2	–	87	–	80	47	12,5	83	118	65	5	2,1	0,23	2,77	4,28	2,9
	2,1	108,5	–	77	–	80	62	12,5	74	118	66	5	2,1	0,41	1,55	2,4	1,62
60	1,5	102,7	–	85,2	–	85	40	13,5	83	111	70	5	1,5	0,18	3,57	5,52	3,74
	1,5	–	107,8	–	78	85	50	13,5	83	111	70	5	1,5	0,18	3,57	5,52	3,74
	1,5	106,9	–	82,4	–	85	50	13,5	79	111	70	8	1,5	0,23	2,78	4,31	2,92
	2,1	118,2	–	92,7	–	85	50	13,5	89	128	70	5	2,1	0,23	2,75	4,26	2,88
	2,1	118,3	–	85,6	–	85	65	13,5	82	128	72	5	2,1	0,39	1,62	2,51	1,7
	1,5	106,1	–	87,2	–	92	41	13,5	86	116	75	5	1,5	0,19	3,36	5,21	3,52
65	1,5	113,6	–	93,7	–	98	43	14,5	92	121	80	5	1,5	0,19	3,32	5,15	3,48
	1,5	114,3	–	93,3	–	98	55	14,5	90	121	80	12	1,5	0,26	2,47	3,82	2,59
	2,1	134,8	–	104,8	–	98	55	14,5	100	148	80	5	2,1	0,23	2,77	4,29	2,9
	2,1	135,2	–	100,5	–	98	73	14,5	94	148	82	5	2,1	0,38	1,64	2,54	1,72
70	2	122,1	–	101,8	–	105	46	16,75	99	129	85	5	2	0,16	3,9	6,03	4,08
	2	121	–	99,2	–	105	59	16,75	96	129	85	12	2	0,25	2,48	3,84	2,6
	2,1	144,3	–	110,6	–	105	59	16,75	107	158	85	5	2,1	0,22	2,87	4,44	3
	2,1	144,1	–	107,6	–	105	78	16,75	100	158	88	5	2,1	0,37	1,7	2,62	1,78
75	2	130,4	–	107,5	–	110	50	17,75	105	139	90	6	2	0,17	3,73	5,78	3,91
	2	130	–	105,2	–	110	63	17,75	102	139	91	12	2	0,26	2,46	3,81	2,58
	3	151,9	–	117,2	–	110	63	17,75	114	166	91	6	2,5	0,22	2,88	4,46	3,02
	3	152,2	–	114,4	–	110	82	17,75	106	166	94	6	2,5	0,37	1,68	2,61	1,76

Self-aligning ball bearings

With adapter sleeve





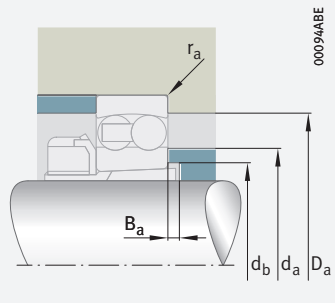
Ball projection C_1 [1)]

d_{1H} = 80 – 100 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤381|1.12 ➤381|1.13	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
80	90	160	30	57 000	23 500	1 330	4 550	4 850	2,48	1,21	**1218-K-TVH-C3**	**H218**
	90	160	40	71 000	28 500	1 630	4 400	5 200	3,18	1,41	**2218-K-TVH-C3**	**H318**
	90	190	43	109 000	43 000	2 300	5 500	4 200	6,27	1,41	**1318-K-M-C3**	**H318**
	90	190	64	156 000	58 000	3 100	5 100	5 000	8,38	1,71	**2318-K-M-C3**	**H2318**
85	95	170	32	64 000	27 000	1 490	6 300	4 600	3,28	1,39	**1219-K-M-C3**	**H219**
	95	170	43	84 000	34 500	1 890	6 100	5 000	4,24	1,58	**2219-K-M-C3**	**H319**
	95	200	45	134 000	51 000	2 650	5 100	4 050	7,2	1,58	**1319-K-M-C3**	**H319**
	95	200	67	167 000	64 000	3 350	4 800	4 750	9,97	1,95	**2319-K-M-C3**	**H2319**
90	100	180	34	70 000	29 500	1 590	6 000	4 500	3,94	1,52	**1220-K-M-C3**	**H220**
	100	180	46	98 000	40 500	2 180	5 700	4 900	5,1	1,76	**2220-K-M-C3**	**H320**
	100	215	47	145 000	57 000	2 900	4 700	3 850	8,95	1,76	**1320-K-M-C3**	**H320**
	100	215	73	196 000	79 000	4 000	4 300	4 350	12,7	2,2	**2320-K-M-C3**	**H2320**
100	110	200	38	89 000	38 500	1 960	5 300	4 200	5,49	1,95	**1222-K-M-C3**	**H222**
	110	200	53	126 000	52 000	2 650	5 000	4 700	7,27	2,25	**2222-K-M-C3**	**H322**
	110	240	50	165 000	72 000	3 400	4 200	3 400	12,2	2,25	**1322-K-M-C3**	**H322**
	110	240	80	221 000	95 000	4 550	3 850	3 900	17,5	2,78	**2322-K-M-C3**	**H2322**

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1) The ball projection must be taken into consideration when designing the adjacent construction.



Mounting dimensions

Dimensions								Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	d_1 ≈	D_m	B_1	B_2 ≈	C_1 [1]	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
80	2	138,7	112,7	120	52	17,75	–	110	149	95	6	2	0,17	3,74	5,79	3,92
	2	139,4	111,5	120	65	17,75	–	108	149	96	10	2	0,27	2,33	3,61	2,44
	3	159,8	124,4	120	65	17,75	–	120	176	96	6	2,5	0,22	2,83	4,38	2,97
	3	159,8	115,7	120	86	17,75	–	112	176	100	6	2,5	0,39	1,63	2,53	1,71
85	2,1	148,2	120,5	125	55	18,75	–	117	158	100	7	2,1	0,17	3,73	5,78	3,91
	2,1	147,9	118,9	125	68	18,75	–	114	158	102	9	2,1	0,27	2,32	3,59	2,43
	3	169,9	127,6	125	68	18,75	1,6	126	186	102	7	2,5	0,23	2,73	4,23	2,86
	3	167,7	121,6	125	90	18,75	–	117	186	105	7	2,5	0,38	1,66	2,57	1,74
90	2,1	155,2	127,3	130	58	19,75	–	124	168	106	7	2,1	0,18	3,58	5,53	3,75
	2,1	156,9	124,4	130	71	19,75	–	120	168	108	8	2,1	0,27	2,33	3,61	2,44
	3	181,3	135,9	130	71	19,75	2,4	132	201	108	7	2,5	0,24	2,68	4,15	2,81
	3	182,7	130,8	130	97	19,75	–	125	201	110	7	2,5	0,38	1,67	2,58	1,75
100	2,1	173,2	140,2	145	63	20,75	–	138	188	116	7	2,1	0,17	3,61	5,59	3,78
	2,1	174,1	136,9	145	77	20,75	–	132	188	118	6	2,1	0,28	2,23	3,45	2,33
	3	202,5	154,5	145	77	20,75	2,7	150	226	118	9	2,5	0,23	2,79	4,32	2,92
	3	201,8	145,5	145	105	20,75	–	139	226	121	7	2,5	0,37	1,69	2,62	1,77

Cylindrical roller bearings



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Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Cylindrical roller bearings with cage, single row			
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			non-locating bearing	semi-locating bearing	locating bearing	detailed information ➤ 416
Load carrying capacity	radial	F_r	+++	+++	+++	➤ 421 | 1.2
	axial, one direction	F_a	–	+	+	➤ 421 | 1.2
	axial, both directions	F_a	–	–	+	➤ 421 | 1.2
	moments	M	–	–	–	➤ 421 | 1.2
Compensation of angular misalignments	static		(+)	(+)	(+)	➤ 424 | 1.3
	dynamic		(+)	(+)	(+)	➤ 424 | 1.3
Bearing design	cylindrical bore		✓	✓	✓	➤ 416 | 1.1
	tapered bore		–	–	–	
	separable		✓	✓	✓	➤ 435 | 1.17
Lubrication	greased		–	–	–	➤ 424 | 1.4
Sealing	open		✓	✓	✓	➤ 424 | 1.5
	non-contact		–	–	–	➤ 424 | 1.5
	contact		–	–	–	➤ 424 | 1.5
Operating temperature in °C	from to		–30+150 [3]	–30+150 [3]	–30+150 [3]	➤ 426 | 1.8
Suitability for	high speeds	n	++	++ [5]	++ [5]	➤ 424 | 1.6 ➤ 24
	high running accuracy		++	++	++	➤ 429 | 1.11 ➤ 115
	low-noise running		+	(+)	(+)	➤ 425 | 1.7 ➤ 27
	high rigidity		++	++	++	➤ 54
	reduced friction		++	++	++	➤ 56
	length compensation within bearing		+++	(+)	–	➤ 417 ➤ 25
	non-locating bearing arrangement		+++	+	–	➤ 141
	locating bearing arrangement		–	+	++	➤ 141
X-life bearings		X-life	✓	✓	✓	➤ 419
Bearing bore d in mm	from to		15 710 [8]	15 280 [8]	15 280 [8]	➤ 438
Product tables	from page ➤		438	454	454	

1) Valid only for series SL1923
2) Valid only for non-locating bearings SL0248 and SL0249
3) Valid for bearings with sheet steel cage or brass cage
4) With greasing using GA22
5) For low axial load only
6) Valid for locating bearings SL0148 and SL0149
7) Only semi-locating bearings SL1850
8) Larger catalogue bearings GL 1

	Cylindrical roller bearings with disc cage or spacers			Single row full complement cylindrical roller bearings		Double row full complement cylindrical roller bearings			
	with disc cage	with spacers	detailed information ➤ 482	semi-locating bearing	detailed information ➤ 502	locating/semi-locating/non-locating bearing	locating bearing with annular slots	detailed information ➤ 528	
	+++	+++	➤484|2.2	+++	➤505|3.2	+++	+++	➤532|4.2	F_r
	+	+	➤484|2.2	+	➤505|3.2	(+)	(+)	➤532|4.2	F_a
	–	–	➤484|2.2	–	➤505|3.2	(+)	(+)	➤532|4.2	F_a
	–	–	➤484|2.2	–	➤505|3.2	+	+	➤532|4.2	M
	(+)	(+)	➤487|2.3	(+)	➤508|3.3	–	–	➤535|4.3	
	(+)	(+)	➤487|2.3	(+)	➤508|3.3	–	–	➤535|4.3	
	✓	✓	➤482|2.1	✓	➤508|3.3	✓	✓	➤535|4.3	
	–	–		–		–	–		
	✓	✓	➤496|2.17	✓[1]	➤516|3.17	✓[2]	–	➤546|4.17	
	–	–	➤488|2.4	–	➤508|3.4	–	✓	➤535|4.4	
	✓	✓	➤488|2.5	✓	➤508|3.5	✓	–	➤535|4.5	
	–	–	➤488|2.5	–	➤508|3.5	–	–	➤535|4.5	
	–	–	➤488|2.5	–	➤508|3.5	–	✓	➤535|4.5	
	–30 +120	–30 +120	➤490|2.8	–30 +120	➤510|3.8	–30 +120	–40[4] +80	➤537|4.8	
	++	++	➤488|2.6	–	➤509|3.6	–	–	➤535|4.6	n
	+	(+)	➤492|2.11 ➤24	+	➤511|3.11 ➤24	+	+	➤539|4.11 ➤24	
	(+)	(+)	➤489|2.7 ➤27	–	➤509|3.7	–	–	➤536|4.7	
	++	++	➤54	+++	➤54	+++	+++	➤54	
	+	+	➤56	–	➤56	–	–	➤56	
	(+)	(+)	➤25	(+)	➤25	–[6]	–	➤529 ➤25	
	+	+	➤141	+	➤141	+[6]	+	➤141	
	+	+	➤141	+	➤141	+[6]	+	➤141	
	✓	✓	➤484	✓	➤504	✓[7]	–	➤531	X-life
	80 300[8]	25 120	➤498	20 500[8]	➤518	20 400[8]	20 300[8]	➤548	
	498	500		518		548	556		

1 Single row cylindrical roller bearings with cage

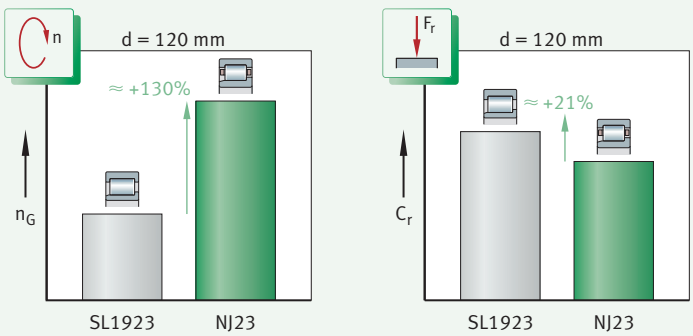
Single row cylindrical roller bearings with cage are suitable where:

- bearing arrangements are subjected to very high radial loads ➤*421*|*1.2*
- not only high radial forces but also axial loads from one or both directions must be supported by the bearing position (semi-locating or locating bearing function) ➤*421*|*1.2*
- bearing arrangements must have very high rigidity
- axial displacements of the shaft relative to the housing must be compensated without constraint in the bearing (in the case of bearings with a non-locating or semi-locating bearing function) ➤*416*|*1.1*
- high radial loads and very high speeds occur but the very high radial load carrying capacity of full complement cylindrical roller bearings is not required ➤*424*|*1.6*
- the bearings should be separable (one bearing ring can be removed) for easier mounting ➤*416*|*1.1*

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*414*.

1
Cylindrical roller bearing with cage/full complement bearing, comparison of speed and load carrying capacity

n_G = *limiting speed*
C_r = *basic dynamic load rating*
SL1923 = *full complement cylindrical roller bearing*
NJ23 = *cylindrical roller bearing with cage*



1.1 Bearing design

✎ *Design variants*

Single row cylindrical roller bearings with cage are available in the basic design as:

- type NU (non-locating bearing) ➤*418*|*3*
- type N (non-locating bearing) ➤*418*|*3*
- type NJ (semi-locating bearing) ➤*418*|*4*
- type NUP (locating bearing) ➤*418*|*4*
- X-life bearings ➤*419*

In addition to the bearings described here, Schaeffler supplies single row cylindrical roller bearings with cage in other types, series and dimensions. These products are described in some cases in special publications. If necessary, please contact Schaeffler. Larger catalogue bearings GL 1.

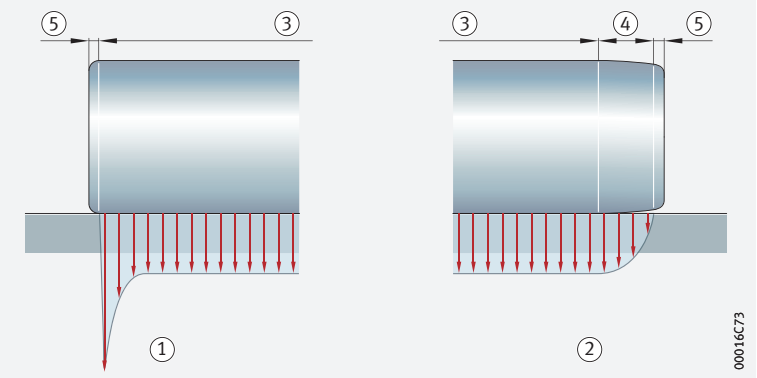
Bearings of basic design – standard range

✎ *Key features*

Single row cylindrical roller bearings with cage are part of the group of radial roller bearings. In contrast to the ball, the roller has a larger contact area perpendicular to the roller axis. As a result, it can transmit higher forces, has greater rigidity and allows smaller rolling element diameters under the same load. The single row bearings comprise solid outer rings, inner rings and cages that are fitted with a large number of cylindrical rollers. The rollers have profiled ends, i. e. they have a slight lateral curvature towards the ends. This modified line contact between the rolling elements and raceways prevents damaging edge stresses ➤*417*|🗀 *2*.
In all standard designs, the cylindrical rollers are guided between rigid ribs by at least one bearing ring. Together with the cage and rollers, this forms a ready-to-fit unit. The other bearing ring can be removed. As a result, the inner ring and outer ring can be mounted separately. Tight fits can thus be achieved on both rings. Bearings of the basic design are manufactured in many different types that differ essentially in the arrangement of the ribs on the inner ring and outer ring. Depending on the design, they are used as non-locating bearings, semi-locating bearings or locating bearings.

🗀 **2**
Roller profile and stress distribution

① *Cylindrical roller profile (high stress peaks)*
② *Roller with profiled ends (no stress peak)*
③ *Cylindrical centre region*
④ *Region of logarithmic tapering*
⑤ *Rounding of edge*



Type NU

✎ *Bearings with non-locating bearing function*

In bearings of type NU, the outer ring has two rigid ribs, while the inner ring has no ribs ➤*418*|🗀 *3*. As a result, axial displacements of the shaft relative to the housing are possible in both directions and within certain limits. During rotational motion, length compensation occurs without constraint in the bearing between the rollers and the raceway without ribs and is therefore practically free from friction. The maximum axial displacement s is given in the product tables. The bearings are used as non-locating bearings, i. e. they cannot guide the shaft axially in either direction ➤*421*|*1.2*. For use as semi-locating bearings, they can be combined with the L-section ring HJ ➤*419*|🗀 *5*.

Type N

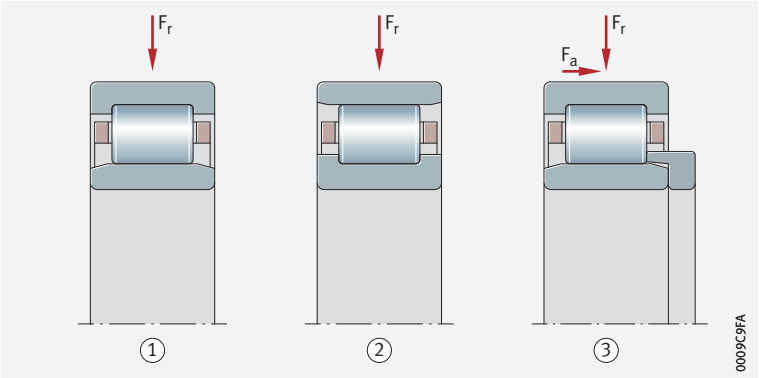
✎ *Bearings with non-locating bearing function*

Cylindrical roller bearings of type N have two rigid ribs on the inner ring, while the outer ring has no ribs ➤*418*|🗀 *3*. Due to the absence of ribs, axial displacements of the shaft relative to the housing are possible in both directions within the bearing. The maximum axial displacement s is given in the product tables. Bearings of type N are used as non-locating bearings, i. e. they cannot guide the shaft axially in either direction ➤*421*|*1.2*.

3
Single row cylindrical roller bearings – non-locating or semi-locating bearings

F_r = *radial load*
F_a = *axial load*

① *Cylindrical roller bearing NU (non-locating bearing)*
② *Cylindrical roller bearing N (non-locating bearing)*
③ *Cylindrical roller bearing NU + L-section ring HJ (semi-locating bearing)*



Type NJ

✎ *Bearings with semi-locating bearing function*

Bearings of type NJ have two rigid ribs on the outer ring and one rigid rib on the inner ring ➤*418*|⧉*4*. With these cylindrical roller bearings, axial displacements of the shaft relative to the housing are possible in one direction only. The maximum axial displacement s is given in the product tables. Bearings of type NJ are used as semi-locating bearings, i. e. they can guide the shaft axially in one direction ➤*421*|*1.2*. Semi-locating bearings NJ can be combined with an L-section ring HJ to form a locating bearing unit ➤*419*|⧉*5*.

Type NUP

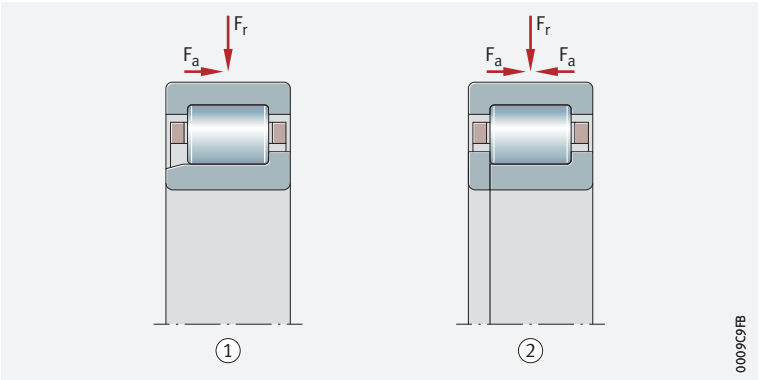
✎ *Bearings with locating bearing function*

Cylindrical roller bearings of type NUP have two rigid ribs on the outer ring as well as one rigid rib and one loose rib washer on the inner ring ➤*418*|⧉*4*. With these cylindrical roller bearings, axial displacements between the shaft and the housing are not possible. Bearings of type NUP are used as locating bearings, i. e. they can guide the shaft axially in both directions ➤*421*|*1.2*.

4
Single row cylindrical roller bearings – semi-locating or locating bearings

F_r = *radial load*
F_a = *axial load*

① *Cylindrical roller bearing NJ (semi-locating bearing)*
② *Cylindrical roller bearing NUP (locating bearing)*



L-section rings

✎ *Functional expansion by means of L-section rings*

In order to expand the function of cylindrical roller bearings NU and NJ, these types can be combined with L-section rings HJ ➤*419*|⧉*5*. In this way, bearings NU can perform a semi-locating bearing function, while bearings NJ in combination with L-section rings can perform a locating bearing function ➤*419*|⧉*5*.

Cylindrical roller bearings NU must not be mounted with two L-section rings, since this can lead to axial bracing of the rollers.

Areas of application of L-section rings

L-section rings can be advantageous where:

- the inner ring in locating bearing arrangements that are subjected to high loads has a very tight fit; bearings of type NJ + HJ permit tighter fits than bearings NUP, which have a shortened inner ring and a loose rib washer
- the shaft must be axially guided in one or both directions and bearings NJ or NUP are not available
- the design of the bearing arrangement and the mounting and dismounting of the bearings should be simplified

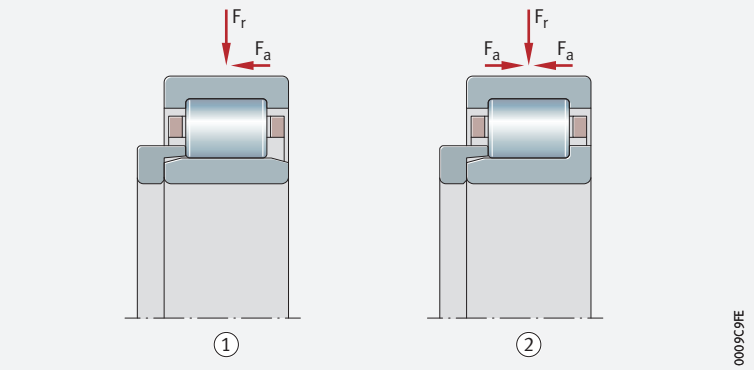
Design of L-section rings

The L-section rings are made from rolling bearing steel and are hardened and ground. The axial runout of the lateral faces corresponds to the normal tolerances of the appropriate bearings. Where available, the L-section rings are listed in the product tables together with the associated bearings (e.g. bearing NJ206-E-TVP2 + L-section ring HJ206-E). Since the L-section rings are not a component of the bearing, these must always be ordered together with the bearing ➤430|🗀14.

🗀5
Cylindrical roller bearings with L-section rings – semi-locating or locating bearings

F_r = *radial load*
F_a = *axial load*

① *Cylindrical roller bearing NU + L-section ring HJ (semi-locating bearing)*
② *Cylindrical roller bearing NJ + L-section ring HJ (locating bearing)*

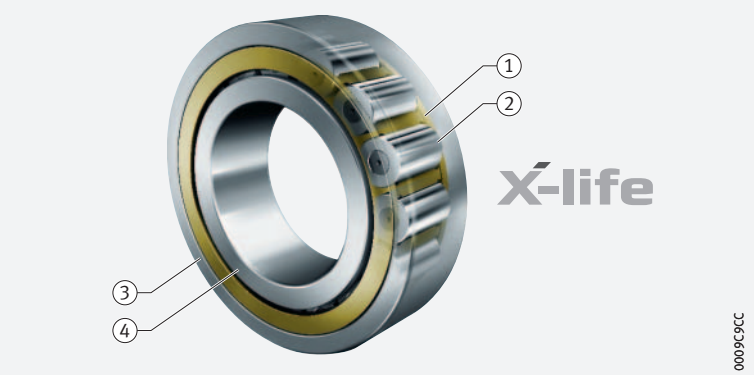


X-life premium quality

Single row cylindrical roller bearings with cage are supplied up to an outside diameter D = 320 mm as X-life bearings ➤419|🗀6. These bearings exhibit considerably higher performance than comparable standard cylindrical roller bearings. This is achieved, for example, through the modified internal construction, the optimised contact geometry between the rollers and raceways, the better surface quality ➤420|🗀7 and the optimised roller guidance and lubricant film formation.

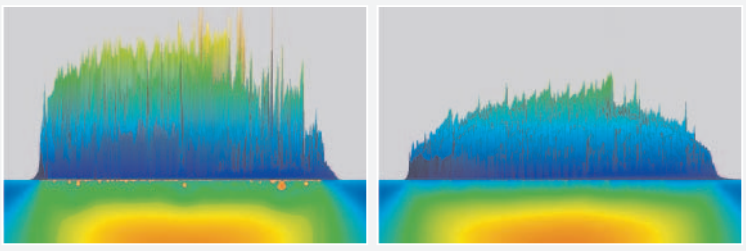
🗀6
Cylindrical roller bearing in X-life design

① *Brass cage*
② *Cylindrical roller, honed*
③ *Outer ring, honed*
④ *Inner ring, honed*



7
Comparison of surface qualities

① *Standard surface – a rough surface causes stress peaks under radial load*
② *X-life surface – a higher surface quality reduces stress peaks; this increases the bearing operating life*



Advantages

Increased customer benefits due to X-life

These technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings ➤*417*|*2* and ➤*420*|*8*
- a higher fatigue limit load
- lower heat generation in the bearing
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements

Interchangeable with comparable standard bearings

Since X-life cylindrical roller bearings have the same dimensions as the corresponding standard bearings, the latter can be replaced without any problems by the higher-performance X-life bearings. The major advantages of X-life can therefore also be used for existing bearing arrangements with standard bearings.

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

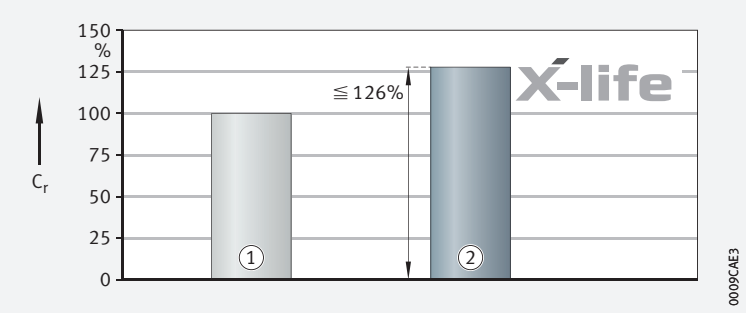
Suffix XL

X-life cylindrical roller bearings include the suffix XL in the designation ➤*429*|*1.12* and ➤*438*|▦.

8
Cylindrical roller bearing with cage: comparison of basic dynamic load rating C_r with bearings without X-life quality

C_r = *radial basic dynamic load rating*

① *Bearing without X-life quality*
② *X-life cylindrical roller bearing*



Areas of application

Due to their special technical features, X-life cylindrical roller bearings are highly suitable, for example, for bearing arrangements in:

- heavy industry (steel production)
- power transmission (gearbox engineering)
- processing machines and construction machinery
- wind turbines (gearbox applications)

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

1.2 Load carrying capacity

✎Designed for very high radial loads

Depending on the type, single row cylindrical roller bearings can support not only very high radial forces but also high axial loads on one or both sides:

- The types N and NU can only support radial loads. If NU bearings are combined with an L-section ring, these can also support axial loads on one side ➤*418*|*3*.
- The type NJ can support axial loads on one side and radial loads. If this type is combined with an L-section ring, it can support axial loads on both sides ➤*419*|*5*.
- The type NUP can support axial loads on both sides and radial loads

✎Higher capacity roller set in variant E

Bearings with the suffix E have a higher capacity roller set and are thus designed for very high load carrying capacity.

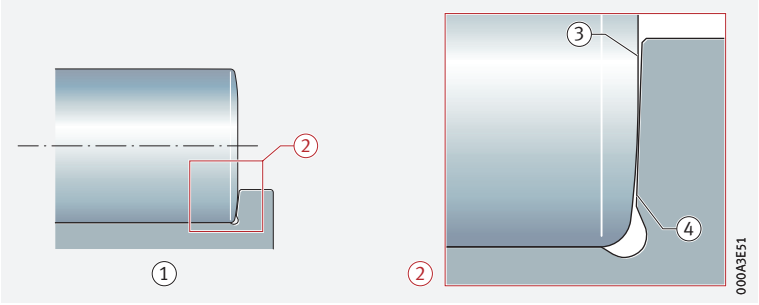
Higher axial load carrying capacity of bearings with toroidal crowned roller end face

✎Neither wear nor fatigue occurs on the rib contact running and roller end faces

In the case of cylindrical roller bearings with toroidal crowned rollers (TB design), the axial load carrying capacity has been significantly improved with the aid of new calculation and manufacturing methods. A special curvature of the roller end faces facilitates optimum contact conditions between the rollers and ribs ➤*421*|*9*. As a result, the axial contact pressures on the rib are significantly minimised and a lubricant film capable of supporting higher loads is formed. Under standard operating conditions, this completely eliminates wear and fatigue at the rib contact running and roller end faces. In addition, the frictional torque is reduced by up to 50%. The bearing temperature during operation is therefore significantly lower. Bearings of the toroidal crowned design are available for a bore diameter of, or larger than, d = 170 mm ➤*438*.

9
Contact geometry of roller end face/rib face – modified roller end faces

① *Cylindrical roller with inner ring*
② *Detail (representation not to scale)*
③ *End of roller*
④ *Rib*



Load ratio F_a/F_r

Ratio $F_a/F_r \leqq 0,4$ or 0,6

The bearings can support axial loads on one side by means of the ribs on the inner and outer ring. In order to ensure problem-free running (tilting of the rollers is prevented), they must always be subjected to radial load at the same time as axial load. The ratio F_a/F_r must not exceed the value 0,4. For bearings with toroidal crowned roller ends (TB design), values up to 0,6 are permissible.

The load F_r describes the radial load for a single row bearing. For multi-row bearings, F_r must be divided by the number of rows.

Continuous axial loading without simultaneous radial loading is not permissible.

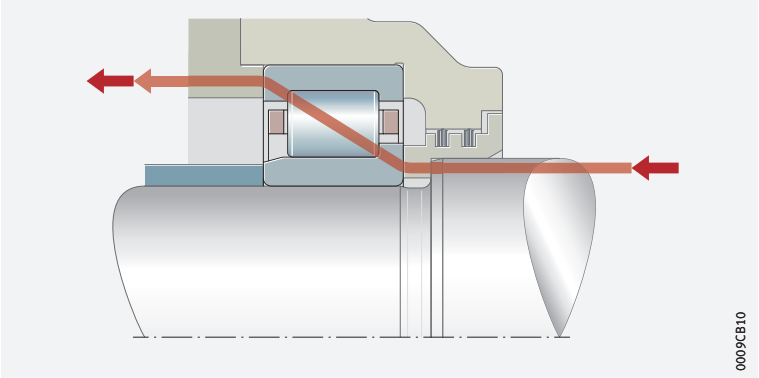
Permissible axial load

Influencing factors on the axial load carrying capacity

Axial loads are supported by the bearing ribs and the roller end faces ➤*418*| *4*. The axial load carrying capacity of the bearing is therefore essentially dependent on:

- the size of the sliding surfaces between the ribs and the end faces of the rolling elements
- the sliding velocity at the ribs
- the lubrication of the contact surfaces
- tilting of the bearing
- friction

10
Force flow under axial load – semi-locating bearing NJ



Calculation of permissible axial load – cylindrical rollers with conventional roller ends

Bearings with standard roller ends

The permissible axial load $F_{a\,per}$ can be calculated from the hydrodynamic load carrying capacity of the contact ➤*422*| *1*.

1
Permissible axial load – bearings of standard design

$$F_{a\,per} = k_S \cdot k_B \cdot d_M^{\,1,54} \cdot n^{-0,6} \leqq F_{a\,max}$$

Legend

$F_{a\,per}$	N	Permissible continuous axial load. In order to prevent unacceptably high temperatures in the bearing, $F_{a\,per}$ must not be exceeded
$F_{a\,max}$	N	Maximum continuous axial load in relation to rib fracture. In order to prevent unacceptably high pressures at the contact surfaces, $F_{a\,max}$ must not be exceeded
k_S	–	Factor as a function of lubrication method ➤*423*| *1*. The factor takes into consideration the lubrication method used for the bearing. The better the lubrication and, in particular, the heat dissipation, the higher the permissible axial load
k_B	–	Factor as a function of bearing series ➤*423*| *2*
d_M	mm	Mean bearing diameter $d_M = (D + d)/2$ ➤*438*|
n	min^{-1}	Operating speed.

1 *Factor k_S*

Lubrication method	Factor k_S	
	from	to
Minimal heat dissipation, drip feed oil lubrication, oil mist lubrication, low operating viscosity ($\nu < 0{,}5 \cdot \nu_1$)	7,5	10
Poor heat dissipation, oil sump lubrication, oil spray lubrication, low oil flow	10	15
Good heat dissipation, recirculating oil lubrication (pressurised oil lubrication)	12	18
Very good heat dissipation, recirculating oil lubrication with oil cooling, high operating viscosity ($\nu > 2 \cdot \nu_1$)	16	24

The precondition for these k_S values is an operating viscosity of the lubricant of at least the reference viscosity ν_1 in accordance with DIN ISO 281:2010.

Doped lubricating oils should be used, such as CLP (DIN 51517) and HLP (DIN 51524) of ISO VG grades 32 to 460, as well as ATF oils (DIN 51502) and transmission oils (DIN 51512) of SAE viscosity grades 75W to 140W.

2 *Bearing factor k_B*

Series	Factor k_B
NJ2..-E, NJ22..-E, NUP2..-E, NUP22..-E	15
NJ3..-E, NJ23..-E, NUP3..-E, NUP23..-E	20
NJ4	22

Calculation of permissible axial load – cylindrical rollers with toroidal roller ends

Higher axial loads possible

For bearings with toroidal roller ends, the permissible axial loads are 50% higher ➤*423*| *f 2*.

f 2 *Permissible axial load – bearings of TB design*

$$F_{a\,per} = 1{,}5 \cdot k_S \cdot k_B \cdot {d_M}^{1{,}54} \cdot n^{-0{,}6} \leqq F_{a\,max}$$

Calculation of maximum permissible axial load

For bearings with rollers of the standard or TB design, the maximum permissible axial load $F_{a\,max}$ ➤*423*| *f 3* is calculated from the rib strength and the security against wear. This must not be exceeded, even if $F_{a\,per}$ gives higher values ➤*423*| *f 4*.

f 3 *Maximum axial load – bearings of standard and TB design*

$$F_{a\,max} = 0{,}075 \cdot k_B \cdot {d_M}^{2{,}1}$$

f 4 *Permissible axial load*

$$F_{a\,per} \leqq F_{a\,max}$$

Axial load under shaft deflection

Permissible axial load under shaft deflection of up to 2′

Under considerable shaft deflection, the shaft shoulder presses against the inner ring rib. In combination with the active axial load, this can lead to high alternating loading of the inner ring ribs. Under a shaft deflection of up to 2′, the permissible axial load can be estimated ➤*423*| *f 5*.

If more severe tilting is present, a separate strength analysis is required. In this case, please contact Schaeffler.

f 5 *Axial load under misalignment*

$$F_{as} = 20 \cdot {d_M}^{1{,}42}$$

Legend

F_{as}	N	Permissible axial load under misalignment.

1.3 Compensation of angular misalignments

Angular deviations are misalignments between the inner and outer ring

The possible misalignment between the inner ring and outer ring is influenced by the internal bearing construction, the operating clearance, the forces acting on the bearing etc. Due to these complex relationships, it is not possible to give generally valid absolute values here. However, misalignments (angular deviations) between the inner ring and outer ring will generally always have an effect on the running noise and the operating life of the bearings.

Permissible tilting

The permissible guide values at which, based on experience, there is no significant reduction in operating life are as follows:

- 4′ for series 10, 19, 2, 3, 4
- 3′ for series 22, 23

Scope of values

The values apply to:

- bearing arrangements with static misalignment (consistent position of the shaft and housing axis)
- bearings that are not required to perform an axial guidance function
- bearings subjected to small loads (with $C_{0r}/P \geqq 5$)

Checking by means of the calculation program BEARINX is recommended in all cases. If there is any uncertainty regarding possible misalignment, please consult Schaeffler.

1.4 Lubrication

Oil or grease lubrication

Single row cylindrical roller bearings with cage are not greased. They must be lubricated with oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed; i. e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

1.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

✎ *Values for grease lubrication*

For the grease lubrication of bearings without seals or shields, 85% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 65% of the value stated in the product tables is permissible in each case.

Reference speeds

✎ *$n_{\vartheta r}$ is used to calculate n_{ϑ}*

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_{ϑ} ➤64.

1.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

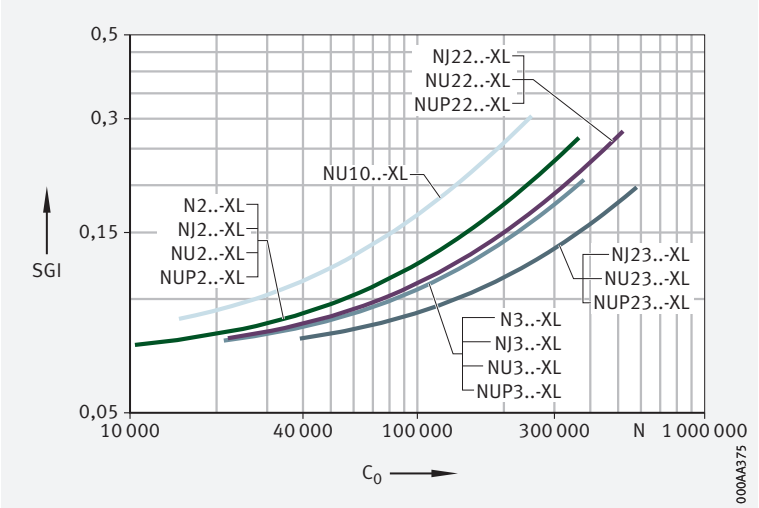
The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:

- ***medias*** *https://medias.schaeffler.com*

11
Schaeffler Noise Index for single row cylindrical roller bearings with cage

SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and cylindrical rollers
- the cage
- the lubricant

Possible operating temperatures of single row cylindrical roller bearings ➤*426*| ▦ *3*.

▦ **3**
Permissible temperature ranges

Operating temperature	Single row cylindrical roller bearings	
	with polyamide cage PA66	with brass or sheet steel cage
	–30 °C to +120 °C	–30 °C to +150 °C For continuous operating temperatures higher than +120 °C, please contact us

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

The right cage for any purpose

✎ *Standard materials are plastic, brass and steel*

Approximately two-thirds of Schaeffler cylindrical roller bearings are supplied with cages. For standard applications, the cage materials used essentially are plastic, brass and sheet steel. A large number of cage types and sizes are designed using these three materials. As a result, the right bearing – in accordance with the operating conditions – is always available. For cylindrical roller bearings standardised in accordance with DIN 5412, there are four standard cages available for selection. A summary of the various cage characteristics and their suitability for certain applications is shown in ➤*427*| ▦ *4*.

✎ *Plastic cage TVP2*

The highly versatile plastic cage TVP2 is the standard cage for bearings up to a medium bearing diameter ➤*427*| ▦ *5*. In comparison with metal cages, it has a range of advantages: low mass, low running noises due to good damping, high elasticity, good tribological characteristics with steel rolling elements and very good emergency running characteristics. This cage is thus a good choice for applications that allow the use of a plastic cage. Due to their wide-ranging positive characteristics, such plastic cages are now in use in many millions of bearings and applications.

✎ *Two-piece solid brass cage M1*

A classic design of brass cage is the two-piece, riveted-bar brass cage M1 ➤*427*| ▦ *5*. It comprises a so-called comb cage and a cage cover. The cage parts are joined by means of hot riveting, where the rivet pin is integrated in the cage comb.

✎ *One-piece, milled brass cage MPAX/MPBX*

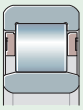
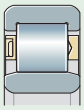
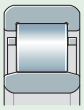
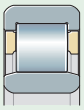
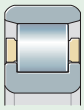
The brass cage MPAX or MPBX is intended for demanding conditions, such as the high speeds and radial accelerations occurring in planetary gear bearing arrangements ➤*427*| ▦ *4*. The optimised pocket geometry and the minimised mass allow a lower running temperature than comparable brass cages. The cages differ in the type of rib guidance. Cage MPAX is guided on the outer ring rib and cage MPBX is guided on the inner ring rib.

✎ Sheet steel cage JP3

For applications that require increased temperature resistance, good lubrication and high geometrical stability of the cage, a bearing with a sheet steel cage is often the most economical solution ➤427| 4. With the aid of highly developed manufacturing technologies, the geometry of the crosspieces and thus the running contact of the rollers on the cage bars is significantly improved. This goes hand in hand with a favourable surface structure, which has a positive influence on lubricant film formation.

4 *Cage, cage characteristics, suitability*

+++ = *extremely suitable*
\+ = *suitable*
– = *less suitable*

Criteria	Cage				
	TVP2	M1	JP3	MPAX	MPBX
					
Large number of rolling elements	+	+	+	+	+
High radial cage rigidity	–	+++	+	+++	+++
Low mass	+++	–	+	–	–
Good emergency running (damage case)	–	+++	+	+++	+++
Low noise	+++	+	+	+	+
High guidance normal acceleration	+	+	+	+++	+++
Strong vibrations	+	+	+	+++	+++
Relubrication facility	–	–	+++	+	+
Grease/oil compatibility	–	+	+++	+	+
Application temperatures > 120 °C	–	+	+++	+	+
Large temperature fluctuations	–	+	+++	+	+

✎ Solid cages made from brass and polyamide PA66 are used as standard

Standard cages are shown in ➤427| 5. The cage design is dependent on the bearing series and the bore code. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with brass cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

5 *Cage, cage suffix, bore code*

Bearing series	Solid cage made from polyamide PA66 TVP2 standard	Solid brass cage M1 standard
	Bore code	
NU10	–	from 05
NU19	–	from 92
NU2..-E, NJ2..-E, NUP2..-E	up to 26	from 28
NU3..-E, NJ3..-E, NUP3..-E	up to 28	from 30
NU4, NJ4	–	all
NU22..-E, NJ22..-E	up to 26	from 28
NU23..-E, NJ23..-E	up to 22	from 24
N2..-E	up to 20, 22 to 26	21, from 28
N3..-E	up to 16	from 17
NUP22..-E	up to 26	from 28
NUP23..-E	up to 22	from 24

1.10 Internal clearance

Radial internal clearance

The standard is CN

Cylindrical roller bearings with cage are manufactured as standard with the radial internal clearance CN (normal) ➤*428*|▦*6*. CN is not stated in the designation.

Certain sizes are also available by agreement with the larger internal clearance C3, C4 and C5 ➤*428*|▦*6*.

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤*428*|▦*6*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦*6*
Radial internal clearance of single row cylindrical roller bearings with cage

Nominal bore diameter d mm		Radial internal clearance							
		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm		C5 (Group 5) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	20	45	35	60	50	75	65	90
24	30	20	45	35	60	50	75	70	95
30	40	25	50	45	70	60	85	80	105
40	50	30	60	50	80	70	100	98	125
50	65	40	70	60	90	80	110	110	140
65	80	40	75	65	100	90	125	130	165
80	100	50	85	75	110	105	140	155	190
100	120	50	90	85	125	125	165	180	220
120	140	60	105	100	145	145	190	200	245
140	160	70	120	115	165	165	215	225	275
160	180	75	125	120	170	170	220	250	300
180	200	90	145	140	195	195	250	275	330
200	225	105	165	160	220	220	280	305	365
225	250	110	175	170	235	235	300	330	395
250	280	125	195	190	260	260	330	370	440
280	315	130	205	200	275	275	350	410	485
315	355	145	225	225	305	305	385	455	535
355	400	190	280	280	370	370	460	510	600
400	450	210	310	310	410	410	510	565	665
450	500	220	330	330	440	440	550	625	735
500	560	240	360	360	480	480	600	690	810
560	630	260	380	380	500	500	620	780	900
630	710	285	425	425	565	565	705	865	1005

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of cylindrical roller bearings correspond to ISO 15:2017 (DIN 616:2000 and DIN 5412-1:2005).

The main dimensions of L-section rings HJ correspond to ISO 246:1995 (DIN 5412-1:2005).

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137|7.11*.
Nominal value of chamfer dimension ➤*438|*.

Tolerances

The dimensional tolerances of cylindrical roller bearings correspond to the tolerance class Normal, the running tolerance to the tolerance class 6 in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*126|*.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

7 Suffixes and corresponding descriptions

Suffix	Description of suffix	
C3	Radial internal clearance C3 (larger than normal)	Available by agreement
C4	Radial internal clearance C4 (larger than C3)	
C5	Radial internal clearance C5 (larger than C4)	
E	Increased capacity design	Standard
EX	Increased capacity design, design modified in accordance with standard (parts from these bearings must not be interchanged with parts from bearings of the same size of the previous design E)	
JP3	Sheet steel window cage, single-piece, roller-guided	Available by agreement
J30P	Black oxide coated (Durotect B)	
MPAX	Solid brass cage, single-piece, rib-guided on outer ring	
MPBX	Solid brass cage, single-piece, rib-guided on inner ring	
M1	Solid brass cage, two-piece, roller-guided	Standard
M1A	Solid brass cage, two-piece, rib-guided on outer ring	Available by agreement
M1B	Solid brass cage, two-piece, rib-guided on inner ring	
TB	Bearing with increased axial load carrying capacity (toroidal crowned design)	Standard, dependent on bearing size
TVP2	Solid window cage made from glass fibre reinforced polyamide PA66	Standard
XL	X-life bearing	

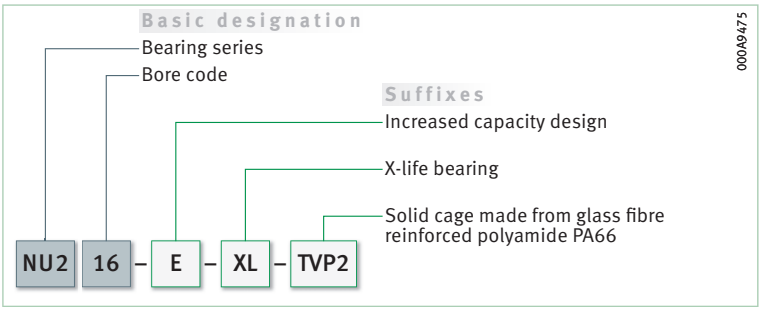
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

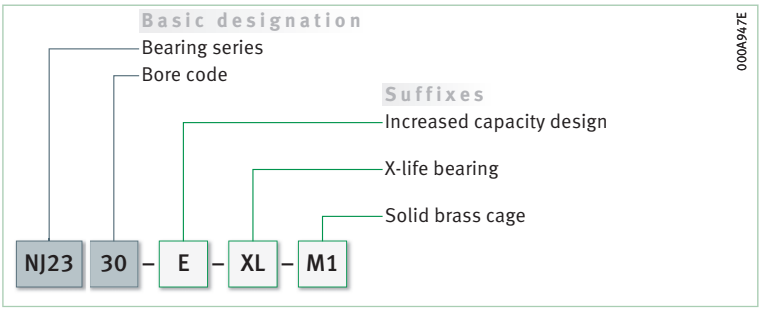
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ➤*430*|*12* to ➤*430*|*14*. The composition of designations is subject to DIN 623-1 ➤*102*|*10*.

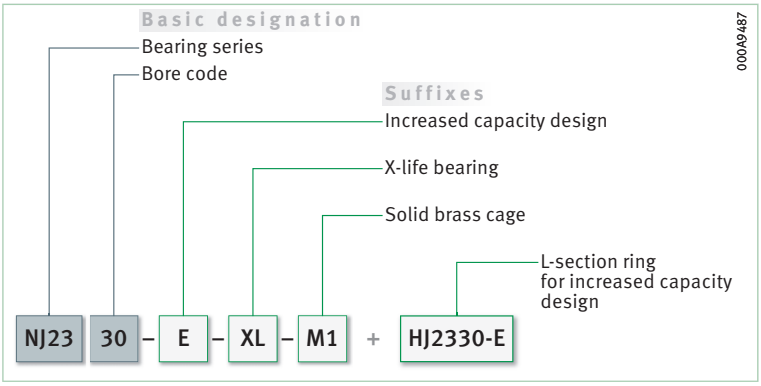
12
Single row cylindrical roller bearing with cage – bearing with non-locating bearing function: designation structure



13
Single row cylindrical roller bearing with cage – bearing with semi-locating bearing function: designation structure



14
Single row cylindrical roller bearing with cage, type NJ with L-section ring – bearing with locating bearing function: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

$P = F_r$ under purely radial load of constant magnitude and direction

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

Cylindrical roller bearings with non-locating bearing function

$P = F_r$

Non-locating bearings can only support radial loads. For these bearings ➤*430*|*f 6*.

f 6
Equivalent dynamic load

$P = F_r$

Cylindrical roller bearings with semi-locating or locating bearing function

✎ P is a substitute force for combined load and various load cases

If the condition described above is not met, i.e. if, in addition to the radial force F_r, there is also an axial force F_a, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ $F_a/F_r \leqq e$ or $F_a/F_r > e$

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factors e and Y ➤ *431* | *f 7* and ➤ *431* | *f 8*.

f 7
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r$$

f 8
Equivalent dynamic load

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}92 \cdot F_r + Y \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load
e, Y	–	Factors ➤ *431*	*8*.

8
Factors e and Y

Bearing series	Calculation factors	
	e	Y
NJ2, NUP2, NJ3, NUP3, NJ4	0,2	0,6
NJ22, NUP22, NJ23, NUP23	0,3	0,4

Equivalent static bearing load

✎ $P_0 = F_{0r}$

For cylindrical roller bearings subjected to static load ➤ *431* | *f 9*.

f 9
Equivalent static load

$$P_0 = F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}	N	Largest radial load present (maximum load).

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤ *431* | *f 10*.

f 10
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is necessary during continuous operation

In order that no slippage occurs between the contact partners, the cylindrical roller bearings must be constantly subjected to a sufficiently high radial load. For continuous operation, experience shows that a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤433|▦9 to ➤434|▦11.

Radial location

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤152|▦6 and ➤160|▦7.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤146
- conditions of rotation ➤147
- tolerance classes for cylindrical shaft seats (radial bearings) ➤149|▦2
- shaft fits ➤152|▦6
- tolerance classes for bearing seats in housings (radial bearings) ➤150|▦4
- housing fits ➤160|▦7

Axial location

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings, retaining rings, adapter and withdrawal sleeves etc., are fundamentally suitable ➤434|🗀15.

Dimensional, geometrical and running accuracy of cylindrical seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For cylindrical roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and in the housing seat to a minimum of IT7; with tolerance class 6, the shaft seat should correspond to a minimum of IT5 and the housing seat to a minimum of IT6. Guide values for the geometrical and positional tolerances of the bearing seating surfaces ➤433|▦9. Tolerances t_1 to t_3 in accordance with ➤170|🗀11. Numerical values for IT grades ➤433|▦10.

9
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance	Parallelism tolerance	Total axial runout tolerance of abutment shoulder
				t_1	t_2	t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
6	P6	Shaft	IT5	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	
		Housing	IT6	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	

10
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm					
	over **10**	**18**	**30**	**50**	**80**	**120**
	incl. **18**	**30**	**50**	**80**	**120**	**180**
	Values in µm					
IT3	3	4	4	5	6	8
IT4	5	6	7	8	10	12
IT5	8	9	11	13	15	18
IT6	11	13	16	19	22	25
IT7	18	21	25	30	35	40

continued ▼

10
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm					
	over **180**	**250**	**315**	**400**	**500**	**630**
	incl. **250**	**315**	**400**	**500**	**630**	**800**
	Values in µm					
IT3	10	12	13	15	16	18
IT4	14	16	18	20	22	25
IT5	20	23	25	27	32	36
IT6	29	32	36	40	44	50
IT7	46	52	57	63	70	80

continued ▲

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤434|▦ 11.

▦ 11
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4
500	1 250	3,2[1)]	1,6	1,6	0,8

1) *For the mounting of bearings using the hydraulic method, a value Ra = 1,6 µm must not be exceeded.*

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5418:1993 or an undercut to DIN 509:2006. Proven mounting dimensions for the radii and diameters of abutment shoulders are given in the product tables ➤434|⧉ 15 and ➤438|▦. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

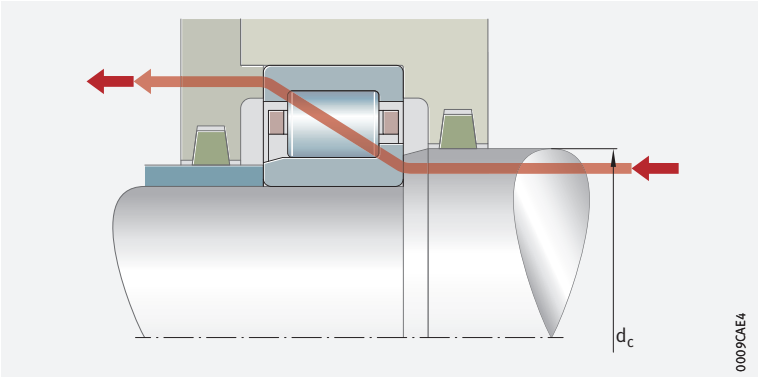
Rib support in axially loaded bearings

Ribs under axial load must be supported over their entire height and entire circumference. The size and axial runout accuracy of the contact surfaces on the inner ring rib must be observed especially in the case of cylindrical roller bearings subjected to high loads, since these factors also influence the uniformity of the rib load and the running accuracy of the shaft. This means that the ribs may be subjected to damaging alternating stresses even in the case of very small misalignments. If the mounting dimensions indicated in the product tables are observed, the problems described can be reliably avoided ➤438|▦.

Support in semi-locating bearings

In semi-locating bearings, it is sufficient to support the bearing rings on one side, on the rib supporting the axial load ➤434|⧉ 15.

⧉ 15
Support of the inner ring rib – type NJ (semi-locating bearing)



d_c = *recommended height of shaft shoulder with axially loaded rib*
Arrow = *force flow*

1.17 Mounting and dismounting

The mounting and dismounting options for cylindrical roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Since one bearing ring can be removed, the bearings are easy to mount.

Together with the cage and rollers, the bearing ring with the two rigid ribs forms a ready-to-mount unit. The other bearing ring can be removed. As a result, the bearing parts can be mounted separately from each other ➤*416|1.1*. This gives simplified mounting of the bearings, especially when the two bearing rings have a tight fit.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

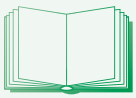
Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

1.19 Further information



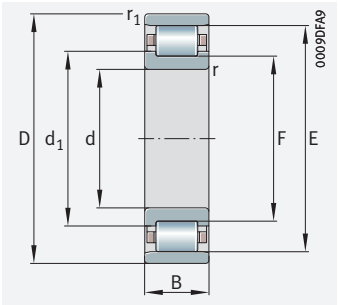
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

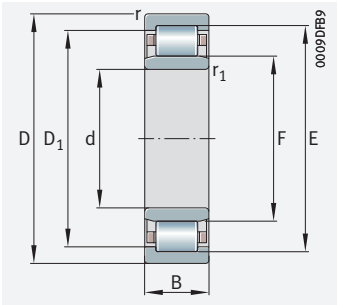


Cylindrical roller bearings with cage

Non-locating bearings



N

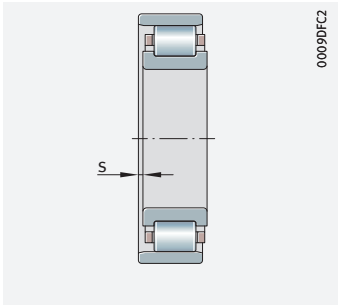


NU

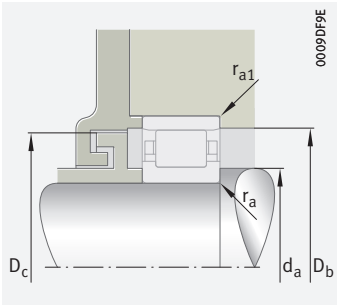
d = 15 – 35 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*429*|*1.12* ➤*430*|*1.13* X-life ➤*419*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
15	35	11	15 100	10 400	1 640	27 000	17 900	0,047	**N202-E-XL-TVP2**
	35	11	15 100	10 400	1 440	27 000	17 900	0,048	**NU202-E-XL-TVP2**
17	40	12	20 800	14 600	2 230	22 900	15 300	0,068	**N203-E-XL-TVP2**
	40	12	20 800	14 600	1 910	22 900	15 300	0,069	**NU203-E-XL-TVP2**
	40	16	28 500	21 900	3 550	22 900	13 200	0,051	**NU2203-E-XL-TVP2**
	47	14	30 000	21 200	2 700	19 600	13 500	0,121	**NU303-E-XL-TVP2**
20	47	14	32 500	24 700	3 950	19 200	12 800	0,112	**N204-E-XL-TVP2**
	47	14	32 500	24 700	3 000	19 200	12 800	0,114	**NU204-E-XL-TVP2**
	47	18	38 500	31 000	5 200	19 200	11 100	0,146	**NU2204-E-XL-TVP2**
	52	15	37 500	27 000	3 150	17 200	11 900	0,153	**NU304-E-XL-TVP2**
	52	21	49 500	39 000	6 300	17 200	9 700	0,215	**NU2304-E-XL-TVP2**
25	47	12	18 500	14 800	1 820	26 000	12 900	0,092	**NU1005-XL-M1**
	52	15	34 500	27 500	4 450	17 200	11 600	0,135	**N205-E-XL-TVP2**
	52	15	34 500	27 500	3 400	17 200	11 600	0,137	**NU205-E-XL-TVP2**
	52	18	41 500	34 500	5 800	17 200	9 600	0,165	**NU2205-E-XL-TVP2**
	62	17	49 000	37 500	5 700	14 400	10 100	0,242	**N305-E-XL-TVP2**
	62	17	49 000	37 500	4 550	14 400	10 100	0,245	**NU305-E-XL-TVP2**
	62	24	67 000	56 000	9 300	14 400	8 200	0,349	**NU2305-E-XL-TVP2**
30	55	13	22 900	19 300	2 470	22 400	11 000	0,134	**NU1006-XL-M1**
	62	16	46 000	37 500	5 500	14 200	9 600	0,205	**N206-E-XL-TVP2**
	62	16	46 000	37 500	4 450	14 200	9 600	0,207	**NU206-E-XL-TVP2**
	62	20	58 000	50 000	8 000	14 200	8 000	0,255	**NU2206-E-XL-TVP2**
	72	19	61 000	48 000	7 900	12 400	8 900	0,366	**N306-E-XL-TVP2**
	72	19	61 000	48 000	6 200	12 400	8 900	0,368	**NU306-E-XL-TVP2**
	72	27	86 000	75 000	13 400	12 400	7 200	0,529	**NU2306-E-XL-TVP2**
	90	23	84 000	65 000	8 500	13 400	8 100	0,858	**NU406-XL-M1**
35	62	14	29 000	26 000	3 250	19 700	9 700	0,177	**NU1007-XL-M1**
	72	17	59 000	50 000	7 800	12 300	8 100	0,301	**N207-E-XL-TVP2**
	72	17	59 000	50 000	6 300	12 300	8 100	0,303	**NU207-E-XL-TVP2**
	72	23	73 000	65 000	10 700	12 300	7 200	0,406	**NU2207-E-XL-TVP2**
	80	21	76 000	63 000	10 800	10 900	7 900	0,486	**N307-E-XL-TVP2**
	80	21	76 000	63 000	8 300	10 900	7 900	0,486	**NU307-E-XL-TVP2**
	80	31	108 000	98 000	17 900	10 900	6 600	0,723	**NU2307-E-XL-TVP2**
	100	25	103 000	83 000	10 900	11 800	7 000	1,14	**NU407-XL-M1**

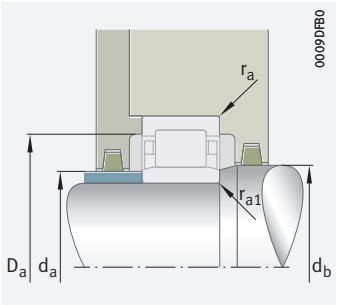
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s"
for N and NU



Mounting dimensions
for N

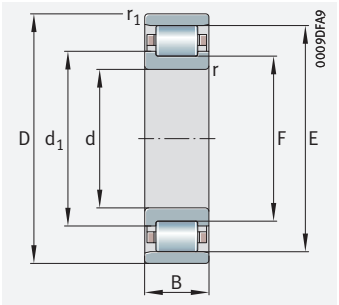


Mounting dimensions
for NU

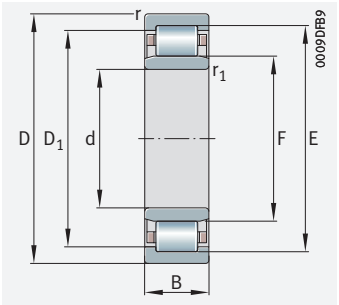
Dimensions								Mounting dimensions							
d	r	r_1	s	E	F	D_1	d_1	d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}
	min.	min.				≈	≈	min.	max.	min.	max.	min.	max.	max.	max.
15	0,6	0,3	0,5	30,3	19,3	–	21,6	17,4	–	–	32,6	31	29	0,6	0,3
	0,6	0,3	1,6	30,3	19,3	28	–	17,4	18,5	20	32,6	–	–	0,6	0,3
17	0,6	0,3	1,2	35,1	22,1	–	24,9	21	–	–	36	36	34	0,6	0,3
	0,6	0,3	1,2	35,1	22,1	32,5	–	21	21,5	23	36	–	–	0,6	0,3
	0,6	0,3	1,7	35,1	22,1	32,5	–	21	21,5	23	36	–	–	0,6	0,3
	1	0,6	1,2	40,2	24,2	37,1	–	21,2	23,5	25	42,8	–	–	1	0,6
20	1	0,6	0,8	41,5	26,5	–	29,7	24	–	–	41	43	40	1	0,6
	1	0,6	0,8	41,5	26,5	38,8	–	24	26	29	41	–	–	1	0,6
	1	0,6	1,8	41,5	26,5	38,8	–	24	26	29	41	–	–	1	0,6
	1,1	0,6	1	45,5	27,5	42,4	–	24	27	30	45	–	–	1	0,6
	1,1	0,6	1,9	45,5	27,5	42,4	–	24	27	30	45	–	–	1	0,6
25	0,6	0,3	2,4	41,5	30,5	39,3	–	27	30	32	44	–	–	0,6	0,3
	1	0,6	1,3	46,5	31,5	–	34,7	29	–	–	46	48	45	1	0,6
	1	0,6	1,2	46,5	31,5	43,8	–	29	31	34	46	–	–	1	0,6
	1	0,6	1,7	46,5	31,5	43,8	–	29	31	34	46	–	–	1	0,5
	1,1	1,1	1,4	54	34	–	38,1	32	–	–	55	55	53	1	1
	1,1	1,1	1,5	54	34	50,7	–	32	33	37	55	–	–	1	1
	1,1	1,1	1,9	54	34	50,7	–	32	33	37	55	–	–	1	1
30	1	0,6	2,4	48,5	36,5	46,1	–	33	35	38	50	–	–	1	0,6
	1	0,6	1,4	55,5	37,5	–	41,1	34	–	–	56	57	54	1	0,6
	1	0,6	1,5	55,5	37,5	52,5	–	34	37	40	56	–	–	1	0,6
	1	0,6	1,6	55,5	37,5	52,5	–	34	37	40	56	–	–	1	0,6
	1,1	1,1	0,6	62,5	40,5	–	45	37	–	–	65	64	61	1	1
	1,1	1,1	1,2	62,5	40,5	59,2	–	37	40	44	65	–	–	1	1
	1,1	1,1	2,2	62,5	40,5	59,2	–	37	40	44	65	–	–	1	1
	1,5	1,5	2,3	73	45	68,4	–	41	44	47	79	–	–	1,5	1,5
35	1	0,6	2,6	55	42	52,4	–	38	41	44	57	–	–	1	0,6
	1,1	0,6	0,7	64	44	–	48	39	–	–	65	65	63	1	0,6
	1,1	0,6	0,7	64	44	61	–	39	43	46	65	–	–	1	0,6
	1,1	0,6	2,2	64	44	61	–	39	43	46	65	–	–	1	0,6
	1,5	1,1	0,6	70,2	46,2	–	51	42	–	–	71	71	69	1,5	1
	1,5	1,1	0,6	70,2	46,2	66,6	–	42	45	48	71	–	–	1,5	1
	1,5	1,1	3	70,2	46,2	66,6	–	42	45	48	71	–	–	1,5	1
	1,5	1,5	2,6	83	53	78,2	–	46	52	55	89	–	–	1,5	1,5

Cylindrical roller bearings with cage

Non-locating bearings



N

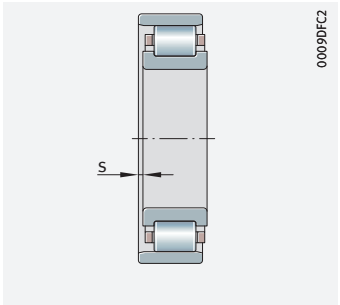


NU

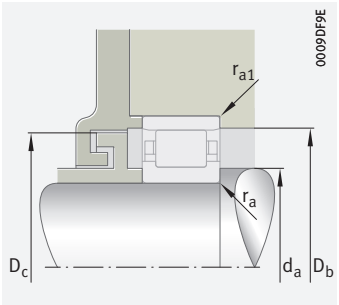
d = 40 – 55 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*429* | *1.12* ➤*430* | *1.13* X-life ➤*419*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
40	68	15	33 500	30 500	3 900	17 700	8 900	0,216	**NU1008-XL-M1**
	80	18	63 000	53 000	8 500	10 900	7 500	0,358	**N208-E-XL-TVP2**
	80	18	63 000	53 000	6 800	10 900	7 500	0,379	**NU208-E-XL-TVP2**
	80	23	83 000	75 000	12 900	10 900	6 300	0,492	**NU2208-E-XL-TVP2**
	90	23	96 000	79 000	13 900	9 500	7 100	0,656	**N308-E-XL-TVP2**
	90	23	96 000	79 000	10 500	9 500	7 100	0,659	**NU308-E-XL-TVP2**
	90	33	132 000	119 000	22 000	9 500	5 800	0,958	**NU2308-E-XL-TVP2**
	110	27	119 000	95 000	12 700	10 500	6 500	1,47	**NU408-XL-M1**
45	75	16	40 000	37 500	4 900	16 000	8 100	0,277	**NU1009-XL-M1**
	85	19	72 000	63 000	10 500	10 200	7 000	0,434	**N209-E-XL-TVP2**
	85	19	72 000	63 000	8 300	10 200	7 000	0,434	**NU209-E-XL-TVP2**
	85	23	87 000	82 000	14 100	10 200	5 800	0,532	**NU2209-E-XL-TVP2**
	100	25	116 000	99 000	17 600	8 500	6 400	0,891	**N309-E-XL-TVP2**
	100	25	116 000	99 000	13 500	8 500	6 400	0,893	**NU309-E-XL-TVP2**
	100	36	163 000	154 000	28 500	8 500	5 200	1,3	**NU2309-E-XL-TVP2**
	120	29	143 000	119 000	16 000	9 600	5 900	1,87	**NU409-XL-M1**
50	80	16	42 500	41 500	5 400	15 000	7 400	0,305	**NU1010-XL-M1**
	90	20	75 000	69 000	11 400	9 700	6 600	0,488	**N210-E-XL-TVP2**
	90	20	75 000	69 000	9 000	9 700	6 600	0,487	**NU210-E-XL-TVP2**
	90	23	92 000	88 000	15 300	9 700	5 300	0,573	**NU2210-E-XL-TVP2**
	110	27	128 000	110 000	20 400	7 800	6 100	1,16	**N310-E-XL-TVP2**
	110	27	131 000	114 000	15 700	7 800	6 000	1,16	**NU310-E-XL-TVP2**
	110	40	193 000	187 000	35 500	7 800	4 900	1,75	**NU2310-E-XL-TVP2**
	130	31	175 000	148 000	20 200	8 600	5 300	2,33	**NU410-XL-M1**
55	90	18	49 500	50 000	6 800	13 500	6 900	0,446	**NU1011-XL-M1**
	100	21	99 000	95 000	16 400	8 700	5 800	0,668	**N211-E-XL-TVP2**
	100	21	99 000	95 000	13 000	8 700	5 800	0,665	**NU211-E-XL-TVP2**
	100	25	117 000	118 000	21 000	8 700	4 700	0,796	**NU2211-E-XL-TVP2**
	120	29	159 000	139 000	26 000	7 000	5 500	1,48	**N311-E-XL-TVP2**
	120	29	159 000	139 000	19 500	7 000	5 500	1,48	**NU311-E-XL-TVP2**
	120	43	235 000	230 000	44 000	7 000	4 500	2,23	**NU2311-E-XL-TVP2**
	140	33	187 000	164 000	22 500	8 200	5 100	2,83	**NU411-XL-M1**

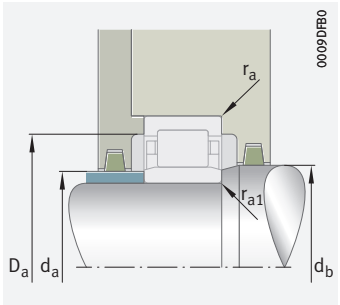
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s" for N and NU



Mounting dimensions for N

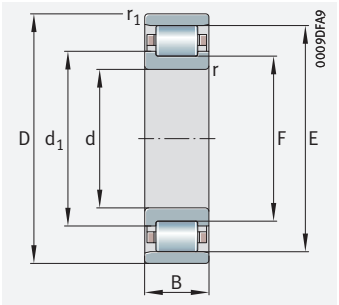


Mounting dimensions for NU

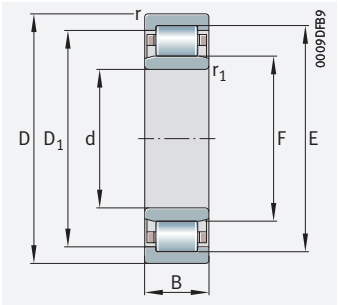
Dimensions								Mounting dimensions							
d	r	r_1	s	E	F	D_1	d_1	d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}
	min.	min.				≈	≈	min.	max.	min.	max.	min.	max.	max.	max.
40	1	0,6	2	61	47	58,2	–	43	46	49	63	–	–	1	0,6
	1,1	1,1	1	71,5	49,5	–	54	47	–	–	73	73	70	1	1
	1,1	1,1	1	71,5	49,5	68,3	–	47	49	52	73	–	–	1	1
	1,1	1,1	1,5	71,5	49,5	68,3	–	47	49	52	73	–	–	1	1
	1,5	1,5	1,2	80	52	–	57,6	49	–	–	81	81	79	1,5	1,5
	1,5	1,5	1,3	80	52	75,9	–	49	51	55	81	–	–	1,5	1,5
	1,5	1,5	2,7	80	52	75,9	–	49	51	55	81	–	–	1,5	1,5
	2	2	2,8	92	58	86,4	–	53	57	60	97	–	–	2	2
45	1	0,6	2,5	67,5	52,5	64,5	–	48	52	54	70	–	–	1	0,6
	1,1	1,1	1	76,5	54,5	–	59	52	–	–	78	78	75	1	1
	1,1	1,1	1	76,5	54,5	73,3	–	52	54	57	78	–	–	1	1
	1,1	1,1	1,5	76,5	54,5	73,3	–	52	54	57	78	–	–	1	1
	1,5	1,5	1	88,5	58,5	–	64,4	54	–	–	91	90	87	1,5	1,5
	1,5	1,5	1	88,5	58,5	84,1	–	54	57	60	91	–	–	1,5	1,5
	1,5	1,5	2,5	88,5	58,5	84,1	–	54	57	60	91	–	–	1,5	1,5
	2	2	2,9	100,5	64,5	94,6	–	58	63	66	107	–	–	2	2
50	1	0,6	2,1	72,5	57,5	69,5	–	53	57	59	75	–	–	1	0,6
	1,1	1,1	1,3	81,5	59,5	–	64	57	–	–	83	83	80	1	1
	1,1	1,1	1,3	81,5	59,5	78,3	–	57	58	62	83	–	–	1	1
	1,1	1,1	1,3	81,5	59,5	78,3	–	57	58	62	83	–	–	1	1
	2	2	1,7	97	65	–	71,3	61	–	–	99	98	96	2	2
	2	2	1,7	97	65	92,5	–	61	63	67	99	–	–	2	2
	2	2	3,2	97	65	92,5	–	61	63	67	99	–	–	2	2
	2,1	2,1	3	110,8	70,8	104,3	–	64	69	73	116	–	–	2	2
55	1,1	1	2,4	80,5	64,5	77,3	–	60	63	66	84	–	–	1,1	1
	1,5	1,1	0,8	90	66	–	70,8	62	–	–	91	91	89	1,5	1
	1,5	1,1	0,8	90	66	86,6	–	62	65	68	91	–	–	1,5	1
	1,5	1,1	1,3	90	66	86,6	–	62	65	68	91	–	–	1,5	1
	2	2	1,8	106,5	70,5	–	77,5	66	–	–	109	108	105	2	2
	2	2	1,8	106,5	70,5	101,4	–	66	69	72	109	–	–	2	2
	2	2	3,3	106,5	70,5	101,4	–	66	69	72	109	–	–	2	2
	2,1	2,1	3,3	117,2	77,2	110,7	–	69	76	79	126	–	–	2	2

Cylindrical roller bearings with cage

Non-locating bearings



N

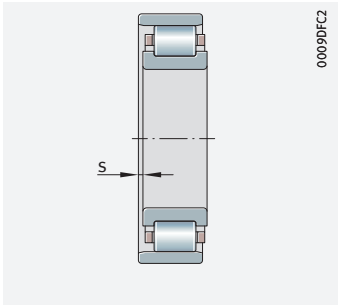


NU

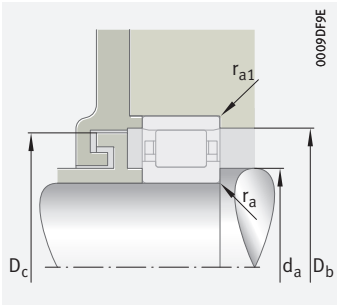
d = 60 – 75 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*429* | *1.12* ➤*430* | *1.13* X-life ➤*419*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
60	95	18	52 000	55 000	7 400	12 800	6 400	0,48	**NU1012-XL-M1**
	110	22	112 000	103 000	14 200	7 700	5 300	0,824	**NU212-E-XL-TVP2**
	110	22	112 000	103 000	18 100	7 700	5 300	0,827	**N212-E-XL-TVP2**
	110	28	152 000	153 000	28 000	7 700	4 300	1,08	**NU2212-E-XL-TVP2**
	130	31	177 000	157 000	29 000	6 500	5 200	1,84	**N312-E-XL-TVP2**
	130	31	177 000	157 000	21 900	6 500	5 200	1,85	**NU312-E-XL-TVP2**
	130	46	265 000	260 000	51 000	6 500	4 250	2,78	**NU2312-E-XL-TVP2**
	150	35	211 000	184 000	24 900	7 500	4 800	3,41	**NU412-XL-M1**
65	100	18	53 000	58 000	7 800	12 200	5 900	0,507	**NU1013-XL-M1**
	120	23	128 000	120 000	21 200	7 100	4 900	1,05	**N213-E-XL-TVP2**
	120	23	128 000	120 000	16 800	7 100	4 900	1,04	**NU213-E-XL-TVP2**
	120	31	177 000	182 000	34 000	7 100	4 100	1,43	**NU2213-E-XL-TVP2**
	140	33	214 000	191 000	35 000	5 900	4 800	2,28	**N313-E-XL-TVP2**
	140	33	214 000	191 000	26 500	5 900	4 800	2,28	**NU313-E-XL-TVP2**
	140	48	295 000	285 000	55 000	5 900	4 000	3,32	**NU2313-E-XL-TVP2**
	160	37	230 000	203 000	27 000	7 000	4 600	4,08	**NU413-XL-M1**
70	110	20	77 000	81 000	10 400	10 700	5 500	0,706	**NU1014-XL-M1**
	125	24	141 000	138 000	24 700	6 800	4 650	1,16	**N214-E-XL-TVP2**
	125	24	141 000	138 000	19 500	6 800	4 650	1,15	**NU214-E-XL-TVP2**
	125	31	185 000	195 000	36 500	6 800	3 850	1,52	**NU2214-E-XL-TVP2**
	150	35	242 000	222 000	40 500	5 500	4 500	2,79	**N314-E-XL-TVP2**
	150	35	242 000	222 000	30 500	5 500	4 500	2,79	**NU314-E-XL-TVP2**
	150	51	325 000	325 000	61 000	5 500	3 800	4,02	**NU2314-E-XL-TVP2**
	180	42	285 000	255 000	33 500	6 200	4 250	5,97	**NU414-XL-M1**
75	115	20	78 000	85 000	11 000	10 300	5 200	0,737	**NU1015-XL-M1**
	130	25	155 000	157 000	28 000	6 500	4 400	1,29	**N215-E-XL-TVP2**
	130	25	155 000	157 000	22 200	6 500	4 400	1,27	**NU215-E-XL-TVP2**
	130	31	192 000	208 000	38 500	6 500	3 600	1,6	**NU2215-E-XL-TVP2**
	160	37	285 000	265 000	47 000	5 100	4 150	3,34	**N315-E-XL-TVP2**
	160	37	285 000	265 000	35 500	5 100	4 150	3,33	**NU315-E-XL-TVP2**
	160	55	390 000	395 000	73 000	5 100	3 550	4,95	**NU2315-E-XL-TVP2**
	190	45	325 000	295 000	38 000	5 800	4 100	7,09	**NU415-XL-M1**

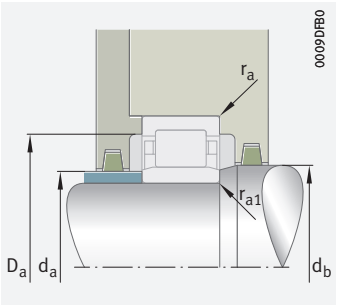
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s" for N and NU



Mounting dimensions for N

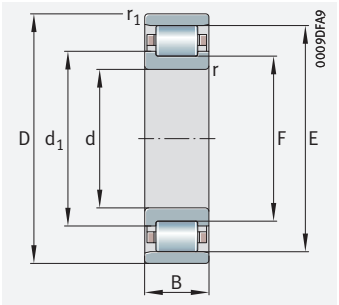


Mounting dimensions for NU

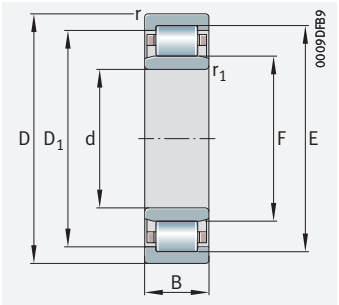
Dimensions								Mounting dimensions							
d	r	r_1	s	E	F	D_1	d_1	d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}
	min.	min.				≈	≈	min.	max.	min.	max.	min.	max.	max.	max.
60	1,1	1	2,4	85,5	69,5	–	82,3	65	68	71	89	–	–	1,1	1
	1,5	1,5	1,6	100	72	–	96,1	69	71	75	101	–	–	1,5	1,5
	1,5	1,5	1,6	100	72	77,6	–	69	–	–	101	101	99	1,5	1,5
	1,5	1,5	1,6	100	72	–	96,1	69	71	75	101	–	–	1,5	1,5
	2,1	2,1	1,9	115	77	84,4	–	72	–	–	118	116	114	2,1	2,1
	2,1	2,1	1,8	115	77	–	109,6	72	75	79	118	–	–	2,1	2,1
	2,1	2,1	3,5	115	77	–	109,6	72	75	79	118	–	–	2,1	2,1
	2,1	2,1	3,4	127	83	–	119,5	74	82	85	136	–	–	2	2
65	1,1	1	3,3	90,5	74,5	87,3	–	70	73	76	94	–	–	1,1	1
	1,5	1,5	1,4	108,5	78,5	–	84,4	74	–	–	111	110	107	1,5	1,5
	1,5	1,5	1,4	108,5	78,5	104,3	–	74	77	81	111	–	–	1,5	1,5
	1,5	1,5	1,9	108,5	78,5	104,3	–	74	77	81	111	–	–	1,5	1,5
	2,1	2,1	1,4	124,5	82,5	–	90,5	77	–	–	128	126	123	2,1	2,1
	2,1	2,1	1,5	124,5	82,5	118,6	–	77	81	85	128	–	–	2,1	2,1
	2,1	2,1	4	124,5	82,5	118,6	–	77	81	85	128	–	–	2,1	2,1
	2,1	2,1	3,5	135,3	89,3	127,7	–	79	88	91	146	–	–	2	2
70	1,1	1	2,5	100	80	96	–	75	78	82	104	–	–	1	1
	1,5	1,5	1,2	113,5	83,5	–	89,4	79	–	–	116	115	112	1,5	1,5
	1,5	1,5	1,2	113,5	83,5	109,4	–	79	82	86	116	–	–	1,5	1,5
	1,5	1,5	1,6	113,5	83,5	109,4	–	79	82	86	116	–	–	1,5	1,5
	2,1	2,1	1,6	133	89	–	97,4	82	–	–	138	135	131	2,1	2,1
	2,1	2,1	1,7	133	89	126,8	–	82	87	92	138	–	–	2,1	2,1
	2,1	2,1	4,7	133	89	126,8	–	82	87	92	138	–	–	2,1	2,1
	3	3	4	152	100	142,7	–	86	99	102	164	–	–	2,5	2,5
75	1,1	1	2,5	105	85	101,7	–	80	83	87	109	–	–	1,1	1
	1,5	1,5	1,1	118,5	88,5	–	94,4	84	–	–	121	120	117	1,5	1,5
	1,5	1,5	1,2	118,5	88,5	114,4	–	84	87	90	121	–	–	1,5	1,5
	1,5	1,5	1,6	118,5	88,5	114,4	–	84	87	90	121	–	–	1,5	1,5
	2,1	2,1	1,1	143	95	–	104,1	87	–	–	148	145	141	2,1	2,1
	2,1	2,1	1,2	143	95	136,2	–	87	93	97	148	–	–	2,1	2,1
	2,1	2,1	4,2	143	95	136,2	–	87	93	97	148	–	–	2,1	2,1
	3	3	4,5	160,5	104,5	150,7	–	91	103	107	174	–	–	2,5	2,5

Cylindrical roller bearings with cage

Non-locating bearings



N

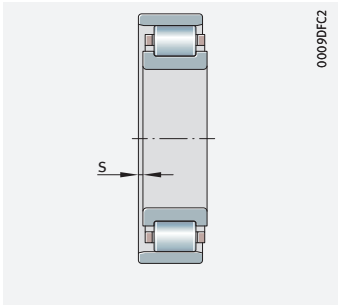


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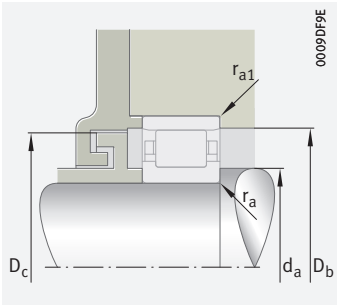
d = 80 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*429* | *1.12* ➤*430* | *1.13* X-life ➤*419*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
80	125	22	91 000	99 000	13 200	9 400	5 000	0,99	**NU1016-XL-M1**
	140	26	166 000	168 000	29 500	6 100	4 200	1,55	**N216-E-XL-TVP2**
	140	26	166 000	168 000	23 100	6 100	4 200	1,55	**NU216-E-XL-TVP2**
	140	33	221 000	244 000	44 500	6 100	3 400	2,01	**NU2216-E-XL-TVP2**
	170	39	300 000	275 000	50 000	4 800	4 100	4,12	**N316-E-XL-TVP2**
	170	39	300 000	275 000	37 500	4 800	4 100	3,96	**NU316-E-XL-TVP2**
	170	58	420 000	425 000	80 000	4 800	3 450	5,89	**NU2316-E-XL-TVP2**
	200	48	395 000	365 000	47 000	5 400	3 750	8,37	**NU416-XL-M1**
85	130	22	93 000	103 000	13 700	9 000	4 750	1,04	**NU1017-XL-M1**
	150	28	194 000	194 000	34 000	5 600	4 000	1,92	**N217-E-XL-TVP2**
	150	28	194 000	194 000	26 500	5 600	4 000	1,91	**NU217-E-XL-TVP2**
	150	36	255 000	275 000	50 000	5 600	3 300	2,5	**NU2217-E-XL-TVP2**
	180	41	340 000	325 000	58 000	5 900	3 800	5,3	**N317-E-XL-M1**
	180	41	320 000	300 000	40 500	4 550	3 900	4,62	**NU317-E-XL-TVP2**
	180	60	435 000	445 000	82 000	4 550	3 300	6,72	**NU2317-E-XL-TVP2**
	210	52	420 000	385 000	49 000	5 200	3 850	9,85	**NU417-XL-M1**
90	140	24	111 000	124 000	16 600	8 400	4 550	1,36	**NU1018-XL-M1**
	160	30	215 000	217 000	37 500	5 200	3 900	2,37	**N218-E-XL-TVP2**
	160	30	215 000	217 000	29 500	5 200	3 900	2,36	**NU218-E-XL-TVP2**
	160	40	285 000	315 000	57 000	5 200	3 250	3,17	**NU2218-E-XL-TVP2**
	190	43	370 000	350 000	60 000	5 500	3 650	6,19	**N318-E-XL-M1**
	190	43	370 000	350 000	45 500	4 250	3 650	5,39	**NU318-E-XL-TVP2**
	190	64	510 000	530 000	94 000	4 250	3 000	8,04	**NU2318-E-XL-TVP2**
	225	54	465 000	425 000	54 000	4 800	3 500	11,8	**NU418-XL-M1**
95	145	24	113 000	130 000	17 200	8 100	4 350	1,42	**NU1019-XL-M1**
	170	32	260 000	265 000	45 000	4 850	3 650	2,89	**N219-E-XL-TVP2**
	170	32	260 000	265 000	35 000	4 850	3 650	2,88	**NU219-E-XL-TVP2**
	170	43	340 000	370 000	66 000	4 850	3 050	3,9	**NU2219-E-XL-TVP2**
	200	45	390 000	380 000	65 000	5 300	3 550	7,12	**N319-E-XL-M1**
	200	45	390 000	380 000	49 000	4 050	3 550	6,32	**NU319-E-XL-TVP2**
	200	67	540 000	580 000	101 000	4 050	2 800	9,4	**NU2319-E-XL-TVP2**
	240	55	495 000	470 000	59 000	4 550	3 200	13,9	**NU419-XL-M1**

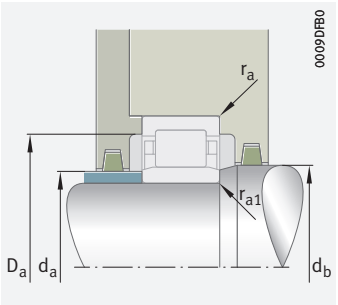
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s"
for N and NU



Mounting dimensions
for N

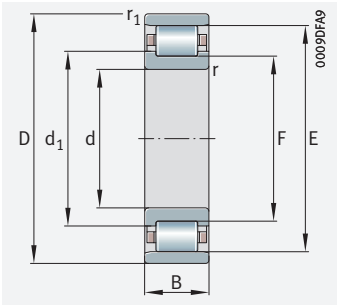


Mounting dimensions
for NU

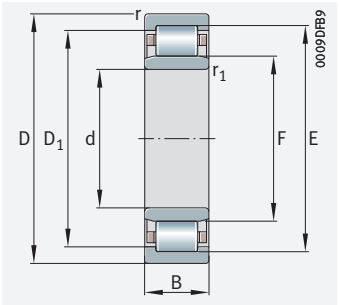
Dimensions								Mounting dimensions							
d	r	r_1	s	E	F	D_1	d_1	d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}
	min.	min.				≈	≈	min.	max.	min.	max.	min.	max.	max.	max.
80	1,1	1	2,7	113,5	91,5	109,8	–	85	90	94	119	–	–	1	1
	2	2	1,2	127,3	95,3	–	101,5	91	–	–	129	129	126	2	2
	2	2	1,3	127,3	95,3	122,9	–	91	94	97	129	–	–	2	2
	2	2	1,3	127,3	95,3	122,9	–	91	94	97	129	–	–	2	2
	2,1	2,1	0,6	151	101	–	110,4	92	–	–	158	153	149	2,1	2,1
	2,1	2,1	0,7	151	101	143,9	–	92	99	105	158	–	–	2,1	2,1
	2,1	2,1	3,7	151	101	143,9	–	92	99	105	158	–	–	2,1	2,1
	3	3	4,6	170	110	159,7	–	96	109	112	184	–	–	2,5	2,5
85	1,1	1	4	118,5	96,5	114,8	–	90	95	99	124	–	–	1	1
	2	2	0,7	136,5	100,5	–	107,5	96	–	–	139	138	135	2	2
	2	2	0,8	136,5	100,5	131,5	–	96	99	104	139	–	–	2	2
	2	2	1,3	136,5	100,5	131,5	–	96	99	104	139	–	–	2	2
	3	3	1,1	160	108	–	117,8	99	–	–	166	162	158	2,5	2,5
	3	3	1,3	160	108	152,7	–	99	106	110	166	–	–	2,5	2,5
	3	3	4,7	160	108	152,7	–	99	106	110	166	–	–	2,5	2,5
	4	4	5,2	177	113	165,7	–	105	111	115	190	–	–	3	3
90	1,5	1,1	3	127	103	122,9	–	96	101	106	133	–	–	1,5	1
	2	2	1,4	145	107	–	114,3	101	–	–	149	147	143	2	2
	2	2	1,5	145	107	139,7	–	101	105	109	149	–	–	2	2
	2	2	2,5	145	107	139,7	–	101	105	109	149	–	–	2	2
	3	3	1,3	169,5	113,5	–	124	104	–	–	176	171	168	2,5	2,5
	3	3	1,5	169,5	113,5	161,6	–	104	111	117	176	–	–	2,5	2,5
	3	3	5	169,5	113,5	161,6	–	104	111	117	176	–	–	2,5	2,5
	4	4	5	191,5	123,5	179,7	–	110	122	125	205	–	–	3	3
95	1,5	1,1	3,1	132	108	127,9	–	101	106	111	138	–	–	1,5	1
	2,1	2,1	0,6	154,5	112,5	–	120,5	107	–	–	158	156	153	2,1	2,1
	2,1	2,1	0,7	154,5	112,5	148,6	–	107	111	116	158	–	–	2,1	2,1
	2,1	2,1	2,2	154,5	112,5	148,6	–	107	111	116	158	–	–	2,1	2,1
	3	3	1,4	177,5	121,5	–	132	109	–	–	186	179	176	2,5	2,5
	3	3	1,4	177,5	121,5	169,6	–	109	119	124	186	–	–	2,5	2,5
	3	3	5,6	177,5	121,5	169,6	–	109	119	124	186	–	–	2,5	2,5
	4	4	5,2	201,5	133,5	189,7	–	115	132	136	220	–	–	3	3

Cylindrical roller bearings with cage

Non-locating bearings



N

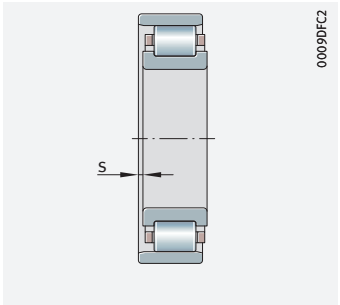


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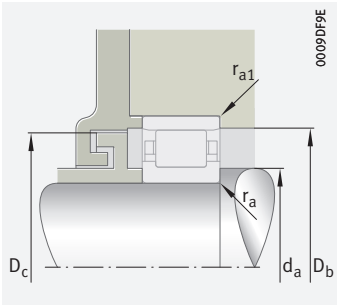
d = 100 – 130 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*429* | *1.12* ➤*430* | *1.13* X-life ➤*419*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
100	150	24	116 000	135 000	17 700	7 800	4 150	1,46	**NU1020-XL-M1**
	180	34	295 000	305 000	52 000	4 550	3 450	3,5	**N220-E-XL-TVP2**
	180	34	295 000	305 000	40 500	4 550	3 450	3,49	**NU220-E-XL-TVP2**
	180	46	395 000	445 000	78 000	4 550	2 900	4,77	**NU2220-E-XL-TVP2**
	215	47	450 000	425 000	72 000	4 850	3 350	8,75	**N320-E-XL-M1**
	215	47	450 000	425 000	54 000	3 700	3 350	7,67	**NU320-E-XL-TVP2**
	215	73	680 000	720 000	126 000	3 700	2 500	12,1	**NU2320-E-XL-TVP2**
	250	58	550 000	530 000	65 000	4 350	2 950	15,8	**NU420-XL-M1**
105	160	26	132 000	154 000	20 000	7 300	4 050	1,84	**NU1021-XL-M1**
	190	36	310 000	320 000	54 000	5 600	3 400	4,63	**N221-E-XL-M1**
	190	36	310 000	320 000	41 500	4 350	3 400	4,08	**NU221-E-XL-TVP2**
	260	60	610 000	590 000	71 000	4 150	2 750	17,7	**NU421-XL-M1**
110	170	28	167 000	191 000	25 000	6 700	3 850	2,31	**NU1022-XL-M1**
	200	38	345 000	365 000	47 000	4 100	3 250	4,84	**NU222-E-XL-TVP2**
	200	38	345 000	365 000	60 000	4 100	3 250	4,85	**N222-E-XL-TVP2**
	200	53	455 000	520 000	88 000	4 100	2 750	6,76	**NU2222-E-XL-TVP2**
	240	50	495 000	475 000	60 000	3 350	3 050	10,3	**NU322-E-XL-TVP2**
	240	50	520 000	510 000	86 000	4 350	2 950	11,7	**N322-E-XL-M1**
	240	80	750 000	800 000	140 000	3 350	2 290	16,6	**NU2322-E-XL-TVP2**
	280	65	680 000	660 000	80 000	3 850	2 550	22,4	**NU422-XL-M1**
120	180	28	175 000	208 000	27 000	6 400	3 550	2,47	**NU1024-XL-M1**
	215	40	390 000	415 000	69 000	3 750	3 050	5,67	**N224-E-XL-TVP2**
	215	40	390 000	415 000	54 000	3 750	3 050	5,8	**NU224-E-XL-TVP2**
	215	58	530 000	610 000	105 000	3 750	2 500	8,38	**NU2224-E-XL-TVP2**
	260	55	610 000	600 000	73 000	3 050	2 650	13,3	**NU324-E-XL-TVP2**
	260	55	610 000	600 000	97 000	3 950	2 650	15,3	**N324-E-XL-M1**
	260	86	930 000	1 010 000	170 000	3 950	1 980	23,5	**NU2324-E-XL-M1**
	310	72	850 000	840 000	99 000	3 450	2 200	30,8	**NU424-XL-M1**
130	200	33	212 000	250 000	32 000	5 700	3 500	3,74	**NU1026-XL-M1**
	230	40	425 000	445 000	56 000	3 500	2 800	6,5	**NU226-E-XL-TVP2**
	230	40	425 000	445 000	71 000	3 500	2 800	6,51	**N226-E-XL-TVP2**
	230	64	620 000	730 000	121 000	3 500	2 280	10,4	**NU2226-E-XL-TVP2**
	280	58	680 000	670 000	81 000	2 850	2 430	16,2	**NU326-E-XL-TVP2**
	280	58	720 000	720 000	115 000	3 700	2 340	18,4	**N326-E-XL-M1**
	280	93	1 080 000	1 220 000	200 000	3 700	1 750	28,8	**NU2326-E-XL-M1**

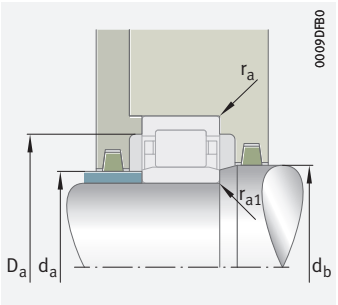
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s" for N and NU



Mounting dimensions for N

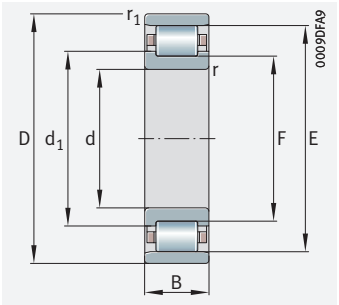


Mounting dimensions for NU

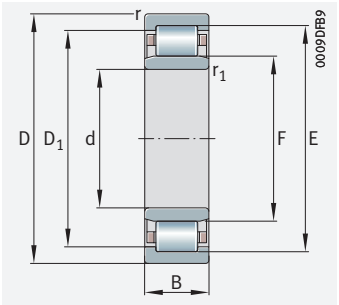
Dimensions								Mounting dimensions							
d	r	r_1	s	E	F	D_1	d_1	d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}
	min.	min.				≈	≈	min.	max.	min.	max.	min.	max.	max.	max.
100	1,5	1,1	2,9	137	113	132,9	–	106	111	116	143	–	–	1,5	1
	2,1	2,1	1,4	163	119	–	127,3	112	–	–	168	165	161	2,1	2,1
	2,1	2,1	1,5	163	119	156,9	–	112	117	122	168	–	–	2,1	2,1
	2,1	2,1	2,5	163	119	156,9	–	112	117	122	168	–	–	2,1	2,1
	3	3	1,2	191,5	127,5	–	139,4	114	–	–	201	193	190	2,5	2,5
	3	3	1,2	191,5	127,5	182	–	114	125	132	201	–	–	2,5	2,5
	3	3	4,2	191,5	127,5	182	–	114	125	132	201	–	–	2,5	2,5
	4	4	5,7	211	139	198,2	–	120	137	141	230	–	–	3	3
105	2	1,1	4,5	145,5	119,5	141	–	111	118	122	151	–	–	2	1
	2,1	2,1	1,2	171,5	125,5	–	134,5	117	–	–	178	173	170	2,1	2,1
	2,1	2,1	1,3	171,5	125,5	165,1	–	117	123	128	178	–	–	2,1	2,1
	4	4	5,7	220,5	144,5	207,4	–	125	143	147	240	–	–	3	3
110	2	1,1	3,2	155	125	–	149,7	116	124	128	161	–	–	2	1
	2,1	2,1	1,5	180,5	132,5	–	173,8	122	130	135	188	–	–	2,1	2,1
	2,1	2,1	1,4	180,5	132,5	141,6	–	122	–	–	188	182	179	2	2
	2,1	2,1	4	180,5	132,5	–	173,8	122	130	135	188	–	–	2,1	2,1
	3	3	1,3	211	143	–	200,9	124	140	145	226	–	–	2,5	2,5
	3	3	1,3	211	143	155,6	–	124	–	–	226	213	209	2,5	2,5
	3	3	5,8	211	143	–	200,9	124	140	145	226	–	–	2,5	2,5
	4	4	6,2	235	155	–	220,9	130	153	157	260	–	–	3	3
120	2	1,1	3,2	165	135	–	159,7	126	134	138	171	–	–	2	1
	2,1	2,1	1,4	195,5	143,5	153,2	–	132	–	–	203	197	194	2,1	2,1
	2,1	2,1	1,4	195,5	143,5	–	187,8	132	141	146	203	–	–	2,1	2,1
	2,1	2,1	4,5	195,5	143,5	–	187,8	132	141	146	203	–	–	2,1	2,1
	3	3	3,5	230	154	–	218,7	134	151	156	246	–	–	2,5	2,5
	3	3	3,5	230	154	168,7	–	134	–	–	246	232	228	2,5	2,5
	3	3	7,2	230	154	–	218,7	134	151	156	246	–	–	2,5	2,5
	5	5	6,9	260	170	–	243,9	144	168	172	286	–	–	4	4
130	2	1,1	3,9	182	148	–	175,9	136	146	151	191	–	–	2	1
	3	3	1,2	209,5	153,5	–	201,2	144	151	158	216	–	–	2,5	2,5
	3	3	1,2	209,5	153,5	164	–	144	–	–	216	212	207	2,5	2,5
	3	3	5,2	209,5	153,5	–	201,2	144	151	158	216	–	–	2,5	2,5
	4	4	3,5	247	167	–	235,2	147	164	169	263	–	–	3	3
	4	4	3,5	247	167	181,7	–	147	–	–	263	249	245	3	3
	4	4	8,1	247	167	–	235,2	147	164	169	263	–	–	3	3

Cylindrical roller bearings with cage

Non-locating bearings



N

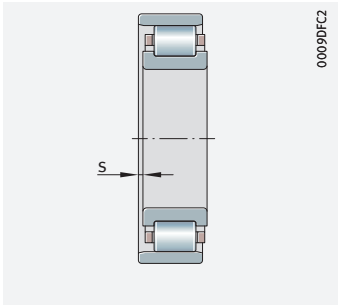


NU

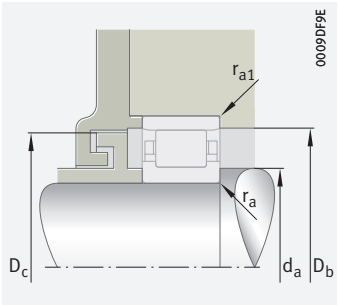
d = 140 – 180 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*429* | *1.12* ➤*430* | *1.13* X-life ➤*419*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
140	210	33	216 000	265 000	33 000	5 400	3 250	3,94	**NU1028-XL-M1**
	250	42	460 000	510 000	79 000	4 250	2 600	9,3	**N228-E-XL-M1**
	250	42	460 000	510 000	62 000	4 250	2 600	9,31	**NU228-E-XL-M1**
	250	68	670 000	830 000	134 000	4 250	2 050	14,5	**NU2228-E-XL-M1**
	300	62	790 000	800 000	126 000	3 450	2 170	22,5	**N328-E-XL-M1**
	300	62	790 000	800 000	95 000	2 650	2 170	20,1	**NU328-E-XL-TVP2**
	300	102	1 210 000	1 390 000	224 000	3 450	1 620	36	**NU2328-E-XL-M1**
150	225	35	248 000	310 000	39 000	5 100	3 100	4,93	**NU1030-XL-M1**
	270	45	520 000	590 000	90 000	3 950	2 350	11,8	**N230-E-XL-M1**
	270	45	520 000	590 000	70 000	3 950	2 350	11,9	**NU230-E-XL-M1**
	270	73	780 000	970 000	156 000	3 950	1 850	18,6	**NU2230-E-XL-M1**
	320	65	900 000	930 000	141 000	3 200	1 940	26,9	**N330-E-XL-M1**
	320	65	900 000	930 000	108 000	3 200	1 940	27	**NU330-E-XL-M1**
	320	108	1 380 000	1 600 000	250 000	3 200	1 460	43,4	**NU2330-E-XL-M1**
160	240	38	290 000	355 000	44 000	4 650	3 000	5,92	**NU1032-XL-M1**
	290	48	590 000	670 000	102 000	3 650	2 160	14,7	**N232-E-XL-M1**
	290	48	590 000	670 000	80 000	3 650	2 160	14,7	**NU232-E-XL-M1**
	290	80	940 000	1 170 000	189 000	3 600	1 660	23,7	**NU2232-E-XL-M1**
	340	68	860 000	1 060 000	130 000	3 000	1 770	32,6	**N332-E-M1**
	340	68	860 000	1 060 000	94 000	3 000	1 770	31,8	**NU332-E-M1**
	340	114	1 300 000	1 800 000	231 000	3 000	1 350	51,5	**NU2332-E-M1**
170	260	42	350 000	435 000	52 000	4 300	2 750	8,03	**NU1034-XL-M1**
	310	52	700 000	780 000	118 000	3 350	1 970	18	**N234-E-XL-M1**
	310	52	700 000	780 000	93 000	3 350	1 970	18,1	**NU234-E-XL-M1**
	310	86	1 130 000	1 400 000	218 000	3 300	1 470	29,4	**NU2234-E-XL-M1**
	360	72	960 000	1 210 000	141 000	2 800	1 610	37,9	**N334-E-TB-M1**
	360	72	960 000	1 210 000	97 000	2 800	1 610	38	**NU334-E-TB-M1**
	360	120	1 490 000	2 070 000	232 000	2 800	1 210	61,4	**NU2334-EX-TB-M1**
180	280	46	425 000	520 000	64 000	3 900	2 550	10,5	**NU1036-XL-M1**
	320	52	730 000	830 000	124 000	3 250	1 850	18,9	**N236-E-XL-M1**
	320	52	730 000	830 000	98 000	3 250	1 850	18,9	**NU236-E-XL-M1**
	320	86	1 180 000	1 490 000	230 000	3 200	1 380	30,7	**NU2236-E-XL-M1**
	380	75	1 040 000	1 320 000	103 000	2 650	1 500	43,9	**NU336-E-TB-M1**
	380	126	1 680 000	2 330 000	260 000	2 600	1 120	71,8	**NU2336-EX-TB-M1**

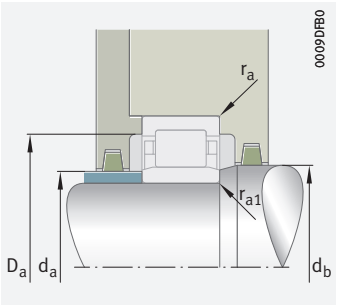
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s"
for N and NU



Mounting dimensions
for N

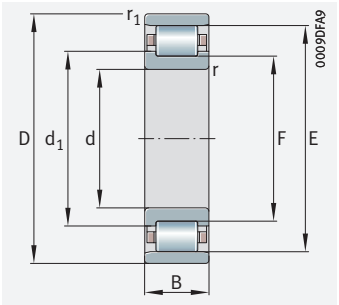


Mounting dimensions
for NU

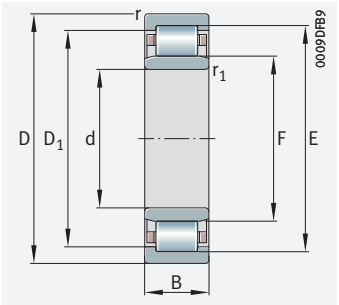
Dimensions								Mounting dimensions							
d	r	r_1	s	E	F	D_1	d_1	d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}
	min.	min.				≈	≈	min.	max.	min.	max.	min.	max.	max.	max.
140	2	1,1	3,8	192	158	185,9	–	146	156	161	201	–	–	2	1
	3	3	3,8	225	169	–	179,4	154	–	–	236	227	223	2,5	2,5
	3	3	3,8	225	169	216,7	–	154	166	171	236	–	–	2,5	2,5
	3	3	7	225	169	216,7	–	154	166	171	236	–	–	2,5	2,5
	4	4	5,2	264	180	–	195,4	157	–	–	283	266	262	3	3
	4	4	5,2	264	180	251,7	–	157	176	182	283	–	–	3	3
	4	4	9,2	264	180	251,7	–	157	176	182	283	–	–	3	3
150	2,1	1,5	4,2	205,5	169,5	199	–	158	167	173	215	–	–	2,1	1,5
	3	3	4	242	182	–	193,1	164	–	–	256	244	240	2,5	2,5
	3	3	4	242	182	233,2	–	164	179	184	256	–	–	2,5	2,5
	3	3	7,5	242	182	233,2	–	164	179	184	256	–	–	2,5	2,5
	4	4	5,5	283	193	–	209,5	167	–	–	303	285	281	3	3
	4	4	5,5	283	193	269,8	–	167	190	195	303	–	–	3	3
	4	4	9,7	283	193	269,8	–	167	190	195	303	–	–	3	3
160	2,1	1,5	4,3	220	180	212,9	–	168	178	184	230	–	–	2,1	1,5
	3	3	4,1	259	195	–	206,8	174	–	–	276	261	257	2,5	2,5
	3	3	4,1	259	195	249,6	–	174	192	197	276	–	–	2,5	2,5
	3	3	7,2	261	193	251,1	–	174	192	197	276	–	–	2,5	2,5
	4	4	5,5	300	204	–	221,6	177	–	–	323	302	298	3	3
	4	4	5,6	300	204	286	–	177	200	211	323	–	–	3	3
	4	4	9,9	300	204	286	–	177	200	211	323	–	–	3	3
170	2,1	2,1	4,8	237	193	229,1	–	180	190	197	250	–	–	2,1	2,1
	4	4	4,3	279	207	–	218,4	187	–	–	293	281	277	3	3
	4	4	4,3	279	207	268,5	–	187	204	211	293	–	–	3	3
	4	4	7,2	281	205	269,9	–	187	204	211	293	–	–	3	3
	4	4	5,9	318	218	–	238	187	–	–	343	320	316	3	3
	4	4	6	318	218	298	–	187	215	221	343	–	–	3	3
	4	4	10,2	320	216	299,2	–	187	214	218	343	–	–	3	3
180	2,1	2,1	5	255	205	245,9	–	190	203	209	270	–	–	2,1	2,1
	4	4	4,7	289	217	–	230,2	197	–	–	303	292	286	3	3
	4	4	4,7	289	217	278,6	–	197	214	221	303	–	–	3	3
	4	4	7,2	291	215	280	–	197	214	221	303	–	–	3	3
	4	4	6,1	335	231	314,2	–	197	228	234	363	–	–	3	3
	4	4	10,5	339	227	316,6	–	197	225	229	363	–	–	3	3

Cylindrical roller bearings with cage

Non-locating bearings



N

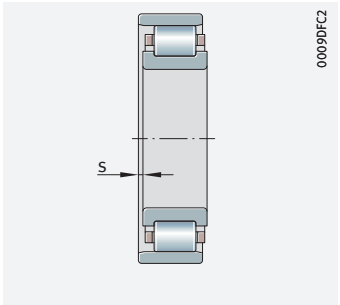


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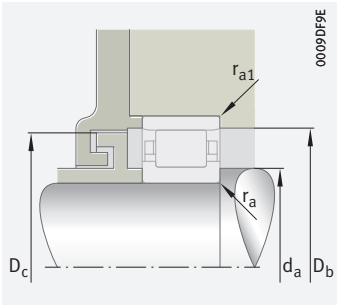
d = 190 – 280 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*429* | *1.12* ➤*430* | *1.13* X-life ➤*419*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
190	290	46	435 000	550 000	66 000	3 800	2 410	10,9	**NU1038-XL-M1**
	340	55	680 000	930 000	112 000	3 050	1 720	22,8	**N238-E-M1**
	340	55	680 000	930 000	83 000	3 050	1 720	22,8	**NU238-E-M1**
	340	92	1 090 000	1 650 000	206 000	3 000	1 290	37,1	**NU2238-E-M1**
	400	78	1 120 000	1 440 000	110 000	2 550	1 400	50,6	**NU338-E-TB-M1**
	400	132	1 890 000	2 650 000	295 000	2 440	1 010	83,1	**NU2338-EX-TB-M1**
200	310	51	470 000	600 000	71 000	3 550	2 310	14,1	**NU1040-XL-M1**
	360	58	750 000	1 040 000	123 000	2 900	1 600	27,2	**N240-E-M1**
	360	58	750 000	1 040 000	92 000	2 900	1 600	27,2	**NU240-E-M1**
	360	98	1 220 000	1 880 000	230 000	2 850	1 180	44,7	**NU2240-E-M1**
	420	80	1 180 000	1 520 000	116 000	2 410	1 320	57,3	**NU340-E-TB-M1**
	420	138	2 040 000	2 900 000	315 000	2 330	940	95,6	**NU2340-EX-TB-M1**
220	340	56	510 000	770 000	69 000	3 150	2 040	20,5	**NU1044-M1**
	400	65	950 000	1 330 000	106 000	2 600	1 380	38,1	**NU244-E-M1**
	400	108	1 630 000	2 370 000	255 000	2 440	1 000	61,6	**NU2244-EX-TB-M1**
	460	88	1 440 000	1 890 000	138 000	2 170	1 140	75,5	**NU344-E-TB-M1**
	460	145	2 350 000	3 350 000	350 000	2 110	830	121	**NU2344-EX-TB-M1**
240	360	56	540 000	840 000	74 000	3 000	1 850	19,9	**NU1048-M1**
	440	72	1 160 000	1 650 000	175 000	2 320	1 210	51,5	**N248-E-TB-M1**
	440	72	1 140 000	1 610 000	125 000	2 320	1 220	51,8	**NU248-E-TB-M1**
	440	120	1 850 000	2 800 000	295 000	2 250	900	82,8	**NU2248-EX-TB-M1**
	500	95	1 720 000	2 280 000	162 000	1 980	1 000	95,7	**NU348-E-TB-M1**
	500	155	2 600 000	3 750 000	380 000	1 940	750	151	**NU2348-EX-TB-M1**
260	400	65	650 000	1 010 000	90 000	2 700	1 690	29,7	**NU1052-M1**
	480	80	1 350 000	1 890 000	142 000	2 100	1 110	68,4	**NU252-E-TB-M1**
	480	130	2 180 000	3 350 000	350 000	2 060	780	109	**NU2252-E-TB-M1**
	540	102	1 910 000	2 600 000	187 000	1 840	900	121	**NU352-E-TB-M1**
	540	165	3 100 000	4 500 000	455 000	1 780	660	189	**NU2352-EX-TB-M1**
280	420	65	680 000	1 100 000	96 000	2 550	1 550	31,4	**NU1056-M1**
	500	80	1 400 000	2 020 000	150 000	2 020	1 020	72,1	**NU256-E-TB-M1**
	500	130	2 270 000	3 600 000	370 000	1 980	720	114	**NU2256-E-TB-M1**
	580	108	2 180 000	3 050 000	205 000	1 700	790	147	**NU356-E-TB-M1**
	580	175	3 500 000	5 200 000	510 000	1 640	590	234	**NU2356-EX-TB-M1**

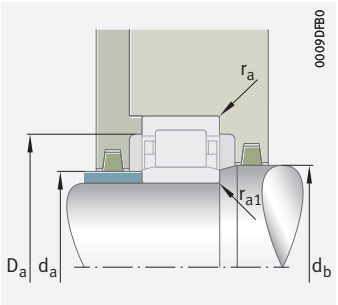
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s"
for N and NU



Mounting dimensions
for N

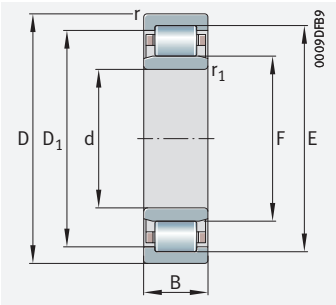


Mounting dimensions
for NU

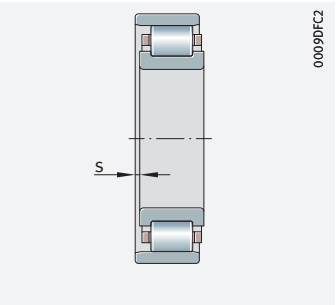
Dimensions								Mounting dimensions							
d	r	r_1	s	E	F	D_1	d_1	d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}
	min.	min.				≈	≈	min.	max.	min.	max.	min.	max.	max.	max.
190	2,1	2,1	5	265	215	255,9	–	200	213	219	280	–	–	2,1	2,1
	4	4	4,7	306	230	–	244	207	–	–	323	309	303	3	3
	4	4	4,7	306	230	295	–	207	227	234	323	–	–	3	3
	4	4	8	308	228	296,4	–	207	227	234	323	–	–	3	3
	5	5	6,3	353	245	331,4	–	210	242	248	380	–	–	4	4
	5	5	11	360	240	336	–	210	237,8	242,2	380	–	–	4	4
200	2,1	2,1	8,3	281	229	271,5	–	210	226	233	300	–	–	2,1	2,1
	4	4	4,8	323	243	–	257,6	217	–	–	343	326	320	3	3
	4	4	4,8	323	243	311,5	–	217	240	247	343	–	–	3	3
	4	4	8,2	325	241	312,9	–	217	240	247	343	–	–	3	3
	5	5	6,3	370	258	347,6	–	220	255	261	400	–	–	4	4
	5	5	11,3	377	253	352,2	–	220	250,7	255,3	400	–	–	4	4
220	3	3	6,2	310	250	298,9	–	232	248	254	328	–	–	2,5	2,5
	4	4	5,5	358	268	344,9	–	237	265	271	383	–	–	3	3
	4	4	8,4	367	259	345,4	–	237	256,7	261,3	383	–	–	3	3
	5	5	7	406	282	381,2	–	240	279	285	440	–	–	4	4
	5	5	11,9	413	277	385,8	–	240	274,7	279,3	440	–	–	4	4
240	3	3	6,4	330	270	318,9	–	252	268	275	348	–	–	2,5	2,5
	4	4	6	393	293	–	313	257	–	–	423	396	390	3	3
	4	4	6	393	293	373	–	257	290	296	423	–	–	3	3
	4	4	10,2	399	287	376,6	–	257	284,5	289,5	423	–	–	3	3
	5	5	7,4	442	306	414,8	–	260	303	309	480	–	–	4	4
	5	5	13,3	447	303	418,2	–	260	300,5	305,5	480	–	–	4	4
260	4	4	7,2	364	296	351,3	–	275	292	300	385	–	–	3	3
	5	5	6,2	429	317	406,6	–	280	314	320	460	–	–	4	4
	5	5	10,5	433	313	409	–	280	310	316	460	–	–	4	4
	6	6	10	477	337	449	–	286	334,3	339,7	514	–	–	5	5
	6	6	13,7	484	324	452	–	286	321,3	326,7	514	–	–	5	5
280	4	4	7,2	384	316	371,3	–	295	312	321	405	–	–	3	3
	5	5	6,3	449	337	426,6	–	300	334	340	480	–	–	4	4
	5	5	10,5	453	333	429	–	300	330	336	480	–	–	4	4
	6	6	8,7	512	362	482	–	306	359	366	554	–	–	5	5
	6	6	13,8	521	351	487	–	306	348	354	554	–	–	5	5

Cylindrical roller bearings with cage

Non-locating bearings



NU

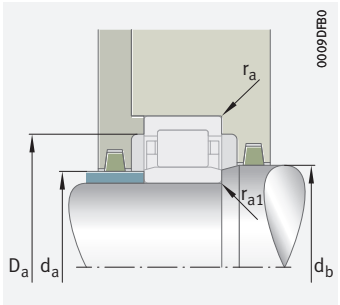


Axial displacement "s" for NU

d = 300 – 710 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*429*|*1.12* ➤*430*|*1.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
300	460	74	900 000	1 430 000	122 000	2 290	1 390	44,6	**NU1060-M1**
	540	85	1 600 000	2 330 000	170 000	1 860	920	90,4	**NU260-E-TB-M1**
	540	140	2 700 000	4 100 000	415 000	1 780	650	143	**NU2260-EX-TB-M1**
320	480	74	910 000	1 490 000	125 000	2 200	1 300	46,9	**NU1064-M1**
	580	92	1 810 000	2 700 000	190 000	1 730	830	113	**NU264-EX-TB-M1**
	580	150	3 150 000	4 900 000	470 000	1 650	570	180	**NU2264-EX-TB-M1**
340	520	82	1 120 000	1 830 000	150 000	2 010	1 190	63,2	**NU1068-M1**
360	540	82	1 150 000	1 910 000	155 000	1 940	1 110	65,9	**NU1072-M1**
	650	170	3 600 000	5 800 000	540 000	1 490	510	254	**NU2272-E-TB-M1**
380	560	82	1 170 000	1 990 000	160 000	1 880	1 050	69,1	**NU1076-M1**
	680	175	4 050 000	6 700 000	620 000	1 420	450	288	**NU2276-E-TB-M1**
400	600	90	1 380 000	2 330 000	178 000	1 730	980	90,1	**NU1080-TB-M1**
420	620	90	1 410 000	2 430 000	185 000	1 680	920	92,9	**NU1084-TB-M1**
440	650	94	1 560 000	2 750 000	202 000	1 600	860	107	**NU1088-TB-M1**
460	620	74	1 020 000	1 970 000	157 000	1 770	860	63,1	**NU1992-M1**
	680	100	1 680 000	2 950 000	217 000	1 530	830	125	**NU1092-TB-M1**
480	650	78	1 150 000	2 250 000	179 000	1 680	810	74,2	**NU1996-M1**
	700	100	1 720 000	3 100 000	225 000	1 490	780	129	**NU1096-TB-M1**
500	720	100	1 750 000	3 200 000	232 000	1 450	750	133	**NU10/500-TB-M1**
560	750	85	1 460 000	2 950 000	227 000	1 450	660	105	**NU19/560-M1**
	820	115	2 700 000	5 100 000	335 000	1 250	590	213	**NU10/560-TB-M1**
600	800	90	1 960 000	3 900 000	275 000	1 300	570	125,3	**NU19/600-E-TB-M1**
670	900	103	2 040 000	4 250 000	295 000	1 190	530	186	**NU19/670-TB-M1**
710	950	106	2 230 000	4 750 000	330 000	1 130	485	213	**NU19/710-TB-M1**

medias *https://www.schaeffler.de/std/1F9A*

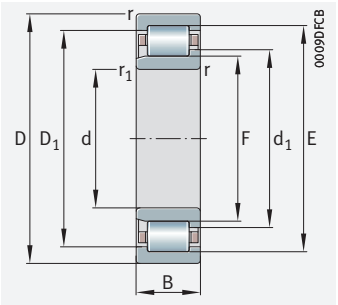


Mounting dimensions for NU

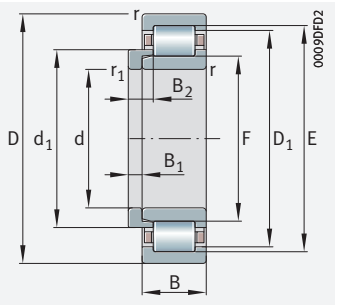
Dimensions							Mounting dimensions					
d	r	r_1	s	E	F	D_1	d_a		d_b	D_a	r_a	r_{a1}
	min.	min.				≈	min.	max.	min.	max.	max.	max.
300	4	4	7,9	420	340	405,2	315	336	345	445	3	3
	5	5	6,9	484	364	460	320	359	367	520	4	4
	5	5	12,2	495	355	467	320	352	358	520	4	4
320	4	4	11,5	440	360	425,1	335	356	365	465	3	3
	5	5	7,5	520	392	494,4	340	388,5	395,5	560	4	4
	5	5	11,9	530	380	500	340	376,5	383,5	560	4	4
340	5	5	12,5	475	385	458,2	357	381	390	503	4	4
360	5	5	12,5	495	405	478,1	377	400	410	523	4	4
	6	6	15	588	428	556	386	424	432	624	5	5
380	5	5	9	515	425	498,1	397	420	430	543	4	4
	6	6	13,8	615	451	582,2	406	446	456	654	5	5
400	5	5	9,5	550	450	530	417	445	455	583	4	4
420	5	5	9,6	570	470	550	437	465	475	603	4	4
440	6	6	9,8	597	493	576,2	463	488	498	627	5	5
460	4	4	8,4	578	502	562,8	475	498	506	605	3	3
	6	6	11,2	624	516	602,4	483	510	522	657	5	5
480	5	5	6,8	605	525	589	497	521	529	633	4	4
	6	6	10,7	644	536	622,4	503	530	542	677	5	5
500	6	6	10,7	664	556	642,4	523	550	562	697	5	5
560	5	5	9,6	700	610	682	577	606	614	733	4	4
	6	6	9,8	754	626	728,4	583	620	632	797	5	5
600	5	5	9,9	748	652	735,4	617	647	657	783	4	4
670	6	6	11,3	839	731	817	693	726	736	877	5	5
710	6	6	9,3	886	774	863,6	733	769	779	927	5	5

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

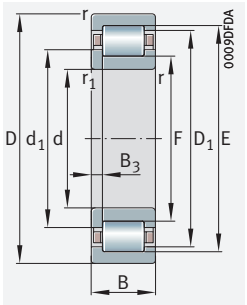


NJ and HJ
Locating bearings

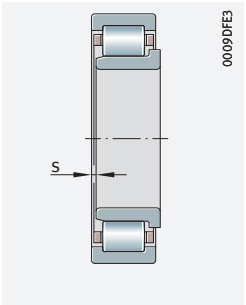
d = 15 – 20 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
15	35	11	15 100	10 400	1 620	27 000	17 900	0,049	–	**NJ202-E-XL-TVP2**	–
	35	11	15 100	10 400	1 620	27 000	17 900	0,049	0,005	**NJ202-E-XL-TVP2**	**HJ202-E**
17	40	12	20 800	14 600	2 220	22 900	15 300	0,07	–	**NJ203-E-XL-TVP2**	–
	40	12	20 800	14 600	2 220	22 900	15 300	0,07	0,008	**NJ203-E-XL-TVP2**	**HJ203-E**
	40	12	20 800	14 600	2 230	22 900	15 300	0,073	–	**NUP203-E-XL-TVP2**	**–**
	40	16	28 500	21 900	3 550	22 900	13 200	0,053	–	**NJ2203-E-XL-TVP2**	–
	40	16	28 500	21 900	3 550	22 900	13 200	0,053	0,008	**NJ2203-E-XL-TVP2**	**HJ2203-E**
	40	16	28 500	21 900	3 550	22 900	13 200	0,055	–	**NUP2203-E-XL-TVP2**	**–**
	47	14	30 000	21 200	3 400	19 600	13 500	0,124	–	**NJ303-E-XL-TVP2**	–
	47	14	30 000	21 200	3 400	19 600	13 500	0,124	0,014	**NJ303-E-XL-TVP2**	**HJ303-E**
	47	14	30 000	21 200	3 400	19 600	13 500	0,142	–	**NUP303-E-XL-TVP2**	**–**
20	47	14	32 500	24 700	3 950	19 200	12 800	0,117	–	**NJ204-E-XL-TVP2**	–
	47	14	32 500	24 700	3 950	19 200	12 800	0,117	0,011	**NJ204-E-XL-TVP2**	**HJ204-E**
	47	14	32 500	24 700	3 950	19 200	12 800	0,119	–	**NUP204-E-XL-TVP2**	**–**
	47	18	38 500	31 000	5 200	19 200	11 100	0,15	–	**NJ2204-E-XL-TVP2**	–
	47	18	38 500	31 000	5 200	19 200	11 100	0,15	0,012	**NJ2204-E-XL-TVP2**	**HJ2204-E**
	47	18	38 500	31 000	5 200	19 200	11 100	0,154	–	**NUP2204-E-XL-TVP2**	**–**
	52	15	37 500	27 000	3 950	17 200	11 900	0,156	–	**NJ304-E-XL-TVP2**	–
	52	15	37 500	27 000	3 950	17 200	11 900	0,156	0,017	**NJ304-E-XL-TVP2**	**HJ304-E**
	52	15	37 500	27 000	3 950	17 200	11 900	0,16	–	**NUP304-E-XL-TVP2**	**–**
	52	21	49 500	39 000	6 300	17 200	9 700	0,219	–	**NJ2304-E-XL-TVP2**	–
	52	21	49 500	39 000	6 300	17 200	9 700	0,219	0,019	**NJ2304-E-XL-TVP2**	**HJ2304-E**
	52	21	49 500	39 000	6 300	17 200	9 700	0,224	–	**NUP2304-E-XL-TVP2**	**–**

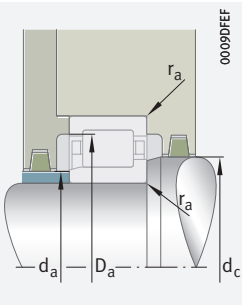
medias *https://www.schaeffler.de/std/1F9A*



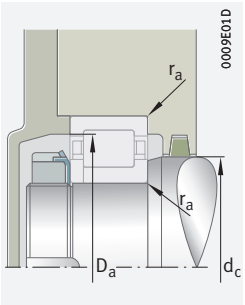
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



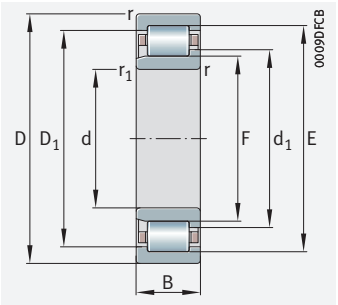
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
15	0,6	0,3	1,6	30,3	19,3	28	21,6	–	–	–	17,4	18,5	22	32,6	0,6
	0,6	0,3	–	30,3	19,3	28	21,6	2,5	5	–	17,4	–	22	32,6	0,6
17	0,6	0,3	1,2	35,1	22,1	32,5	24,7	–	–	–	21	21,5	28	36	0,6
	0,6	0,3	–	35,1	22,1	32,5	24,7	3	5,5	–	21	–	28	36	0,6
	0,6	0,3	–	35,1	22,1	32,5	24,7	–	–	2,5	21	–	28	36	0,6
	0,6	0,3	1,7	35,1	22,1	32,5	24,7	–	–	–	21	21,5	26	36	0,6
	0,6	0,3	–	35,1	22,1	32,5	24,7	3	6	–	21	–	26	36	0,6
	0,6	0,6	–	35,1	22,1	32,5	24,7	–	–	3	21	–	26	36	0,6
	1	0,6	1,2	40,2	24,2	37,1	27,6	–	–	–	21,2	23,5	28	42,8	1
	1	0,6	–	40,2	24,2	37,1	27,6	4	6,5	–	21,2	–	28	42,8	1
	1	0,6	–	40,2	24,2	37,1	27,6	–	–	2,5	21,2	–	28	42,8	1
20	1	0,6	1	41,5	26,5	38,8	29,7	–	–	–	24	26	32	41	1
	1	0,6	–	41,5	26,5	38,8	29,7	3	5,5	–	24	–	32	41	1
	1	0,6	–	41,5	26,5	38,8	29,7	–	–	2,5	24	–	32	41	1
	1	0,6	1,8	41,5	26,5	38,8	29,7	–	–	–	24	26	32	41	1
	1	0,6	–	41,5	26,5	38,8	29,7	3	6,5	–	24	–	32	41	1
	1	0,6	–	41,5	26,5	38,8	29,7	–	–	3,5	24	–	32	41	1
	1,1	0,6	1	45,5	27,5	42,4	31,3	–	–	–	24	27	33	45	1
	1,1	0,6	–	45,5	27,5	42,4	31,3	4	6,5	–	24	–	33	45	1
	1,1	0,6	–	45,5	27,5	42,4	31,3	–	–	2,5	24	–	33	45	1
	1,1	0,6	1,9	45,5	27,5	42,4	31,3	–	–	–	24	27	33	45	1
	1,1	0,6	–	45,5	27,5	42,4	31,3	4	7,5	–	24	–	33	45	1
	1,1	0,6	–	45,5	27,5	42,4	31,3	–	–	3,5	24	–	33	45	1

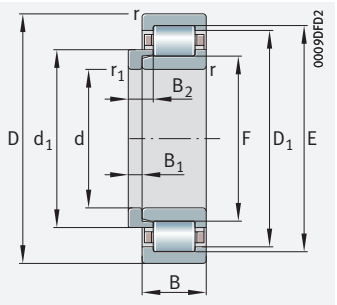
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

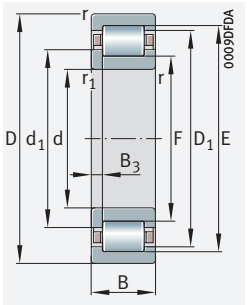


NJ and HJ
Locating bearings

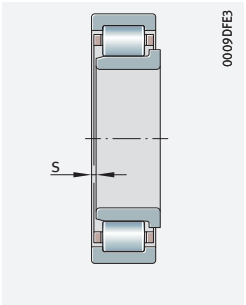
d = 25 – 30 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
25	52	15	34 500	27 500	4 450	17 200	11 600	0,14	–	**NJ205-E-XL-TVP2**	–
	52	15	34 500	27 500	4 450	17 200	11 600	0,14	0,014	**NJ205-E-XL-TVP2**	**HJ205-E**
	52	15	34 500	27 500	4 450	17 200	11 600	0,145	–	**NUP205-E-XL-TVP2**	**–**
	52	18	41 500	34 500	5 800	17 200	9 600	0,17	–	**NJ2205-E-XL-TVP2**	–
	52	18	41 500	34 500	5 800	17 200	9 600	0,17	0,015	**NJ2205-E-XL-TVP2**	**HJ2205-E**
	52	18	41 500	34 500	5 800	17 200	9 600	0,174	–	**NUP2205-E-XL-TVP2**	**–**
	62	17	49 000	37 500	5 700	14 400	10 100	0,25	–	**NJ305-E-XL-TVP2**	–
	62	17	49 000	37 500	5 700	14 400	10 100	0,25	0,025	**NJ305-E-XL-TVP2**	**HJ305-E**
	62	17	49 000	37 500	5 700	14 400	10 100	0,256	–	**NUP305-E-XL-TVP2**	**–**
	62	24	66 000	54 000	9 300	14 400	8 300	0,356	–	**NJ2305-E-XL-TVP2**	–
	62	24	66 000	54 000	9 300	14 400	8 300	0,356	0,027	**NJ2305-E-XL-TVP2**	**HJ2305-E**
	62	24	67 000	56 000	9 300	14 400	8 200	0,364	–	**NUP2305-E-XL-TVP2**	**–**
30	62	16	46 000	37 500	5 500	14 200	9 600	0,213	–	**NJ206-E-XL-TVP2**	–
	62	16	46 000	37 500	5 500	14 200	9 600	0,213	0,024	**NJ206-E-XL-TVP2**	**HJ206-E**
	62	16	46 000	37 500	5 500	14 200	9 600	0,219	–	**NUP206-E-XL-TVP2**	**–**
	62	20	58 000	50 000	7 900	14 200	8 000	0,261	–	**NJ2206-E-XL-TVP2**	–
	62	20	58 000	50 000	7 900	14 200	8 000	0,261	0,025	**NJ2206-E-XL-TVP2**	**HJ2206-E**
	62	20	58 000	50 000	8 000	14 200	8 000	0,268	–	**NUP2206-E-XL-TVP2**	**–**
	72	19	61 000	48 000	7 800	12 400	8 900	0,376	–	**NJ306-E-XL-TVP2**	–
	72	19	61 000	48 000	7 800	12 400	8 900	0,376	0,042	**NJ306-E-XL-TVP2**	**HJ306-E**
	72	19	61 000	48 000	7 900	12 400	8 900	0,385	–	**NUP306-E-XL-TVP2**	**–**
	72	27	86 000	75 000	13 300	12 400	7 200	0,54	–	**NJ2306-E-XL-TVP2**	–
	72	27	86 000	75 000	13 300	12 400	7 200	0,54	0,044	**NJ2306-E-XL-TVP2**	**HJ2306-E**
	72	27	86 000	75 000	13 300	12 400	7 200	0,551	–	**NUP2306-E-XL-TVP2**	**–**
	90	23	84 000	65 000	11 200	13 400	8 100	0,872	–	**NJ406-XL-M1**	–
	90	23	84 000	65 000	11 200	13 400	8 100	0,872	0,082	**NJ406-XL-M1**	**HJ406**

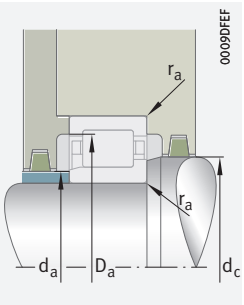
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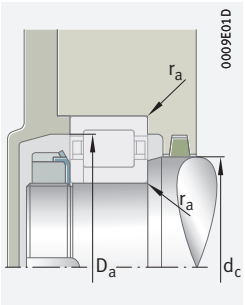
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



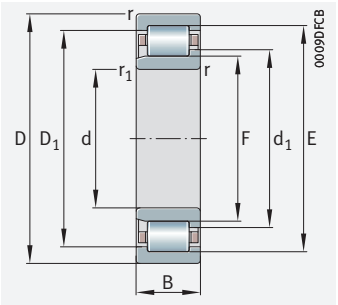
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
25	1	0,6	1,2	46,5	31,5	43,8	34,7	–	–	–	29	31	37	46	1
	1	0,6	–	46,5	31,5	43,8	34,7	3	6	–	29	–	37	46	1
	1	0,6	–	46,5	31,5	43,8	34,7	–	–	3	29	–	37	46	1
	1	0,6	1,7	46,5	31,5	43,8	34,7	–	–	–	29	31	37	46	1
	1	0,6	–	46,5	31,5	43,8	34,7	3	6,5	–	29	–	37	46	1
	1	0,6	–	46,5	31,5	43,8	34,7	–	–	3,5	29	–	37	46	1
	1,1	1,1	1,5	54	34	50,7	38,1	–	–	–	32	33	40	55	1
	1,1	1,1	–	54	34	50,7	38,1	4	7	–	32	–	40	55	1
	1,1	1,1	–	54	34	50,7	38,1	–	–	3	32	–	40	55	1
	1,1	1,1	1,9	54	34	50,7	38,1	–	–	–	32	33	40	55	1
	1,1	1,1	–	54	34	50,7	38,1	4	8	–	32	–	40	55	1
	1,1	1,1	–	54	34	50,7	38,1	–	–	4	32	–	40	55	1
30	1	0,6	1,5	55,5	37,5	52,5	41,1	–	–	–	34	37	44	56	1
	1	0,6	–	55,5	37,5	52,5	41,1	4	7	–	34	–	44	56	1
	1	0,6	–	55,5	37,5	52,5	41,1	–	–	3	34	–	44	56	1
	1	0,6	1,6	55,5	37,5	52,5	41,3	–	–	–	34	37	44	56	1
	1	0,6	–	55,5	37,5	52,5	41,3	4	7,5	–	34	–	44	56	1
	1	0,6	–	55,5	37,5	52,5	41,3	–	–	3,5	34	–	44	56	1
	1,1	1,1	1,2	62,5	40,5	59,2	45	–	–	–	37	40	48	65	1
	1,1	1,1	–	62,5	40,5	59,2	45	5	8,5	–	37	–	48	65	1
	1,1	1,1	–	62,5	40,5	59,2	45	–	–	3,5	37	–	48	65	1
	1,1	1,1	2,2	62,5	40,5	59,2	45	–	–	–	37	40	48	65	1
	1,1	1,1	–	62,5	40,5	59,2	45	5	9,5	–	37	–	48	65	1
	1,1	1,1	–	62,5	40,5	59,2	45	–	–	4,5	37	–	48	65	1
	1,5	1,5	2,3	73	45	68,4	50,3	–	–	–	41	44	52	79	1,5
	1,5	1,5	–	73	45	68,4	50,3	7	11,5	–	41	–	52	79	1,5

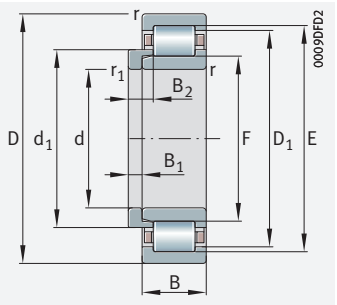
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

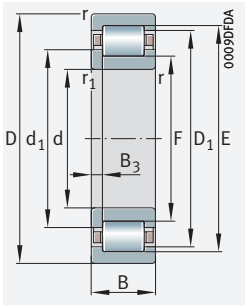


NJ and HJ
Locating bearings

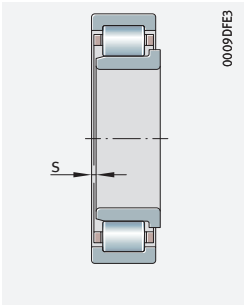
d = 35 – 40 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
35	72	17	59 000	50 000	7 700	12 300	8 100	0,309	–	**NJ207-E-XL-TVP2**	–
	72	17	59 000	50 000	7 700	12 300	8 100	0,309	0,032	**NJ207-E-XL-TVP2**	**HJ207-E**
	72	17	59 000	50 000	7 800	12 300	8 100	0,317	–	**NUP207-E-XL-TVP2**	**–**
	72	23	73 000	65 000	10 700	12 300	7 200	0,416	–	**NJ2207-E-XL-TVP2**	–
	72	23	73 000	65 000	10 700	12 300	7 200	0,416	0,035	**NJ2207-E-XL-TVP2**	**HJ2207-E**
	72	23	73 000	65 000	10 700	12 300	7 200	0,427	–	**NUP2207-E-XL-TVP2**	**–**
	80	21	76 000	63 000	10 800	10 900	7 900	0,496	–	**NJ307-E-XL-TVP2**	–
	80	21	76 000	63 000	10 800	10 900	7 900	0,496	0,06	**NJ307-E-XL-TVP2**	**HJ307-E**
	80	21	76 000	63 000	10 800	10 900	7 900	0,506	–	**NUP307-E-XL-TVP2**	**–**
	80	31	108 000	98 000	17 900	10 900	6 600	0,736	–	**NJ2307-E-XL-TVP2**	–
	80	31	108 000	98 000	17 900	10 900	6 600	0,736	0,063	**NJ2307-E-XL-TVP2**	**HJ2307-E**
	80	31	108 000	98 000	17 900	10 900	6 600	0,751	–	**NUP2307-E-XL-TVP2**	**–**
	100	25	103 000	83 000	14 500	11 800	7 000	1,16	–	**NJ407-XL-M1**	–
	100	25	103 000	83 000	14 500	11 800	7 000	1,16	0,127	**NJ407-XL-M1**	**HJ407**
40	80	18	63 000	53 000	8 500	10 900	7 500	0,389	–	**NJ208-E-XL-TVP2**	–
	80	18	63 000	53 000	8 500	10 900	7 500	0,389	0,049	**NJ208-E-XL-TVP2**	**HJ208-E**
	80	18	63 000	53 000	8 500	10 900	7 500	0,399	–	**NUP208-E-XL-TVP2**	**–**
	80	23	83 000	75 000	12 900	10 900	6 300	0,504	–	**NJ2208-E-XL-TVP2**	–
	80	23	83 000	75 000	12 900	10 900	6 300	0,504	0,05	**NJ2208-E-XL-TVP2**	**HJ2208-E**
	80	23	83 000	75 000	12 900	10 900	6 300	0,518	–	**NUP2208-E-XL-TVP2**	**–**
	90	23	96 000	79 000	13 800	9 500	7 100	0,674	–	**NJ308-E-XL-TVP2**	–
	90	23	96 000	79 000	13 800	9 500	7 100	0,674	0,087	**NJ308-E-XL-TVP2**	**HJ308-E**
	90	23	96 000	79 000	13 900	9 500	7 100	0,688	–	**NUP308-E-XL-TVP2**	**–**
	90	33	132 000	119 000	21 900	9 500	5 800	0,978	–	**NJ2308-E-XL-TVP2**	–
	90	33	132 000	119 000	21 900	9 500	5 800	0,978	0,091	**NJ2308-E-XL-TVP2**	**HJ2308-E**
	90	33	132 000	119 000	21 900	9 500	5 800	0,999	–	**NUP2308-E-XL-TVP2**	**–**
	110	27	119 000	95 000	17 100	10 500	6 500	1,5	–	**NJ408-XL-M1**	–
	110	27	119 000	95 000	17 100	10 500	6 500	1,5	0,148	**NJ408-XL-M1**	**HJ408**

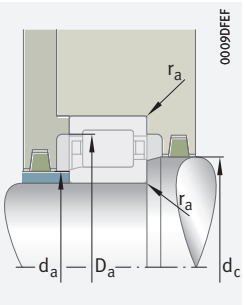
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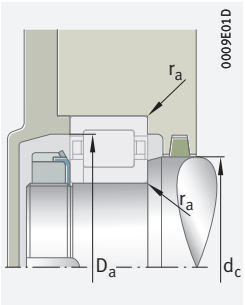
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



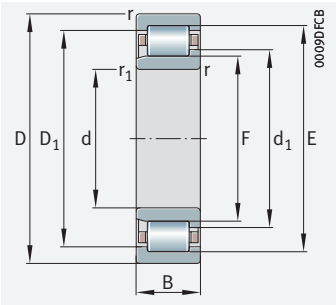
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
35	1,1	0,6	0,7	64	44	61	48	–	–	–	39	43	50	65	1
	1,1	0,6	–	64	44	61	48	4	7	–	39	–	50	65	1
	1,1	0,6	–	64	44	61	48	–	–	3	39	–	50	65	1
	1,1	0,6	2,2	64	44	61	48	–	–	–	39	43	50	65	1
	1,1	0,6	–	64	44	61	48	4	8,5	–	39	–	50	65	1
	1,1	0,6	–	64	44	61	48	–	–	4,5	39	–	50	65	1
	1,5	1,1	0,6	70,2	46,2	66,6	51	–	–	–	42	45	53	71	1,5
	1,5	1,1	–	70,2	46,2	66,6	51	6	9,5	–	42	–	53	71	1,5
	1,5	1,1	–	70,2	46,2	66,6	51	–	–	3,5	42	–	53	71	1,5
	1,5	1,1	2,1	70,2	46,2	66,6	51	–	–	–	42	45	53	71	1,5
	1,5	1,1	–	70,2	46,2	66,6	51	6	11	–	42	–	53	71	1,5
	1,5	1,5	–	70,2	46,2	66,6	51	–	–	5	42	–	53	71	1,5
	1,5	1,5	2,6	83	53	78,2	58,8	–	–	–	46	52	61	89	1,5
	1,5	1,5	–	83	53	78,2	58,8	8	13	–	46	–	61	89	1,5
40	1,1	1,1	1	71,5	49,5	68,3	54	–	–	–	47	49	56	73	1
	1,1	1,1	–	71,5	49,5	68,3	54	5	8,5	–	47	–	56	73	1
	1,1	1,1	–	71,5	49,5	68,3	54	–	–	3,5	47	–	56	73	1
	1,1	1,1	1,5	71,5	49,5	68,3	54	–	–	–	47	49	56	73	1
	1,1	1,1	–	71,5	49,5	68,3	54	5	9	–	47	–	56	73	1
	1,1	1,1	–	71,5	49,5	68,3	54	–	–	4	47	–	56	73	1
	1,5	1,5	1,3	80	52	75,9	57,6	–	–	–	49	51	60	81	1,5
	1,5	1,5	–	80	52	75,9	57,6	7	11	–	49	–	60	81	1,5
	1,5	1,5	–	80	52	75,9	57,6	–	–	4	49	–	60	81	1,5
	1,5	1,5	2,7	80	52	75,9	57,6	–	–	–	49	51	60	81	1,5
	1,5	1,5	–	80	52	75,9	57,6	7	12,5	–	49	–	60	81	1,5
	1,5	1,5	–	80	52	75,9	57,6	–	–	5,5	49	–	60	81	1,5
	2	2	2,8	92	58	86,4	64,6	–	–	–	53	57	67	97	2
	2	2	–	92	58	86,4	64,6	8	13	–	53	–	67	97	2

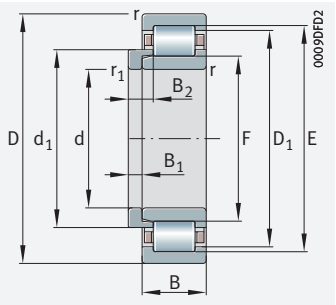
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

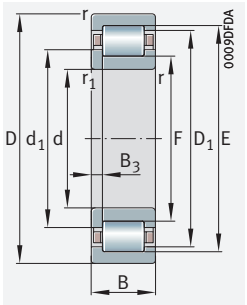


NJ and HJ
Locating bearings

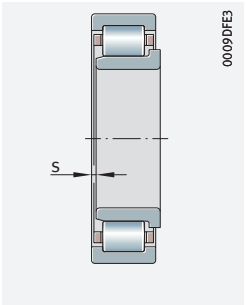
d = 45 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
45	85	19	72 000	63 000	10 500	10 200	7 000	0,445	–	**NJ209-E-XL-TVP2**	–
	85	19	72 000	63 000	10 500	10 200	7 000	0,445	0,054	**NJ209-E-XL-TVP2**	**HJ209-E**
	85	19	72 000	63 000	10 500	10 200	7 000	0,457	–	**NUP209-E-XL-TVP2**	**–**
	85	23	87 000	82 000	14 100	10 200	5 800	0,544	–	**NJ2209-E-XL-TVP2**	–
	85	23	87 000	82 000	14 100	10 200	5 800	0,544	0,055	**NJ2209-E-XL-TVP2**	**HJ2209-E**
	85	23	87 000	82 000	14 100	10 200	5 800	0,559	–	**NUP2209-E-XL-TVP2**	**–**
	100	25	116 000	99 000	17 500	8 500	6 400	0,913	–	**NJ309-E-XL-TVP2**	–
	100	25	116 000	99 000	17 500	8 500	6 400	0,913	0,109	**NJ309-E-XL-TVP2**	**HJ309-E**
	100	25	116 000	99 000	17 600	8 500	6 400	0,937	–	**NUP309-E-XL-TVP2**	**–**
	100	36	163 000	154 000	28 500	8 500	5 200	1,33	–	**NJ2309-E-XL-TVP2**	–
	100	36	163 000	154 000	28 500	8 500	5 200	1,33	0,115	**NJ2309-E-XL-TVP2**	**HJ2309-E**
	100	36	163 000	154 000	28 500	8 500	5 200	1,36	–	**NUP2309-E-XL-TVP2**	**–**
	120	29	143 000	119 000	21 700	9 600	5 900	1,9	–	**NJ409-XL-M1**	–
	120	29	143 000	119 000	21 700	9 600	5 900	1,9	0,181	**NJ409-XL-M1**	**HJ409**
50	90	20	75 000	69 000	11 300	9 700	6 600	0,503	–	**NJ210-E-XL-TVP2**	–
	90	20	75 000	69 000	11 300	9 700	6 600	0,503	0,06	**NJ210-E-XL-TVP2**	**HJ210-E**
	90	20	75 000	69 000	11 400	9 700	6 600	0,517	–	**NUP210-E-XL-TVP2**	**–**
	90	23	92 000	88 000	15 300	9 700	5 300	0,586	–	**NJ2210-E-XL-TVP2**	–
	90	23	92 000	88 000	15 300	9 700	5 300	0,586	0,06	**NJ2210-E-XL-TVP2**	**HJ210-E**
	90	23	92 000	88 000	15 300	9 700	5 300	0,597	–	**NUP2210-E-XL-TVP2**	**–**
	110	27	131 000	114 000	20 400	7 800	6 000	1,19	–	**NJ310-E-XL-TVP2**	–
	110	27	131 000	114 000	20 400	7 800	6 000	1,19	0,149	**NJ310-E-XL-TVP2**	**HJ310-E**
	110	27	131 000	114 000	20 500	7 800	6 000	1,21	–	**NUP310-E-XL-TVP2**	**–**
	110	40	193 000	187 000	35 500	7 800	4 900	1,77	–	**NJ2310-E-XL-TVP2**	–
	110	40	193 000	187 000	35 500	7 800	4 900	1,77	0,156	**NJ2310-E-XL-TVP2**	**HJ2310-E**
	110	40	193 000	187 000	35 500	7 800	4 900	1,82	–	**NUP2310-E-XL-TVP2**	**–**
	130	31	175 000	148 000	27 500	8 600	5 300	2,36	–	**NJ410-XL-M1**	–
	130	31	175 000	148 000	27 500	8 600	5 300	2,36	0,238	**NJ410-XL-M1**	**HJ410**

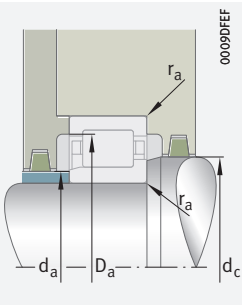
medias *https://www.schaeffler.de/std/1F9A*



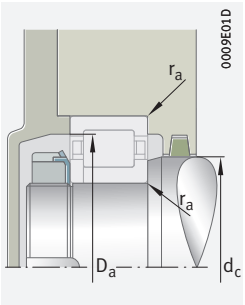
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



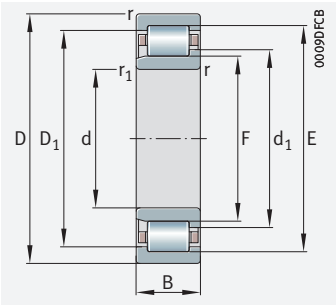
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
45	1,1	1,1	1,9	76,5	54,5	73,3	59	–	–	–	52	54	61	78	1
	1,1	1,1	–	76,5	54,5	73,3	59	5	8,5	–	52	–	61	78	1
	1,1	1,1	–	76,5	54,5	73,3	59	–	–	3,5	52	–	61	78	1
	1,1	1,1	1,5	76,5	54,5	73,3	59	–	–	–	52	54	61	78	1
	1,1	1,1	–	76,5	54,5	73,3	59	5	9	–	52	–	61	78	1
	1,1	1,1	–	76,5	54,5	73,3	59	–	–	4	52	–	61	78	1
	1,5	1,5	1	88,5	58,5	84,1	64,4	–	–	–	54	57	66	91	1,5
	1,5	1,5	–	88,5	58,5	84,1	64,4	7	11,5	–	54	–	66	91	1,5
	1,5	1,5	–	88,5	58,5	84,1	64,4	–	–	4,5	54	–	66	91	1,5
	1,5	1,5	2,5	88,5	58,5	84,1	64,4	–	–	–	54	57	66	91	1,5
	1,5	1,5	–	88,5	58,5	84,1	64,4	7	13	–	54	–	66	91	1,5
	1,5	1,5	–	88,5	58,5	84,1	64,4	–	–	6	54	–	66	91	1,5
	2	2	2,9	100,5	64,5	94,6	71,6	–	–	–	58	63	74	107	2
	2	2	–	100,5	64,5	94,6	71,6	8	13,5	–	58	–	74	107	2
50	1,1	1,1	1,3	81,5	59,5	78,3	64	–	–	–	57	58	67	83	1
	1,1	1,1	–	81,5	59,5	78,3	64	5	9	–	57	–	67	83	1
	1,1	1,1	–	81,5	59,5	78,3	64	–	–	4	57	–	67	83	1
	1,1	1,1	1,3	81,5	59,5	78,3	64	–	–	–	57	58	67	83	1
	1,1	1,1	–	81,5	59,5	78,3	64	5	9	–	57	–	67	83	1
	1,1	1,1	–	81,5	59,5	78,3	64	–	–	4	57	–	67	83	1
	2	2	1,7	97	65	92,5	71,3	–	–	–	61	63	73	99	2
	2	2	–	97	65	92,5	71,3	8	13	–	61	–	73	99	2
	2	2	–	97	65	92,5	71,3	–	–	5	61	–	73	99	2
	2	2	4,2	97	65	92,5	71,3	–	–	–	61	63	73	99	2
	2	2	–	97	65	92,5	71,3	8	14,5	–	61	–	73	99	2
	2	2	–	97	65	92,5	71,3	–	–	6,5	61	–	73	99	2
	2,1	2,1	3	110,8	70,8	104,3	78,6	–	–	–	64	69	81	116	2
	2,1	2,1	–	110,8	70,8	104,3	78,6	9	14,5	–	64	–	81	116	2

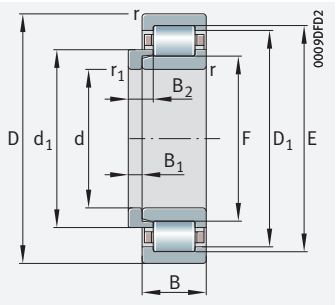
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

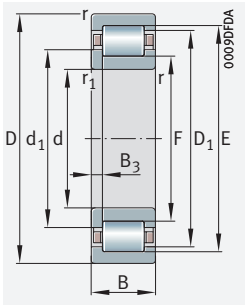


NJ and HJ
Locating bearings

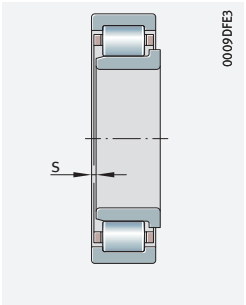
d = 55 – 60 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
55	100	21	99 000	95 000	16 400	8 700	5 800	0,679	–	**NJ211-E-XL-TVP2**	–
	100	21	99 000	95 000	16 400	8 700	5 800	0,679	0,087	**NJ211-E-XL-TVP2**	**HJ211-E**
	100	21	99 000	95 000	16 400	8 700	5 800	0,693	–	**NUP211-E-XL-TVP2**	**–**
	100	25	117 000	118 000	21 000	8 700	4 700	0,812	–	**NJ2211-E-XL-TVP2**	–
	100	25	117 000	118 000	21 000	8 700	4 700	0,812	0,087	**NJ2211-E-XL-TVP2**	**HJ2211-E**
	100	25	117 000	118 000	21 000	8 700	4 700	0,828	–	**NUP2211-E-XL-TVP2**	**–**
	120	29	159 000	139 000	25 500	7 000	5 500	1,51	–	**NJ311-E-XL-TVP2**	–
	120	29	159 000	139 000	25 500	7 000	5 500	1,51	0,192	**NJ311-E-XL-TVP2**	**HJ311-E**
	120	29	159 000	139 000	26 000	7 000	5 500	1,54	–	**NUP311-E-XL-TVP2**	**–**
	120	43	235 000	230 000	44 000	7 000	4 500	2,27	–	**NJ2311-E-XL-TVP2**	–
	120	43	235 000	230 000	44 000	7 000	4 500	2,27	0,2	**NJ2311-E-XL-TVP2**	**HJ2311-E**
	120	43	235 000	230 000	44 000	7 000	4 500	2,31	–	**NUP2311-E-XL-TVP2**	**–**
	140	33	187 000	164 000	30 500	8 200	5 100	2,88	–	**NJ411-XL-M1**	–
	140	33	187 000	164 000	30 500	8 200	5 100	2,88	0,302	**NJ411-XL-M1**	**HJ411**
60	110	22	112 000	103 000	18 000	7 700	5 300	0,845	–	**NJ212-E-XL-TVP2**	–
	110	22	112 000	103 000	18 000	7 700	5 300	0,845	0,106	**NJ212-E-XL-TVP2**	**HJ212-E**
	110	22	112 000	103 000	18 100	7 700	5 300	0,865	–	**NUP212-E-XL-TVP2**	**–**
	110	28	152 000	153 000	28 000	7 700	4 300	1,1	–	**NJ2212-E-XL-TVP2**	–
	110	28	152 000	153 000	28 000	7 700	4 300	1,1	0,106	**NJ2212-E-XL-TVP2**	**HJ212-E**
	110	28	152 000	153 000	28 000	7 700	4 300	1,12	–	**NUP2212-E-XL-TVP2**	**–**
	130	31	177 000	157 000	29 000	6 500	5 200	1,89	–	**NJ312-E-XL-TVP2**	–
	130	31	177 000	157 000	29 000	6 500	5 200	1,89	0,229	**NJ312-E-XL-TVP2**	**HJ312-E**
	130	31	177 000	157 000	29 000	6 500	5 200	1,93	–	**NUP312-E-XL-TVP2**	**–**
	130	46	265 000	260 000	50 000	6 500	4 250	2,83	–	**NJ2312-E-XL-TVP2**	–
	130	46	265 000	260 000	50 000	6 500	4 250	2,83	0,238	**NJ2312-E-XL-TVP2**	**HJ2312-E**
	130	46	265 000	260 000	50 000	6 500	4 250	2,88	–	**NUP2312-E-XL-TVP2**	**–**
	150	35	211 000	184 000	33 500	7 500	4 800	3,47	–	**NJ412-XL-M1**	–
	150	35	211 000	184 000	33 500	7 500	4 800	3,47	0,347	**NJ412-XL-M1**	**HJ412**

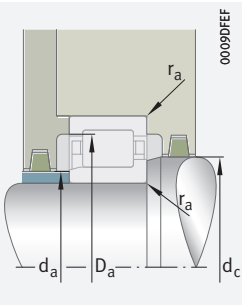
medias *https://www.schaeffler.de/std/1F9A*



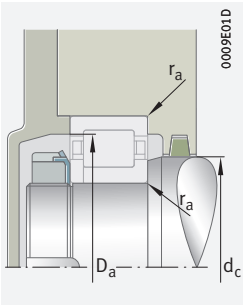
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



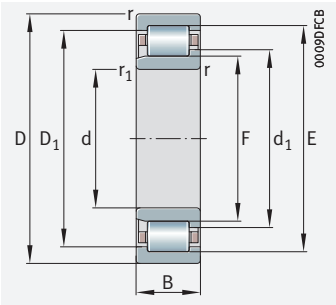
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
55	1,5	1,1	0,8	90	66	86,6	70,8	–	–	–	62	65	73	91	1,5
	1,5	1,1	–	90	66	86,6	70,8	6	9,5	–	62	–	73	91	1,5
	1,5	1,1	–	90	66	86,6	70,8	–	–	3,5	62	–	73	91	1,5
	1,5	1,1	1,3	90	66	86,6	70,8	–	–	–	62	65	73	91	1,5
	1,5	1,1	–	90	66	86,6	70,8	6	10	–	62	–	73	91	1,5
	1,5	1,1	–	90	66	86,6	70,8	–	–	4	62	–	73	91	1,5
	2	2	1,8	106,5	70,5	101,4	77,5	–	–	–	66	69	80	109	2
	2	2	–	106,5	70,5	101,4	77,5	9	14	–	66	–	80	109	2
	2	2	–	106,5	70,5	101,4	77,5	–	–	5	66	–	80	109	2
	2	2	3,3	106,5	70,5	101,4	77,5	–	–	–	66	69	80	109	2
	2	2	–	106,5	70,5	101,4	77,5	9	15,5	–	66	–	80	109	2
	2	2	–	106,5	70,5	101,4	77,5	–	–	6,5	66	–	80	109	2
	2,1	2,1	3,3	117,2	77,2	110,7	85	–	–	–	69	76	87	126	2,1
	2,1	2,1	–	117,2	77,2	110,7	85	10	16,5	–	69	–	87	126	2,1
60	1,5	1,5	1,6	100	72	96,1	77,6	–	–	–	69	71	80	101	1,5
	1,5	1,5	–	100	72	96,1	77,6	6	10	–	69	–	80	101	1,5
	1,5	1,5	–	100	72	96,1	77,6	–	–	4	69	–	80	101	1,5
	1,5	1,5	1,6	100	72	96,1	77,6	–	–	–	69	71	80	101	1,5
	1,5	1,5	–	100	72	96,1	77,6	6	10	–	69	–	80	101	1,5
	1,5	1,5	–	100	72	96,1	77,6	–	–	4	69	–	80	101	1,5
	2,1	2,1	1,8	115	77	109,6	84,4	–	–	–	72	75	86	118	2,1
	2,1	2,1	–	115	77	109,6	84,4	9	14,5	–	72	–	86	118	2,1
	2,1	2,1	–	115	77	109,6	84,4	–	–	5,5	72	–	86	118	2,1
	2,1	2,1	3,5	115	77	109,6	84,4	–	–	–	72	75	86	118	2,1
	2,1	2,1	–	115	77	109,6	84,4	9	16	–	72	–	86	118	2,1
	2,1	2,1	–	115	77	109,6	84,4	–	–	7	72	–	86	118	2,1
	2,1	2,1	3,4	127	83	119,5	91,6	–	–	–	74	82	94	136	2
	2,1	2,1	–	127	83	119,5	91,6	10	16,5	–	74	–	94	136	2

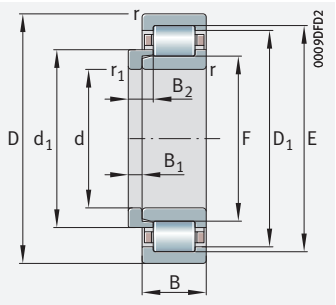
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

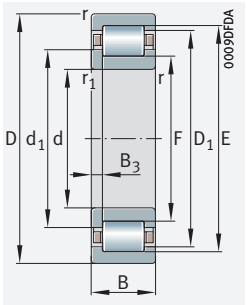


NJ and HJ
Locating bearings

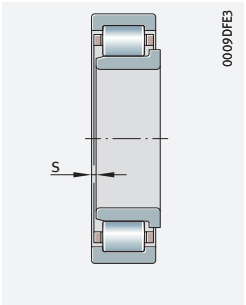
d = 65 – 70 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
65	120	23	128 000	120 000	21 000	7 100	4 900	1,06	–	**NJ213-E-XL-TVP2**	–
	120	23	128 000	120 000	21 000	7 100	4 900	1,06	0,127	**NJ213-E-XL-TVP2**	**HJ213-E**
	120	23	128 000	120 000	21 200	7 100	4 900	1,09	–	**NUP213-E-XL-TVP2**	**–**
	120	31	177 000	182 000	33 500	7 100	4 100	1,46	–	**NJ2213-E-XL-TVP2**	–
	120	31	177 000	182 000	33 500	7 100	4 100	1,46	0,13	**NJ2213-E-XL-TVP2**	**HJ2213-E**
	120	31	177 000	182 000	34 000	7 100	4 100	1,54	–	**NUP2213-E-XL-TVP2**	**–**
	140	33	214 000	191 000	35 000	5 900	4 800	2,32	–	**NJ313-E-XL-TVP2**	–
	140	33	214 000	191 000	35 000	5 900	4 800	2,32	0,285	**NJ313-E-XL-TVP2**	**HJ313-E**
	140	33	214 000	191 000	35 000	5 900	4 800	2,37	–	**NUP313-E-XL-TVP2**	**–**
	140	48	295 000	285 000	54 000	5 900	4 000	3,38	–	**NJ2313-E-XL-TVP2**	–
	140	48	295 000	285 000	54 000	5 900	4 000	3,38	0,303	**NJ2313-E-XL-TVP2**	**HJ2313-E**
	140	48	295 000	285 000	54 000	5 900	4 000	3,45	–	**NUP2313-E-XL-TVP2**	**–**
	160	37	230 000	203 000	36 500	7 000	4 600	4,15	–	**NJ413-XL-M1**	–
	160	37	230 000	203 000	36 500	7 000	4 600	4,15	0,432	**NJ413-XL-M1**	**HJ413**
70	125	24	141 000	138 000	24 500	6 800	4 650	1,18	–	**NJ214-E-XL-TVP2**	–
	125	24	141 000	138 000	24 500	6 800	4 650	1,18	0,155	**NJ214-E-XL-TVP2**	**HJ214-E**
	125	24	141 000	138 000	24 700	6 800	4 650	1,2	–	**NUP214-E-XL-TVP2**	**–**
	125	31	185 000	195 000	36 000	6 800	3 850	1,54	–	**NJ2214-E-XL-TVP2**	–
	125	31	185 000	195 000	36 000	6 800	3 850	1,54	0,157	**NJ2214-E-XL-TVP2**	**HJ2214-E**
	125	31	185 000	195 000	36 500	6 800	3 850	1,58	–	**NUP2214-E-XL-TVP2**	**–**
	150	35	242 000	222 000	40 000	5 500	4 500	2,84	–	**NJ314-E-XL-TVP2**	–
	150	35	242 000	222 000	40 000	5 500	4 500	2,84	0,328	**NJ314-E-XL-TVP2**	**HJ314-E**
	150	35	242 000	222 000	40 500	5 500	4 500	2,89	–	**NUP314-E-XL-TVP2**	**–**
	150	51	325 000	325 000	60 000	5 500	3 800	4,1	–	**NJ2314-E-XL-TVP2**	–
	150	51	325 000	325 000	60 000	5 500	3 800	4,1	0,352	**NJ2314-E-XL-TVP2**	**HJ2314-E**
	150	51	325 000	325 000	60 000	5 500	3 800	4,18	–	**NUP2314-E-XL-TVP2**	**–**
	180	42	285 000	255 000	46 000	6 200	4 250	6,07	–	**NJ414-XL-M1**	–
	180	42	285 000	255 000	46 000	6 200	4 250	6,07	0,63	**NJ414-XL-M1**	**HJ414**

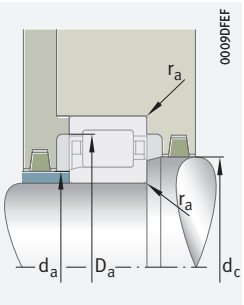
medias *https://www.schaeffler.de/std/1F9A*



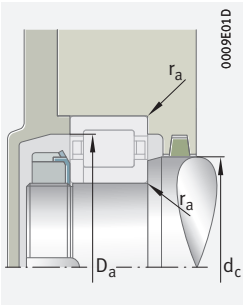
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



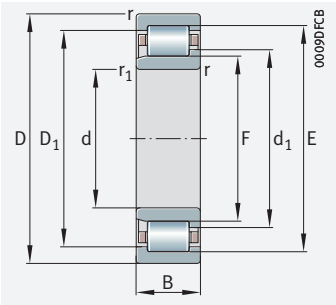
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
65	1,5	1,5	1,4	108,5	78,5	104,3	84,4	–	–	–	74	77	87	111	1,5
	1,5	1,5	–	108,5	78,5	104,3	84,4	6	10	–	74	–	87	111	1,5
	1,5	1,5	–	108,5	78,5	104,3	84,4	–	–	4	74	–	87	111	1,5
	1,5	1,5	1,9	108,5	78,5	104,3	84,4	–	–	–	74	77	87	111	1,5
	1,5	1,5	–	108,5	78,5	104,3	84,4	6	10,5	–	74	–	87	111	1,5
	1,5	1,5	–	108,5	78,5	104,3	84,4	–	–	4,5	74	–	87	111	1,5
	2,1	2,1	1,5	124,5	82,5	118,6	90,5	–	–	–	77	81	93	128	2,1
	2,1	2,1	–	124,5	82,5	118,6	90,5	10	15,5	–	77	–	93	128	2,1
	2,1	2,1	–	124,5	82,5	118,6	90,5	–	–	5,5	77	–	93	128	2,1
	2,1	2,1	4	124,5	82,5	118,6	90,5	–	–	–	77	81	93	128	2,1
	2,1	2,1	–	124,5	82,5	118,6	90,5	10	18	–	77	–	93	128	2,1
	2,1	2,1	–	124,5	82,5	118,6	90,5	–	–	8	77	–	93	128	2,1
	2,1	2,1	3,5	135,3	89,3	127,7	98,3	–	–	–	79	88	100	146	2,1
	2,1	2,1	–	135,3	89,3	127,7	98,3	11	18	–	79	–	100	146	2,1
70	1,5	1,5	1,2	113,5	83,5	109,4	89,4	–	–	–	79	82	92	116	1,5
	1,5	1,5	–	113,5	83,5	109,4	89,4	7	11	–	79	–	92	116	1,5
	1,5	1,5	–	113,5	83,5	109,4	89,4	–	–	4	79	–	92	116	1,5
	1,5	1,5	1,6	113,5	83,5	109,4	89,4	–	–	–	79	–	92	116	1,5
	1,5	1,5	–	113,5	83,5	109,4	89,4	7	11,5	–	79	–	92	116	1,5
	1,5	1,5	–	113,5	83,5	109,4	89,4	–	–	4,5	79	–	92	116	1,5
	2,1	2,1	1,7	133	89	126,8	97,4	–	–	–	82	87	100	138	2,1
	2,1	2,1	–	133	89	126,8	97,4	10	15,5	–	82	–	100	138	2,1
	2,1	2,1	–	133	89	126,8	97,4	–	–	5,5	82	–	100	138	2,1
	2,1	2,1	4,7	133	89	126,8	97,4	–	–	–	82	87	100	138	2,1
	2,1	2,1	–	133	89	126,8	97,4	10	18,5	–	82	–	100	138	2,1
	2,1	2,1	–	133	89	126,8	97,4	–	–	8,5	82	–	100	138	2,1
	3	3	4	152	100	142,7	110,3	–	–	–	86	99	112	164	2,5
	3	3	–	152	100	142,7	110,3	12	20	–	86	–	112	164	2,5

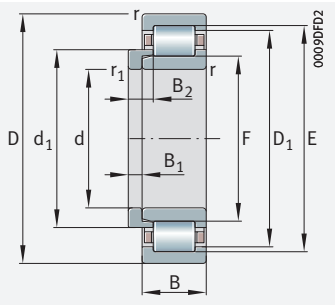
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

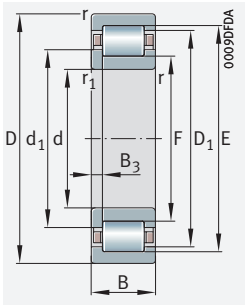


NJ and HJ
Locating bearings

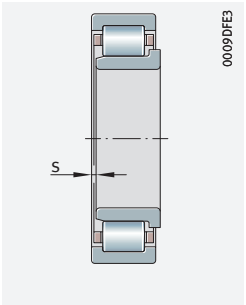
d = 75 – 80 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
75	130	25	155 000	157 000	28 000	6 500	4 400	1,3	–	**NJ215-E-XL-TVP2**	–
	130	25	155 000	157 000	28 000	6 500	4 400	1,3	0,164	**NJ215-E-XL-TVP2**	**HJ215-E**
	130	25	155 000	157 000	28 000	6 500	4 400	1,33	–	**NUP215-E-XL-TVP2**	**–**
	130	31	192 000	208 000	38 500	6 500	3 600	1,64	–	**NJ2215-E-XL-TVP2**	–
	130	31	192 000	208 000	38 500	6 500	3 600	1,64	0,165	**NJ2215-E-XL-TVP2**	**HJ2215-E**
	130	31	192 000	208 000	38 500	6 500	3 600	1,67	–	**NUP2215-E-XL-TVP2**	**–**
	160	37	285 000	265 000	47 000	5 100	4 150	3,39	–	**NJ315-E-XL-TVP2**	–
	160	37	285 000	265 000	47 000	5 100	4 150	3,39	0,407	**NJ315-E-XL-TVP2**	**HJ315-E**
	160	37	285 000	265 000	47 000	5 100	4 150	3,45	–	**NUP315-E-XL-TVP2**	**–**
	160	55	390 000	395 000	73 000	5 100	3 550	5,04	–	**NJ2315-E-XL-TVP2**	–
	160	55	390 000	395 000	73 000	5 100	3 550	5,04	0,436	**NJ2315-E-XL-TVP2**	**HJ2315-E**
	160	55	390 000	395 000	73 000	5 100	3 550	5,14	–	**NUP2315-E-XL-TVP2**	**–**
	190	45	325 000	295 000	51 000	5 800	4 100	7,21	–	**NJ415-XL-M1**	–
	190	45	325 000	295 000	51 000	5 800	4 100	7,21	0,737	**NJ415-XL-M1**	**HJ415**
80	140	26	166 000	168 000	29 500	6 100	4 200	1,58	–	**NJ216-E-XL-TVP2**	–
	140	26	166 000	168 000	29 500	6 100	4 200	1,58	0,22	**NJ216-E-XL-TVP2**	**HJ216-E**
	140	26	166 000	168 000	29 500	6 100	4 200	1,62	–	**NUP216-E-XL-TVP2**	**–**
	140	33	221 000	244 000	44 000	6 100	3 400	2,04	–	**NJ2216-E-XL-TVP2**	–
	140	33	221 000	244 000	44 000	6 100	3 400	2,04	0,22	**NJ2216-E-XL-TVP2**	**HJ216-E**
	140	33	221 000	244 000	44 500	6 100	3 400	2,08	–	**NUP2216-E-XL-TVP2**	**–**
	170	39	300 000	275 000	50 000	4 800	4 100	4,03	–	**NJ316-E-XL-TVP2**	–
	170	39	300 000	275 000	50 000	4 800	4 100	4,03	0,456	**NJ316-E-XL-TVP2**	**HJ316-E**
	170	39	300 000	275 000	50 000	4 800	4 100	4,11	–	**NUP316-E-XL-TVP2**	**–**
	170	58	420 000	425 000	79 000	4 800	3 450	6	–	**NJ2316-E-XL-TVP2**	–
	170	58	420 000	425 000	79 000	4 800	3 450	6	0,488	**NJ2316-E-XL-TVP2**	**HJ2316-E**
	170	58	420 000	425 000	79 000	4 800	3 450	6,11	–	**NUP2316-E-XL-TVP2**	**–**
	200	48	395 000	365 000	64 000	5 400	3 750	8,52	–	**NJ416-XL-M1**	–
	200	48	395 000	365 000	64 000	5 400	3 750	8,52	0,808	**NJ416-XL-M1**	**HJ416**

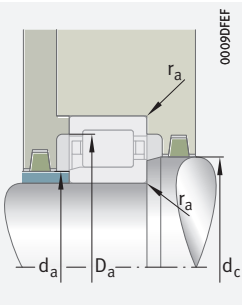
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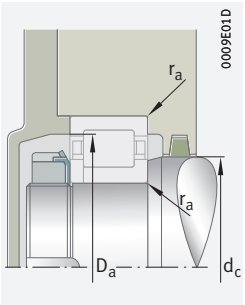
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



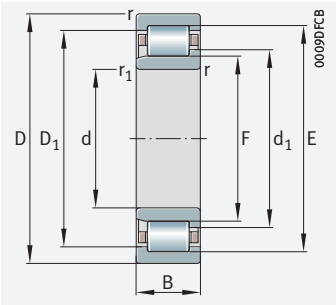
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
75	1,5	1,5	1,2	118,5	88,5	114,4	94,4	–	–	–	84	87	96	121	1,5
	1,5	1,5	–	118,5	88,5	114,4	94,4	7	11	–	84	–	96	121	1,5
	1,5	1,5	–	118,5	88,5	114,4	94,4	–	–	4	84	–	96	121	1,5
	1,5	1,5	1,6	118,5	88,5	114,4	94,4	–	–	–	84	87	96	121	1,5
	1,5	1,5	–	118,5	88,5	114,4	94,4	7	11,5	–	84	–	96	121	1,5
	1,5	1,5	–	118,5	88,5	114,4	94,4	–	–	4,5	84	–	96	121	1,5
	2,1	2,1	1,2	143	95	136,2	104,1	–	–	–	87	93	106	148	2,1
	2,1	2,1	–	143	95	136,2	104,1	11	16,5	–	87	–	106	148	2,1
	2,1	2,1	–	143	95	136,2	104,1	–	–	5,5	87	–	106	148	2,1
	2,1	2,1	4,2	143	95	136,2	104,1	–	–	–	87	93	106	148	2,1
	2,1	2,1	–	143	95	136,2	104,1	11	19,5	–	87	–	106	148	2,1
	2,1	2,1	–	143	95	136,2	104,1	–	–	8,5	87	–	106	148	2,1
	3	3	4,5	160,5	104,5	150,7	115,8	–	–	–	91	103	118	174	2,5
	3	3	–	160,5	104,5	150,7	115,8	13	21,5	–	91	–	118	174	2,5
80	2	2	1,3	127,3	95,3	122,9	101,5	–	–	–	91	94	104	129	2
	2	2	–	127,3	95,3	122,9	101,5	8	12,5	–	91	–	104	129	2
	2	2	–	127,3	95,3	122,9	101,5	–	–	4,5	91	–	104	129	2
	2	2	1,3	127,3	95,3	122,9	101,5	–	–	–	91	94	104	129	2
	2	2	–	127,3	95,3	122,9	101,5	8	12,5	–	91	–	104	129	2
	2	2	–	127,3	95,3	122,9	101,5	–	–	4,5	91	–	104	129	2
	2,1	2,1	0,7	151	101	143,9	110,4	–	–	–	92	99	114	158	2,1
	2,1	2,1	–	151	101	143,9	110,4	11	17	–	92	–	114	158	2,1
	2,1	2,1	–	151	101	143,9	110,4	–	–	6	92	–	114	158	2,1
	2,1	2,1	3,7	151	101	143,9	110,4	–	–	–	92	99	114	158	2,1
	2,1	2,1	–	151	101	143,9	110,4	11	20	–	92	–	114	158	2,1
	2,1	2,1	–	151	101	143,9	110,4	–	–	9	92	–	114	158	2,1
	3	3	4,6	170	110	159,7	121,8	–	–	–	96	109	124	184	2,5
	3	3	–	170	110	159,7	121,8	13	22	–	96	–	124	184	2,5

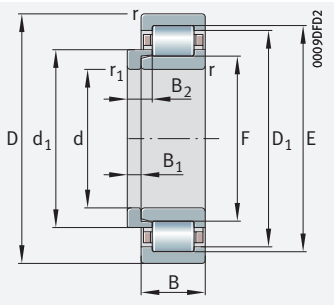
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

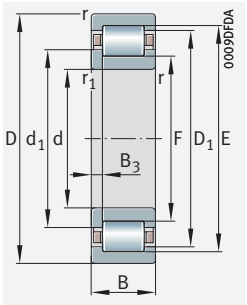


NJ and HJ
Locating bearings

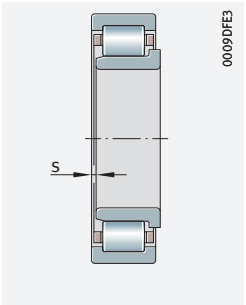
d = 85 – 90 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
85	150	28	194 000	194 000	34 000	5 600	4 000	1,95	–	**NJ217-E-XL-TVP2**	–
	150	28	194 000	194 000	34 000	5 600	4 000	1,95	0,247	**NJ217-E-XL-TVP2**	**HJ217-E**
	150	28	194 000	194 000	34 000	5 600	4 000	2,08	–	**NUP217-E-XL-TVP2**	**–**
	150	36	255 000	275 000	49 500	5 600	3 300	2,55	–	**NJ2217-E-XL-TVP2**	–
	150	36	255 000	275 000	49 500	5 600	3 300	2,55	0,249	**NJ2217-E-XL-TVP2**	**HJ2217-E**
	150	36	255 000	275 000	49 500	5 600	3 300	2,6	–	**NUP2217-E-XL-TVP2**	**–**
	180	41	320 000	300 000	54 000	4 550	3 900	4,71	–	**NJ317-E-XL-TVP2**	–
	180	41	320 000	300 000	54 000	4 550	3 900	4,71	0,566	**NJ317-E-XL-TVP2**	**HJ317-E**
	180	41	320 000	300 000	54 000	4 550	3 900	4,8	–	**NUP317-E-XL-TVP2**	**–**
	180	60	435 000	445 000	81 000	4 550	3 300	6,85	–	**NJ2317-E-XL-TVP2**	–
	180	60	435 000	445 000	81 000	4 550	3 300	6,85	0,606	**NJ2317-E-XL-TVP2**	**HJ2317-E**
	180	60	435 000	445 000	81 000	4 550	3 300	6,99	–	**NUP2317-E-XL-TVP2**	**–**
	210	52	420 000	385 000	67 000	5 200	3 850	10	–	**NJ417-XL-M1**	–
	210	52	420 000	385 000	67 000	5 200	3 850	10	0,901	**NJ417-XL-M1**	**HJ417**
90	160	30	215 000	217 000	37 500	5 200	3 900	2,41	–	**NJ218-E-XL-TVP2**	–
	160	30	215 000	217 000	37 500	5 200	3 900	2,41	0,317	**NJ218-E-XL-TVP2**	**HJ218-E**
	160	30	215 000	217 000	37 500	5 200	3 900	2,46	–	**NUP218-E-XL-TVP2**	**–**
	160	40	285 000	315 000	56 000	5 200	3 250	3,23	–	**NJ2218-E-XL-TVP2**	–
	160	40	285 000	315 000	56 000	5 200	3 250	3,23	0,323	**NJ2218-E-XL-TVP2**	**HJ2218-E**
	160	40	285 000	315 000	56 000	5 200	3 250	3,29	–	**NUP2218-E-XL-TVP2**	**–**
	190	43	370 000	350 000	60 000	4 250	3 650	5,49	–	**NJ318-E-XL-TVP2**	–
	190	43	370 000	350 000	60 000	4 250	3 650	5,49	0,623	**NJ318-E-XL-TVP2**	**HJ318-E**
	190	43	370 000	350 000	60 000	4 250	3 650	5,59	–	**NUP318-E-XL-TVP2**	**–**
	190	64	510 000	530 000	94 000	4 250	3 000	8,19	–	**NJ2318-E-XL-TVP2**	–
	190	64	510 000	530 000	94 000	4 250	3 000	8,19	0,669	**NJ2318-E-XL-TVP2**	**HJ2318-E**
	190	64	510 000	530 000	94 000	4 250	3 000	8,35	–	**NUP2318-E-XL-TVP2**	**–**
	225	54	465 000	425 000	74 000	4 800	3 500	11,8	–	**NJ418-XL-M1**	–
	225	54	465 000	425 000	74 000	4 800	3 500	11,8	1,1	**NJ418-XL-M1**	**HJ418**

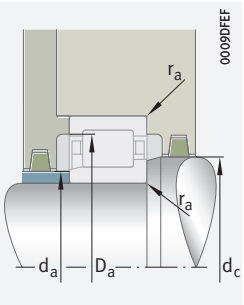
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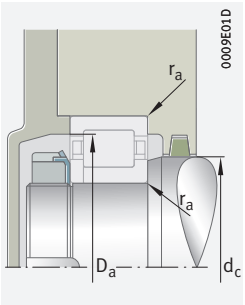
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



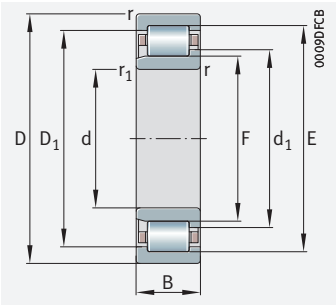
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
85	2	2	0,8	136,5	100,5	131,5	107,5	–	–	–	96	99	110	139	2
	2	2	–	136,5	100,5	131,5	107,5	8	12,5	–	96	–	110	139	2
	2	2	–	136,5	100,5	131,5	107,5	–	–	4,5	96	–	110	139	2
	2	2	1,3	136,5	100,5	131,5	107,5	–	–	–	96	99	110	139	2
	2	2	–	136,5	100,5	131,5	107,5	8	13	–	96	–	110	139	2
	2	2	–	136,5	100,5	131,5	107,5	–	–	5	96	–	110	139	2
	3	3	1,3	160	108	152,7	117,8	–	–	–	99	106	119	166	2,5
	3	3	–	160	108	152,7	117,8	12	18,5	–	99	–	119	166	2,5
	3	3	–	160	108	152,7	117,8	–	–	6,5	99	–	119	166	2,5
	3	3	4,7	160	108	152,7	117,8	–	–	–	99	106	119	166	2,5
	3	3	–	160	108	152,7	117,8	12	22	–	99	–	119	166	2,5
	3	3	–	160	108	152,7	117,8	–	–	10	99	–	119	166	2,5
	4	4	5,2	177	113	165,7	125,8	–	–	–	105	111	128	190	3
	4	4	–	177	113	165,7	125,8	14	24	–	105	–	128	190	3
90	2	2	1,5	145	107	139,7	114,3	–	–	–	101	105	116	149	2
	2	2	–	145	107	139,7	114,3	9	14	–	101	–	116	149	2
	2	2	–	145	107	139,7	114,3	–	–	5	101	–	116	149	2
	2	2	2,5	145	107	139,7	114,3	–	–	–	101	105	116	149	2
	2	2	–	145	107	139,7	114,3	9	15	–	101	–	116	149	2
	2	2	–	145	107	139,7	114,3	–	–	6	101	–	116	149	2
	3	3	1,5	169,5	113,5	161,6	124	–	–	–	104	111	127	176	2,5
	3	3	–	169,5	113,5	161,6	124	12	18,5	–	104	–	127	176	2,5
	3	3	–	169,5	113,5	161,6	124	–	–	6,5	104	–	127	176	2,5
	3	3	5	169,5	113,5	161,6	124	–	–	–	104	111	127	176	2,5
	3	3	–	169,5	113,5	161,6	124	12	22	–	104	–	127	176	2,5
	3	3	–	169,5	113,5	161,6	124	–	–	10	104	–	127	176	2,5
	4	4	5	191,5	123,5	179,7	136,8	–	–	–	110	122	139	205	3
	4	4	–	191,5	123,5	179,7	136,8	14	24	–	110	–	139	205	3

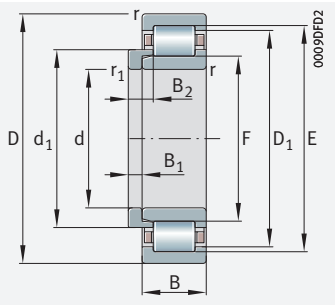
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

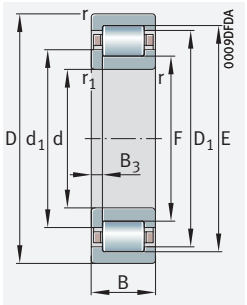


NJ and HJ
Locating bearings

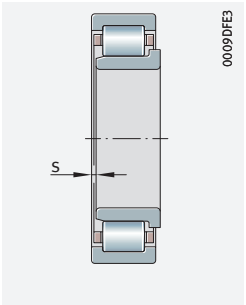
d = 95 – 105 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
95	170	32	260 000	265 000	45 000	4 850	3 650	2,94	–	**NJ219-E-XL-TVP2**	–
	170	32	260 000	265 000	45 000	4 850	3 650	2,94	0,352	**NJ219-E-XL-TVP2**	**HJ219-E**
	170	32	260 000	265 000	45 000	4 850	3 650	2,99	–	**NUP219-E-XL-TVP2**	**–**
	170	43	340 000	370 000	65 000	4 850	3 050	3,98	–	**NJ2219-E-XL-TVP2**	–
	170	43	340 000	370 000	65 000	4 850	3 050	3,98	0,366	**NJ2219-E-XL-TVP2**	**HJ2219-E**
	170	43	340 000	370 000	65 000	4 850	3 050	4,05	–	**NUP2219-E-XL-TVP2**	**–**
	200	45	390 000	380 000	65 000	4 050	3 550	6,44	–	**NJ319-E-XL-TVP2**	–
	200	45	390 000	380 000	65 000	4 050	3 550	6,44	0,777	**NJ319-E-XL-TVP2**	**HJ319-E**
	200	45	390 000	380 000	65 000	4 050	3 550	6,56	–	**NUP319-E-XL-TVP2**	**–**
	200	67	540 000	580 000	101 000	4 050	2 800	9,58	–	**NJ2319-E-XL-TVP2**	–
	200	67	540 000	580 000	101 000	4 050	2 800	9,58	0,83	**NJ2319-E-XL-TVP2**	**HJ2319-E**
	200	67	540 000	580 000	100 000	4 050	2 800	9,77	–	**NUP2319-E-XL-TVP2**	**–**
	240	55	495 000	470 000	81 000	4 550	3 200	14,1	–	**NJ419-XL-M1**	–
	240	55	495 000	470 000	81 000	4 550	3 200	14,1	1,36	**NJ419-XL-M1**	**HJ419**
100	180	34	295 000	305 000	52 000	4 550	3 450	3,55	–	**NJ220-E-XL-TVP2**	–
	180	34	295 000	305 000	52 000	4 550	3 450	3,55	0,436	**NJ220-E-XL-TVP2**	**HJ220-E**
	180	34	295 000	305 000	52 000	4 550	3 450	3,61	–	**NUP220-E-XL-TVP2**	**–**
	180	46	395 000	445 000	77 000	4 550	2 900	4,85	–	**NJ2220-E-XL-TVP2**	–
	180	46	395 000	445 000	77 000	4 550	2 900	4,85	0,446	**NJ2220-E-XL-TVP2**	**HJ2220-E**
	180	46	395 000	445 000	77 000	4 550	2 900	4,92	–	**NUP2220-E-XL-TVP2**	**–**
	215	47	450 000	425 000	72 000	3 700	3 350	7,82	–	**NJ320-E-XL-TVP2**	–
	215	47	450 000	425 000	72 000	3 700	3 350	7,82	0,883	**NJ320-E-XL-TVP2**	**HJ320-E**
	215	47	450 000	425 000	72 000	3 700	3 350	7,96	–	**NUP320-E-XL-TVP2**	**–**
	215	73	680 000	720 000	125 000	3 700	2 500	12,3	–	**NJ2320-E-XL-TVP2**	–
	215	73	680 000	720 000	125 000	3 700	2 500	12,3	0,934	**NJ2320-E-XL-TVP2**	**HJ2320-E**
	215	73	680 000	720 000	125 000	3 700	2 500	12,5	–	**NUP2320-E-XL-TVP2**	**–**
	250	58	550 000	530 000	88 000	4 350	2 950	16,1	–	**NJ420-XL-M1**	–
	250	58	550 000	530 000	88 000	4 350	2 950	16,1	1,55	**NJ420-XL-M1**	**HJ420**
105	190	36	310 000	320 000	54 000	4 350	3 400	4,17	–	**NJ221-E-XL-TVP2**	–
	190	36	310 000	320 000	54 000	4 350	3 400	4,17	0,51	**NJ221-E-XL-TVP2**	**HJ221-E**
	190	36	310 000	320 000	54 000	4 350	3 400	4,26	–	**NUP221-E-XL-TVP2**	**–**
	260	60	610 000	590 000	97 000	4 150	2 750	18	–	**NJ421-XL-M1**	–
	260	60	610 000	590 000	97 000	4 150	2 750	18	1,65	**NJ421-XL-M1**	**HJ421**

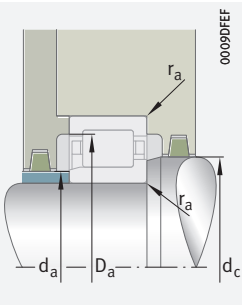
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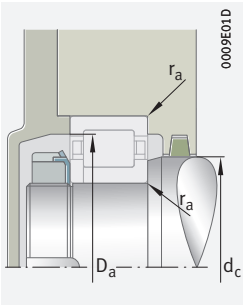
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



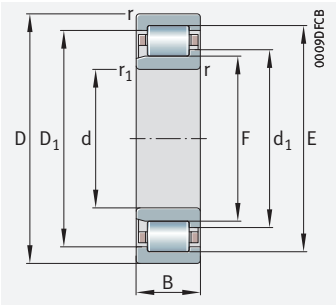
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
95	2,1	2,1	0,7	154,5	112,5	148,6	120,5	–	–	–	107	111	123	158	2,1
	2,1	2,1	–	154,5	112,5	148,6	120,5	9	14	–	107	–	123	158	2,1
	2,1	2,1	–	154,5	112,5	148,6	120,5	–	–	5	107	–	123	158	2,1
	2,1	2,1	2,2	154,5	112,5	148,6	120,5	–	–	–	107	111	123	158	2,1
	2,1	2,1	–	154,5	112,5	148,6	120,5	9	15,5	–	107	–	123	158	2,1
	2,1	2,1	–	154,5	112,5	148,6	120,5	–	–	6,5	107	–	123	158	2,1
	3	3	1,4	177,5	121,5	169,6	132	–	–	–	109	119	134	186	2,5
	3	3	–	177,5	121,5	169,6	132	13	20,5	–	109	–	134	186	2,5
	3	3	–	177,5	121,5	169,6	132	–	–	7,5	109	–	134	186	2,5
	3	3	5,6	177,5	121,5	169,6	132	–	–	–	109	119	134	186	2,5
	3	3	–	177,5	121,5	169,6	132	13	24,5	–	109	–	134	186	2,5
	3	3	–	177,5	121,5	169,6	132	–	–	11,5	109	–	134	186	2,5
	4	4	5,2	201,5	133,5	189,7	146,8	–	–	–	115	132	149	220	3
	4	4	–	201,5	133,5	189,7	146,8	15	25,5	–	115	–	149	220	3
100	2,1	2,1	1,5	163	119	156,9	127,3	–	–	–	112	117	130	168	2,1
	2,1	2,1	–	163	119	156,9	127,3	10	15	–	112	–	130	168	2,1
	2,1	2,1	–	163	119	156,9	127,3	–	–	5	112	–	130	168	2,1
	2,1	2,1	3	163	119	156,9	127,3	–	–	–	112	117	130	168	2,1
	2,1	2,1	–	163	119	156,9	127,3	10	16	–	112	–	130	168	2,1
	2,1	2,1	–	163	119	156,9	127,3	–	–	6	112	–	130	168	2,1
	3	3	1,2	191,5	127,5	182	139,4	–	–	–	114	125	143	201	2,5
	3	3	–	191,5	127,5	182	139,4	13	20,5	–	114	–	143	201	2,5
	3	3	–	191,5	127,5	182	139,4	–	–	7,5	114	–	143	201	2,5
	3	3	4,2	191,5	127,5	182	139,4	–	–	–	114	125	143	201	2,5
	3	3	–	191,5	127,5	182	139,4	13	23,5	–	114	–	143	201	2,5
	3	3	–	191,5	127,5	182	139,4	–	–	10,5	114	–	143	201	2,5
	4	4	5,7	211	139	198,2	152,8	–	–	–	120	137	156	230	3
	4	4	–	211	139	198,2	152,8	16	27	–	120	–	156	230	3
105	2,1	2,1	1,3	171,5	125,5	165,1	134,5	–	–	–	117	123	137	178	2,1
	2,1	2,1	–	171,5	125,5	165,1	134,5	10	16	–	117	–	137	178	2,1
	2,1	2,1	–	171,5	125,5	165,1	134,5	–	–	6	117	–	137	178	2,1
	4	4	5,7	220,5	144,5	207,4	158,8	–	–	–	125	143	162	240	3
	4	4	–	220,5	144,5	207,4	158,8	16	27	–	125	–	162	240	3

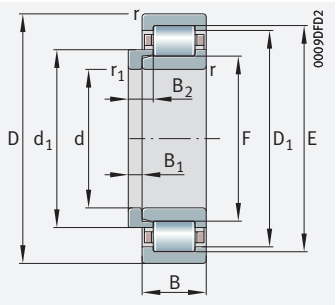
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

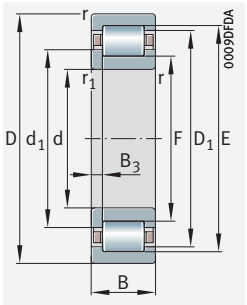


NJ and HJ
Locating bearings

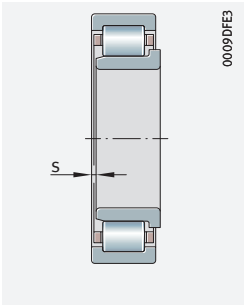
d = 110 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
110	200	38	345 000	365 000	60 000	4 100	3 250	4,93	–	**NJ222-E-XL-TVP2**	–
	200	38	345 000	365 000	60 000	4 100	3 250	4,93	0,616	**NJ222-E-XL-TVP2**	**HJ222-E**
	200	38	345 000	365 000	60 000	4 100	3 250	5,02	–	**NUP222-E-XL-TVP2**	**–**
	200	53	455 000	520 000	88 000	4 100	2 750	6,89	–	**NJ2222-E-XL-TVP2**	–
	200	53	455 000	520 000	88 000	4 100	2 750	6,89	0,647	**NJ2222-E-XL-TVP2**	**HJ2222-E**
	200	53	455 000	520 000	88 000	4 100	2 750	7,02	–	**NUP2222-E-XL-TVP2**	**–**
	240	50	495 000	475 000	80 000	3 350	3 050	10,3	–	**NJ322-E-XL-TVP2**	–
	240	50	495 000	475 000	80 000	3 350	3 050	10,3	1,21	**NJ322-E-XL-TVP2**	**HJ322-E**
	240	50	495 000	475 000	80 000	3 350	3 050	10,7	–	**NUP322-E-XL-TVP2**	**–**
	240	80	750 000	800 000	138 000	3 350	2 290	16,9	–	**NJ2322-E-XL-TVP2**	–
	240	80	750 000	800 000	138 000	3 350	2 290	16,9	1,3	**NJ2322-E-XL-TVP2**	**HJ2322-E**
	240	80	750 000	800 000	137 000	3 350	2 290	17,2	–	**NUP2322-E-XL-TVP2**	**–**
	280	65	680 000	660 000	107 000	3 850	2 550	22,8	–	**NJ422-XL-M1**	–
	280	65	680 000	660 000	107 000	3 850	2 550	22,8	2,1	**NJ422-XL-M1**	**HJ422**
120	215	40	390 000	415 000	70 000	3 750	3 050	5,91	–	**NJ224-E-XL-TVP2**	–
	215	40	390 000	415 000	70 000	3 750	3 050	5,91	0,707	**NJ224-E-XL-TVP2**	**HJ224-E**
	215	40	390 000	415 000	69 000	3 750	3 050	6,02	–	**NUP224-E-XL-TVP2**	**–**
	215	58	530 000	610 000	104 000	3 750	2 500	8,54	–	**NJ2224-E-XL-TVP2**	–
	215	58	530 000	610 000	104 000	3 750	2 500	8,54	0,75	**NJ2224-E-XL-TVP2**	**HJ2224-E**
	215	58	530 000	610 000	104 000	3 750	2 500	8,7	–	**NUP2224-E-XL-TVP2**	**–**
	260	55	610 000	600 000	97 000	3 050	2 650	13,5	–	**NJ324-E-XL-TVP2**	–
	260	55	610 000	600 000	97 000	3 050	2 650	13,5	1,41	**NJ324-E-XL-TVP2**	**HJ324-E**
	260	55	610 000	600 000	97 000	3 050	2 650	13,8	–	**NUP324-E-XL-TVP2**	**–**
	260	86	930 000	1 010 000	169 000	3 950	1 980	23,8	–	**NJ2324-E-XL-M1**	–
	260	86	930 000	1 010 000	169 000	3 950	1 980	23,8	1,49	**NJ2324-E-XL-M1**	**HJ2324-E**
	260	86	930 000	1 010 000	168 000	3 950	1 980	24,1	–	**NUP2324-E-XL-M1**	**–**
	310	72	850 000	840 000	131 000	3 450	2 200	31,3	–	**NJ424-XL-M1**	–
	310	72	850 000	840 000	131 000	3 450	2 200	31,3	2,61	**NJ424-XL-M1**	**HJ424**

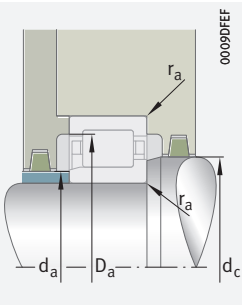
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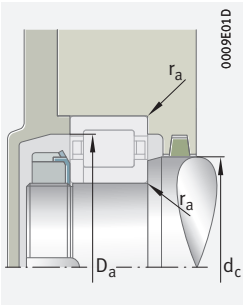
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



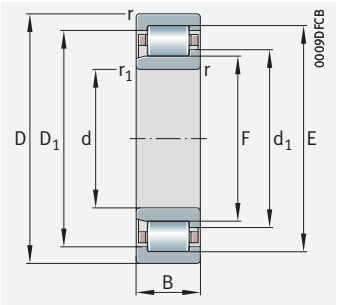
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
110	2,1	2,1	1,5	180,5	132,5	173,8	141,6	–	–	–	122	130	144	188	2,1
	2,1	2,1	–	180,5	132,5	173,8	141,6	11	17	–	122	–	144	188	2,1
	2,1	2,1	–	180,5	132,5	173,8	141,6	–	–	6	122	–	144	188	2,1
	2,1	2,1	4	180,5	132,5	173,8	141,6	–	–	–	122	130	144	188	2,1
	2,1	2,1	–	180,5	132,5	173,8	141,6	11	19,5	–	122	–	144	188	2,1
	2,1	2,1	–	180,5	132,5	173,8	141,6	–	–	8,5	122	–	144	188	2,1
	3	3	1,3	211	143	200,9	155,6	–	–	–	124	140	158	226	2,5
	3	3	–	211	143	200,9	155,6	14	22	–	124	–	158	226	2,5
	3	3	–	211	143	200,9	155,6	–	–	8	124	–	158	226	2,5
	3	3	5,8	211	143	200,9	155,6	–	–	–	124	140	158	226	2,5
	3	3	–	211	143	200,9	155,6	14	26,5	–	124	–	158	226	2,5
	3	3	–	211	143	200,9	155,6	–	–	12,5	124	–	158	226	2,5
	4	4	6,2	235	155	220,9	170,3	–	–	–	130	153	173	260	3
	4	4	–	235	155	220,9	170,3	17	29,5	–	130	–	173	260	3
120	2,1	2,1	1,4	195,5	143,5	187,8	153,2	–	–	–	132	141	156	203	2,1
	2,1	2,1	–	195,5	143,5	187,8	153,2	11	17	–	132	–	156	203	2,1
	2,1	2,1	–	195,5	143,5	187,8	153,2	–	–	6	132	–	156	203	2,1
	2,1	2,1	4,5	195,5	143,5	187,8	153,2	–	–	–	132	141	156	203	2,1
	2,1	2,1	–	195,5	143,5	187,8	153,2	11	20	–	132	–	156	203	2,1
	2,1	2,1	–	195,5	143,5	187,8	153,2	–	–	9	132	–	156	203	2,1
	3	3	3,5	230	154	218,7	168,1	–	–	–	134	151	171	246	2,5
	3	3	–	230	154	218,7	168,1	14	22,5	–	134	–	171	246	2,5
	3	3	–	230	154	218,7	168,1	–	–	8,5	134	–	171	246	2,5
	3	3	7,2	230	154	218,7	168,1	–	–	–	134	151	171	246	2,5
	3	3	–	230	154	218,7	168,1	14	26	–	134	–	171	246	2,5
	3	3	–	230	154	218,7	168,1	–	–	12	134	–	171	246	2,5
	5	5	6,9	260	170	243,9	187,3	–	–	–	144	168	190	286	4
	5	5	–	260	170	243,9	187,3	17	30,5	–	144	–	190	286	4

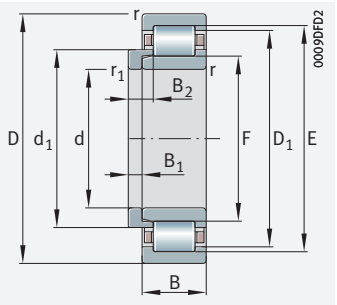
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

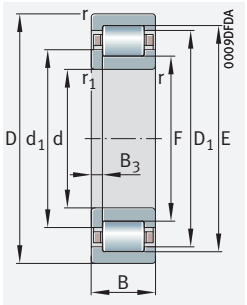


NJ and HJ
Locating bearings

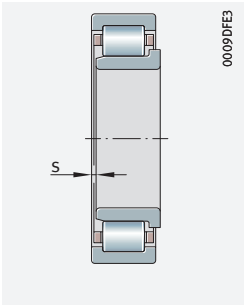
d = 130 – 140 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429 | 1.12 ➤430 | 1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
130	230	40	425 000	445 000	71 000	3 500	2 800	6,63	–	**NJ226-E-XL-TVP2**	–
	230	40	425 000	445 000	71 000	3 500	2 800	6,63	0,78	**NJ226-E-XL-TVP2**	**HJ226-E**
	230	40	425 000	445 000	71 000	3 500	2 800	6,74	–	**NUP226-E-XL-TVP2**	**–**
	230	64	620 000	730 000	120 000	3 500	2 280	10,6	–	**NJ2226-E-XL-TVP2**	–
	230	64	620 000	730 000	120 000	3 500	2 280	10,6	0,849	**NJ2226-E-XL-TVP2**	**HJ2226-E**
	230	64	620 000	730 000	120 000	3 500	2 280	10,8	–	**NUP2226-E-XL-TVP2**	**–**
	280	58	680 000	670 000	107 000	2 850	2 430	16,5	–	**NJ326-E-XL-TVP2**	–
	280	58	680 000	670 000	107 000	2 850	2 430	16,5	1,64	**NJ326-E-XL-TVP2**	**HJ326-E**
	280	58	680 000	670 000	106 000	2 850	2 430	16,7	–	**NUP326-E-XL-TVP2**	**–**
	280	93	1 080 000	1 220 000	198 000	3 700	1 750	29,2	–	**NJ2326-E-XL-M1**	–
	280	93	1 080 000	1 220 000	198 000	3 700	1 750	29,2	1,77	**NJ2326-E-XL-M1**	**HJ2326-E**
	280	93	1 080 000	1 220 000	197 000	3 700	1 750	29,7	–	**NUP2326-E-XL-M1**	**–**
140	250	42	460 000	510 000	78 000	4 250	2 600	9,46	–	**NJ228-E-XL-M1**	–
	250	42	460 000	510 000	78 000	4 250	2 600	9,46	0,986	**NJ228-E-XL-M1**	**HJ228-E**
	250	42	460 000	510 000	79 000	4 250	2 600	9,61	–	**NUP228-E-XL-M1**	**–**
	250	68	670 000	830 000	133 000	4 250	2 050	14,7	–	**NJ2228-E-XL-M1**	–
	250	68	670 000	830 000	133 000	4 250	2 050	14,7	1,08	**NJ2228-E-XL-M1**	**HJ2228-E**
	250	68	670 000	830 000	133 000	4 250	2 050	16,8	–	**NUP2228-E-XL-M1**	**–**
	300	62	790 000	800 000	126 000	2 650	2 170	20,5	–	**NJ328-E-XL-TVP2**	–
	300	62	790 000	800 000	126 000	2 650	2 170	20,5	2,03	**NJ328-E-XL-TVP2**	**HJ328-E**
	300	62	790 000	800 000	126 000	2 650	2 170	20,8	–	**NUP328-E-XL-TVP2**	**–**
	300	102	1 210 000	1 390 000	222 000	3 450	1 620	36,6	–	**NJ2328-E-XL-M1**	–
	300	102	1 210 000	1 390 000	222 000	3 450	1 620	36,6	2,2	**NJ2328-E-XL-M1**	**HJ2328-E**
	300	102	1 210 000	1 390 000	221 000	3 450	1 620	37,1	–	**NUP2328-E-XL-M1**	**–**

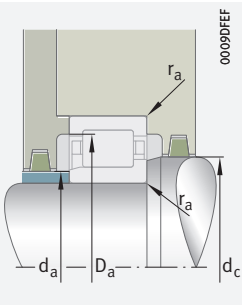
medias *https://www.schaeffler.de/std/1F9A*



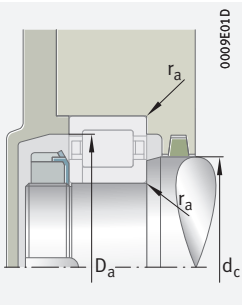
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



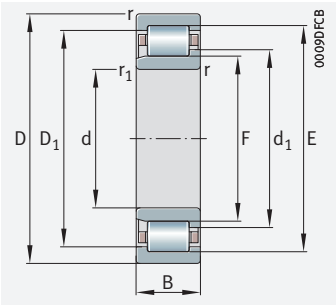
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
130	3	3	1,2	209,5	153,5	201,2	164	–	–	–	144	151	168	216	2,5
	3	3	–	209,5	153,5	201,2	164	11	17	–	144	–	168	216	2,5
	3	3	–	209,5	153,5	201,2	164	–	–	6	144	–	168	216	2,5
	3	3	5,2	209,5	153,5	201,2	164	–	–	–	144	151	168	216	2,5
	3	3	–	209,5	153,5	201,2	164	11	21	–	144	–	168	216	2,5
	3	3	–	209,5	153,5	201,2	164	–	–	10	144	–	168	216	2,5
	4	4	3,5	247	167	235,2	181,7	–	–	–	147	164	184	263	3
	4	4	–	247	167	235,2	181,7	14	23	–	147	–	184	263	3
	4	4	–	247	167	235,2	181,7	–	–	9	147	–	184	263	3
	4	4	8,1	247	167	235,2	181,7	–	–	–	147	164	184	263	3
	4	4	–	247	167	235,2	181,7	14	28	–	147	–	184	263	3
	4	4	–	247	167	235,2	181,7	–	–	14	147	–	184	263	3
140	3	3	3,8	225	169	216,7	179,4	–	–	–	154	166	182	236	2,5
	3	3	–	225	169	216,7	179,4	11	18	–	154	–	182	236	2,5
	3	3	–	225	169	216,7	179,4	–	–	7	154	–	182	236	2,5
	3	3	7	225	169	216,7	179,4	–	–	–	154	166	182	236	2,5
	3	3	–	225	169	216,7	179,4	11	23	–	154	–	182	236	2,5
	3	3	–	225	169	216,7	179,4	–	–	12	154	–	182	236	2,5
	4	4	5,2	264	180	251,7	195,4	–	–	–	157	176	198	283	3
	4	4	–	264	180	251,7	195,4	15	25	–	157	–	198	283	3
	4	4	–	264	180	251,7	195,4	–	–	10	157	–	198	283	3
	4	4	9,2	264	180	251,7	195,4	–	–	–	157	176	198	283	3
	4	4	–	264	180	251,7	195,4	15	31	–	157	–	198	283	3
	4	4	–	264	180	251,7	195,4	–	–	16	157	–	198	283	3

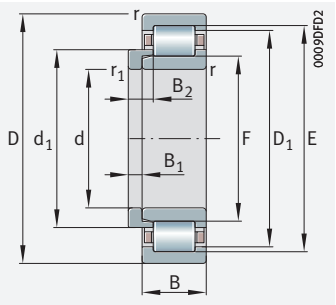
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

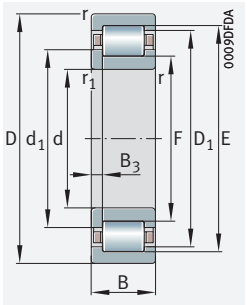


NJ and HJ
Locating bearings

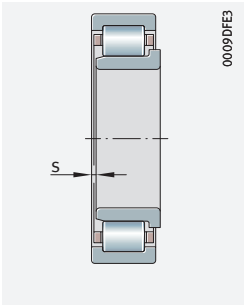
d = 150 – 170 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429 | 1.12 ➤430 | 1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
150	270	45	520 000	590 000	90 000	3 950	2 350	12	–	**NJ230-E-XL-M1**	–
	270	45	520 000	590 000	90 000	3 950	2 350	12	1,26	**NJ230-E-XL-M1**	**HJ230-E**
	270	45	520 000	590 000	90 000	3 950	2 350	12,2	–	**NUP230-E-XL-M1**	**–**
	270	73	780 000	970 000	155 000	3 950	1 850	18,9	–	**NJ2230-E-XL-M1**	–
	270	73	780 000	970 000	155 000	3 950	1 850	18,9	1,36	**NJ2230-E-XL-M1**	**HJ2230-E**
	270	73	780 000	970 000	154 000	3 950	1 850	19,2	–	**NUP2230-E-XL-M1**	**–**
	320	65	900 000	930 000	141 000	3 200	1 940	27,4	–	**NJ330-E-XL-M1**	–
	320	65	900 000	930 000	141 000	3 200	1 940	27,4	2,33	**NJ330-E-XL-M1**	**HJ330-E**
	320	65	900 000	930 000	141 000	3 200	1 940	27,8	–	**NUP330-E-XL-M1**	**–**
	320	108	1 380 000	1 600 000	250 000	3 200	1 460	44,1	–	**NJ2330-E-XL-M1**	–
	320	108	1 380 000	1 600 000	250 000	3 200	1 460	44,1	2,55	**NJ2330-E-XL-M1**	**HJ2330-E**
	320	108	1 380 000	1 600 000	249 000	3 200	1 460	44,8	–	**NUP2330-E-XL-M1**	**–**
160	290	48	590 000	670 000	102 000	3 650	2 160	14,9	–	**NJ232-E-XL-M1**	–
	290	48	590 000	670 000	102 000	3 650	2 160	14,9	1,47	**NJ232-E-XL-M1**	**HJ232-E**
	290	48	590 000	670 000	102 000	3 650	2 160	15,2	–	**NUP232-E-XL-M1**	**–**
	290	80	940 000	1 170 000	187 000	3 600	1 660	24,1	–	**NJ2232-E-XL-M1**	–
	290	80	940 000	1 170 000	187 000	3 600	1 660	24,1	1,56	**NJ2232-E-XL-M1**	**HJ2232-E**
	290	80	940 000	1 170 000	185 000	3 600	1 660	24,5	–	**NUP2232-E-XL-M1**	**–**
	340	68	860 000	1 060 000	130 000	3 000	1 770	32,3	–	**NJ332-E-M1**	–
	340	68	860 000	1 060 000	130 000	3 000	1 770	32,3	2,58	**NJ332-E-M1**	**HJ332-E**
	340	114	1 300 000	1 800 000	229 000	3 000	1 350	52,3	–	**NJ2332-E-M1**	–
	340	114	1 300 000	1 800 000	229 000	3 000	1 350	52,3	2,85	**NJ2332-E-M1**	**HJ2332-E**
170	310	52	700 000	780 000	119 000	3 350	1 970	18,4	–	**NJ234-E-XL-M1**	–
	310	52	700 000	780 000	119 000	3 350	1 970	18,4	1,58	**NJ234-E-XL-M1**	**HJ234-E**
	310	52	700 000	780 000	118 000	3 350	1 970	18,6	–	**NUP234-E-XL-M1**	**–**
	310	86	1 130 000	1 400 000	216 000	3 300	1 470	29,8	–	**NJ2234-E-XL-M1**	–
	310	86	1 130 000	1 400 000	216 000	3 300	1 470	29,8	1,78	**NJ2234-E-XL-M1**	**HJ2234-E**
	310	86	1 130 000	1 400 000	215 000	3 300	1 470	30,2	–	**NUP2234-E-XL-M1**	**–**
	360	72	960 000	1 210 000	140 000	2 800	1 610	38,6	–	**NJ334-E-TB-M1**	–
	360	72	960 000	1 210 000	140 000	2 800	1 610	38,6	3,21	**NJ334-E-TB-M1**	**HJ334-E**
	360	120	1 490 000	2 070 000	231 000	2 800	1 210	62,3	–	**NJ2334-EX-TB-M1**	–
	360	120	1 490 000	2 070 000	231 000	2 800	1 210	62,3	3,53	**NJ2334-EX-TB-M1**	**HJ2334-E**

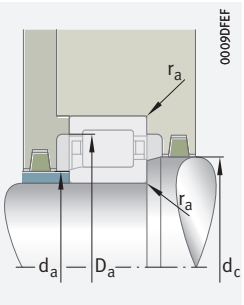
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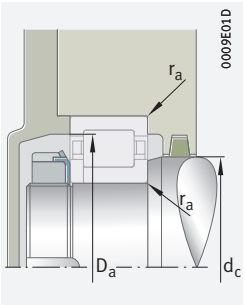
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



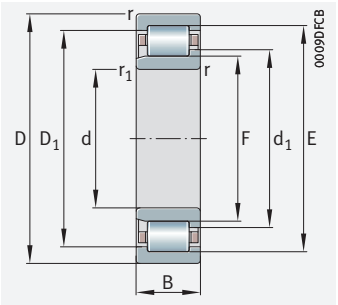
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
150	3	3	4	242	182	233,2	193,1	–	–	–	164	179	196	256	2,5
	3	3	–	242	182	233,2	193,1	12	19,5	–	164	–	196	256	2,5
	3	3	–	242	182	233,2	193,1	–	–	7,5	164	–	196	256	2,5
	3	3	7,5	242	182	233,2	193,1	–	–	–	164	179	196	256	2,5
	3	3	–	242	182	233,2	193,1	12	24,5	–	164	–	196	256	2,5
	3	3	–	242	182	233,2	193,1	–	–	12,5	164	–	196	256	2,5
	4	4	5,5	283	193	269,8	209,5	–	–	–	167	190	213	303	3
	4	4	–	283	193	269,8	209,5	15	25	–	167	–	213	303	3
	4	4	–	283	193	269,8	209,5	–	–	10	167	–	213	303	3
	4	4	9,7	283	193	269,8	209,5	–	–	–	167	190	213	303	3
	4	4	–	283	193	269,8	209,5	15	31,5	–	167	–	213	303	3
	4	4	–	283	193	269,8	209,5	–	–	16,5	167	–	213	303	3
160	3	3	4,1	259	195	249,6	206,8	–	–	–	174	192	210	276	2,5
	3	3	–	259	195	249,6	206,8	12	20	–	174	–	210	276	2,5
	3	3	–	259	195	249,6	206,8	–	–	8	174	–	210	276	2,5
	3	3	7,2	261	193	251,1	205,5	–	–	–	174	192	210	276	2,5
	3	3	–	261	193	251,1	205,5	12	24,5	–	174	–	210	276	2,5
	3	3	–	261	193	251,1	205,5	–	–	12,5	174	–	210	276	2,5
	4	4	5,6	300	204	286	221,6	–	–	–	177	200	228	323	3
	4	4	–	300	204	286	221,6	15	25	–	177	–	228	323	3
	4	4	9,9	300	204	286	221,6	–	–	–	177	200	228	323	3
	4	4	–	300	204	286	221,6	15	32	–	177	–	228	323	3
170	4	4	4,3	279	207	268,5	218,4	–	–	–	187	204	223	293	3
	4	4	–	279	207	268,5	218,4	12	20	–	187	–	223	293	3
	4	4	–	279	207	268,5	218,4	–	–	8	187	–	223	293	3
	4	4	7,2	281	205	269,9	219	–	–	–	187	204	223	293	3
	4	4	–	281	205	269,9	219	12	24	–	187	–	223	293	3
	4	4	–	281	205	269,9	219	–	–	12	187	–	223	293	3
	4	4	6	–	218	298	238	–	–	–	187	215	240	343	3
	4	4	–	–	218	298	238	16	27	–	187	–	240	343	3
	4	4	10,2	–	216	299,2	236,8	–	–	–	187	214	238,3	343	3
	4	4	–	–	216	299,2	236,8	16	33,5	–	187	–	238,3	343	3

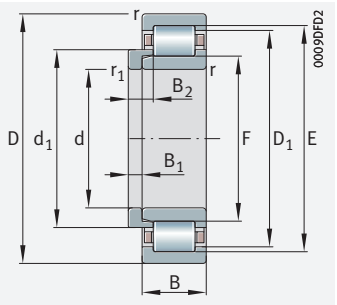
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

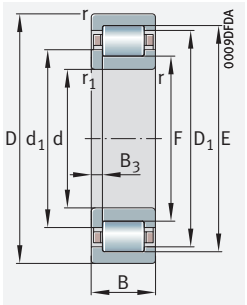


NJ and HJ
Locating bearings

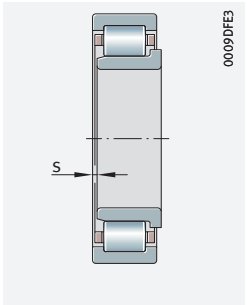
d = 180 – 200 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13 X-life ➤419	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
180	320	52	730 000	830 000	124 000	3 250	1 850	19,2	–	**NJ236-E-XL-M1**	–
	320	52	730 000	830 000	124 000	3 250	1 850	19,2	1,76	**NJ236-E-XL-M1**	**HJ236-E**
	320	52	730 000	830 000	124 000	3 250	1 850	17,3	–	**NUP236-E-XL-M1**	**–**
	320	86	1 180 000	1 490 000	228 000	3 200	1 380	31,1	–	**NJ2236-E-XL-M1**	–
	320	86	1 180 000	1 490 000	228 000	3 200	1 380	31,1	1,87	**NJ2236-E-XL-M1**	**HJ2236-E**
	320	86	1 180 000	1 490 000	227 000	3 200	1 380	31,6	–	**NUP2236-E-XL-M1**	**–**
	380	75	1 040 000	1 320 000	145 000	2 650	1 500	44,6	–	**NJ336-E-TB-M1**	–
	380	75	1 040 000	1 320 000	145 000	2 650	1 500	44,6	3,77	**NJ336-E-TB-M1**	**HJ336-E**
	380	126	1 680 000	2 330 000	260 000	2 600	1 120	72,9	–	**NJ2336-EX-TB-M1**	–
	380	126	1 680 000	2 330 000	260 000	2 600	1 120	72,9	4,05	**NJ2336-EX-TB-M1**	**HJ2336-E**
190	340	55	680 000	930 000	113 000	3 050	1 720	23,2	–	**NJ238-E-M1**	–
	340	55	680 000	930 000	113 000	3 050	1 720	23,2	2,17	**NJ238-E-M1**	**HJ238-E**
	340	55	680 000	930 000	112 000	3 050	1 720	23,5	–	**NUP238-E-M1**	**–**
	340	92	1 090 000	1 650 000	204 000	3 000	1 290	37,7	–	**NJ2238-E-M1**	–
	340	92	1 090 000	1 650 000	204 000	3 000	1 290	37,7	2,31	**NJ2238-E-M1**	**HJ2238-E**
	400	132	1 890 000	2 650 000	290 000	2 440	1 010	84,4	–	**NJ2338-EX-TB-M1**	–
	400	132	1 890 000	2 650 000	290 000	2 440	1 010	84,4	4,8	**NJ2338-EX-TB-M1**	**HJ2338-E**
200	360	58	750 000	1 040 000	124 000	2 900	1 600	27,5	–	**NJ240-E-M1**	–
	360	58	750 000	1 040 000	124 000	2 900	1 600	27,5	2,62	**NJ240-E-M1**	**HJ240-E**
	360	58	750 000	1 040 000	123 000	2 900	1 600	28	–	**NUP240-E-M1**	**–**
	360	98	1 220 000	1 880 000	229 000	2 850	1 180	45,3	–	**NJ2240-E-M1**	–
	360	98	1 220 000	1 880 000	229 000	2 850	1 180	45,3	2,78	**NJ2240-E-M1**	**HJ2240-E**
	420	80	1 180 000	1 520 000	165 000	2 410	1 320	58,1	–	**NJ340-E-TB-M1**	–
	420	80	1 180 000	1 520 000	165 000	2 410	1 320	58,1	4,94	**NJ340-E-TB-M1**	**HJ340-E**
	420	138	2 040 000	2 900 000	315 000	2 330	940	97,2	–	**NJ2340-EX-TB-M1**	–
	420	138	2 040 000	2 900 000	315 000	2 330	940	97,2	5,28	**NJ2340-EX-TB-M1**	**HJ2340-E**

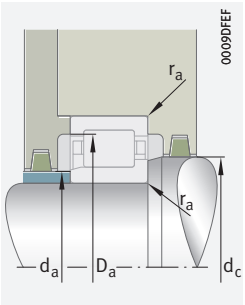
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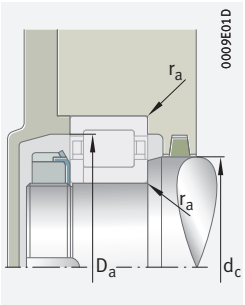
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



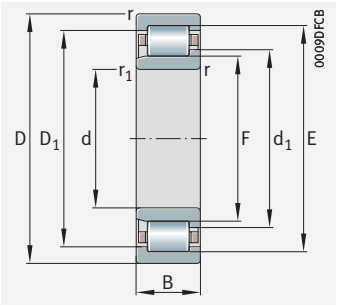
Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
180	4	4	4,7	289	217	278,6	230,2	–	–	–	197	214	233	303	3
	4	4	–	289	217	278,6	230,2	12	20	–	197	–	233	303	3
	4	4	–	289	217	278,6	230,2	–	–	8	197	–	233	303	3
	4	4	7,2	291	215	280	229	–	–	–	197	214	233	303	3
	4	4	–	291	215	280	229	12	24	–	197	–	233	303	3
	4	4	–	291	215	280	229	–	–	12	197	–	233	303	3
	4	4	6,1	–	231	314,2	251,8	–	–	–	197	228	254	363	3
	4	4	–	–	231	314,2	251,8	17	28,5	–	197	–	254	363	3
	4	4	10,5	–	227	316,6	249,4	–	–	–	197	225	250,6	363	3
	4	4	–	–	227	316,6	249,4	17	35	–	197	–	250,6	363	3
190	4	4	4,7	306	230	295	244	–	–	–	207	227	247	323	3
	4	4	–	306	230	295	244	13	21,5	–	207	–	247	323	3
	4	4	–	306	230	295	244	–	–	8,5	207	–	247	323	3
	4	4	8	308	228	296,4	242,7	–	–	–	207	227	247	323	3
	4	4	–	308	228	296,4	242,7	13	26,5	–	207	–	247	323	3
	5	5	11	–	240	336	264	–	–	–	210	237,8	265,3	380	4
	5	5	–	–	240	336	264	18	36,5	–	210	–	265,3	380	4
200	4	4	4,8	323	243	311,5	257,6	–	–	–	217	240	261	343	3
	4	4	–	323	243	311,5	257,6	14	23	–	217	–	261	343	3
	4	4	–	323	243	311,5	257,6	–	–	9	217	–	261	343	3
	4	4	8,2	325	241	312,9	256,3	–	–	–	217	240	261	343	3
	4	4	–	325	241	312,9	256,3	14	28	–	217	–	261	343	3
	5	5	6,3	–	258	347,6	280,4	–	–	–	220	255	282	400	4
	5	5	–	–	258	347,6	280,4	18	30	–	220	–	282	400	4
	5	5	11,3	–	253	352,2	277,8	–	–	–	220	250,7	279	400	4
	5	5	–	–	253	352,2	277,8	18	37	–	220	–	279	400	4

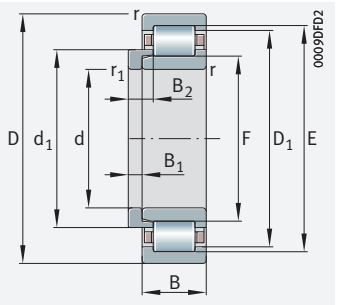
[1] Under axial load, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



NJ
Semi-locating bearing

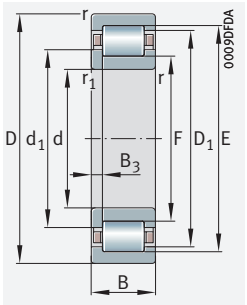


NJ and HJ
Locating bearings

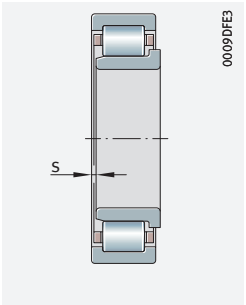
d = 220 – 280 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤429|1.12 ➤430|1.13	
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	L-section ring	Bearing	L-section ring
			N	N	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
220	400	65	950 000	1 330 000	152 000	2 600	1 380	38,7	–	**NJ244-E-M1**	–
	400	65	950 000	1 330 000	152 000	2 600	1 380	38,7	3,55	**NJ244-E-M1**	**HJ244-E**
	400	65	950 000	1 330 000	152 000	2 600	1 380	39,3	–	**NUP244-E-M1**	**–**
	400	108	1 630 000	2 370 000	255 000	2 440	1 000	63,4	–	**NUP2244-EX-TB-M1**	**–**
	460	145	2 350 000	3 350 000	350 000	2 110	830	124	–	**NUP2344-EX-TB-M1**	**–**
240	440	72	1 140 000	1 610 000	174 000	2 320	1 220	52,5	–	**NJ248-E-TB-M1**	–
	440	72	1 140 000	1 610 000	174 000	2 320	1 220	52,5	4,6	**NJ248-E-TB-M1**	**HJ248-E**
	500	95	1 720 000	2 280 000	238 000	1 980	1 000	97	–	**NJ348-E-TB-M1**	–
	500	95	1 720 000	2 280 000	238 000	1 980	1 000	97	8,3	**NJ348-E-TB-M1**	**HJ348-E**
260	480	80	1 350 000	1 890 000	195 000	2 100	1 110	69,4	–	**NJ252-E-TB-M1**	–
	480	80	1 350 000	1 890 000	195 000	2 100	1 110	69,4	5,92	**NJ252-E-TB-M1**	**HJ252-E**
280	580	108	2 180 000	3 050 000	295 000	1 700	790	149	–	**NJ356-E-TB-M1**	–
	580	108	2 180 000	3 050 000	295 000	1 700	790	149	13,7	**NJ356-E-TB-M1**	**HJ356-E**

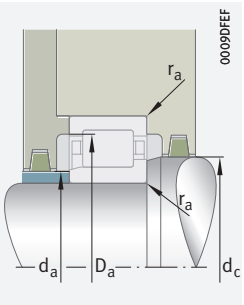
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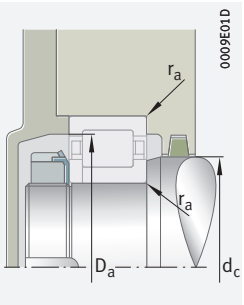
NUP
Locating bearing



Axial displacement "s"
for NJ



Mounting dimensions
for NJ



Mounting dimensions
for NUP

Dimensions											Mounting dimensions				
d	r	r_1	s	E	F	D_1	d_1	B_1	B_2	B_3	d_a		d_c	D_a	r_a
	min.	min.				≈	≈				min.[1]	max.	min.	max.[1]	max.
220	4	4	5,5	358	268	344,9	285,2	–	–	–	237	265	288	383	3
	4	4	–	358	268	344,9	285,2	15	25	–	237	–	288	383	3
	4	4	–	358	268	344,9	285,2	–	–	10	237	–	288	383	3
	4	4	–	367	259	345,4	280,6	–	–	14	237	–	282,3	383	3
	5	5	–	413	277	385,8	304,2	–	–	20	240	–	305,1	440	4
240	4	4	6	–	293	373	313	–	–	–	257	290	315	423	3
	4	4	–	–	293	373	313	16	27	–	257	–	315	423	3
	5	5	7,4	–	306	414,8	333,2	–	–	–	260	303	335	480	4
	5	5	–	–	306	414,8	333,2	22	35,5	–	260	–	335	480	4
260	5	5	6,2	–	317	406,6	339,7	–	–	–	280	314	341	460	4
	5	5	–	–	317	406,6	339,7	18	30	–	280	–	341	460	4
280	6	6	8,7	–	362	482	392	–	–	–	306	359	393,4	554	5
	6	6	–	–	362	482	392	26	42,5	–	306	–	393,4	554	5

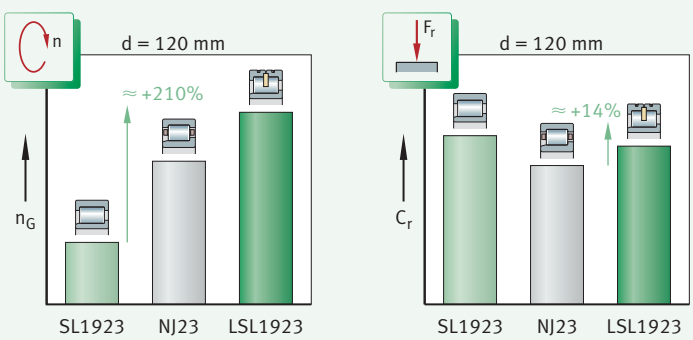
[1] Under axial load, observe the dimensions D_1 and d_1.

2 Cylindrical roller bearings with disc cage or with spacers

Cylindrical roller bearings with disc cage/with spacers are suitable where:

- bearing arrangements are subjected to very high radial loads and higher speeds occur ➤*484|2.2*, ➤*488|2.6*
- high dynamic inertia forces are present
- not only high radial forces but also axial loads from one direction must be supported by the bearing position (semi-locating bearing function) ➤*484|2.2*
- high shock loads occur
- thermally stable conditions are required in the bearing even at higher speeds
- the cages are subjected to high dynamic inertia forces; e.g. in vibratory machinery
- axial displacements of the shaft relative to the housing must be compensated without constraint in the bearing
- the bearings should be separable for easier mounting; in vibratory machinery, for example, the bearing ring with circumferential load as well as the ring with point load should have a tight fit ➤*482|2.1*, ➤*496|2.17*

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*414*.



1 *Cylindrical roller bearing with full complement bearing/standard cage/disc cage, comparison of speed and load carrying capacity*

n_G = *limiting speed*
C_r = *basic dynamic load rating*
SL1923 = *full complement cylindrical roller bearing*
NJ23 = *cylindrical roller bearing with standard cage*
LSL1923 = *cylindrical roller bearing with disc cage*

2.1 Bearing design

✎ *Design variants*

These cylindrical roller bearings are available as:

- type LSL1923 (bearing with disc cage) ➤*483|2*
- type ZSL1923 (bearing with spacers) ➤*483|3*
- special design for vibratory machinery ➤*484*
- X-life bearings ➤*484*

Basic design – standard range

✎ *LSL1923 and ZSL1923 correspond to dimension series 23*

Cylindrical roller bearings with disc cage or with spacers are part of the group of radial roller bearings and correspond to dimension series 23. These single row bearings comprise radially split or unsplit outer rings, removable inner rings, disc cages or spacers and cylindrical rollers. The rollers have profiled ends, i. e. they have a slight lateral curvature towards the ends. This modified line contact between the rolling elements and raceways prevents damaging edge stresses ➤*417*|*2*. For mounting of the bearings, the inner ring can be removed.

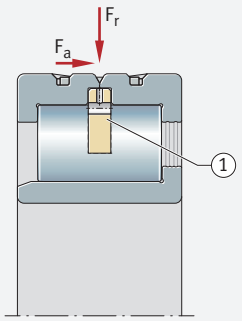
Series LSL1923 – bearings with disc cage

✎ *Bearings with semi-locating bearing function*

Cylindrical roller bearings LSL1923 have two rigid ribs on the outer ring and one rigid rib on the inner ring. An externally-guided flat brass disc cage prevents the rolling elements from coming into contact with each other during rolling ➤*483*|*2* and ➤*490*|*2.9*. The disc cage has pockets in which the rolling elements run. The rollers are guided between the ribs on the outer ring. The outer ring is axially split and held together by fasteners. Due to their design configuration, the bearings permit axial displacements of the shaft relative to the housing in one direction. In the opposite direction, they act as locating bearings. The maximum axial displacement s is given in the product tables.

2
Cylindrical roller bearing with disc cage

F_r = *radial load*
F_a = *axial load*
① *Brass disc cage*



0009CA72

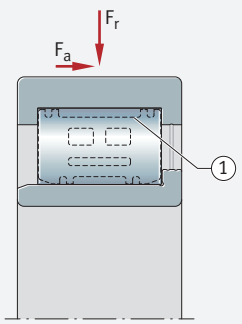
Series ZSL1923 – bearings with spacers

✎ *Bearings with semi-locating bearing function*

In the case of cylindrical roller bearings ZSL1923, plastic spacers prevent the rollers from coming into contact with each other during rolling ➤*483*|*3* and ➤*490*|*2.9*. The spacers are guided axially between the ribs on the outer ring. They are designed such that the rolling element set is self-retaining, so the outer ring with the rolling element set and the inner ring can be mounted separately from each other. Due to their design configuration, the bearings permit axial displacements of the shaft relative to the housing in one direction. In the opposite direction, they act as locating bearings. The maximum axial displacement s is given in the product tables.

3
Cylindrical roller bearing with spacers

F_r = *radial load*
F_a = *axial load*
① *Plastic spacers*



0009CA73

Special design of bearings LSL and ZSL for vibratory machinery

In addition to high basic dynamic load ratings C_r (and thus long rating life values), bearings for vibratory machinery must also be able to compensate or support considerable shaft tilting due to load or misalignment. The cylindrical roller bearings LSL and ZSL are therefore also available by agreement in the BIR design ➤492|⊞4.
In these bearings, the inner ring raceway is ground slightly spherical.

X-life premium quality

Many sizes of the bearings are also available as X-life bearings. These bearings exhibit considerably higher performance than comparable standard cylindrical roller bearings. This is achieved, for example, through the modified internal construction, the optimised contact geometry between the rollers and raceways, better surface quality and the optimised roller guidance and lubricant film formation.

Increased customer benefits due to X-life

These technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings
- a higher fatigue limit load
- lower heat generation in the bearing
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements

Interchangeable with comparable standard bearings

Since X-life cylindrical roller bearings have the same dimensions as the corresponding standard bearings, the latter can be replaced without any problems by the higher-performance X-life bearings. The major advantages of X-life can therefore also be used for existing bearing arrangements with standard bearings.

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life cylindrical roller bearings include the suffix XL in the designation ➤492|2.12 and ➤498|▦.

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤10.

2.2 Load carrying capacity

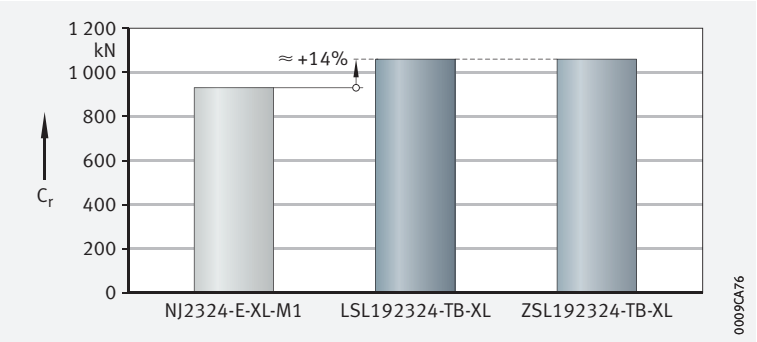
Designed for high radial loads

Cylindrical roller bearings LSL and ZSL are used as semi-locating bearings. These bearings can support not only high radial forces but also axial loads in one direction; i.e. they can guide the shaft axially in one direction. Furthermore, they can withstand high shock loads, vibrations and accelerations.

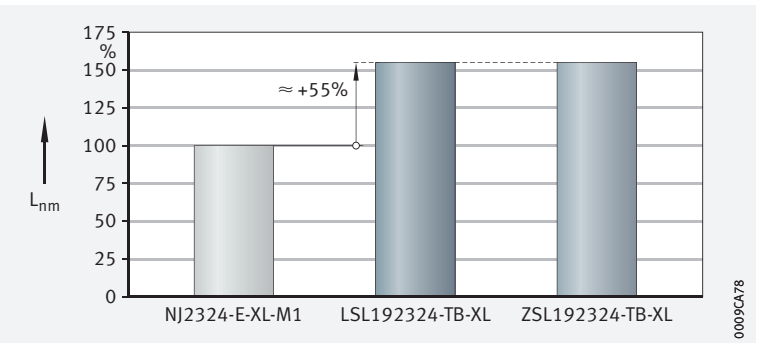
Higher basic dynamic load ratings lead to an increase in basic rating life

Due to the internal construction, the bearings can acommodate more rolling elements than conventional cylindrical roller bearings. As a result, there is a significant increase in the basic dynamic and static load rating and thus the basic rating life compared with conventional cylindrical roller bearings. ➤485|⧉4 shows a comparison of the basic dynamic load rating C_r between a cylindrical roller bearing NJ2324 with a conventional cage, a bearing with a disc cage and a bearing with spacers.
The advantage in basic dynamic load rating of approx. 14% gives an increase in the basic rating life of approx. 55% ➤485|⧉5.

4
Comparison of basic dynamic load ratings – conventional cylindrical roller bearing NJ2324 with LSL192324 and ZSL192324



5
Comparison of basic percentage rating life – conventional cylindrical roller bearing NJ2324 with LSL192324 and ZSL192324



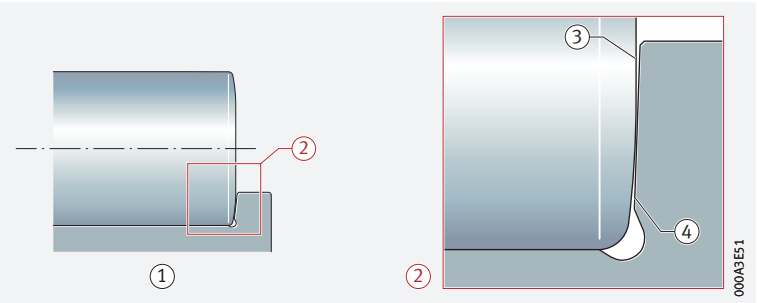
Higher axial load carrying capacity of bearings with toroidal crowned roller end face

✎ Neither wear nor fatigue occurs on the rib contact running and roller end faces

In the case of cylindrical roller bearings with toroidal crowned rollers (TB design), the axial load carrying capacity has been significantly improved with the aid of new calculation and manufacturing methods. A special curvature of the roller end faces facilitates optimum contact conditions between the rollers and ribs ➤*485*|6. As a result, the axial contact pressures on the rib are significantly minimised and a lubricant film capable of supporting higher loads is formed. Under standard operating conditions, this completely eliminates wear and fatigue at the rib contact running and roller end faces. In addition, the frictional torque is reduced by up to 50%. The bearing temperature during operation is therefore significantly lower. Bearings of the toroidal crowned design are available for a bore diameter of, or larger than, d = 90 mm ➤*498*|▦.

6
Contact geometry of roller end face/rib face – modified roller end faces

① *Cylindrical roller with inner ring*
② *Detail (representation not to scale)*
③ *End of roller*
④ *Rib*



Load ratio F_a/F_r

✎ Ratio $F_a/F_r \leqq 0{,}4$ or 0,6

The bearings can support axial loads on one side by means of the ribs on the inner and outer ring. In order to ensure problem-free running (tilting of the rollers is prevented), they must always be subjected to radial load at the same time as axial load. The ratio F_a/F_r must not exceed the value 0,4. For bearings with toroidal crowned roller ends (TB design), values up to 0,6 are permissible.

The load F_r describes the radial load for a single row bearing. For multi-row bearings, F_r must be divided by the number of rows.

Continuous axial loading without simultaneous radial loading is not permissible.

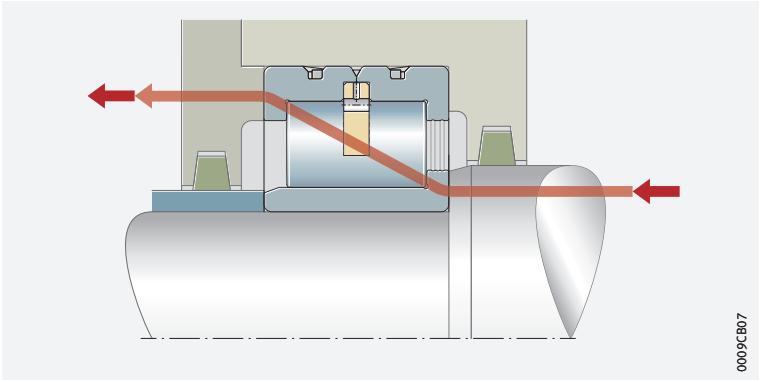
Permissible axial load

Influencing factors on the axial load carrying capacity

Axial loads are supported by the bearing ribs and the roller end faces ➤*486*|*7* and ➤*496*|*13*. The axial load carrying capacity of the bearing is therefore essentially dependent on:

- the size of the sliding surfaces between the ribs and the end faces of the rolling elements
- the sliding velocity at the ribs
- the lubrication of the contact surfaces
- tilting of the bearing
- friction

7 *Force flow under axial load – semi-locating bearing LSL1923*



Calculation of permissible axial load – cylindrical rollers with conventional roller ends

Bearings with standard roller ends

The permissible axial load $F_{a\,per}$ can be calculated from the hydrodynamic load carrying capacity of the contact ➤*486*|*1*.

1 *Permissible axial load – bearings of standard design*

$$F_{a\,per} = k_S \cdot k_B \cdot d_M^{1,54} \cdot n^{-0,6} \leqq F_{a\,max}$$

Legend

$F_{a\,per}$	N	Permissible continuous axial load. In order to prevent unacceptably high temperatures in the bearing, $F_{a\,per}$ must not be exceeded
$F_{a\,max}$	N	Maximum continuous axial load in relation to rib fracture. In order to prevent unacceptably high pressures at the contact surfaces, $F_{a\,max}$ must not be exceeded
k_S	–	Factor as a function of lubrication method ➤*486*|*1*. The factor takes into consideration the lubrication method used for the bearing. The better the lubrication and, in particular, the heat dissipation, the higher the permissible axial load
k_B	–	Factor as a function of the bearing series, $k_B = 28$
d_M	mm	Mean bearing diameter $d_M = (D + d)/2$ ➤*498*
n	min^{-1}	Operating speed.

1 *Factor k_S*

Lubrication method	Factor k_S	
	from	up to
Minimal heat dissipation, drip feed oil lubrication, oil mist lubrication, low operating viscosity ($\nu < 0,5 \cdot \nu_1$)	7,5	10
Poor heat dissipation, oil sump lubrication, oil spray lubrication, low oil flow	10	15
Good heat dissipation, recirculating oil lubrication (pressurised oil lubrication)	12	18
Very good heat dissipation, recirculating oil lubrication with oil cooling, high operating viscosity ($\nu > 2 \cdot \nu_1$)	16	24

The precondition for these k_S values is an operating viscosity of the lubricant of at least the reference viscosity ν_1 in accordance with DIN ISO 281:2010.

Doped lubricating oils should be used, such as CLP (DIN 51517) and HLP (DIN 51524) of ISO VG grades 32 to 460, as well as ATF oils (DIN 51502) and transmission oils (DIN 51512) of SAE viscosity grades 75W to 140W.

Calculation of permissible axial load – cylindrical rollers with toroidal roller ends

Higher axial loads possible

For bearings with toroidal roller ends, the permissible axial loads are 50% higher ➤487| 2.

2
Permissible axial load – bearings of TB design

$$F_{a\,per} = 1{,}5 \cdot k_S \cdot k_B \cdot d_M^{\,1{,}54} \cdot n^{-0{,}6} \leqq F_{a\,max}$$

Calculation of maximum permissible axial load

For bearings with rollers of the standard or TB design, the maximum permissible axial load $F_{a\,max}$ ➤487| 3 is calculated from the rib strength and the security against wear. This must not be exceeded, even if $F_{a\,per}$ gives higher values ➤487| 4.

3
Maximum axial load – bearings of standard and TB design

$$F_{a\,max} = 0{,}075 \cdot k_B \cdot d_M^{\,2{,}1}$$

4
Permissible axial load

$$F_{a\,per} \leqq F_{a\,max}$$

Axial load under shaft deflection

Permissible axial load under shaft deflection of up to 2′

Under considerable shaft deflection, the shaft shoulder presses against the inner ring rib. In combination with the active axial load, this can lead to high alternating loading of the inner ring ribs. Under a shaft deflection of up to 2′, the permissible axial load can be estimated ➤487| 5.

If more severe tilting is present, a separate strength analysis is required. In this case, please contact Schaeffler.

5
Axial load under misalignment

$$F_{as} = 20 \cdot d_M^{\,1{,}42}$$

Legend

F_{as}	N	Permissible axial load under misalignment.

2.3 Compensation of angular misalignments

Angular deviations are misalignments between the inner and outer ring

The permissible misalignment between the inner ring and outer ring is influenced by the internal bearing construction, the operating clearance, the forces acting on the bearings etc. Due to these complex relationships, it is not possible to give generally valid absolute values here.
However, misalignments (angular deviations) between the inner ring and outer ring will generally always have an effect on the running noise and the operating life of the bearings.

Permissible tilting

The permissible guide value at which, based on experience, there is no significant reduction in operating life is 3′.

Scope of value

The value applies to:

- bearing arrangements with static misalignment (consistent position of the shaft and housing axis)
- bearings that are not required to perform an axial guidance function
- bearings subjected to small loads (with $C_{0r}/P \geqq 5$)

Checking by means of the calculation program BEARINX is recommended in all cases. If there is any uncertainty regarding possible misalignment, please consult Schaeffler.

2.4 Lubrication

Oil or grease lubrication is possible

The cylindrical roller bearings are not greased. They must be lubricated with oil or grease.

Pay attention to the compatibility of the lubricant with plastic

When using bearings with plastic spacers, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

2.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed, i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

2.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

Values for grease lubrication

For the grease lubrication of bearings without seals or shields, 85% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 65% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

2.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

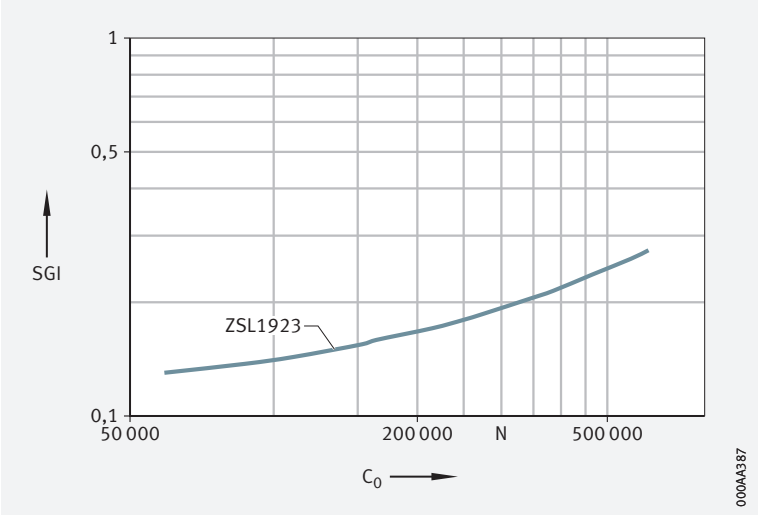
This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:

- ***medias*** *https://medias.schaeffler.com*



8
Schaeffler Noise Index for cylindrical roller bearings with spacers

SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*

2.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and cylindrical rollers
- the cage (disc cage or spacers)
- the lubricant

Possible operating temperatures of bearings ➤*490*|▦ *2*.

▦ **2**
Permissible temperature ranges

Operating temperature	Cylindrical roller bearings with disc cage or with spacers
	–30 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

2.9 Cages

Bearings with a disc cage or spacers are suitable for applications with high dynamic inertia forces

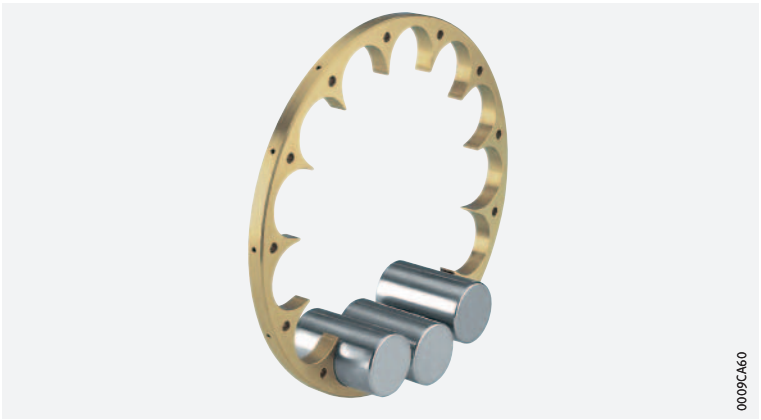
In addition to the actual task of a bearing cage, which is to hold rolling elements apart from each other, a cage designed for vibrations (e. g. for use in vibratory machinery) must be able to support, on a fatigue-resistant basis, principally the inertia forces that act on the cage due to its own mass, as well as the inertia forces of the rolling elements that act directly on the cage pockets. Since these applications also call for very high basic load ratings, conventional cages can only support this requirement under very limited conditions. As a result, bearings with a brass disc cage or plastic spacers have been developed, which constitute a transition from full complement bearings to conventional cage bearings.

Disc cage

Rolling elements are held by the cage

This cage is designed as a flat disc ➤*490*|⧉ *9*. Facing towards the inside diameter are rolling element pockets that support the rolling elements. The cage inside diameter is extended downwards to below the pitch circle line. This gives retention of the rolling elements, i. e. the inner ring can be mounted separately from the rest of the bearing. Facing the outside diameter, the disc cage is seated concentrically between the ribs in a slot in the outer ring.

⧉ **9**
Rollers and solid brass disc cage

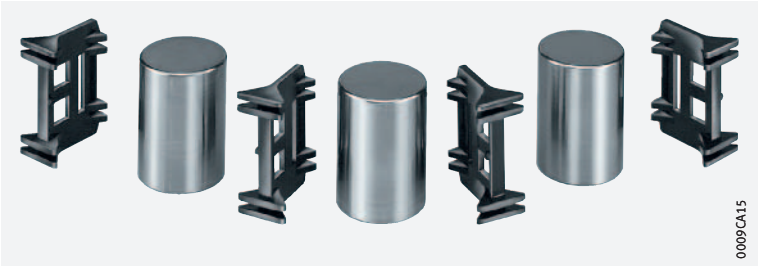


Spacers

Lower bearing frictional torque due to the geometry of the spacers

The plastic spacers were developed specially for the series ZSL1923 ➤*491*|*10*. They are designed such that the rolling element set is self-retaining, i. e. the bearing and inner ring can be mounted separately from each other.

10
Rollers and plastic spacers



2.10 Internal clearance

Radial internal clearance

The standard is CN

As standard, cylindrical roller bearings with disc cage or with spacers have the radial internal clearance CN (normal) ➤*491*|*3*. CN is not stated in the designation.

When used in vibratory machinery, both bearing rings have a tight fit. As a result, and due to the temperature differential between the inner ring and outer ring, the internal clearance C4 is generally necessary. As standard, bearings for vibratory machinery therefore have this internal clearance group.

Certain sizes are also available by agreement with the larger internal clearance C3, C4 and C5 ➤*491*|*3*.

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤*491*|*3*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

3
Radial internal clearance of cylindrical roller bearings with disc cage or with spacers

Nominal bore diameter d mm		Radial internal clearance							
		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm		C5 (Group 5) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	20	45	35	60	50	75	65	90
24	30	20	45	35	60	50	75	70	95
30	40	25	50	45	70	60	85	80	105
40	50	30	60	50	80	70	100	95	125
50	65	40	70	60	90	80	110	110	140
65	80	40	75	65	100	90	125	130	165
80	100	50	85	75	110	105	140	155	190
100	120	50	90	85	125	125	165	180	200
120	140	60	105	100	145	145	190	200	245
140	160	70	120	115	165	165	215	225	275
160	180	75	125	120	170	170	220	250	300
180	200	90	145	140	195	195	250	275	330
200	225	105	165	160	220	220	280	305	365
225	250	110	175	170	235	235	300	330	395
250	280	125	195	190	260	260	330	370	440
280	315	130	205	200	275	275	350	410	485

2.11 Dimensions, tolerances

Dimension standards

The main dimensions of cylindrical roller bearings correspond to ISO 15:2017 (DIN 616:2000 and DIN 5412-1:2005).

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137*|*7.11*.
Nominal value of chamfer dimension ➤*498*|▦.

Tolerances

The dimensional and running tolerances correspond to the tolerance class Normal in accordance with ISO 492:2014.
Tolerance values in accordance with ISO 492 ➤*124*|▦*8*.

2.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

▦**4** *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
BIR	Inner ring raceway ground slightly spherical	Available by agreement
BR	Black oxide coated	
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
C5	Radial internal clearance C5 (larger than C4)	
TB	Bearing with increased axial load carrying capacity	Standard dependent on bearing size
XL	X-life bearing	

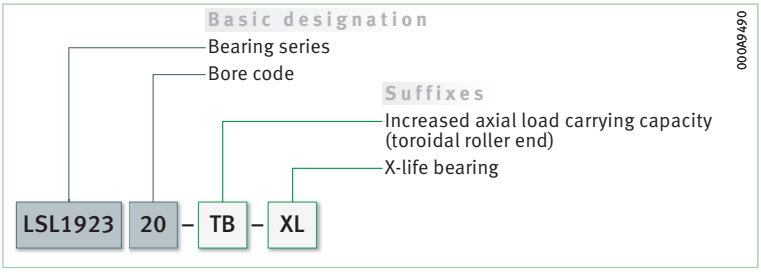
2.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

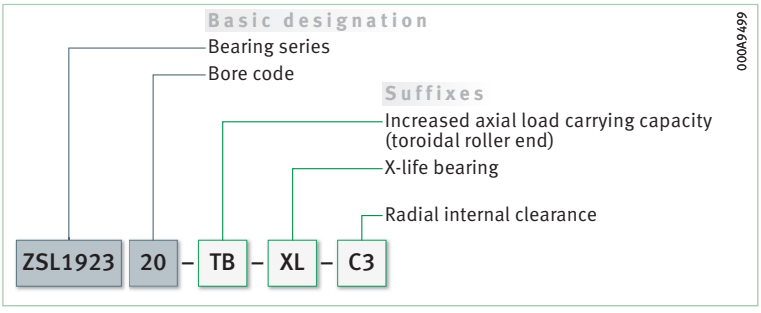
✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*492*|🗗*11* and ➤*492*|🗗*12*. The composition of designations is subject to DIN 623-1 ➤*102*|🗗*10*.

🗗**11** *Cylindrical roller bearing with disc cage: designation structure*



🗗**12** *Cylindrical roller bearing with spacers, internal clearance C3: designation structure*



2.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

Cylindrical roller bearings with non-locating bearing function

✎ *$P = F_r$*

Non-locating bearings can only support radial loads. For these bearings ➤*493*| *f 6*.

f 6 *Equivalent dynamic load*

$$P = F_r$$

Cylindrical roller bearings with semi-locating or locating bearing function

✎ *P is a substitute force for combined load and various load cases*

If the condition described above is not met, i. e. if, in addition to the radial force F_r, there is also an axial force F_a, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ *$F_a/F_r \leqq e$ or $F_a/F_r > e$*

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factors e and Y ➤*493*| *f 7* and ➤*493*| *f 8*.

f 7 *Equivalent dynamic load*

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r$$

f 8 *Equivalent dynamic load*

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}92 \cdot F_r + Y \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load
e	–	Factor, e = 0,3
Y	–	Factor, Y = 0,4.

Equivalent static bearing load

✎ *$P_0 = F_{0r}$*

For cylindrical roller bearings subjected to static load ➤*493*| *f 9*.

f 9 *Equivalent static load*

$$P_0 = F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}	N	Largest radial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*493*| *f 10*.

f 10 *Static load safety factor*

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

2.15 Minimum load

In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is necessary during continuous operation

In order that no slippage occurs between the contact partners, the cylindrical roller bearings must be constantly subjected to a sufficiently high radial load. For continuous operation, experience shows that a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

2.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤*495*|▦ *5* to ➤*495*|▦ *7*.

Radial location

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤*152*|▦ *6* and ➤*160*|▦ *7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤*146*
- conditions of rotation ➤*147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*149*|▦ *2*
- shaft fits ➤*152*|▦ *6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*150*|▦ *4*
- housing fits ➤*160*|▦ *7*

Axial location

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings, retaining rings, adapter and withdrawal sleeves etc., are fundamentally suitable; example ➤*496*|⧉ *13*.

Dimensional, geometrical and running accuracy of cylindrical bearing seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For cylindrical roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of the bearing seating surfaces ➤*495*|▦ *5*. Tolerances t_1 to t_3 in accordance with ➤*170*|⧉ *11*. Numerical values for IT grades ➤*495*|▦ *6*.

▦ *5*
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	

▦ *6*
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm						
	over **18**	**30**	**50**	**80**	**120**	**180**	**250**
	incl. **30**	**50**	**80**	**120**	**180**	**250**	**315**
	Values in µm						
IT4	6	7	8	10	12	14	16
IT5	9	11	13	15	18	20	23
IT6	13	16	19	22	25	29	32
IT7	21	25	30	35	40	46	52

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*495*|▦ *7*.

▦ *7*
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5418:1993 or an undercut to DIN 509:2006. Proven mounting dimensions for the radii and diameters of abutment shoulders are given in the product tables ➤*498*| and ➤*496*| *13*. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Rib support in axially loaded bearings

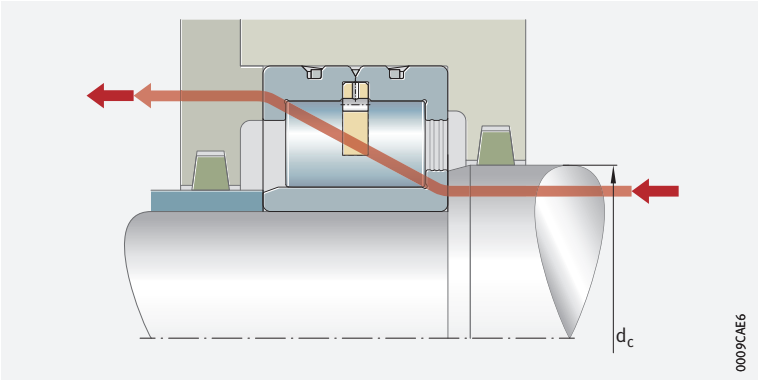
Ribs under axial load must be supported over their entire height and entire circumference. The size and axial runout accuracy of the contact surfaces on the inner ring rib must be observed especially in the case of cylindrical roller bearings subjected to high loads, since these factors also influence the uniformity of the rib load and the running accuracy of the shaft. This means that the ribs may be subjected to damaging alternating stresses even in the case of very small misalignments.
If the mounting dimensions indicated in the product tables are observed, the problems described can be reliably avoided ➤*496*| *13* and ➤*498*|.

Support in semi-locating bearings

In semi-locating bearings, it is sufficient to support the bearing rings on one side, on the rib supporting the axial load ➤*496*| *13*.

13
Support of the inner ring rib – bearing with disc cage LSL 1923 (semi-locating bearing)

d_c = *recommended height of shaft shoulder with axially loaded rib*
Arrow = *force flow*



2.17 Mounting and dismounting

The mounting and dismounting options for cylindrical roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

As the bearings are not self-retaining, they are easy to mount

The cylindrical roller bearings LSL 1923 and ZSL 1923 are not self-retaining. As a result, the bearing parts can be mounted separately from each other ➤*482*|*2.1*. This gives simplified mounting of the bearings, especially when the two bearing rings have a tight fit.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

2.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

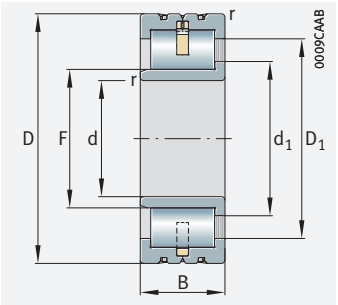
2.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

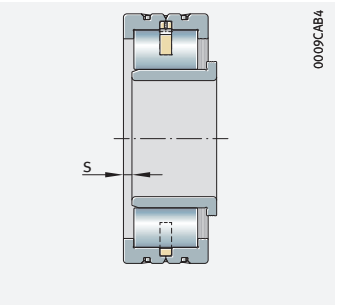
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

Cylindrical roller bearings with disc cage

Semi-locating bearings



LSL 1923

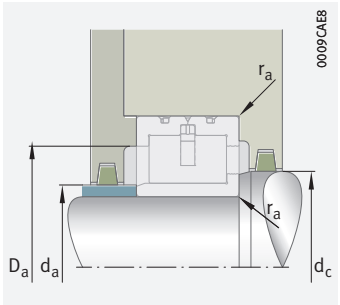


Axial displacement “s”

d = 80 – 300 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤492|2.12 ➤492|2.13 X-life ➤484
			N	N	N	min^{-1}	min^{-1}	≈ kg	
80	170	58	420 000	495 000	76 000	8 500	4 600	6,1	**LSL192316**
85	180	60	445 000	520 000	77 000	8 000	4 350	7,3	**LSL192317**
90	190	64	590 000	610 000	109 000	7 500	4 050	8,6	**LSL192318-TB-XL**
95	200	67	610 000	660 000	117 000	7 000	3 750	10	**LSL192319-TB-XL**
100	215	73	750 000	790 000	139 000	6 600	3 450	12,8	**LSL192320-TB-XL**
110	240	80	880 000	930 000	158 000	5 800	3 000	17,3	**LSL192322-TB-XL**
120	260	86	1 060 000	1 140 000	189 000	5 300	2 650	22	**LSL192324-TB-XL**
130	280	93	1 190 000	1 280 000	209 000	4 900	2 450	27,2	**LSL192326-TB-XL**
140	300	102	1 340 000	1 460 000	234 000	4 600	2 300	34	**LSL192328-TB-XL**
150	320	108	1 410 000	1 760 000	204 000	4 250	2 020	40,7	**LSL192330-TB**
160	340	114	1 600 000	2 010 000	227 000	3 900	1 820	48,1	**LSL192332-TB**
170	360	120	1 740 000	2 210 000	249 000	3 750	1 760	57,5	**LSL192334-TB**
180	380	126	1 840 000	2 430 000	270 000	3 500	1 620	67,4	**LSL192336-TB**
190	400	132	2 100 000	2 750 000	300 000	3 400	1 540	78,1	**LSL192338-TB**
200	420	138	2 340 000	3 050 000	325 000	3 200	1 420	89,3	**LSL192340-TB**
220	460	145	2 500 000	3 200 000	335 000	2 850	1 270	108	**LSL192344-TB**
240	500	155	2 750 000	3 550 000	360 000	2 700	1 220	138,6	**LSL192348-TB**
260	540	165	3 350 000	4 350 000	435 000	2 380	1 010	168	**LSL192352-TB**
280	580	175	3 700 000	4 850 000	465 000	2 250	950	206,6	**LSL192356-TB**
300	620	185	4 150 000	5 500 000	530 000	2 130	890	253	**LSL192360-TB**

medias *https://www.schaeffler.de/std/1F9A*

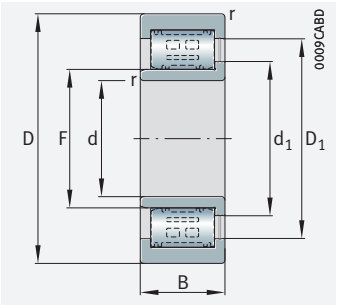


Mounting dimensions

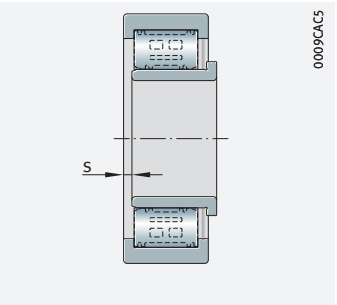
Dimensions						Mounting dimensions			
d	r min.	s	F	d_1 ≈	D_1 ≈	d_a	d_c	D_a	r_a max.
80	2,1	3,5	94	104,5	134,8	94	104,5	134,5	2,1
85	3	4	100	111,3	143,9	100	111,5	143,5	3
90	3	4	105,3	117,2	152,5	105	117,5	152,5	3
95	3	4	114,7	126,6	161	114,5	127	161	3
100	3	4	119,3	132,7	172	119	133	172	3
110	3	5	135,5	150,7	193,1	135,5	151	193	3
120	3	5	147,4	164,2	213,1	147	164,5	213	3
130	4	5	157,9	176	227,9	157,5	176	227,5	4
140	4	7	168,5	187,5	243,2	168	187,5	243	4
150	4	7	182,5	203,3	263,9	182	203,5	263,5	4
160	4	7	196,4	219	284,8	196	219	284,5	4
170	4	7	230,6	226,6	295,4	230,5	227	295	4
180	4	7	221,6	245	313,3	221,5	245	313	4
190	5	7	224,4	250	325,5	224	250	325,5	5
200	5	7	238,5	265,7	345,9	238	266	345,5	5
220	5	7	266,7	297	385,9	266,5	297	385,5	5
240	5	10	280,6	312,5	406,1	280,5	312,5	406	5
260	6	10	315,6	351,6	457,2	315,5	352	457	6
280	6	12	333,1	371	485	333	371	485	6
300	7,5	12	350,9	390,9	508,5	350,5	391	508,5	7,5

Cylindrical roller bearings with spacers

Semi-locating bearings



ZSL 1923

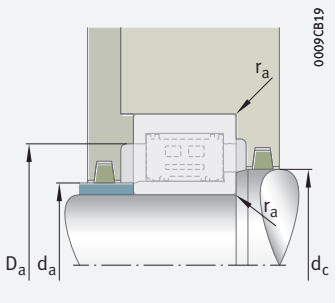


Axial displacement “s”

d = 25 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	dyn. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤492|2.12 ➤492|2.13 X-life ➤484
			N	N	N	min^{-1}	min^{-1}	≈ kg	
25	62	24	60 000	54 000	7 100	17 100	10 000	0,36	**ZSL192305**
30	72	27	83 000	80 000	11 000	14 400	8 500	0,55	**ZSL192306**
35	80	31	105 000	101 000	15 400	12 300	7 500	0,72	**ZSL192307**
40	90	33	141 000	142 000	21 700	10 600	6 300	1	**ZSL192308**
45	100	36	151 000	157 000	24 100	9 900	6 300	1,34	**ZSL192309**
50	110	40	193 000	199 000	31 000	8 900	5 800	1,76	**ZSL192310**
55	120	43	224 000	231 000	36 500	8 000	5 400	2,22	**ZSL192311**
60	130	46	240 000	255 000	40 500	7 400	5 200	2,82	**ZSL192312**
65	140	48	295 000	320 000	51 000	6 700	4 600	3,44	**ZSL192313**
70	150	51	325 000	355 000	56 000	6 400	4 600	4,27	**ZSL192314**
75	160	55	385 000	435 000	67 000	5 900	4 200	5,2	**ZSL192315**
80	170	58	450 000	520 000	77 000	5 500	3 850	6,2	**ZSL192316**
85	180	60	480 000	570 000	82 000	5 100	3 600	7,23	**ZSL192317**
90	190	64	590 000	610 000	109 000	5 100	3 750	8,7	**ZSL192318-TB-XL**
95	200	67	620 000	660 000	117 000	4 750	3 450	10	**ZSL192319-TB-XL**
100	215	73	750 000	790 000	139 000	4 450	3 200	12,7	**ZSL192320-TB-XL**
110	240	80	890 000	900 000	150 000	3 850	2 700	16,5	**ZSL192322-TB-XL**
120	260	86	1 060 000	1 140 000	189 000	3 600	2 400	21,9	**ZSL192324-TB-XL**

medias *https://www.schaeffler.de/std/1F9A*



Mounting dimensions

Dimensions						Mounting dimensions			
d	r min.	s	F	d_1 ≈	D_1 ≈	d_a	d_c	D_a	r_a max.
25	1,1	2	31,7	36,7	47,5	31,5	37	47,5	1,1
30	1,1	2	38,3	43,5	56	38	43,5	56	1,1
35	1,5	2	44,7	50,7	65,8	44,5	51	65,5	1,5
40	1,5	2	51,1	57,5	75,2	51	57,5	75	1,5
45	1,5	3	56,1	62,5	80,3	56	62,5	80	1,5
50	2	3	60,7	68,3	89,7	60,5	68,5	89,5	2
55	2	3	67,1	75,5	99,3	67	75,5	99	2
60	2,1	3	73,6	82	105,8	73,5	82	105,5	2,1
65	2,1	3,5	80,7	90	116,5	80,5	90	116,5	2,1
70	2,1	3,5	84,1	93,5	121,6	84	93,5	121,5	2,1
75	2,1	3,5	91,2	101,6	131,9	91	102	131,5	2,1
80	2,1	3,5	98,2	109,5	142,1	98	109,5	142	2,1
85	3	4	107	118,5	150,9	107	118,5	150,5	3
90	3	4	105,3	117,5	152,5	105	117,5	152,5	3
95	3	4	114,7	126,6	161,9	114,5	127	161,5	3
100	3	4	119,3	132,7	172,8	119	133	172,5	3
110	3	5	134,3	151,1	199,9	134	151,5	199,5	3
120	3	5	147,4	164,2	213,1	147	164,5	213	3

3 Single row full complement cylindrical roller bearings

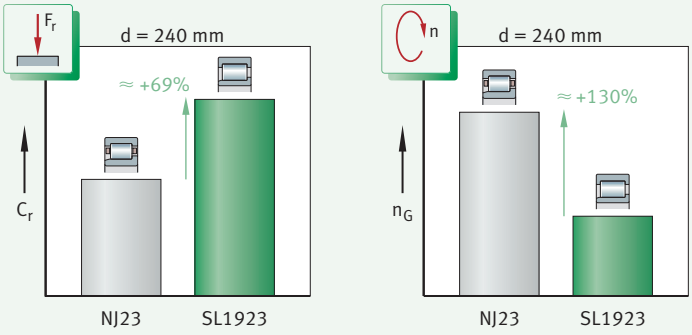
Single row full complement cylindrical roller bearings are suitable where:

- bearing arrangements are subjected to particularly high radial loads ➤*505|3.2*
- not only very high radial forces but also high axial loads from one direction must be supported by the bearing position (semi-locating bearing function) ➤*505|3.2*
- bearing arrangements operating under the conditions described above must have very high rigidity
- axial displacements of the shaft relative to the housing must be compensated without constraint in the bearing ➤*502|3.1*
- very high radial loads occur at lower speeds, i. e. the bearings do not need to achieve speeds as high as those of cylindrical roller bearings with cage ➤*509|3.6* and ➤*518|*
- particularly space-saving designs are required despite very high load
- the bearings should be separable (not self-retaining) for easier mounting ➤*502|3.1*

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*414*.

1
Cylindrical roller bearing with cage/full complement bearing, comparison of speed and load carrying capacity

C_r = *basic dynamic load rating*
n_G = *limiting speed*



3.1 Bearing design

Design variants

Single row full complement cylindrical roller bearings are available as:

- series SL1818, SL1829, SL1830, SL1822 (semi-locating bearings) ➤*503|2*
- series SL1923 (semi-locating bearings) ➤*503|3*
- X-life bearings ➤*504*

In addition to the bearings described here, Schaeffler supplies single row full complement cylindrical roller bearings in other types, series and dimensions. These products are described in some cases in special publications. If necessary, please contact Schaeffler. Larger catalogue bearings GL 1.

Bearings of basic design – standard range

✎ *Key features*

Single row full complement cylindrical roller bearings are part of the group of radial roller bearings. These bearings comprise solid outer rings, inner rings and full complement rolling element sets. Due to the absence of a cage, the bearing can accommodate the largest possible number of rolling elements. The rollers have profiled ends, i.e. they have a slight lateral curvature towards the ends. This modified line contact between the rolling elements and raceways prevents damaging edge stresses ➤*417*|⧉ *2*. The series SL1923 is self-retaining. Certain sizes are also available in an increased capacity design ➤*518*|▦. These bearings have the suffix E ➤*512*|▦ *6*.

Series SL1818, SL1829, SL1830, SL1822

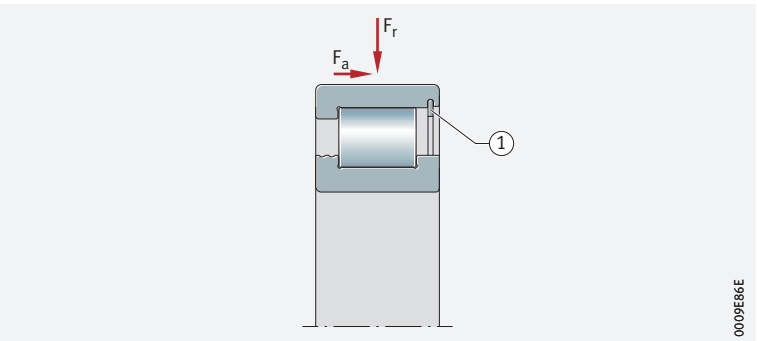
✎ *Bearings with semi-locating bearing function*

In these bearings, the outer ring has one rigid rib and the inner ring has two rigid ribs ➤*503*|⧉ *2*. As a result, axial displacements of the shaft relative to the housing can be compensated within certain limits. The maximum axial displacement s is given in the product tables. Since the axial motion occurs without constraint in the bearing itself, this is practically free from friction with a rotating bearing. Cylindrical roller bearings of this design are used as semi-locating bearings, i.e. they can guide the shaft axially in one direction, while they act in the opposite direction as non-locating bearings ➤*505*|*3.2*.

The bearings are held together in handling and mounting by a transport and mounting retaining device on the outer ring ➤*503*|⧉ *2*.
This retaining device remains in the bearing even after mounting and must not be subjected to axial load.

⧉ *2*
Single row full complement cylindrical roller bearing – semi-locating bearing

F_r = *radial load*
F_a = *axial load*
① *Transport and mounting retaining device*



Series SL1923

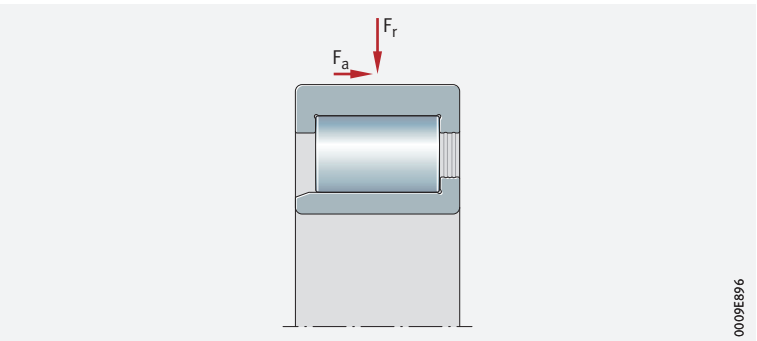
✎ *Bearings with semi-locating bearing function*

Cylindrical roller bearings of this design have two rigid ribs on the outer ring and a self-retaining rolling element set, while the inner ring has only one rigid rib ➤*503*|⧉ *3*. As a result, the inner ring can be removed from the bearing. This gives easier mounting of the cylindrical roller bearings.

The bearings are used as semi-locating bearings, i.e. they can guide the shaft axially in one direction ➤*505*|*3.2* and permit axial displacements in the bearing between the shaft and housing in one direction. The maximum axial displacement s is given in the product tables.

⧉ *3*
Single row full complement cylindrical roller bearing

F_r = *radial load*
F_a = *axial load*

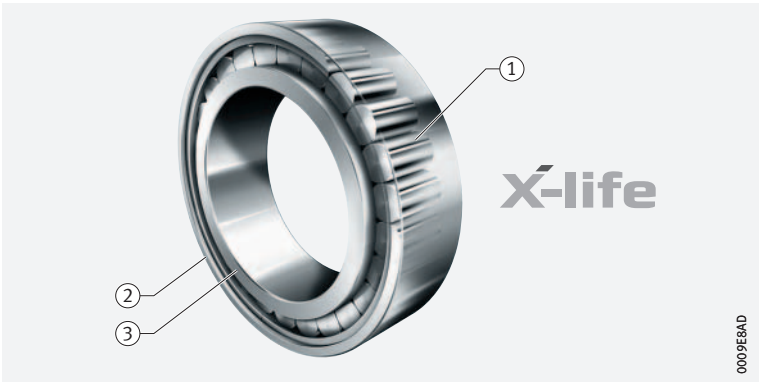


X-life premium quality

Many sizes are available as X-life bearings ➤*504*|🖼*4*. These bearings exhibit considerably higher performance than comparable standard cylindrical roller bearings. This is achieved, for example, through the modified internal construction, the optimised contact geometry between the rollers and raceways, better surface quality and the optimised roller guidance and lubricant film formation.

🖼*4*
Single row full complement cylindrical roller bearing in X-life design

① *Cylindrical roller, honed*
② *Outer ring, honed*
③ *Inner ring, honed*



Advantages

✎ *Increased customer benefits due to X-life*

These technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings
- a higher fatigue limit load
- lower heat generation in the bearing
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements

✎ *Interchangeable with comparable standard bearings*

Since the single row full complement X-life cylindrical roller bearings have the same dimensions as the corresponding standard bearings, the latter can be replaced without any problems by the higher-performance X-life bearings. The major advantages of X-life can therefore also be used for existing bearing arrangements with standard bearings.

✎ *Lower operating costs, higher machine availability*

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

✎ *Suffix XL*

X-life cylindrical roller bearings include the suffix XL in the designation ➤*512*|*3.12* and ➤*518*|▦.

Areas of application

Due to their special technical features, single row full complement X-life cylindrical roller bearings are highly suitable, for example, for bearing arrangements in:

- heavy industry (steel production)
- power transmission (gearbox engineering)
- processing machines and construction machinery
- wind turbines (gearbox applications)

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

3.2 Load carrying capacity

Designed for very high radial loads

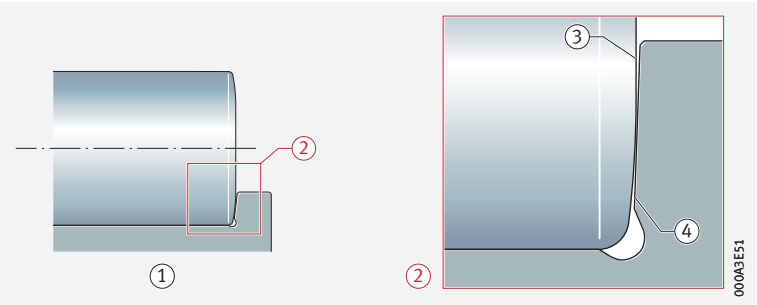
Due to the absence of a cage, the bearing can accommodate the largest possible number of rolling elements. As a result, full complement cylindrical roller bearings have very high radial load carrying capacity.

Higher axial load carrying capacity of bearings with toroidal crowned roller end face

Neither wear nor material fatigue occurs on the rib contact running and roller end faces

In the case of cylindrical roller bearings with toroidal crowned rollers (TB design), the axial load carrying capacity has been significantly improved with the aid of new calculation and manufacturing methods. A special curvature of the roller end faces facilitates optimum contact conditions between the rollers and ribs ➤505|5. As a result, the axial contact pressures on the rib are significantly minimised and a lubricant film capable of supporting higher loads is formed. Under standard operating conditions, this completely eliminates wear and fatigue at the rib contact running and roller end faces. In addition, the axial frictional torque is reduced by up to 50%. The bearing temperature during operation is therefore significantly lower. Available bearings of toroidal crowned design ➤505|1.

5
Contact geometry of roller end face/rib face – modified roller end faces



① *Cylindrical roller with inner ring*
② *Detail (representation not to scale)*
③ *End of roller*
④ *Rib*

1
Single row full complement cylindrical roller bearings with toroidal crowned roller ends available by agreement

Series	Bore diameter d mm from
SL1818	460
SL1822	140
SL1829	300
SL1830	180
SL1923	90

Load ratio F_a/F_r

Ratio $F_a/F_r \leqq 0,4$ or 0,6

The bearings can support axial loads on one side by means of the ribs on the inner and outer ring. In order to ensure problem-free running (tilting of the rollers is prevented), they must always be subjected to radial load at the same time as axial load. The ratio F_a/F_r must not exceed the value 0,4. For bearings with toroidal crowned roller ends (TB design), values up to 0,6 are permissible.

The load F_r describes the radial load for a single row bearing. For multi-row bearings, F_r must be divided by the number of rows.

Continuous axial loading without simultaneous radial loading is not permissible.

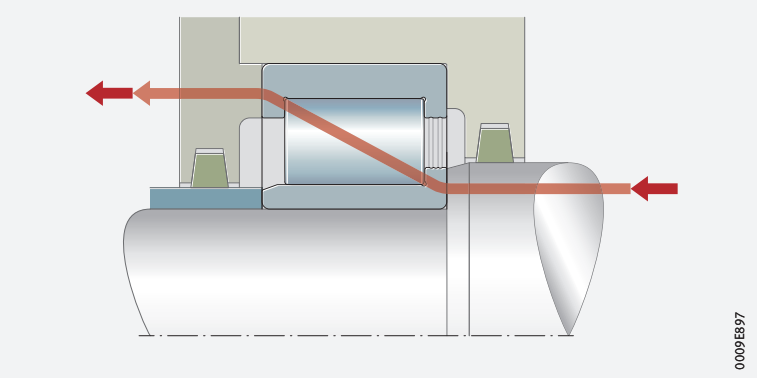
Permissible axial load

Influencing factors on the axial load carrying capacity

Axial loads are supported by the bearing ribs and the roller end faces ➤*506*|*6*. The axial load carrying capacity of the bearing is therefore essentially dependent on:

- the size of the sliding surfaces between the ribs and the end faces of the rolling elements
- the sliding velocity at the ribs
- the lubrication of the contact surfaces
- tilting of the bearing
- friction

6
Force flow under axial load – semi-locating bearing SL1923



Calculation of permissible axial load – cylindrical rollers with conventional roller ends

Bearings with standard roller ends

The permissible axial load $F_{a\,per}$ can be calculated from the hydrodynamic load carrying capacity of the contact ➤*506*|*1*.

1
Permissible axial load – bearings of standard design

$$F_{a\,per} = k_S \cdot k_B \cdot {d_M}^{1,54} \cdot n^{-0,6} \leqq F_{a\,max}$$

Legend

$F_{a\,per}$	N	Permissible continuous axial load. In order to prevent unacceptably high temperatures in the bearing, $F_{a\,per}$ must not be exceeded
$F_{a\,max}$	N	Maximum continuous axial load in relation to rib fracture. In order to prevent unacceptably high pressures at the contact surfaces, $F_{a\,max}$ must not be exceeded
k_S	–	Factor as a function of lubrication method ➤*506*|*2*. The factor takes into consideration the lubrication method used for the bearing. The better the lubrication and, in particular, the heat dissipation, the higher the permissible axial load
k_B	–	Factor as a function of the bearing series ➤*507*|*3*
d_M	mm	Mean bearing diameter $d_M = (D + d)/2$ ➤*518*
n	min^{-1}	Operating speed.

2
Factor k_S

Lubrication method	Factor k_S	
	from	up to
Minimal heat dissipation, drip feed oil lubrication, oil mist lubrication, low operating viscosity ($\nu < 0,5 \cdot \nu_1$)	7,5	10
Poor heat dissipation, oil sump lubrication, oil spray lubrication, low oil flow	10	15
Good heat dissipation, recirculating oil lubrication (pressurised oil lubrication)	12	18
Very good heat dissipation, recirculating oil lubrication with oil cooling, high operating viscosity ($\nu > 2 \cdot \nu_1$)	16	24

The precondition for these k_S values is an operating viscosity of the lubricant of at least the reference viscosity ν_1 in accordance with DIN ISO 281:2010.

Doped lubricating oils should be used, such as CLP (DIN 51517) and HLP (DIN 51524) of ISO VG grades 32 to 460, as well as ATF oils (DIN 51502) and transmission oils (DIN 51512) of SAE viscosity grades 75W to 140W.

3 *Bearing factor k_B*

Series	k_B
SL1818	4,5
SL1829	11
SL1830	17
SL1822	20
SL1923	30

Calculation of permissible axial load – cylindrical rollers with toroidal crowned roller ends

For bearings with toroidal roller ends, the permissible axial loads are 50% higher ➤507| 2.

2 *Permissible axial load – bearings of TB design*

$$F_{a\,per} = 1{,}5 \cdot k_S \cdot k_B \cdot d_M^{\,1{,}54} \cdot n^{-0{,}6} \leqq F_{a\,max}$$

Calculation of maximum permissible axial load

The maximum permissible axial load $F_{a\,max}$ ➤507| 3 is calculated from the rib strength and security against wear. This must not be exceeded, even if $F_{a\,per}$ gives higher values ➤507| 4.

3 *Maximum axial load – bearings of standard and TB design*

$$F_{a\,max} = 0{,}075 \cdot k_B \cdot d_M^{\,2{,}1}$$

4 *Permissible axial load*

$$F_{a\,per} \leqq F_{a\,max}$$

Axial load under shaft deflection

Permissible axial load under shaft deflection of up to 2′

Under considerable shaft deflection, the shaft shoulder presses against the inner ring rib. In combination with the active axial load, this can lead to high alternating loading of the inner ring ribs. Under a shaft deflection of up to 2′, the permissible axial load can be estimated ➤507| 5.

If more severe tilting is present, a separate strength analysis is required. In this case, please contact Schaeffler.

5 *Axial load under misalignment*

$$F_{as} = 20 \cdot d_M^{\,1{,}42}$$

Legend

F_{as}	N	Permissible axial load under misalignment.

3.3 Compensation of angular misalignments

Angular deviations are misalignments between the inner and outer ring

The possible misalignment between the inner ring and outer ring is influenced by the internal bearing construction, the operating clearance, the forces acting on the bearing etc. Due to these complex relationships, it is not possible to give generally valid absolute values here. However, misalignments (angular deviations) between the inner ring and outer ring will generally always have an effect on the running noise and the operating life of the bearings.

Permissible tilting

The permissible guide values at which, based on experience, there is no significant reduction in operating life are as follows:

- 4′ for series SL1818
- 3′ for series SL1923, SL1822, SL1829, SL1830

Scope of values

The stated values apply to:

- bearing arrangements with static misalignment (consistent position of the shaft and housing axis)
- bearings that are not required to perform an axial guidance function
- bearings subjected to small loads (with $C_{0r}/P \geqq 5$)

Checking by means of the calculation program BEARINX is recommended in all cases. If there is any uncertainty regarding possible misalignment, please consult Schaeffler.

3.4 Lubrication

Oil or grease lubrication is possible

The cylindrical roller bearings are not greased. They must be lubricated with oil or grease.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

3.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed, i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

3.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Lower speed capacity than bearings with cage

Due to the kinematic conditions, however, bearings without cage do not achieve the high speeds that are possible when using bearings with cage.

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

Values for grease lubrication

For the grease lubrication of bearings without seals or shields, 85% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 65% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

3.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

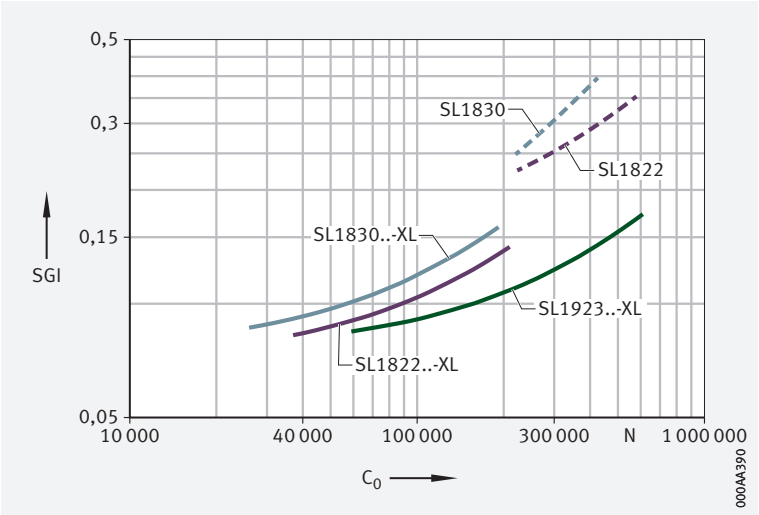
The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:

- ***medias*** *https://medias.schaeffler.com*

7
Schaeffler Noise Index for single row full complement cylindrical roller bearings

SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



3.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:
- the dimensional stability of the bearing rings and cylindrical rollers
- the cage
- the lubricant

Possible operating temperatures of single row cylindrical roller bearings ➤*510*|▦*4*.

4
Permissible temperature ranges

Operating temperature	Single row full complement cylindrical roller bearings
	–30 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

3.9 Cages

Full complement cylindrical roller bearings do not have a cage for guidance and separation of the rolling elements. The cylindrical rollers are guided by the ribs on the bearing rings.

3.10 Internal clearance

Radial internal clearance

✎ *The standard is CN*

Single row full complement cylindrical roller bearings are manufactured as standard with the radial internal clearance CN (normal) ➤*511*|▦ *5*. CN is not stated in the designation.

Certain sizes are also available by agreement with the larger internal clearance C3, C4 and C5 ➤*511*|▦ *5*.

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤*511*|▦ *5*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦ **5**
Radial internal clearance of single row full complement cylindrical roller bearings

Nominal bore diameter d mm		Radial internal clearance							
		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm		C5 (Group 5) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	20	45	35	60	50	75	65	90
24	30	20	45	35	60	50	75	70	95
30	40	25	50	45	70	60	85	80	105
40	50	30	60	50	80	70	100	95	125
50	65	40	70	60	90	80	110	110	140
65	80	40	75	65	100	90	125	130	165
80	100	50	85	75	110	105	140	155	190
100	120	50	90	85	125	125	165	180	220
120	140	60	105	100	145	145	190	200	245
140	160	70	120	115	165	165	215	225	275
160	180	75	125	120	170	170	220	250	300
180	200	90	145	140	195	195	250	275	330
200	225	105	165	160	220	220	280	305	365
225	250	110	175	170	235	235	300	330	395
250	280	125	195	190	260	260	330	370	440
280	315	130	205	200	275	275	350	410	485
315	355	145	225	225	305	305	385	455	535
355	400	190	280	280	370	370	460	510	600
400	450	210	310	310	410	410	510	565	665
450	500	220	330	330	440	440	550	625	735

3.11 Dimensions, tolerances

Dimension standards

The main dimensions of cylindrical roller bearings correspond to ISO 15:2017 (DIN 616:2000 and DIN 5412-1:2005).

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137*|*7.11*. Nominal value of chamfer dimension ➤*518*|▦.

Tolerances

The dimensional and running tolerances of the cylindrical roller bearings correspond to the tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*124*|▦ *8*.

3.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

▦6 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
BR	Black oxide coated	Available by agreement
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
C5	Radial internal clearance C5 (larger than C4)	
E	Increased capacity design	Standard, dependent on bore code and bearing series; others available by agreement
TB	Bearing with increased axial load carrying capacity	
XL	X-life bearing	

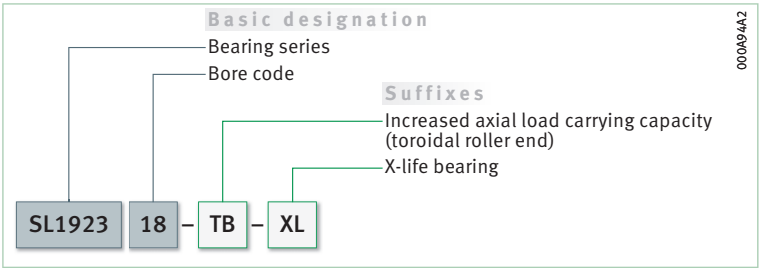
3.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

✎ *Example of composition of bearing designation*

The designation of bearings follows a set model. Example ➤*512*|⧉*8*. The composition of designations is subject to DIN 623-1 ➤*102*|⧉*10*.

⧉8 *Single row full complement cylindrical roller bearing (semi-locating bearing): designation structure*



3.14 Dimensioning

Equivalent dynamic bearing load

✎ *P = F_r under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

Cylindrical roller bearings with semi-locating bearing function

✎ *P is a substitute force for combined load and various load cases*

If the condition described above is not met, i. e. if, in addition to the radial force F_r, there is also an axial force F_a, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ $F_a/F_r \leqq e$ *or* $F_a/F_r > e$

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factors e and Y ➤*512*|𝑓⃞*6* and ➤*513*|𝑓⃞*7*.

𝑓⃞6 *Equivalent dynamic load*

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r$$

*f*7
Equivalent dynamic load

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}92 \cdot F_r + Y \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load
e, Y	–	Factors ➤*513*|▦*7*.

▦7
Factors e and Y

Bearing series	Calculation factors	
	e	Y
SL1818	0,2	0,6
SL1923, SL1822, SL1829, SL1830	0,3	0,4

Equivalent static bearing load

✎ *$P_0 = F_{0r}$*

For cylindrical roller bearings subjected to static load ➤*513*\|*f*8.

*f*8
Equivalent static load

$$P_0 = F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}	N	Largest radial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*513*\|*f*9.

*f*9
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

3.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is necessary during continuous operation*

In order that no slippage occurs between the contact partners, the cylindrical roller bearings must be constantly subjected to a sufficiently high radial load. For continuous operation, experience shows that a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

3.16 Design of bearing arrangements

✎ *Support bearing rings over their entire circumference and width*

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤*514*\|▦*8* to ➤*515*\|▦*10*.

Radial location

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤152|▦6 and ➤160|▦7.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤146
- conditions of rotation ➤147
- tolerance classes for cylindrical shaft seats (radial bearings) ➤149|▦2
- shaft fits ➤152|▦6
- tolerance classes for bearing seats in housings (radial bearings) ➤150|▦4
- housing fits ➤160|▦7

Axial location

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings, retaining rings, adapter and withdrawal sleeves etc., are fundamentally suitable; example ➤516|⧉9.

Dimensional, geometrical and running accuracy of cylindrical seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For cylindrical roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of the bearing seating surfaces ➤514|▦8. Tolerances t_1 to t_3 in accordance with ➤170|⧉11. Numerical values for IT grades ➤515|▦9.

▦8 *Guide values for the geometrical and positional tolerances of bearing seating surfaces*

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	

9
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm								
	over	18	30	50	80	120	180	250	315	400
	incl.	30	50	80	120	180	250	315	400	500
	Values in µm									
IT4		6	7	8	10	12	14	16	18	20
IT5		9	11	13	15	18	20	23	25	27
IT6		13	16	19	22	25	29	32	36	40
IT7		21	25	30	35	40	46	52	57	63

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*515*|▦ *10*.

10
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5418:1993 or an undercut to DIN 509:2006. Proven mounting dimensions for the radii and diameters of abutment shoulders are given in the product tables ➤*518*|▦ and ➤*516*|⧉ *9*. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Rib support in axially loaded bearings

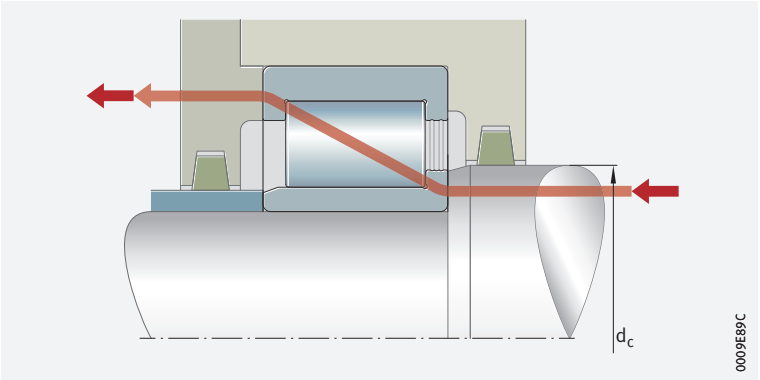
Ribs under axial load must be supported over their entire height and entire circumference ➤*516*|⧉ *9*. The size and axial runout accuracy of the contact surfaces on the inner ring rib must be observed especially in the case of cylindrical roller bearings subjected to high loads, since these factors also influence the uniformity of the rib load and the running accuracy of the shaft. This means that the ribs may be subjected to damaging alternating stresses even in the case of very small misalignments. If the mounting dimensions indicated in the product tables are observed, the problems described can be reliably avoided ➤*518*|▦.

Support in semi-locating bearings

In semi-locating bearings, it is sufficient to support the bearing rings on one side, on the rib supporting the axial load ➤*516*|⧉ *9*.

9
Support of the inner ring rib – series SL1923 (semi-locating bearing)

d_c = *recommended height of shaft shoulder with axially loaded rib*
Arrow = *force flow*



3.17 Mounting and dismounting

The mounting and dismounting options for cylindrical roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

3.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

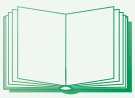
Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

3.19 Further information



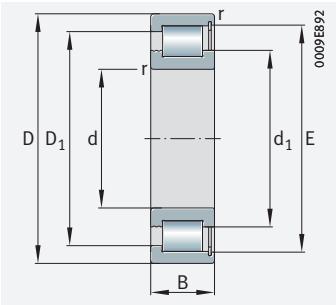
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

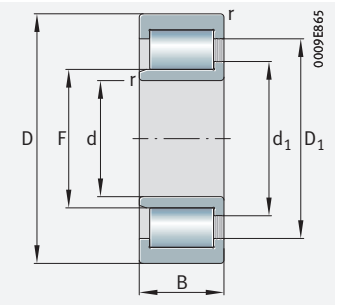


Single row full complement cylindrical roller bearings

Semi-locating bearings



SL1829, SL1830, SL1822

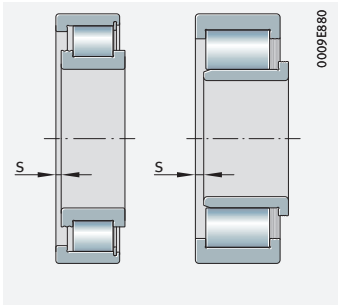


SL1923

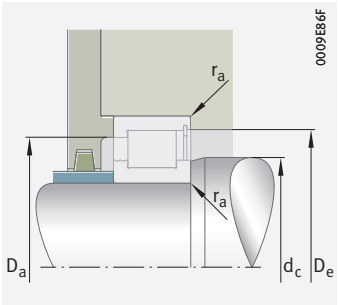
d = 20 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤ *512|3.12* ➤ *512|3.13* X-life ➤ *504*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
20	42	16	30 500	26 000	4 550	11 400	7 500	0,11	**SL183004-XL**
	47	18	45 500	37 000	6 200	10 400	6 500	0,16	**SL182204-XL**
25	47	16	35 000	32 000	5 600	9 500	6 000	0,12	**SL183005-XL**
	52	18	51 000	44 500	7 500	9 000	5 500	0,18	**SL182205-XL**
	62	24	73 000	59 000	9 600	8 100	4 800	0,37	**SL192305-XL**
30	55	19	45 000	42 000	7 600	8 100	5 600	0,2	**SL183006-XL**
	62	20	70 000	64 000	10 400	7 400	4 550	0,3	**SL182206-XL**
	72	27	100 000	87 000	14 800	6 800	4 050	0,56	**SL192306-XL**
35	62	20	55 000	53 000	9 600	7 100	4 950	0,26	**SL183007-XL**
	72	23	88 000	78 000	12 900	6 400	4 250	0,44	**SL182207-XL**
	80	31	126 000	110 000	20 500	5 800	3 600	0,74	**SL192307-XL**
40	68	21	66 000	67 000	11 400	6 300	4 350	0,31	**SL183008-XL**
	80	23	97 000	91 000	15 200	5 600	3 650	0,55	**SL182208-XL**
	90	33	170 000	153 000	29 000	5 000	3 050	1,01	**SL192308-XL**
45	75	23	70 000	74 000	12 700	5 800	4 200	0,4	**SL183009-XL**
	85	23	101 000	98 000	16 300	5 300	3 450	0,59	**SL182209-XL**
	100	36	181 000	164 000	31 000	4 600	3 000	1,37	**SL192309-XL**
50	80	23	88 000	94 000	15 300	5 300	3 700	0,43	**SL183010-XL**
	90	23	109 000	111 000	18 500	4 750	3 000	0,64	**SL182210-XL**
	110	40	232 000	215 000	41 000	4 200	2 800	1,81	**SL192310-XL**
55	90	26	120 000	136 000	23 000	4 550	3 100	0,64	**SL183011-XL**
	100	25	140 000	148 000	25 500	4 350	2 700	0,87	**SL182211-XL**
	120	43	270 000	250 000	48 500	3 750	2 550	2,28	**SL192311-XL**
60	85	16	63 000	76 000	13 900	4 700	2 900	0,29	**SL182912-XL**
	95	26	123 000	143 000	24 100	4 350	3 000	0,69	**SL183012-XL**
	110	28	169 000	176 000	33 000	3 900	2 550	1,18	**SL182212-XL**
	130	46	285 000	275 000	54 000	3 500	2 480	2,88	**SL192312-XL**
65	90	16	67 000	84 000	15 400	4 250	2 550	0,31	**SL182913-XL**
	100	26	130 000	157 000	26 500	4 000	2 700	0,73	**SL183013-XL**
	120	31	198 000	210 000	39 500	3 650	2 480	1,57	**SL182213-XL**
	140	48	350 000	345 000	67 000	3 200	2 180	3,52	**SL192313-XL**

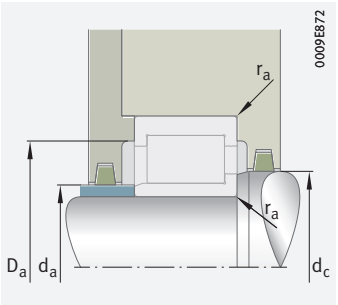
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s"



Mounting dimensions for SL1829, SL1830, SL1822

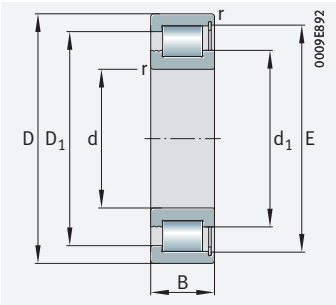


Mounting dimensions for SL1923

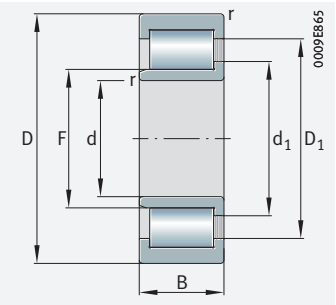
Dimensions							Mounting dimensions				
d	r min.	s	F	d_1 ≈	D_1 ≈	E	d_a	d_c	D_a	D_e	r_a max.
20	0,6	1,5	–	28,8	32,8	36,8	–	28,5	32,5	36,5	0,6
	1	1	–	30,3	36,9	41,5	–	30	36,5	41	1
25	0,6	1,5	–	34,6	38,5	42,5	–	34,5	38,5	42,5	0,6
	1	1	–	35,5	41,9	46,5	–	35,5	41,5	46,5	1
	1,1	2	31,7	36,7	47,5	–	31,5	36,5	47,5	–	1,1
30	1	2	–	40	45,4	49,6	–	40	45	49,5	1
	1	1	–	42	50,6	55,2	–	42	50,5	55	1
	1,1	2	38,3	43,5	56	–	38	43,5	56	–	1,1
35	1	2	–	44,9	51,3	55,5	–	44,5	51	55,5	1
	1,1	1	–	47	59,3	64	–	47	59	63,5	1,1
	1,5	2	44,7	50,7	65,8	–	44,5	50,5	65,5	–	1,5
40	1	2	–	50,5	57,1	61,7	–	50,5	57	61,5	1
	1,1	1	–	54	66,3	70,9	–	54	66	70,5	1,1
	1,5	2	51,1	57,5	75,2	–	51	57,5	75	–	1,5
45	1	2	–	55,3	62,2	66,9	–	55	62	66,5	1
	1,1	1	–	57,5	69,8	74,4	–	57,5	69,5	74	1,1
	1,5	3	56,1	62,5	80,3	–	56	62,5	80	–	1,5
50	1	2	–	59,1	67,7	72,3	–	59	67,5	72	1
	1,1	1	–	64,4	76,7	81,4	–	64	76,5	81	1,1
	2	3	60,7	68,3	89,7	–	60,5	68	89,5	–	2
55	1,1	2	–	68,5	78,8	83,5	–	68,5	78,5	83,5	1,1
	1,5	1	–	70	84,1	88,8	–	70	84	88,5	1,5
	2	3	67,1	75,5	99,3	–	67	75,5	99	–	2
60	1	1	–	69	74,4	78,6	–	69	74	78,5	1
	1,1	2	–	71,7	82,1	86,7	–	71,5	82	86,5	1,1
	1,5	1,5	–	76,8	93,9	99,2	–	76,5	93,5	99	1,5
	2,1	3	73,6	82	105,8	–	73,5	82	105,5	–	2,1
65	1	1	–	75,7	81	85,2	–	75,5	81	85	1
	1,1	2	–	78,1	88,4	93,1	–	78	88	93	1,1
	1,5	1,5	–	82,3	100,7	106,3	–	82	100,5	106	1,5
	2,1	3,5	80,7	90	116,5	–	80,5	90	116,5	–	2,1

Single row full complement cylindrical roller bearings

Semi-locating bearings



SL1829, SL1830, SL1822

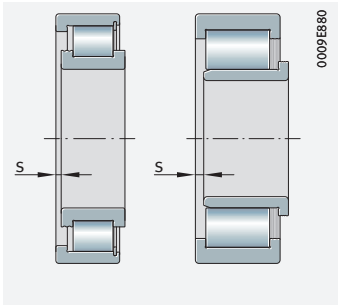


SL1923

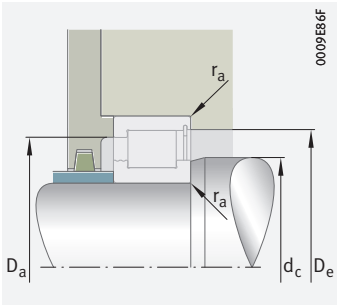
d = 70 – 110 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤512|3.12 ➤512|3.13 X-life ➤504
			N	N	N	min^{-1}	min^{-1}	≈ kg	
70	100	19	88 000	111 000	19 200	3 950	2 550	0,49	**SL182914-XL**
	110	30	153 000	174 000	30 000	3 750	2 800	1,02	**SL183014-XL**
	125	31	181 000	223 000	34 500	3 450	2 340	1,66	**SL182214**
	150	51	385 000	385 000	73 000	3 050	2 170	4,33	**SL192314-XL**
75	105	19	91 000	119 000	20 400	3 700	2 370	0,52	**SL182915-XL**
	115	30	162 000	192 000	33 000	3 450	2 490	1,06	**SL183015-XL**
	130	31	187 000	236 000	36 500	3 250	2 210	1,75	**SL182215**
	160	55	460 000	465 000	88 000	2 800	2 000	5,3	**SL192315-XL**
80	110	19	94 000	126 000	21 700	3 500	2 220	0,55	**SL182916-XL**
	125	34	170 000	220 000	33 500	3 200	2 470	1,43	**SL183016**
	140	33	223 000	280 000	41 500	3 000	2 040	2,15	**SL182216**
	170	58	540 000	560 000	101 000	2 600	1 820	6,32	**SL192316-XL**
85	120	22	118 000	159 000	26 000	3 300	2 200	0,81	**SL182917-XL**
	130	34	175 000	231 000	35 000	3 050	2 360	1,51	**SL183017**
	150	36	255 000	320 000	47 500	2 850	2 000	2,74	**SL182217**
	180	60	570 000	610 000	108 000	2 410	1 710	7,34	**SL192317-XL**
90	125	22	122 000	169 000	27 000	3 100	2 050	0,84	**SL182918-XL**
	140	37	205 000	275 000	41 000	2 850	2 240	1,97	**SL183018**
	160	40	285 000	365 000	54 000	2 700	1 990	3,48	**SL182218**
	190	64	620 000	650 000	118 000	2 400	1 760	8,83	**SL192318-TB-XL**
95	130	22	132 000	177 000	28 000	2 950	1 940	0,86	**SL182919-XL**
	170	43	330 000	425 000	62 000	2 420	1 780	4,17	**SL182219**
	200	67	650 000	710 000	126 000	2 240	1 620	10,2	**SL192319-TB-XL**
100	140	24	152 000	203 000	32 500	2 750	1 870	1,14	**SL182920-XL**
	150	37	216 000	300 000	43 500	2 600	2 040	2,15	**SL183020**
	180	46	390 000	510 000	74 000	2 300	1 700	5,13	**SL182220**
	215	73	790 000	850 000	150 000	2 110	1 490	13	**SL192320-TB-XL-BR**
110	150	24	155 000	213 000	34 500	2 500	1 710	1,23	**SL182922-XL**
	170	45	280 000	385 000	55 000	2 350	2 010	3,5	**SL183022**
	200	53	450 000	580 000	83 000	2 130	1 720	7,24	**SL182222**
	240	80	950 000	970 000	163 000	1 820	1 270	17	**SL192322-TB-XL-BR**

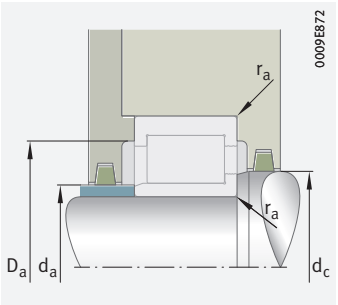
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s"



Mounting dimensions for SL1829, SL1830, SL1822

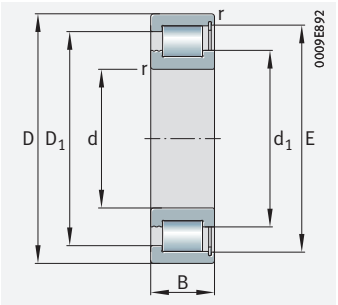


Mounting dimensions for SL1923

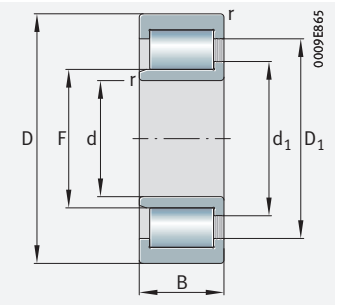
Dimensions							Mounting dimensions				
d	r min.	s	F	d_1 ≈	D_1 ≈	E	d_a	d_c	D_a	D_e	r_a max.
70	1	1	–	81,2	87,8	92,3	–	81	87,5	92	1
	1,1	3	–	81,5	95,6	100,3	–	81,5	95,5	100	1,1
	1,5	1,5	–	87	105,2	111,5	–	87	105	111	1,5
	2,1	3,5	84,1	93,5	121,6	–	84	93,5	121,5	–	2,1
75	1	1	–	86,3	92,8	97,4	–	86	92,5	97	1
	1,1	3	–	89	103,2	107,9	–	89	103	107,5	1,1
	1,5	1,5	–	91,8	110	116,2	–	91,5	110	116	1,5
	2,1	3,5	91,2	101,6	131,5	–	91	101,5	131,5	–	2,1
80	1	1	–	91,4	98	102,5	–	91	98	102,5	1
	1,1	4	–	95	111,7	117,4	–	95	111,5	117	1,1
	2	1,5	–	98,6	119,3	126,3	–	98,5	119	126	2
	2,1	3,5	98,2	109,5	142,1	–	98	109,5	142	–	2,1
85	1,1	1	–	96,4	105	109,6	–	96	105	109,5	1,1
	1,1	4	–	99,4	116,1	122	–	99	116	121,5	1,1
	2	1,5	–	104,4	126,3	133,8	–	104	126	133,5	2
	3	4	107	118,2	150,9	–	107	118	150,5	–	3
90	1,1	1	–	102	110,7	115,8	–	102	110,5	115,5	1,1
	1,5	4	–	106,1	124,5	130,1	–	106	124,5	130	1,5
	2	2,5	–	110,2	133,3	141,2	–	110	133	141	2
	3	4	105,3	117,5	152,5	–	105	117,5	152,5	–	3
95	1,1	1	–	106,7	117	122,3	–	106,5	117	122	1,1
	2,1	2,5	–	122	147,3	156	–	122	147	155,5	2,1
	3	4	114,7	126,6	161,9	–	114,5	126,5	161,5	–	3
100	1,1	1,5	–	113,4	125,7	131	–	113	125,5	130,5	1,1
	1,5	4	–	115,7	134	140,2	–	115,5	134	140	1,5
	2,1	2,5	–	127,5	154,3	163,4	–	127,5	154	163	2,1
	3	4	119,3	132,7	172,8	–	119	132,5	172,5	–	3
110	1,1	1,5	–	124	136,2	141,5	–	124	136	141,5	1,1
	2	5,5	–	127,3	149,3	156,7	–	127	149	156,5	2
	2,1	4	–	137	168	177,6	–	137	168	177,5	2,1
	3	5	134,3	151,1	199,9	–	134	151	199,5	–	3

Single row full complement cylindrical roller bearings

Semi-locating bearings



SL1829, SL1830, SL1822

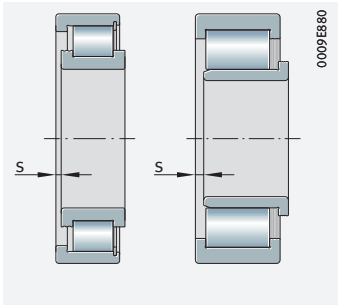


SL1923

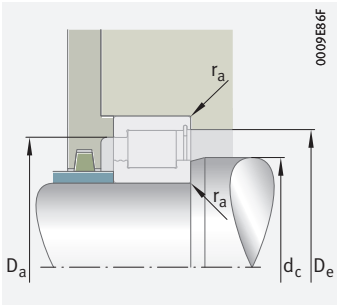
d = 120 – 190 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤ *512|3.12* ➤ *512|3.13* X-life ➤ *504*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
120	165	27	199 000	285 000	46 500	2 290	1 590	1,73	**SL182924-XL**
	180	46	295 000	425 000	59 000	2 160	1 840	3,8	**SL183024**
	215	58	530 000	720 000	100 000	1 930	1 500	9,08	**SL182224**
	260	86	1 130 000	1 230 000	204 000	1 690	1 120	22,3	**SL192324-TB-XL-BR**
130	180	30	238 000	350 000	55 000	2 110	1 500	2,33	**SL182926-XL**
	200	52	425 000	600 000	84 000	1 990	1 660	5,65	**SL183026**
	230	64	620 000	850 000	115 000	1 790	1 360	11,25	**SL182226**
	280	93	1 260 000	1 380 000	225 000	1 570	1 040	27,95	**SL192326-TB-XL-BR**
140	190	30	260 000	375 000	61 000	1 950	1 370	2,42	**SL182928-XL**
	210	53	450 000	660 000	90 000	1 820	1 470	6,04	**SL183028**
	250	68	720 000	1 000 000	134 000	1 660	1 230	14,47	**SL182228**
	300	102	1 410 000	1 570 000	250 000	1 470	970	34,9	**SL192328-TB-XL-BR**
150	210	36	340 000	480 000	78 000	1 790	1 360	3,77	**SL182930-XL**
	225	56	475 000	700 000	93 000	1 740	1 430	7,33	**SL183030**
	270	73	820 000	1 160 000	154 000	1 560	1 130	18,43	**SL182230**
	320	108	1 490 000	1 900 000	235 000	1 350	840	42,1	**SL192330-TB-BR**
160	220	36	350 000	510 000	82 000	1 680	1 270	4	**SL182932-XL**
	240	60	540 000	800 000	105 000	1 600	1 280	8,8	**SL183032**
	290	80	1 020 000	1 470 000	187 000	1 370	920	23	**SL182232**
	340	114	1 690 000	2 170 000	244 000	1 250	760	49,7	**SL192332-TB-BR**
170	230	36	365 000	540 000	85 000	1 590	1 190	4,3	**SL182934-XL**
	260	67	700 000	1 050 000	135 000	1 480	1 120	12,2	**SL183034**
	310	86	1 140 000	1 660 000	208 000	1 300	870	28,65	**SL182234**
	360	120	1 830 000	2 380 000	270 000	1 200	730	59,2	**SL192334-TB-BR**
180	250	42	455 000	680 000	106 000	1 500	1 150	6,2	**SL182936-XL**
	280	74	810 000	1 240 000	157 000	1 370	1 020	16,1	**SL183036**
	320	86	1 180 000	1 760 000	218 000	1 230	800	29,8	**SL182236**
	380	126	1 940 000	2 600 000	285 000	1 120	670	69,1	**SL192336-TB-BR**
190	260	42	510 000	770 000	118 000	1 420	1 030	6,5	**SL182938-XL**
	290	75	830 000	1 300 000	163 000	1 320	970	17	**SL183038**
	340	92	1 300 000	1 900 000	232 000	1 170	770	35,65	**SL182238**
	400	132	2 220 000	2 950 000	320 000	1 090	630	80,3	**SL192338-TB-BR**

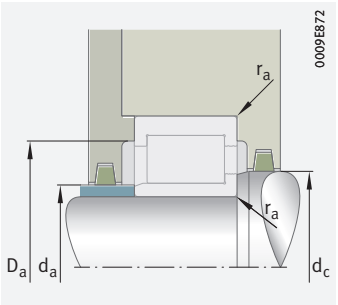
medias *https://www.schaeffler.de/std/1F9A*



Axial displacement "s"



Mounting dimensions for SL1829, SL1830, SL1822

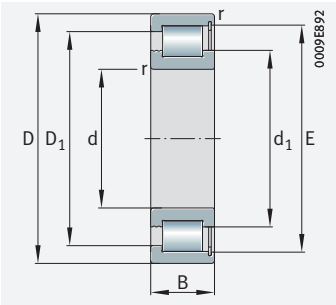


Mounting dimensions for SL1923

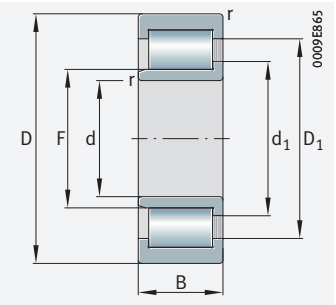
Dimensions							Mounting dimensions				
d	r min.	s	F	d_1 ≈	D_1 ≈	E	d_a	d_c	D_a	D_e	r_a max.
120	1,1	1,5	–	134,8	149	154,3	–	134,5	149	154	1,1
	2	5,5	–	138,8	160,7	168,2	–	138,5	160,5	168	2
	2,1	4	–	150,7	183	192,9	–	150,5	183	192,5	2,1
	3	5	147,4	164,2	213,1	–	147	164	213	–	3
130	1,5	2	–	146	161,1	167,2	–	146	161	167	1,5
	2	5,5	–	148,6	175,5	184,4	–	148,5	175,5	184	2
	3	5	–	162,3	197	207,8	–	162	197	207,5	3
	4	5	157,9	176	227,9	–	157,5	176	227,5	–	4
140	1,5	2	–	157	174	180	–	157	174	180	1,5
	2	5,5	–	162,2	189,5	198,4	–	162	189,5	198	2
	3	5	–	173,9	211,1	222,6	–	173,5	211	222,5	3
	4	7	168,4	187,8	243,4	–	168	187,5	243	–	4
150	2	2,5	–	169	189,6	196,8	–	169	189,5	196,5	2
	2,1	7	–	170	198	207,5	–	170	198	207	2,1
	3	6	–	185,5	225,2	237,4	–	185,5	225	237	3
	4	7	182,5	203,3	263,5	–	182	203	263,5	–	4
160	2	2,5	–	179,7	200,5	207,6	–	179,5	200,5	207,5	2
	2,1	7	–	184,8	215,8	225,5	–	184,5	215,5	225	2,1
	3	6	–	208,7	253,4	267,1	–	208,5	253	267	3
	4	7	196,4	219	284,4	–	196	219	284	–	4
170	2	2,5	–	190,6	211,3	218,5	–	190,5	211	218	2
	2,1	7	–	198,1	232,7	243,6	–	198	232,5	243,5	2,1
	4	7	–	220,3	267,4	281,9	–	220	267	281,5	4
	4	7	203,6	226,6	295	–	203,5	226,5	295	–	4
180	2	2,5	–	200,7	224	231,9	–	200,5	224	231,5	2
	2,1	7	–	212,2	249,4	261	–	212	249	261	2,1
	4	7	–	232,4	279,5	294	–	232	279,5	294	4
	4	7	221,6	245	312,9	–	221,5	245	312,5	–	4
190	2	2	–	211,5	238,5	244,2	–	211,5	238,5	244	2
	2,1	9	–	221,8	259	270,6	–	221,5	259	270,5	2,1
	4	9	–	243,5	295,5	311,5	–	243,5	295,5	311,5	4
	5	7	224,4	250	326,8	–	224	250	326,5	–	5

Single row full complement cylindrical roller bearings

Semi-locating bearings



SL1818, SL1829, SL1830, SL1822

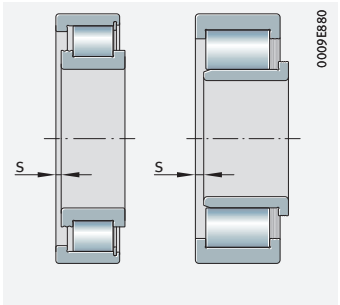


SL1923

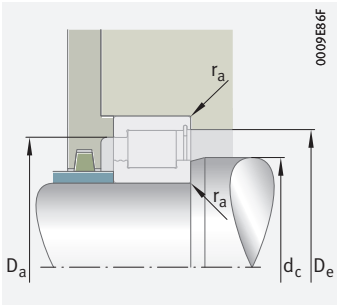
d = 200 – 360 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*512|3.12* ➤*512|3.13* X-life ➤*504*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
200	250	24	178 000	320 000	34 000	1 420	1 040	2,57	**SL181840**
	280	48	610 000	940 000	142 000	1 320	950	9,1	**SL182940-XL**
	310	82	950 000	1 510 000	187 000	1 230	890	21,8	**SL183040**
	360	98	1 410 000	2 010 000	245 000	1 150	770	43,12	**SL182240**
	420	138	2 470 000	3 300 000	350 000	1 020	570	92,1	**SL192340-TB-BR**
220	270	24	187 000	350 000	36 500	1 290	940	2,8	**SL181844**
	300	48	650 000	1 030 000	152 000	1 210	840	9,9	**SL182944-XL**
	340	90	1 150 000	1 820 000	219 000	1 140	800	28,4	**SL183044**
	460	145	2 650 000	3 450 000	360 000	910	520	111,2	**SL192344-TB-BR**
240	300	28	265 000	490 000	55 000	1 160	870	4,29	**SL181848-E**
	320	48	600 000	1 120 000	132 000	1 120	750	10,6	**SL182948**
	360	92	1 210 000	1 990 000	234 000	1 040	720	30,9	**SL183048**
	500	155	2 900 000	3 800 000	390 000	860	500	142,3	**SL192348-TB-BR**
260	320	28	275 000	530 000	58 000	1 080	790	4,61	**SL181852-E**
	360	60	780 000	1 450 000	168 000	1 020	690	18,5	**SL182952**
	400	104	1 600 000	2 500 000	290 000	940	620	44,5	**SL183052-TB**
	540	165	3 550 000	4 700 000	465 000	760	410	173,2	**SL192352-TB-BR**
280	350	33	355 000	670 000	74 000	990	730	6,89	**SL181856-E**
	380	60	910 000	1 710 000	193 000	940	590	19,7	**SL182956-TB**
	420	106	1 650 000	2 650 000	300 000	900	590	48	**SL183056-TB**
300	380	38	455 000	840 000	91 000	920	680	9,79	**SL181860-E**
	420	72	1 170 000	2 200 000	246 000	870	540	31,2	**SL182960-TB**
	460	118	2 020 000	3 300 000	335 000	800	500	66,6	**SL183060-TB**
320	400	38	470 000	900 000	96 000	870	620	10,36	**SL181864-E**
	440	72	1 210 000	2 340 000	260 000	820	495	32,9	**SL182964-TB**
	480	121	2 080 000	3 450 000	350 000	770	480	71,7	**SL183064-TB**
340	420	38	485 000	960 000	100 000	810	570	10,93	**SL181868-E**
	460	72	1 250 000	2 470 000	270 000	770	460	34,7	**SL182968-TB**
	520	133	2 490 000	4 150 000	405 000	710	430	95,8	**SL183068-TB**
360	440	38	500 000	1 010 000	104 000	770	530	11,49	**SL181872-E**
	480	72	1 280 000	2 600 000	280 000	730	430	36,4	**SL182972-TB**
	540	134	2 550 000	4 350 000	420 000	680	405	101	**SL183072-TB**

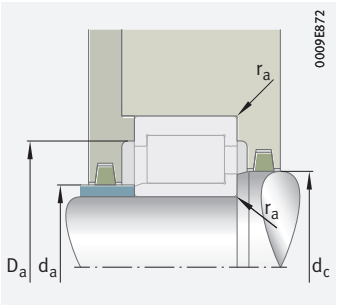
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Axial displacement "s"



Mounting dimensions for SL1818, SL1829, SL1830, SL1822

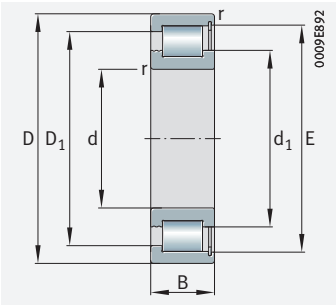


Mounting dimensions for SL1923

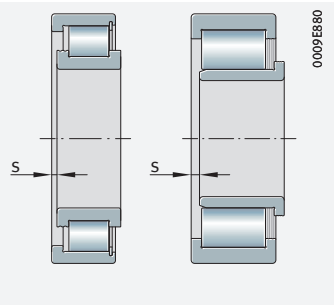
Dimensions							Mounting dimensions				
d	r min.	s	F	d_1 ≈	D_1 ≈	E	d_a	d_c	D_a	D_e	r_a max.
200	1,5	2	–	216,6	231,6	237,6	–	216,5	231,5	237,5	1,5
	2,1	3	–	225,5	252,4	261,6	–	225,5	252	261,5	2,1
	2,1	9	–	236,6	276,2	288,6	–	236,5	276	288,5	2,1
	4	9	–	246,6	302,4	319,4	–	246,5	302	319	4
	5	7	238,5	265,7	347,2	–	238	265,5	347	–	5
220	1,5	2	–	237,3	252,3	258,5	–	237	252	258,5	1,5
	2,1	3	–	246,3	273,2	282,5	–	246	273	282	2,1
	3	9	–	254,6	299,2	312	–	254,5	299	312	3
	5	7	266,7	297	388,3	–	266,5	297	388	–	5
240	2	2	–	260,5	281	287,5	–	260,5	281	287,5	2
	2,1	3	–	267,5	294,4	303,7	–	267,5	294	303,5	2,1
	3	11	–	277,5	322,1	336	–	277,5	322	336	3
	5	10	280,6	312,5	408,5	–	280,5	312,5	408,5	–	5
260	2	2	–	281	301,5	308	–	281	301,5	308	2
	2,1	5	–	291,5	323,4	333,7	–	291,5	323	333,5	2,1
	4	11	–	304	358,4	376	–	304	358	375,5	4
	6	10	315,6	351,6	459,6	–	315,5	351,5	459,5	–	6
280	2	2,5	–	304	327	335	–	304	327	335	2
	2,1	3,5	–	314	348,5	359,5	–	314	348,5	359,5	2,1
	4	11	–	319,5	372,9	390,3	–	319,5	372,5	390	4
300	2,1	3	–	323,5	350,5	360	–	323,5	350,5	360	2,1
	3	5	–	338	376,9	389,5	–	338	376,5	389	3
	4	14	–	353,6	415,6	434,9	–	353,5	415,5	434,5	4
320	2,1	3	–	344,5	371,5	381	–	344,5	371,5	381	2,1
	3	5	–	358,5	397,4	409,9	–	358,5	397	409,5	3
	4	14	–	369,5	430,1	449,5	–	369,5	430	449,5	4
340	2,1	3	–	365,5	392,5	402,2	–	365,5	392,5	402	2,1
	3	5	–	379	418,7	430,2	–	379	418,5	430	3
	5	16	–	396,1	463,9	485,7	–	396	463,5	485,5	5
360	2,1	3	–	387	413,5	423,5	–	387	413,5	423,5	2,1
	3	5	–	399,5	438,6	450,6	–	399,5	438,5	450,5	3
	5	16	–	414	481,6	503,5	–	414	481,5	503	5

Single row full complement cylindrical roller bearings

Semi-locating bearings



SL1818, SL1829, SL1830

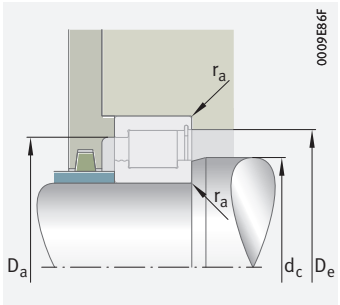


Axial displacement “s”

d = 380 – 500 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*512|3.12* ➤*512|3.13*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
380	480	46	650 000	1 290 000	133 000	710	490	18,87	**SL181876-E**
	520	82	1 660 000	3 300 000	345 000	680	380	52,1	**SL182976-TB**
	560	135	2 600 000	4 450 000	430 000	660	390	106	**SL183076-TB**
400	500	46	660 000	1 340 000	137 000	680	470	19,81	**SL181880-E**
	540	82	1 710 000	3 500 000	360 000	650	350	54,3	**SL182980-TB**
	600	148	3 050 000	5 400 000	520 000	610	345	140	**SL183080-TB**
420	520	46	680 000	1 420 000	143 000	650	430	20,6	**SL181884-E**
	560	82	1 730 000	3 600 000	370 000	630	340	56,9	**SL182984-TB**
440	540	46	700 000	1 470 000	147 000	620	415	21,54	**SL181888-E**
	600	95	2 090 000	4 100 000	420 000	590	325	78,1	**SL182988-TB**
460	580	56	940 000	1 890 000	189 000	580	385	33,21	**SL181892-E-TB**
	620	95	2 130 000	4 250 000	430 000	570	310	81,1	**SL182992-TB**
480	600	56	960 000	1 970 000	195 000	560	365	34,53	**SL181896-E-TB**
	650	100	2 390 000	4 800 000	480 000	530	280	94,7	**SL182996-TB**
500	620	56	980 000	2 050 000	200 000	540	345	35,73	**SL1818/500-E-TB**
	670	100	2 430 000	4 950 000	490 000	520	270	98,3	**SL1829/500-TB**

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Mounting dimensions
for SL1818, SL1829, SL1830

Dimensions						Mounting dimensions				
d	r min.	s	d_1 ≈	D_1 ≈	E	d_a	d_c	D_a	D_e	r_a max.
380	2,1	4	415,5	448	459	–	415,5	448	459	2,1
	4	5	426	472,1	486,7	–	426	472	486,5	4
	5	16	431,7	499,5	521,3	–	431,5	499,5	521	5
400	2,1	4	432	464,5	475,5	–	432	464,5	475,5	2,1
	4	5	450	496,1	510,9	–	450	496	510,5	4
	5	18	462,5	535,1	558,5	–	462,5	535	558,5	5
420	2,1	4	457	489,5	500	–	457	489,5	500	2,1
	4	5	462	509	523	–	462	509	522,5	4
440	2,1	4	473,5	506	517	–	473,5	506	517	2,1
	4	7	490	544,6	562	–	490	544,5	562	4
460	3	5	501,5	540	554	–	501,5	540	554	3
	4	7	504	559,6	576,3	–	504	559,5	576	4
480	3	5	522	560	574,5	–	522	560	574,5	3
	5	7	538	596,6	614,8	–	538	596,5	614,5	5
500	3	5	542	580,5	594,5	–	542	580,5	594,5	3
	5	7	553	612,7	630	–	553	612,5	630	5

4 Double row full complement cylindrical roller bearings

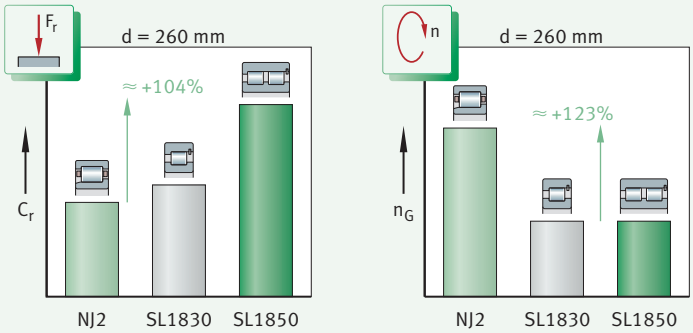
Double row full complement cylindrical roller bearings are suitable where:

- bearing arrangements are subjected to particularly high radial loads ➤*532*|*4.2*
- not only particularly high radial forces but also high axial loads from one or both directions must be supported by the bearing position (semi-locating or locating bearing function) ➤*532*|*4.2*
- bearing arrangements must have very high rigidity
- Axial displacements of the shaft relative to the housing must be aompensated without constraint in the bearing (in the case of bearings with a non-locating or semi-locating bearing function) ➤*528*|*4.1*
- very high radial loads occur at lower speeds, i. e. the bearings do not need to achieve speeds as high as those of cylindrical roller bearings with cage ➤*535*|*4.6* and ➤*548*|▦
- space-saving designs are required despite very high load
- the bearings should be separable for easier mounting (bearings with non-locating bearing function) ➤*528*|*4.1* and ➤*546*|*4.17*

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*414*.

1
Cylindrical roller bearing with cage/single row full complement bearing, double row full complement bearing, comparison of speed and load carrying capacity

C_r = *basic dynamic load rating*
n_G = *limiting speed*



4.1 Bearing design

✎ *Design variants*

The standard range of double row full complement cylindrical roller bearings comprises:

- series SL0248 and SL0249 (non-locating bearings) ➤*529*|*2*
- series SL1850 (semi-locating bearings) ➤*530*|*3*
- series SL0148 and SL0149 (locating bearings) ➤*530*|*4*
- series SL0450 and SL04 (cylindrical roller bearings with annular slots – rope sheave bearings) ➤*531*|*5*
- X-life bearings ➤*531*

In addition to the bearings described here, Schaeffler supplies double row full complement cylindrical roller bearings in other types, series and dimensions. These products are described in some cases in special publications. If necessary, please contact Schaeffler. Larger catalogue bearings GL 1.

Bearings of basic design – standard range

Key features

Double row full complement cylindrical roller bearings are part of the group of radial roller bearings. These bearings comprise solid outer rings, inner rings and full complement rolling element sets. Due to the absence of a cage, the bearing can accommodate the largest possible number of rolling elements. The rollers have profiled ends, i.e. they have a slight lateral curvature towards the ends. This modified line contact between the rolling elements and raceways prevents damaging edge stresses ➤417|2. Bearings in the standard range differ essentially in the arrangement of the ribs on the inner ring and outer ring. Depending on the design, they are used as non-locating bearings, semi-locating bearings or locating bearings.

Series SL0248, SL0249

Bearings with non-locating bearing function

In bearings of these series, the inner ring has three rigid ribs, while the outer ring is without ribs ➤529|2.
As a result, axial displacements of the shaft relative to the housing can be compensated within certain limits. During rotational motion, length compensation occurs without constraint in the bearing between the rollers and the raceway without ribs and is therefore practically free from friction. The maximum axial displacement s is given in the product tables. The bearings are used as non-locating bearings, i.e. they cannot guide the shaft axially in either direction ➤532|4.2.

According to DIN 5412-9:1982, which has now been withdrawn, the bearings have the following designation:

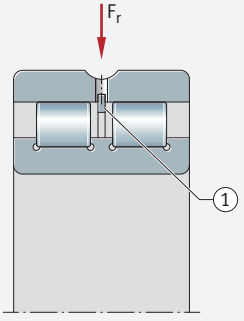
- SL0248: NNCL48..V
- SL0249: NNCL49..V

The bearings are held together in handling and mounting by a transport and mounting retaining device on the outer ring ➤529|2.
This retaining device remains in the bearing even after mounting and must not be subjected to axial load.

2
Double row full complement cylindrical roller bearing – non-locating bearing

F_r = *radial load*

① *Transport and mounting retaining device*



0009EC25

Series SL1850

Bearings with semi-locating bearing function

Bearings of series SL1850 (dimension series 50) have three rigid ribs on the inner ring and one rigid rib on the outer ring ➤530|3. In these cylindrical roller bearings, axial displacements of the shaft relative to the housing are possible in one direction only. The maximum axial displacement s is given in the product tables ➤548|▦. The bearings are used as semi-locating bearings, i.e. they can guide the shaft axially in one direction ➤532|4.2.

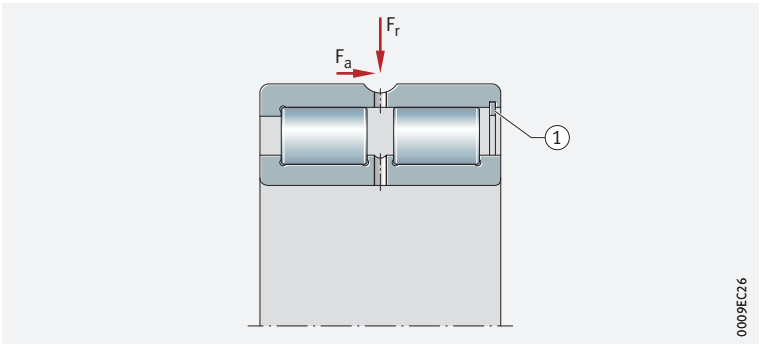
The bearings are held together in handling and mounting by a transport and mounting retaining device on the outer ring ➤530|3.

This retaining device remains in the bearing even after mounting and must not be subjected to axial load.

3
Double row full complement cylindrical roller bearing – semi-locating bearing

F_r = *radial load*
F_a = *axial load*

① *Transport and mounting retaining device*



Series SL0148, SL0149

Bearings with locating bearing function

In these bearings, the inner ring has three rigid ribs and the outer ring has two rigid ribs ➤*530*|*4*. Axial displacements between the shaft and housing are not possible. The bearings are used as locating bearings, i.e. they can guide the shaft axially in both directions ➤*532*|*4.2*.

According to DIN 5412-9:1982, which has now been withdrawn, the bearings have the following designation:

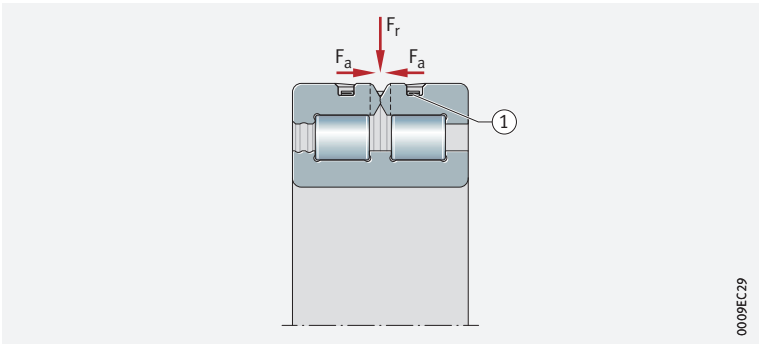
- SL0148: NNC48..V
- SL0149: NNC49..V

The split outer ring is held together by a transport and mounting retaining device ➤*530*|*4*. This retaining device remains in the bearing even after mounting and must not be subjected to axial load.

4
Double row full complement cylindrical roller bearing – locating bearing

F_r = *radial load*
F_a = *axial load*

① *Retaining ring*



Series SL0450..-PP and SL04..-PP – cylindrical roller bearings with annular slots

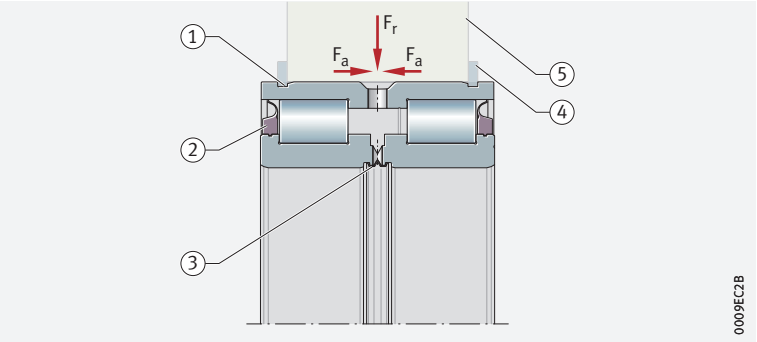
Bearings with locating bearing function, particularly suitable for the support of rope sheaves

These bearings comprise solid outer rings with central rib, inner rings with three ribs, rib-guided rolling element sets and sealing rings ➤*531*|*5*. The outer rings have annular slots for retaining rings. The inner rings are axially split, 1 mm wider than the outer rings and held together by a sheet metal ring. They are used as locating bearings (but can support only slight axial loads) and are used in preference for the support of rope sheaves.

Light series and dimension series 50

Cylindrical roller bearings with annular slots are available as a light series SL04..-PP and in the dimension series 50 as SL0450..-PP. The latter has a higher load carrying capacity than the light series ➤*556*|▦.

Extensive information on rope sheave bearing arrangements is given in the Technical Product Information TPI 237. This publication can be requested from Schaeffler.



5 *Double row full complement cylindrical roller bearing with annular slots – locating bearing*

F_r = *radial load*
F_a = *axial load*

① *Slots in outer ring*
② *Sealing rings*
③ *Sheet metal ring*
④ *Retaining rings*
⑤ *Rope sheave*

X-life premium quality

Double row full complement cylindrical roller bearings of series SL1850 are available in many sizes as X-life bearings ➤*548*|▦. These bearings exhibit considerably higher performance than comparable standard cylindrical roller bearings. This is achieved, for example, through the modified internal construction, the optimised contact geometry between the rollers and raceways, the better surface quality and the optimised roller guidance and lubricant film formation.

Advantages

Increased customer benefits due to X-life

These technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings
- a higher fatigue limit load
- lower heat generation in the bearing
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements

Interchangeable with comparable standard bearings

Since X-life cylindrical roller bearings have the same dimensions as the corresponding standard bearings, the latter can be replaced without any problems by the higher-performance X-life bearings. The major advantages of X-life can therefore also be used for existing bearing arrangements with standard bearings.

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life cylindrical roller bearings include the suffix XL in the designation ➤*539*|*4.12* and ➤*548*|▦.

Areas of application

Due to their special technical features, double row full complement X-life cylindrical roller bearings are highly suitable, for example, for bearing arrangements in:

- heavy industry (steel production)
- power transmission (gearbox engineering)
- processing machines and construction machinery
- wind turbines (gearbox applications)

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

4.2 Load carrying capacity

Designed for very high radial loads

Depending on the type, double row full complement cylindrical roller bearings can support not only very high radial forces but also high axial loads on one or both sides:

- The series SL0248 and SL0249 must only be subjected to radial load
- The series SL1850 can support radial loads as well as axial loads on one side
- The series SL0148 and SL0149 can support radial loads as well as axial loads on both sides
- The series SL0450..-PP and SL04..50-PP can support radial loads and are suitable for the support of slight axial loads from both directions

Higher axial load carrying capacity of bearings with toroidal crowned roller end face

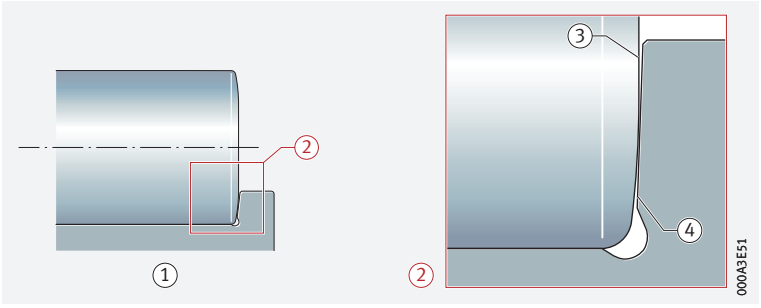
Neither wear nor material fatigue occurs on the rib contact running and roller end faces

In the case of cylindrical roller bearings with toroidal crowned rollers (TB design), the axial load carrying capacity has been significantly improved with the aid of new calculation and manufacturing methods. A special curvature of the roller end faces facilitates optimum contact conditions between the rollers and ribs ➤532| 6. As a result, the axial contact pressures on the rib are significantly minimised and a lubricant film capable of supporting higher loads is formed. Under standard operating conditions, this completely eliminates wear and fatigue at the rib contact running and roller end faces. In addition, the axial frictional torque is reduced by up to 50%. The bearing temperature during operation is therefore significantly lower. Bearings of toroidal crowned design ➤548|.

By agreement, bearings of series SL1850 are available starting from a bore diameter d = 180 mm in the TB design.

6
Contact geometry of roller end face/rib face – modified roller end faces

① *Cylindrical roller with inner ring*
② *Detail (representation not to scale)*
③ *End of roller*
④ *Rib*



Load ratio F_a/F_r

Ratio $F_a/F_r \leqq 0,4$ or 0,6

The bearings can support axial loads on one side by means of the ribs on the inner and outer ring. In order to ensure problem-free running (tilting of the rollers is prevented), they must always be subjected to radial load at the same time as axial load. The ratio F_a/F_r must not exceed the value 0,4. For bearings with toroidal crowned roller ends (TB design), values up to 0,6 are permissible.

The load F_r describes the radial load for a single row bearing. For multi-row bearings, F_r must be divided by the number of rows.

Continuous axial loading without simultaneous radial loading is not permissible.

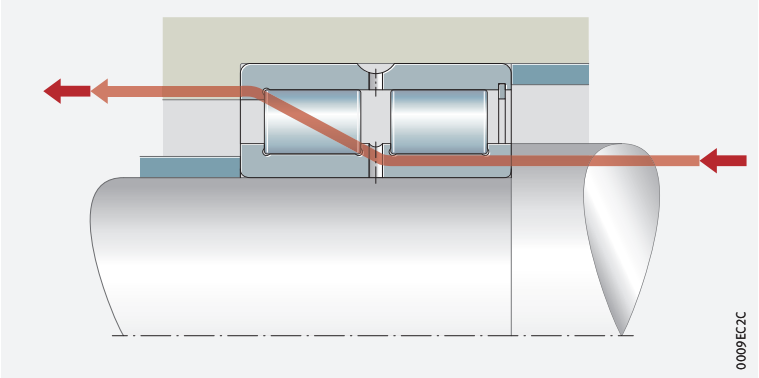
Permissible axial load

Influencing factors on the axial load carrying capacity

Axial loads are supported by the bearing ribs and the roller end faces ➤*533*| *7*. The axial load carrying capacity of the bearing is therefore essentially dependent on:

- the size of the sliding surfaces between the ribs and the end faces of the rolling elements
- the sliding velocity at the ribs
- the lubrication of the contact surfaces
- tilting of the bearing
- friction

7
Force flow under axial load – semi-locating bearing SL1850



Calculation of permissible axial load – cylindrical rollers with conventional roller ends

Bearings with standard roller ends

The permissible axial load $F_{a\,per}$ can be calculated from the hydrodynamic load carrying capacity of the contact ➤*533*| *1*.

1
Permissible axial load – bearings of standard design

$$F_{a\,per} = k_S \cdot k_B \cdot d_M^{\,1,54} \cdot n^{-0,6} \leqq F_{a\,max}$$

Legend

$F_{a\,per}$	N	Permissible continuous axial load. In order to prevent unacceptably high temperatures in the bearing, $F_{a\,per}$ must not be exceeded
$F_{a\,max}$	N	Maximum continuous axial load in relation to rib fracture. In order to prevent unacceptably high pressures at the contact surfaces, $F_{a\,max}$ must not be exceeded
k_S	–	Factor as a function of lubrication method ➤*534*| *1*. The factor takes into consideration the lubrication method used for the bearing. The better the lubrication and, in particular, the heat dissipation, the higher the permissible axial load
k_B	–	Factor as a function of bearing series ➤*534*| *2*
d_M	mm	Mean bearing diameter $d_M = (D + d)/2$ ➤*548*
n	min^{-1}	Operating speed.

1 *Factor k_S*

Lubrication method	Factor k_S	
	from	up to
Standard greasing, no heat dissipation by the lubricant	1,5	3
Minimal heat dissipation, drip feed oil lubrication, oil mist lubrication, low operating viscosity ($\nu < 0,5 \cdot \nu_1$)	7,5	10
Poor heat dissipation, oil sump lubrication, oil spray lubrication, low oil flow	10	15
Good heat dissipation, recirculating oil lubrication (pressurised oil lubrication)	12	18
Very good heat dissipation, recirculating oil lubrication with oil cooling, high operating viscosity ($\nu > 2 \cdot \nu_1$)	16	24

The precondition for these k_S values is an operating viscosity of the lubricant of at least the reference viscosity ν_1 in accordance with DIN ISO 281:2010.

Doped lubricating oils should be used, such as CLP (DIN 51517) and HLP (DIN 51524) of ISO VG grades 32 to 460, as well as ATF oils (DIN 51502) and transmission oils (DIN 51512) of SAE viscosity grades 75W to 140W.

2 *Bearing factor k_B*

Series	k_B
SL0148	4,5
SL0149	11
SL1850	17
SL0450	17
SL04	10

Calculation of permissible axial load – cylindrical rollers with toroidal roller ends

For bearings with toroidal roller ends, the permissible axial loads are 50% higher ➤*534* | *f 2*.

f 2 *Permissible axial load – bearings of TB design*

$$F_{a\,per} = 1{,}5 \cdot k_S \cdot k_B \cdot d_M^{\,1{,}54} \cdot n^{-0{,}6} \leqq F_{a\,max}$$

Calculation of maximum permissible axial load

For bearings with rollers of the standard or TB design, the maximum permissible axial load $F_{a\,max}$ ➤*534* | *f 3* is calculated from the rib strength and the security against wear. This must not be exceeded, even if $F_{a\,per}$ gives higher values ➤*534* | *f 4*.

f 3 *Maximum axial load – bearings of standard and TB design*

$$F_{a\,max} = 0{,}075 \cdot k_B \cdot d_M^{\,2{,}1}$$

f 4 *Permissible axial load*

$$F_{a\,per} \leqq F_{a\,max}$$

Axial load carrying capacity of cylindrical roller bearings with annular slots (rope sheave bearings)

For cylindrical roller bearings with annular slots in the outer ring, the calculations of $F_{a\,per}$ and $F_{a\,max}$ cannot be used. For the axial load carrying capacity of these bearings, please consult Schaeffler.

4.3 Compensation of angular misalignments

The bearings do not permit any misalignments between the inner and outer ring, i. e. the bearing positions must be well aligned.

4.4 Lubrication

Oil or grease lubrication is possible

The cylindrical roller bearings are not greased. They must be lubricated with oil or grease. The bearings can be lubricated via the end faces of the outer ring as well as via a lubrication groove and lubrication holes in the outer ring.

Cylindrical roller bearings with annular slots (rope sheave bearings)

The bearings have an initial greasing

These bearings are supplied greased and can be relubricated via the outer ring or inner ring. The grease used is a lithium complex soap grease to GA08. Arcanol LOAD150 ➤*70* is suitable for relubrication. The greases named are highly suitable, due to their good moisture resistance and high load carrying capacity, for applications in rope sheaves at low to moderate speeds.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

4.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed, i. e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

Cylindrical roller bearings with annular slots (rope sheave bearings)

The bearings are sealed on both sides

In the case of these bearings, the rolling element system is protected against contamination and moisture by polyurethane sealing rings on both sides of the bearing. The seals have low friction and are particularly resistant to climate and temperature. Where environmental conditions are particularly critical, sealing of the bearings can be improved further by means of additional seals, such as V rings, in the adjacent construction.

4.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Lower speed capacity than bearings with cage

Due to the kinematic conditions, full complement cylindrical roller bearings do not achieve the high speeds that are possible when using cylindrical roller bearings with cage.

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

Bearings with solid brass cages have a significantly higher limiting speed for oil lubrication.

Values for grease lubrication

For the grease lubrication of bearings without seals or shields, 85% of the value stated in the product tables is permissible in each case.

For the grease lubrication of bearings with solid brass cages, 65% of the value stated in the product tables is permissible in each case.

Reference speeds

✎ *$n_{\vartheta r}$ is used to calculate n_{ϑ}*

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_{ϑ} ➤64.

✎ *Bearings with contact seals*

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

4.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

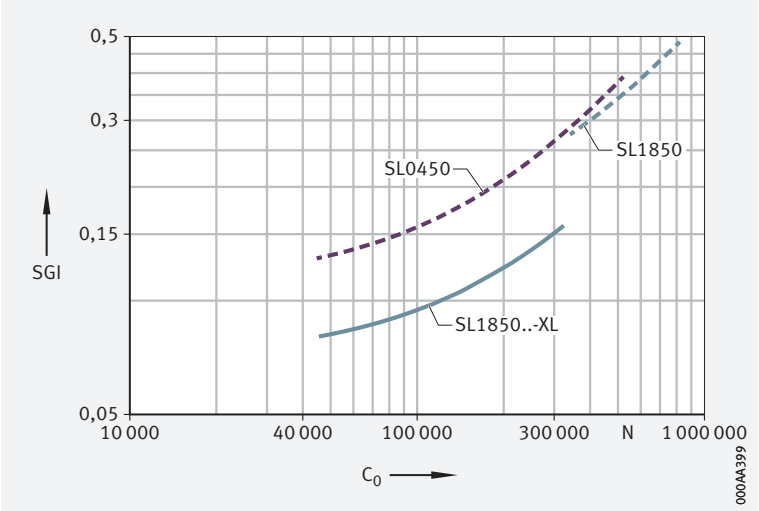
The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:

- ***medias*** *https://medias.schaeffler.com*

8
Schaeffler Noise Index for double row full complement cylindrical roller bearings

SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



4.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and cylindrical rollers
- the lubricant
- the seals

Possible operating temperatures of double row cylindrical roller bearings ➤ *537* | ▦ *3*.

▦ *3*
Permissible temperature ranges

Operating temperature	Open full complement bearings	Rope sheave bearings
	–30 °C to +120 °C	–20 °C to +80 °C, limited by the lubricant, cage material and seal material –40 °C to +80 °C with greasing by means of GA22

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

4.9 Cages

Full complement cylindrical roller bearings do not have a cage for guidance and separation of the rolling elements. The cylindrical rollers are guided by the ribs on the bearing rings.

4.10 Internal clearance

Radial internal clearance

The standard is CN

Double row full complement cylindrical roller bearings are manufactured as standard with the radial internal clearance CN (normal) ➤*538*|▦*4*. CN is not stated in the designation.

Certain sizes are also available by agreement with the larger internal clearance C3, C4 and C5 ➤*538*|▦*4*.

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤*538*|▦*4*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦*4* *Radial internal clearance of double row full complement cylindrical roller bearings*

Nominal bore diameter d mm		Radial internal clearance							
		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm		C5 (Group 5) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	20	45	35	60	50	75	65	90
24	30	20	45	35	60	50	75	70	95
30	40	25	50	45	70	60	85	80	105
40	50	30	60	50	80	70	100	95	125
50	65	40	70	60	90	80	110	110	140
65	80	40	75	65	100	90	125	130	165
80	100	50	85	75	110	105	140	155	190
100	120	50	90	85	125	125	165	180	220
120	140	60	105	100	145	145	190	200	245
140	160	70	120	115	165	165	215	225	275
160	180	75	125	120	170	170	220	250	300
180	200	90	145	140	195	195	250	275	330
200	225	105	165	160	220	220	280	305	365
225	250	110	175	170	235	235	300	330	395
250	280	125	195	190	260	260	330	370	440
280	315	130	205	200	275	275	350	410	485
315	355	145	225	225	305	305	385	455	535
355	400	190	280	280	370	370	460	510	600

Radial internal clearance of cylindrical roller bearings with annular slots (rope sheave bearings)

The correct radial internal clearance is of decisive importance for the correct function of rope sheaves. The radial internal clearance group is dependent on the material of the rope sheave ➤*538*|▦*5*.

▦*5* *Radial internal clearance of cylindrical roller bearings with annular slots for the support of rope sheaves as a function of the material of adjacent parts – recommendation*

Nominal bore diameter d mm		Material of rope sheave	
		Steel	Plastic
		Internal clearance group of bearing	
over	incl.		
–	85	CN or C3	C5
85	300	C3	

4.11 Dimensions, tolerances

Dimension standards

The main dimensions of cylindrical roller bearings correspond to ISO 15:2017 (DIN 616:2000).

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤137|7.11. Nominal value of chamfer dimension ➤548|.

Tolerances

The dimensional and running tolerances of the cylindrical roller bearings correspond to the tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤124|8.

4.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

6 *Suffixes and corresponding descriptions, double row full complement cylindrical roller bearings*

Suffix	Description of suffix	
BR	Black oxide coated	Available by agreement
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
C5	Radial internal clearance C5 (larger than C4)	
TB	Bearing with increased axial load carrying capacity	Standard, dependent on bore code and bearing series
XL	X-life bearing	

7 *Suffixes and corresponding descriptions, cylindrical roller bearings with annular slots (rope sheave bearings)*

Suffix	Description of suffix	
C3	Radial internal clearance C3 (larger than normal)	Special design, available by agreement
C4	Radial internal clearance C4 (larger than C3)	
C5	Radial internal clearance C5 (larger than C4)	
D	Improved outer ring profile, with an enlarged load-bearing area and optimised edge transitions	Standard
GA22	Bearing greased with lithium soap grease GA22 for expanded temperature range	Special design, available by agreement
P	Contact seal on one side	
PP	Contact seal on both sides	Standard
RR	Corrosion-resistant design, with Corrotect coating	Special design, available by agreement
2NR	Supplied with two loose-packed retaining rings WRE	
2WR	Supplied with two loose-packed retaining rings WR	
–	Without seals	

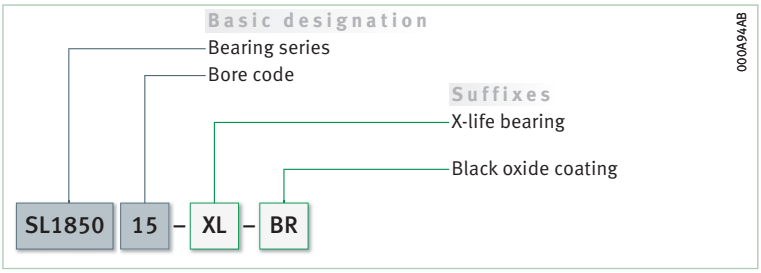
4.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

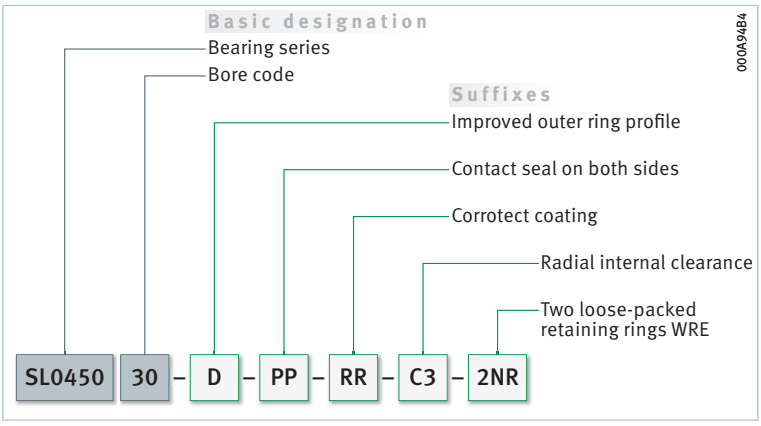
✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples are shown in ➤ *540* | *9* and ➤ *540* | *10*. The composition of designations is subject to DIN 623-1 ➤ *102* | *10*.

9
Double row full complement cylindrical roller bearing (semi-locating bearing): designation structure



10
Double row full complement cylindrical roller bearing (rope sheave bearing): designation structure



4.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

Bearings with non-locating bearing function and cylindrical roller bearings with annular slots (rope sheave bearings)

✎ *$P = F_r$*

Non-locating bearings can only support radial loads, rope sheave bearings only have a small axial load carrying capacity. For these bearings ➤ *540* | *5*.

5
Equivalent dynamic load

$$P = F_r$$

Cylindrical roller bearings with semi-locating and locating bearing function

✎ *P is a substitute force for combined load and various load cases*

If the condition described above is not met, i. e. if, in addition to the radial force F_r, there is also an axial force F_a, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ $F_a/F_r \leqq e$ or $F_a/F_r > e$

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factors e and Y ➤ *541* | *f 6* and ➤ *541* | *f 7*.

f 6
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r$$

f 7
Equivalent dynamic load

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}92 \cdot F_r + Y \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load
e, Y	–	Factors ➤ *541*	▦ *8*.

▦ *8*
Factors e and Y

Bearing series	Calculation factors	
	e	Y
SL1850	0,2	0,6
SL0148, SL0149	0,24	0,5

Equivalent static bearing load

✎ $P_0 \geqq F_{0r}$

For cylindrical roller bearings subjected to static load ➤ *541* | *f 8*.

f 8
Equivalent static load

$$P_0 = F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}	N	Largest radial load present (maximum load).

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤ *541* | *f 9*.

f 9
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

4.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is necessary during continuous operation*

In order that no slippage occurs between the contact partners, the cylindrical roller bearings must be constantly subjected to a sufficiently high radial load. For continuous operation, experience shows that a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

4.16 Design of bearing arrangements

✎ Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤ *544* | ▦ *9* to ➤ *545* | ▦ *12*.

Radial location

✎ For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤ *152* | ▦ *6* and ➤ *160* | ▦ *7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤ *146*
- conditions of rotation ➤ *147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤ *149* | ▦ *2*
- shaft fits ➤ *152* | ▦ *6*
- tolerance classes for bearing seats in housings (radial bearings) ➤ *150* | ▦ *4*
- housing fits ➤ *160* | ▦ *7*

Radial location of cylindrical roller bearings with annular slots (rope sheave bearings)

The outer ring must have an interference fit to achieve rigid seating

The axial loads occurring cannot be securely transmitted by the retaining rings. Transmission of the loads is only possible if sufficient joint pressure is present. Due to the operating conditions present in rope sheave bearing arrangements, an interference fit between the outer ring and rope sheave is absolutely critical in order to achieve correct bearing function and load transmission. The joint pressure must be between $p_{min} = 2$ N/mm^2 and $p_{max} = 25$ N/mm^2. The internal clearance has a considerable influence on bearing function ➤*538*| 5.

Axial location

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings, retaining rings, adapter and withdrawal sleeves etc., are fundamentally suitable; example ➤*546*| 12.

Axial location of cylindrical roller bearings with annular slots (rope sheave bearings)

Axial location is carried out by means of retaining rings

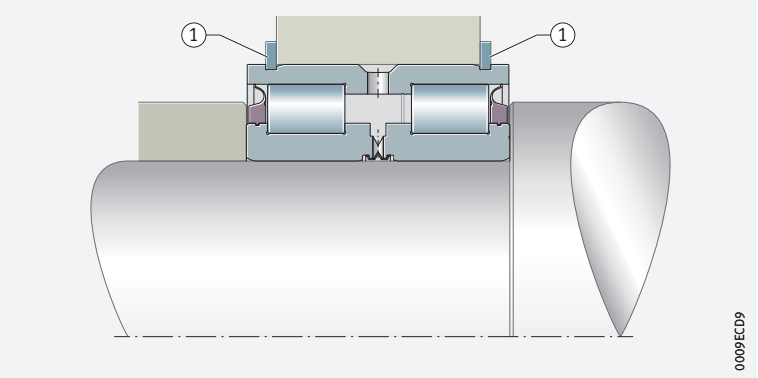
The annular slots allow axial location of the outer rings using retaining rings ➤*544*| 11. Suitable fasteners are WRE rings or rings in accordance with DIN 471. Locating rings are not included in the scope of delivery. The design 2NR is supplied with two retaining rings WRE packed loose. The split inner ring must be axially secured ➤*544*| 11.
The fasteners must not be subjected to axial load.

Arrangement of several rope sheaves adjacent to each other

If housing tolerances are present or several rope sheaves are arranged adjacent to each other, axial clearance may occur between the inner rings. This must always be prevented by means of design measures. For example, shims are suitable for this purpose.

11
Cylindrical roller bearing with annular slots (rope sheave bearing) – location of outer ring, support of ribs

① *Retaining ring*



Dimensional, geometrical and running accuracy of cylindrical bearing seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For cylindrical roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of the bearing seating surfaces ➤*544* | ▦ *9*. Tolerances t_1 to t_3 in accordance with ➤*170* | ⧉ *11*. Numerical values for IT grades ➤*544* | ▦ *10*.

9
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	

10
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm							
	over **18**	**30**	**50**	**80**	**120**	**180**	**250**	**315**
	incl. **30**	**50**	**80**	**120**	**180**	**250**	**315**	**400**
	Values in µm							
IT4	6	7	8	10	12	14	16	18
IT5	9	11	13	15	18	20	23	25
IT6	13	16	19	22	25	29	32	36
IT7	21	25	30	35	40	46	52	57

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*545*|▦ *11*.

▦ 11
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Bearing seat design (roughness) for cylindrical roller bearings with annular slots (rope sheave bearings)

Recommended roughness values for bearing seating surfaces ➤*545*|▦ *12*.

▦ 12
Roughness for bearing seating surfaces on the shaft and in the housing bore for cylindrical roller bearings with annular slots – recommendation

Nominal diameter of bearing seat d (D) mm		Roughness	
over	incl.	Shaft	Housing bore
20	300	Rz 4	Rz 16

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5418:1993 or an undercut to DIN 509:2006. Proven mounting dimensions for the radii and diameters of abutment shoulders are given in the product tables ➤*548*|▦. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Rib support in axially loaded bearings

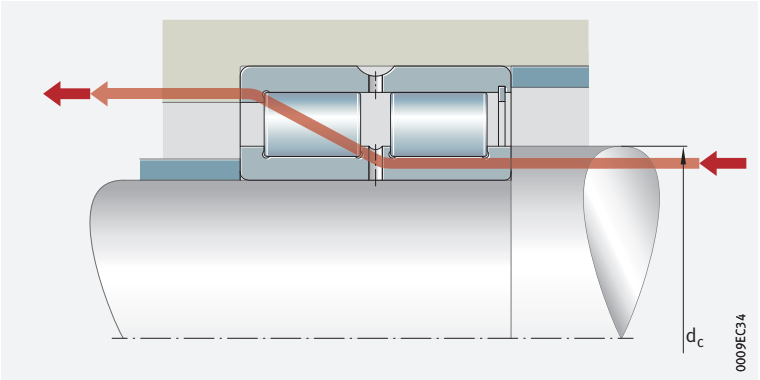
Ribs under axial load must be supported over their entire height and entire circumference ➤*548*|▦ and ➤*546*|◯ *12*. The size and axial runout accuracy of the contact surfaces on the inner ring rib must be observed especially in the case of cylindrical roller bearings subjected to high loads, since these factors also influence the uniformity of the rib load and the running accuracy of the shaft. This means that the ribs may be subjected to damaging alternating stresses even in the case of very small misalignments. If the mounting dimensions indicated in the product tables are observed, the problems described can be reliably avoided ➤*548*|▦.

Support in semi-locating bearings

In semi-locating bearings, it is sufficient to support the bearing rings on one side, on the rib supporting the axial load ➤*546*|*12*.

12
Support of inner ring rib supporting axial load

d_c = *recommended height of shaft shoulder with axially loaded rib*
Arrow = *force flow*



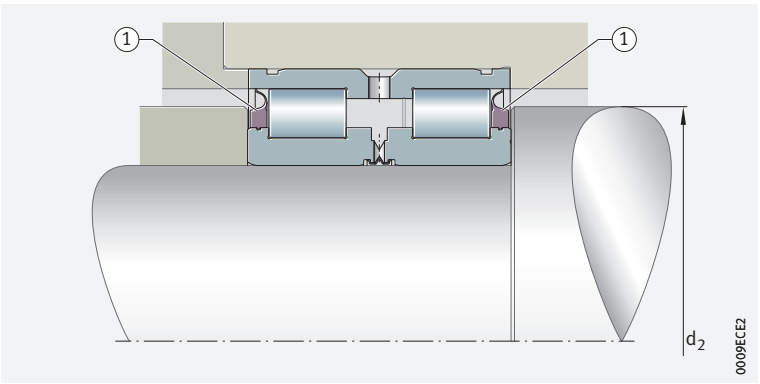
Support of sealing rings in cylindrical roller bearings with annular slots (rope sheave bearings)

Observe the abutment dimension of the sealing rings

The sealing rings must be supported to a sufficient height that they are not pressed out during lubrication of the bearings ➤*546*|*13*.
The dimension d_2 in the product tables must be observed ➤*556*|.

13
Rope sheave bearings – support of sealing rings

d_2 = *abutment dimension*
① *Sealing ring*



4.17 Mounting and dismounting

The mounting and dismounting options for cylindrical roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Mounting and dismounting of cylindrical roller bearings with annular slots (rope sheave bearings)

Before the bearing is pressed into the rope sheave, it is recommended that the bearing seating surfaces should be lightly oiled or alternatively rubbed or sprayed with dry lubricant. In order to prevent bearing damage and inaccurate seating of the bearings, pressing in should be carried out on a suitable device with control of force and travel.

During mounting and dismounting of the bearings, the mounting forces must never be directed through the rolling elements, sealing rings or the fasteners on the split bearing ring.

Schaeffler Mounting Handbook

✎ Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

4.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

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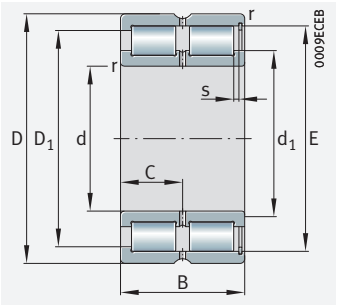
4.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

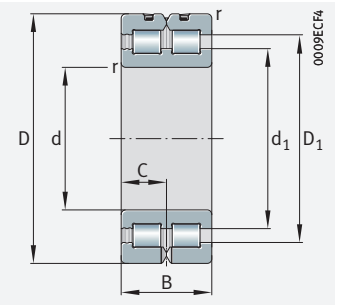
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

Double row full complement cylindrical roller bearings

Semi-locating, locating and non-locating bearings



SL1850
Semi-locating bearing

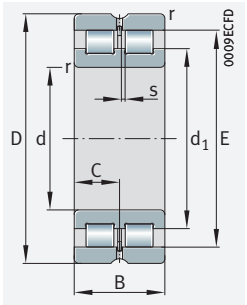


SL0148, SL0149
Locating bearings

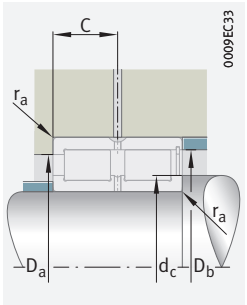
d = 20 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤539|4.12 ➤540|4.13 X-life ➤531		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	Semi-locating bearing	Locating bearing	Non-locating bearing
			N	N	N	min^{-1}	min^{-1}	≈ kg			
20	42	30	53 000	52 000	9 100	11 400	7 400	0,2	**SL185004-XL**	–	–
25	47	30	60 000	64 000	11 300	9 500	6 000	0,23	**SL185005-XL**	–	–
30	55	34	78 000	84 000	15 200	8 100	5 300	0,35	**SL185006-XL**	–	–
35	62	36	94 000	107 000	19 200	7 100	4 750	0,46	**SL185007-XL**	–	–
40	68	38	113 000	133 000	22 800	6 300	4 200	0,56	**SL185008-XL**	–	–
45	75	40	120 000	148 000	25 500	5 800	3 950	0,71	**SL185009-XL**	–	–
50	80	40	151 000	188 000	30 500	5 300	3 450	0,76	**SL185010-XL**	–	–
55	90	46	206 000	275 000	46 000	4 550	2 900	1,16	**SL185011-XL**	–	–
60	85	25	70 000	121 000	17 700	4 650	2 650	0,49	–	**SL014912**	–
	85	25	70 000	121 000	17 700	4 650	2 650	0,47	–	–	**SL024912**
	95	46	212 000	285 000	48 500	4 350	2 800	1,24	**SL185012-XL**	–	–
65	100	46	223 000	315 000	53 000	4 000	2 500	1,32	**SL185013-XL**	–	–
70	100	30	106 000	185 000	27 500	3 900	2 330	0,78	–	**SL014914**	–
	100	30	106 000	185 000	27 500	3 900	2 330	0,75	–	–	**SL024914**
	110	54	265 000	350 000	60 000	3 750	2 650	1,85	**SL185014-XL**	–	–
75	115	54	275 000	385 000	66 000	3 450	2 370	1,93	**SL185015-XL**	–	–
80	110	30	112 000	206 000	30 500	3 550	2 090	0,88	–	**SL014916**	–
	110	30	112 000	206 000	30 500	3 550	2 090	0,85	–	–	**SL024916**
	125	60	330 000	440 000	83 000	3 200	2 320	2,59	**SL185016-XL**	–	–
85	130	60	300 000	465 000	70 000	3 050	2 210	2,72	**SL185017**	–	–
90	125	35	153 000	290 000	39 500	3 050	1 870	1,35	–	**SL014918**	–
	125	35	153 000	290 000	39 500	3 050	1 870	1,3	–	–	**SL024918**
	140	67	350 000	550 000	82 000	2 850	2 140	3,62	**SL185018**	–	–
100	140	40	191 000	370 000	48 500	2 700	1 720	1,95	–	**SL014920**	–
	140	40	191 000	370 000	48 500	2 700	1 720	1,9	–	–	**SL024920**
	150	67	370 000	600 000	87 000	2 600	1 930	3,94	**SL185020**	–	–
110	150	40	198 000	400 000	51 000	2 500	1 600	2,15	–	**SL014922**	–
	150	40	198 000	400 000	51 000	2 500	1 600	2,1	–	–	**SL024922**
	170	80	485 000	770 000	111 000	2 350	1 730	6,32	**SL185022**	–	–
120	165	45	222 000	440 000	56 000	2 260	1 540	2,95	–	**SL014924**	–
	165	45	222 000	440 000	56 000	2 260	1 540	2,85	–	–	**SL024924**
	180	80	510 000	850 000	119 000	2 160	1 530	6,77	**SL185024**	–	–

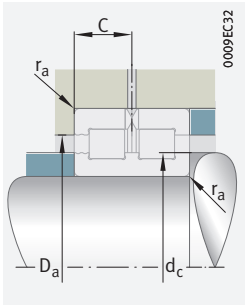
medias *https://www.schaeffler.de/std/1F9A*



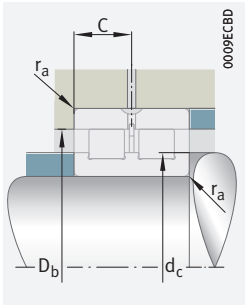
SL0248, SL0249
Non-locating bearings



Mounting dimensions
for semi-locating bearings



Mounting dimensions
for locating bearings

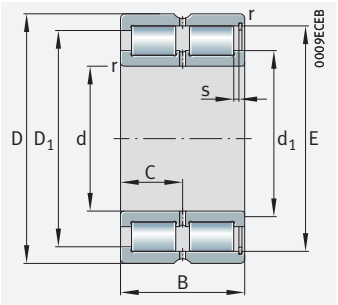


Mounting dimensions
for non-locating bearings

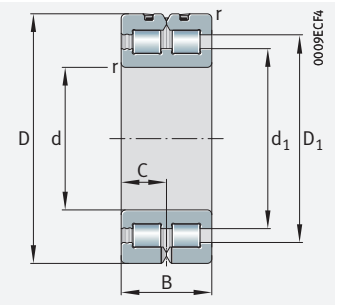
d	Designation to DIN 5412	Dimensions						Mounting dimensions			
		r min.	s	C	d_1 ≈	D_1 ≈	E	d_c	D_a	D_b	r_a max.
20	–	0,6	1	15	28,4	33,3	36,8	28	33,5	36,5	0,6
25	–	0,6	1	15	34,5	39	42,5	34,5	39	42,5	0,6
30	–	1	1,5	17	40	45,3	49,6	40	45,5	49,5	1
35	–	1	1,5	18	44,9	51,2	55,5	44,5	51,5	55,5	1
40	–	1	1,5	19	50,5	57,2	61,7	50,5	57,5	61,5	1
45	–	1	1,5	20	55,3	62,6	66,9	55	63	66,5	1
50	–	1	1,5	20	59,1	67,6	72,3	59	68	72	1
55	–	1,1	1,5	23	68,5	78,7	83,5	68,5	79	83,5	1,1
60	NNC4912V	1	–	12,5	70,3	73,5	–	70	73,5	–	1
	NNCL4912V	1	1	12,5	70,3	–	77,51	70,5	–	77,5	1
	–	1,1	1,5	23	71,7	81,9	86,7	71,5	82	86,5	1,1
65	–	1,1	1,5	23	78,1	88,3	93,1	78	88,5	93	1,1
70	NNC4914V	1	–	15	82,5	87,4	–	82,5	87,5	–	1
	NNCL4914V	1	1	15	82,5	–	91,87	82,5	–	91,5	1
	–	1,1	3	27	81,5	95,7	100,3	81,5	96	100	1,1
75	–	1,1	3	27	89	102,9	107,9	89	103	107,5	1,1
80	NNC4916V	1	–	15	91,4	96,2	–	91	96,5	–	1
	NNCL4916V	1	1	15	91,4	–	100,78	91,5	–	100,5	1
	–	1,1	3,5	30	95	111,7	117,4	95	112	117	1,1
85	–	1,1	3,5	30	99	116,1	122	99	116,5	121,5	1,1
90	NNC4918V	1,1	–	17,5	103,9	110,7	–	103,5	111	–	1,1
	NNCL4918V	1,1	1,5	17,5	103	–	115,2	103	–	115	1,1
	–	1,5	4	33,5	106,1	124,5	130,7	106	124,5	130,5	1,5
100	NNC4920V	1,1	–	20	116,4	125	–	116	125	–	1,1
	NNCL4920V	1,1	2	20	116,4	–	129,6	116,5	–	129,5	1,1
	–	1,5	4	33,5	115,7	134	140,2	115,5	134	140	1,5
110	NNC4922V	1,1	–	20	125	133,6	–	125	134	–	1,1
	NNCL4922V	1,1	2	20	125	–	138,2	125	–	138	1,1
	–	2	5	40	127,3	149,3	156,7	127	149,5	156,5	2
120	NNC4924V	1,1	–	22,5	138,6	148,6	–	138,5	149	–	1,1
	NNCL4924V	1,1	3	22,5	138,6	–	153,55	139	–	153,5	1,1
	–	2	5	40	138,8	160,7	168,2	138,5	161	168	2

Double row full complement cylindrical roller bearings

Semi-locating, locating and non-locating bearings



SL1850
Semi-locating bearing

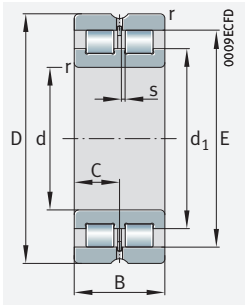


SL0148, SL0149
Locating bearings

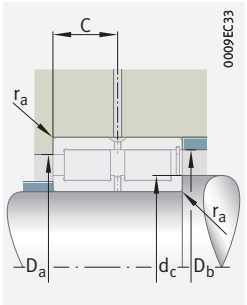
d = 130 – 190 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤539|4.12 ➤540|4.13		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	Semi-locating bearing	Locating bearing	Non-locating bearing
			N	N	N	min^{-1}	min^{-1}	≈ kg			
130	180	50	260 000	510 000	64 000	2 090	1 500	3,95	–	**SL014926**	–
	180	50	260 000	510 000	64 000	2 090	1 500	3,8	–	–	**SL024926**
	200	95	730 000	1 210 000	167 000	1 990	1 340	10,2	**SL185026**	–	–
140	190	50	270 000	550 000	67 000	1 950	1 370	4,2	–	**SL014928**	–
	190	50	270 000	550 000	67 000	1 950	1 370	4,1	–	–	**SL024928**
	210	95	770 000	1 330 000	180 000	1 820	1 180	11,1	**SL185028**	–	–
150	190	40	231 000	530 000	63 000	1 900	1 270	2,9	–	**SL014830**	–
	190	40	231 000	530 000	63 000	1 900	1 270	2,8	–	–	**SL024830**
	210	60	410 000	820 000	106 000	1 790	1 200	6,65	–	**SL014930**	–
	210	60	410 000	820 000	106 000	1 790	1 200	6,45	–	–	**SL024930**
	225	100	810 000	1 390 000	186 000	1 740	1 150	13,3	**SL185030**	–	–
160	200	40	237 000	560 000	66 000	1 800	1 200	3,1	–	**SL014832**	–
	200	40	237 000	560 000	66 000	1 800	1 200	3	–	–	**SL024832**
	220	60	425 000	880 000	112 000	1 660	1 080	7	–	**SL014932**	–
	220	60	425 000	880 000	112 000	1 660	1 080	6,8	–	–	**SL024932**
	240	109	930 000	1 610 000	210 000	1 600	1 030	12,2	**SL185032**	–	–
170	215	45	260 000	600 000	70 000	1 670	1 180	4,1	–	**SL014834**	–
	215	45	260 000	600 000	70 000	1 670	1 180	3,95	–	–	**SL024834**
	230	60	435 000	930 000	116 000	1 580	1 010	7,35	–	**SL014934**	–
	230	60	435 000	930 000	116 000	1 580	1 010	7,1	–	–	**SL024934**
	260	122	1 200 000	2 110 000	270 000	1 480	900	22,5	**SL185034**	–	–
180	225	45	270 000	640 000	73 000	1 560	1 070	4,3	–	**SL014836**	–
	225	45	270 000	640 000	73 000	1 560	1 070	4,15	–	–	**SL024836**
	250	69	570 000	1 200 000	149 000	1 480	920	10,8	–	**SL014936**	–
	250	69	570 000	1 200 000	149 000	1 480	920	10,5	–	–	**SL024936**
	280	136	1 390 000	2 480 000	315 000	1 370	820	29,9	**SL185036-TB**	–	–
190	240	50	310 000	730 000	82 000	1 480	1 030	5,65	–	**SL014838**	–
	240	50	310 000	730 000	82 000	1 480	1 030	5,45	–	–	**SL024838**
	260	69	580 000	1 270 000	155 000	1 410	860	11,2	–	**SL014938**	
	260	69	580 000	1 270 000	155 000	1 410	860	10,9	–	–	**SL024938**
	290	136	1 430 000	2 600 000	325 000	1 320	770	31,3	**SL185038-TB**	–	–

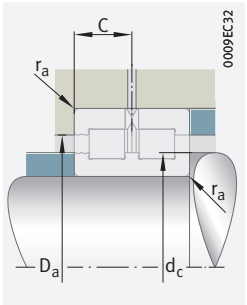
medias *https://www.schaeffler.de/std/1F9A*



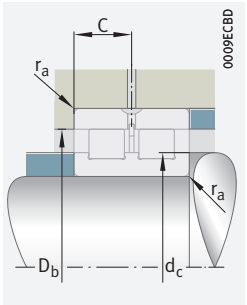
SL0248, SL0249
Non-locating bearings



Mounting dimensions
for semi-locating bearings



Mounting dimensions
for locating bearings

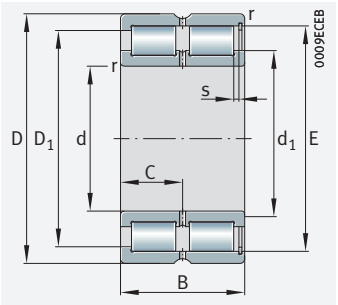


Mounting dimensions
for non-locating bearings

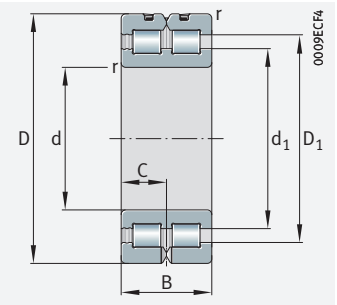
d	Designation to DIN 5412	Dimensions						Mounting dimensions			
		r min.	s	C	d_1 ≈	D_1 ≈	E	d_c	D_a	D_b	r_a max.
130	NNC4926V	1,5	–	25	148,4	160	–	148	160	–	1,5
	NNCL4926V	1,5	4	25	149,5	–	165,4	149,5	–	165	1,5
	–	2	5	47,5	148,6	175,5	184,4	148,5	175,5	184	2
140	NNC4928V	1,5	–	25	159	170,5	–	159	170,5	–	1,5
	NNCL4928V	1,5	4	25	160	–	175,9	160	–	175,5	1,5
	–	2	5	47,5	162,6	189,5	198,4	162,5	189,5	198	2
150	NNC4830V	1,1	–	20	165,1	174,2	–	165	174,5	–	1,1
	NNCL4830V	1,1	2	20	165,1	–	178,3	165,5	–	178	1,1
	NNC4930V	2	–	30	171,8	187,2	–	171,5	187,5	–	2
	NNCL4930V	2	4	30	171,8	–	192,77	172	–	192,5	2
	–	2	6	50	170	198	207,5	170	198	207	2
160	NNC4832V	1,1	–	20	173,7	182,8	–	173,5	183	–	1,1
	NNCL4832V	1,1	2	20	173,7	–	186,9	174	–	186,5	1,1
	NNC4932V	2	–	30	184,2	200,3	–	184	200,5	–	2
	NNCL4932V	2	4	30	184,2	–	206,16	184,5	–	206	2
	–	2,1	6	54,5	184,8	215,8	224,8	184,5	216	224,5	2,1
170	NNC4834V	1,1	–	22,5	186,3	197	–	186	197	–	1,1
	NNCL4834V	1,1	3	22,5	186,3	–	201,3	186,5	–	201	1,1
	NNC4934V	2	–	30	193,1	209,1	–	193	209,5	–	2
	NNCL4934V	2	4	30	193,1	–	215,08	193,5	–	215	2
	–	2,1	6	61	198	232,7	242,9	198	233	242,5	2,1
180	NNC4836V	1,1	–	22,5	199,1	209,8	–	199	210	–	1,1
	NNCL4836V	1,1	3	22,5	199,1	–	214,1	199,5	–	214	1,1
	NNC4936V	2	–	34,5	204,9	224,1	–	204,5	224,5	–	2
	NNCL4936V	2	4	34,5	204,9	–	230,5	205	–	230,5	2
	–	2,1	8	68	212,2	249,4	260,2	212	249,5	260	2,1
190	NNC4838V	1,5	–	25	207,6	220,7	–	207,5	221	–	1,5
	NNCL4838V	1,5	4	25	207,6	–	225	208	–	225	1,5
	NNC4938V	2	–	34,5	215	234,3	–	215	234,5	–	2
	NNCL4938V	2	4	34,5	215	–	240,7	215	–	240,5	2
	–	2,1	8,2	68	221,8	259	269,8	221,5	259	269,5	2,1

Double row full complement cylindrical roller bearings

Semi-locating, locating and non-locating bearings



SL1850
Semi-locating bearing

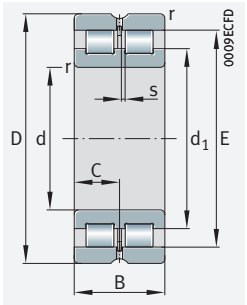


SL0148, SL0149
Locating bearings

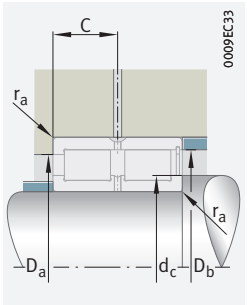
d = 200 – 300 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*539*|*4.12* ➤*540*|*4.13*		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	Semi-locating bearing	Locating bearing	Non-locating bearing
			N	N	N	min^{-1}	min^{-1}	≈ kg			
200	250	50	320 000	770 000	86 000	1 410	960	5,9	–	**SL014840**	–
	250	50	320 000	770 000	86 000	1 410	960	5,7	–	–	**SL024840**
	280	80	680 000	1 440 000	176 000	1 310	820	15,8	–	**SL014940**	–
	280	80	680 000	1 440 000	176 000	1 310	820	15,3	–	–	**SL024940**
	310	150	1 630 000	3 000 000	375 000	1 230	710	40,4	**SL185040-TB**	–	–
220	270	50	335 000	840 000	92 000	1 290	850	6,4	–	**SL014844**	–
	270	50	335 000	840 000	92 000	1 290	850	6,2	–	–	**SL024844**
	300	80	700 000	1 550 000	185 000	1 220	750	17,2	–	**SL014944**	–
	300	80	700 000	1 550 000	185 000	1 220	750	16,7	–	–	**SL024944**
	340	160	1 980 000	3 650 000	440 000	1 140	630	51,6	**SL185044-TB**	–	–
240	300	60	510 000	1 260 000	145 000	1 170	730	10	–	**SL014848**	–
	300	60	510 000	1 260 000	145 000	1 170	730	9,9	–	–	**SL024848**
	320	80	740 000	1 700 000	198 000	1 110	660	18,5	–	**SL014948**	–
	320	80	740 000	1 700 000	198 000	1 110	660	17,9	–	–	**SL024948**
	360	160	2 080 000	4 000 000	470 000	1 040	550	55,2	**SL185048-TB**	–	–
260	320	60	540 000	1 370 000	154 000	1 080	650	11	–	**SL014852**	–
	320	60	540 000	1 370 000	154 000	1 080	650	10,6	–	–	**SL024852**
	360	100	1 100 000	2 470 000	285 000	1 010	570	32	–	**SL014952**	–
	360	100	1 100 000	2 470 000	285 000	1 010	570	31,2	–	–	**SL024952**
	400	190	2 750 000	5 000 000	580 000	940	490	82,6	**SL185052-TB**	–	–
280	350	69	700 000	1 820 000	201 000	980	570	16	–	**SL014856**	–
	350	69	700 000	1 820 000	201 000	980	570	15,6	–	–	**SL024856**
	380	100	1 150 000	2 650 000	300 000	940	520	34	–	**SL014956**	–
	380	100	1 150 000	2 650 000	300 000	940	520	33,1	–	–	**SL024956**
	420	190	2 850 000	5 300 000	600 000	900	460	88	**SL185056-TB**	–	–
300	380	80	820 000	2 070 000	228 000	920	550	23	–	**SL014860**	–
	380	80	820 000	2 070 000	228 000	920	550	22	–	–	**SL024860**
	420	118	1 630 000	3 700 000	410 000	870	445	53	–	**SL014960**	–
	420	118	1 630 000	3 700 000	410 000	870	445	51,9	–	–	**SL024960**
	460	218	3 450 000	6 600 000	670 000	800	395	124	**SL185060-TB**	–	–

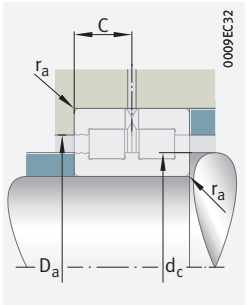
medias *https://www.schaeffler.de/std/1F9A*



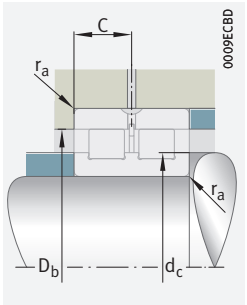
SL0248, SL0249
Non-locating bearings



Mounting dimensions
for semi-locating bearings



Mounting dimensions
for locating bearings

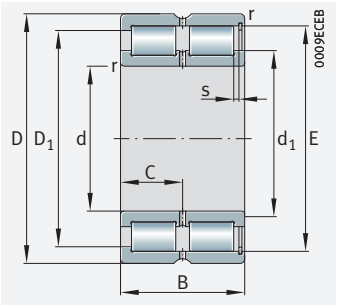


Mounting dimensions
for non-locating bearings

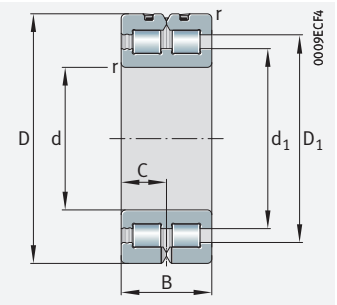
d	Designation to DIN 5412	Dimensions						Mounting dimensions			
		r min.	s	C	d_1 ≈	D_1 ≈	E	d_c	D_a	D_b	r_a max.
200	NNC4840V	1,5	–	25	218,1	231,2	–	218	231,5	–	1,5
	NNCL4840V	1,5	4	25	218,1	–	235,5	218,5	–	235,5	1,5
	NNC4940V	2,1	–	40	230,5	252,3	–	230,5	252,5	–	2,1
	NNCL4940V	2,1	5	40	230,5	–	259,34	230,5	–	259	2,1
	–	2,1	8,9	75	236,6	276,2	287,8	236,5	276,5	287,5	2,1
220	NNC4844V	1,5	–	25	239,1	252,3	–	239	252,5	–	1,5
	NNCL4844V	1,5	4	25	239,1	–	256,5	239,5	–	256,5	1,5
	NNC4944V	2,1	–	40	248	268,5	–	248	268,5	–	2,1
	NNCL4944V	2,1	5	40	248	–	276,52	248	–	276,5	2,1
	–	3	9	80	254,6	297,8	312,2	254,5	298	312	3
240	NNC4848V	2	–	30	259,5	276,7	–	259,5	277	–	2
	NNCL4848V	2	4	30	259,5	–	281,9	259,5	–	281,5	2
	NNC4948V	2,1	–	40	270,6	292,3	–	270,5	292,5	–	2,1
	NNCL4948V	2,1	5	40	270,6	–	299,46	271	–	299	2,1
	–	3	9	80	277,5	322,1	335,1	277,5	322,5	335	3
260	NNC4852V	2	–	30	281,8	298,8	–	281,5	299	–	2
	NNCL4852V	2	4	30	281,8	–	304,2	282	–	304	2
	NNC4952V	2,1	–	50	294,5	322,1	–	294,5	322,5	–	2,1
	NNCL4952V	2,1	6	50	294,5	–	331,33	294,5	–	331	2,1
	–	4	11,3	95	304	359,7	376	304	360	375,5	4
280	NNC4856V	2	–	34,5	306,8	326,4	–	306,5	326,5	–	2
	NNCL4856V	2	4	34,5	306,8	–	332,4	307	–	332	2
	NNC4956V	2,1	–	50	316,5	344,6	–	316,5	345	–	2,1
	NNCL4956V	2,1	6	50	316,5	–	353,34	316,5	–	353	2,1
	–	4	11,3	95	318,3	374,1	390,3	318	374,5	390	4
300	NNC4860V	2,1	–	40	327,9	349,9	–	327,5	350	–	2,1
	NNCL4860V	2,1	6	40	327,9	–	356,7	328	–	356,5	2,1
	NNC4960V	3	–	59	340,7	374,3	–	340,5	374,5	–	3
	NNCL4960V	3	6	59	340,7	–	385,51	341	–	385,5	3
	–	4	12,5	109	353,6	413,6	433,6	353,5	414	433,5	4

Double row full complement cylindrical roller bearings

Semi-locating, locating and non-locating bearings



SL1850
Semi-locating bearing

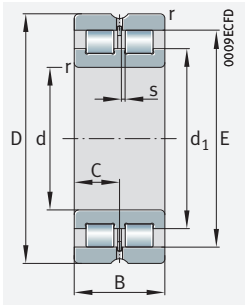


SL0148, SL0149
Locating bearings

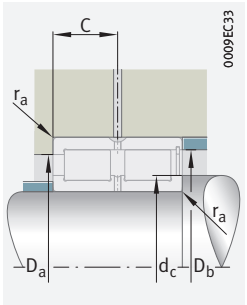
d = 320 – 400 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤539|4.12 ➤540|4.13		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	Semi-locating bearing	Locating bearing	Non-locating bearing
			N	N	N	min^{-1}	min^{-1}	≈ kg			
320	400	80	850 000	2 220 000	240 000	860	495	24	–	**SL014864**	–
	400	80	850 000	2 220 000	240 000	860	495	23,5	–	–	**SL024864**
	440	118	1 700 000	4 050 000	435 000	800	395	56	–	**SL014964**	–
	440	118	1 700 000	4 050 000	435 000	800	395	54,9	–	–	**SL024964**
	480	218	3 550 000	6 900 000	700 000	770	375	128,4	**SL185064-TB**	–	–
340	420	80	870 000	2 330 000	249 000	810	465	25,5	–	**SL014868**	–
	420	80	870 000	2 330 000	249 000	810	465	25	–	–	**SL024868**
	460	118	1 750 000	4 250 000	450 000	770	375	59	–	**SL014968**	–
	460	118	1 750 000	4 250 000	450 000	770	375	57,8	–	–	**SL024968**
	520	243	4 250 000	8 300 000	810 000	710	335	178	**SL185068-TB**	–	–
360	440	80	900 000	2 480 000	260 000	770	430	27	–	**SL014872**	–
	440	80	900 000	2 480 000	260 000	770	430	26	–	–	**SL024872**
	480	118	1 790 000	4 450 000	465 000	730	350	62,1	–	**SL014972**	–
	480	118	2 020 000	4 450 000	570 000	730	350	60,8	–	–	**SL024972**
	540	243	4 400 000	8 700 000	840 000	680	320	178	**SL185072-TB**	–	–
380	480	100	1 320 000	3 500 000	365 000	710	375	45,5	–	**SL014876**	–
	480	100	1 320 000	3 500 000	365 000	710	375	44	–	–	**SL024876**
	520	140	2 250 000	5 500 000	590 000	680	325	92,4	–	**SL014976**	–
	520	140	2 250 000	5 500 000	590 000	680	325	90,5	–	–	**SL024976**
	560	243	4 450 000	8 900 000	860 000	660	305	196,5	**SL185076-TB**	–	–
400	500	100	1 350 000	3 650 000	375 000	680	360	46,5	–	**SL014880**	–
	500	100	1 350 000	3 650 000	375 000	680	360	45,8	–	–	**SL024880**
	540	140	2 310 000	5 800 000	610 000	650	300	96,5	–	**SL014980**	–
	540	140	2 310 000	5 800 000	610 000	650	300	94,6	–	–	**SL024980**

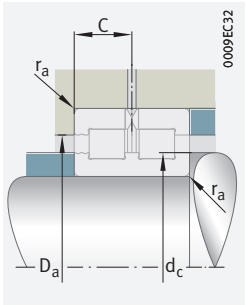
medias *https://www.schaeffler.de/std/1F9A*



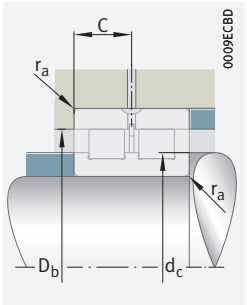
SL0248, SL0249
Non-locating bearings



Mounting dimensions
for semi-locating bearings



Mounting dimensions
for locating bearings

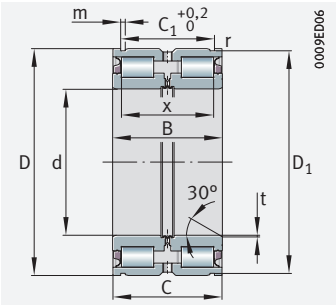


Mounting dimensions
for non-locating bearings

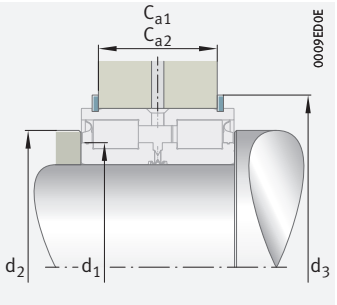
d	Designation to DIN 5412	Dimensions						Mounting dimensions			
		r min.	s	C	d_1 ≈	D_1 ≈	E	d_c	D_a	D_b	r_a max.
320	NNC4864V	2,1	–	40	350,9	372,9	–	350,5	373	–	2,1
	NNCL4864V	2,1	6	40	350,9	–	379,7	351	–	379,5	2,1
	NNC4964V	3	–	59	367,5	401,1	–	367,5	401,5	–	3
	NNCL4964V	3	6	59	367,5	–	412,27	367,5	–	412	3
	–	4	12,5	109	369,5	431,5	449,5	369,5	431,5	449,5	4
340	NNC4868V	2,1	–	40	368,1	390,1	–	368	390,5	–	2,1
	NNCL4868V	2,1	6	40	368,1	–	396,9	368,5	–	396,5	2,1
	NNC4968V	3	–	59	385,3	418,9	–	385	419	–	3
	NNCL4968V	3	6	59	385,3	–	430,11	385,5	–	430	3
	–	5	14,3	121,5	396	465,5	485,7	396	465,5	485,5	5
360	NNC4872V	2,1	–	40	391	413,2	–	391	413,5	–	2,1
	NNCL4872V	2,1	6	40	391	–	419,8	391	–	419,5	2,1
	NNC4972V	3	–	59	404	436,8	–	404	437	–	3
	NNCL4972V	3	6	59	404	–	447,95	404	–	447,5	3
	–	5	14	121,5	413,8	481	503,5	413,5	481	503	5
380	NNC4876V	2,1	–	50	419	447,2	–	419	447,5	–	2,1
	NNCL4876V	2,1	6	50	419	–	455,8	419	–	455,5	2,1
	NNC4976V	4	–	70	430,2	468,7	–	430	469	–	4
	NNCL4976V	4	7	70	430,2	–	481,35	430,5	–	481	4
	–	5	14,1	121,5	432	499	521,3	432	499	521	5
400	NNC4880V	2,1	–	50	433,8	462	–	433,5	462	–	2,1
	NNCL4880V	2,1	6	50	433,8	–	470,59	434	–	470,5	2,1
	NNC4980V	4	–	70	450,5	489	–	450,5	489	–	4
	NNCL4980V	4	7	70	450,5	–	501,74	450,5	–	501,5	4

Double row full complement cylindrical roller bearings

With annular slots
Locating bearings



SL0450..-PP
SL04..-PP



Mounting dimensions

d = 20 – 160 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	m	➤*539|4.12* ➤*540|4.13*
			N	N	N	min^{-1}	≈ kg	
20	42	30	41 500	51 000	7 000	5 500	0,2	**SL045004-D-PP**
25	47	30	46 000	60 000	8 300	4 700	0,24	**SL045005-D-PP**
30	55	34	50 000	67 000	9 700	4 100	0,37	**SL045006-D-PP**
35	62	36	63 000	88 000	12 600	3 550	0,48	**SL045007-D-PP**
40	68	38	80 000	111 000	16 300	3 150	0,56	**SL045008-D-PP**
45	75	40	97 000	139 000	20 200	2 800	0,7	**SL045009-D-PP**
50	80	40	102 000	151 000	22 100	2 600	0,76	**SL045010-D-PP**
55	90	46	120 000	186 000	25 500	2 340	1,18	**SL045011-D-PP**
60	95	46	125 000	201 000	28 000	2 180	1,26	**SL045012-D-PP**
65	100	46	130 000	215 000	30 000	2 040	1,33	**SL045013-D-PP**
70	110	54	175 000	275 000	37 000	1 850	1,87	**SL045014-D-PP**
75	115	54	201 000	315 000	42 500	1 740	1,96	**SL045015-D-PP**
80	125	60	210 000	340 000	46 000	1 620	2,71	**SL045016-D-PP**
85	130	60	219 000	365 000	48 500	1 510	2,83	**SL045017-D-PP**
90	140	67	305 000	510 000	70 000	1 410	3,71	**SL045018-D-PP**
95	145	67	315 000	530 000	72 000	1 360	3,88	**SL045019-D-PP**
100	150	67	330 000	550 000	79 000	1 300	3,95	**SL045020-D-PP**
110	170	80	395 000	680 000	96 000	1 170	6,57	**SL045022-D-PP**
120	180	80	410 000	740 000	101 000	1 090	7,04	**SL045024-D-PP**
130	200	95	540 000	960 000	130 000	960	10,5	**SL045026-D-PP**
	190	80	430 000	790 000	106 000	1 020	7,5	**SL04130-D-PP**
140	210	95	610 000	1 100 000	148 000	910	11,1	**SL045028-D-PP**
	200	80	445 000	840 000	112 000	960	8	**SL04140-D-PP**
150	225	100	710 000	1 260 000	166 000	850	13,3	**SL045030-D-PP**
	210	80	465 000	920 000	119 000	880	8,4	**SL04150-D-PP**
160	240	109	740 000	1 360 000	176 000	790	16,6	**SL045032-D-PP**
	220	80	480 000	970 000	124 000	830	8,8	**SL04160-D-PP**

medias *https://www.schaeffler.de/std/1F9A*

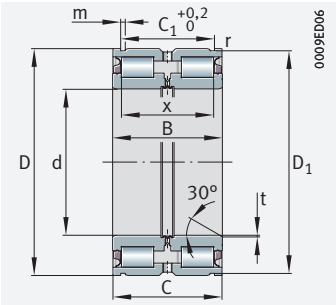
1) For snap rings WRE.

2) For retaining ring to DIN 471.

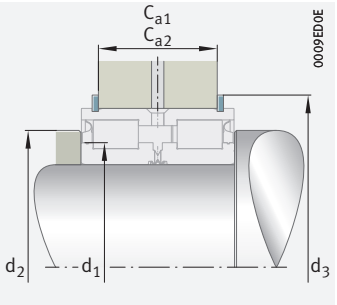
Dimensions								Mounting dimensions					Snap ring WRE	Retaining ring to DIN 471
d	C	C_1 +0,2	D_1	m	r min.	t	x	C_{a1} [1] −0,2	C_{a2} [2] −0,2	d_1	d_2	d_3 [1]		
20	29	24,7	40,2	1,8	0,3	0,5	22,5	21,5	21	31	34	47	WRE42	42×1,75
25	29	24,7	45,2	1,8	0,3	0,5	22,5	21,5	21	35,5	39	52	WRE47	47×1,75
30	33	28,2	53	2,1	0,3	0,5	25,5	25	24	41	44	60	WRE55	55×2
35	35	30,2	60	2,1	0,3	0,5	27,5	27	26	46,5	50	67	WRE62	62×2
40	37	32,2	65,8	2,7	0,6	0,8	28,5	28	27	51,5	55	75	WRE68	68×2,5
45	39	34,2	72,8	2,7	0,6	0,8	30,5	30	29	57	61	82	WRE75	75×2,5
50	39	34,2	77,8	2,7	0,6	0,8	30,5	30	29	62	66	87	WRE80	80×2,5
55	45	40,2	87,4	3,2	0,6	1	36	35	34	69	73	99	WRE90	90×3
60	45	40,2	92,4	3,2	0,6	1	36	35	34	74	79	104	WRE95	95×3
65	45	40,2	97,4	3,2	0,6	1	36	35	34	79	84	109	WRE100	100×3
70	53	48,2	107,1	4,2	0,6	1	42	43	40	84,5	91	119	WRE110	110×4
75	53	48,2	112,1	4,2	0,6	1	42	43	40	90	97	124	WRE115	115×4
80	59	54,2	122,1	4,2	0,6	1,5	48	49	46	97,5	105	137	WRE125	125×4
85	59	54,2	127,1	4,2	0,6	1,5	48	49	46	104	112	142	WRE130	130×4
90	66	59,2	137	4,2	0,6	1,5	54	54	51	109,5	118	152	WRE140	140×4
95	66	59,2	142	4,2	0,6	1,5	54	54	51	113,5	122	157	WRE145	145×4
100	66	59,2	147	4,2	0,6	1,5	54	54	51	117,5	128	162	WRE150	150×4
110	79	70,2	167	4,2	0,6	1,8	64	65	62	132	143	182	WRE170	170×4
120	79	71,2	176	4,2	0,6	1,8	64	65	63	141	153	196	WRE180	180×4
130	94	83,2	196	4,2	0,6	1,8	77	77	75	157	170	216	WRE200	200×4
	79	71,2	186	4,2	0,6	1,8	64	65	63	151	160	206	WRE190	190×4
140	94	83,2	206	5,2	0,6	1,8	77	77	73	165,5	181	226	WRE210	210×5
	79	71,2	196	4,2	0,6	1,8	64	65	63	160	170	216	WRE200	200×4
150	99	87,2	221	5,2	0,6	2	80	81	77	176	192	245	WRE225	225×5
	79	71,2	206	5,2	0,6	1,8	64	65	61	174,5	185	226	WRE210	210×5
160	108	95,2	236	5,2	0,6	2	89	89	85	189	207	260	WRE240	240×5
	79	71,2	216	5,2	0,6	1,8	64	65	61	184,5	196	236	WRE220	220×5

Double row full complement cylindrical roller bearings

With annular slots
Locating bearings



SL0450..-PP
SL04..-PP



Mounting dimensions

d = 170 – 300 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	m	➤*539*|*4.12* ➤*540*|*4.13*
			N	N	N	min^{-1}	≈ kg	
170	260	122	960 000	1 750 000	224 000	740	22,6	**SL045034-D-PP**
	230	80	490 000	1 030 000	129 000	790	9,3	**SL04170-D-PP**
180	280	136	1 140 000	2 130 000	270 000	680	30,1	**SL045036-D-PP**
	240	80	500 000	1 080 000	134 000	750	9,8	**SL04180-D-PP**
190	290	136	1 160 000	2 210 000	275 000	660	31,5	**SL045038-D-PP**
	260	80	520 000	1 160 000	141 000	700	12,7	**SL04190-D-PP**
200	310	150	1 350 000	2 600 000	315 000	610	40,8	**SL045040-D-PP**
	270	80	540 000	1 210 000	146 000	670	13,2	**SL04200-D-PP**
220	340	160	1 570 000	3 050 000	370 000	560	52,5	**SL045044-D-PP**
	300	95	700 000	1 550 000	185 000	610	19,5	**SL04220-D-PP**
240	360	160	1 630 000	3 300 000	390 000	530	56	**SL045048-D-PP**
	320	95	740 000	1 700 000	198 000	560	21	**SL04240-D-PP**
260	400	190	2 380 000	4 700 000	540 000	475	84,5	**SL045052-D-PP**
	340	95	840 000	1 990 000	229 000	520	22,5	**SL04260-D-PP**
280	420	190	2 600 000	5 200 000	590 000	450	90	**SL045056-D-PP**
	360	95	870 000	2 120 000	239 000	485	24	**SL04280-D-PP**
300	460	218	3 000 000	5 800 000	650 000	415	126	**SL045060-D-PP**
	380	95	900 000	2 250 000	249 000	455	25,5	**SL04300-D-PP**

medias *https://www.schaeffler.de/std/1F9A*

[1] For snap rings WRE.

[2] For retaining ring to DIN 471.

Dimensions								Mounting dimensions					Snap ring WRE	Retaining ring to DIN 471
d	C	C_1 +0,2	D_1	m	r min.	t	x	C_{a1} 1) −0,2	C_{a2} 2) −0,2	d_1	d_2	d_3 1)		
170	121	107,2	254	5,2	0,6	2	100	99	97	201	220	282	WRE260	260×5
	79	71,2	226	5,2	0,6	1,8	64	65	61	194	206	250	WRE230	230×5
180	135	118,2	274	5,2	0,6	2	112	110	108	218	239	302	WRE280	280×5
	79	71,2	236	5,2	0,6	1,8	64	65	61	203,5	216	260	WRE240	240×5
190	135	118,2	284	5,2	0,6	2	112	110	108	226	248	312	WRE290	290×5
	79	73,2	254	5,2	0,6	1,8	64	65	63	218	231	282	WRE260	260×5
200	149	128,2	304	6,3	0,6	2	126	120	116	243,5	267	336	WRE310	310×6
	79	73,2	264	5,2	0,6	1,8	64	65	63	227,5	241	292	WRE270	270×5
220	159	138,2	334	6,3	1	2	132	130	126	260	286	366	WRE340	340×6
	94	83,2	294	5,2	1	2	72	75	73	249	264	322	WRE300	300×5
240	159	138,2	354	6,3	1	2	132	130	126	279,5	305	386	WRE360	360×6
	94	83,2	314	6,3	1	2	72	75	71	272	287	346	WRE320	320×6
260	189	162,2	394	6,3	1,1	3	150	154	150	305	336	426	WRE400	400×6
	94	83,2	334	6,3	1	3	75	75	71	293	310	366	WRE340	340×6
280	189	163,2	413	7,3	1,1	3	150	154	149	321	354	453	WRE420	420×7
	94	83,2	354	6,3	1	3	75	75	71	310,5	386	327	WRE360	360×6
300	216	185,2	453	7,3	1,1	3	170	176	171	347	375	493	WRE460	460×7
	94	83,2	374	6,3	1	3	75	75	71	328	346	406	WRE380	380×6

Tapered roller bearings



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FAG



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Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

+++ extremely suitable
++ highly suitable
+ suitable
(+) suitable with restrictions
– not suitable/not applicable
✓ available

Design features and suitability			Tapered roller bearings			
			single row	matched pairs	integral tapered roller bearings, fitted in pairs	detailed information ➤ 564
Load carrying capacity	radial		+++	+++	+++	➤ 570 | 1.2
	axial, one direction		+++	+++	+++	➤ 570 | 1.2
	axial, both directions		–	+++	+++	➤ 570 | 1.2
	moments		(+)	(+)	(+)	➤ 570 | 1.2
Compensation of angular misalignments	static		(+)	(+)	(+)	➤ 570 | 1.3
	dynamic		(+)	(+)	(+)	➤ 570 | 1.3
Bearing design	cylindrical bore		✓	✓	✓	➤ 564 | 1.1
	tapered bore		–	–	–	➤ 564 | 1.1
	separable		✓	✓	–	➤ 593 | 1.17
Lubrication	greased		–	–	✓	➤ 571 | 1.4
Sealing	open		✓	✓	–	➤ 572 | 1.5
	non-contact		–	–	–	➤ 572 | 1.5
	contact		–	–	✓	➤ 572 | 1.5
Operating temperature in °C	from to		–30 +120[1]	–30 +120[1]	–30 +110	➤ 574 | 1.8
Suitability for	high speeds		+[2]	(+)	(+)	➤ 572 | 1.6 ➤ 64
	high running accuracy		++	++	++	➤ 575 | 1.11 ➤ 115
	low-noise running		(+)	(+)	(+)	➤ 572 | 1.7 ➤ 27
	high rigidity		+++[3]	+++	+++	➤ 54
	reduced friction		+	+	+	➤ 56
	length compensation within bearing		–	–	–	
	non-locating bearing arrangement		(+)[3]	(+)	(+)	➤ 141
	locating bearing arrangement		+++	+++	+++	➤ 141
X-life bearings			✓	✓	–	➤ 565
Bearing bore d in mm	from to		15 360[4][5]	40 260[4]	30 80	➤ 596
Product tables	from page ➤		596	644	648	

1) Where D > 220 mm: +200 °C
2) Reduced suitability when mounted in pairs
3) For mounting in pairs
4) Larger catalogue bearings GL 1
5) Bearings to ANSI/ABMA up to d = 673,1 mm

1 Tapered roller bearings

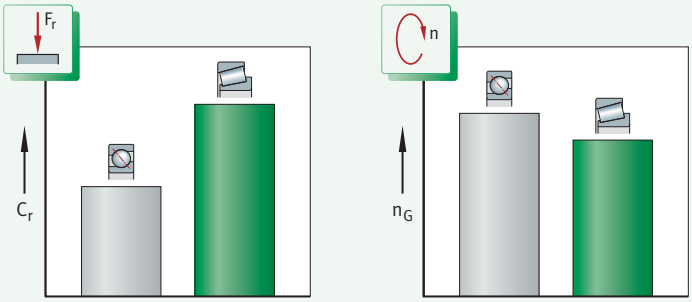
Tapered roller bearings are particularly suitable where:

- high radial loads occur ➤*564|1.1* and ➤*570|1.2*
- high axial loads act on one side ➤*570|1.2*
- combined loads must be supported (radial and axial forces acting simultaneously) ➤*570|1.2*
- precise axial guidance of the shaft is required (locating bearing function)
- the bearing arrangement must have very high axial rigidity
- the bearing position is operated clearance-free or under preload (single bearings are adjusted against each other) ➤*590|1.16*
- high running accuracy is required
- the load carrying capacity of angular contact ball bearings is no longer sufficient and the higher speed suitability of angular contact ball bearings is not required ➤*564|1*
- the bearings are not required to compensate misalignments
- the design objective comprises compact, rigid and economical bearing arrangements with a high load carrying capacity

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*563*.

1
Load carrying capacity and speed comparison – single row tapered roller bearings/single row angular contact ball bearings

F_r = *radial load*
C_r = *basic dynamic load rating*
n_G = *limiting speed*



1.1 Bearing design

✎ *Design variants*

Tapered roller bearings are available in an extensive range of single row and multi-row designs. X-life is the new performance standard for tapered roller bearings and stands for eXtended life ➤*565*. The key designs based on single row tapered roller bearings are:

- single row tapered roller bearings
- matched tapered roller bearings
- integral tapered roller bearings

Tapered roller bearings are also available in many other designs and sizes, as well as for specific applications, by agreement. For general availability, please contact Schaeffler. An upgrade to X-life performance is available. X-life bearings TPI 241. Matched tapered roller bearings TPI 245. Integral tapered roller bearings TPI 151.
Larger catalogue bearings and other bearing designs GL 1.

✎ *Available in metric and inch sizes*

Tapered roller bearings are produced in metric and inch sizes.

Classification and designation – bearings in metric and inch sizes

Bearings in metric sizes:

- DIN 720:2008
- ISO 355:2007
- ANSI/ABMA 19.1:2011 (prefix KJ)

Bearings in inch sizes:

- ANSI/ABMA 19.2:2013 (prefix K)

Tapered roller bearings of basic design

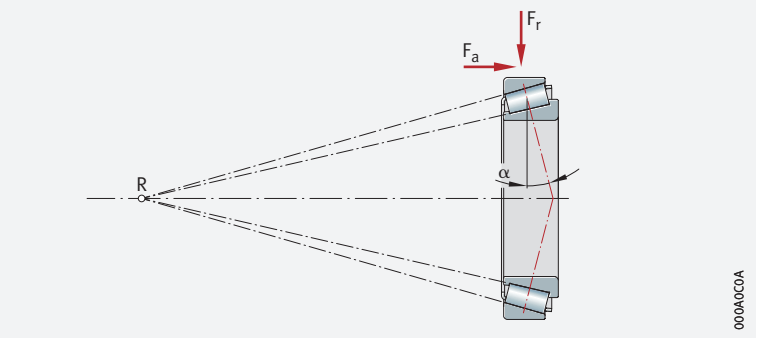
Fundamental design features

Tapered roller bearings are part of the group of radial roller bearings. In contrast to the ball, the roller has a larger contact area perpendicular to the roller axis. As a result, it can transmit higher forces, has greater rigidity and allows smaller rolling element diameters under the same load.
The bearings comprise a ribless outer ring, an inner ring with two ribs of different heights and a cage ➤565| 2, ➤567| 5. The cage contains truncated conical rollers. The roller and cage assembly together with the inner ring forms a unit. The low rib retains, in conjunction with the cage, the rollers on the inner ring raceway; the high rib supports the axial force component arising from the tapered form of the rollers. While the tapered rollers roll on the raceways, they slide on the higher rib of the inner ring. The projected lines of contact of the tapered rollers intersect the projected raceways of the inner and outer ring at a point on the bearing axis ➤565| 2. As a result of this geometrical characteristic, tapered roller bearings are highly suitable for supporting combined loads. This also prevents any kinematic forced slippage at the rolling contact.

Low running noise and vibrations

Due to the dimensional and geometrical accuracy of the tapered rollers, the rolling elements in a roller set are subjected to virtually the same proportion of load in the load range. In operation, this leads to low-noise and low-vibration running, as well as a high adjustment accuracy.

2
Single row tapered roller bearing: the apex points of the tapered surfaces meet at a point on the bearing axis



F_r = *radial load*
F_a = *axial load*
R = *roller cone apex*
α = *nominal contact angle*

X-life premium quality

X-life

Single row tapered roller bearings are available in numerous series and dimensions as X-life bearings. These bearings exhibit considerably higher performance than comparable tapered roller bearings without X-life characteristics ➤566| 3. This is achieved, in part, by superior ring materials and optimised contact geometry between roller and raceway, as well as between roller and rib. In combination with an increased surface quality, this leads to improved lubricant film formation.

Advantages

Increased customer benefits due to X-life

These technical enhancements offer a range of advantages, such as:

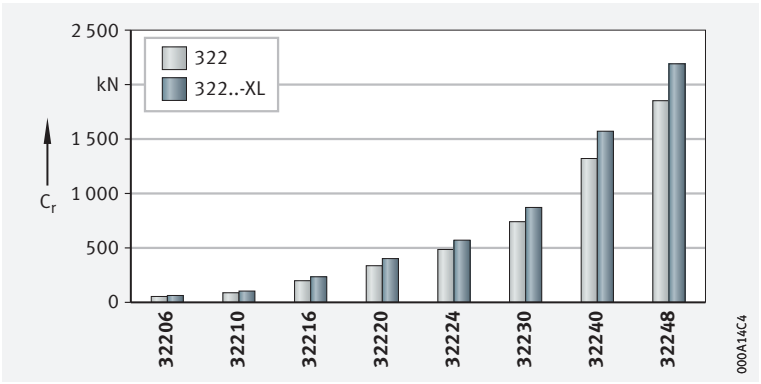
- up to 20 % higher basic dynamic load ratings C_r ➤*566*|*3*
- a higher running accuracy and smooth running
- running with reduced friction and greater energy efficiency (reduction in friction up to 50 %, in the case of tapered roller bearings with a steep taper, up to 75 %)
- lower heat generation in the bearing
- higher limiting speeds
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings ➤*566*|*4*
- high reliability and operational security
- lower overall operating costs
- compact, environmentally-friendly bearing arrangements

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

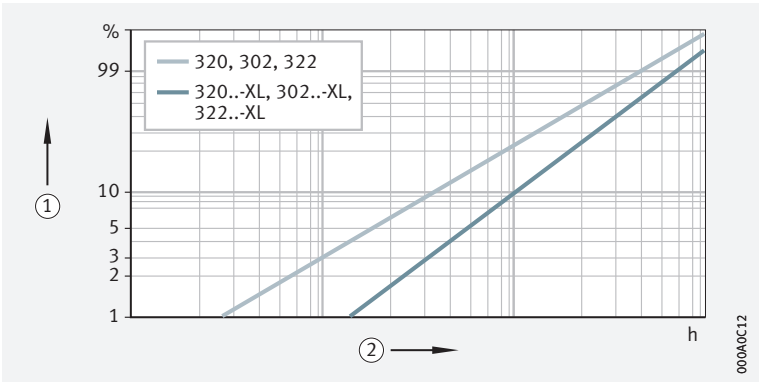
Suffix XL

X-life tapered roller bearings include the suffix XL in the designation ➤*580*|*1.12*.



3
Comparison of basic dynamic load rating C_r of X-life tapered roller bearings with bearings without X-life performance

C_r = *basic dynamic load rating*



4
Fatigue running time in Weibull diagram – comparison of X-life tapered roller bearings with bearings without X-life performance

① *Probability of failure*
② *Running time in hours*

Areas of application

Due to their special technical features, X-life tapered roller bearings are highly suitable for bearing arrangements in:

- mobile hydraulics (axial piston and orbital motors)
- tractors (wheel bearings and gearboxes)
- vertical mills (grinding rolls)
- hot and cold rolling mills (work rolls in roll stands)
- applications for oil and gas extraction
- offshore and onshore wind turbines (gearboxes)
- construction machinery (road rollers, drill head bearings)

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10* and TPI 241.

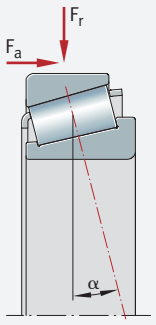
Single row tapered roller bearings

✎ Optimised product characteristics give a sustainable improvement in operating behaviour

Tapered roller bearings are individual, single row bearings of open design which, for technical reasons, are always adjusted against a second tapered roller bearing in a mirror image arrangement ➤*567*|*5*.
The bearings are designed such that they reliably cover the extensive demands in relation to generally common requirements.
For example, in order to improve the lubricant film formation and running characteristics, the sliding surfaces on the guidance rib of the inner ring, as well as the end faces and contact profile of the rollers, have been optimised ➤*565*. In addition, the high production accuracy allows the bearings to be adjusted against each other with high functional security. This in turn leads to improved operating characteristics and thus to a higher operational reliability. Tapered roller bearings are not self-retaining. As a result, the inner ring with the roller and cage assembly can be mounted separately from the outer ring. This gives simplified mounting of the bearings.

5
Single row tapered roller bearing

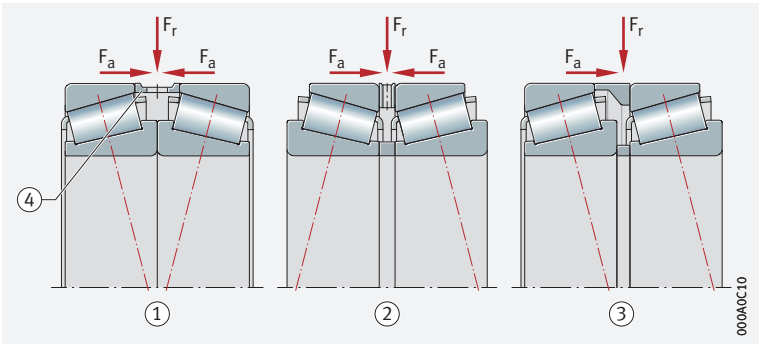
F_r = *radial load*
F_a = *axial load*
α = *nominal contact angle*



000A0C0B

Matched tapered roller bearings

If the load carrying capacity of a bearing is not sufficient or the shaft is to be guided in both directions with a specific axial clearance, then ready-to-fit, matched bearing sets are available. Matched tapered roller bearings are essentially available in three arrangements comprising an X, O and tandem arrangement.



6 *Matched tapered rolling bearing pairs in tandem, X and O arrangement, load directions, contact lines*

F_r = *radial load*
F_a = *axial load*

① *X arrangement*
② *O arrangement*
③ *Tandem arrangement*
④ *Fit ring*

X arrangement

For bearing sets in an X arrangement, the contact lines converge relative to the bearing axis ➤*568*| 6. Axial forces occur from both directions, but are always only supported by one bearing. The X arrangement is of simple design and the most frequently used arrangement of matched tapered roller bearings fitted in pairs.

O arrangement

For bearing sets in an O arrangement, the contact lines diverge relative to the bearing axis ➤*568*| 6. Axial forces occur from both directions, but are always only supported by one bearing. The support base is at its largest in the O arrangement, which is beneficial if the component with small bearing spacing must be guided with the smallest possible tilting clearance, or tilting forces must be supported. Bearing arrangements in an O arrangement are relatively rigid and can also support loads resulting from tilting moments.

Tandem arrangement

For bearing sets in a tandem arrangement, the contact lines run parallel to each other. In contrast to an X and O arrangement, the tandem arrangement can only support axial force in one direction. This bearing pair is usually adjusted against another tapered roller bearing, which supports axial forces in the opposite direction.

The product tables ➤*644*| contain only a few examples of matched tapered roller bearing sets in an X arrangement for reference purposes. Other matched tapered roller bearing sets are available in an X arrangement by agreement. Further information on “Matched tapered roller bearings” TPI 245.

Advantages of matched bearing sets

Matched bearing pairs in an O or X arrangement provide an economical solution to various bearing arrangement problems due, for example, to:

- their ability to support high radial loads as well as axial loads in both directions
- the simplified mounting of bearings, as the insertion of fit rings is no longer required and mounting defects are thus avoided
- the precise axial guidance of the shaft; the axial clearance of the bearing pair is already defined in bearing production
- simple lubrication; the lubricant can be easily fed to the rolling system by means of lubrication holes in the fit ring

Ordering and designation system

In order to simplify the ordering process, the ordering designation has been modified for matched tapered roller bearings fitted in pairs:

- The first module letter D = 2 (duplex) represents the number of bearings
- The second module letter represents the bearing arrangement:
  - B = O arrangement – Back to Back
  - F = X arrangement – Face to Face
  - T = tandem arrangement
- Where necessary (special design), a third module letter is added as a continuous counter for describing a variant. Example: A, B, ... = different set width, variant of intermediate ring design
- The axial internal clearance is indicated explicitly in the designation. For example, A80-120 means that the axial internal clearance of the unmounted bearing pair (delivered condition) is between 80 µm and 120 µm. Ordering example ➤*582*|*17*

The number of bearing pairs must be stated when ordering matched tapered roller bearings.

Integral tapered roller bearings (JK0S) – fitted in pairs

The bearings are predominantly fitted in pairs

Integral tapered roller bearings are ready-to-fit bearing units, which are greased, sealed on one side and predominantly mounted in pairs in an O arrangement ➤*569*|*7*. The bearings are not separable.

There is no need to set the axial internal clearance

The precise axial internal clearance is not achieved by adjusting the bearings, but is set automatically when the recommended bearing seat tolerances are observed. As a result, there is no need to adjust the bearings against each other in the manner normally required. When integral tapered roller bearings are mounted in pairs, a slot is formed on the outer ring for the retaining ring (snap ring BR). Schaeffler integral tapered roller bearings are interchangeable with each other.

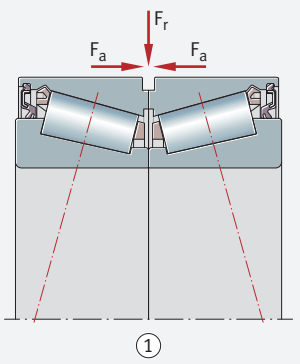
When ordering, please always state the number of single bearings and not the number of bearing pairs. The snap ring must be ordered separately, for example:

- 2 tapered roller bearings JK0S080-A ➤*596*|
- 1 snap ring BR125

7
Paired integral tapered roller bearing, load directions

F_r = *radial load*
F_a = *axial load*

① *Integral tapered roller bearings (JK0S), fitted in pairs in an O arrangement, sealed, clearance preset*



1.2 Load carrying capacity

Bearings of basic design

Capable of supporting axial loads in one direction and radial loads

Single row tapered roller bearings can support axial loads in one direction and high radial loads ➤565| 2 and ➤567| 5. However, they must always be axially adjusted against a second bearing fitted in a mirror image arrangement. This bearing combination is then fitted in an O or X arrangement.

The larger the contact angle, the higher the axial load carrying capacity

The axial load carrying capacity of the bearings is dependent on the nominal contact angle α ➤565| 2. The greater this angle, the higher the axial load to which the bearing can be subjected. The size of the contact angle – and thus the load carrying capacity of the bearing – is indicated by the value e in the product tables ➤596|. The nominal contact angle α in most bearing series is between 10° and 20°. In special series, α is approximately 28° to 30°. Bearings of series 313, 323..-B, T5ED and T7FC have a very high axial load carrying capacity due to their particularly large contact angle.

Basic load rating and fatigue limit load for bearing pairs comprising single bearings

If two bearings of the same size and design are fitted immediately adjacent to each other in an O or X arrangement, the basic dynamic load rating C_r, the basic static load rating C_{0r} and the fatigue limit load C_{ur} of the bearing pair are as follows:

- $C_r = 1{,}715 \cdot C_{r\ \text{single bearing}}$
- $C_{0r} = 2 \cdot C_{0r\ \text{single bearing}}$
- $C_{ur} = 2 \cdot C_{ur\ \text{single bearing}}$

Values for single bearings in the product tables ➤596|, ➤624|.

Matched bearings

Capable of supporting radial loads, axial loads in both directions and moment loads

Matched tapered roller bearings support higher radial forces than single row tapered roller bearings. In X and O arrangements, axial forces and moment loads are supported in both directions. The tandem arrangement can only support axial forces in one direction.

Basic load rating and fatigue limit load for matched bearings

For matched bearing pairs of design DF, the basic load ratings and fatigue limit loads are given in the dimension tables ➤644|.

Integral tapered roller bearings – fitted in pairs

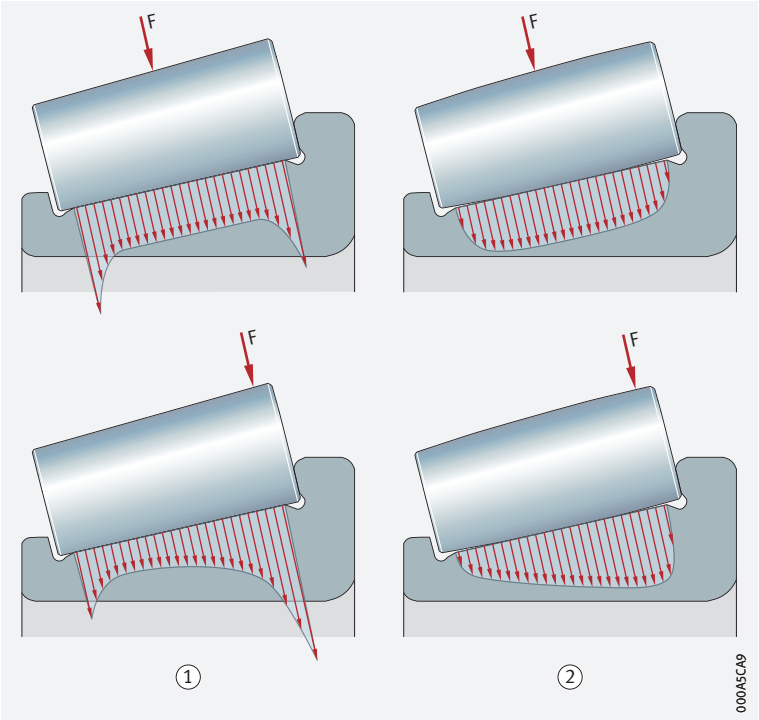
Capable of supporting axial loads in both directions and radial loads

Single row integral tapered roller bearings fitted in pairs in an O arrangement support high axial loads in both directions and high radial loads ➤569| 7.

1.3 Compensation of angular misalignments

Compensation of angular misalignments possible

The modified line contact between the tapered rollers and the raceways ensures optimum stress distribution at the contact points and prevents stress increases at the edges. As a result, the bearings can tolerate certain angular misalignments and give better support of moment loads ➤571| 8.



8 *Uniform load distribution due to optimised roller and raceway profile*

F = *load on the roller*
① *Straight profile*
② *Logarithmic profile*

Permissible angular misalignment

If the load ratio $P/C_{0r} \leqq 0{,}2$, the tilting of the bearing rings relative to each other must not exceed 4 angular minutes. This is, however, subject to the position of the shaft and housing axis remaining constant (no dynamic movements).

If larger loads/misalignments or dynamic angular defects are present, please consult Schaeffler.

1.4 Lubrication

Single row and matched tapered roller bearings

Oil or grease lubrication is possible

Single row and matched tapered roller bearings are not greased. These bearings must be lubricated with oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

Integral tapered roller bearings

Usually maintenance-free due to initial greasing

Integral tapered roller bearings are supplied already greased with a quality grease to DIN 51825. The grease filling is measured such that these bearings are maintenance-free during their operating lives in most applications.

1.5 Sealing

Single row and matched tapered roller bearings

Provide seals in the adjacent construction

Single row and matched tapered roller bearings are not sealed, i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position

Integral tapered roller bearings

Integral tapered roller bearings are sealed on one side with a contact seal (lip seal).

1.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

Bearings with contact seals

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

Speeds for matched bearings fitted in pairs

Observing the thermal balance

For matched bearing pairs, the limiting speeds n_G given in the product tables are permissible if the less favourable thermal balance of the bearing pair is taken into consideration in the operating conditions.

1.7 Noise

The Schaeffler Noise Index (SGI) has been developed as a new feature for comparing the noise level of different bearing types and series. As a result, a noise evaluation of rolling bearings can now be carried out for the first time.

Schaeffler Noise Index

The SGI value is based on the maximum permissible noise level of a bearing in accordance with internal standards, which is calculated on the basis of ISO 15242. In order that different bearing types and series can be compared, the SGI value is plotted against the basic static load rating C_0.

This permits direct comparisons between bearings with the same load carrying capacity. The upper limit value is given in each of the diagrams. This means that the average noise level of the bearings is lower than illustrated in the diagram.

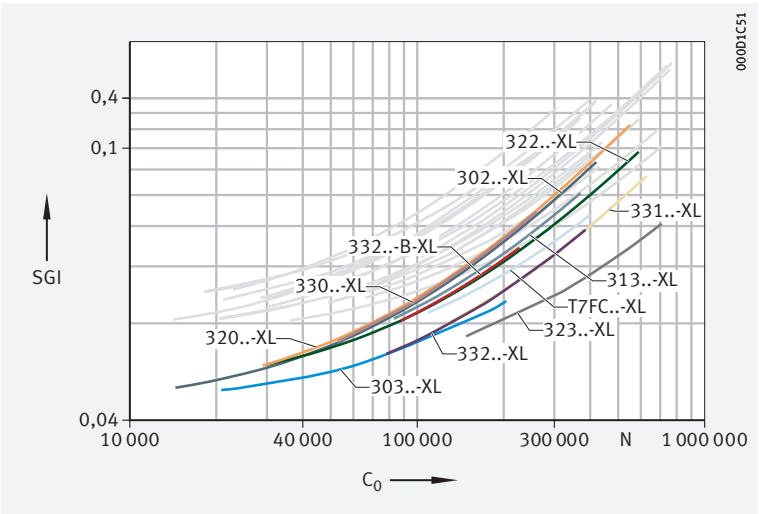
The Schaeffler Noise Index is an additional performance characteristic in the selection of bearings for noise-sensitive applications. The specific suitability of a bearing for an application in terms of installation space, load carrying capacity or speed limit for example, must be checked independently of this.

The Noise Index is currently available for the main series. Additional series will be updated and introduced in subsequent publications.

Further information:
■ ***medias*** *https://medias.schaeffler.com*

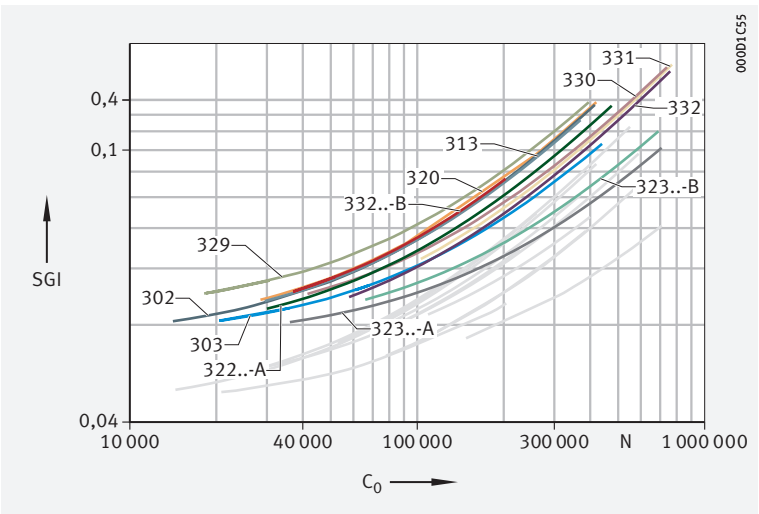
9
Schaeffler Noise Index for X-life tapered roller bearings

In comparison with DIN and ISO standard series
SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



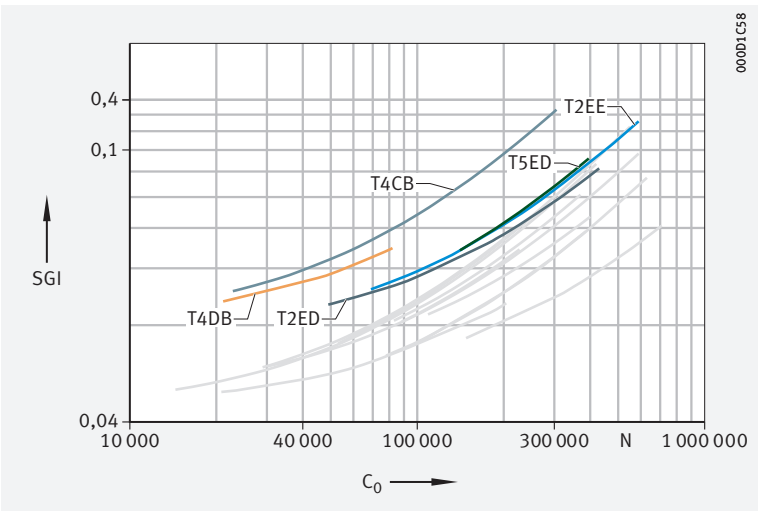
10
Schaeffler Noise Index for DIN tapered roller bearings

In comparison with X-life series
SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



11
Schaeffler Noise Index for ISO tapered roller bearings

In comparison with X-life series
SGI = *Schaeffler Noise Index*
C_0 = *basic static load rating*



1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and tapered rollers
- the cage
- the lubricant
- the seals

Possible operating temperatures of tapered roller bearings ➤*574*| ▦ *1*.

▦ **1**
Permissible temperature ranges

Operating temperature	Open tapered roller bearings				Sealed tapered roller bearings	
	D ≦ 220 mm		D > 220 mm			
	°C		°C		°C	
	from	to	from	to	from	to
	–30	+120	–30	+200	–30	+110
					limited by the lubricating grease and seal material	

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *Sheet steel cages are used as standard*

Open tapered roller bearings have sheet steel cages. Plastic cages are available by agreement.

✎ *Cages for JK0S*

Integral tapered roller bearings have cages made from glass fibre reinforced polyamide PA66.

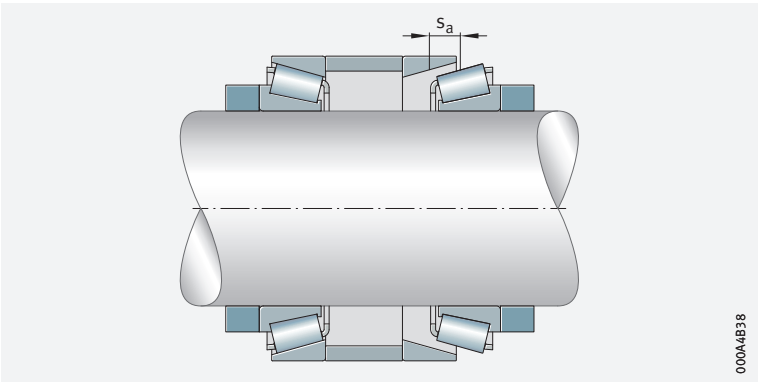
For high continuous temperatures and applications with difficult operating conditions, bearings with sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

1.10 Internal clearance

For tapered roller bearings, the axial internal clearance s_a is a characteristic value. This is the result of mounting the bearing against a second tapered roller bearing ➤*574*| ⧉ *12*.

⧉ **12**
Axial internal clearance

s_a = *axial internal clearance*



Matched tapered roller bearing sets

Simple mounting of the bearing sets in the mounting position is achieved by precise matching of the intermediate ring to the required geometric axial internal clearance. As a result, ready-to-fit, matched bearing sets are made available by Schaeffler. This offers high economical and technical advantages such as:

- Uncomplicated mounting: mounting defects are, for example, avoided by the intermediate ring, which is supplied already matched
- Knowledge and inclusion of the axial deflection of the bearings, as well as highly developed measurement methods, guarantee a precise design of the axial internal clearance. This ensures precise axial guidance of the shaft
- Simple maintenance and high operational reliability are achieved by means of design elements, lubrication grooves and holes in the intermediate ring

Indicating the axial internal clearance

The axial internal clearance is indicated explicitly in the designation. Ordering example ➤*582*|*17*.

1.11 Dimensions, tolerances

Dimension standards – bearings in metric sizes

The main dimensions of bearings in metric sizes correspond to ISO 355:2007 and DIN 720:2008. Bearings in metric sizes with the prefix KJ correspond to ANSI/ABMA 19.1:2011.

Chamfer dimensions

Tapered roller bearings in metric sizes

The limiting dimensions for the chamfer dimensions of metric tapered roller bearings to DIN/ISO correspond to ISO 582:1995. Overview and limiting values for metric tapered roller bearings to DIN/ISO ➤*139*|*30*.

Minimum chamfer dimensions for metric tapered roller bearings to ANSI/ABMA with the prefix KJ correspond to ANSI/ABMA 19.1:2011. The values are given in the product tables.

Bearings in inch sizes to ANSI/ABMA

Minimum chamfer dimensions r_{min} for bearings in inch sizes correspond to ANSI/ABMA 19.2:2013. The values are given in the product tables ➤*624*.

Tolerances

All tapered roller bearings to DIN 720, ISO 355 and integral tapered roller bearings have the tolerance class Normal to ISO 492:2014. In contrast to the standard, X-life bearings achieve improved radial runout values t_{Kia} and t_{Kea}, in addition to dedicated axial runout values t_{Sia} ➤*577*|*13*. Inner ring tolerances ➤*576*|*2*, outer ring tolerances ➤*576*|*3*, width tolerances ➤*576*|*4*. This excludes bearings of series 320, 329, 330, 331, 332 for d ≦ 200 mm: these have the tolerance class 6X ➤*577*. The width tolerances $t_{\Delta Ts}$ of the T7FC series with the suffix XL correspond to the tolerance class 6X in accordance with ISO 492:2014 ➤*577*|*5*.

2 Inner ring tolerances, tolerance class Normal

Tolerance symbols in accordance with ISO 492 ➤117|6
U = *upper limit deviation*
L = *lower limit deviation*
t_{Sia} = *axial runout to Schaeffler standard ➤577|13*

Nominal bore diameter d mm		Bore deviation $t_{\Delta dmp}$ µm		Variation t_{Vdsp} µm	t_{Vdmp} µm	Radial runout ISO 492 t_{Kia} µm	Radial runout X-life t_{Kia} µm	Axial runout X-life t_{Sia} µm
over	incl.	U	L	max.	max.	max.	max.	max.
10	18	0	−12	12	9	15	7	10
18	30	0	−12	12	9	18	8	13
30	50	0	−12	12	9	20	9	13
50	80	0	−15	15	11	25	10	15
80	120	0	−20	20	15	30	13	18
120	180	0	−25	25	19	35	19	20
180	250	0	−30	30	23	50	24	25
250	315	0	−35	35	26	60	28	28
315	400	0	−40	40	30	70	33	35

3 Outer ring tolerances, tolerance class Normal

Tolerance symbols in accordance with ISO 492 ➤117|6
U = *upper limit deviation*
L = *lower limit deviation*

Nominal outside diameter D mm		Deviation of outside diameter $t_{\Delta Dmp}$ µm		Variation t_{VDsp} µm	t_{VDmp} µm	Radial runout ISO 492 t_{Kea} µm	Radial runout X-life t_{Kea} µm
over	incl.	U	L	max.	max.	max.	max.
18	30	0	−12	12	9	18	9
30	50	0	−14	14	11	20	10
50	80	0	−16	16	12	25	13
80	120	0	−18	18	14	35	16
120	150	0	−20	20	15	40	19
150	180	0	−25	25	19	45	21
180	250	0	−30	30	23	50	25
250	315	0	−35	35	26	60	30
315	400	0	−40	40	30	70	34
400	500	0	−45	45	34	80	40
500	630	0	−50	60	38	100	46

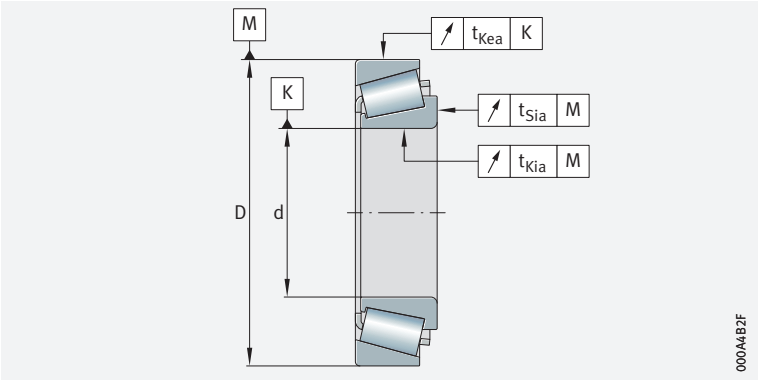
4 Width tolerances, tolerance class Normal

Tolerance symbols in accordance with ISO 492 ➤117|6
U = *upper limit deviation*
L = *lower limit deviation*

Nominal bore diameter d mm		Deviation of inner ring width $t_{\Delta Bs}$ µm		Deviation of outer ring width $t_{\Delta Cs}$ µm		Width deviation $t_{\Delta Ts}$ µm		$t_{\Delta T1s}$ µm		$t_{\Delta T2s}$ µm	
over	incl.	U	L	U	L	U	L	U	L	U	L
10	18	0	−120	0	−120	+200	0	+100	0	+100	0
18	30	0	−120	0	−120	+200	0	+100	0	+100	0
30	50	0	−120	0	−120	+200	0	+100	0	+100	0
50	80	0	−150	0	−150	+200	0	+100	0	+100	0
80	120	0	−200	0	−200	+200	−200	+100	−100	+100	−100
120	180	0	−250	0	−250	+350	−250	+150	−150	+200	−100
180	250	0	−300	0	−300	+350	−250	+150	−150	+200	−100
250	315	0	−350	0	−350	+350	−250	+150	−150	+200	−100
315	400	0	−400	0	−400	+400	−400	+200	−200	+200	−200

13
Axial and radial runout on the drawing

D = *outside diameter*
d = *bearing bore*



Series 320, 329, 330, 331, 332 for d ≦ 200 mm and bearings with the prefix KJ

Bearings 320, 329, 330, 331, 332 for d ≦ 200 mm and bearings with the prefix KJ have dimensional and running tolerances to the tolerance class Normal, but have restricted width tolerances to tolerance class 6X in accordance with ISO 492:2014 ➤*577*|▦ *5*; inner ring tolerances ➤*576*|▦ *2*, outer ring tolerances ➤*576*|▦ *3*.

5
Width tolerances, tolerance class 6X

Tolerance symbols in accordance with ISO 492 ➤117|▦ *6*
U = *upper limit deviation*
L = *lower limit deviation*

Nominal bore diameter		Deviation of inner ring width		Deviation of outer ring width		Width deviation					
d		$t_{\Delta Bs}$		$t_{\Delta Cs}$		$t_{\Delta Ts}$		$t_{\Delta T1s}$		$t_{\Delta T2s}$	
mm		µm		µm		µm		µm		µm	
over	incl.	U	L	U	L	U	L	U	L	U	L
10	18	0	−50	0	−100	+100	0	+50	0	+50	0
18	30	0	−50	0	−100	+100	0	+50	0	+50	0
30	50	0	−50	0	−100	+100	0	+50	0	+50	0
50	80	0	−50	0	−100	+100	0	+50	0	+50	0
80	120	0	−50	0	−100	+100	0	+50	0	+50	0
120	180	0	−50	0	−100	+150	0	+50	0	+100	0
180	200	0	−50	0	−100	+150	0	+50	0	+100	0

Restricted tolerances to tolerance class 5

Tapered roller bearings are also available by agreement with restricted tolerances to tolerance class 5 in accordance with ISO 492:2014; inner ring tolerances ➤*578*|▦*6*, outer ring tolerances ➤*578*|▦*7*, width tolerances ➤*578*|▦*8*.

▦6 *Restricted inner ring tolerances, tolerance class 5*

Tolerance symbols in accordance with ISO 492 ➤*117*|▦*6*
U = *upper limit deviation*
L = *lower limit deviation*

Nominal bore diameter d mm		Bore deviation $t_{\Delta dmp}$ µm		Variation t_{Vdsp} µm	t_{Vdmp} µm	Radial runout t_{Kia} µm	Axial runout of lateral face t_{Sd} µm
over	incl.	U	L	max.	max.	max.	max.
10	18	0	−7	5	5	5	7
18	30	0	−8	6	5	5	8
30	50	0	−10	8	5	6	8
50	80	0	−12	9	6	7	8
80	120	0	−15	11	8	8	9
120	180	0	−18	14	9	11	10
180	250	0	−22	17	11	13	11
250	315	0	−25	19	13	13	13
315	400	0	−30	23	15	15	15

▦7 *Restricted outer ring tolerances, tolerance class 5*

Tolerance symbols in accordance with ISO 492 ➤*117*|▦*6*
U = *upper limit deviation*
L = *lower limit deviation*

Nominal outside diameter D mm		Deviation of outside diameter $t_{\Delta Dmp}$ µm		Variation t_{VDsp} µm	t_{VDmp} µm	Radial runout t_{Kea} µm	Axial runout of lateral face t_{Si} µm
over	incl.	U	L	max.	max.	max.	max.
18	30	0	−8	6	5	6	4
30	50	0	−9	7	5	7	4
50	80	0	−11	8	6	8	4
80	120	0	−13	10	7	10	4,5
120	150	0	−15	11	8	11	5
150	180	0	−18	14	9	13	5
180	250	0	−20	15	10	15	5,5
250	315	0	−25	19	13	18	6,5
315	400	0	−28	22	14	20	6,5
400	500	0	−33	26	17	24	8,5
500	630	0	−38	30	20	30	10

▦8 *Width tolerances, tolerance class 5*

Tolerance symbols in accordance with ISO 492 ➤*117*|▦*6*
U = *upper limit deviation*
L = *lower limit deviation*

Nominal bore diameter d mm		Deviation of inner ring width $t_{\Delta Bs}$ µm		Deviation of outer ring width $t_{\Delta Cs}$ µm		Width deviation $t_{\Delta Ts}$ µm		$t_{\Delta T1s}$ µm		$t_{\Delta T2s}$ µm	
over	incl.	U	L	U	L	U	L	U	L	U	L
10	18	0	−200	0	−200	+200	−200	+100	−100	+100	−100
18	30	0	−200	0	−200	+200	−200	+100	−100	+100	−100
30	50	0	−240	0	−240	+200	−200	+100	−100	+100	−100
50	80	0	−300	0	−300	+200	−200	+100	−100	+100	−100
80	120	0	−400	0	−400	+200	−200	+100	−100	+100	−100
120	180	0	−500	0	−500	+350	−250	+150	−150	+200	−100
180	250	0	−600	0	−600	+350	−250	+150	−150	+200	−100
250	315	0	−700	0	−700	+350	−250	+150	−150	+200	−100
315	400	0	−800	0	−800	+400	−400	+200	−200	+200	−200

Total width tolerance of matched bearings

The tolerance for the total width 2T of matched bearing sets of design DF is determined from the axial internal clearance and the deviations of the width $t_{\Delta Ts}$ of the single bearings. The tolerance for the total width 2B is determined from the deviations of the inner ring width $t_{\Delta Bs}$ of the single bearings ➤ *576*|▦ *4*.

Bearings in inch sizes to ANSI/ABMA

Tapered roller bearings with the prefix K are manufactured as standard to the following tables. The values in the tables meet the requirements for normal tolerances in accordance with ANSI/ABMA 19.2:2013 and, in some cases, exceed these by a considerable margin.
Exception: bearings with the prefix KJ correspond to ISO 492:2014.
The bore and outside diameters of bearings in inch sizes have plus tolerances; inner ring tolerances ➤ *579*|▦ *9*, outer ring tolerances ➤ *579*|▦ *10*, width tolerances ➤ *580*|▦ *11*.

▦ 9
Inner ring tolerances, bearings in inch sizes

Tolerance symbols in accordance with ISO 492 ➤ *117*|▦ *6*
U = *upper limit deviation*
L = *lower limit deviation*
t_{Sia} = *axial runout to Schaeffler standard* ➤ *577*|◯ *13*

Nominal bore diameter		Bore deviation		Radial runout		Axial runout
				According to standard	X-life	X-life
d		$t_{\Delta dmp}$		t_{Kia}	t_{Kia}	t_{Sia}
mm		µm		µm	µm	µm
over	incl.	U	L	max.	max.	max.
10	18	+12	0	15	7	10
18	30	+12	0	18	8	13
30	50	+12	0	20	9	13
50	80	+12	0	25	10	15
80	120	+25	0	30	13	18
120	180	+25	0	35	19	20
180	250	+25	0	50	24	25
250	304,8	+25	0	50	28	28
304,8	315	+50	0	50	28	28
315	400	+50	0	50	33	35
400	500	+50	0	50	39	38
500	609,6	+50	0	50	45	43
609,6	800	+75	0	75	54	–

▦ 10
Outer ring tolerances, bearings in inch sizes

Tolerance symbols in accordance with ISO 492 ➤ *117*|▦ *6*
U = *upper limit deviation*
L = *lower limit deviation*

Nominal outside diameter		Bore deviation		Radial runout	
				According to standard	X-life
D		$t_{\Delta Dmp}$		t_{Kea}	t_{Kea}
mm		µm		µm	µm
over	incl.	U	L	max.	max.
18	30	+25	0	18	9
30	50	+25	0	20	10
50	80	+25	0	25	13
80	120	+25	0	35	16
120	150	+25	0	40	19
150	180	+25	0	45	21
180	250	+25	0	50	25
250	304,8	+25	0	50	29
304,8	609,6	+50	0	50	45
609,6	800	+75	0	75	54

11 *Width tolerances, bearings in inch sizes*

Tolerance symbols in accordance with ISO 492 ➤*117*|▦*6*
U = *upper limit deviation*
L = *lower limit deviation*

Nominal bore diameter d mm		Deviation of inner ring width $t_{\Delta Bs}$ µm		Deviation of outer ring width $t_{\Delta Cs}$ µm		Width deviation $t_{\Delta Ts}$ µm	
over	incl.	U	L	U	L	U	L
10	50	0	−120	0	−120	+200	0
50	80	0	−150	0	−150	+200	0
80	101,6	0	−200	0	−200	+200	0
101,6	120	0	−200	0	−200	+350	−250
120	180	0	−250	0	−250	+350	−250
180	304,8	0	−250	0	−250	+350	−250
304,8	800	0	−250	0	−250	+375	−375

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

Observe the ordering and designation system for matched tapered roller bearings ➤*569* and ➤*582*|🗀*17*.

12 *Suffixes and corresponding descriptions*

Suffix	Description of suffix
A	Modified internal construction (excluding bearings to ANSI/ABMA)
B	Increased contact angle (for bearings to DIN)
X	External dimensions matched to international standards (for bearings to DIN)
XL	X-life

13 *Suffixes for matched bearings*

Suffix	Description of suffix
DF	Two tapered roller bearings matched in an X arrangement, with an intermediate ring between the outer rings
A	Initiates the axial internal clearance range for matched tapered roller bearings; example: A80-120 (axial internal clearance between 80 µm and 120 µm)
VA	Initiates the axial preload range for matched tapered roller bearings; example: VA20-40 (preload between 20 µm and 40 µm)

Tapered roller bearings for special applications

Special tapered roller bearings are available for applications where tapered roller bearing arrangements are used under very difficult operating conditions, for example at high operating temperatures or with heavily contaminated lubricating oil. In such cases, please consult Schaeffler. Suffixes for special designs ➤*580*|▦*14*.

14 *Special designs, available by agreement*

Suffix	Description of suffix
DBA	Two tapered roller bearings matched in an O arrangement, with an intermediate ring between the outer rings and the inner rings in variant A
DFA	Two tapered roller bearings matched in an X arrangement, with an intermediate ring between the outer rings in variant A
DTA	Two tapered roller bearings matched in a tandem arrangement, with an intermediate ring between the outer rings and the inner rings in variant A
P5	Bearing in tolerance class 5

Other special designs with suffixes are available by agreement, such as for:

- dimensional stabilisation
- special heat treatment
- special materials
- tapered roller bearings with reduced friction
- tolerance classes
- restricted width tolerances

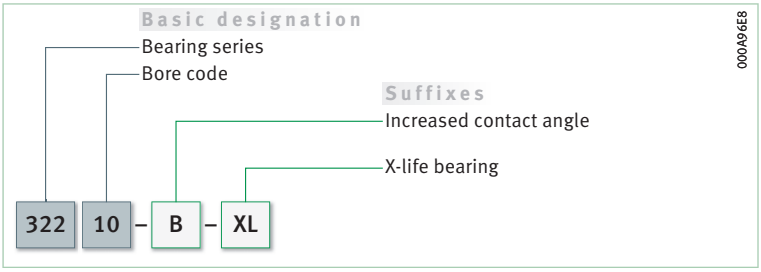
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

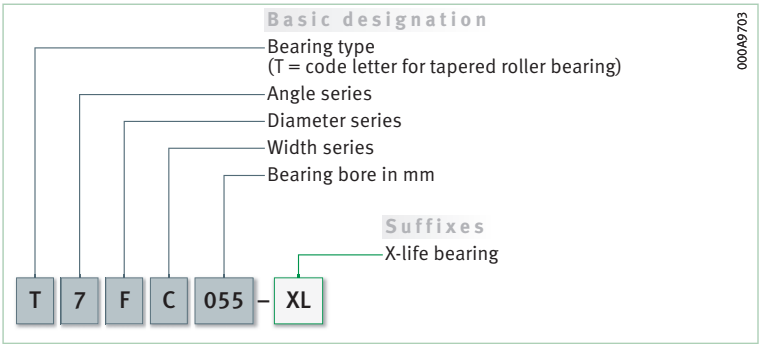
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ➤*581*|*14* to ➤*582*|*18*. The composition of designations is subject to DIN 623-1:1993 ➤*102*|*10*, DIN 720:2008 ➤*101*|*9*, ISO 10317:2008, ISO 355:2007 ➤*101*|*8*, ANSI/ABMA 19.1:2011 and ANSI/ABMA 19.2:2013.

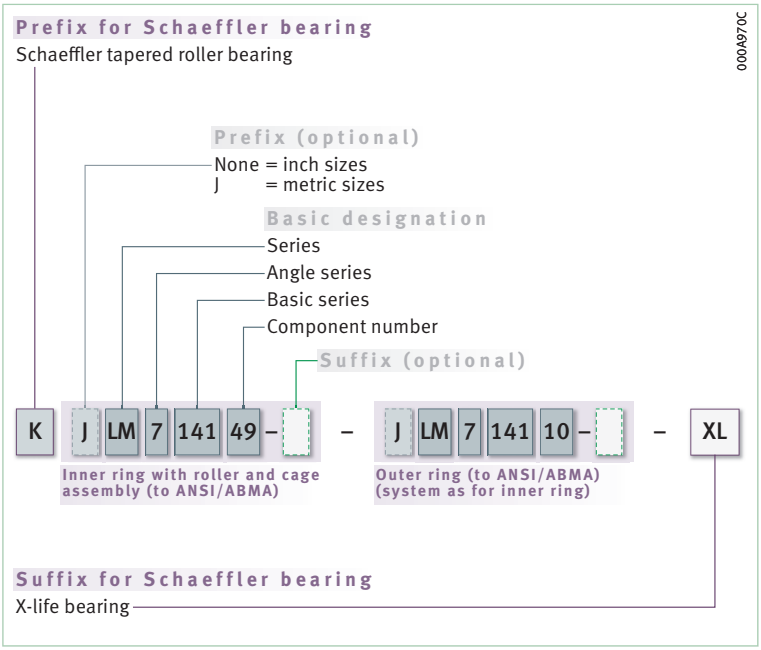
14
Single row tapered roller bearing, metric, to DIN 623-1:1993, DIN 720:2008: designation structure



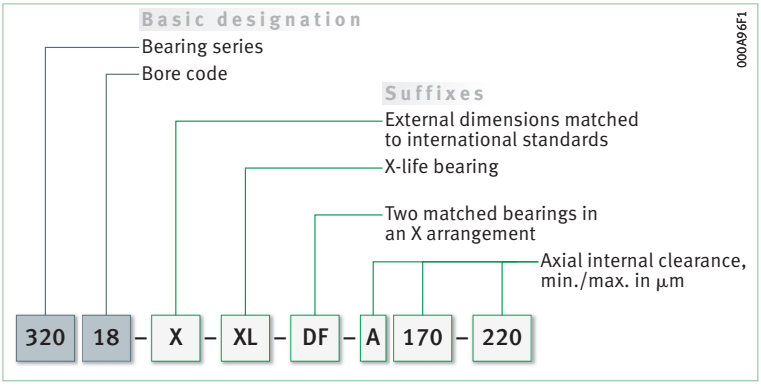
15
Single row tapered roller bearing, metric, to ISO 10317:2008, ISO 355:2007: designation structure



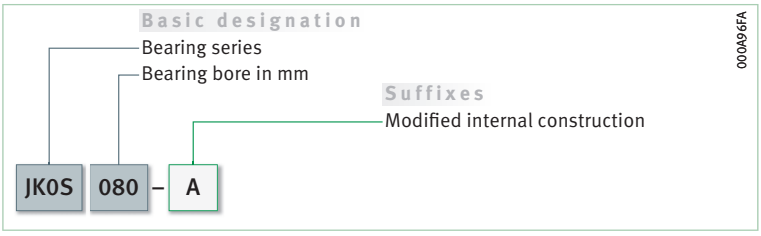
16
Single row tapered roller bearing, metric, to ANSI/ABMA 19.1:2011; inch sizes, to ANSI/ABMA 19.2:2013: designation structure



17
Matched tapered roller bearing pair: designation structure



18
Integral tapered roller bearing: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *P = F_r under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of radial bearings under dynamic load assumes a radial load P of constant magnitude. If the bearing is subjected to purely radial load, the radial load F_r is used directly in the rating life equation for P ($P = F_r$).

✎ *P is a substitute force for combined load*

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

✎ *$F_a/F_r \leqq e$ or $F_a/F_r > e$*

The calculation of P is dependent on the load ratio F_a/F_r and the factor e.

✎ *Single bearings and JKOS bearings*

For single bearings under dynamic load and integral tapered roller bearings ➤ *583* | *1* and ➤ *583* | *2*.

1
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r$$

2
Equivalent dynamic load

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}4 \cdot F_r + Y \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Resulting axial force ➤ *584*	*15*. The information in the section “Calculation of internal resulting axial force F_a for single bearings” must be taken into consideration when calculating F_a ➤ *584*
e, Y	–	Factors ➤ *596*.

✎ *Bearing pairs in O or X arrangement*

For bearing pairs under dynamic load in an O or X arrangement comprising single bearings ➤ *583* | *3* and ➤ *583* | *4*.

3
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r + 1{,}12 \cdot Y \cdot F_a$$

4
Equivalent dynamic load

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}67 \cdot F_r + 1{,}68 \cdot Y \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Resulting axial force ➤ *584*	*15*. The information in the section “Calculation of internal resulting axial force F_a for single bearings” must be taken into consideration when calculating F_a ➤ *584*
e, Y	–	Factors ➤ *596*.

Matched bearing pairs

For matched bearing pairs under dynamic load 313 (320, 322, 329)..-DF-A ➤*584*| *f 5* and ➤*584*| *f 6*.

f 5
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r + Y_1 \cdot F_a$$

f 6
Equivalent dynamic load

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}67 \cdot F_r + Y_2 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Resulting axial force. The information in the section "Calculation of internal resulting axial force F_a for single bearings" must be taken into consideration when calculating F_a ➤*584*
e, Y_1, Y_2	–	Factors ➤*644*|▦.

Calculation of internal resulting axial force F_a for single bearings and for bearing pairs in an X and O arrangement

Reasons why the internal resulting axial force F_a must be taken into consideration

Single row tapered roller bearings transmit radial forces from one raceway to the other oblique to the bearing axis. In the case of a shaft supported by two single row tapered roller bearings of identical or different size, the radial load on bearing A leads, due to the inclination of the raceways ($\alpha_0 \neq 0°$), to an axial load on bearing B. The radial load on bearing B also has the effect of an axial load on bearing A; external forces in bearing systems of this type ➤*585*|⧉ *19* and ➤*585*|⧉ *20*. This internal resulting axial force F_a must be taken into consideration in the calculation of the equivalent dynamic bearing load P.

Equations for calculation

Equations for calculation of resulting axial force F_a ➤*584*|▦ *15*.

Preconditions for calculation

Bearing A is subjected to a radial load F_{rA}, bearing B to a radial load F_{rB} ➤*585*|⧉ *19* and ➤*585*|⧉ *20*. F_{rA} and F_{rB} act at the central pressure points of the bearings and are always regarded as positive. The bearings are clearance-free, but without preload.

The stated equations for determining the axial load correspond to an approximation carried out under the assumption of a load zone of 180° in bearings under radial load. For a more precise calculation, the use of BEARINX or BEARINX-online is recommended.

▦ *15*
Equations for calculation of the internal resulting axial force F_a

Parameters ➤*584*| *f 6*, ➤*585*|⧉ *19 and* ➤*585*|⧉ *20*

$Y_A = Y_B$ ➤*596*|▦

Case	Load ratio	External axial force
1	$\frac{F_{rA}}{Y_A} \leqq \frac{F_{rB}}{Y_B}$	$K_a \geqq 0$
2	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$	$K_a > 0{,}47 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$
3		$K_a \leqq 0{,}47 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$

continued ▼

15
Equations for calculation of the internal resulting axial force F_a

Parameters ➤584| 6, ➤585| 19 *and* ➤585| 20

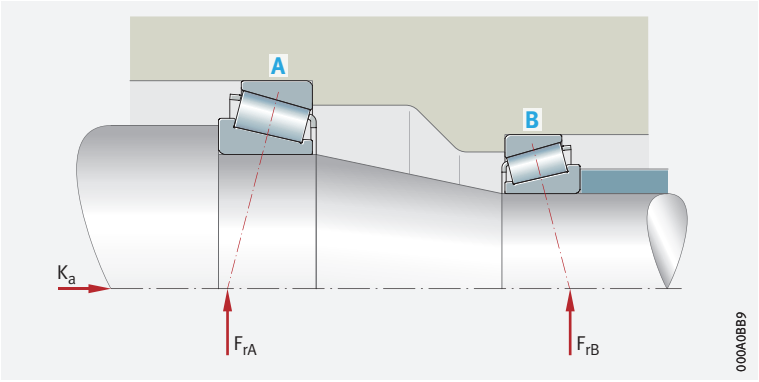
$Y_A = Y_B$ ➤596|

Case	Load ratio	Resulting axial force F_a	
		Bearing A	Bearing B
1	$\frac{F_{rA}}{Y_A} \leqq \frac{F_{rB}}{Y_B}$	$F_{aA} = K_a + 0{,}47 \cdot \frac{F_{rB}}{Y_B}$	F_a is not taken into consideration in the calculation
2	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$	$F_{aA} = K_a + 0{,}47 \cdot \frac{F_{rB}}{Y_B}$	F_a is not taken into consideration in the calculation
3		F_a is not taken into consideration in the calculation	$F_{aB} = 0{,}47 \cdot \frac{F_{rA}}{Y_A} - K_a$

continued ▲

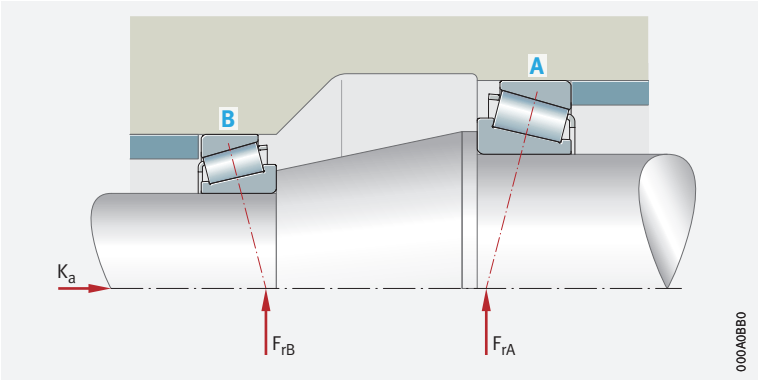
19
Adjusted bearing arrangement with two single row tapered roller bearings in O arrangement, external forces

K_a = *external axial force acting on the shaft*
F_{rA} = *radial load, bearing A*
F_{rB} = *radial load, bearing B*



20
Adjusted bearing arrangement with two single row tapered roller bearings in X arrangement, external forces

K_a = *external axial force acting on the shaft*
F_{rA} = *radial load, bearing A*
F_{rB} = *radial load, bearing B*

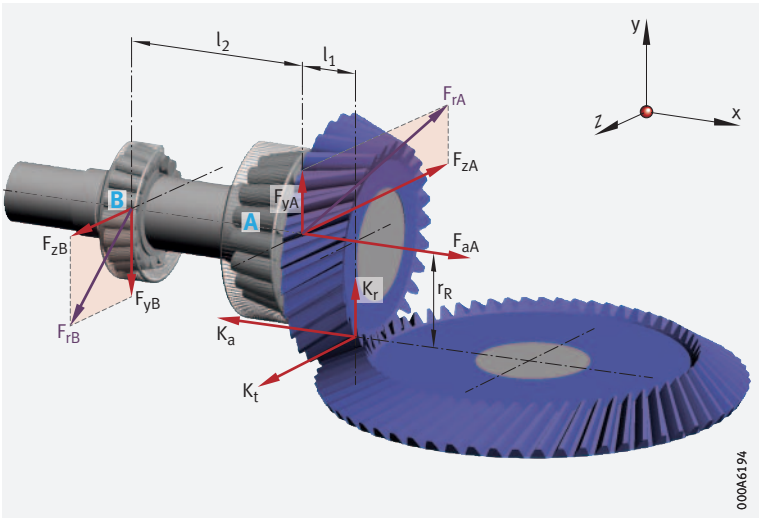


Example of calculation of internal resulting axial force F_a

Bearing arrangement for pinion shaft

Two single row tapered roller bearings are used for the bearing arrangement of a pinion shaft ➤*586*|*21*. The bearing arrangement should be adjusted and in an O arrangement. In order to calculate the basic rating life of bearing A, the equivalent dynamic bearing load P_A must be determined.

21
BEARINX calculation model: load on bearing A and B



K_a = *external axial force = 6,52 kN*
K_r = *external radial force*
K_t = *tangential force*
F_{rA} = *radial load, bearing A (resultant of reaction forces F_{yA} and F_{zA})*
F_{rB} = *radial load, bearing B (resultant of reaction forces F_{yB} and F_{zB})*
l_1 = *spacing between pinion and contact cone apex of bearing A*
l_2 = *spacing between contact cone apexes of bearing A and bearing B*

The resulting radial forces F_{rA} and F_{rB} on the bearings must be determined from the external radial force K_r and the tangential force K_t by the solution of the equilibrium of moments and forces on the shaft. Result:

- F_{rA} = 7,3 kN
- F_{rB} = 2,2 kN

In a bearing arrangement with two single bearings, the resulting axial force F_a must be taken into consideration

Since this is an adjusted bearing arrangement with two single bearings, the internal resulting axial force F_a in the bearing system must be taken into consideration in the bearing calculation in accordance with ➤*584*|*15*. For both tapered roller bearings $Y_A = Y_B = 1,6$. Loads ➤*586*|*21*. Tapered roller bearing 32206-XL is envisaged for bearing A.

Step 1

Calculate the load ratio using ➤*586*|*7*.

7
Load ratio

$$\frac{F_{rA}}{Y_A};\ \frac{F_{rB}}{Y_B}$$

$$\frac{F_{rA}}{Y_A} = \frac{7,3\ \text{kN}}{1,6} = 4,56$$

$$\frac{F_{rB}}{Y_B} = \frac{2,2\ \text{kN}}{1,6} = 1,38$$

$$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$$

Step 2

Compare the result with possible cases ➤584| 15. Case 2 or case 3 can be considered ➤587| 16.

16 *Equations for calculation of the internal resulting axial force F_a*

Parameters ➤584| 6

$Y_A = Y_B = 1{,}6$

Case	Load ratio	External axial force	Resulting axial force F_a	
			Bearing A	Bearing B
2	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$	$K_a > 0{,}47 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$	$F_{aA} = K_a + 0{,}47 \cdot \frac{F_{rB}}{Y_B}$	–
3		$K_a \leqq 0{,}47 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$	–	$F_{aB} = 0{,}47 \cdot \frac{F_{rA}}{Y_A} - K_a$

Step 3

Using ➤587| f 8, check whether case 2 applies ➤587| 16.

f 8 *External axial force in relation to load ratio*

$$K_a > 0{,}47 \cdot \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$$

$$6{,}52\,\text{kN} > 0{,}47\left(\frac{7{,}30\,\text{kN}}{1{,}6} - \frac{2{,}20\,\text{kN}}{1{,}6}\right)$$
$$> 0{,}47\left(4{,}563\,\text{kN} - 1{,}375\,\text{kN}\right)$$
$$6{,}52\,\text{kN} > 1{,}498\,\text{kN}$$

If case 2 applies ➤587| 16. This means that bearing A supports the external axial force K_a.

Step 4

✎ *Calculating F_a*

Using ➤587| f 9, calculate the internal resulting axial force F_a for bearing A. The calculations are in accordance with ➤587| 16, case 2.

f 9 *Internal resulting axial force for bearing A*

$$F_{aA} = K_a + 0{,}47 \cdot \frac{F_{rB}}{Y_B}$$

$$F_{aA} = 6{,}52\,\text{kN} + 0{,}47 \cdot \frac{2{,}20\,\text{kN}}{1{,}6}$$
$$= 7{,}17\,\text{kN}$$

Example of calculation of P

Using value F_a in the calculation of P

Using ➤*588*| *11*, calculate the ratio between the axial force F_a and radial force F_r of bearing A and compare this with the limit value e in accordance with the product table (in this instance e = 0,37).

11
Load ratio, bearing A

$$\frac{F_{aA}}{F_{rA}}$$

$$\frac{7{,}17\ \text{kN}}{7{,}3\ \text{kN}} = 0{,}98$$

This gives:

$$\frac{F_a}{F_r} > e = 0{,}37$$

As a result, the axial force F_a of bearing A (F_{aA}) must be taken into consideration within the equivalent bearing load P_A of bearing A ➤*583*| *2* and thus ➤*588*| *11* apply.

11
P for $F_a/F_r > e$

$$P_A = 0{,}4 \cdot F_{rA} + Y_A \cdot F_{aA}$$

$$P_A = 0{,}4 \cdot 7{,}3\ \text{kN} + 1{,}6 \cdot 7{,}17\ \text{kN}$$
$$= 14{,}39\ \text{kN}$$

The equivalent dynamic bearing load P_A of bearing A is then used to calculate the basic rating life of bearing A.

Equivalent static bearing load

Single bearings and JK0S bearings

For single bearings under static load and integral tapered roller bearings ➤*588*| *12* and ➤*588*| *13*.

12
Equivalent static load

$$\frac{F_{0a}}{F_{0r}} \leqq \frac{1}{2 \cdot Y_0} \quad \Rightarrow \quad P_0 = F_{0r}$$

13
Equivalent static load

$$\frac{F_{0a}}{F_{0r}} > \frac{1}{2 \cdot Y_0} \quad \Rightarrow \quad P_0 = 0{,}5 \cdot F_{0r} + Y_0 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load)
Y_0	–	Axial load factor.

For bearing pairs under static load in an O or X arrangement ➤589| 14.

14 *Equivalent static load*

$$P_0 = F_{0r} + 2 \cdot Y_0 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load)
Y_0	–	Axial load factor.

For matched bearing pairs under static load 313 (320, 322, 329)..-DF-A.. ➤589| 15.

15 *Equivalent static load*

$$P_0 = F_{0r} + Y_0 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load)
Y_0	–	Axial load factor.

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤589| 16.

16 *Static load safety factor*

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is required*

In order that no slippage occurs between the contact partners, the tapered roller bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Radial location of bearings

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤ *152* | ▦ *6* and ➤ *160* | ▦ *7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤ *146*
- conditions of rotation ➤ *147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤ *149* | ▦ *2*
  excluding tapered roller bearings to ANSI/ABMA 19.2:2013 or with special tolerances
- shaft fits ➤ *152* | ▦ *6*
- tolerance classes for bearing seats in housings (radial bearings) ➤ *150* | ▦ *4*
  excluding tapered roller bearings to ANSI/ABMA 19.2:2013 or with special tolerances
- housing fits ➤ *160* | ▦ *7*

Shaft and housing fits for bearings in inch sizes

For bearings with a different tolerance accuracy, such as ANSI/ABMA 19.2:2013 for example, the tolerance class must be shifted in accordance with the fit.

Shaft and housing fits for integral tapered roller bearings

Recommended shaft and housing tolerances for integral tapered roller bearings ➤ *590* | ▦ *17*.

▦ **17** *Tolerances for integral tapered roller bearings*

Circumferential load	Tolerance class	
	Shaft	Housing
on inner ring	m6 Ⓔ	H7 Ⓔ
on outer ring	g6 Ⓔ	M7 Ⓔ

Axial location of bearings

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable ➤ *593* | ⧉ *22*.

Dimensional, geometrical and running accuracy of the bearing seats

✎A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For single row tapered roller bearings with the tolerance class Normal or 6X, the shaft seat should correspond to a minimum of standard tolerance grade IT6
and the housing seat to a minimum of IT7; with tolerance class 5, the shaft seat should correspond to a minimum of IT5 and the housing seat to a minimum of IT6. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤*591*|▦ *18*. Tolerances t_1 to t_3 in accordance with ➤*170*|◯ *11*. Numerical values for IT grades ➤*591*|▦ *19*.

▦ 18
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal 6X	PN (P0) P6X	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
5	P5	Shaft	IT5	Circumferential load IT2/2	Circumferential load IT2/2	IT2
				Point load IT3/2	Point load IT3/2	
		Housing	IT6	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	

▦ 19
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm											
	over	**10**	**18**	**30**	**50**	**80**	**120**	**180**	**250**	**315**	**400**	**500**	**630**
	incl.	**18**	**30**	**50**	**80**	**120**	**180**	**250**	**315**	**400**	**500**	**630**	**800**
	Values in µm												
IT2		2	2,5	2,5	3	4	5	7	8	9	10	11	13
IT3		3	4	4	5	6	8	10	12	13	15	16	18
IT4		5	6	7	8	10	12	14	16	18	20	22	25
IT5		8	9	11	13	15	18	20	23	25	27	32	36
IT6		11	13	16	19	22	25	29	32	36	40	44	50
IT7		18	21	25	30	35	40	46	52	57	63	70	80

Roughness of cylindrical bearing seats

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤592|*20*.

20
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4
500	1 250	3,2[1)]	1,6	1,6	0,8

1) *For the mounting of bearings using the hydraulic method, a value Ra = 1,6 µm must not be exceeded.*

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders are defined in accordance with DIN 5418 ➤596|. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

If single row tapered roller bearings are mounted in a tandem arrangement, it must be ensured that the end faces of the outer rings in contact with each other have sufficient overlap. In case of doubt, please consult Schaeffler.

Cage projection

In the open bearings, the cages project laterally to a certain extent. In order to prevent the cages from grazing the adjacent construction, the lateral minimum distances C_a and C_b in the product tables must be taken into consideration in the design of the adjacent construction ➤596|.

Adjustment of bearings

Always adjust single bearings against a second bearing

Due to their internal construction, single row tapered roller bearings cannot be mounted alone, but must always be used together with a second bearing or as a bearing set ➤593|*22*. In bearing arrangements with two individual single row bearings, these must be adjusted against each other until the requisite preload or desired clearance is achieved ➤593|*22*. The preload is only achieved once the bearings have been fitted and is dependent on the adjustment against the second bearing.

Select the adjustment such that full function and operational reliability of the bearings is ensured

The correct adjustment of the bearings has a considerable influence on the function and operational reliability of the bearing arrangement. If the clearance is too large, the load carrying capacity of the bearings will not be fully utilised; if the preload is too high, the increased friction losses will give rise to higher operating temperatures, which will, in turn, have a negative effect on the rating life of the bearings.

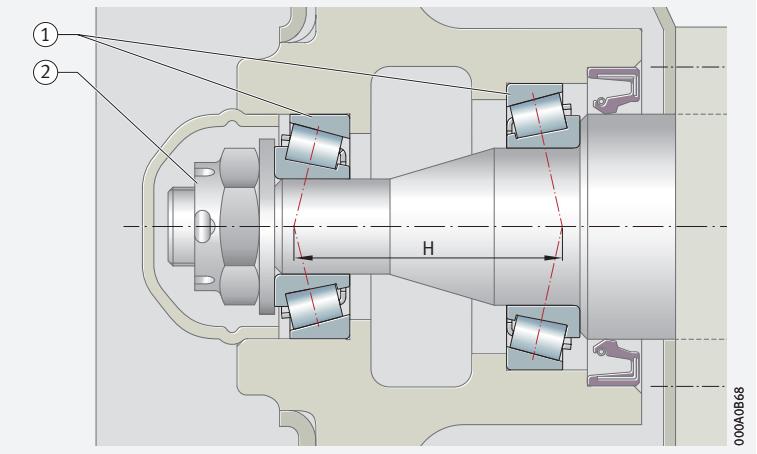
In order that the rollers can be positioned correctly, the shaft or housing must be rotated several times in both directions when adjusting the bearings.

22
Adjusted bearing arrangement with two single row tapered roller bearings

H = *support spacing*

① *Tapered roller bearings mounted in an O arrangement and adjusted against each other*

② *Fixing nut*



Matched bearings

Adjustment not required for matched bearing sets

Matched tapered roller bearings do not need to be adjusted ➤*564|1.1.* The desired internal clearance or required preload is already set at the manufacturing plant.

1.17 Mounting and dismounting

The mounting and dismounting options for tapered roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Ensure that the bearings are not damaged during mounting

Integral tapered roller bearings are not separable. In the mounting of such bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

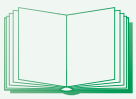
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1.19 Further information



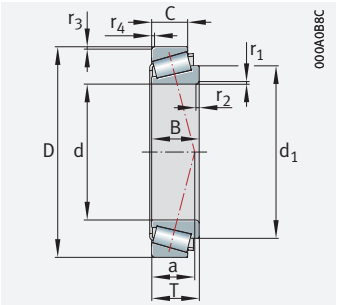
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

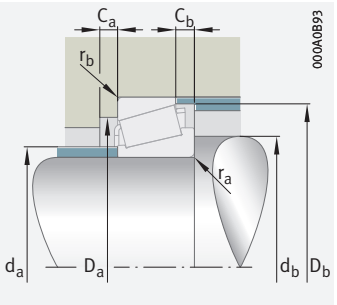
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*



Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 15 – 25 mm

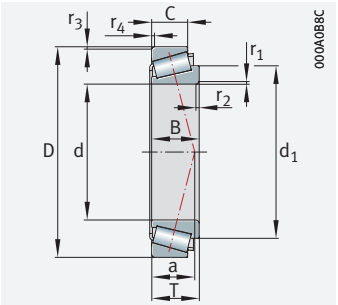
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
15	35	11	10	11,75	17 700	14 400	1 770	28 500	13 400	0,056	**30202-XL**	–
	42	13	11	14,25	27 500	20 800	2 850	23 900	12 000	0,095	**30302-XL**	T2FB015
17	40	12	11	13,25	22 900	19 000	2 550	24 400	11 800	0,079	**30203-XL**	T2DB017
	40	16	14	17,25	34 500	30 000	4 400	23 500	10 700	0,107	**32203-XL**	T2DD017
	47	14	12	15,25	33 000	25 000	3 500	21 300	10 800	0,128	**30303-XL**	T2FB017
	47	19	16	20,25	36 500	36 000	4 150	17 200	10 300	0,175	**32303-A**	T2FD017
20	37	12	9	12	14 500	16 500	1 810	21 100	12 000	0,053	**32904**	T2BD020
	42	15	12	15	28 500	29 000	4 050	21 900	10 700	0,101	**32004-X-XL**	T3CC020
	45	14	10	14	22 200	21 100	2 300	17 500	10 700	0,103	**T4DB020**	T4DB020
	47	14	12	15,25	32 000	27 500	3 900	20 400	10 100	0,126	**30204-XL**	T2DB020
	47	18	15	19,25	39 000	37 000	5 700	19 400	9 500	0,17	**32204-B-XL**	T5DD020
	47	18	15	19,25	40 500	36 500	5 500	20 200	9 700	0,165	**32204-XL**	T2DD020
	50	22	18,5	22	46 000	49 000	5 900	15 400	9 400	0,23	**T2ED020**	T2ED020
	52	15	13	16,25	34 000	32 500	3 700	15 600	9 700	0,173	**30304-A**	T2FB020
	52	15	11	16,25	28 500	27 500	3 150	14 900	8 500	0,173	**31304**	–
	52	21	18	22,25	46 000	47 500	6 200	15 200	9 400	0,24	**32304-A**	T2FD020
22	40	12	9	12	16 000	18 100	1 960	19 300	10 700	0,065	**329/22**	T2BC022
	44	15	11,5	15	24 800	30 500	3 200	16 800	10 200	0,103	**320/22-X**	T3CC022
	47	14	10	14	23 300	22 800	2 490	16 600	10 000	0,109	**T4CB022**	T4CB022
	52	22	18,5	22	47 500	51 000	6 200	14 600	8 800	0,239	**T2ED022**	T2ED022
25	42	12	9	12	14 900	18 800	1 960	18 000	9 900	0,067	**32905**	T2BD025
	47	15	11,5	15	31 500	34 000	4 800	18 900	9 000	0,117	**32005-X-XL**	T4CC025
	47	17	14	17	33 000	41 500	4 750	15 700	9 400	0,139	**33005**	T2CE025
	50	14	10	14	24 200	24 600	2 700	15 300	9 200	0,121	**T4CB025**	T4CB025
	52	15	13	16,25	38 500	35 500	5 200	18 000	9 100	0,154	**30205-XL**	T3CC025
	52	18	15	19,25	44 500	46 000	7 100	17 100	8 100	0,195	**32205-B-XL**	T5CD025
	52	18	16	19,25	47 500	45 000	6 800	17 500	8 000	0,186	**32205-XL**	T2CD025
	52	22	18	22	48 500	58 000	7 100	14 200	8 300	0,223	**33205**	T2DE025
	58	26	21	26	61 000	69 000	8 700	12 900	8 200	0,349	**T2EE025**	T2EE025
	62	17	15	18,25	47 000	45 500	5 300	12 800	8 000	0,264	**30305-A**	T2FB025
	62	17	13	18,25	37 000	38 500	4 200	12 000	7 100	0,264	**31305-A**	T7FB025
	62	24	20	25,25	62 000	66 000	7 900	12 500	7 800	0,372	**32305-A**	T2FD025
	62	24	20	25,25	57 000	66 000	8 200	12 200	7 900	0,405	**32305-B**	–

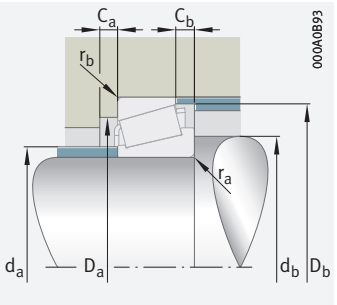
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
15	0,6	0,6	9	25,8	20	19	29	29	32	2	1,5	0,6	0,6	0,35	1,73	0,95
	1	1	10	28,7	22	21	36	36	38	2	3	1	1	0,29	2,11	1,16
17	1	1	10	29,5	23	23	34	34	37	2	2	1	1	0,35	1,74	0,96
	1	1	11	29,3	22	23	34	34	37	3	3	1	1	0,31	1,92	1,06
	1	1	11	32	25	23	40	41	42	2	3	1	1	0,29	2,11	1,16
	1	1	12	31,5	24	23	39	41	43	3	4	1	1	0,29	2,11	1,16
20	0,3	0,3	8	–	24	24	32	34	34	2	3	0,3	0,3	0,32	1,88	1,04
	0,6	0,6	10	33,1	25	25	36	37	39	3	3	0,6	0,6	0,37	1,6	0,88
	1	1	11	–	26	27	38	40	42	3	4	1	1	0,45	1,34	0,73
	1	1	12	34,7	27	26	40	41	43	2	3	1	1	0,35	1,74	0,96
	1	1	15	36,2	26	27	37	41	44	2	4	1	1	0,52	1,16	0,64
	1	1	13	33,9	26	26	39	41	43	3	4	1	1	0,33	1,81	1
	2	1,5	14	–	26	28	41	43	47	4	3	2	1,5	0,33	1,8	0,99
	1,5	1,5	12	36,1	28	27	44	45	47	2	3	1,5	1,5	0,3	2	1,1
	1,5	1,5	16	37,9	26	29	43	47	48	3	5	1,5	1,5	0,73	0,82	0,45
	1,5	1,5	14	35,25	27	27	43	45	47	3	4	1,5	1,5	0,3	2	1,1
22	0,3	0,3	9	–	26	26	35	37	37	2	3	0,3	0,3	0,32	1,88	1,04
	0,6	0,6	11	35,3	27	27	38	39	41	3	3,5	0,6	0,6	0,4	1,51	0,83
	1	1	12	–	28	29	40	42	44	3	4	1	1	0,47	1,27	0,7
	2	1,5	14	–	28	30	43	45	49	4	3,5	2	1,5	0,33	1,84	1,01
25	0,3	0,3	9	–	29	30	37	–	39	2	3	0,3	0,3	0,32	1,88	1,04
	0,6	0,6	12	38,5	30	30	40	42	44	3	3,5	0,6	0,6	0,43	1,39	0,77
	0,6	0,6	11	37,3	30	30	41	42	44	3	3	0,6	0,6	0,29	2,07	1,14
	1	1	13	–	30	32	43	45	47	3	4	1	1	0,51	1,18	0,65
	1	1	13	38,5	31	31	44	46	48	2	3	1	1	0,37	1,6	0,88
	1	1	16	41,3	30	31	41	46	49	3	4	1	1	0,58	1,03	0,57
	1	1	14	39,5	31	31	44	46	48	3	4	1	1	0,36	1,67	0,92
	1	1	14	39,6	30	31	43	46	49	4	4	1	1	0,35	1,71	0,94
	2	1,5	16	–	32	34	48	51	54	4	5	2	1,5	0,33	1,8	0,99
	1,5	1,5	13	42,3	34	32	54	55	57	2	3	1,5	1,5	0,3	2	1,1
	1,5	1,5	21	46,3	34	32	47	55	59	3	5	1,5	1,5	0,83	0,73	0,4
	1,5	1,5	16	42,3	33	32	53	55	57	3	5	1,5	1,5	0,3	2	1,1
	1,5	1,5	20	–	31	36	46	55	58	3	5	1,5	1,5	0,55	1,1	0,6

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 28 – 32 mm

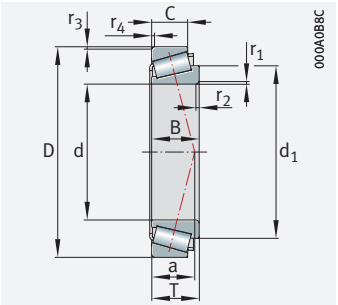
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
28	45	12	9	12	15 800	20 900	2 180	16 700	8 900	0,073	**329/28**	T2BD028
	52	16	12	16	34 000	40 500	4 600	14 200	8 400	0,146	**320/28-X**	T4CC028
	55	14,5	11	15	30 000	31 000	3 450	13 900	8 400	0,151	**T4CB028**	T4CB028
	58	19	16	20,25	42 000	49 500	5 700	12 800	7 600	0,249	**322/28-B**	T5DD028
	58	24	19	24	57 000	66 000	8 200	12 700	7 700	0,296	**332/28**	–
	65	27	22	27	71 000	78 000	9 600	11 600	7 500	0,451	**T2ED028**	T2ED028
	68	18	16	19,75	53 000	51 000	5 900	11 200	7 800	0,342	**303/28**	–
30	47	12	9	12	18 700	24 900	2 750	16 000	8 200	0,075	**32906**	T2BD030
	55	17	13	17	46 000	47 000	7 100	16 100	7 900	0,173	**32006-X-XL**	T4CC030
	55	20	16	20	53 000	57 000	9 000	15 900	8 300	0,212	**33006-XL**	T2CE030
	60	16,5	12,5	17	38 000	38 500	4 600	12 600	8 000	0,207	**T4CB030**	T4CB030
	62	16	14	17,25	52 000	48 500	7 000	12 400	7 400	0,24	**30206-XL**	T3DB030
	62	20	17	21,25	62 000	65 000	9 900	14 200	6 700	0,28	**32206-B-XL**	T5DC030
	62	20	17	21,25	63 000	62 000	9 900	14 600	6 800	0,292	**32206-XL**	T3DC030
	62	25	19,5	25	77 000	78 000	12 600	14 300	7 000	0,355	**33206-XL**	T2DE030
	68	29	24	29	80 000	93 000	11 800	10 900	7 100	0,534	**T2EE030**	T2EE030
	72	19	16	20,75	71 000	61 000	9 300	13 300	7 100	0,402	**30306-XL**	T2FB030
	72	19	14	20,75	45 000	46 500	5 400	10 300	6 400	0,393	**31306-A**	T7FB030
	72	27	23	28,75	80 000	89 000	11 000	10 700	7 000	0,587	**32306-A**	T2FD030
	72	27	23	28,75	73 000	87 000	10 700	10 400	7 100	0,6	**32306-B**	T5FD030
32	52	15	10	14	24 200	30 500	3 100	14 300	7 900	0,114	**329/32**	T2BD032
	58	17	13	17	39 000	48 500	5 700	12 600	7 500	0,19	**320/32-X**	T4CC032
	65	17,5	13,5	18	43 500	45 000	5 400	11 700	7 500	0,262	**T4DB032**	T4DB032
	65	17	15	18,25	49 000	50 000	5 800	12 000	7 600	0,28	**302/32**	T3DB032
	65	26	20,5	26	71 000	85 000	10 700	11 200	6 800	0,41	**332/32**	T2DE032
	72	29	24	29	87 000	100 000	12 500	10 400	6 700	0,594	**T2ED032**	T2ED032

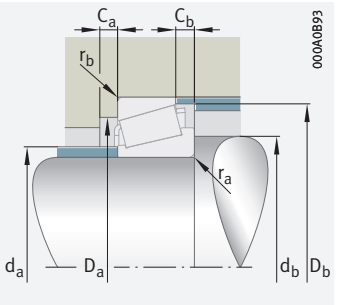
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
28	0,3	0,3	9	–	32	32	41	41	42	2	3	0,3	0,3	0,32	1,88	1,04
	1	1	13	41	33	34	45	46	49	3	4	1	1	0,43	1,39	0,77
	1	1	13	–	34	35	48	49	52	3	4	1	1	0,47	1,27	0,7
	1	1	17	44,9	33	34	46	55	52	3	4	1	1	0,56	1,07	0,59
	1	1	15	43,9	33	34	49	52	55	4	5	1	1	0,34	1,77	0,97
	2	2	18	–	35	37	54	57	61	5	5	2	2	0,34	1,77	0,97
	1,5	1,5	14	46,5	38	35	59	61	62	3	3,5	1,5	1,5	0,3	2	1,1
30	0,3	0,3	9	39,5	34	34	43	43	44	2	3	0,3	0,3	0,32	1,88	1,04
	1	1	14	43,9	35	36	48	49	52	3	4	1	1	0,43	1,39	0,77
	1	1	13	43,8	35	36	48	49	52	3	4	1	1	0,29	2,06	1,13
	1	1	15	–	36	37	52	54	57	3	4,5	1	1	0,47	1,27	0,7
	1	1	14	46,2	37	36	53	56	57	2	3	1	1	0,37	1,6	0,88
	1	1	18	48,5	36	36	50	56	60	3	4	1	1	0,56	1,07	0,59
	1	1	16	46,8	37	36	52	56	59	3	4	1	1	0,37	1,6	0,88
	1	1	16	47	36	36	53	56	59	5	5,5	1	1	0,34	1,76	0,97
	2	2	19	–	37	40	56	60	64	5	5	2	2	0,33	1,81	1
	1,5	1,5	15	49,3	40	37	62	65	66	3	4,5	1,5	1,5	0,32	1,9	1,05
	1,5	1,5	24	54	40	37	55	65	68	3	6,5	1,5	1,5	0,83	0,73	0,4
	1,5	1,5	18	49,3	39	37	59	65	66	4	5,5	1,5	1,5	0,32	1,9	1,05
	1,5	1,5	23	53,2	38	37	59	65	67	4	5,5	1,5	1,5	0,55	1,1	0,6
32	0,6	0,6	10	–	36	37	47	48	49	3	3	0,6	0,6	0,32	1,88	1,04
	1	1	14	46,5	38	38	50	52	55	3	4	1	1	0,45	1,32	0,73
	1	1	16	–	39	40	56	59	61	3	4,5	1	1	0,47	1,27	0,7
	1	1	14	46,7	39	38	56	59	60	3	3	1	1	0,37	1,6	0,88
	1	1	17	–	38	38	55	59	62	4	5,5	1	1	0,35	1,73	0,95
	2	2	19	–	40	42	60	64	67	5	5	2	2	0,34	1,78	0,98

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 35 – 42 mm

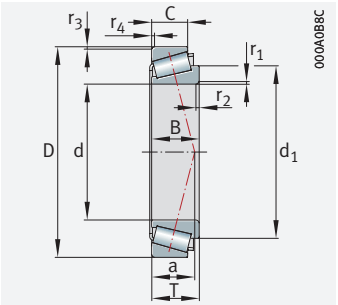
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
35	55	14	11,5	14	27 500	38 000	3 950	13 200	7 000	0,127	**32907**	T2BD035
	62	18	14	18	54 000	57 000	9 000	14 000	7 000	0,228	**32007-X-XL**	T4CC035
	62	21	17	21	53 000	70 000	8 700	11 500	7 200	0,273	**33007**	T2CE035
	70	18	14	19	51 000	55 000	6 600	10 800	6 900	0,317	**T4DB035**	T4DB035
	72	17	15	18,25	64 000	59 000	9 100	12 900	6 400	0,333	**30207-XL**	T3DB035
	72	23	19	24,25	75 000	80 000	12 800	12 200	6 200	0,464	**32207-B-XL**	T5DC035
	72	23	19	24,25	84 000	85 000	13 700	12 500	6 000	0,449	**32207-XL**	T3DC035
	72	28	22	28	103 000	105 000	17 100	12 300	6 200	0,53	**33207-XL**	T2DE035
	78	32,5	27	33	106 000	120 000	15 000	9 400	6 400	0,777	**T2EE035**	T2EE035
	80	21	18	22,75	73 000	75 000	8 800	9 700	6 500	0,53	**30307-A**	T2FB035
	80	21	15	22,75	60 000	64 000	7 600	9 100	5 700	0,51	**31307-A**	T7FB035
	80	31	25	32,75	100 000	113 000	13 800	9 400	6 500	0,76	**32307-A**	T2FE035
	80	31	25	32,75	95 000	116 000	14 600	9 100	6 400	0,8	**32307-B**	T5FE035
38	65	18	14	18	49 000	64 000	7 700	11 100	6 400	0,252	**320/38-X**	–
40	62	15	12	15	32 500	46 000	5 100	11 700	6 200	0,162	**32908**	T2BC040
	68	19	14,5	19	63 000	71 000	11 200	12 800	6 200	0,279	**32008-X-XL**	T3CD040
	68	22	18	22	62 000	87 000	10 800	10 400	6 300	0,34	**33008**	T2BE040
	75	18	14	19	53 000	59 000	7 100	9 900	6 300	0,345	**T4CB040**	T4CB040
	75	26	20,5	26	93 000	104 000	17 200	11 500	5 500	0,517	**33108-XL**	T2CE040
	80	18	16	19,75	73 000	67 000	10 300	11 600	5 900	0,432	**30208-XL**	T3DB040
	80	23	19	24,75	87 000	88 000	14 200	11 000	5 500	0,57	**32208-B-XL**	T5DC040
	80	23	19	24,75	94 000	94 000	15 000	11 200	5 300	0,55	**32208-XL**	T3DC040
	80	32	25	32	105 000	134 000	16 900	9 000	5 700	0,74	**33208**	T2DE040
	85	32,5	28	33	114 000	139 000	17 400	8 600	5 700	0,88	**T2EE040**	T2EE040
	90	23	20	25,25	91 000	102 000	12 000	8 500	5 700	0,75	**30308-A**	T2FB040
	90	23	17	25,25	89 000	83 000	12 400	9 600	5 100	0,72	**31308-XL**	T7FB040
	90	33	27	35,25	142 000	149 000	24 200	9 700	5 600	1,08	**32308-B-XL**	T5FD040
	90	33	27	35,25	143 000	148 000	23 900	10 100	5 700	1,07	**32308-XL**	T2FD040
42	72	20	15,5	20	59 000	82 000	9 800	9 400	5 800	0,345	**320/42-X**	–

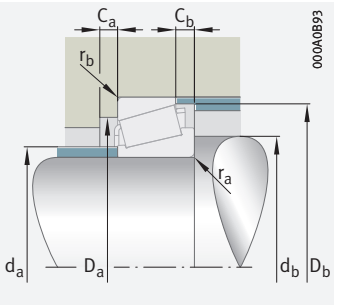
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
35	0,6	0,6	11	–	40	40	50	50	52	3	3	0,6	0,6	0,29	2,06	1,13
	1	1	15	50,1	40	41	54	56	59	4	4	1	1	0,45	1,32	0,73
	1	1	14	–	41	41	55	56	59	4	4	1	1	0,31	1,97	1,08
	1	1	16	–	43	43	61	64	66	4	5	1	1	0,45	1,32	0,73
	1,5	1,5	15	53,4	44	42	62	65	67	3	3	1,5	1,5	0,37	1,6	0,88
	1,5	1,5	22	56	42	42	56	65	68	3	5	1,5	1,5	0,58	1,03	0,57
	1,5	1,5	18	53,9	43	42	61	65	67	3	5,5	1,5	1,5	0,37	1,6	0,88
	1,5	1,5	19	53,9	42	42	61	65	68	5	6	1,5	1,5	0,35	1,7	0,93
	2,5	2	21	–	43	45	65	70	74	6	6	2,5	2	0,32	1,85	1,02
	2	1,5	16	55,7	45	44	70	71	74	3	4,5	2	1,5	0,32	1,9	1,05
	2	1,5	26	59,9	44	44	62	71	76	4	7,5	2	1,5	0,83	0,73	0,4
	2	1,5	20	56,1	44	44	66	71	74	4	7,5	2	1,5	0,32	1,9	1,05
	2	1,5	25	59,8	42	44	61	71	76	4	7,5	2	1,5	0,55	1,1	0,6
38	1	1	14	–	43	44	58	59	62	4	4	1	1	0,37	1,6	0,88
40	0,6	0,6	12	52,1	45	45	57	57	59	3	3	0,6	0,6	0,29	2,07	1,14
	1	1	15	55,2	46	46	60	62	65	4	4,5	1	1	0,38	1,58	0,87
	1	1	15	–	46	46	61	62	65	4	4	1	1	0,28	2,12	1,17
	1	1	18	–	47	48	65	69	71	4	5	1	1	0,49	1,22	0,67
	1,5	1,5	18	59,2	47	47	65	68	71	4	5,5	1,5	1,5	0,36	1,69	0,93
	1,5	1,5	17	59	49	47	69	73	74	3	3,5	1,5	1,5	0,37	1,6	0,88
	1,5	1,5	22	61,1	48	47	65	73	76	4	5,5	1,5	1,5	0,55	1,1	0,6
	1,5	1,5	19	60	48	47	68	73	75	3	5,5	1,5	1,5	0,37	1,6	0,88
	1,5	1,5	21	60,7	47	47	67	73	76	5	7	1,5	1,5	0,36	1,68	0,92
	2,5	2	22	61,9	48	51	70	75	80	6	5	2,5	2	0,34	1,74	0,96
	2	1,5	19	63,3	52	49	77	81	82	3	5	2	1,5	0,35	1,74	0,96
	2	1,5	30	67,7	51	49	71	81	86	4	8	2	1,5	0,83	0,73	0,4
	2	1,5	28	67,3	50	49	69	81	85	4	8	2	1,5	0,55	1,1	0,6
	2	1,5	23	64,2	50	49	73	81	82	4	8	2	1,5	0,35	1,74	0,96
42	1	1	16	58,32	48	48	64	66	69	4	4,5	1	1	0,37	1,6	0,88

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 45 – 50 mm

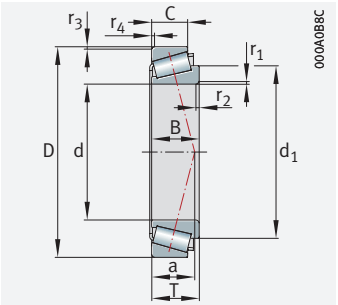
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
45	68	15	12	15	34 500	52 000	5 800	10 600	5 500	0,196	**32909**	T2BC045
	75	20	15,5	20	72 000	86 000	13 500	11 400	5 400	0,354	**32009-X-XL**	T3CC045
	75	24	19	24	85 000	104 000	16 800	11 300	5 900	0,432	**33009-XL**	T2CE045
	80	26	20,5	26	84 000	115 000	14 700	8 800	4 950	0,55	**33109**	T3CE045
	85	19	16	20,75	84 000	83 000	12 900	10 600	5 400	0,488	**30209-XL**	T3DB045
	85	20	15,5	21	69 000	77 000	9 400	8 700	5 600	0,497	**T4DB045**	T4DB045
	85	23	19	24,75	93 000	99 000	15 900	10 100	4 950	0,62	**32209-B-XL**	T5DC045
	85	23	19	24,75	97 000	100 000	16 100	10 300	4 850	0,59	**32209-XL**	T3DC045
	85	32	25	32	107 000	146 000	18 700	8 200	5 200	0,8	**33209**	T3DE045
	90	31	26	32	105 000	141 000	18 200	7 900	5 200	0,967	**T5ED045**	T5ED045
	95	26,5	20	29	105 000	109 000	16 900	8 900	6 100	0,92	**T7FC045-XL**	T7FC045
	95	35	30	36	143 000	175 000	22 000	7 700	5 100	1,19	**T2ED045**	T2ED045
	100	25	22	27,25	111 000	125 000	15 100	7 600	5 100	1	**30309-A**	T2FB045
	100	25	18	27,25	114 000	108 000	16 400	8 600	4 650	0,97	**31309-XL**	T7FB045
	100	36	30	38,25	154 000	193 000	24 400	7 300	4 900	1,43	**32309-A**	T2FD045
	100	36	30	38,25	144 000	187 000	23 600	7 200	5 100	1,46	**32309-BA**	T5FD045
50	72	15	12	15	35 500	55 000	6 200	9 900	5 100	0,2	**32910**	T2BC050
	80	20	15,5	20	75 000	94 000	14 900	10 500	4 950	0,385	**32010-X-XL**	T3CC050
	80	24	19	24	89 000	114 000	18 600	10 500	5 300	0,454	**33010-XL**	T2CE050
	85	26	20	26	86 000	122 000	15 300	8 200	4 600	0,59	**33110**	T3CE050
	90	20	15,5	21	71 000	82 000	10 000	8 100	5 200	0,534	**T4DB050**	T4DB050
	90	20	17	21,75	94 000	97 000	15 100	9 900	5 000	0,56	**30210-XL**	T3DB050
	90	23	19	24,75	98 000	102 000	16 200	9 500	4 600	0,66	**32210-B-XL**	T5DC050
	90	23	19	24,75	104 000	110 000	17 700	9 700	4 500	0,64	**32210-XL**	T3DC050
	90	32	24,5	32	136 000	163 000	27 000	9 300	4 700	0,87	**33210-XL**	T3DE050
	100	35	30	36	150 000	188 000	23 900	7 200	4 750	1,266	**T2ED050**	T2ED050
	100	34,5	29	36	131 000	183 000	23 600	7 000	4 750	1,35	**T5ED050**	T5ED050
	105	29	22	32	127 000	135 000	21 000	8 000	5 600	1,23	**T7FC050-XL**	T7FC050
	110	27	23	29,25	155 000	150 000	23 400	8 300	4 700	1,26	**30310-XL**	T2FB050
	110	27	19	29,25	131 000	125 000	18 900	7 100	4 300	1,24	**31310-XL**	T7FB050
	110	40	33	42,25	187 000	237 000	30 000	6 600	4 550	1,91	**32310-A**	T2FD050
	110	40	33	42,25	165 000	223 000	28 000	6 500	4 800	1,95	**32310-B**	T5FD050

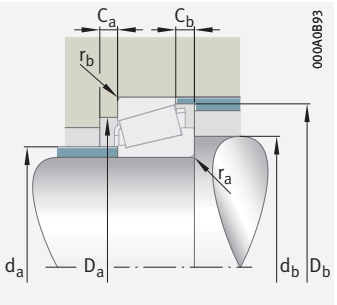
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
45	0,6	0,6	12	57,8	51	50	62	63	64	3	3	0,6	0,6	0,32	1,88	1,04
	1	1	17	62,2	51	51	67	69	72	4	4,5	1	1	0,39	1,53	0,84
	1	1	17	61,8	51	51	67	69	71	4	5	1	1	0,29	2,04	1,12
	1,5	1,5	19	63,8	52	52	69	73	77	4	5,5	1,5	1,5	0,38	1,57	0,86
	1,5	1,5	18	64,8	54	52	74	78	80	3	4,5	1,5	1,5	0,4	1,48	0,81
	2	2	19	–	53	54	74	77	80	5	5,5	2	2	0,46	1,31	0,72
	1,5	1,5	24	66,8	53	52	70	78	82	4	5,5	1,5	1,5	0,59	1,01	0,56
	1,5	1,5	20	65,6	53	52	73	78	80	3	5,5	1,5	1,5	0,4	1,48	0,81
	1,5	1,5	22	66,2	52	52	72	78	81	5	7	1,5	1,5	0,39	1,56	0,86
	4	2	27	–	52	57	70	82	86	5	6	4	2	0,55	1,1	0,6
	2,5	2,5	33	73,5	53	59	71	83	91	5	9	2,5	2,5	0,87	0,69	0,38
	2,5	2,5	24	68,8	54	56	80	83	89	6	6	2,5	2,5	0,32	1,86	1,02
	2	1,5	21	70,65	59	54	86	91	92	3	5	2	1,5	0,35	1,74	0,96
	2	1,5	32	74,7	56	54	79	91	95	4	9	2	1,5	0,83	0,73	0,4
	2	1,5	26	71,1	56	54	82	91	93	4	8	2	1,5	0,35	1,74	0,96
	2	1,5	30	74,2	55	54	76	91	94	5	8	2	1,5	0,55	1,1	0,6
50	0,6	0,6	14	62,2	55	55	66	67	69	3	3	0,6	0,6	0,34	1,76	0,97
	1	1	18	67,3	56	56	72	74	77	4	4,5	1	1	0,42	1,42	0,78
	1	1	18	66,5	56	56	72	74	76	4	5	1	1	0,32	1,9	1,04
	1,5	1,5	21	69,1	56	57	74	78	82	4	6	1,5	1,5	0,41	1,46	0,8
	2	2	21	–	58	59	79	82	85	4	5,5	2	2	0,49	1,23	0,67
	1,5	1,5	20	69,7	58	57	79	83	85	3	4,5	1,5	1,5	0,42	1,43	0,79
	1,5	1,5	25	71,2	57	57	76	83	87	4	6,5	1,5	1,5	0,59	1,02	0,56
	1,5	1,5	22	70	58	57	78	83	85	3	5,5	1,5	1,5	0,42	1,43	0,79
	1,5	1,5	23	72,5	57	57	77	83	87	5	7,5	1,5	1,5	0,41	1,45	0,8
	2,5	2,5	25	73,9	59	61	84	90	94	6	6	2,5	2,5	0,34	1,75	0,96
	4	2	30	–	59	64	78	91	95	5	7	4	2	0,53	1,13	0,62
	3	3	36	81,1	59	65	78	91	100	5	10	3	3	0,87	0,69	0,38
	2,5	2	23	78,4	65	60	95	100	102	4	6	2,5	2	0,35	1,74	0,96
	2,5	2	35	81,7	62	60	87	100	104	4	10	2,5	2	0,83	0,73	0,4
	2,5	2	29	78,35	62	60	90	100	102	5	9	2,5	2	0,35	1,74	0,96
	2,5	2	33	82,3	60	60	83	100	103	5	9	2,5	2	0,55	1,1	0,6

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 55 – 60 mm

Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
55	80	17	14	17	45 500	75 000	9 000	8 900	4 700	0,304	**32911**	T2BC055
	90	23	17,5	23	96 000	118 000	19 400	9 300	4 600	0,56	**32011-X-XL**	T3CC055
	90	27	21	27	111 000	143 000	23 900	9 300	4 850	0,67	**33011-XL**	T2CE055
	95	20	15,5	21	73 000	88 000	10 800	7 600	4 700	0,575	**T4CB055**	T4CB055
	95	30	23	30	135 000	164 000	27 000	8 800	4 250	0,88	**33111-XL**	T3CE055
	100	21	18	22,75	109 000	109 000	16 500	8 900	4 600	0,72	**30211-XL**	T3DB055
	100	25	19	26,75	124 000	130 000	20 500	8 600	4 150	0,88	**32211-B-XL**	–
	100	25	21	26,75	130 000	137 000	21 600	8 700	4 100	0,87	**32211-XL**	T3DC055
	100	35	27	35	164 000	194 000	32 500	8 400	4 350	1,19	**33211-XL**	T3DE055
	105	34,5	29	36	135 000	193 000	25 000	6 600	4 450	1,43	**T5ED055**	T5ED055
	110	39	32	39	176 000	226 000	23 400	6 300	4 300	1,7	**T2ED055**	T2ED055
	115	31	23,5	34	152 000	165 000	26 000	7 200	5 000	1,59	**T7FC055-XL**	T7FC055
	120	29	25	31,5	180 000	175 000	27 500	7 500	4 350	1,64	**30311-XL**	T2FB055
	120	29	21	31,5	145 000	139 000	21 000	6 500	4 100	1,57	**31311-XL**	T7FB055
	120	43	35	45,5	211 000	270 000	34 000	6 100	4 350	2,38	**32311-A**	T2FD055
	120	43	35	45,5	194 000	265 000	34 000	5 900	4 450	2,48	**32311-B**	T5FD055
60	85	17	14	17	49 000	85 000	10 100	8 300	4 250	0,315	**32912**	T2BC060
	95	23	17,5	23	97 000	124 000	20 100	8 800	4 350	0,61	**32012-X-XL**	T4CC060
	95	27	21	27	113 000	149 000	25 000	8 800	4 650	0,71	**33012-XL**	T2CE060
	100	20	15,5	21	75 000	93 000	11 400	7 200	4 400	0,597	**T4CB060**	T4CB060
	100	30	23	30	138 000	172 000	28 500	8 300	3 950	0,93	**33112-XL**	T3CE060
	110	22	19	23,75	122 000	123 000	18 700	8 200	4 250	0,92	**30212-XL**	T3EB060
	110	28	21	29,75	151 000	162 000	26 000	7 700	3 900	1,19	**32212-B-XL**	–
	110	28	24	29,75	158 000	171 000	27 500	8 000	3 850	1,18	**32212-XL**	T3EC060
	110	38	29	38	169 000	237 000	30 500	6 300	4 050	1,55	**33212**	T3EE060
	115	38	31	39	156 000	223 000	28 500	6 000	4 150	1,85	**T5ED060**	T5ED060
	115	39	33	40	189 000	250 000	32 000	6 100	4 050	1,83	**T2EE060**	T2EE060
	125	33,5	26	37	181 000	200 000	32 000	6 700	4 700	2,02	**T7FC060-XL**	T7FC060
	130	31	26	33,5	208 000	204 000	32 000	6 900	4 050	2,02	**30312-XL**	T2FB060
	130	31	22	33,5	173 000	169 000	26 000	6 600	3 800	1,96	**31312-XL**	T7FB060
	130	46	37	48,5	220 000	300 000	38 500	5 400	4 150	3,06	**32312-BA**	T5FD060
	130	46	37	48,5	285 000	310 000	52 000	6 700	4 050	2,97	**32312-XL**	T2FD060

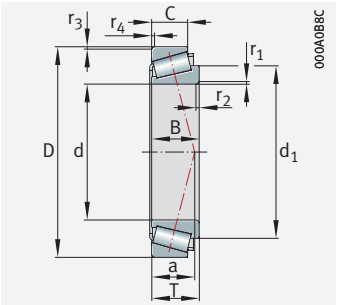
medias *https://www.schaeffler.de/std/1F9A*

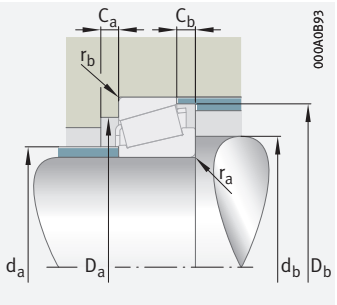
Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
55	1	1	15	68,8	61	61	73	74	76	4	3	1	1	0,31	1,94	1,07
	1,5	1,5	20	75,1	63	62	81	83	86	4	5,5	1,5	1,5	0,41	1,48	0,81
	1,5	1,5	19	74,4	63	62	81	83	86	5	6	1,5	1,5	0,31	1,92	1,06
	2	2	20	–	64	65	85	87	90	5	5,5	2	2	0,45	1,35	0,74
	1,5	1,5	22	76,6	62	62	83	88	91	5	7	1,5	1,5	0,37	1,6	0,88
	2	1,5	21	76	64	64	88	91	94	4	4,5	2	1,5	0,4	1,48	0,81
	2	1,5	26	78	61	64	85	91	96	4	7,5	2	1,5	0,57	1,05	0,58
	2	1,5	23	76,7	63	64	87	91	95	4	5,5	2	1,5	0,4	1,48	0,81
	2	1,5	26	79,4	62	64	85	91	96	6	8	2	1,5	0,4	1,5	0,83
	4	2,5	31	–	63	69	82	95	100	5	7	4	2,5	0,56	1,07	0,59
	2,5	2,5	27	81,5	65	68	93	100	104	7	7	2,5	2,5	0,35	1,73	0,95
	3	3	40	88,8	65	72	86	101	109	5	10,5	3	3	0,87	0,69	0,38
	2,5	2	25	85,4	71	65	104	110	111	4	6,5	2,5	2	0,35	1,74	0,96
	2,5	2	39	88,5	68	65	94	110	113	4	10,5	2,5	2	0,83	0,73	0,4
	2,5	2	30	85	68	65	99	110	111	5	10,5	2,5	2	0,35	1,74	0,96
	2,5	2	36	89,6	65	65	91	110	112	5	10,5	2,5	2	0,55	1,1	0,6
60	1	1	16	73,8	66	66	78	79	81	4	3	1	1	0,33	1,81	1
	1,5	1,5	21	79,6	67	67	85	88	91	4	5,5	1,5	1,5	0,43	1,39	0,77
	1,5	1,5	20	78,5	67	67	85	88	90	5	6	1,5	1,5	0,33	1,83	1,01
	2	2	22	79,9	68	70	89	92	95	4	5,5	2	2	0,47	1,27	0,7
	1,5	1,5	24	81,3	67	67	88	93	96	5	7	1,5	1,5	0,4	1,51	0,83
	2	1,5	22	82,4	70	69	96	101	103	4	4,5	2	1,5	0,41	1,48	0,81
	2	1,5	29	85,6	69	69	92	104	105	5	8,5	2	1,5	0,57	1,05	0,58
	2	1,5	25	83,2	69	69	95	101	104	4	5,5	2	1,5	0,4	1,48	0,81
	2	1,5	28	86,2	69	69	93	101	105	6	9	2	1,5	0,4	1,48	0,82
	4	2,5	33	90,9	69	76	91	103	110	6	8	4	2,5	0,53	1,13	0,62
	2,5	2,5	28	86,3	69	73	98	105	109	7	7	2,5	2,5	0,33	1,8	0,99
	3	3	42	95,8	71	78	94	111	119	6	11	3	3	0,82	0,73	0,4
	3	2,5	26	92,2	77	72	112	118	120	5	7,5	3	2,5	0,35	1,74	0,96
	3	2,5	41	96,2	73	72	103	118	123	5	11,5	3	2,5	0,83	0,73	0,4
	3	2,5	39	97	71	72	100	118	122	6	11,5	3	2,5	0,55	1,1	0,6
	3	2,5	32	92,5	74	72	107	118	120	6	11,5	3	2,5	0,35	1,74	0,96



Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 65 – 70 mm

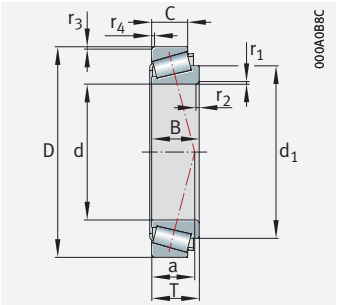
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
65	90	17	14	17	49 500	88 000	10 400	7 800	4 000	0,323	**32913**	T2BC065
	100	23	17,5	23	97 000	125 000	20 800	8 300	4 150	0,64	**32013-X-XL**	T4CC065
	100	27	21	27	118 000	161 000	27 000	8 300	4 300	0,76	**33013-XL**	T2CE065
	105	20	15,5	21	80 000	102 000	12 500	6 800	4 100	0,65	**T4CB065**	T4CB065
	110	34	26,5	34	177 000	226 000	37 500	6 800	3 650	1,31	**33113-XL**	T3DE065
	120	23	20	24,75	142 000	143 000	22 000	7 400	3 850	1,16	**30213-XL**	T3EB065
	120	31	23	32,75	174 000	185 000	29 500	7 100	3 750	1,53	**32213-B-XL**	–
	120	31	27	32,75	185 000	202 000	32 500	7 200	3 600	1,55	**32213-XL**	T3EC065
	120	38	31	39	161 000	235 000	30 000	5 700	3 950	1,94	**T5ED065**	T5ED065
	120	41	32	41	242 000	285 000	47 500	6 900	3 750	2,04	**33213-XL**	T3EE065
	130	33,5	26	37	186 000	211 000	33 500	6 300	4 450	2,15	**T7FC065-XL**	T7FC065
	140	33	28	36	196 000	228 000	27 500	5 300	3 850	2,48	**30313-A**	T2GB065
	140	33	23	36	193 000	188 000	29 000	6 100	3 650	2,35	**31313-XL**	T7GB065
	140	48	39	51	248 000	340 000	44 000	5 000	3 850	3,68	**32313-BA**	T5GD065
	140	48	39	51	320 000	350 000	57 000	6 200	3 750	3,6	**32313-XL**	T2GD065
70	100	20	16	20	85 000	116 000	18 700	8 400	3 800	0,5	**32914-XL**	T2BC070
	110	20	15,5	21	82 000	108 000	13 000	6 500	3 800	0,68	**T4CB070**	T4CB070
	110	25	19	25	123 000	159 000	26 500	7 600	3 800	0,88	**32014-X-XL**	T4CC070
	110	31	25,5	31	136 000	223 000	29 500	6 200	3 850	1,11	**33014**	T2CE070
	120	37	29	37	174 000	260 000	33 500	5 700	3 500	1,71	**33114**	T3DE070
	125	24	21	26,25	155 000	162 000	25 000	7 100	3 700	1,29	**30214-XL**	T3EB070
	125	31	23,5	33,25	179 000	196 000	31 500	6 700	3 550	1,64	**32214-B-XL**	–
	125	31	27	33,25	194 000	216 000	34 500	6 200	3 450	1,65	**32214-XL**	T3EC070
	125	41	32	41	249 000	300 000	50 000	6 600	3 550	2,14	**33214-XL**	T3EE070
	130	40	34	42	195 000	295 000	38 000	5 200	3 550	2,51	**T5ED070**	T5ED070
	130	42	35	43	225 000	310 000	40 000	5 300	3 550	2,52	**T2ED070**	T2ED070
	140	35,5	27	39	208 000	237 000	38 000	5 800	4 150	2,62	**T7FC070-XL**	T7FC070
	150	35	30	38	223 000	260 000	31 500	4 900	3 650	3,031	**30314-A**	T2GB070
	150	35	25	38	221 000	219 000	33 500	5 700	3 450	2,9	**31314-XL**	T7GB070
	150	51	42	54	285 000	395 000	49 500	4 650	3 600	4,53	**32314-BA**	T5GD070
	150	51	42	54	370 000	410 000	66 000	5 800	3 500	4,39	**32314-XL**	T2GD070

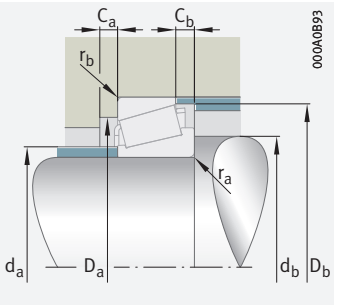
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
65	1	1	17	79	71	71	83	84	86	4	3	1	1	0,35	1,7	0,93
	1,5	1,5	23	85,1	72	72	90	93	97	4	5,5	1,5	1,5	0,46	1,31	0,72
	1,5	1,5	21	83,9	72	72	89	93	96	5	6	1,5	1,5	0,35	1,72	0,95
	2	2	24	–	73	75	94	97	100	4	5,5	2	2	0,5	1,2	0,66
	1,5	1,5	26	89,5	73	72	96	103	106	6	7,5	1,5	1,5	0,39	1,55	0,85
	2	1,5	23	90,6	77	74	106	111	113	4	4,5	2	1,5	0,4	1,48	0,81
	2	1,5	31	92,1	74	74	101	111	114	5	9,5	2	1,5	0,56	1,07	0,59
	2	1,5	27	92	76	74	104	111	115	4	5,5	2	1,5	0,4	1,48	0,81
	4	2,5	35	95,85	74	80	95	108	115	6	8	4	2,5	0,56	1,07	0,59
	2	1,5	30	93,1	74	74	102	111	115	6	9	2	1,5	0,39	1,54	0,85
	3	3	45	101	75	83	98	116	124	5	11	3	3	0,87	0,69	0,38
	3	2,5	29	99,6	83	77	122	128	130	5	8	3	2,5	0,35	1,74	0,96
	3	2,5	44	103,5	79	77	111	128	132	5	13	3	2,5	0,83	0,73	0,4
	3	2,5	42	104,3	77	77	109	128	133	6	12	3	2,5	0,55	1,1	0,6
	3	2,5	35	99,6	80	77	117	128	130	6	12	3	2,5	0,35	1,74	0,96
70	1	1	18	85,9	76	76	93	94	96	4	4	1	1	0,32	1,9	1,05
	2	2	23	90,1	78	81	100	102	106	4	5,5	2	2	0,46	1,3	0,72
	1,5	1,5	24	91,7	78	77	98	103	105	5	6	1,5	1,5	0,43	1,38	0,76
	1,5	1,5	22	91	78	77	99	103	105	5	5,5	1,5	1,5	0,28	2,11	1,16
	2	1,5	28	97	79	79	104	111	115	6	8	2	1,5	0,38	1,58	0,87
	2	1,5	25	95,2	81	79	110	116	118	4	5	2	1,5	0,42	1,43	0,79
	2	1,5	34	97,5	78	79	105	116	120	5	9,5	2	1,5	0,59	1,02	0,56
	2	1,5	28	96,4	80	79	108	116	119	4	6	2	1,5	0,42	1,43	0,79
	2	1,5	31	98,2	79	79	107	116	120	7	9	2	1,5	0,41	1,47	0,81
	4	2,5	37	–	81	87	105	119	124	7	8	4	2,5	0,52	1,15	0,63
	3	2,5	31	99,6	80	85	111	119	123	7	8	3	2,5	0,33	1,8	0,99
	3	3	47	108,8	81	90	106	126	133	6	12	3	3	0,87	0,69	0,38
	3	2,5	30	106,6	89	82	130	138	140	5	8	3	2,5	0,35	1,74	0,96
	3	2,5	47	110,4	84	82	118	138	141	5	13	3	2,5	0,83	0,73	0,4
	3	2,5	44	112	83	82	117	138	143	7	12	3	2,5	0,55	1,1	0,6
	3	2,5	37	106,4	86	82	125	138	140	6	12	3	2,5	0,35	1,74	0,96

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 75 – 80 mm

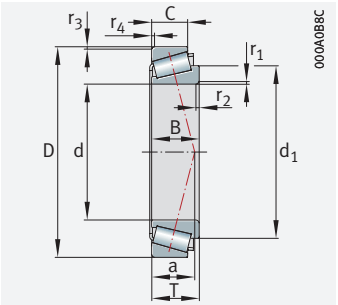
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
75	105	20	16	20	74 000	124 000	15 400	6 600	3 550	0,52	**32915**	T2BC075
	115	20	15,5	21	88 000	122 000	14 500	6 100	3 500	0,7	**T4CB075**	T4CB075
	115	25	19	25	124 000	165 000	27 500	7 200	3 600	0,92	**32015-X-XL**	T4CC075
	115	31	25,5	31	164 000	233 000	40 000	7 100	3 700	1,16	**33015-XL**	T2CE075
	125	37	29	37	178 000	275 000	35 000	5 400	3 300	1,79	**33115**	T3DE075
	130	25	22	27,25	160 000	169 000	26 500	6 700	3 600	1,4	**30215-XL**	T4DB075
	130	31	27	33,25	201 000	227 000	37 000	6 500	3 250	1,75	**32215-XL**	T4DC075
	130	41	31	41	245 000	310 000	52 000	6 300	3 350	2,23	**33215-XL**	T3EE075
	135	40	34	42	200 000	310 000	39 500	5 000	3 400	2,66	**T5ED075**	T5ED075
	135	42	35	43	233 000	330 000	42 000	5 100	3 350	2,655	**T2ED075**	T2ED075
	150	38	29	42	238 000	275 000	43 000	5 400	3 950	3,22	**T7FC075-XL**	T7FC075
	160	37	31	40	250 000	295 000	35 000	4 600	3 400	3,68	**30315-A**	T2GB075
	160	37	26	40	240 000	236 000	35 500	5 300	3 300	3,45	**31315-XL**	T7GB075
	160	55	45	58	360 000	475 000	58 000	4 450	3 300	5,3	**32315-A**	T2GD075
	160	55	45	58	330 000	470 000	55 000	4 350	3 400	5,525	**32315-B**	T5GD075
80	110	20	16	20	77 000	132 000	16 400	6 300	3 350	0,571	**32916**	T2BC080
	125	22,5	17,5	24	114 000	150 000	18 200	5 600	3 450	1	**T4CB080**	T4CB080
	125	29	22	29	162 000	212 000	34 500	6 600	3 450	1,29	**32016-X-XL**	T3CC080
	125	36	29,5	36	208 000	290 000	49 500	6 500	3 550	1,63	**33016-XL**	T2CE080
	130	37	29	37	188 000	300 000	38 000	5 200	3 050	1,9	**33116**	T3DE080
	140	26	22	28,25	184 000	193 000	29 000	6 300	3 400	1,67	**30216-XL**	T3EB080
	140	33	28	35,25	234 000	265 000	41 500	6 100	3 050	2,14	**32216-XL**	T3EC080
	140	40	34	42	204 000	320 000	41 000	4 800	3 250	2,75	**T5ED080**	T5ED080
	140	46	35	46	295 000	385 000	63 000	5 800	3 150	2,93	**33216-XL**	T3EE080
	145	45	38	46	265 000	370 000	46 500	4 750	3 200	3,26	**T2ED080**	T2ED080
	160	41	31	45	270 000	315 000	49 000	5 100	3 750	3,98	**T7FC080-XL**	T7FC080
	170	39	33	42,5	285 000	345 000	40 000	4 250	3 200	4,37	**30316-A**	T2GB080
	170	39	27	42,5	270 000	270 000	39 500	5 000	3 150	4,09	**31316-XL**	T7GB080
	170	58	48	61,5	355 000	510 000	62 000	4 100	3 300	6,74	**32316-B**	T5GD080
	170	58	48	61,5	475 000	540 000	84 000	5 000	3 150	6,4	**32316-XL**	T2GD080

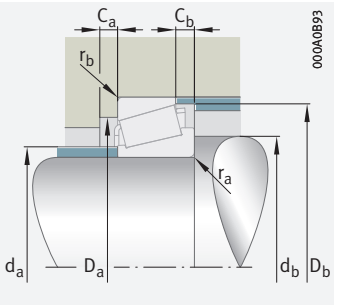
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
75	1	1	19	90,5	81	81	98	99	101	4	4	1	1	0,33	1,8	0,99
	2	2	25	95,1	83	85	105	107	111	4	5,5	2	2	0,48	1,24	0,68
	1,5	1,5	26	97	83	82	103	108	110	5	6	1,5	1,5	0,46	1,31	0,72
	1,5	1,5	23	96,5	83	82	104	108	110	6	5,5	1,5	1,5	0,3	2,01	1,11
	2	1,5	30	101,4	84	84	109	116	120	6	8	2	1,5	0,4	1,51	0,83
	2	1,5	27	100,4	86	84	115	121	124	4	5	2	1,5	0,43	1,38	0,76
	2	1,5	30	101,6	85	84	115	121	124	4	6	2	1,5	0,43	1,38	0,76
	2	1,5	32	104,2	83	84	111	121	125	7	10	2	1,5	0,43	1,4	0,77
	5	2,5	38	–	85	92	109	124	129	6	8	5	2,5	0,55	1,1	0,6
	3	2,5	32	–	86	89	116	124	128	7	8	3	2,5	0,35	1,73	0,95
	3	3	51	116,6	87	96	114	136	143	6	13	3	3	0,87	0,69	0,38
	3	2,5	32	114	95	87	139	148	149	5	9	3	2,5	0,35	1,74	0,96
	3	2,5	50	117,6	91	87	127	148	151	6	14	3	2,5	0,83	0,73	0,4
	3	2,5	39	114	91	87	133	148	149	7	13	3	2,5	0,35	1,74	0,96
	3	2,5	47	120	90	87	124	148	151	7	14	3	2,5	0,55	1,1	0,6
80	1	1	20	96,1	86	86	102	104	106	4	4	1	1	0,35	1,71	0,94
	2	2	26	101	86	90	113	115	120	5	6,5	2	2	0,45	1,33	0,73
	1,5	1,5	27	104,2	89	87	112	117	120	6	7	1,5	1,5	0,42	1,42	0,78
	1,5	1,5	26	103,2	90	87	112	117	119	6	6,5	1,5	1,5	0,28	2,16	1,19
	2	1,5	31	106,6	89	89	114	121	126	6	8	2	1,5	0,42	1,44	0,79
	2,5	2	28	106,4	91	90	124	130	132	4	6	2,5	2	0,42	1,43	0,79
	2,5	2	31	107,7	90	90	122	130	134	5	7	2,5	2	0,42	1,43	0,79
	5	3	40	–	89	97	113	128	124	6	8	5	3	0,57	1,05	0,58
	2,5	2	35	112,2	89	90	119	130	135	7	11	2,5	2	0,43	1,41	0,78
	3	2,5	33	110,3	92	95	125	134	137	7	8	3	2,5	0,32	1,88	1,03
	3	3	54	124,3	93	103	121	146	152	7	14	3	3	0,87	0,69	0,38
	3	2,5	34	121,7	102	92	148	158	159	5	9,5	3	2,5	0,35	1,74	0,96
	3	2,5	53	124,4	97	92	134	158	159	6	15	3	2,5	0,83	0,73	0,4
	3	2,5	49	126,85	96	92	130	158	160	7	13,5	3	2,5	0,55	1,1	0,6
	3	2,5	42	120,6	98	92	142	158	159	7	13,5	3	2,5	0,35	1,74	0,96

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 85 – 90 mm

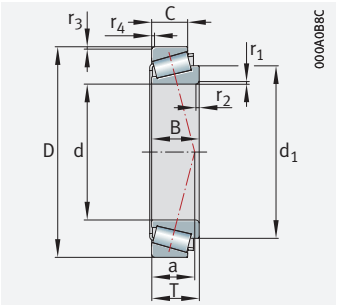
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
85	120	23	18	23	95 000	160 000	20 000	5 700	3 250	0,8	**32917**	T2BC085
	130	22,5	17,5	24	120 000	163 000	19 500	5 400	3 250	1,05	**T4CB085**	T4CB085
	130	29	22	29	167 000	224 000	36 500	6 300	3 250	1,36	**32017-X-XL**	T4CC085
	130	36	29,5	36	184 000	315 000	40 500	5 100	3 300	1,758	**33017**	T2CE085
	140	41	32	41	260 000	350 000	57 000	5 800	2 950	2,54	**33117-XL**	T3DE085
	145	40	34	42	210 000	340 000	42 500	4 600	3 050	2,87	**T5ED085**	T5ED085
	150	28	24	30,5	212 000	226 000	34 000	5 900	3 250	2,08	**30217-XL**	T3EB085
	150	36	30	38,5	270 000	305 000	47 500	5 700	2 950	2,7	**32217-XL**	T3EC085
	150	46	38	46	275 000	395 000	49 000	4 600	3 050	3,4	**T2ED085**	T2ED085
	150	49	37	49	345 000	440 000	70 000	5 400	3 050	3,6	**33217-XL**	T3EE085
	170	45	33	48	310 000	365 000	56 000	4 800	3 550	4,76	**T7FC085-XL**	T7FC085
	180	41	34	44,5	310 000	375 000	43 000	4 050	3 100	5	**30317-A**	T2GB085
	180	41	28	44,5	300 000	300 000	43 500	4 700	3 000	4,73	**31317-XL**	T7GB085
	180	60	49	63,5	480 000	590 000	92 000	4 650	3 000	7,7	**32317-B-XL**	T5GD085
	180	60	49	63,5	510 000	580 000	89 000	4 750	3 000	7,3	**32317-XL**	T2GD085
90	125	23	18	23	99 000	171 000	21 400	5 500	3 050	0,918	**32918**	T2BC090
	135	22,5	17,5	24	119 000	164 000	19 300	5 100	3 100	1,1	**T4CB090**	T4CB090
	140	32	24	32	195 000	255 000	41 000	5 900	3 200	1,77	**32018-X-XL**	T3CC090
	140	39	32,5	39	255 000	365 000	60 000	5 700	3 150	2,26	**33018-XL**	T2CE090
	150	40	34	42	214 000	355 000	44 000	4 450	2 900	2,99	**T5ED090**	T5ED090
	150	45	35	45	315 000	425 000	68 000	5 400	2 800	3,16	**33118-XL**	T3DE090
	155	46	38	46	280 000	410 000	50 000	4 400	2 900	3,5	**T2ED090**	T2ED090
	160	30	26	32,5	239 000	260 000	38 000	5 500	3 050	2,59	**30218-XL**	T3FB090
	160	40	34	42,5	310 000	360 000	56 000	5 300	2 850	3,43	**32218-XL**	T3FC090
	160	55	42	55	350 000	520 000	63 000	4 200	3 000	4,76	**33218**	T3FE090
	175	45	33	48	315 000	380 000	58 000	4 600	3 400	4,97	**T7FC090-XL**	T7FC090
	190	43	36	46,5	330 000	395 000	44 500	3 850	3 050	5,8	**30318-A**	T2GB090
	190	43	30	46,5	325 000	325 000	46 500	4 450	2 900	5,5	**31318-XL**	T7GB090
	190	64	53	67,5	435 000	630 000	75 000	3 650	2 850	9,29	**32318-B**	–
	190	64	53	67,5	580 000	660 000	100 000	4 500	2 750	8,21	**32318-XL**	T2GD090

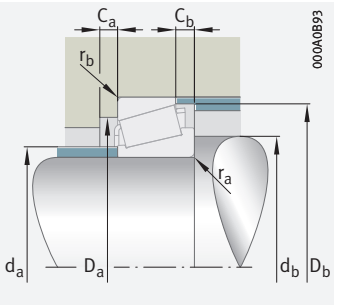
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
85	1,5	1,5	21	103,1	92	92	111	113	115	5	5	1,5	1,5	0,33	1,83	1,01
	2	2	27	106,1	91	95	118	120	125	5	6,5	2	2	0,47	1,27	0,7
	1,5	1,5	29	109,1	94	92	117	122	125	6	7	1,5	1,5	0,44	1,36	0,75
	1,5	1,5	27	108,5	94	92	118	122	125	6	6,5	1,5	1,5	0,29	2,06	1,13
	2,5	2	33	114,7	95	95	122	130	135	7	9	2,5	2	0,41	1,48	0,81
	5	3	39	–	96	103	120	133	139	6	8	5	3	0,52	1,14	0,63
	2,5	2	30	112,6	97	95	132	140	141	5	6,5	2,5	2	0,42	1,43	0,79
	2,5	2	34	114,7	96	95	130	140	142	5	8,5	2,5	2	0,42	1,43	0,79
	3	3	34	115,5	97	100	130	138	142	5	7	3	3	0,33	1,8	0,99
	2,5	2	37	117,8	95	95	128	140	144	7	12	2,5	2	0,42	1,43	0,79
	4	4	55	132	100	110	131	153	161	7	15	4	4	0,8	0,75	0,41
	3	3	36	127,6	107	99	156	166	167	6	10,5	3	3	0,35	1,74	0,96
	4	3	56	131,8	103	99	143	166	169	6	16,5	4	3	0,83	0,73	0,4
	4	3	52	133,5	102	99	138	166	169	7	14,5	4	3	0,55	1,1	0,6
	4	3	44	127,6	103	99	150	166	167	8	14,5	4	3	0,35	1,74	0,96
90	1,5	1,5	22	107,8	97	97	116	–	120	5	5	1,5	1,5	0,34	1,75	0,96
	2	2	30	111,1	96	100	123	125	130	5	6,5	2	2	0,49	1,21	0,67
	2	1,5	30	115,8	100	99	125	131	134	6	8	2	1,5	0,42	1,42	0,78
	2	1,5	28	116,4	100	99	127	131	135	7	6,5	2	1,5	0,27	2,23	1,23
	5	3	41	–	100	107	124	138	144	6	8	5	3	0,55	1,1	0,6
	2,5	2	36	121,8	100	100	130	140	144	7	10	2,5	2	0,4	1,51	0,83
	3	3	34	–	102	106	135	143	147	6	8	3	3	0,33	1,84	1,01
	2,5	2	32	120	103	100	140	150	150	5	6,5	2,5	2	0,42	1,43	0,79
	2,5	2	36	121,8	102	100	138	150	152	5	8,5	2,5	2	0,42	1,43	0,79
	2,5	2	41	125,8	101	100	135	150	154	9	13	2,5	2	0,42	1,43	0,78
	4	4	58	137,3	102	115	134	161	167	7	15	4	4	0,83	0,72	0,4
	4	3	37	135	113	104	165	176	176	6	10,5	4	3	0,35	1,74	0,96
	4	3	58	138,9	109	104	151	176	179	6	16,5	4	3	0,83	0,73	0,4
	4	3	55	–	108	104	146	176	180	8	14,5	4	3	0,55	1,1	0,6
	4	3	47	133	108	104	157	176	177	8	14,5	4	3	0,35	1,74	0,96

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 95 – 100 mm

Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580*|*1.12* ➤*581*|*1.13* X-life ➤*565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
95	130	23	18	23	102 000	181 000	22 500	5 300	2 900	0,88	**32919**	T2BC095
	140	22,5	17,5	24	114 000	167 000	19 500	4 950	2 950	1,15	**T4CB095**	T4CB095
	145	32	24	32	201 000	275 000	43 500	5 600	3 000	1,85	**32019-X-XL**	T4CC095
	145	39	32,5	39	260 000	380 000	62 000	5 600	3 000	2,573	**33019-XL**	T2CE095
	155	40	34	42	218 000	365 000	45 000	4 250	2 800	3,15	**T5ED095**	T5ED095
	160	46	38	46	285 000	430 000	52 000	4 500	2 750	3,76	**T2ED095**	T2ED095
	160	49	38	49	305 000	490 000	60 000	4 200	2 750	3,95	**33119**	T3EE095
	170	32	27	34,5	265 000	285 000	42 000	5 100	2 950	3,09	**30219-XL**	T3FB095
	170	43	37	45,5	355 000	420 000	64 000	4 950	2 700	4,22	**32219-XL**	T3FC095
	170	58	44	58	375 000	560 000	68 000	3 950	2 850	5,5	**33219**	T3FE095
	180	45	33	49	325 000	400 000	60 000	4 400	3 300	5,2	**T7FC095-XL**	T7FC095
	200	45	38	49,5	360 000	440 000	48 500	3 650	2 950	6,7	**30319-A**	T2GB095
	200	45	32	49,5	360 000	370 000	52 000	4 250	2 800	6,5	**31319-XL**	T7GB095
	200	67	55	71,5	570 000	690 000	104 000	4 150	2 700	10,9	**32319-B-XL**	–
	200	67	55	71,5	620 000	710 000	107 000	4 250	2 600	10	**32319-XL**	T2GD095
100	140	25	20	25	126 000	211 000	25 500	4 900	2 750	1,17	**32920**	T2CC100
	145	22,5	17,5	24	119 000	179 000	20 700	4 750	2 800	1,21	**T4CB100**	T4CB100
	150	32	24	32	205 000	285 000	44 500	5 400	2 900	1,91	**32020-X-XL**	T4CC100
	150	39	32,5	39	225 000	395 000	48 500	4 450	2 900	2,43	**33020**	T2CE100
	160	40	34	42	275 000	395 000	61 000	5 000	2 650	3,5	**T5ED100-XL**	T5ED100
	165	46	39	47	300 000	470 000	57 000	4 100	2 600	3,95	**T2EE100**	T2EE100
	165	52	40	52	325 000	540 000	66 000	4 000	2 700	4,39	**33120**	T3EE100
	180	34	29	37	295 000	325 000	47 500	4 850	2 850	3,76	**30220-XL**	T3FB100
	180	46	39	49	400 000	475 000	72 000	4 650	2 600	5,1	**32220-XL**	T3FC100
	180	63	48	63	510 000	660 000	102 000	4 500	2 650	6,8	**33220-XL**	T3FE100
	215	47	39	51,5	490 000	510 000	72 000	4 100	2 700	8,3	**30320-XL**	T2GB100
	215	51	35	56,5	450 000	480 000	67 000	3 850	2 550	8,7	**31320-X-XL**	T7GB100
	215	73	60	77,5	610 000	840 000	96 000	3 250	2 360	12,9	**32320-A**	T2GD100
	215	73	60	77,5	680 000	780 000	114 000	3 200	2 500	13,4	**32320-B-XL**	–

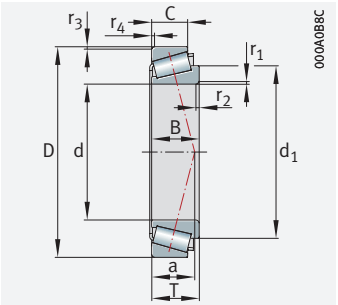
medias *https://www.schaeffler.de/std/1F9A*

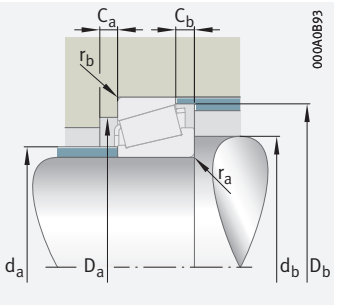
Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
95	1,5	1,5	24	113	102	102	121	123	125	5	5	1,5	1,5	0,36	1,68	0,92
	2	2	29	–	104	107	129	130	135	5	6,5	2	2	0,45	1,32	0,73
	2	1,5	32	121,4	105	104	130	136	140	6	8	2	1,5	0,44	1,36	0,75
	2	1,5	29	120,8	104	104	131	136	139	7	6,5	2	1,5	0,28	2,16	1,19
	5	3	43	–	104	112	128	143	150	6	8	5	3	0,57	1,06	0,58
	3	3	35	125,6	107	111	140	148	152	8	8	3	3	0,34	1,77	0,97
	2,5	2	38	–	106	105	138	150	154	8	11	2,5	2	0,4	1,51	0,83
	3	2,5	34	127,3	110	107	149	158	159	5	7,5	3	2,5	0,42	1,43	0,79
	3	2,5	39	129	108	107	145	158	161	5	8,5	3	2,5	0,42	1,43	0,79
	3	2,5	43	132	107	107	144	158	163	9	14	3	2,5	0,41	1,47	0,81
	4	4	61	142,4	108	119	138	164	172	7	16	4	4	0,87	0,69	0,38
	4	3	40	139	118	109	172	186	184	6	11,5	4	3	0,35	1,74	0,96
	4	3	62	145,6	114	109	157	186	187	6	17,5	4	3	0,83	0,73	0,4
	4	3	58	149,3	115	109	153	186	189	8	16,5	4	3	0,55	1,1	0,6
	4	3	49	142	115	109	166	186	186	8	16,5	4	3	0,35	1,74	0,96
100	1,5	1,5	24	120,6	109	107	131	131	135	5	5	1,5	1,5	0,33	1,82	1
	3	3	30	122,7	109	112	133	133	140	5	6,5	3	3	0,47	1,27	0,7
	2	1,5	33	126,3	109	109	134	141	144	6	8	2	1,5	0,46	1,31	0,72
	2	1,5	29	124,7	108	109	135	141	143	7	6,5	2	1,5	0,29	2,09	1,15
	5	3	42	133,8	110	117	135	146	154	6	8	5	3	0,53	1,14	0,63
	3	3	35	131,3	112	116	145	151	157	8	8	3	3	0,32	1,88	1,04
	2,5	2	40	–	111	110	142	155	159	8	12	2,5	2	0,41	1,48	0,81
	3	2,5	36	134,2	116	112	157	168	168	5	8	3	2,5	0,42	1,43	0,79
	3	2,5	42	136,5	114	112	154	168	171	5	10	3	2,5	0,42	1,43	0,79
	3	2,5	46	138,8	112	112	151	168	172	10	15	3	2,5	0,4	1,48	0,82
	4	3	42	150	127	114	184	201	197	6	12,5	4	3	0,35	1,74	0,96
	4	3	68	158,5	121	114	168	201	202	7	21,5	4	3	0,83	0,73	0,4
	4	3	53	152	123	114	177	201	200	8	17,5	4	3	0,35	1,74	0,96
	4	3	62	155,9	117	114	166	201	203	8	17,5	4	3	0,53	1,13	0,62



Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 105 – 120 mm

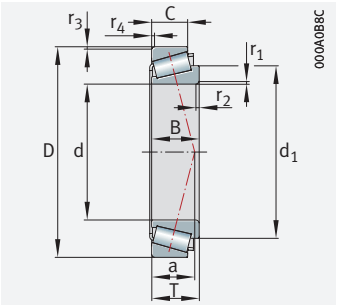
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤ *580* | *1.12* ➤ *581* | *1.13* X-life ➤ *565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
105	145	25	20	25	128 000	217 000	26 000	4 700	2 650	1,2	**32921**	T2CC105
	150	22,5	17,5	24	121 000	185 000	21 100	4 600	2 650	1,25	**T4CB105**	T4CB105
	160	35	26	35	238 000	330 000	51 000	5 100	2 800	2,44	**32021-X-XL**	T4DC105
	160	43	34	43	265 000	450 000	55 000	4 150	2 850	3,089	**33021**	T2DE105
	170	46	39	47	315 000	495 000	59 000	4 200	2 490	4,13	**T2EE105**	T2EE105
	175	56	44	56	360 000	600 000	70 000	3 900	2 600	5,44	**33121**	T3EE105
	190	36	30	39	330 000	370 000	53 000	4 600	2 700	4,46	**30221-XL**	T3FB105
	190	50	43	53	455 000	550 000	83 000	4 400	2 550	6,3	**32221-XL**	T3FC105
	190	68	52	68	495 000	760 000	89 000	3 500	2 480	8,379	**33221**	T3FE105
	225	49	41	53,5	530 000	560 000	78 000	3 950	2 550	9,4	**30321-XL**	T2GB105
	225	53	36	58	480 000	510 000	71 000	3 700	2 440	10	**31321-X-XL**	T7GB105
	225	77	63	81,5	670 000	930 000	105 000	3 100	2 220	14,8	**32321-A**	T2GD105
110	150	25	20	25	133 000	231 000	27 500	4 550	2 500	1,24	**32922**	T2CC110
	160	25,5	19,5	27	156 000	237 000	26 500	4 300	2 550	1,69	**T4CB110**	T4CB110
	170	38	29	38	285 000	395 000	60 000	4 750	2 650	3,05	**32022-X-XL**	T4DC110
	170	47	37	47	295 000	520 000	63 000	3 950	2 750	3,83	**33022**	T2DE110
	175	46	39	47	335 000	540 000	64 000	3 800	2 360	4,27	**T2EE110**	T2EE110
	180	56	43	56	440 000	630 000	97 000	4 400	2 460	5,64	**33122-XL**	T3EE110
	200	38	32	41	375 000	420 000	60 000	4 300	2 550	5,2	**30222-XL**	T3FB110
	200	53	46	56	490 000	590 000	88 000	4 150	2 410	7,2	**32222-XL**	T3FC110
	240	50	42	54,5	570 000	600 000	81 000	3 700	2 340	11	**30322-XL**	T2GB110
	240	57	38	63	550 000	590 000	80 000	3 450	2 250	12,2	**31322-X-XL**	T7GB110
	240	80	65	84,5	740 000	1 020 000	129 000	2 900	2 030	18	**32322-A**	T2GD110
120	165	29	23	29	176 000	305 000	35 500	4 100	2 370	1,77	**32924**	T2CC120
	170	25	19,5	27	181 000	238 000	33 500	4 850	2 420	1,74	**T4CB120-XL**	T4CB120
	180	38	29	38	295 000	420 000	63 000	4 450	2 460	3,27	**32024-X-XL**	T4DC120
	180	48	38	48	310 000	560 000	66 000	3 700	2 600	4,22	**33024**	T2DE120
	190	49	41	50	360 000	590 000	69 000	3 500	2 230	5,282	**T2EE120**	T2EE120
	200	62	48	62	460 000	770 000	89 000	3 250	2 160	7,68	**33124**	T3FE120
	215	40	34	43,5	395 000	445 000	64 000	4 000	2 470	6,2	**30224-XL**	T4FB120
	215	58	50	61,5	570 000	730 000	107 000	3 800	2 150	9,3	**32224-XL**	T4FD120
	260	55	46	59,5	660 000	700 000	94 000	3 400	2 150	14,1	**30324-XL**	T2GB120
	260	62	42	68	640 000	700 000	93 000	3 150	2 020	15,8	**31324-X-XL**	T7GB120
	260	86	69	90,5	670 000	970 000	120 000	2 750	2 060	21,7	**32324**	T2GD120

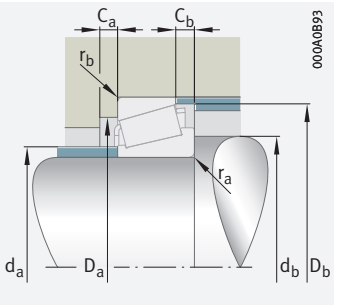
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
105	1,5	1,5	25	125	114	112	135	136	140	5	5	1,5	1,5	0,34	1,75	0,96
	3	3	32	–	114	116	138	138	145	5	6,5	3	3	0,49	1,22	0,67
	2,5	2	35	133,7	116	115	143	150	154	6	9	2,5	2	0,44	1,35	0,74
	2,5	2	31	131,5	116	115	145	150	153	7	9	2,5	2	0,28	2,12	1,17
	3	3	36	136,3	117	121	150	158	163	8	8	3	3	0,33	1,83	1,01
	2,5	2	43	142	116	115	150	165	169	9	12	2,5	2	0,4	1,48	0,82
	3	2,5	38	141,6	122	117	165	178	177	6	9	3	2,5	0,42	1,43	0,79
	3	2,5	45	143,6	120	117	161	178	180	5	10	3	2,5	0,42	1,43	0,79
	3	2,5	49	–	117	117	159	178	182	10	16	3	2,5	0,4	1,49	0,82
	4	3	44	156,7	132	119	193	211	206	7	12,5	4	3	0,35	1,74	0,96
	4	3	70	165,3	127	119	176	211	211	7	22	4	3	0,83	0,73	0,4
	4	3	56	160,85	128	119	185	211	209	9	18,5	4	3	0,35	1,74	0,96
110	1,5	1,5	26	130,9	118	117	140	141	145	5	5	1,5	1,5	0,36	1,69	0,93
	3	3	32	134,4	120	123	148	148	154	5	7	3	3	0,44	1,36	0,75
	2,5	2	37	141	122	120	152	160	163	7	9	2,5	2	0,43	1,39	0,77
	2,5	2	33	139,2	123	120	152	160	161	7	10	2,5	2	0,29	2,09	1,15
	4	3	37	141	121	126	155	163	168	5	8	4	3	0,34	1,78	0,98
	2,5	2	44	–	121	120	155	170	174	9	13	2,5	2	0,42	1,43	0,79
	3	2,5	40	149,3	129	122	174	188	187	6	9	3	2,5	0,42	1,43	0,79
	3	2,5	46	151,4	126	122	170	188	190	6	10	3	2,5	0,42	1,43	0,79
	4	3	45	166,6	141	124	206	226	220	8	12,5	4	3	0,35	1,74	0,96
	4	3	75	176,7	135	124	188	226	224	7	25	4	3	0,83	0,73	0,4
	4	3	58	171,5	137	124	198	226	222	9	19,5	4	3	0,35	1,74	0,96
120	1,5	1,5	29	141	128	127	154	158	160	6	6	1,5	1,5	0,35	1,72	0,95
	3	3	35	144,6	130	132	157	157	164	5	7,5	3	3	0,47	1,27	0,7
	2,5	2	40	151,2	131	130	161	170	173	7	9	2,5	2	0,46	1,31	0,72
	2,5	2	36	148,5	132	130	160	170	171	6	10	2,5	2	0,31	1,97	1,08
	4	3	39	–	133	137	169	177	182	9	9	4	3	0,32	1,86	1,02
	2,5	2	48	–	133	130	172	190	192	9	14	2,5	2	0,4	1,51	0,83
	3	2,5	44	162	140	132	187	203	201	6	9,5	3	2,5	0,43	1,38	0,76
	3	2,5	51	164,3	136	132	181	203	204	7	11,5	3	2,5	0,43	1,38	0,76
	4	3	48	179,5	152	134	221	246	237	10	13,5	4	3	0,35	1,74	0,96
	4	3	82	191,5	145	134	203	246	244	9	26	4	3	0,83	0,73	0,4
	4	3	66	187	148	134	213	246	239	9	21,5	4	3	0,39	1,53	0,84

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 130 – 150 mm

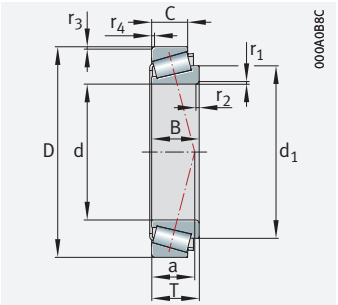
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤580 | 1.12 ➤581 | 1.13 X-life ➤565	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
130	180	32	25	32	208 000	370 000	42 000	3 750	2 220	2,43	**32926**	T2CC130
	185	27	21	29	212 000	275 000	37 500	4 050	2 280	2,24	**T4CB130-XL**	T4CB130
	200	45	34	45	385 000	550 000	81 000	4 000	2 320	5	**32026-X-XL**	T4EC130
	200	55	43	55	410 000	740 000	85 000	3 250	2 260	6,32	**33026**	T2EE130
	230	40	34	43,75	420 000	470 000	64 000	3 700	2 290	7	**30226-XL**	T4FB130
	230	64	54	67,75	660 000	850 000	122 000	3 550	1 980	11,3	**32226-XL**	T4FD130
	280	58	49	63,75	710 000	740 000	98 000	3 150	2 030	16,9	**30326-XL**	T2GB130
	280	66	44	72	720 000	790 000	103 000	2 950	1 860	19	**31326-X-XL**	T7GB130
	280	93	78	98,75	830 000	1 120 000	136 000	2 500	1 860	26,6	**32326**	–
140	190	32	25	32	214 000	395 000	44 000	3 500	2 070	2,6	**32928**	T2CC140
	195	27	21	29	190 000	305 000	33 000	3 450	2 100	2,39	**T4CB140**	T4CB140
	210	45	34	45	400 000	590 000	86 000	3 800	2 180	5,4	**32028-X-XL**	T4DC140
	210	56	44	56	435 000	780 000	87 000	3 100	2 150	6,8	**33028**	T2DE140
	215	52	44	53	430 000	730 000	82 000	3 050	1 860	6,89	**T2ED140**	T2ED140
	250	42	36	45,75	490 000	560 000	76 000	3 450	2 040	8,8	**30228-XL**	T4FB140
	250	68	58	71,75	760 000	990 000	139 000	3 250	1 760	14,6	**32228-XL**	T4FD140
	300	62	53	67,75	690 000	730 000	95 000	3 000	2 000	20,3	**30328-XL**	T2GB140
	300	70	47	77	830 000	910 000	116 000	2 700	1 690	23,2	**31328-X-XL**	T7GB140
	300	102	85	107,75	1 390 000	1 710 000	228 000	2 750	1 450	35,132	**32328-XL**	–
150	210	30	23	32	217 000	345 000	34 000	3 250	2 040	3,04	**T4DB150**	T4DB150
	210	38	30	38	285 000	495 000	54 000	3 200	2 040	3,9	**32930**	T2DC150
	225	48	36	48	455 000	680 000	96 000	3 550	1 990	6,5	**32030-X-XL**	T4EC150
	225	52	44	53	435 000	760 000	84 000	2 900	1 740	7,25	**T2ED150**	T2ED150
	225	59	46	59	550 000	890 000	127 000	3 450	1 910	8,1	**33030-XL**	T2EE150
	270	45	38	49	550 000	630 000	84 000	3 200	1 880	10,9	**30230-XL**	T4GB150
	270	73	60	77	870 000	1 150 000	159 000	3 000	1 590	18,1	**32230-XL**	T4GD150
	320	65	55	72	950 000	1 030 000	127 000	2 750	1 630	25	**30330-XL**	T2GB150
	320	75	50	82	930 000	1 040 000	130 000	2 550	1 540	27,8	**31330-X-XL**	T7GB150
	320	108	90	114	1 330 000	1 950 000	226 000	2 120	1 320	42,5	**32330-A**	–

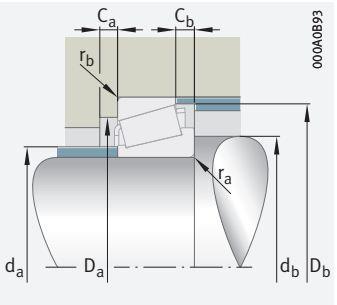
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
130	2	1,5	32	154,7	141	139	167	171	173	6	7	2	1,5	0,34	1,77	0,97
	3	3	38	156,3	140	143	171	173	178	6	8	3	3	0,47	1,27	0,7
	2,5	2	44	165,9	144	140	178	190	192	8	11	2,5	2	0,43	1,38	0,76
	2,5	2	42	166,2	143	140	178	190	192	8	12	2,5	2	0,34	1,76	0,97
	4	3	46	173,1	152	144	203	216	217	7	9,5	4	3	0,43	1,38	0,76
	4	3	56	175,2	146	144	193	216	219	7	13,5	4	3	0,43	1,38	0,76
	5	4	53	193	164	148	239	262	255	8	14,5	5	4	0,35	1,73	0,95
	5	4	87	206	157	148	218	262	261	9	28	5	4	0,83	0,73	0,4
	5	4	69	197,3	160	147	230	262	260	10	20,5	5	4	0,34	1,75	0,96
140	2	1,5	34	164,8	150	149	177	181	184	6	7	2	1,5	0,36	1,67	0,92
	3	3	41	167,2	150	153	180	183	189	6	8	3	3	0,5	1,19	0,66
	2,5	2	46	175,6	153	150	187	200	202	8	11	2,5	2	0,46	1,31	0,72
	2,5	2	46	173,8	152	150	186	200	202	7	12	2,5	2	0,36	1,67	0,92
	4	3	43	–	154	159	193	202	206	9	9	4	3	0,32	1,88	1,04
	4	3	49	188	163	154	219	236	234	9	9,5	4	3	0,43	1,38	0,76
	4	3	60	191,5	159	154	210	236	238	8	13,5	4	3	0,43	1,38	0,76
	5	4	52	204	176	158	255	282	273	8	14,5	5	4	0,28	2,18	1,2
	5	4	94	220,5	169	158	235	282	280	9	30	5	4	0,83	0,73	0,4
	5	4	74	–	170	157	247	282	280	10	22,5	5	4	0,35	1,74	0,96
150	3	3	42	179	161	164	194	198	203	5	9	3	3	0,46	1,3	0,72
	2,5	2	36	177,8	162	160	194	201	202	7	8	2,5	2	0,33	1,83	1,01
	3	2,5	50	187,8	164	162	200	213	216	8	12	3	2,5	0,46	1,31	0,72
	4	4	45	–	163	168	202	210	216	9	9	4	4	0,34	1,79	0,98
	3	2,5	48	189,5	164	162	200	213	217	8	13	3	2,5	0,36	1,64	0,9
	4	3	52	201,5	175	164	234	256	250	9	11	4	3	0,43	1,38	0,76
	4	3	64	205,5	171	164	226	256	254	8	17	4	3	0,43	1,38	0,76
	5	4	60	221,5	189	168	273	302	292	9	17	5	4	0,35	1,74	0,96
	5	4	100	235,5	181	168	251	302	300	9	32	5	4	0,83	0,73	0,4
	5	4	79	230	184	167	264	301	299	12	24	5	4	0,35	1,74	0,96

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 160 – 190 mm

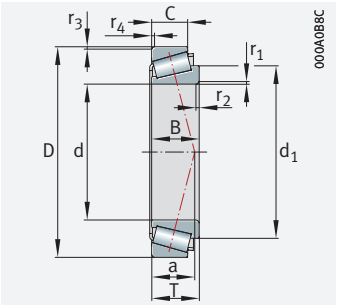
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤580 | 1.12 ➤581 | 1.13 X-life ➤565	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
160	220	30	23	32	226 000	370 000	39 000	3 050	1 910	3,3	**T4DB160**	T4DB160
	220	38	30	38	295 000	530 000	57 000	3 000	1 900	4,1	**32932**	T2DC160
	235	52	44	53	455 000	820 000	102 000	2 800	1 610	7,68	**T2ED160**	T2ED160
	240	51	38	51	500 000	740 000	104 000	3 300	1 850	7,8	**32032-X-XL**	T4EC160
	290	48	40	52	630 000	790 000	103 000	2 950	1 610	14	**30232-XL**	T4GB160
	290	80	67	84	1 030 000	1 380 000	188 000	2 800	1 430	23,2	**32232-XL**	T4GD160
	340	68	58	75	890 000	1 140 000	126 000	2 130	1 500	29,5	**30332-A**	T2GB160
	340	114	95	121	1 170 000	1 740 000	197 000	2 030	1 390	48,2	**32332**	–
170	230	30	23	32	228 000	390 000	47 000	2 950	1 790	3,42	**T4DB170**	T4DB170
	230	38	30	38	295 000	560 000	60 000	2 850	1 790	4,4	**32934**	T3DC170
	245	52	44	53	470 000	860 000	105 000	2 650	1 500	8,02	**T2ED170**	T2ED170
	260	57	43	57	600 000	880 000	122 000	3 050	1 690	10,4	**32034-X-XL**	T4EC170
	310	52	43	57	690 000	810 000	103 000	2 750	1 590	17	**30234-XL**	T4GB170
	310	86	71	91	1 160 000	1 560 000	207 000	2 600	1 310	28,6	**32234-XL**	T4GD170
	360	72	62	80	1 040 000	1 360 000	149 000	1 990	1 340	35	**30334-A**	T2GB170
	360	120	100	127	1 640 000	2 550 000	285 000	1 870	1 090	59,4	**32334**	–
180	240	30	23	32	230 000	400 000	47 500	2 800	1 710	3,62	**T4DB180**	T4DB180
	250	45	34	45	360 000	710 000	86 000	2 600	1 670	6,5	**32936**	T4DC180
	255	52	44	53	475 000	890 000	108 000	2 550	1 420	8,37	**T2ED180**	T2ED180
	280	64	48	64	740 000	1 100 000	148 000	2 800	1 510	14	**32036-X-XL**	T3FD180
	320	52	43	57	720 000	850 000	107 000	2 650	1 510	17,5	**30236-XL**	T4GB180
	320	86	71	91	1 190 000	1 640 000	216 000	2 490	1 240	29,8	**32236-XL**	T4GD180
	380	75	64	83	1 120 000	1 470 000	158 000	1 880	1 250	41	**30336**	–
	380	126	106	134	1 440 000	2 170 000	240 000	1 810	1 200	67	**32336**	–
190	260	34	27	37	300 000	520 000	61 000	2 600	1 630	5,319	**T4DB190**	T4DB190
	260	45	34	45	435 000	750 000	103 000	3 000	1 560	6,9	**32938-XL**	T4DC190
	270	55	46	56	530 000	1 000 000	120 000	2 400	1 310	9,98	**T2ED190**	T2ED190
	290	64	48	64	740 000	1 120 000	151 000	2 700	1 440	14,6	**32038-X-XL**	T4FD190
	340	55	46	60	800 000	930 000	115 000	2 490	1 390	20,8	**30238-XL**	T4GB190
	340	92	75	97	1 340 000	1 820 000	235 000	2 340	1 150	35,7	**32238-XL**	T4GD190
	400	78	65	86	1 210 000	1 600 000	165 000	1 820	1 180	46,7	**30338**	–
	400	132	109	140	1 960 000	2 950 000	315 000	1 680	970	83,2	**32338**	–

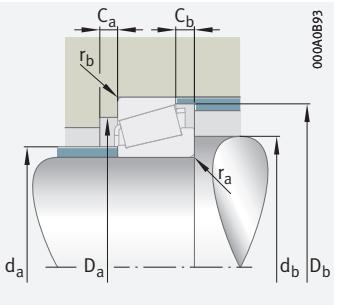
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
160	3	3	45	189,3	171	174	204	206	213	7	9	3	3	0,49	1,23	0,68
	2,5	2	38	188	173	170	204	210	212	7	8	2,5	2	0,35	1,73	0,95
	4	4	47	–	173	178	211	220	226	9	9	4	4	0,35	1,71	0,94
	3	2,5	53	200,4	175	172	213	228	231	8	13	3	2,5	0,46	1,31	0,72
	4	3	56	220,5	189	174	252	276	269	9	12	4	3	0,43	1,38	0,76
	4	3	69	221	183	174	242	276	274	10	17	4	3	0,43	1,38	0,76
	5	4	63	237	201	178	290	319	310	9	17	5	4	0,35	1,74	0,96
	5	4	86	245	190	177	280	321	320	12	26	5	4	0,38	1,58	0,87
170	3	3	45	199	182	185	214	216	223	6	9	3	3	0,46	1,3	0,72
	2,5	2	42	199	183	180	213	220	222	7	8	2,5	2	0,38	1,57	0,86
	5	4	46	–	183	188	223	230	236	9	9	5	4	0,33	1,84	1,01
	3	2,5	57	214,5	187	182	230	248	249	10	14	3	2,5	0,44	1,35	0,74
	5	4	60	232	203	188	269	292	288	8	14	5	4	0,43	1,38	0,76
	5	4	74	237	196	188	259	292	294	10	20	5	4	0,43	1,38	0,76
	5	4	67	252	213	188	307	342	329	9	18	5	4	0,35	1,74	0,96
	5	4	90	256	208	187	295	341	335	12	27	5	4	0,36	1,67	0,92
180	3	3	48	209,4	192	195	224	228	233	5	9	3	3	0,48	1,24	0,68
	2,5	2	54	217	193	190	225	240	241	8	11	2,5	2	0,48	1,25	0,69
	5	4	49	–	193	198	232	239	246	9	9	5	4	0,34	1,77	0,97
	3	2,5	60	228	199	192	247	268	267	10	16	3	2,5	0,42	1,42	0,78
	5	4	62	241	211	198	278	302	297	9	14	5	4	0,45	1,33	0,73
	5	4	77	246,5	204	198	267	302	303	10	20	5	4	0,45	1,33	0,73
	5	4	69	267	230	197	327	359	350	10	19	5	4	0,35	1,74	0,96
	5	4	93	274	215	197	310	361	355	14	28	5	4	0,38	1,58	0,87
190	3	3	50	–	204	207	241	246	251	7	10	3	3	0,45	1,33	0,73
	2,5	2	55	226	204	200	235	249	251	8	11	2,5	2	0,48	1,26	0,69
	5	4	50	–	205	210	247	254	260	9	10	5	4	0,33	1,84	1,01
	3	2,5	63	239	209	202	257	278	279	10	16	3	2,5	0,44	1,36	0,75
	5	4	64	255,5	224	207	298	322	318	9	14	5	4	0,43	1,38	0,76
	5	4	81	261	216	207	286	322	323	10	22	5	4	0,43	1,38	0,76
	6	5	72	278,9	240	210	341	378	364	10	21	6	5	0,35	1,74	0,96
	6	5	97	281	230	210	330	378	373	14	31	6	5	0,35	1,73	0,95

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 200 – 260 mm

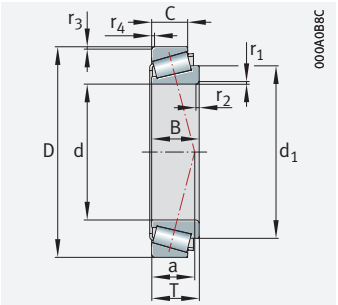
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤ *580* | *1.12* ➤ *581* | *1.13* X-life ➤ *565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
200	270	34	27	37	310 000	550 000	64 000	2 460	1 530	5,5	**T4DB200**	T4DB200
	280	51	39	51	495 000	930 000	109 000	2 320	1 410	9,3	**32940-A**	T3EC200
	280	55	46	56	540 000	1 040 000	123 000	2 300	1 240	10,4	**T2ED200**	T2ED200
	310	70	53	70	900 000	1 380 000	179 000	2 500	1 280	18,7	**32040-X-XL**	T4FD200
	360	58	48	64	900 000	1 060 000	129 000	2 350	1 290	25,1	**30240-XL**	T4GB200
	360	98	82	104	1 570 000	2 080 000	260 000	2 230	1 080	42,8	**32240-XL**	T3GD200
	420	80	67	89	1 300 000	1 720 000	174 000	1 680	1 110	52,7	**30340**	–
	420	138	115	146	2 550 000	3 400 000	415 000	1 910	870	93	**32340-XL**	–
220	290	34	27	37	320 000	590 000	67 000	2 270	1 370	6	**T4DB220**	T4DB220
	300	51	39	51	590 000	990 000	127 000	2 600	1 280	10,1	**32944-XL**	T3EC220
	300	55	46	56	570 000	1 140 000	132 000	2 140	1 100	11,3	**T2ED220**	T2ED220
	340	76	57	76	1 060 000	1 640 000	207 000	2 290	1 130	24,2	**32044-X-XL**	T4FD220
	400	65	54	72	1 120 000	1 330 000	153 000	2 120	1 130	34,5	**30244-XL**	–
	400	108	90	114	1 820 000	2 550 000	310 000	1 980	920	59,2	**32244-XL**	–
	460	88	73	97	1 440 000	1 880 000	189 000	1 560	1 030	68	**30344**	–
	460	145	122	154	2 400 000	3 650 000	375 000	1 470	820	115	**32344**	–
240	320	39	30	42	480 000	730 000	90 000	2 500	–	8,3	**T4EB240-XL**	T4EB240
	320	51	39	51	600 000	1 050 000	133 000	2 420	1 160	11	**32948-XL**	T4EC240
	320	56	46	57	590 000	1 250 000	141 000	2 000	1 000	12,3	**T2EE240**	T2EE240
	360	76	57	76	1 060 000	1 680 000	210 000	2 150	1 060	25,8	**32048-X-XL**	T4FD240
	440	72	60	79	1 190 000	1 530 000	174 000	1 980	1 040	47	**30248-XL**	–
	440	120	100	127	2 190 000	3 100 000	370 000	1 790	810	80,6	**32248-XL**	–
	500	95	80	105	1 780 000	2 410 000	237 000	1 430	870	88,6	**30348**	–
	500	155	132	165	3 300 000	4 300 000	490 000	1 620	720	144	**32348-XL**	–
260	340	39	30	42	430 000	810 000	76 000	1 930	1 100	9,3	**T4DB260**	T4DB260
	360	63,5	48	63,5	890 000	1 500 000	185 000	2 150	1 000	18,6	**32952-XL**	T3EC260
	400	87	65	87	1 360 000	2 140 000	260 000	1 930	910	37,9	**32052-X-XL**	T4FC260
	480	80	67	89	1 730 000	2 090 000	229 000	1 740	860	62,8	**30252-XL**	–
	480	130	106	137	2 650 000	3 800 000	435 000	1 630	690	104	**32252-XL**	–
	540	102	85	113	2 290 000	2 600 000	280 000	1 600	820	105	**30352-XL**	–
	540	165	136	176	3 150 000	4 900 000	480 000	1 240	650	181	**32352**	–

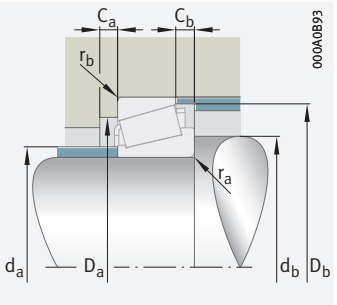
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
200	3	3	54	234	214	218	251	254	262	7	10	3	3	0,47	1,27	0,7
	3	2,5	54	239	216	212	257	268	271	9	12	3	2,5	0,39	1,52	0,84
	5	4	53	–	214	220	256	264	271	9	10	5	4	0,34	1,77	0,97
	3	2,5	67	253	221	212	273	298	297	11	17	3	2,5	0,43	1,39	0,77
	5	4	69	270	237	217	315	342	336	9	16	5	4	0,43	1,38	0,76
	5	4	83	269,5	226	217	302	342	340	11	22	5	4	0,41	1,48	0,81
	6	5	76	288	250	250	360	397	385	10	22	6	5	0,35	1,74	0,96
	6	5	104	298	240	258	344	397	392	17	31	6	5	0,36	1,67	0,92
220	3	3	60	255	233	238	270	276	282	7	10	3	3	0,51	1,17	0,64
	3	2,5	59	259,5	234	232	275	288	290	9	12	3	2,5	0,43	1,41	0,78
	5	4	53	–	235	240	277	284	290	9	10	5	4	0,32	1,87	1,03
	4	3	73	278,5	243	234	300	326	326	12	19	4	3	0,43	1,39	0,77
	5	4	75	296	255	237	348	382	371	10	18	5	4	0,42	1,43	0,79
	5	4	95	305	258	237	336	382	380	12	24	5	4	0,43	1,38	0,76
	6	5	82	321	274	240	392	437	418	10	24	6	5	0,35	1,74	0,96
	6	5	107	322	260	250	380	437	430	16	32	6	5	0,35	1,74	0,96
240	3	3	61	276	255	259	299	306	310	8	12	3	3	0,46	1,31	0,72
	3	2,5	65	280,5	254	252	294	308	311	9	12	3	2,5	0,46	1,31	0,72
	6	4	58	–	254	260	296	304	311	9	11	6	4	0,34	1,74	0,96
	4	3	79	298,5	261	254	318	346	346	12	19	4	3	0,46	1,31	0,72
	5	4	76	322,5	285	257	383	420	410	10	19	5	4	0,36	1,68	0,92
	5	4	105	334,5	286	257	372	422	415	14	27	5	4	0,43	1,38	0,76
	6	5	90	347,5	296	260	425	476	454	12	25	6	5	0,35	1,74	0,96
	6	5	115	351	285	260	411	476	465	16	32	6	5	0,35	1,74	0,96
260	3	3	68	297	274	279	318	326	330	8	12	3	3	0,49	1,23	0,67
	3	2,5	70	309	279	272	328	348	347	11	15,5	3	2,5	0,41	1,48	0,81
	5	4	86	327,5	287	278	352	382	383	14	22	5	4	0,43	1,38	0,76
	6	5	89	353,5	310	280	419	457	447	10	22	6	5	0,4	1,48	0,81
	6	5	113	366	306	280	401	457	455	14	31	6	5	0,43	1,39	0,77
	7,5	6	97	369,5	320	286	456	508	490	12	28	7,5	6	0,35	1,73	0,95
	7,5	6	124	–	310	286	450	513	500	16	40	7,5	6	0,35	1,74	0,96

Tapered roller bearings

Single row to DIN/ISO





Mounting dimensions

d = 280 – 380 mm

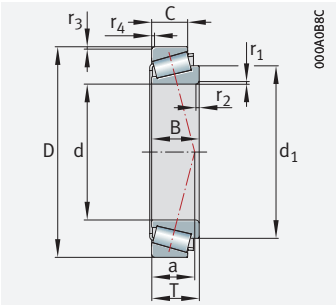
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Interchange designation to ISO 10317 and ISO 355
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤ *580* | *1.12* ➤ *581* | *1.13* X-life ➤ *565*	
					N	N	N	min^{-1}	min^{-1}	≈ kg		
280	380	63,5	48	63,5	880 000	1 520 000	185 000	2 030	940	19,8	**32956-XL**	T4EC280
	420	87	65	87	1 420 000	2 300 000	275 000	1 830	840	40,2	**32056-X-XL**	T4FC280
	500	80	67	89	1 740 000	2 130 000	233 000	1 670	830	66,5	**30256-XL**	–
	500	130	106	137	2 700 000	3 950 000	455 000	1 560	650	110	**32256-XL**	–
	580	108	90	119	2 700 000	3 250 000	340 000	1 470	690	136	**30356-XL**	–
	580	175	145	187	3 600 000	5 700 000	540 000	1 150	570	220	**32356**	–
300	420	76	57	76	1 170 000	2 040 000	242 000	1 820	810	31,2	**32960-XL**	T3FD300
	460	100	74	100	1 780 000	2 850 000	335 000	1 670	750	57,3	**32060-X-XL**	T4GD300
	540	85	71	96	2 020 000	2 440 000	260 000	1 550	750	83,7	**30260-XL**	–
	540	140	115	149	3 150 000	4 550 000	510 000	1 440	590	139	**32260-XL**	–
320	440	76	57	76	1 260 000	2 280 000	265 000	1 730	730	33	**32964-XL**	T3FD320
	480	100	74	100	1 850 000	3 050 000	355 000	1 580	690	60,6	**32064-X-XL**	T4GD320
	580	92	75	104	2 310 000	3 000 000	315 000	1 420	650	107	**30264-XL**	–
	580	150	125	159	3 550 000	5 200 000	570 000	1 330	530	170	**32264-XL**	–
340	460	76	57	76	1 270 000	2 370 000	275 000	1 650	690	35	**32968-XL**	T4FD340
360	480	76	57	76	1 260 000	2 370 000	270 000	1 580	660	36,3	**32972-XL**	T4FD360
380	560	112	84	112	2 370 000	3 900 000	430 000	1 350	560	88,3	**32076-XL**	–

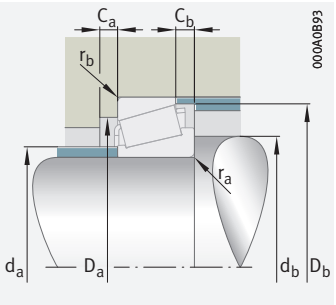
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions									Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	max.	min.	min.	min.	max.	max.			
280	3	2,5	75	330	298	292	348	368	368	11	15,5	3	2,5	0,43	1,39	0,76
	5	4	91	347	305	298	370	402	402	14	22	5	4	0,46	1,31	0,72
	6	5	97	369,5	330	300	433	477	465	12	22	6	5	0,45	1,33	0,73
	6	5	118	384,5	322	300	418	477	475	14	31	6	5	0,45	1,34	0,73
	7,5	6	105	403,5	345	357	492	548	525	15	29	7,5	6	0,35	1,74	0,96
	7,5	6	132	–	335	306	480	552	540	16	41	7,5	6	0,35	1,74	0,96
300	4	3	80	359	324	314	383	406	405	12	19	4	3	0,39	1,52	0,84
	5	4	99	376	329	318	404	442	439	15	26	5	4	0,43	1,38	0,76
	6	5	103	391,5	340	352	468	517	500	15	25	6	5	0,43	1,38	0,76
	6	5	127	412,5	346	320	453	517	510	16	34	6	5	0,43	1,38	0,76
320	4	3	86	379	343	334	402	426	426	13	19	4	3	0,42	1,44	0,79
	5	4	104	398,5	350	338	424	462	461	15	26	5	4	0,46	1,31	0,72
	6	5	112	432,5	380	340	501	556	536	12	29	6	5	0,43	1,38	0,76
	6	5	136	443	372	340	486	556	555	16	34	6	5	0,43	1,38	0,76
340	4	3	91	404	361	354	421	446	446	12	19	4	3	0,44	1,37	0,75
360	4	3	97	383,8	380	374	439	466	466	14	19	4	3	0,46	1,31	0,72
380	6	5	125	463,5	402	422	494	538	538	16	28	6	5	0,47	1,26	0,69

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 15,875 – 34,925 mm

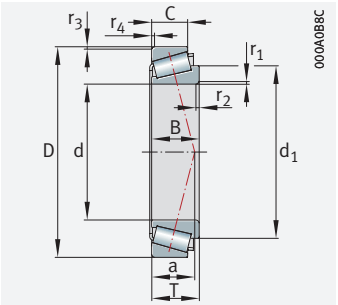
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*
					N	N	N	min^{-1}	≈ kg	
15,875	42,863	14,287	9,525	14,288	17 900	18 000	1 920	18 800	0,107	**K11590-11520**
17,462	39,878	14,605	10,668	13,843	21 200	20 800	2 240	20 100	0,083	**KLM11749-LM11710**
19,05	45,237	16,637	12,065	15,494	28 000	28 000	3 100	17 800	0,121	**KLM11949-LM11910**
21,43	50,005	18,288	13,97	17,526	37 500	39 000	4 500	15 800	0,169	**KM12649-M12610**
21,986	45,237	16,637	12,065	15,494	28 500	32 000	3 600	16 900	0,118	**KLM12749-LM12710**
	45,974	16,637	12,065	15,494	28 500	32 000	3 600	16 900	0,123	**KLM12749-LM12711**
22,606	47	15,5	12	15,5	23 700	27 000	2 900	16 300	0,129	**KLM72849-LM72810**
25,4	50,292	14,732	10,668	14,224	26 000	29 500	3 250	15 200	0,129	**KL44643-L44610**
	56,896	19,837	15,875	19,368	43 000	46 500	5 400	14 200	0,243	**K1780-1729**
26,988	50,292	14,732	10,668	14,224	26 000	29 500	3 250	15 200	0,119	**KL44649-L44610**
	63,5	20,638	15,875	20,638	47 500	55 000	6 500	12 100	0,319	**K15106-15250-X**
28,575	57,15	19,355	15,875	19,845	48 000	55 000	6 600	13 100	0,234	**K1985-1922**
	57,15	19,355	15,875	19,845	48 000	55 000	6 600	13 100	0,267	**K1988-1922**
	59,131	16,764	11,811	15,875	34 000	40 000	4 550	12 800	0,207	**KLM67043-LM67010**
	72,626	24,257	17,463	24,608	56 000	53 000	6 200	10 500	0,492	**K41125-41286**
30,162	64,292	21,433	16,67	21,433	52 000	67 000	8 100	11 500	0,373	**KM86649-M86610**
31,75	59,131	16,764	11,811	15,875	34 000	40 000	4 550	12 800	0,187	**KLM67047-LM67010**
	59,131	16,764	11,811	15,875	34 000	40 000	4 550	12 800	0,187	**KLM67048-LM67010**
	59,131	16,764	11,811	15,875	34 000	40 000	4 550	12 800	0,19	**KLM67049-A-LM67010**
	61,986	16,764	11,811	15,875	34 000	40 000	4 550	12 800	0,212	**KLM67048-LM67014**
	73,025	27,782	23,02	29,37	72 000	97 000	12 400	9 900	0,641	**KHM88542-HM88510**
	76,2	28,575	23,02	29,37	79 000	107 000	13 700	9 400	0,705	**KHM89440-HM89411**
33,338	68,262	22,225	17,462	22,225	56 000	72 000	8 800	10 700	0,382	**KM88048-M88010**
	73,025	27,783	23,02	29,37	72 000	97 000	12 400	9 900	0,601	**KHM88547-HM88510**
	76,2	28,575	23,02	29,37	79 000	107 000	13 600	8 800	0,757	**KHM89443-HM89410**
34,925	65,088	18,288	13,97	18,034	46 500	56 000	6 600	11 500	0,261	**KLM48548-A-LM48510**
	65,088	18,288	13,97	18,034	46 500	56 000	6 600	11 500	0,248	**KLM48548-LM48510**
	65,088	18,288	13,97	18,034	46 500	56 000	6 400	10 500	0,278	**KLM48549-X-LM48510**
	72,233	25,4	19,842	25,4	68 000	91 000	11 500	10 000	0,5	**KHM88649-HM88610**
	73,025	24,608	19,05	23,812	78 000	78 000	12 600	12 500	0,462	**K25877-25821-XL**
	76,2	28,575	23,812	29,37	77 000	91 000	11 100	9 400	0,636	**K31594-31520**
	76,2	28,575	23,02	29,37	79 000	107 000	13 700	9 400	0,65	**KHM89446-HM89410**
	79,375	29,771	23,813	29,37	90 000	110 000	13 600	8 800	0,785	**K3478-3420**

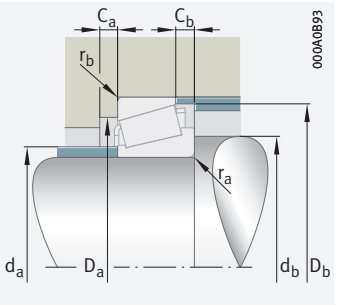
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
15,875	1,5	1,5	13	32,1	22,5	24,5	34,5	39,5	2	4,5	1,5	1,5	0,7	0,85	0,47
17,462	1,3	1,3	9	29,6	21,5	23	34	37	3	3	1,3	1,3	0,29	2,1	1,15
19,05	1,3	1,3	10	31,8	23,5	25	39,5	41,5	3,5	4,5	1,3	1,3	0,3	2	1,1
21,43	1,3	1,3	11	34,5	25,5	27,5	44	46	4	3,5	1,3	1,3	0,28	2,16	1,19
21,986	1,3	1,3	10	34,8	26	27,5	39,5	42	3	3	1,3	1,3	0,31	1,96	1,08
	1,3	1,3	10	34,8	26	27,5	40	42,5	3	3	1,3	1,3	0,31	1,96	1,08
22,606	1,5	1	13	–	28	30	40,5	44	2	3	1,5	1	0,47	1,27	0,7
25,4	1,3	1,3	11	39,5	30	32	44,5	47	3	3,5	1,3	1,3	0,37	1,6	0,88
	0,8	1,3	13	39,8	30	30,5	49	51	2	3	0,8	1,3	0,31	1,95	1,07
26,988	3,6	1,3	11	40,1	31	37,5	44,5	47	2,5	3,5	3,6	1,3	0,37	1,6	0,88
	0,8	1,5	15	46,75	32,5	33,5	55	59	3	3,5	0,8	1,5	0,35	1,71	0,94
28,575	0,8	1,5	14	43	33,5	34	51	53,5	3	3,5	0,8	1,5	0,33	1,82	1
	3,6	1,5	14	43	33,5	39,5	51	53,5	3	4	3,6	1,5	0,33	1,82	1
	4,8	1,3	13	–	34	40,5	52	56	3	4	4,8	1,3	0,41	1,46	0,8
	4,8	1,5	21	50,8	36,5	48	61	68	4	6,5	4,8	1,5	0,6	0,99	0,55
30,162	1,5	1,5	18	50,7	38	44	54	60	3	4,5	1,5	1,5	0,55	1,1	0,6
31,75	2,3	1,3	13	–	36,5	42,5	52	56	3	4	2,3	1,3	0,41	1,46	0,8
	3,6	1,3	13	45,8	36	42,5	52	56	3,5	4,5	3,6	1,3	0,41	1,46	0,8
	0,8	1,3	13	45,8	36	37	52	56	3	4	0,8	1,3	0,41	1,46	0,8
	3,6	1,3	13	45,8	36	42,5	52	56	3,5	4,5	3,6	1,3	0,41	1,46	0,8
	1,3	3,3	24	58	42,6	45,5	59	70	4	6	1,3	3,3	0,55	1,1	0,6
	0,8	0,8	24	–	44,5	45,5	65	73	3	6	0,8	0,8	0,55	1,1	0,6
33,338	0,8	1,5	20	53,25	41	42,5	58	65	3	4	0,8	1,5	0,55	1,1	0,6
	0,8	3,3	24	56,8	42,6	45,5	59	70	4	6	0,8	3,3	0,55	1,1	0,6
	0,8	3,3	24	60,5	44,5	46,5	62	73	3	5,5	0,8	3,3	0,55	1,1	0,6
34,925	0,8	1,3	14	–	41,5	48	58	61	3	4	0,8	1,3	0,38	1,59	0,88
	3,6	1,3	14	49,7	41,5	48	58	61	3	4	3,6	1,3	0,38	1,59	0,88
	2,3	1,3	14	49,7	40	42	58	61	3	4	2,3	1,3	0,38	1,59	0,88
	2,3	2,3	21	56,8	42,5	48,5	60	69	3	5	2,3	2,3	0,55	1,1	0,6
	1,5	0,8	16	–	43	46	62	67	5	4	1,5	0,8	0,29	2,07	1,14
	1,5	3,3	22	57,2	43,5	46	64	72	2	5	1,5	3,3	0,4	1,49	0,82
	3,6	3,3	24	59,8	43	49	62	72	3	6	3,6	3,3	0,55	1,1	0,6
	3,6	3,3	21	57,5	43,5	50	67	74	2	5	3,6	3,3	0,37	1,64	0,9

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 34,988 – 41,275 mm

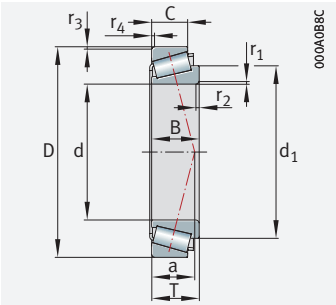
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*
					N	N	N	min^{-1}	≈ kg	
34,988	59,131	16,764	11,938	15,875	34 000	44 500	5 100	12 400	0,17	**KL68149-L68110**
	59,974	16,764	11,938	15,875	34 000	44 500	5 100	12 400	0,17	**KL68149-L68111**
	61,973	17	13,6	16,7	38 000	49 000	5 900	11 800	0,2	**KLM78349-LM78310-A**
	61,973	17	15	18	38 000	49 000	5 900	11 800	0,215	**KLM78349-A-LM78310-C**
35,717	72,233	25,4	19,842	25,4	68 000	91 000	11 500	10 000	0,54	**KHM88648-HM88610**
36,512	76,2	28,575	23,02	29,37	79 000	107 000	13 700	9 400	0,65	**KHM89448-HM89410**
	76,2	28,575	23,02	29,37	79 000	107 000	13 700	9 400	0,717	**KHM89449-HM89410**
	76,2	28,575	23,02	29,37	79 000	107 000	13 600	8 800	0,63	**KHM89449-HM89411**
	79,375	28,829	22,664	29,37	92 000	111 000	13 900	9 200	0,679	**KHM89249-HM89210**
38	63	17	13,5	17	39 500	53 000	6 200	11 400	0,204	**KJL69349-JL69310**
38,1	65,088	18,288	13,97	18,034	45 000	60 000	7 100	11 200	0,227	**KLM29748-LM29710**
	65,088	18,288	13,97	18,034	45 000	60 000	7 100	11 200	0,239	**KLM29749-LM29710**
	65,088	18,288	15,748	19,812	45 000	60 000	6 900	10 500	0,262	**KLM29749-LM29711**
	79,375	29,771	23,813	29,37	90 000	110 000	13 600	8 800	0,677	**K3490-3420**
	82,55	28,575	23,02	29,37	89 000	122 000	15 500	7 800	0,77	**KHM801346-HM801310**
	90,488	40,386	33,338	39,688	142 000	185 000	23 700	8 000	1,33	**K4375-4335**
39,688	79,974	30,391	23,812	29,37	94 000	109 000	13 700	9 200	0,731	**K3382-3325**
	79,974	30,391	23,812	29,37	94 000	109 000	13 700	9 200	0,534	**K3386-3325**
	80,167	30,391	23,812	29,37	94 000	109 000	13 700	9 200	0,66	**K3382-3320**
	80,167	30,391	23,812	29,37	94 000	109 000	13 700	9 200	0,537	**K3386-3320**
40,483	82,55	28,575	23,02	29,37	89 000	122 000	15 200	8 700	0,724	**KHM801349-HM801310**
40,987	67,975	18	13,5	17,5	46 000	63 000	7 500	10 700	0,246	**KLM300849-LM300811**
	78	18	13,5	17,5	46 000	63 000	7 500	10 700	0,392	**KLM300849-LM300816**
41,275	73,431	19,812	14,732	19,558	55 000	68 000	8 300	10 000	0,334	**KLM501349-LM501310**
	73,431	19,812	16,604	21,43	55 000	68 000	8 300	10 000	0,366	**KLM501349-LM501314**
	80	22,403	21	24,176	64 000	70 000	8 400	9 400	0,498	**K336-332-A**
	82,55	25,654	20,193	26,543	83 000	111 000	14 100	8 700	0,65	**KM802048-M802011**
	87,313	30,886	23,812	30,163	97 000	121 000	15 200	8 500	0,85	**K3585-3525**
	88,5	29,083	22,225	26,988	89 000	98 000	12 000	8 900	0,79	**K419-414**
	88,9	29,37	23,02	30,162	93 000	123 000	15 700	8 000	0,938	**KHM803146-HM803110**
	90	22,225	15,875	20	72 000	84 000	10 100	8 400	0,648	**K365-A-362**
	93,662	31,75	26,195	31,75	110 000	142 000	17 900	7 900	1,12	**K46162-46368**
	95,25	29,37	23,02	30,162	111 000	151 000	19 300	7 500	1,19	**KHM804840-HM804810**

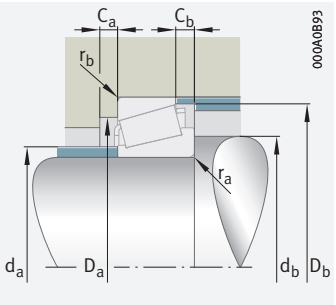
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
34,988	3,6	1,3	13	48,8	40	42	52	56	3	4	3,6	1,3	0,42	1,44	0,79
	3,6	1,3	13	48,8	40	42	52	56	3	4	3,6	1,3	0,42	1,44	0,79
	3,6	1,5	14	49,7	40	46	54	59	3	3	3,6	1,5	0,44	1,35	0,74
	1,5	1,5	16	–	39,5	42	56	59	3	3	1,5	1,5	0,44	1,35	0,74
35,717	3,5	2,3	21	–	43	52	60	69	4	5,5	3,5	2,3	0,55	1,1	0,6
36,512	0,8	3,3	24	60,5	44,5	48,5	62	73	3	6	0,8	3,3	0,55	1,1	0,6
	3,6	3,3	24	60,5	44,5	54	62	73	3	5,5	3,6	3,3	0,55	1,1	0,6
	3,6	0,8	24	60,5	44,5	54	65	73	3	5	3,6	0,8	0,55	1,1	0,6
	3,6	3,3	23	59,3	44	55	66	75	3	6,7	3,6	3,3	0,55	1,1	0,6
38	3,6	1,3	15	51,8	42,5	49	56	60	3	4	3,6	1,3	0,42	1,44	0,79
38,1	3,6	1,3	13	53	42,5	49	59	62	2	4	3,6	1,3	0,33	1,8	0,99
	2,3	1,3	13	53	42,5	46	59	62	2	4	2,3	1,3	0,33	1,8	0,99
	2,3	1,3	15	53	42,5	46	58	62	2	4	2,3	1,3	0,33	1,8	0,99
	3,6	3,3	21	57,5	45,5	52	67	74	2	5	3,6	3,3	0,37	1,64	0,9
	0,8	3,3	24	64,25	49,1	51	68	78	5	6	0,8	3,3	0,55	1,1	0,6
	1,5	3,3	25	–	51	53	77	85	3,5	6,3	1,5	3,3	0,28	2,11	1,16
39,688	3,6	3,3	19	57	45,5	52	70	75	2	6	3,6	3,3	0,27	2,2	1,21
	0,8	3,3	19	–	45,5	46,5	70	75	2	6	0,8	3,3	0,27	2,2	1,21
	3,6	3,3	19	57	45,5	52	70	75	2	6	3,6	3,3	0,27	2,2	1,21
	0,8	3,3	19	–	45,5	46,5	70	75	2	6	0,8	3,3	0,27	2,2	1,21
40,483	3,6	3,3	24	65,6	49	58	68	78	3	6	3,6	3,3	0,55	1,1	0,6
40,987	3,6	1,5	14	55,8	45	52	61	65	3	4	3,6	1,5	0,35	1,72	0,95
	3,6	0,3	14	55,8	45	52	61	65	5	4	3,6	0,3	0,35	1,72	0,95
41,275	3,6	0,8	16	57,2	46,5	53	67	70	4	4,5	3,6	0,8	0,4	1,5	0,83
	3,6	0,8	18	57,2	46,5	53	66	70	1,5	4,5	3,6	0,8	0,4	1,5	0,83
	0,8	2,3	18	–	46	47	71	75	2	6	0,8	2,3	0,27	2,21	1,21
	3,6	3,3	23	64,15	51	57	70	79	3	5,5	3,6	3,3	0,55	1,1	0,6
	1,5	3,3	20	64,5	48	50	75	81	3,5	6	1,5	3,3	0,31	1,96	1,08
	3,6	1,5	17	–	47	54	77	80	5	6	3,6	1,5	0,26	2,27	1,25
	3,6	3,3	26	69,5	52	57	70	84	4	7	3,6	3,3	0,55	1,1	0,6
	3,6	2	16	–	48,5	55	81	84	5	5,5	3,6	2	0,32	1,88	1,03
	0,8	3,3	24	–	51	52	79	87	3,5	5,5	0,8	3,3	0,4	1,49	0,82
	3,6	3,3	26	73,1	54	61	81	91	4,5	7	3,6	3,3	0,55	1,1	0,6

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 42,07 – 47,625 mm

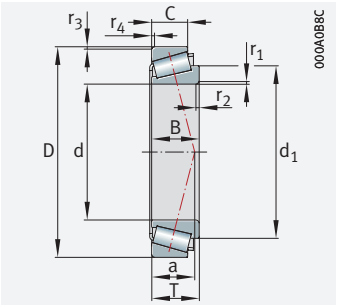
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤580|1.12 ➤581|1.13 X-life ➤565
					N	N	N	min^{-1}	≈ kg	
42,07	90,488	40,386	33,338	39,688	142 000	185 000	23 200	7 800	1,29	**K4395-4335**
44,45	82,931	25,4	19,05	23,812	81 000	105 000	13 100	8 900	0,583	**K25581-25520**
	88,9	29,37	23,02	30,162	93 000	123 000	15 700	8 000	0,86	**KHM803149-HM803110**
	90,119	21,692	21,808	23	74 000	86 000	10 400	8 400	0,694	**K355-X-352**
	93,264	30,302	23,812	30,162	123 000	138 000	22 700	9 300	0,97	**K3782-3720-XL**
	93,662	31,75	25,4	31,75	109 000	130 000	16 100	7 400	1,02	**K49175-49368**
	95,25	28,575	22,225	27,783	131 000	145 000	23 800	9 100	1	**AK33885-33822-XL**
	95,25	29,37	23,02	30,162	111 000	151 000	19 300	7 500	1,13	**KHM804842-HM804810**
	95,25	29,37	23,02	30,162	111 000	151 000	19 300	7 500	1,16	**KHM804843-HM804810**
	95,25	28,575	22,225	30,958	99 000	120 000	14 700	7 500	1,04	**KHM903249-HM903210**
	101,6	31,75	25,4	31,75	108 000	132 000	17 800	7 200	1,27	**K49576-49520**
	104,775	36,512	28,575	36,512	145 000	201 000	25 000	6 300	1,68	**KHM807040-HM807010**
	111,125	36,957	30,162	38,1	146 000	186 000	23 500	6 900	1,88	**K535-532-A**
44,987	104,986	31,75	23,368	32,512	116 000	157 000	19 600	6 600	1,43	**KHM905843-HM905810**
45,242	73,431	19,812	15,748	19,558	57 000	79 000	9 700	9 700	0,316	**KLM102949-LM102910**
	77,788	19,842	15,08	19,842	55 000	69 000	8 400	9 300	0,37	**KLM603049-LM603011**
	77,788	19,842	16,667	21,43	55 000	69 000	8 400	9 300	0,38	**KLM603049-LM603012**
	80	19,842	15,08	19,842	55 000	69 000	8 400	9 300	0,399	**KLM603049-LM603014**
45,618	83,058	25,4	19,114	23,877	81 000	105 000	13 200	8 900	0,567	**K25590-25522**
45,987	74,975	18	14	18	48 500	67 000	8 000	9 600	0,3	**KLM503349-A-LM503310**
	74,975	18	14	18	48 500	67 000	8 000	9 600	0,304	**KLM503349-LM503310**
	90,975	32	26,5	32	117 000	146 000	18 400	7 900	0,958	**KHM204049-HM204010**
46,038	85	21,692	17,462	20,635	74 000	86 000	10 400	8 800	0,694	**K359-S-354-X**
47,625	88,9	22,225	16,513	20,637	72 000	84 000	10 100	8 400	0,559	**K369-A-362-A**
	88,9	22,225	16,513	20,637	72 000	84 000	10 100	8 400	0,556	**K369-S-362-A**
	95,25	29,37	23,02	30,162	111 000	151 000	19 300	7 500	1,09	**KHM804846-HM804810**
	96,838	21,946	15,875	21	76 000	95 000	11 500	7 500	0,725	**K386-A-382-A**
	112,713	28,575	20,638	30,163	102 000	133 000	16 400	6 300	1,5	**KHM907639-HM907616**

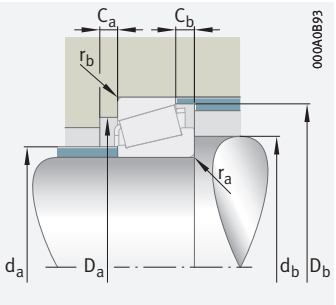
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
42,07	3,6	3,3	25	66	51	55	74	84	5	6	3,6	3,3	0,28	2,11	1,16
44,45	0,5	0,8	18	63,7	51	55	74	77	4,5	5	0,5	0,8	0,33	1,79	0,99
	3,6	3,3	26	69,1	53	62	74	85	4	7	3,6	3,3	0,55	1,1	0,6
	3,6	2,3	18	63,2	50	56	78	82	2	2,5	3,6	2,3	0,31	1,96	1,08
	3,6	3,3	22	72,2	52	58	82	88	3,5	7	3,6	3,3	0,34	1,77	0,97
	3,6	3,3	23	67,2	53	59	82	87	3	5,5	3,6	3,3	0,36	1,67	0,92
	0,8	0,8	20	73,4	53	53	86	90	5,5	6,5	0,8	0,8	0,33	1,82	1
	3,6	3,3	26	73,1	54	61	81	91	4,5	7	3,6	3,3	0,55	1,1	0,6
	3,6	3,3	26	73,1	57	63	81	91	4,5	7	3,6	3,3	0,55	1,1	0,6
	3,6	0,8	31	72	54	65	81	91	2	6,5	3,6	0,8	0,74	0,81	0,45
	0,8	3,3	25	–	54	55	88	96	4	6,5	0,8	3,3	0,4	1,5	0,82
	3,6	3,3	29	80,35	59	66	91	100	6	7,5	3,6	3,3	0,49	1,23	0,68
	3,6	3,3	26	78,1	54	60	95	100	2,5	8	3,6	3,3	0,3	2,02	1,11
44,987	2,5	2,5	34	82,2	60	68	86	100	3	7	2,5	2,5	0,78	0,77	0,42
45,242	3,6	0,8	15	60	50	56	68	70	3	4	3,6	0,8	0,31	1,97	1,08
	3,6	0,8	18	61,7	50	57	71	74	3	4,5	3,6	0,8	0,43	1,41	0,77
	3,6	0,8	19	61,7	50	57	70	74	2	4,5	3,6	0,8	0,43	1,41	0,77
	3,6	0,8	18	61,7	50	57	71	75	3	4,5	3,6	0,8	0,43	1,41	0,77
45,618	3,6	2	18	64,1	51	58	73	77	4,5	4,5	3,6	2	0,33	1,79	0,99
45,987	3,6	1,5	16	62	51	57	67	71	3,5	4	3,6	1,5	0,4	1,49	0,82
	2,3	1,5	16	61,9	51	55	67	71	4	3,5	2,3	1,5	0,4	1,49	0,82
	3,6	3,6	22	67,5	54	63	79	86	4	4	3,6	3,6	0,33	1,8	0,99
46,038	2,3	1,5	16	63,2	51	55	77	80	3	3	2,3	1,5	0,31	1,96	1,08
47,625	3,6	1,3	16	68,6	53	60	81	84	5	5,5	3,6	1,3	0,32	1,88	1,03
	2,3	1,3	16	68,1	53	60	81	84	5	5,5	2,3	1,3	0,32	1,88	1,03
	3,6	3,3	26	73,1	57	66	81	91	4,5	7	3,6	3,3	0,55	1,1	0,6
	0,8	0,8	19	–	55	56	89	92	5,5	5	0,8	0,8	0,35	1,69	0,93
	3,6	3,3	37	–	65,3	72	91	106	4	10	3,6	3,3	0,88	0,68	0,37

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 48,412 – 55 mm

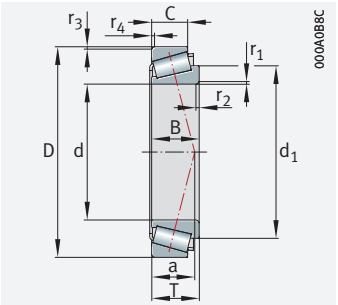
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤580|1.12 ➤581|1.13 X-life ➤565
					N	N	N	min^{-1}	≈ kg	
48,412	95,25	29,37	23,02	30,162	111 000	151 000	19 300	7 500	1,366	**KHM804848-HM804810**
	95,25	29,37	23,02	30,162	111 000	151 000	19 100	7 000	1,089	**KHM804848-HM804811**
	95,25	29,37	23,02	30,162	111 000	151 000	19 300	7 500	1,089	**KHM804849-HM804810**
49,212	104,775	36,512	28,575	36,512	145 000	201 000	26 000	6 700	1,498	**KHM807044-HM807010**
50	90	28	23	28	104 000	136 000	17 300	7 900	0,75	**KJM205149-JM205110**
50,8	82,55	22,225	16,51	21,59	69 000	94 000	11 700	8 700	0,428	**KLM104949-LM104911**
	82,931	22,225	16,51	21,59	69 000	94 000	11 500	7 800	0,432	**KLM104949-LM104912**
	88,9	22,225	16,513	20,637	72 000	84 000	10 100	8 400	0,516	**K368-362-A**
	88,9	22,225	16,513	20,637	72 000	84 000	9 900	7 400	0,341	**K368-A-362-A**
	93,264	30,302	23,812	30,162	104 000	137 000	17 000	7 000	0,89	**K3780-3720**
	95,25	28,575	22,225	27,783	107 000	138 000	17 500	7 500	0,861	**K33889-33822**
	104,775	30,958	23,813	30,162	126 000	162 000	20 500	6 800	0,835	**K45284-45220**
	104,775	36,512	28,575	36,512	145 000	201 000	25 500	6 300	1,54	**KHM807046-HM807010**
	104,775	36,512	28,575	36,512	145 000	201 000	26 000	6 700	1,494	**KHM807046-HM807011**
	104,775	40,157	33,338	39,688	159 000	226 000	29 000	6 700	1,668	**K4580-4535**
	107,95	36,957	28,575	36,512	146 000	186 000	23 500	6 900	1,584	**K537-532-X**
	111,125	28,575	20,638	30,163	102 000	133 000	16 400	6 300	1,4	**KHM907643-HM907614**
	123,825	32,791	25,4	36,512	135 000	150 000	18 300	6 000	2,18	**K72200-72487**
51,593	88,9	22,225	16,513	20,637	72 000	84 000	10 100	8 400	0,509	**K368-S-362-A**
	90	22,225	20	20	72 000	84 000	10 100	8 400	0,545	**K368-S-363**
53,975	88,9	19,05	13,492	19,05	69 000	78 000	12 300	9 700	0,434	**KLM806649-LM806610-XL**
	95,25	28,575	22,225	27,783	107 000	138 000	17 500	7 500	0,806	**K33895-33822**
	104,775	36,512	28,575	36,512	145 000	201 000	25 500	6 300	1,42	**KHM807049-HM807010**
	123,825	32,791	25,4	36,512	135 000	150 000	18 300	6 000	1,98	**K72212-72487**
54,488	104,775	36,512	28,575	36,512	145 000	201 000	25 500	6 700	1,42	**KHM807048-HM807010**
55	95	29	23,5	29	111 000	152 000	19 300	7 400	0,84	**KJM207049-JM207010**
	96,838	21,946	15,875	21	76 000	95 000	11 500	7 500	0,63	**K385-X-382-A**

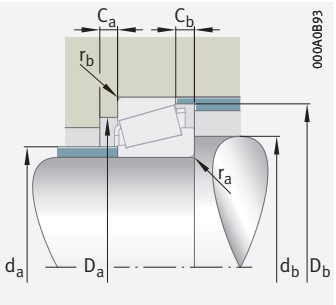
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
48,412	2,3	3,3	26	73,1	57	63	81	91	4,5	7	2,3	3,3	0,55	1,1	0,6
	2,3	0,8	26	73,1	57	63	83	91	4,5	7	2,3	0,8	0,55	1,1	0,6
	3,6	3,3	26	73,1	57	66	81	91	4,5	7	3,6	3,3	0,55	1,1	0,6
49,212	3,6	3,3	29	80,35	63	69	91	100	6	7,5	3,6	3,3	0,49	1,23	0,68
50	3	2,5	20	70,1	57	62	80	85	4,5	5	3	2,5	0,33	1,82	1
50,8	3,6	1,3	16	66,3	55	62	75	78	3	5	3,6	1,3	0,31	1,97	1,08
	3,6	1,3	16	66,3	55	62	75	78	3	4	3,6	1,3	0,31	1,97	1,08
	1,5	1,3	16	68,6	56	58	81	84	5	5,5	1,5	1,3	0,32	1,88	1,03
	3,6	1,3	16	69	56	59	81	84	5	5,5	3,6	1,3	0,32	1,88	1,03
	3,6	3,3	22	72,3	58	64	82	88	3,5	7	3,6	3,3	0,34	1,77	0,97
	3,6	0,8	20	73,1	58	64	86	90	5,5	6,5	3,6	0,8	0,33	1,82	1
	6,4	3,3	22	79,6	59	71	93	99	4	6	6,4	3,3	0,33	1,81	0,99
	3,6	3,3	29	80,35	63	70	89	100	4	6	3,6	3,3	0,49	1,23	0,68
	3,6	0,8	29	80,35	63	70	91	100	4	6	3,6	0,8	0,49	1,23	0,68
	3,6	3,3	28	80,3	61	67	90	99	4	6	3,6	3,3	0,34	1,79	0,98
	3,6	3,3	24	78,1	59	65	94	100	4	7,5	3,6	3,3	0,3	2,02	1,11
	3,6	3,3	37	–	65,3	74	91	105	4	10	3,6	3,3	0,88	0,68	0,37
	3,6	3,2	38	86,8	67	79	102	116	3,5	8,5	3,6	3,2	0,74	0,81	0,45
51,593	2	1,3	16	–	56	59	81	84	5	5,5	2	1,3	0,32	1,88	1,03
	2	0,8	16	–	56	59	81	84	5	5,5	2	0,8	0,32	1,88	1,03
53,975	2,3	2	22	–	61	64	78	84	4	5	2,3	2	0,55	1,1	0,6
	1,5	0,8	20	73,1	60	63	86	90	5,5	6,5	1,5	0,8	0,33	1,82	1
	3,6	3,3	29	80,35	63	73	89	100	6	7,5	3,6	3,3	0,49	1,23	0,68
	3,6	3,2	38	86,75	67	79	102	116	3,5	8,5	3,6	3,2	0,74	0,81	0,45
54,488	3,6	3,3	29	81	63	73	91	100	4	6	3,6	3,3	0,49	1,23	0,68
55	1,5	2,5	21	75,2	62	65	84	91	5	5,5	1,5	2,5	0,33	1,79	0,99
	3,5	0,8	19	75,7	61	67	89	92	5,5	5	3,5	0,8	0,35	1,69	0,93

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 57,15 – 65,088 mm

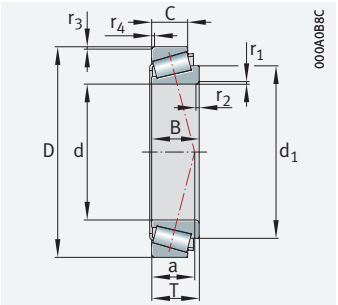
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*580*|*1.12* ➤*581*|*1.13* X-life ➤*565*
					N	N	N	min^{-1}	≈ kg	
57,15	87,312	18,258	14,288	18,258	56 000	88 000	10 400	7 400	0,4	**KL507949-L507910**
	96,838	21,945	15,875	21	76 000	95 000	11 200	6 700	0,6	**K387-382-A**
	96,838	21,946	15,875	21	76 000	95 000	11 500	7 500	0,59	**K387-A-382-A**
	96,838	21,946	20,274	25,4	76 000	95 000	11 200	6 700	0,66	**K387-A-382-S**
	98,425	21,946	17,826	21	76 000	95 000	11 500	7 500	0,637	**K387-A-382**
	104,775	29,317	24,605	30,162	111 000	141 000	17 000	6 300	1,07	**K462-453-X**
	104,775	29,317	24,605	30,163	111 000	141 000	17 300	6 900	1,08	**K462-A-453-X**
	110	29,317	27	27,795	111 000	141 000	17 300	6 900	1,26	**K462-454**
	112,712	30,162	23,812	30,162	137 000	192 000	24 300	6 200	1,333	**K39580-39520**
	112,712	30,162	23,812	30,162	137 000	192 000	24 300	6 200	1,351	**K39581-39520**
	112,712	30,048	23,812	30,162	119 000	176 000	22 400	6 300	1,44	**K3979-3920**
	117,475	30,162	23,812	30,162	124 000	189 000	24 500	5 900	1,62	**K33225-33462**
	119,985	30,162	26,949	32,75	137 000	192 000	24 300	6 200	1,76	**K39580-39528**
59,987	130,175	30,924	23,812	34,1	146 000	171 000	20 100	5 400	2,05	**KHM911244-HM911210**
60,325	122,238	38,354	29,718	38,1	193 000	255 000	32 000	5 600	2,09	**KHM212044-HM212011**
	130,175	33,338	23,813	36,513	146 000	171 000	21 200	5 300	2,045	**KHM911245-HM911210**
61,913	110	21,996	18,824	22	86 000	115 000	13 800	6 600	0,886	**K392-394-A**
	146,05	39,688	25,4	41,275	199 000	236 000	29 000	4 800	3,37	**KH913842-H913810**
62,738	101,6	25,4	19,845	25,4	91 000	135 000	17 100	7 000	0,78	**K28995-28920**
63,5	110	21,996	18,824	22	86 000	115 000	13 700	6 000	0,912	**K395-394-A**
	112,712	30,163	23,812	30,162	137 000	192 000	24 300	6 200	1,27	**K39585-39520**
	112,712	30,048	23,812	30,162	119 000	176 000	22 400	6 300	1,22	**K3982-3920**
	122,238	38,354	29,718	38,1	230 000	255 000	42 500	7 000	2,18	**KHM212047-HM212011-XL**
	130	36,17	29	36,937	168 000	238 000	30 500	5 600	2,29	**K565-562-X**
65	110	28	22,5	28	119 000	167 000	21 100	6 400	1,05	**KJM511946-JM511910**
65,088	135,755	56,007	44,45	53,975	275 000	385 000	50 000	5 200	3,74	**AK6379-6320**

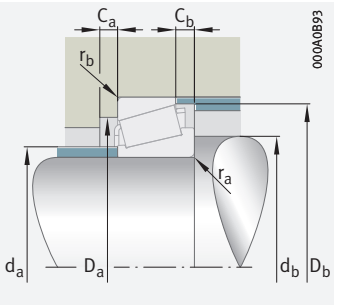
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
57,15	1,5	1,5	17	–	62	65	79	83	2	3,8	1,5	1,5	0,39	1,54	0,85
	2,3	0,8	19	75,7	62	66	89	92	4	5	2,3	0,8	0,35	1,69	0,93
	3,6	0,8	19	76,6	62	69	89	92	4	5	3,6	0,8	0,35	1,69	0,93
	3,6	2,3	23	76,6	62	69	87	91	2	5	3,6	2,3	0,35	1,69	0,93
	3,6	0,8	19	76,6	62	69	90	92	4	3,1	3,6	0,8	0,35	1,69	0,93
	2,3	3,3	24	80,3	67	70	92	98	3	5,5	2,3	3,3	0,34	1,79	0,98
	2,3	3,3	24	80,1	68	67	92	99	2	5	2,3	3,3	0,34	1,79	0,98
	2,3	2	22	80,1	63	67	96	100	4	5	2,3	2	0,34	1,79	0,98
	3,6	3,3	24	89,95	66	72	101	107	6	6	3,6	3,3	0,34	1,77	0,97
	7,9	3,3	24	90	66	81	101	107	6	6	7,9	3,3	0,34	1,77	0,97
	3,6	3,3	27	–	66	72	99	106	4	6	3,6	3,3	0,4	1,49	0,82
	3,6	3,3	28	–	68	74	104	112	3,5	6,5	3,6	3,3	0,44	1,38	0,76
	3,6	0,8	26	89,95	66	72	101	107	2,5	5,5	3,6	0,8	0,34	1,77	0,97
59,987	3,6	3,3	42	96,4	72	79	109	124	4	8	3,6	3,3	0,82	0,73	0,4
60,325	7,9	3,3	27	91,5	70	85	108	116	4	7	7,9	3,3	0,34	1,78	0,98
	5,2	3,3	42	97,3	74,4	87	109	124	6	4	5,2	3,3	0,82	0,73	0,4
61,913	0,8	1,3	21	87,9	69	70	101	105	4	3	0,8	1,3	0,4	1,49	0,82
	3,6	3,3	45	108,5	82,5	90	124	138	5	12,5	3,6	3,3	0,78	0,77	0,42
62,738	3,6	3,3	23	82,9	69	75	90	97	3	5,5	3,6	3,3	0,43	1,41	0,78
63,5	3,6	1,3	21	88,1	70	77	101	104,5	5	3	3,6	1,3	0,4	1,49	0,82
	3,6	3,3	24	89,6	69	73	101	107	6	6	3,6	3,3	0,34	1,77	0,97
	3,6	3,3	26	89	71	77	99	106	4	6	3,6	3,3	0,4	1,49	0,82
	7,1	3,3	27	91,7	73	87	108	116	4	7	7,1	3,3	0,34	1,78	0,98
	3,6	3	29	98,5	78	85	114	121	4	7,5	3,6	3	0,36	1,65	0,91
65	3	2,5	24	87,7	73	77	96	104	5	6	3	2,5	0,4	1,49	0,82
65,088	3,6	3,3	35	98,1	77	84	117	126	6	9	3,6	3,3	0,32	1,85	1,02

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 66,675 – 76,2 mm

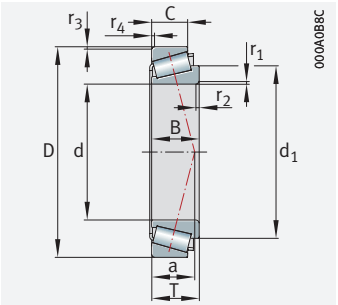
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*580*|*1.12* ➤*581*|*1.13* X-life ➤*565*
					N	N	N	min^{-1}	≈ kg	
66,675	110	21,996	18,824	22	86 000	115 000	13 800	6 600	0,855	**K395-A-394-A**
	110	21,996	18,824	22	86 000	115 000	14 000	6 600	0,801	**K395-S-394-A**
	112,712	30,162	23,812	30,162	137 000	192 000	24 300	6 200	1,18	**K39590-39520**
	112,712	30,048	23,812	30,162	119 000	176 000	22 400	6 300	1,2	**K3984-3920**
	112,712	30,048	23,812	30,162	119 000	176 000	21 900	6 000	0,7	**K3994-3920**
	122,238	38,354	29,718	38,1	193 000	255 000	32 500	5 800	1,93	**KHM212049-HM212010**
	122,238	38,354	29,718	38,1	193 000	255 000	32 500	5 800	1,88	**KHM212049-HM212011**
	136,525	41,275	31,75	41,275	270 000	295 000	47 500	6 300	2,77	**KH414242-H414210-XL**
68,262	110	21,996	18,824	22	86 000	115 000	13 700	6 000	0,781	**K399-A-394-A**
	110	21,996	18,824	22	86 000	115 000	13 700	6 600	0,781	**K399-AS-394-A**
69,85	112,712	21,996	15,875	22,225	85 000	115 000	14 000	6 400	0,798	**KLM613449-LM613410**
	117,475	30,162	23,812	30,162	124 000	189 000	24 500	5 900	1,21	**K33275-33462**
	120	32,545	26,195	32,545	152 000	224 000	28 500	5 800	1,53	**K47487-47420**
	120	29,007	24,237	29,794	112 000	150 000	18 400	5 600	1,317	**K482-472**
	127	36,17	28,575	36,512	168 000	238 000	30 500	5 600	1,95	**K566-563**
70	115	29	23	29	132 000	188 000	23 500	6 000	1,13	**KJM612949-JM612910**
71,438	120	32,545	26,195	32,545	152 000	224 000	28 500	5 800	1,61	**K47490-47420**
73,025	112,712	25,4	19,05	25,4	97 000	154 000	19 900	6 100	0,993	**K29685-29620**
	117,475	30,162	23,812	30,162	124 000	189 000	23 900	5 600	1,2	**K33281-33462**
	117,475	30,162	23,812	30,162	124 000	189 000	23 900	5 600	1,21	**K33287-33462**
75	115	25	19	25	124 000	165 000	27 000	7 200	0,919	**KJLM714149-JLM714110-XL**
	120	29,5	25	31	144 000	183 000	31 000	6 900	1,27	**KJM714249-JM714210-XL**
75,987	131,975	39	32	39	206 000	295 000	37 500	5 200	2,26	**KHM215249-HM215210**
76,2	127	31	22,225	30,162	136 000	199 000	28 500	5 000	1,51	**K42687-42620**
	133,35	29,769	22,225	30,163	134 000	200 000	24 600	5 200	1,95	**K495-A-492-A**
	133,35	39,688	32,545	39,688	189 000	325 000	41 500	5 000	2,4	**KHM516442-HM516410**
	133,35	39,688	32,545	39,688	189 000	325 000	41 500	5 000	2,2	**KHM516447-HM516410**
	136,525	29,769	22,225	30,163	134 000	200 000	24 600	5 200	2,046	**K495-A-493**
	142,138	46,1	33,338	44,45	206 000	290 000	36 500	5 000	2,99	**KHM515745-HM515716**

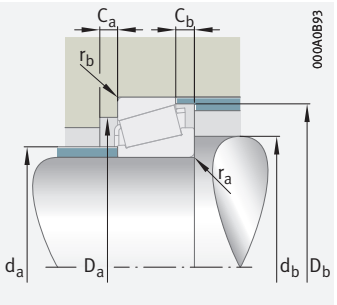
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
66,675	0,8	1,3	21	87,9	73	73	101	105	4	3	0,8	1,3	0,4	1,49	0,82
	3,6	1,3	21	88,1	73	79	101	104,5	5	3	3,6	1,3	0,4	1,49	0,82
	3,6	3,3	24	90	75	82	101	107	6	6	3,6	3,3	0,34	1,77	0,97
	3,6	3,3	27	89	74	80	99	106	4	6	3,6	3,3	0,4	1,49	0,82
	5,6	3,3	27	89	74	84	99	106	4	6	5,6	3,3	0,4	1,49	0,82
	3,6	1,5	27	91,5	75,5	82	108	116	4	8	3,6	1,5	0,34	1,78	0,98
	3,6	3,3	27	91,5	75,5	82	108	116	4	8	3,6	3,3	0,34	1,78	0,98
	3,6	3,3	30	–	81	85	121	129	6	9	3,6	3,3	0,36	1,67	0,92
68,262	2,3	1,3	21	88,1	74	78	101	104,5	5	3	2,3	1,3	0,4	1,49	0,82
	5,1	1,3	21	77,8	74	83	101	104,5	5	3	5,1	1,3	0,4	1,49	0,82
69,85	1,5	0,8	22	–	76	78	104	107	3	6	1,5	0,8	0,42	1,44	0,79
	3,6	3,3	28	95,5	77	84	104	112	4	6	3,6	3,3	0,44	1,38	0,76
	3,6	3,3	27	95	78	84	107	114	4	6	3,6	3,3	0,36	1,67	0,92
	3,6	2	26	93,9	77	83	107	112	3	5	3,6	2	0,38	1,56	0,86
	3,6	3,3	29	98,5	78	85	112	120	4	7,5	3,6	3,3	0,36	1,65	0,91
70	3	2,5	26	92,7	77	83	103	110	4	6	3	2,5	0,43	1,39	0,77
71,438	3,6	3,3	27	95,2	79	86	107	114	4	6	3,6	3,3	0,36	1,67	0,92
73,025	3,6	3,3	26	94,7	80	86	101	109	5	6	3,6	3,3	0,49	1,23	0,68
	3,6	3,3	28	95,5	79	87	104	112	4	6	3,6	3,3	0,44	1,38	0,76
	3,6	3,3	28	95,2	79	87	104	112	4	6	3,6	3,3	0,44	1,38	0,76
75	3	2,5	25	97	81	87	104	110	4,5	6	3	2,5	0,46	1,31	0,72
	3	2,5	29	99,4	83	88	108	115	4	6	3	2,5	0,44	1,35	0,74
75,987	7,1	3,6	30	103,2	85	98	118	126	7	7	7,1	3,6	0,33	1,8	0,99
76,2	3,6	3,3	27	102,6	84	90	114	121	4	8	3,6	3,3	0,42	1,43	0,79
	3,6	3,3	30	110,6	86	92	120	128	4	7,5	3,6	3,3	0,44	1,35	0,74
	3,6	3,3	32	110,5	87	93	118	129	4	7	3,6	3,3	0,4	1,49	0,82
	3,6	3,3	32	110,5	91	98	118	129	4	7	3,6	3,3	0,4	1,49	0,82
	3,6	3,3	30	110,6	86	92	122	130	4	7,5	3,6	3,3	0,44	1,35	0,74
	3,6	3,3	33	–	87	92	124	133	6	10	3,6	3,3	0,39	1,55	0,85

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 77,788 – 95,25 mm

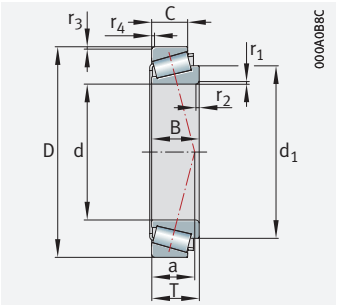
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*
					N	N	N	min^{-1}	≈ kg	
77,788	117,475	25,4	19,05	25,4	99 000	159 000	20 600	5 800	0,932	**KLM814849-LM814810**
	121,442	23,012	17,463	24,607	82 000	113 000	14 000	5 900	0,928	**K34306-34478**
	127	31	22,225	30,162	136 000	199 000	28 500	5 000	1,45	**K42690-42620**
79,974	146,975	40	32,5	40	233 000	355 000	44 000	4 600	3,019	**KHM218238-HM218210**
80	130	34	28,5	35	160 000	239 000	29 500	5 000	1,74	**KJM515649-JM515610**
80,962	136,525	29,769	22,225	30,162	134 000	200 000	24 600	5 200	1,907	**K496-493**
82,55	133,35	33,338	26,195	33,338	153 000	235 000	29 500	5 200	1,79	**AK47686-47620**
	133,35	39,688	32,545	39,688	183 000	310 000	40 500	5 000	2,324	**KHM516449-HM516410**
	136,525	29,769	22,225	30,163	134 000	200 000	24 600	5 200	1,67	**K495-493**
	139,992	36,098	28,575	36,512	177 000	265 000	32 500	5 000	2,21	**K580-572**
	146,05	41,275	31,75	41,275	250 000	305 000	49 000	5 800	2,78	**K663-653-XL**
84,138	133,35	29,769	22,225	30,163	134 000	200 000	24 600	5 200	1,693	**K498-492-A**
	136,525	29,769	22,225	30,163	134 000	200 000	24 600	5 200	1,813	**K498-493**
85	130	29	24	30	130 000	205 000	26 000	5 200	1,37	**KJM716649-JM716610**
85,725	133,35	29,769	22,225	30,162	134 000	200 000	24 600	5 200	1,47	**K497-492-A**
	136,525	29,769	22,225	30,162	156 000	195 000	31 500	6 300	1,5	**AK497-493-XL**
	142,138	42,863	34,133	42,863	216 000	350 000	44 000	4 700	2,6	**KHM617049-HM617010**
88,9	152,4	39,688	30,163	39,688	244 000	350 000	39 000	4 500	2,94	**KHM518445-HM518410**
89,975	146,975	40	32,5	40	233 000	355 000	44 000	4 600	2,57	**KHM218248-HM218210**
90	145	34	27	35	177 000	265 000	32 500	4 700	2,12	**KJM718149-A-JM718110**
	145	34	27	35	177 000	265 000	32 500	4 700	2,15	**KJM718149-JM718110**
92,075	146,05	34,925	26,195	33,338	167 000	275 000	33 500	4 650	2,107	**K47890-47820**
	146,05	34,925	26,195	33,338	167 000	275 000	33 500	4 650	1,979	**K47896-47820**
	150	36,322	27	35,992	182 000	285 000	34 500	4 600	2,41	**K598-A-593-X**
95	135	20	14	20	81 000	131 000	15 900	5 100	0,85	**KJL819349-JL819310**
	150	34	27	35	182 000	285 000	34 500	4 600	2,3	**KJM719149-JM719113**
95,25	152,4	36,322	30,162	39,688	215 000	285 000	45 000	5 500	2,57	**K594-A-592-A-XL**
	152,4	36,322	30,162	39,688	215 000	285 000	45 000	5 500	2,55	**K594-592-A-XL**
	168,275	41,275	30,162	41,275	265 000	350 000	54 000	5 000	3,72	**K683-672-XL**

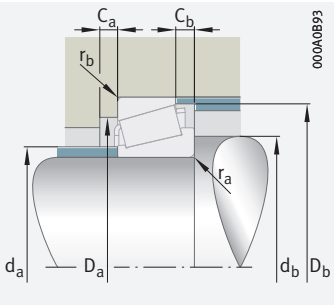
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
77,788	3,6	3,3	28	–	85	91	105	113	3	6	3,6	3,3	0,51	1,18	0,65
	3,6	2	26	99,4	84	90	110	116	3	7	3,6	2	0,45	1,33	0,73
	3,6	3,3	27	102,6	85	91	114	121	4	8	3,6	3,3	0,42	1,43	0,79
79,974	7,1	3,6	32	–	91	104	133	141	7	7,5	7,1	3,6	0,33	1,8	0,99
80	3	2,5	29	105,4	88	94	117	125	4,5	6,5	3	2,5	0,39	1,54	0,85
80,962	3,6	3,3	30	110,6	89	95	122	130	4	7,5	3,6	3,3	0,44	1,35	0,74
82,55	3,6	3,3	30	108,2	91	97	117	126	5	7	3,6	3,3	0,4	1,48	0,82
	3,6	3,3	32	110,5	92	99	118	128	5	7	3,6	3,3	0,4	1,49	0,82
	3,6	3,3	30	–	90	97	122	130	4	7,5	3,6	3,3	0,44	1,35	0,74
	3,6	3,3	31	110,7	91	98	125	133	5	7,5	3,6	3,3	0,4	1,49	0,82
	3,6	3,3	33	114,5	92	99	131	139	5	8	3,6	3,3	0,41	1,47	0,81
84,138	3,6	3,3	30	110,6	91	98	120	128	4	7,5	3,6	3,3	0,44	1,35	0,74
	3,6	3,3	30	110,6	91	98	122	130	4	7,5	3,6	3,3	0,44	1,35	0,74
85	3	2,5	30	109	92	98	117	125	4	6	3	2,5	0,44	1,35	0,74
85,725	3,6	3,3	30	110,6	93	99	120	128	4	7,5	3,6	3,3	0,44	1,35	0,74
	3,6	3,3	30	109,9	93	99	122	130	4	7,5	3,6	3,3	0,44	1,35	0,74
	4,8	3,3	36	116,3	95	106	125	138	4	8	4,8	3,3	0,43	1,39	0,76
88,9	6,4	3,3	34	119,5	100	110	134	146	4	8,5	6,4	3,3	0,4	1,49	0,82
89,975	7,1	3,6	31	119	99	104	130	140	7	7	7,1	3,6	0,33	1,8	0,99
90	6	2,5	33	118,5	99	111	131	139	4	7	6	2,5	0,44	1,35	0,74
	3	2,5	33	118,5	99	105	131	139	4	7	3	2,5	0,44	1,35	0,74
92,075	3,6	3,3	33	122,2	101	107	131	140	4,5	7	3,6	3,3	0,45	1,34	0,74
	3,6	3,3	33	–	101	107	131	140	4,5	7	3,6	3,3	0,45	1,34	0,74
	6,4	3	33	121,5	103	109	130	142	7	8	6,4	3	0,44	1,36	0,75
95	5	2,5	31	116,1	102	111	123	129	4	6	5	2,5	0,58	1,03	0,57
	3	2,5	33	118,5	104	109	135	143	4	6	3	2,5	0,44	1,36	0,75
95,25	5,1	3,3	37	122	104	113	135	144	3	9	5,1	3,3	0,44	1,36	0,75
	3,6	3,3	37	–	103	109	128	141	3	9	3,6	3,3	0,44	1,36	0,75
	3,6	3,3	38	133,5	106	113	149	160	5	9	3,6	3,3	0,47	1,28	0,7

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 96,838 – 136,525 mm

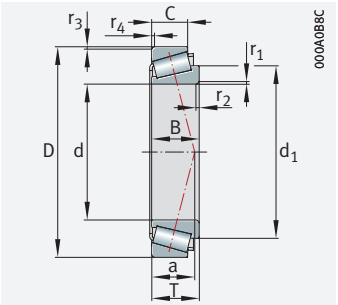
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤580 | 1.12 ➤581 | 1.13 X-life ➤565
					N	N	N	min^{-1}	≈ kg	
96,838	148,43	28,971	21,433	28,575	139 000	216 000	26 000	4 650	1,91	**K42381-42584**
	188,912	46,038	31,75	50,8	270 000	340 000	39 000	3 550	5,62	**K90381-90744**
99,975	156,975	42	34	42	250 000	410 000	49 500	4 250	2,91	**KHM220149-HM220110**
100	155	35	28	36	187 000	305 000	36 500	4 300	2,39	**KJM720249-JM720210**
101,6	168,275	41,275	30,162	41,275	265 000	350 000	54 000	5 000	3,42	**K687-672-XL**
	212,725	66,675	53,975	66,675	580 000	720 000	107 000	4 050	11,1	**K941-932-XL**
106,362	165,1	36,512	26,988	36,512	244 000	335 000	51 000	4 950	2,79	**AK56418-56650-XL**
107,95	158,75	21,438	15,875	23,02	100 000	164 000	18 900	4 400	1	**K37425-37625**
	161,925	34,925	26,988	34,925	175 000	305 000	36 000	4 150	2,46	**K48190-48120**
	165,1	36,512	26,988	36,512	244 000	335 000	51 000	4 950	2,71	**AK56425-56650-XL**
	168,275	36,512	26,988	36,512	244 000	335 000	51 000	4 950	2,89	**AK56425-56662-XL**
109,538	158,75	21,438	15,875	23,02	100 000	164 000	18 900	4 400	1,359	**K37431-37625**
	158,75	21,438	15,875	23,02	100 000	164 000	18 900	4 400	1,36	**K37431-A-37625**
109,987	159,987	34,925	26,988	34,925	174 000	340 000	41 500	4 200	2,36	**KLM522548-LM522510**
	159,987	34,925	26,988	34,925	174 000	340 000	41 500	4 200	2,34	**KLM522549-LM522510**
	164,737	34,925	32,131	37,312	174 000	340 000	41 500	4 200	2,71	**KLM522549-LM522518**
110	165	35	26,5	35	188 000	305 000	36 500	4 050	2,53	**KJM822049-JM822010**
	180	46	38	47	320 000	510 000	60 000	3 750	5,03	**KJHM522649-JHM522610**
114,3	177,8	41,275	30,162	41,275	285 000	395 000	58 000	4 550	3,58	**K64450-64700-XL**
	212,725	66,675	53,975	66,675	580 000	720 000	107 000	4 050	10	**K938-932-XL**
119,957	195,262	57,15	44,45	53,975	375 000	630 000	74 000	3 500	6,4	**KHM124649-HM124618**
120	180	36	26	36	221 000	355 000	41 000	3 750	3	**KJM624649-JM624610**
120,65	190,5	46,038	34,925	46,038	305 000	490 000	56 000	3 500	4,77	**KHM624749-HM624710**
127	234,95	63,5	49,212	63,5	610 000	810 000	116 000	3 550	11,7	**K95500-95925-XL**
133,35	196,85	46,038	38,1	46,038	370 000	570 000	83 000	4 050	4,69	**K67390-67322-XL**
	234,95	63,5	49,212	63,5	610 000	810 000	116 000	3 550	11	**K95525-95925-XL**
136,525	194,975	33	27,5	33	223 000	400 000	44 500	3 450	3,18	**KLM229139-LM229110**

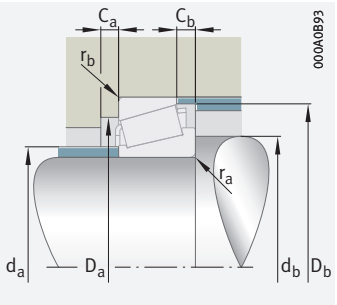
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
96,838	3,6	3	32	123,3	104	110	134	142	4	6,5	3,6	3	0,49	1,22	0,67
	3,5	3,3	64	142,9	113	125	161	179	2,5	12	3,5	3,3	0,87	0,69	0,38
99,975	7,9	3,6	33	129	109	120	140	150	5	8	7,9	3,6	0,33	1,8	0,99
100	3	2,5	36	127,5	109	115	140	149	4	6,5	3	2,5	0,47	1,27	0,7
101,6	3,6	3,3	38	133,5	112	118	149	160	7	11	3,6	3,3	0,47	1,28	0,7
	7,1	3,3	47	155,25	128	141	187	193	5	10	7,1	3,3	0,33	1,84	1,01
106,362	3,6	3,3	38	137,1	117	123	145	159	4	8	3,6	3,3	0,5	1,21	0,66
107,95	3,6	3,3	37	134,2	115	122	143	152	3,5	7	3,6	3,3	0,61	0,99	0,54
	3,6	3,3	39	–	116	122	146	156	3,5	7,5	3,6	3,3	0,51	1,19	0,65
	3,6	3,3	38	137,1	117	123	145	159	4	8	3,6	3,3	0,5	1,21	0,66
	3,6	3,3	38	–	117	123	145	159	4	8	3,6	3,3	0,5	1,21	0,66
109,538	3,6	3,3	37	134,2	116	123	143	152	3	7	3,6	3,3	0,61	0,99	0,54
	5	3,3	37	134,2	116	126	143	152	3	7	5	3,3	0,61	0,99	0,54
109,987	8,1	3,3	33	138,2	118	133	146	154	4	8	8,1	3,3	0,4	1,49	0,82
	3,6	3,3	33	138,2	118	124	146	154	4	7,5	3,6	3,3	0,4	1,49	0,82
	3,6	2,3	36	138,2	118	124	149	157	4	4	3,6	2,3	0,4	1,49	0,82
110	3	2,5	38	139	119	124	149	159	4,5	8	3	2,5	0,5	1,21	0,66
	3	2,5	41	145	122	127	162	172	5	7	3	2,5	0,41	1,48	0,81
114,3	3,6	3,3	43	147,3	125	131	160	172	5	9	3,6	3,3	0,52	1,16	0,64
	7,1	3,3	47	153,3	128	141	187	193	5	10	7,1	3,3	0,33	1,84	1,01
119,957	3	3,3	38	151,8	131	137	168	179	5	9,5	3	3,3	0,26	2,27	1,25
120	3,6	1,5	37	–	128	135	166	173	5,5	9,5	3,6	1,5	0,43	1,4	0,77
120,65	3,6	1,5	43	–	132	138	174	184	5	8,5	3,6	1,5	0,43	1,41	0,77
127	6,4	3,3	50	178	142	154	209	217	7	14	6,4	3,3	0,37	1,62	0,89
133,35	3,6	3,3	40	165,5	143	149	180	189	4	6,5	3,6	3,3	0,34	1,74	0,96
	9,7	3,3	50	178	148	166	209	217	8	12	9,7	3,3	0,37	1,62	0,89
136,525	3,6	3,6	33	–	146	152	182	190	5,5	7,5	3,6	3,6	0,33	1,8	0,99

Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 139,7 – 200,025 mm

Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤580|1.12 ➤581|1.13 X-life ➤565
					N	N	N	min^{-1}	≈ kg	
139,7	180,975	20,638	16,67	21,433	133 000	184 000	23 800	4 800	1,22	**KLL428349-LL428310-XL**
	187,325	29,37	23,02	28,575	180 000	350 000	39 500	3 600	2,21	**KLM328448-LM328410**
	254	66,675	47,625	66,675	680 000	970 000	136 000	3 200	14,2	**K99550-99100-XL**
	295,275	87,312	57,15	82,55	830 000	1 120 000	133 000	2 450	24,1	**KHH231649-HH231615**
142,875	194,975	33	27,5	33	223 000	400 000	44 500	3 450	2,79	**KLM229146-LM229110**
	200,025	39,688	34,13	41,275	255 000	510 000	58 000	3 300	3,873	**K48684-48620**
	200,025	39,688	34,13	41,275	255 000	510 000	58 000	3 300	3,91	**K48685-48620**
146,05	193,675	28,575	23,02	28,575	215 000	335 000	47 500	4 250	2,24	**AK36690-36620-XL**
150	205	28,575	21,438	28,575	173 000	315 000	34 000	3 300	2,63	**KJL730646-JL730612**
152,4	268,288	74,612	57,15	74,612	670 000	1 070 000	130 000	2 500	16,6	**K107060-107105**
	307,975	93,662	66,675	88,9	960 000	1 290 000	149 000	2 260	28,1	**KHH234048-HH234010**
160	240	44,5	37	46	345 000	650 000	80 000	2 700	6,745	**KJM734445-JM734410**
	252,413	69,85	52,388	63,5	520 000	900 000	112 000	2 650	13	**KHM133448-HM133416**
165,1	225,425	39,688	33,338	41,275	239 000	520 000	65 000	2 950	5,03	**K46790-46720**
	336,55	95,25	69,85	92,075	1 280 000	1 550 000	197 000	2 500	37,1	**KHH437549-HH437510-XL**
170	240	44,5	37	46	345 000	650 000	80 000	2 700	6,2	**KJM734449-JM734410**
171,45	222,25	24,608	19,05	25,4	195 000	285 000	35 500	3 850	2,28	**KL435049-L435010-XL**
177,8	227,012	30,162	23,02	30,162	221 000	395 000	52 000	3 550	3,18	**K36990-36920-XL**
180	250	45	37	47	360 000	710 000	86 000	2 600	6,804	**KJM736149-JM736110**
184,15	234,95	33	28	34	234 000	485 000	36 500	2 800	3,46	**KLM236749-LM236710**
	235,229	33	28	34	234 000	485 000	36 500	2 800	3,45	**KLM236749-LM236710-A**
190	260	44	36,5	46	435 000	750 000	102 000	3 000	7,06	**KJM738249-JM738210-XL**
190,5	266,7	46,833	38,1	47,625	415 000	730 000	97 000	2 950	8,1	**K67885-67820-XL**
196,85	257,175	39,688	30,163	39,688	260 000	590 000	70 000	2 550	5,3	**KLM739749-LM739710**
199,949	282,575	49,212	36,512	46,038	435 000	810 000	105 000	2 750	9,6	**K67982-67920-XL**
200,025	276,225	46,038	34,133	42,862	380 000	720 000	84 000	2 420	7,85	**KLM241147-LM241110**

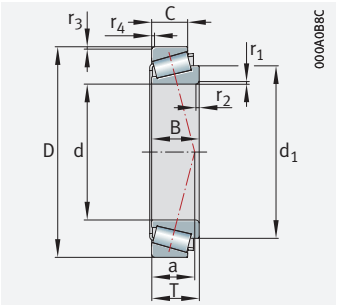
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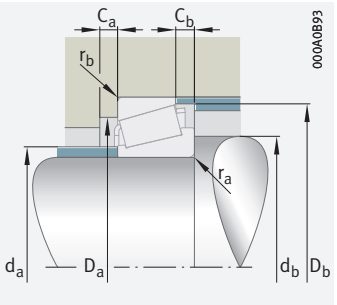
Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2	r_3, r_4	a	d_1	d_a	d_b	D_a	D_b	C_a	C_b	r_a	r_b	e	Y	Y_0
	min.	min.	≈	≈	max.	min.	min.	min.	min.	min.	max.	max.			
139,7	1,5	1,5	30	157	146	148	172	175	3,5	6	1,5	1,5	0,37	1,64	0,9
	1,5	1,5	32	–	147	149	176	182	5	5	1,5	1,5	0,36	1,69	0,93
	7,1	3,3	55	199	156	170	227	238	8	13,5	7,1	3,3	0,41	1,47	0,81
	9,7	6,4	56	199,1	161	177	258	264	9	19	9,7	6,4	0,32	1,88	1,04
142,875	3,6	3,6	33	–	150	157	182	190	5	5,5	3,6	3,6	0,33	1,8	0,99
	7,9	3,3	38	–	151	158	185	193	5	7	7,9	3,3	0,34	1,78	0,98
	3,6	3,3	38	172,3	151	158	185	193	5	7	3,6	3,3	0,34	1,78	0,98
146,05	1,5	1,5	33	168,2	153	155	180	186	5	5	1,5	1,5	0,37	1,63	0,9
150	2,5	2	40	178,3	158	164	190	198	4	7	2,5	2	0,46	1,31	0,72
152,4	6,4	6,4	60	204	171	181	237	249	8	13,5	6,4	6,4	0,39	1,55	0,85
	9,7	6,9	63	214,5	179	191	276	285,4	9	17	9,7	6,9	0,33	1,84	1,01
160	3	2,5	50	205,5	173	178	222	232	6	9	3	2,5	0,44	1,37	0,75
	1,5	3,3	46	–	174	178	221	233	7	11,5	1,5	3,3	0,26	2,27	1,25
165,1	3,6	3,3	45	199	174	181	209	218	2,5	6,5	3,6	3,3	0,38	1,57	0,86
	3,3	6,4	72	239,5	197	196	280	308	10	22	3,3	6,4	0,37	1,62	0,89
170	3	2,5	50	205,5	180	185	222	232	6	9	3	2,5	0,44	1,37	0,75
171,45	1,5	1,5	36	193	179	181	211	215	3	6	1,5	1,5	0,38	1,6	0,88
177,8	1,5	1,5	43	203,6	186	188	214	221	4	7	1,5	1,5	0,44	1,36	0,75
180	3	2,5	54	217	190,5	196	232	242,6	5	8	3	2,5	0,48	1,25	0,69
184,15	2	2	39	209,8	191	195	224	229	4	5	2	2	0,33	1,79	0,99
	2	2	39	209,8	191	195	224	229	4	5	2	2	0,33	1,79	0,99
190	3	2,5	55	227	200	206	242	252	5	7,5	3	2,5	0,48	1,26	0,69
190,5	3,6	3,3	58	233	206	209	239	257	4	7,5	3,6	3,3	0,48	1,26	0,69
196,85	3,6	3,3	51	230	206	213	239	251	4	7,5	3,6	3,3	0,45	1,34	0,74
199,949	3,6	3,3	62	248,5	216	222	260	275	5	8	3,6	3,3	0,51	1,18	0,65
200,025	3,6	3,3	45	–	214	219	260	267	5	9	3,6	3,3	0,32	1,88	1,04



Tapered roller bearings

Single row to ANSI/ABMA





Mounting dimensions

d = 203,2 – 673,1 mm

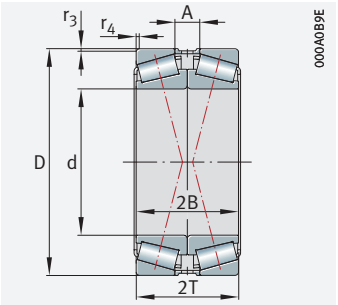
Main dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	C	T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤580 | 1.12 ➤581 | 1.13 X-life ➤565
					N	N	N	min^{-1}	≈ kg	
203,2	276,225	42,862	34,133	42,862	380 000	720 000	84 000	2 420	7,205	**KLM241149-LM241110**
203,987	276,225	46,038	34,133	42,862	380 000	720 000	84 000	2 420	7,248	**KLM241148-LM241110**
	276,225	46,038	34,132	42,862	380 000	720 000	84 000	2 420	7,21	**KLM241148-LM241111**
206,375	282,575	46,038	36,512	46,038	435 000	810 000	105 000	2 750	8,5	**K67985-67920-XL**
212,725	285,75	46,038	34,925	46,038	360 000	790 000	80 000	2 240	8,2	**KLM742745-LM742710**
215,9	285,75	46,038	34,925	46,038	360 000	790 000	80 000	2 240	7,8	**KLM742749-LM742710**
216,408	285,75	49,212	34,925	46,038	360 000	790 000	80 000	2 240	7,85	**KLM742747-LM742710**
216,713	285,75	49,213	34,925	46,038	360 000	790 000	80 000	2 240	7,77	**KLM742747-A-LM742710**
223,838	295,275	46,038	34,925	46,038	370 000	830 000	83 000	2 170	8,5	**KLM844049-LM844010**
228,6	295,275	31,75	23,813	33,338	250 000	510 000	57 000	2 320	5,3	**AK544090-544116**
230,188	317,5	52,388	36,512	47,625	455 000	830 000	93 000	2 090	11,106	**KLM245846-LM245810**
231,775	317,5	52,388	36,512	47,625	540 000	830 000	105 000	2 550	10,8	**KLM245848-LM245810-XL**
234,95	314,325	49,213	36,512	49,212	480 000	990 000	112 000	2 070	10,3	**KLM545849-LM545810**
279,982	380,898	65,088	49,212	65,088	690 000	1 610 000	174 000	1 670	21,317	**KLM654642-LM654610**
285,75	380,898	65,088	49,212	65,088	690 000	1 610 000	174 000	1 670	19,9	**KLM654649-LM654610**
317,5	447,675	85,725	68,262	85,725	1 210 000	2 600 000	265 000	1 420	41,6	**KHM259049-HM259010**
342,9	450,85	66,675	52,388	66,675	1 090 000	2 030 000	232 000	1 730	26,9	**KLM361649-LM361610-XL**
343,154	450,85	66,675	52,388	66,675	1 090 000	2 030 000	232 000	1 730	26,9	**KLM361649-A-LM361610-XL**
596,9	685,8	31,75	25,4	31,75	410 000	1 120 000	95 000	1 010	17,3	**K680235-680270**
673,1	793,75	61,912	49,212	66,675	1 060 000	3 250 000	270 000	630	51,9	**KLL481448-LL481411**

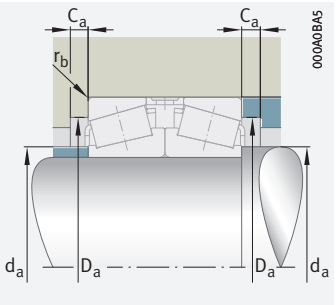
medias *https://www.schaeffler.de/std/1F9A*

Dimensions					Mounting dimensions								Calculation factors		
d	r_1, r_2 min.	r_3, r_4 min.	a ≈	d_1 ≈	d_a max.	d_b min.	D_a min.	D_b min.	C_a min.	C_b min.	r_a max.	r_b max.	e	Y	Y_0
203,2	3,6	3,3	45	–	214	219	260	267	5	8	3,6	3,3	0,32	1,04	1,88
203,987	3,6	3,3	45	–	214	219	260	267	5	9	3,6	3,3	0,32	1,04	1,88
	3,6	3,3	45	–	214	219	260	267	5	8	3,6	3,3	0,32	1,04	1,88
206,375	3,6	3,3	62	248,5	221	220	254	272	5	8	3,6	3,3	0,51	0,65	1,18
212,725	3,6	3,3	61	255	225	230	266	279	5	10,5	3,6	3,3	0,48	0,69	1,25
215,9	3,6	3,3	61	255	227	233	266	279	5	11	3,6	3,3	0,48	0,69	1,25
216,408	3,6	3,3	61	255	227	233	266	279	5	11	3,6	3,3	0,48	0,69	1,25
216,713	3,6	3,3	61	255	227	233	266	279	5	11	3,6	3,3	0,48	0,69	1,25
223,838	3,6	3,3	64	264	235	241	275	288	5	11	3,6	3,3	0,5	0,66	1,2
228,6	3,6	3,3	50	262,5	240	244	280	287	4	9,5	3,6	3,3	0,4	0,82	1,49
230,188	3,3	3,3	50	–	245	248	299	306	10	11	3,3	3,3	0,32	1,04	1,88
231,775	3,3	3,3	50	270	247	248	296	304	10	11	3,3	3,3	0,32	1,04	1,88
234,95	3,6	3,3	58	274,5	246	252	296	306	5	10	3,6	3,3	0,4	0,83	1,51
279,982	3,6	3,3	76	–	298	302	356	368	4,5	12	3,6	3,3	0,43	0,76	1,39
285,75	3,6	3,3	76	334,5	302	306	356	368	7	16	3,6	3,3	0,43	0,76	1,39
317,5	3,6	3,3	80	380,4	337	341	418	428	9	13,5	3,6	3,3	0,33	0,99	1,8
342,9	8,6	3,6	77	390,5	360	373	425	435	7	14	8,6	3,6	0,35	0,94	1,7
343,154	8,6	3,6	77	390,5	360	373	425	435	7	14	8,6	3,6	0,35	0,94	1,7
596,9	3,6	3,3	126	637	615	621	659	667	8	6	3,6	3,3	0,53	0,63	1,14
673,1	6,4	6,4	117	725	690	702	765	771	7	14	6,4	6,4	0,36	0,92	1,67

Tapered roller bearings

Matched pairs





Mounting dimensions

d = 40 – 150 mm

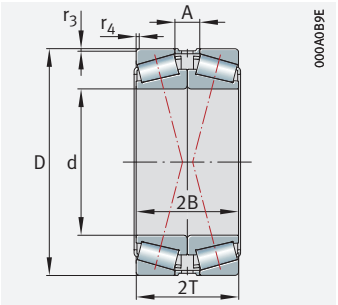
Main dimensions				Basic load ratings for bearing pair		Fatigue limit load Bearing pair	Limiting speed Bearing pair	Speed rating Bearing pair	Mass for bearing pair	Designation
d	D	2B	2T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤ *580* | *1.12* ➤ *581* | *1.13* X-life ➤ *565*
				N	N	N	min^{-1}	min^{-1}	≈ kg	
40	90	46	50,5	153 000	165 000	24 700	8 700	5 100	1,52	**31308-XL-DF-A115-155**
	90	46	50,5	153 000	165 000	24 700	8 700	5 100	1,52	**31308-XL-DF-A50-90**
60	110	44	47,5	210 000	246 000	37 500	7 500	4 250	1,97	**30212-XL-DF-A100-140**
80	125	58	58	280 000	425 000	69 000	6 000	3 450	2,66	**32016-X-XL-DF-A140-170**
	125	58	58	280 000	425 000	69 000	6 000	3 450	2,66	**32016-X-XL-DF-A150-200**
	125	58	58	280 000	425 000	69 000	6 000	3 450	2,66	**32016-X-XL-DF-A25-50**
85	130	58	58	285 000	450 000	73 000	5 700	3 250	2,8	**32017-X-XL-DF-A170-220**
	130	58	58	285 000	450 000	73 000	5 700	3 250	2,8	**32017-X-XL-DF-A190-230**
90	140	64	64	335 000	510 000	82 000	5 400	3 200	3,64	**32018-X-XL-DF-A170-220**
	160	80	85	530 000	720 000	111 000	4 800	2 650	7,12	**32218-XL-DF-A220-270**
100	150	64	64	350 000	570 000	88 000	4 950	2 900	4,02	**32020-X-XL-DF-A220-270**
105	160	70	70	410 000	660 000	101 000	4 650	2 650	5,11	**32021-X-XL-DF-A280-330**
	190	100	106	780 000	1 110 000	166 000	4 000	2 110	13	**32221-XL-DF-A230-280**
110	170	76	76	490 000	790 000	119 000	4 350	2 440	6,31	**32022-X-XL-DF-A170-230**
	170	76	76	490 000	790 000	119 000	4 350	2 440	6,31	**32022-X-XL-DF-A220-270**
	170	76	76	490 000	790 000	119 000	4 350	2 440	6,31	**32022-X-XL-DF-A90-130**
	240	114	126	940 000	1 170 000	160 000	3 100	1 890	26,2	**31322-X-XL-DF-A200-250**
	240	114	126	940 000	1 170 000	160 000	3 100	1 890	26,2	**31322-X-XL-P5-DF-A120-160**
	240	114	126	940 000	1 170 000	160 000	3 100	1 890	26,2	**31322-X-XL-P5-DF-A140-180**
	240	114	126	940 000	1 170 000	160 000	3 100	1 890	26,2	**31322-X-XL-P5-DF-A60-100**
120	180	76	76	510 000	840 000	126 000	4 050	2 240	6,76	**32024-X-XL-DF-A230-280**
130	200	90	90	660 000	1 100 000	161 000	3 650	1 960	9,94	**32026-X-XL-DF-A125-175**
	200	90	90	660 000	1 100 000	161 000	3 650	1 960	9,94	**32026-X-XL-DF-A200-250**
	200	90	90	660 000	1 100 000	161 000	3 650	1 960	9,94	**32026-X-XL-DF-A250-300**
140	210	90	90	690 000	1 180 000	172 000	3 450	1 810	11,1	**32028-X-XL-DF-A250-300**
150	225	96	96	780 000	1 350 000	192 000	3 200	1 650	13,5	**32030-X-XL-DF-A120-170**
	225	96	96	780 000	1 350 000	192 000	3 200	1 650	13,5	**32030-X-XL-DF-A280-330**
	225	118	118	950 000	1 770 000	255 000	3 150	1 580	16,7	**33030-XL-DF-A0-35**

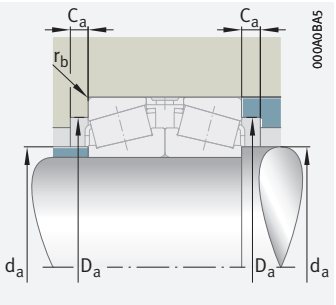
medias *https://www.schaeffler.de/std/1F9A*

Dimensions			Mounting dimensions					Calculation factors			
d	r_3, r_4 min.	A	d_a max.	D_a min.	D_a max.	C_a min.	r_b max.	e	Y_1	Y_2	Y_0
40	1,5	16,5	51	71	81	4	1,5	0,83	0,82	1,22	0,8
	1,5	16,5	51	71	81	4	1,5	0,83	0,82	1,22	0,8
60	1,5	9,5	70	96	101	4	1,5	0,41	1,67	2,48	1,63
80	1,5	14	89	112	117	6	1,5	0,42	1,6	2,38	1,56
	1,5	14	89	112	117	6	1,5	0,42	1,6	2,38	1,56
	1,5	14	89	112	117	6	1,5	0,42	1,6	2,38	1,56
85	1,5	14	94	117	122	6	1,5	0,44	1,53	2,27	1,49
	1,5	14	94	117	122	6	1,5	0,44	1,53	2,27	1,49
90	1,5	16	100	125	131	6	1,5	0,42	1,6	2,38	1,56
	2	17	102	138	150	5	2	0,42	1,61	2,39	1,57
100	1,5	16	109	134	141	6	1,5	0,46	1,47	2,19	1,44
105	2	18	116	143	150	6	2	0,44	1,52	2,26	1,49
	2,5	20	120	161	178	5	2,5	0,42	1,61	2,39	1,57
110	2	18	122	152	160	7	2	0,43	1,57	2,34	1,53
	2	18	122	152	160	7	2	0,43	1,57	2,34	1,53
	2	18	122	152	160	7	2	0,43	1,57	2,34	1,53
	3	50	135	188	226	7	3	0,83	0,82	1,22	0,8
	3	50	135	188	226	7	3	0,83	0,82	1,22	0,8
	3	50	135	188	226	7	3	0,83	0,82	1,22	0,8
	3	50	135	188	226	7	3	0,83	0,82	1,22	0,8
120	2	18	131	161	170	7	2	0,46	1,47	2,19	1,44
130	2	22	144	178	190	8	2	0,43	1,55	2,31	1,52
	2	22	144	178	190	8	2	0,43	1,55	2,31	1,52
	2	22	144	178	190	8	2	0,43	1,55	2,31	1,52
140	2	22	153	187	200	8	2	0,46	1,47	2,19	1,44
150	2,5	24	164	200	213	8	2,5	0,46	1,47	2,19	1,44
	2,5	24	164	200	213	8	2,5	0,46	1,47	2,19	1,44
	2,5	26	164	200	213	8	2,5	0,36	1,85	2,76	1,81

Tapered roller bearings

Matched pairs





Mounting dimensions

d = 170 – 260 mm

Main dimensions				Basic load ratings for bearing pair		Fatigue limit load Bearing pair	Limiting speed Bearing pair	Speed rating Bearing pair	Mass for bearing pair	Designation
d	D	2B	2T	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*580* | *1.12* ➤*581* | *1.13* X-life ➤*565*
				N	N	N	min^{-1}	min^{-1}	≈ kg	
170	310	172	182	1 980 000	3 100 000	415 000	2 350	1 090	59,2	**32234-XL-DF-A320-370**
	310	172	182	1 980 000	3 100 000	415 000	2 350	1 090	59,2	**32234-XL-DF-A350-410**
	310	172	182	1 980 000	3 100 000	415 000	2 350	1 090	59,2	**32234-XL-DF-A490-540**
180	280	128	128	1 270 000	2 200 000	295 000	2 550	1 250	28,9	**32036-X-XL-DF-A240-290**
	280	128	128	1 270 000	2 200 000	295 000	2 550	1 250	28,9	**32036-X-XL-DF-A320-370**
	280	128	128	1 270 000	2 200 000	295 000	2 550	1 250	28,9	**32036-X-XL-DF-A330-380**
	320	172	182	2 040 000	3 300 000	435 000	2 270	1 020	62,3	**32236-XL-DF-A330-380**
	320	172	182	2 040 000	3 300 000	435 000	2 270	1 020	62,3	**32236-XL-DF-A380-430**
	320	172	182	2 040 000	3 300 000	435 000	2 270	1 020	62,3	**32236-XL-DF-A385-445**
	320	172	182	2 040 000	3 300 000	435 000	2 270	1 020	62,3	**32236-XL-DF-A430-480**
190	290	128	128	1 280 000	2 250 000	300 000	2 460	1 180	30,1	**32038-X-XL-DF-A120-150**
	290	128	128	1 280 000	2 250 000	300 000	2 460	1 180	30,1	**32038-X-XL-DF-A200-250**
	290	128	128	1 280 000	2 250 000	300 000	2 460	1 180	30,1	**32038-X-XL-DF-A300-350**
	290	128	128	1 280 000	2 250 000	300 000	2 460	1 180	30,1	**32038-X-XL-DF-A350-400**
	290	128	128	1 280 000	2 250 000	300 000	2 460	1 180	30,1	**32038-X-XL-DF-A370-420**
	290	128	128	1 280 000	2 250 000	300 000	2 460	1 180	30,1	**32038-X-XL-DF-A580-630**
200	360	196	208	2 700 000	4 150 000	520 000	2 030	890	88,2	**32240-XL-DF-A350-400**
	360	196	208	2 700 000	4 150 000	520 000	2 030	890	88,2	**32240-XL-DF-A400-450**
	360	196	208	2 700 000	4 150 000	520 000	2 030	890	88,2	**32240-XL-DF-A500-550**
240	360	152	152	1 820 000	3 350 000	420 000	1 950	870	53,5	**32048-X-XL-DF-A300-350**
	360	152	152	1 820 000	3 350 000	420 000	1 950	870	53,5	**32048-X-XL-DF-A400-450**
	360	152	152	1 820 000	3 350 000	420 000	1 950	870	53,5	**32048-X-XL-DF-A450-500**
	360	152	152	1 820 000	3 350 000	420 000	1 950	870	53,5	**32048-X-XL-DF-A700-750**
	440	240	254	3 750 000	6 200 000	740 000	1 630	660	166	**32248-XL-DF-A350-400**
	440	240	254	3 750 000	6 200 000	740 000	1 630	660	166	**32248-XL-DF-A450-500**
260	480	260	274	4 550 000	7 600 000	880 000	1 480	560	215	**32252-XL-DF-A500-550**
	480	260	274	4 550 000	7 600 000	880 000	1 480	560	215	**32252-XL-DF-A550-600**

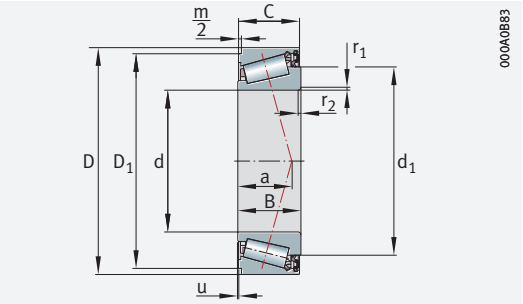
medias *https://www.schaeffler.de/std/1F9A*

Dimensions			Mounting dimensions					Calculation factors			
d	r_3, r_4 min.	A	d_a max.	D_a min.	D_a max.	C_a min.	r_b max.	e	Y_1	Y_2	Y_0
170	4	40	196	259	292	10	4	0,43	1,55	2,31	1,52
	4	40	196	259	292	10	4	0,43	1,55	2,31	1,52
	4	40	196	259	292	10	4	0,43	1,55	2,31	1,52
180	2,5	32	199	247	268	10	2,5	0,42	1,6	2,38	1,56
	2,5	32	199	247	268	10	2,5	0,42	1,6	2,38	1,56
	2,5	32	199	247	268	10	2,5	0,42	1,6	2,38	1,56
	4	40	204	267	302	10	4	0,45	1,5	2,23	1,47
	4	40	204	267	302	10	4	0,45	1,5	2,23	1,47
	4	40	204	267	302	10	4	0,45	1,5	2,23	1,47
	4	40	204	267	302	10	4	0,45	1,5	2,23	1,47
190	2,5	32	209	257	278	10	2,5	0,44	1,53	2,27	1,49
	2,5	32	209	257	278	10	2,5	0,44	1,53	2,27	1,49
	2,5	32	209	257	278	10	2,5	0,44	1,53	2,27	1,49
	2,5	32	209	257	278	10	2,5	0,44	1,53	2,27	1,49
	2,5	32	209	257	278	10	2,5	0,44	1,53	2,27	1,49
	2,5	32	209	257	278	10	2,5	0,44	1,53	2,27	1,49
200	4	44	226	302	342	11	4	0,41	1,66	2,47	1,62
	4	44	226	302	342	11	4	0,41	1,66	2,47	1,62
	4	44	226	302	342	11	4	0,41	1,66	2,47	1,62
240	3	38	261	318	346	12	3	0,46	1,47	2,19	1,44
	3	38	261	318	346	12	3	0,46	1,47	2,19	1,44
	3	38	261	318	346	12	3	0,46	1,47	2,19	1,44
	3	38	261	318	346	12	3	0,46	1,47	2,19	1,44
	4	54	286	372	422	14	4	0,43	1,55	2,31	1,52
	4	54	286	372	422	14	4	0,43	1,55	2,31	1,52
260	5	62	306	401	458	14	5	0,43	1,57	2,34	1,53
	5	62	306	401	458	14	5	0,43	1,57	2,34	1,53



Integral tapered roller bearings

Sealed on one side



d = 30 – 80 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Load carrying capacity	Max. axial assembly clamping force	Mass Bearing[1]	Designation ➤580|1.12 ➤581|1.13	
d	D	B	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	F_{BR}[2]	Bearing pair	m	Bearing	Snap ring
				N	N	N	min^{-1}	N	N	≈ kg		
30	55	19	18,5	38 500	46 500	5 400	6 100	15 700	7 700	0,19	**JK0S030**	BR55
40	68	21	20,5	53 000	71 000	8 500	4 950	12 900	10 600	0,3	**JK0S040**[3]	BR68
50	80	22	21,5	64 000	93 000	11 400	4 050	31 400	12 800	0,41	**JK0S050**	BR80
60	95	26	25	82 000	123 000	15 500	3 350	59 300	16 400	0,67	**JK0S060**	BR95
70	110	27	26,5	104 000	159 000	20 500	2 900	49 000	20 800	0,93	**JK0S070-A**	BR110
80	125	30	29,5	137 000	211 000	27 000	2 550	40 200	27 400	1,32	**JK0S080-A**	BR125

medias *https://www.schaeffler.de/std/1F9A*

Other sizes and designs are also available; please contact us.

Ordering note

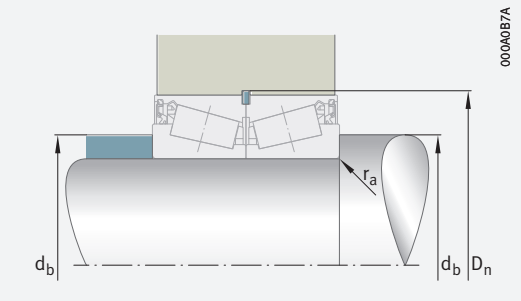
FAG integral tapered roller bearings are interchangeable with each other.
When ordering, please always state the number of single bearings, not the number of bearing pairs.
The snap ring must be ordered separately, for example

2 tapered roller bearings JK0S080-A
1 snap ring BR125

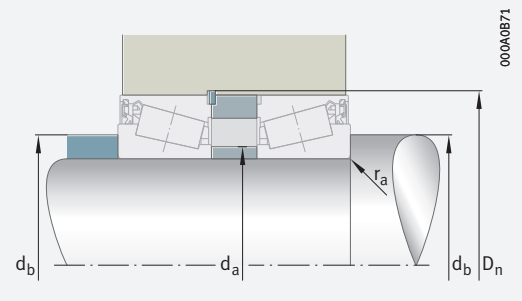
1) Ungreased.

2) For snap ring connection located against a sharp edge.

3) Also available with 95% grease filling; designation: JK0S040-J14.



Mounting dimensions



Mounting dimensions

Dimensions								Mounting dimensions					Calculation factors		
								Shaft			Slot				
d	r_1, r_2 min.	D_1	m/2	a ≈	u	Δ_u Deviations	d_1 ≈	d_a max.	d_b min.	r_a max.	D_n Nominal dimension	Δ_{Dn} Deviations	e	Y	Y_0
30	1	51,4	0,75	15	0,02	+0,05 0	43,6	35	36	1	56,5	+0,19 0	0,43	1,4	0,77
40	1	64,4	0,75	16	0,03	+0,05 0	53,8	46	46	1	69,5	+0,19 0	0,37	1,6	0,88
50	1	75,7	1	19	0,02	+0,05 0	66,4	56	56	1	81,8	+0,22 0	0,42	1,43	0,79
60	1,5	89,3	1,25	23	0,03	+0,05 0	79,5	67	67	1,5	97	+0,22 0	0,43	1,4	0,77
70	1,5	104,8	1,25	25	0,03	+0,05 0	91,5	78	77	1,5	112,3	+0,22 0	0,43	1,38	0,76
80	1,5	119,8	1,25	28	0,03	+0,05 0	104,2	89	87	1,5	127,3	+0,25 0	0,42	1,42	0,78

Barrel roller bearings



Matrix for bearing preselection 653

1 Barrel roller bearings 654

1.1 Bearing design 654
1.2 Load carrying capacity 655
1.3 Compensation of angular misalignments 656
1.4 Lubrication 656
1.5 Sealing 656
1.6 Speeds 656

FAG



1.7 Noise ____ *656*
1.8 Temperature range ____ *657*
1.9 Cages ____ *657*
1.10 Internal clearance ____ *657*
1.11 Dimensions, tolerances ____ *658*
1.12 Suffixes ____ *659*
1.13 Structure of bearing designation ____ *659*
1.14 Dimensioning ____ *660*
1.15 Minimum load ____ *660*
1.16 Design of bearing arrangements ____ *661*
1.17 Mounting and dismounting ____ *664*
1.18 Legal notice regarding data freshness ____ *665*
1.19 Further information ____ *665*

Product tables ____ *666*

Barrel roller bearings with cylindrical or tapered bore ____ *666*

Barrel roller bearings with adapter sleeve ____ *672*

Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Barrel roller bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			cylindrical or tapered bore	with adapter sleeve	detailed information ➤ 654
Load carrying capacity	radial		+++	+++	➤655|1.2
	axial, one direction		+	+	➤655|1.2
	axial, both directions		+	+	➤655|1.2
	moments		–	–	
Compensation of angular misalignments	static		+++	+++	➤656|1.3
	dynamic		+	+	➤656|1.3
Bearing design	cylindrical bore		✓	✓	➤654|1.1
	tapered bore		✓	–	➤654|1.1
	separable		–	–	➤664|1.17
Lubrication	greased		–	–	➤656|1.4
Sealing	open		✓	✓	➤656|1.5
	non-contact		–	–	
	contact		–	–	
Operating temperature in °C	from to		–30 +150[1]	–30 +150[1]	➤657|1.8
Suitability for	high speeds		+	+	➤64
	high running accuracy		(+)	(+)	➤658|1.11 ➤115
	low-noise running		(+)	(+)	➤656|1.7 ➤27
	high rigidity		++	++	➤54
	reduced friction		+	+	➤56
	length compensation within bearing		–	–	
	non-locating bearing arrangement		+	+	➤141
	locating bearing arrangement		+	+	➤141
X-life bearings		X-life	–	–	
Bearing bore[2] d in mm	from to		20 260[3]	20 140[3]	➤666
Product tables	from page ➤		666	672	

1) Data valid for bearings with brass cages, D ≦ 120 mm

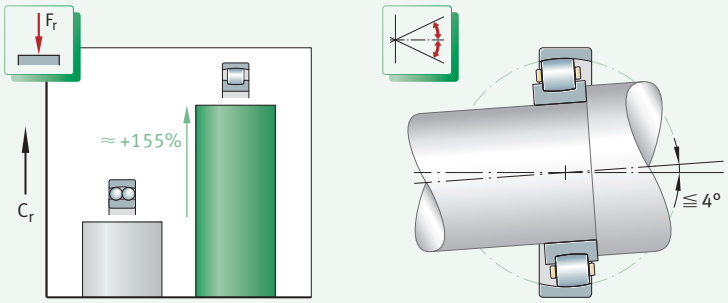
2) For bearings with adapter sleeve: inside diameter of adapter sleeve

3) Larger catalogue bearings GL 1

1 Barrel roller bearings

Barrel roller bearings are suitable:
- for compensating angular misalignments where there is skewing between the outer and inner ring ➤*656|1.3*
- where high radial shock type loads occur, as a result of the line contact ➤*655|1.2*
- where angular misalignments and high radial loads occur, but speed is not a priority ➤*654|1*

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*653*.



1 *Barrel roller bearing: comparison of load carrying capacity with self-aligning ball bearing, compensation of misalignments*

F_r = *radial load*
C_r = *radial basic dynamic load rating*

1.1 Bearing design

Design variants

Barrel roller bearings are available as:
- bearings of basic design ➤*655|2*
- bearings with adapter sleeve ➤*655|3*

Bearings of basic design

The outer ring has a curved raceway

Barrel roller bearings are single row, self-retaining radial roller bearings, which are part of the group of self-aligning bearings. The outer ring has a concave raceway. As a result, the bearings permit the compensation of static and dynamic angular misalignments (skewing between the inner and outer ring) within certain limits ➤*656|1.3*. The inner ring has a formed raceway for the rolling elements and two rigid ribs. The rollers are barrel-shaped and are guided between the inner ring ribs. Their outside surface line closely follows the raceway profile of the outer and inner ring. Solid cages made from polyamide PA66 or brass are used ➤*657|2*.

The bore is cylindrical or tapered

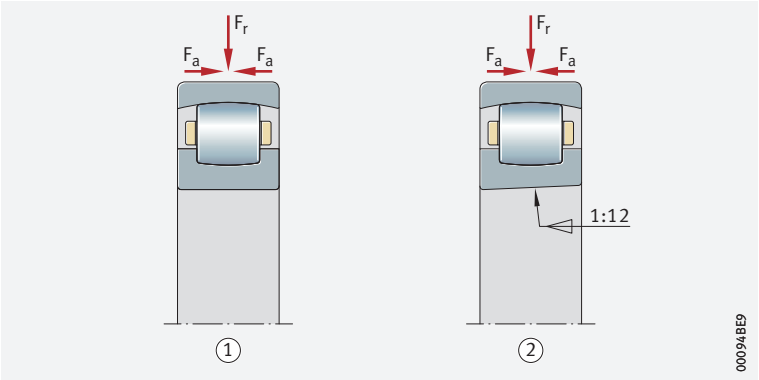
Barrel roller bearings of basic design are available with a cylindrical or tapered bore, as a function of the bore diameter d ➤*655|2*.

Bearings with a tapered bore have a bore taper of 1:12 and the suffix K ➤*659|5*.

2
Barrel roller bearings of basic design

F_r = *radial load*
F_a = *axial load*

① *Barrel roller bearing with cylindrical bore*
② *Barrel roller bearing with tapered bore, bore taper 1:12*



Bearings with adapter sleeve

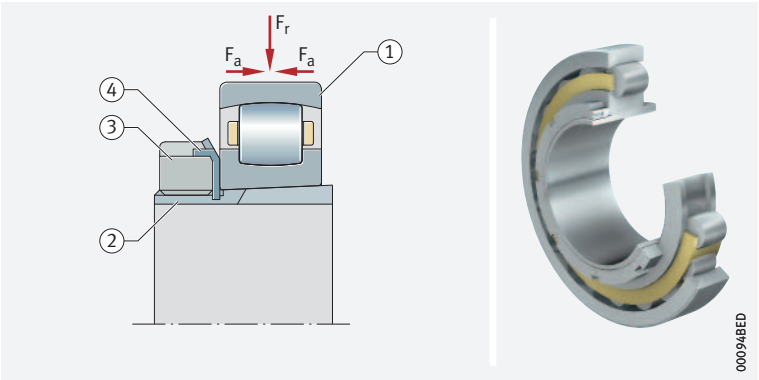
Ready-to-fit bearing mounting kits facilitate the ordering and mounting of barrel roller bearings

Complete bearing mounting kits comprising the bearing of basic design, slotted adapter sleeve, tab washer and locknut, are also available for use in the location of barrel roller bearings with a tapered bore on a cylindrical shaft journal (series 202..-K + H, 203..-K + H) ➤*655*|*3*. Adapter sleeves allow bearings to be located on smooth and stepped shafts. The adapter sleeves must also be stated when placing the order. Ordering example ➤*659*|*5*.

3
Barrel roller bearing with adapter sleeve

F_r = *radial load*
F_a = *axial load*

① *Barrel roller bearing with tapered bore*
② *Adapter sleeve*
③ *Locknut*
④ *Tab washer*



1.2 Load carrying capacity

Suitable for high radial loads

The rolling elements are in line contact with the raceways. As a result, barrel roller bearings have a very high radial load carrying capacity ➤*655*|*2*. In contrast, they have only a low axial load carrying capacity.

Axial load carrying capacity of bearings with adapter sleeve

Where bearings with adapter sleeves are located on a smooth shaft without a fixed stop (e.g. rigid shoulder), their axial load carrying capacity is dependent on the friction between the shaft and the sleeve.

If there is any uncertainty regarding the axial load carrying capacity of the adapter sleeve location method, please consult Schaeffler.

1.3 Compensation of angular misalignments

Barrel roller bearings compensate dynamic and static angular misalignments

Due to the concave rolling element raceway in the outer ring, barrel roller bearings are capable of angular adjustment ➤654|1.1. As a result, they permit skewing between the outer and inner ring within certain limits, without causing damage to the bearings, and can thus compensate misalignments, shaft deflections and housing deformations.

Permissible adjustment angle

With a rotating inner ring, barrel roller bearings can swivel up to 4° from their central position

The magnitude of alignment and angular defects may only be so large when the bearings are mounted that the contact surfaces of the rolling elements under load still lie within the width of the raceway. Under normal operating conditions and with a rotating inner ring, barrel roller bearings can swivel by up to 4° from their central position. The extent to which this value can be used for skewing between the inner and outer ring is, however, essentially dependent on the design of the bearing arrangement.

If the outer ring rotates or the inner ring undergoes tumbling motion, the angular adjustment facility is smaller. In such cases, please consult Schaeffler.

1.4 Lubrication

Oil or grease lubrication

The bearings are not greased. They must be lubricated with oil or grease and can be lubricated from the end faces.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

The bearings are open; provide seals in the adjacent construction

Barrel roller bearings are supplied without seals. As a result, sealing of the bearing position must be carried out in the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position

1.6 Speeds

The product tables give the limiting speed n_G. This is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤69. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** *https://medias.schaeffler.com*

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant

Possible operating temperatures of barrel roller bearings ➤*657*| ▦ *1*.

▦ **1**
Permissible temperature ranges

Operating temperature	Barrel roller bearings	
	with brass cage	with polyamide cage PA66
	–30 °C to +150 °C, for D > 120 mm up to +200 °C	–30 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Standard cages for barrel roller bearings ➤*657*| ▦ *2*.

▦ **2**
Cage, cage suffix, bore code

Bearing series	Solid cage made from polyamide PA66 TVP	Solid brass cage MB
	Bore code	
202	up to 16	from 17
203	up to 12	from 13

For high continuous temperatures and applications with difficult operating conditions, bearings with brass cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

1.10 Internal clearance

Radial internal clearance – bearings with cylindrical bore

✎ *The standard is CN*

Barrel roller bearings with cylindrical bore are manufactured as standard with radial internal clearance CN (normal) ➤*657*| ▦ *3*. CN is not stated in the designation.

Certain sizes are also available by agreement with the smaller internal clearance C2 and with the larger internal clearance C3 and C4.

Values for radial internal clearance ➤*657*| ▦ *3*. These are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦ **3**
Radial internal clearance of barrel roller bearings with cylindrical bore

Nominal bore diameter d mm		Radial internal clearance							
		C2 µm		CN µm		C3 µm		C4 µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	30	2	9	9	17	17	28	28	40
30	40	3	10	10	20	20	30	30	45
40	50	3	13	13	23	23	35	35	50
50	65	4	15	15	27	27	40	40	55
65	80	5	20	20	35	35	55	55	75
80	100	7	25	25	45	45	65	65	90

continued ▼

3
Radial internal clearance of barrel roller bearings with cylindrical bore

Nominal bore diameter d mm		Radial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
100	120	10	30	30	50	50	70	70	95
120	140	15	35	35	55	55	80	80	110
140	160	20	40	40	65	65	95	95	125
160	180	25	45	45	70	70	100	100	130
180	225	30	50	50	75	75	105	105	135
225	250	35	55	55	80	80	110	110	140
250	280	40	60	60	85	85	115	115	145

continued ▲

Radial internal clearance – bearings with tapered bore

✎ *C3 is normally used*

Barrel roller bearings with tapered bore are normally manufactured with the larger radial internal clearance C3 ➤*658*|▦*4*.

Certain sizes are also available by agreement with the smaller internal clearance C2, with internal clearance CN (normal) and with the larger internal clearance C4.

Values for radial internal clearance ➤*658*|▦*4*. These are valid for bearings which are free from load and measurement forces (without elastic deformation).

4
Radial internal clearance of barrel roller bearings with tapered bore

Nominal bore diameter d mm		Radial internal clearance							
		C2 µm		CN µm		C3 µm		C4 µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	30	9	17	17	28	28	40	40	55
30	40	10	20	20	30	30	45	45	60
40	50	13	23	23	35	35	50	50	65
50	65	15	27	27	40	40	55	55	75
65	80	20	35	35	55	55	75	75	95
80	100	25	45	45	65	65	90	90	120
100	120	30	50	50	70	70	95	95	125
120	140	35	55	55	80	80	110	110	140
140	160	40	65	65	95	95	125	125	155
160	180	45	70	70	100	100	130	130	160
180	225	50	75	75	105	105	135	135	165
225	250	55	80	80	110	110	140	140	170
250	280	60	85	85	115	115	145	145	175

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of barrel roller bearings correspond to DIN 635-1:2010. Nominal dimensions of barrel roller bearings ➤*666*|▦.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137*|*7.11*. Nominal value of chamfer dimension ➤*666*|▦.

Tolerances

The tolerances for the dimensional and running accuracy of barrel roller bearings correspond to tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤124|8.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

5 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
C2	Radial internal clearance C2 (smaller than normal)	Special design, available by agreement
C3	Radial internal clearance C3 (larger than normal)	Normally used for bearings with tapered bore, available by agreement for bearings with cylindrical bore
C4	Radial internal clearance C4 (larger than C3)	Special design, available by agreement
CN	Radial internal clearance CN (normal)	Standard for bearings with cylindrical bore, available by agreement for bearings with tapered bore
K	Tapered bore, taper 1:12	Standard
MB	Solid brass cage, guided on inner ring	Standard, cage material dependent on bore code
TVP	Solid cage made from glass fibre reinforced polyamide PA66	

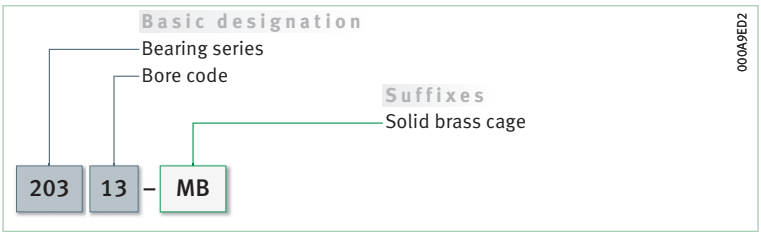
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

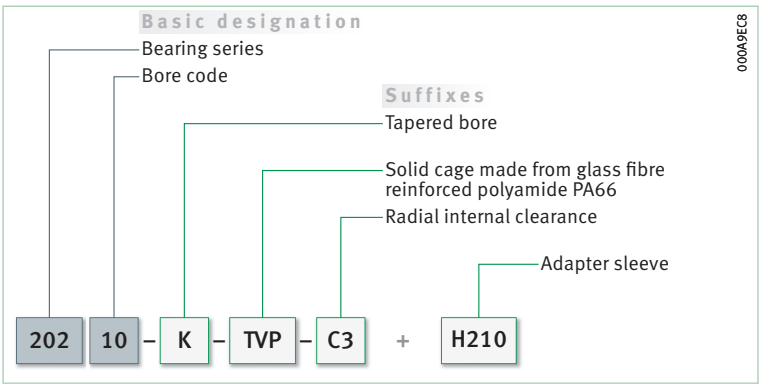
Examples of composition of bearing designation

The designation of bearings follows a set model.
The composition of designations is subject to DIN 623-1 ➤102|10.

4 *Barrel roller bearing with cylindrical bore: designation structure*



5 *Barrel roller bearing with tapered bore and adapter sleeve: designation structure*



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

✎ *P is a substitute force for combined load and various load cases*

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

To calculate P for barrel roller bearings under dynamic load ➤*660*| *1*.

1
Equivalent dynamic load

$$P = F_r + 9{,}5 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load.

Equivalent static bearing load

For barrel roller bearings subjected to static load ➤*660*| *2*.

2
Equivalent static load

$$P_0 = F_{0r} + 5 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*660*| *3*.

3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is required*

In order that no slippage occurs between the contact partners, the barrel roller bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical or tapered seating surface ➤*662*|*6* to ➤*662*|*8*. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤*663*|*6* to ➤*663*|*8*.

Radial location – fit recommendations for bearings with cylindrical bore

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤*152*|*6* and ➤*160*|*7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤*146*
- conditions of rotation ➤*147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*149*|*2*
- shaft fits ➤*152*|*6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*150*|*4*
- housing fits ➤*160*|*7*
- shaft tolerances for adapter sleeves and withdrawal sleeves ➤*168*|*8*

Axial location – location methods for bearings with cylindrical bore

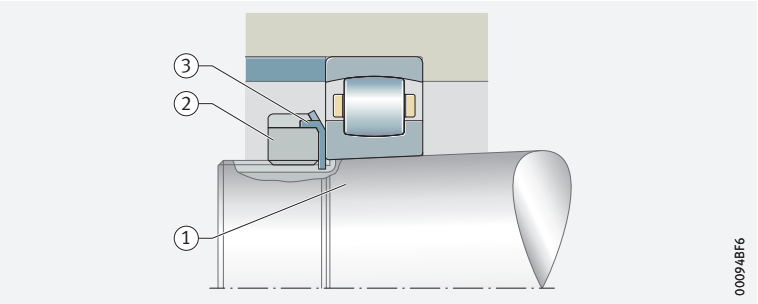
The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings, retaining rings, adapter and withdrawal sleeves etc., are fundamentally suitable.

Location of bearings with tapered bore

✎ Location by means of locknut and tab washer

If a bearing with a tapered bore is mounted directly on a tapered journal, the bearing can be axially located with ease using a locknut and tab washer ➤*662*|🗐*6*.



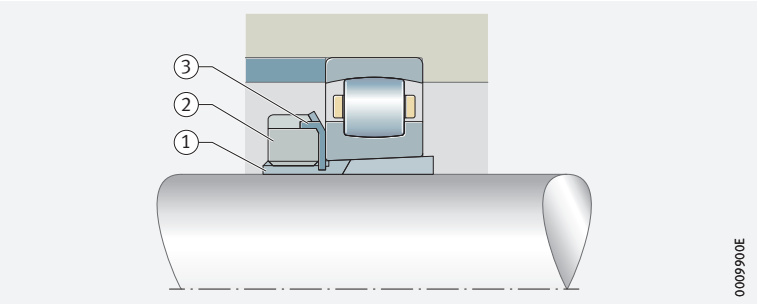
🗐*6*
Barrel roller bearing with tapered bore, mounted directly on the tapered shaft journal

① *Tapered journal with fixing thread*
② *Locknut*
③ *Tab washer*

Location of bearings by means of adapter sleeve

✎ Mounting can be carried out quickly and reliably by means of wrench sets from Schaeffler

Barrel roller bearings with a tapered bore can be located easily and with operational reliably on smooth or stepped shafts by means of an adapter sleeve ➤*662*|🗐*7*. The adapter sleeves do not need to be secured on the shaft by any additional means. The bearings can be positioned at any point on smooth shafts. Axial load carrying capacity of bearing arrangements by means of adapter sleeve connection ➤*655*|*1.2*.

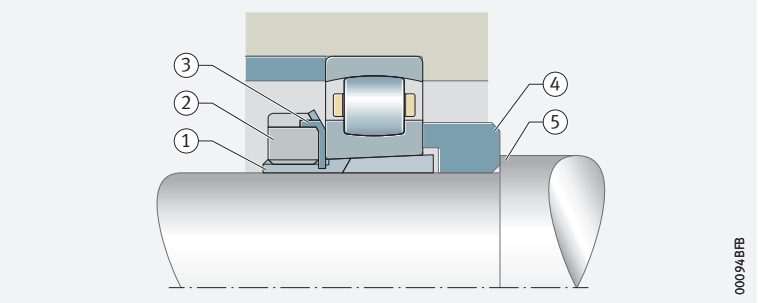


🗐*7*
Barrel roller bearing with adapter sleeve, located on smooth shaft

① *Adapter sleeve*
② *Locknut*
③ *Tab washer*

Location by means of adapter sleeve, axial abutment by means of a support ring

If very high axial forces are present, a support ring can also be used to provide axial abutment ➤*662*|🗐*8*. In this instance, the mounting dimensions of the support ring B_a and d_b in the product tables must be observed ➤*672*|▦.



🗐*8*
Stepped shaft, axial abutment by means of a support ring

① *Adapter sleeve*
② *Locknut*
③ *Tab washer*
④ *Support ring*
⑤ *Shaft shoulder*

Dimensional, geometrical and running accuracy of cylindrical bearing seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For barrel roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤663|▦6. Tolerances t_1 to t_3 in accordance with ➤170|🕮11. Numerical values for IT grades ➤663|▦7.

▦6 *Guide values for the geometrical and positional tolerances of bearing seating surfaces*

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	

▦7 *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm						
	over **18**	**30**	**50**	**80**	**120**	**180**	**250**
	incl. **30**	**50**	**80**	**120**	**180**	**250**	**315**
	Values in µm						
IT4	6	7	8	10	12	14	16
IT5	9	11	13	15	18	20	23
IT6	13	16	19	22	25	29	32
IT7	21	25	30	35	40	46	52

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤663|▦8.

▦8 *Roughness values for cylindrical bearing seating surfaces – guide values*

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Tolerances for tapered bearing seats

Specifications for tapered bearing seats

For bearings located directly on a tapered shaft journal ➤662|🕮6, the guide values are in accordance with: Technical principles | Design of bearing arrangements ➤173|🕮12.

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders are given in the product tables. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Suitable bearing housings for barrel roller bearings

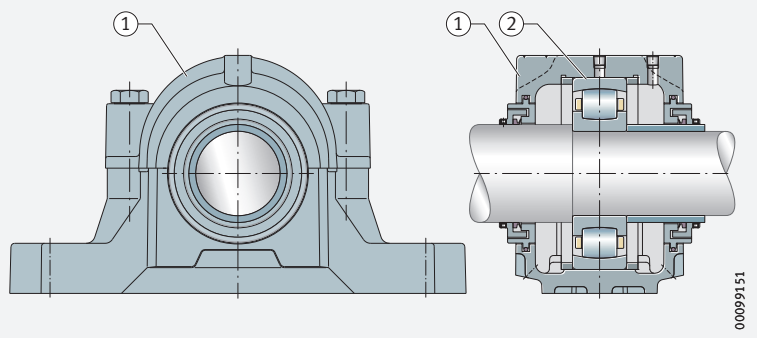
A large range of housings is available

For economical, operationally reliable and easily interchangeable bearing arrangement units, the barrel roller bearings can also be combined with Schaeffler bearing housings ➤*664* | *9*. These easy-to-fit units fulfil all of the requirements for modern machine and plant designs with favourable maintenance-related characteristics.

Due to the large number of application areas, an extensive range of split plummer block housings and flanged housings is available for bearings with cylindrical and tapered bores. Detailed information on bearing housings can be found in publication GK 1 *https://www.schaeffler.de/std/1D54*. This book can be ordered from Schaeffler.

9
Split plummer block housing with a barrel roller bearing

① *Split plummer block housing*
② *Barrel roller bearing*



1.17 Mounting and dismounting

The mounting and dismounting options for barrel roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Ensure that the bearings are not damaged during mounting

Barrel roller bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Bearings with tapered bore – methods for achieving a sufficiently tight fit

Suitable methods: measuring the reduction in radial internal clearance or axial drive-up distance

Bearings with a tapered bore are mounted with a tight fit on the shaft or adapter and withdrawal sleeve. The tight fit can be checked:

- by measuring the reduction in radial internal clearance or
- by measuring the axial drive-up distance of the inner ring on the tapered bearing seat

The malfunction-free operation of barrel roller bearings presupposes that these have been mounted correctly. An insufficient operating clearance or inadequately tight fit on the shaft generally leads to bearing damage.

If there is any uncertainty regarding the practical application of both methods, Schaeffler must always be consulted.

Schaeffler Mounting Handbook

✎ Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

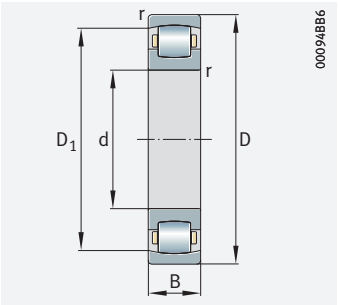
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

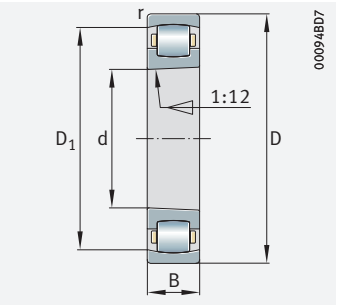
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

Barrel roller bearings

With cylindrical or tapered bore



Cylindrical bore

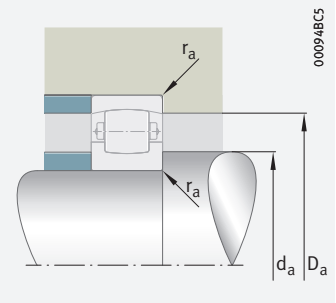


Tapered bore

d = 20 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*659|1.12* ➤*659|1.13*
			N	N	N	min^{-1}	≈ kg	
20	47	14	20 400	19 400	1 730	13 100	0,114	**20204-TVP**
	52	15	27 000	24 600	2 360	11 800	0,152	**20304-TVP**
25	52	15	24 100	24 900	2 260	11 500	0,132	**20205-K-TVP-C3**
	52	15	24 100	24 900	2 260	11 500	0,134	**20205-TVP**
	62	17	36 000	35 000	3 050	9 800	0,243	**20305-TVP**
30	62	16	28 000	28 500	2 950	10 800	0,203	**20206-K-TVP-C3**
	62	16	28 000	28 500	2 950	10 800	0,207	**20206-TVP**
	72	19	48 500	48 500	4 350	8 800	0,37	**20306-TVP**
35	72	17	41 000	43 000	5 000	9 700	0,296	**20207-K-TVP-C3**
	72	17	41 000	43 000	5 000	9 700	0,301	**20207-TVP**
	80	21	58 000	61 000	5 500	8 000	0,493	**20307-TVP**
40	80	18	49 500	53 000	5 200	8 700	0,38	**20208-K-TVP-C3**
	80	18	49 500	53 000	5 200	8 700	0,386	**20208-TVP**
	90	23	76 000	81 000	7 300	7 000	0,671	**20308-TVP**
45	85	19	52 000	58 000	6 100	8 400	0,433	**20209-K-TVP-C3**
	85	19	52 000	58 000	6 100	8 400	0,441	**20209-TVP**
	100	25	87 000	94 000	8 600	6 500	0,914	**20309-TVP**
50	90	20	59 000	69 000	7 200	7 700	0,489	**20210-K-TVP-C3**
	90	20	59 000	69 000	7 200	7 700	0,499	**20210-TVP**
	110	27	108 000	118 000	10 600	5 800	1,17	**20310-TVP**
55	100	21	74 000	85 000	9 000	7 100	0,642	**20211-K-TVP-C3**
	100	21	74 000	85 000	9 000	7 100	0,653	**20211-TVP**
	120	29	120 000	138 000	12 600	5 400	1,49	**20311-K-TVP-C3**
	120	29	120 000	138 000	12 600	5 400	1,53	**20311-TVP**
60	110	22	85 000	100 000	11 000	6 600	0,822	**20212-K-TVP-C3**
	110	22	85 000	100 000	11 000	6 600	0,836	**20212-TVP**
	130	31	147 000	171 000	15 400	4 950	1,89	**20312-K-TVP-C3**
	130	31	147 000	171 000	15 400	4 950	1,92	**20312-TVP**
65	120	23	94 000	117 000	12 700	6 000	1,07	**20213-K-TVP-C3**
	120	23	94 000	117 000	12 700	6 000	1,08	**20213-TVP**
	140	33	168 000	195 000	18 200	4 700	2,14	**20313-K-MB-C3**
	140	33	168 000	195 000	18 200	4 700	2,18	**20313-MB**

medias *https://www.schaeffler.de/std/1F9A*

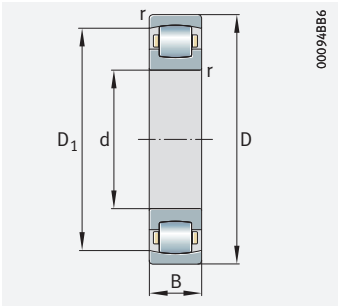


Mounting dimensions

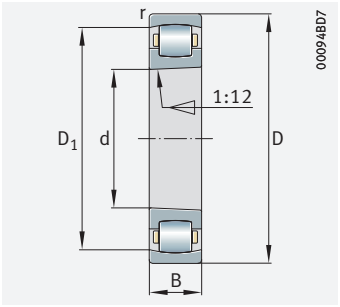
Dimensions			Mounting dimensions		
d	r min.	D_1 ≈	d_a min.	D_a max.	r_a max.
20	1	39	25,6	41,4	1
	1,1	43,5	27	45	1
25	1	43,9	30,6	46,4	1
	1	43,9	30,6	46,4	1
	1,1	51,9	32	55	1
30	1	53	35,6	56,4	1
	1	53	35,6	56,4	1
	1,1	60,7	37	65	1
35	1,1	62,3	42	65	1
	1,1	62,3	42	65	1
	1,5	67,4	44	71	1,5
40	1,1	70,1	47	73	1
	1,1	70,1	47	73	1
	1,5	76,8	49	81	1,5
45	1,1	74,6	52	78	1
	1,1	74,6	52	78	1
	1,5	85,2	54	91	1,5
50	1,1	79,5	57	83	1
	1,1	79,5	57	83	1
	2	94,4	61	99	2
55	1,5	89,2	64	91	1,5
	1,5	89,2	64	91	1,5
	2	101,7	66	109	2
	2	101,7	66	109	2
60	1,5	97,8	69	101	1,5
	1,5	97,8	69	101	1,5
	2,1	111,2	72	118	2,1
	2,1	111,2	72	118	2,1
65	1,5	105,1	74	111	1,5
	1,5	105,1	74	111	1,5
	2,1	120,6	77	128	2,1
	2,1	120,6	77	128	2,1

Barrel roller bearings

With cylindrical or tapered bore



Cylindrical bore

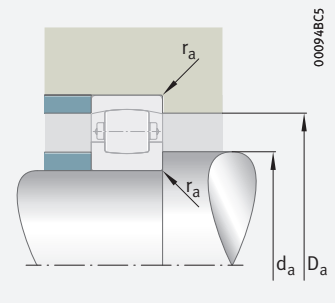


Tapered bore

d = 70 – 140 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*659|1.12* ➤*659|1.13*
			N	N	N	min^{-1}	≈ kg	
70	125	24	107 000	133 000	14 300	5 700	1,17	**20214-TVP**
	150	35	184 000	215 000	19 900	4 450	3,15	**20314-MB**
75	130	25	112 000	143 000	16 400	5 500	1,25	**20215-K-TVP-C3**
	130	25	112 000	143 000	16 400	5 500	1,28	**20215-TVP**
	160	37	216 000	255 000	22 800	4 100	3,76	**20315-MB**
80	140	26	126 000	163 000	15 900	5 200	1,56	**20216-K-TVP-C3**
	140	26	126 000	163 000	15 900	5 200	1,58	**20216-TVP**
	170	39	243 000	285 000	26 000	3 950	4,58	**20316-MB**
85	150	28	155 000	201 000	20 800	4 750	2,19	**20217-K-MB-C3**
	150	28	155 000	201 000	20 800	4 750	2,22	**20217-MB**
	180	41	270 000	320 000	29 000	3 750	5,25	**20317-MB**
90	160	30	174 000	220 000	22 500	4 550	2,68	**20218-K-MB-C3**
	160	30	174 000	220 000	22 500	4 550	2,72	**20218-MB**
	190	43	300 000	360 000	31 500	3 500	6,17	**20318-K-MB-C3**
	190	43	300 000	360 000	31 500	3 500	6,25	**20318-MB**
95	170	32	206 000	265 000	26 500	4 200	3,19	**20219-MB**
	200	45	330 000	400 000	34 500	3 400	7,29	**20319-MB**
100	180	34	225 000	290 000	28 500	4 000	3,9	**20220-K-MB-C3**
	180	34	225 000	290 000	28 500	4 000	3,96	**20220-MB**
	215	47	365 000	440 000	38 500	3 250	8,58	**20320-K-MB-C3**
	215	47	365 000	440 000	38 500	3 250	8,69	**20320-MB**
105	190	36	244 000	315 000	31 000	3 850	4,74	**20221-MB**
110	200	38	285 000	370 000	35 000	3 600	5,45	**20222-K-MB-C3**
	200	38	285 000	370 000	35 000	3 600	5,53	**20222-MB**
	240	50	405 000	480 000	46 000	3 000	11,6	**20322-MB**
120	215	40	305 000	415 000	38 500	3 350	6,51	**20224-K-MB-C3**
	215	40	305 000	415 000	38 500	3 350	6,6	**20224-MB**
	260	55	490 000	630 000	52 000	2 750	15,2	**20324-MB**
130	230	40	330 000	450 000	43 500	3 300	7,21	**20226-K-MB-C3**
	230	40	330 000	450 000	43 500	3 300	7,31	**20226-MB**
	280	58	560 000	720 000	60 000	2 600	18,4	**20326-MB**
140	250	42	395 000	540 000	51 000	3 050	8,98	**20228-K-MB-C3**
	250	42	395 000	540 000	51 000	3 050	9,09	**20228-MB**
	300	62	650 000	840 000	68 000	2 370	22,5	**20328-MB**

medias *https://www.schaeffler.de/std/1F9A*

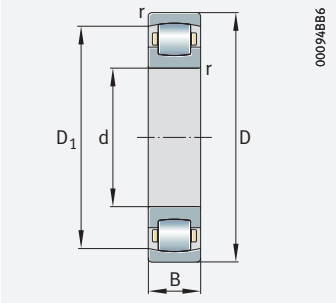


Mounting dimensions

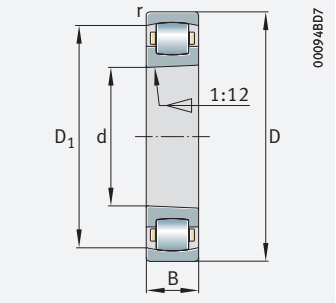
Dimensions			Mounting dimensions		
d	r	D_1	d_a	D_a	r_a
	min.	≈	min.	max.	max.
70	1,5	111	79	116	1,5
	2,1	128,7	82	138	2,1
75	1,5	115,9	84	121	1,5
	1,5	115,9	84	121	1,5
	2,1	138,1	87	148	2,1
80	2	124,5	91	129	2
	2	124,5	91	129	2
	2,1	147,5	92	158	2,1
85	2	133,9	96	139	2
	2	133,9	96	139	2
	3	156,9	99	166	2,5
90	2	143,8	101	149	2
	2	143,8	101	149	2
	3	165,1	104	176	2,5
	3	165,1	104	176	2,5
95	2,1	152,7	107	158	2,1
	3	174,5	109	186	2,5
100	2,1	160,8	112	168	2,1
	2,1	160,8	112	168	2,1
	3	186,6	114	201	2,5
	3	186,6	114	201	2,5
105	2,1	169,2	117	178	2,1
110	2,1	178,6	122	188	2,1
	2,1	178,6	122	188	2,1
	3	208,1	124	226	2,5
120	2,1	191,1	132	203	2,1
	2,1	191,1	132	203	2,1
	3	222,3	134	246	2,5
130	3	205,7	144	216	2,5
	3	205,7	144	216	2,5
	4	240,3	147	263	3
140	3	223,9	154	236	2,5
	3	223,9	154	236	2,5
	4	257,9	157	283	3

Barrel roller bearings

With cylindrical or tapered bore



Cylindrical bore

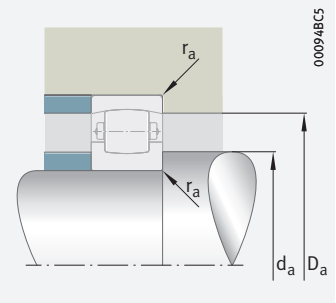


Tapered bore

d = 150 – 200 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*659*|*1.12* ➤*659*|*1.13*
			N	N	N	min^{-1}	≈ kg	
150	270	45	430 000	610 000	56 000	2 850	11,6	**20230-K-MB-C3**
	270	45	430 000	610 000	56 000	2 850	11,7	**20230-MB**
	320	65	720 000	950 000	76 000	2 250	26,9	**20330-MB**
160	290	48	500 000	720 000	65 000	2 650	14,4	**20232-K-MB-C3**
	290	48	500 000	720 000	65 000	2 650	14,5	**20232-MB**
170	310	52	570 000	830 000	72 000	2 460	17,9	**20234-MB**
180	320	52	590 000	850 000	75 000	2 420	18,4	**20236-MB**
190	340	55	650 000	950 000	82 000	2 290	22,5	**20238-MB**
200	360	58	730 000	1 080 000	92 000	2 180	26,7	**20240-MB**

medias *https://www.schaeffler.de/std/1F9A*

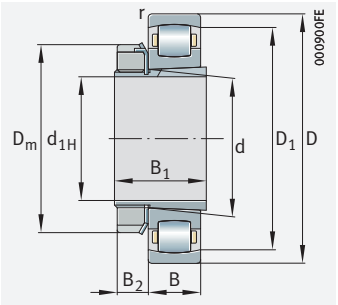


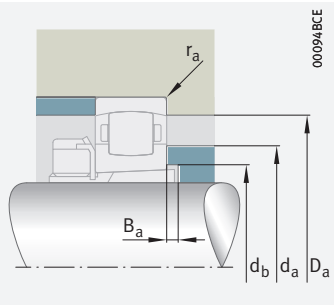
Mounting dimensions

Dimensions			Mounting dimensions		
d	r min.	D_1 ≈	d_a min.	D_a max.	r_a max.
150	3	238,6	164	256	2,5
	3	238,6	164	256	2,5
	4	275,8	167	303	3
160	3	256,5	174	276	2,5
	3	256,5	174	276	2,5
170	4	273,1	187	293	3
180	4	284,3	197	303	3
190	4	301,2	207	323	3
200	4	319	217	343	3

Barrel roller bearings

With adapter sleeve





Mounting dimensions

d_{1H} = 20 – 140 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Mass m		Designation ➤659|1.12 ➤659|1.13	
d_{1H}	d	D	B	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	Bearing ≈ kg	Adapter sleeve ≈ kg	Bearing	Adapter sleeve
20	25	52	15	24 100	24 900	2 260	11 500	0,132	0,07	**20205-K-TVP-C3**	**H205**
25	30	62	16	28 000	28 500	2 950	10 800	0,203	0,1	**20206-K-TVP-C3**	**H206**
30	35	72	17	41 000	43 000	5 000	9 700	0,296	0,136	**20207-K-TVP-C3**	**H207**
35	40	80	18	49 500	53 000	5 200	8 700	0,38	0,177	**20208-K-TVP-C3**	**H208**
40	45	85	19	52 000	58 000	6 100	8 400	0,433	0,23	**20209-K-TVP-C3**	**H209**
45	50	90	20	59 000	69 000	7 200	7 700	0,489	0,276	**20210-K-TVP-C3**	**H210**
50	55	100	21	74 000	85 000	9 000	7 100	0,642	0,319	**20211-K-TVP-C3**	**H211**
	55	120	29	120 000	138 000	12 600	5 400	1,49	0,358	**20311-K-TVP-C3**	**H311**
55	60	110	22	85 000	100 000	11 000	6 600	0,822	0,35	**20212-K-TVP-C3**	**H212**
	60	130	31	147 000	171 000	15 400	4 950	1,89	0,401	**20312-K-TVP-C3**	**H312**
60	65	120	23	94 000	117 000	12 700	6 000	1,07	0,4	**20213-K-TVP-C3**	**H213**
	65	140	33	168 000	195 000	18 200	4 700	2,14	0,471	**20313-K-MB-C3**	**H313**
65	75	130	25	112 000	143 000	16 400	5 500	1,25	0,71	**20215-K-TVP-C3**	**H215**
70	80	140	26	126 000	163 000	15 900	5 200	1,56	0,89	**20216-K-TVP-C3**	**H216**
75	85	150	28	155 000	201 000	20 800	4 750	2,19	1,03	**20217-K-MB-C3**	**H217**
80	90	160	30	174 000	220 000	22 500	4 550	2,68	1,21	**20218-K-MB-C3**	**H218**
	90	190	43	300 000	360 000	31 500	3 500	6,17	1,41	**20318-K-MB-C3**	**H318**
90	100	180	34	225 000	290 000	28 500	4 000	3,9	1,52	**20220-K-MB-C3**	**H220**
	100	215	47	365 000	440 000	38 500	3 250	8,58	1,76	**20320-K-MB-C3**	**H320**
100	110	200	38	285 000	370 000	35 000	3 600	5,45	1,95	**20222-K-MB-C3**	**H222**
110	120	215	40	305 000	415 000	38 500	3 350	6,51	2,01	**20224-K-MB-C3**	**H3024**
115	130	230	40	330 000	450 000	43 500	3 300	7,21	2,96	**20226-K-MB-C3**	**H3026**
125	140	250	42	395 000	540 000	51 000	3 050	8,98	3,3	**20228-K-MB-C3**	**H3028**
135	150	270	45	430 000	610 000	56 000	2 850	11,6	4,02	**20230-K-MB-C3**	**H3030**
140	160	290	48	500 000	720 000	65 000	2 650	14,4	5,44	**20232-K-MB-C3**	**H3032**

medias *https://www.schaeffler.de/std/1F9A*

Dimensions						Mounting dimensions				
d_{1H}	r min.	D_1 ≈	D_m ≈	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.
20	1	43,9	25	26	8,25	33	46,4	28	6	1
25	1	53	45	27	8,25	39	56,4	33	5	1
30	1,1	62,3	52	29	9,25	45	65	38	5	1
35	1,1	70,1	58	31	10,25	51	73	43	5	1
40	1,1	74,6	65	33	11,25	56	78	48	5	1
45	1,1	79,5	70	35	12,25	61	83	53	5	1
50	1,5	89,2	75	37	12,5	68	91	60	6	1,5
	2	101,7	75	45	12,5	72	109	60	6	2
55	1,5	97,8	80	38	12,5	73	101	64	6	1,5
	2,1	111,2	80	47	12,5	78	118	65	5	2,1
60	1,5	105,1	85	40	13,5	80	111	70	5	1,5
	2,1	120,6	85	50	13,5	84	128	70	5	2,1
65	1,5	115,9	98	43	14,5	90	121	80	5	1,5
70	2	124,5	105	46	16,75	96	129	85	5	2
75	2	133,9	110	50	17,75	102	139	90	6	2
80	2	143,8	120	52	17,75	108	149	95	6	2
	3	165,1	120	65	17,75	113	176	96	6	2,5
90	2,1	160,8	130	58	19,75	120	168	106	7	2,1
	3	186,6	130	71	19,75	127	201	108	7	2,5
100	2,1	178,6	145	63	20,75	132	188	116	7	2,1
110	2,1	191,1	145	72	22	143	203	127	13	2,1
115	3	205,7	155	80	23	154	216	137	20	2,5
125	3	223,9	165	82	24	166	236	147	19	2,5
135	3	238,6	180	87	26	181	256	158	19	2,5
140	3	256,5	190	93	27,5	193	276	168	20	2,5

Spherical roller bearings



Matrix for bearing preselection 676

1 Spherical roller bearings 678

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FAG

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Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Spherical roller bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			cylindrical or tapered bore	sealed	detailed information ➤ 678
Load carrying capacity	radial		+++	+++	➤ 685 | 1.2
	axial, one direction		++	++	➤ 685 | 1.2
	axial, both directions		++	++	➤ 685 | 1.2
	moments		–	–	
Compensation of angular misalignments	static		+++	+++	➤ 686 | 1.3
	dynamic		+	+	➤ 686 | 1.3
Bearing design	cylindrical bore		✓	✓	➤ 678 | 1.1
	tapered bore		✓	✓[4]	➤ 678 | 1.1
	separable		–	–	➤ 705 | 1.17
Lubrication	greased		–	✓	➤ 686 | 1.4
Sealing	open		✓	–	➤ 687 | 1.5
	non-contact		–	–	
	contact		–	✓	➤ 687 | 1.5
Operating temperature in °C		from to	–30 +200[1]	–30 +180[2]	➤ 688 | 1.8
Suitability for	high speeds		+	(+)	➤ 688 | 1.6
	high running accuracy		+	+	➤ 693 | 1.11 ➤ 115
	low-noise running		(+)	+	➤ 27
	high rigidity		++	++	➤ 54
	reduced friction		+	+	➤ 56
	length compensation within bearing		–	–	
	non-locating bearing arrangement		+	+	➤ 141
	locating bearing arrangement		++	++	➤ 141
X-life bearings			✓	✓	➤ 684
Bearing bore[3] d in mm		from to	20 1 800	25 620	➤ 710
Product tables		from page ➤	710	768	

1) Data valid for bearings with brass or sheet steel cages

2) Valid only for bearing series 240, 241. Series 222, 223: –40 °C to +100 °C

3) For bearings with adapter sleeve or withdrawal sleeve: inside diameter of adapter or withdrawal sleeve

4) Available by agreement

5) Larger catalogue bearings GL 1

	Spherical roller bearings for vibratory machinery						
	with adapter sleeve	with withdrawal sleeve	cylindrical or tapered bore	with adapter sleeve	with withdrawal sleeve	detailed information ➤ 678	
	+++	+++	+++	+++	+++	➤ 685 | 1.2	F_r
	++	++	++	++	++	➤ 685 | 1.2	F_a
	++	++	++	++	++	➤ 685 | 1.2	F_a
	–	–	–	–	–		M
	+++	+++	+++	+++	+++	➤ 686 | 1.3	
	+	+	+	+	+	➤ 686 | 1.3	
	✓	✓	✓	✓	✓	➤ 678 | 1.1	
	–	–	✓	–	–	➤ 678 | 1.1	
	–	–	–	–	–	➤ 705 | 1.17	
	–	–	–	–	–	➤ 686 | 1.4	
	✓	✓	✓	✓	✓	➤ 687 | 1.5	
	–	–	–	–	–		
	–	–	–	–	–		
	–30 +200[1)]	–30 +200[1)]	–30 +200[1)]	–30 +200[1)]	–30 +200[1)]	➤ 688 | 1.8	
	+	+	+	+	+	➤ 688 | 1.6	n
	(+)	(+)	(+)	(+)	(+)	➤ 693 | 1.11 ➤ 115	
	+	+	+	+	+	➤ 27	
	++	++	++	++	++	➤ 54	
	+	+	+	+	+	➤ 56	
	–	–	–	–	–		
	+	+	+	+	+	➤ 141	
	++	++	++	++	++	➤ 141	
	✓	✓	✓	✓	✓	➤ 684	X-life
	20 850[5)]	35 850[5)]	40 220	35 200	35 200	➤ 774	
	774	792	812	816	818		

1 Spherical roller bearings

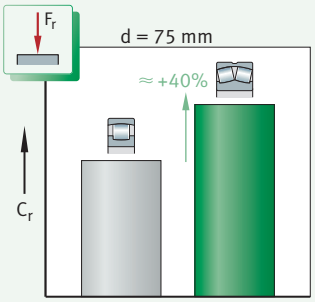
Spherical roller bearings are suitable where:

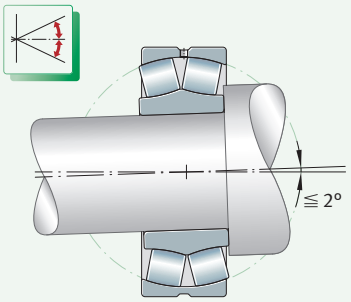
- bearing arrangements are subjected to high and very high radial loads ➤*685|1.2*
- relatively high axial loads occur on one or both sides, in addition to high radial forces ➤*685|1.2*
- dynamic or static misalignments of the shaft relative to the housing, or deflections of the shaft, must be freely compensated by the bearing ➤*686|1.3*
- high shock type loads must be supported dynamically
- locating bearings with a very high load carrying capacity are required

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*676*.

1
Spherical roller bearing: comparison of load carrying capacity with barrel roller bearing of the same dimensions, compensation of misalignments

F_r = *radial load*
C_r = *basic dynamic load rating*





1.1 Bearing design

✎ *Design variants*

The standard product range of spherical roller bearings comprises:

- bearings of the open design ➤*679|3*, ➤*680|4* and ➤*680|5*
- bearings with adapter sleeve or withdrawal sleeve ➤*684|7*
- sealed bearings ➤*683|6*
- bearings for vibratory machinery ➤*683*

The bearings are available in the majority of sizes as X-life designs with significantly higher performance ➤*684*. Larger catalogue bearings and other bearing designs GL 1.

Bearings of basic design

✎ *The outer ring has a curved raceway*

Spherical roller bearings are part of the group of radial roller bearings. These self-retaining rolling bearings have two rows of rollers with a mutually curved raceway in the outer ring and two raceways inclined relative to the bearing axis in the inner ring. This raceway design allows these bearings to combine a range of characteristics, which are essential to many applications, in one bearing, such as angular adjustability for example ➤*686|1.3*. The symmetrical barrel rollers are guided by brass, cast-iron, sheet steel or polyamide cages ➤*689|1.9*.

Roller contact design

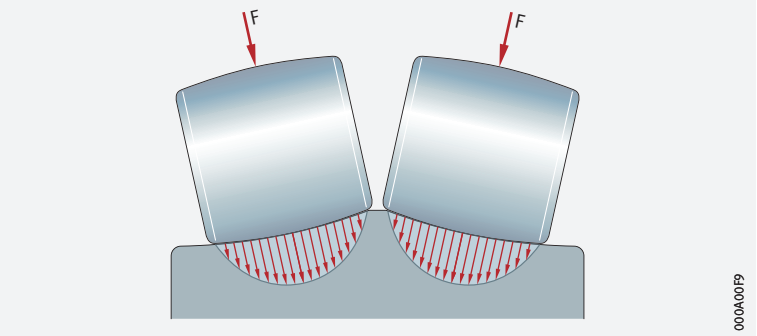
The stress distribution at the contact points between the rollers and raceways is determined by the contact surface of the rollers. As a result, the roller geometry is matched to the raceway. This gives a favourable load distribution over the entire length of the roller and prevents both edge stresses and stress peaks at the ends of the roller ➤679|2.

An increasing number of series and bearing sizes now contain rollers with additionally profiled ends, which offer the following advantages:

- effective protection against edge pressure (e.g. in the event of temporary overload)
- reduced tendency towards wear due to reduced energy input
- further increase in operating life

2
Uniform load distribution due to optimised roller and raceway profile

F = *load on the rollers*



The bore is cylindrical or tapered

Bearings of basic design are supplied without seals and with a cylindrical bore. With the exception of series 233..-E1A and 233..-BEA, these bearings are also available with a tapered bore ➤680|4.

Bearings with a tapered bore have a bore taper of 1:12 and the suffix K, whereas spherical roller bearings of the series 249, 240 and 241 have a bore taper of 1:30 and the suffix K30 ➤695|1.12.

Distinguishing features of bearings in the basic design

In addition to the design of the bore (cylindrical or tapered), the specific bearing design is also dependent on the bearing series and bearing size. The key distinguishing features are the:

- design of the inner ring
  - bearings without a central rib on the inner ring ➤679|3, ➤680|4 and ➤681|1
  - bearings with a rigid central rib on the inner ring ➤679|3, ➤680|4 and ➤681|2
  - bearings with a loose central rib on the inner ring ➤680|5 and ➤682|3
- design of the cage ➤689|1.9

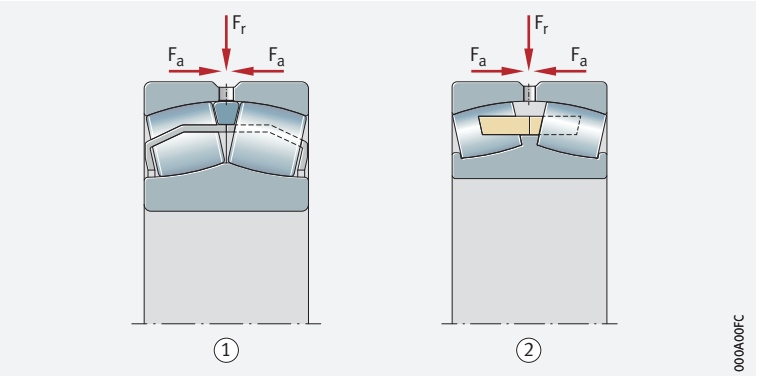
Bearings with a loose central rib on the inner ring

A loose central rib provides axial guidance of the rollers in the load-free zone ➤680|5 and ➤682|3. This reduces friction in the bearing, which in turn leads to lower operating temperatures.

3
Spherical roller bearings of basic design, cylindrical bore

F_r = *radial load*
F_a = *axial load*

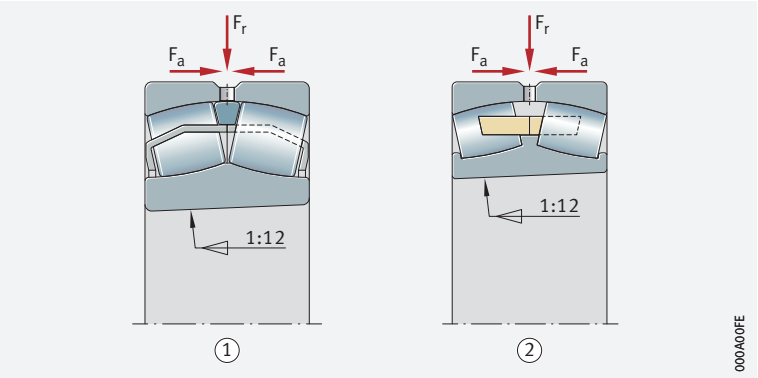
① *Spherical roller bearing without central rib on inner ring*
② *Spherical roller bearing with rigid central rib on inner ring*



4
Spherical roller bearings of basic design, tapered bore

F_r = *radial load*
F_a = *axial load*

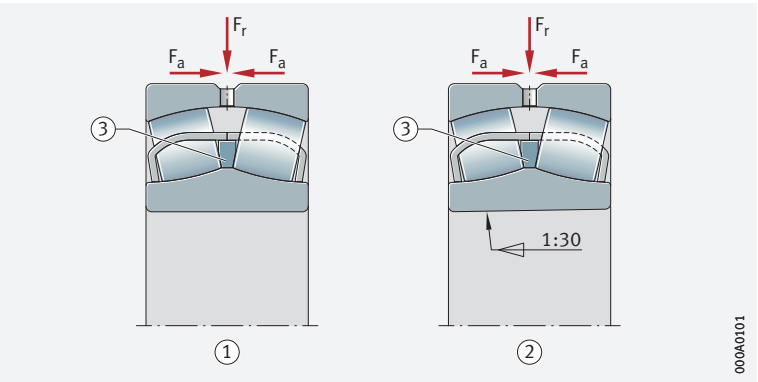
① *Spherical roller bearing without central rib on inner ring*
② *Spherical roller bearing with rigid central rib on inner ring*



5
Spherical roller bearings of basic design, cylindrical or tapered bore, with loose central rib

F_r = *radial load*
F_a = *axial load*

① *Cylindrical bore*
② *Tapered bore*
③ *Loose central rib*

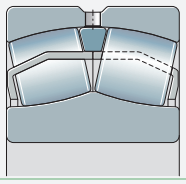
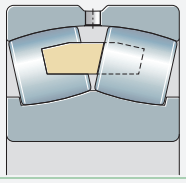
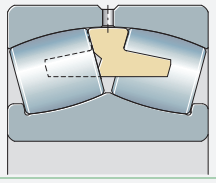
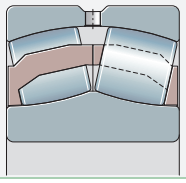


Basic bearing design variants

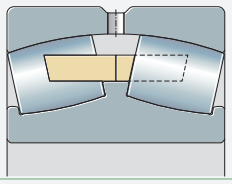
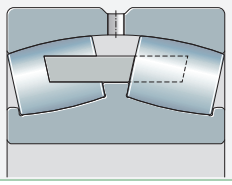
Bearings of basic design are available in the following variants:

- bearings without central rib on inner ring ➤*681* | ▦ *1*
- bearings with rigid central rib on inner ring ➤*681* | ▦ *2*
- bearings with loose central rib ➤*682* | ▦ *3*

1
Bearing design for bearings without central rib on inner ring

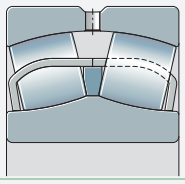
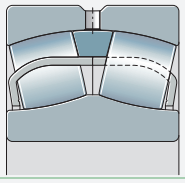
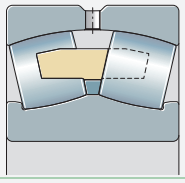
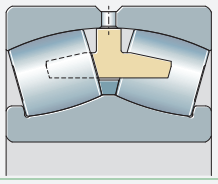
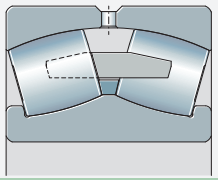
Design			Suffix
①		Two sheet steel cages, surface hardened or coated, guidance on outer ring, X-life	E1-XL
②		One brass double comb cage, guided by rollers, inner ring with two lateral retaining ribs, X-lifeX-life	E1A-XL-M
③		One brass double comb cage, guidance on outer ring, inner ring with two lateral retaining ribs, X-life	E1A-XL-MA1
④		Two window cages made from glass fibre reinforced polyamide, guidance on inner ring, X-life	E1-XL-TVPB

2
Bearing design for bearings with rigid central rib on inner ring

Design			Suffix
①		Two brass cages, guidance on inner ring, inner ring with two lateral retaining ribs and one central rib	MB B-MB
②		One cast-iron double comb cage, guidance on inner ring, inner ring with two lateral retaining ribs and one central rib	B-GB1



3
Bearing design for bearings with loose central rib

Design			Suffix
①		Two sheet steel cages, surface hardened, guidance on inner ring, X-lifeX-life	BE-XL
②		Two sheet steel cages, surface hardened, guidance on outer ring, X-life, vibrating screen design	BE-XL-JPA-T41A
③		One brass double comb cage, guidance on inner ring, inner ring with two lateral retaining ribs, X-life	BEA-XL-MB1
④		One brass double comb cage, guidance on outer ring, inner ring with two lateral retaining ribs, X-life	BEA-XL-MA1
⑤		One cast-iron double comb cage, guidance on inner ring, inner ring with two lateral retaining ribs, X-life	BEA-XL-GB1

Sealed spherical roller bearings

A selection of standard bearings is also available with seals on both sides ➤683|6 and ➤687|1.5.

✎ *Series 222, 223*

Sealed bearings of series 222 and 223 include an oversize width and the prefix WS in the designation.

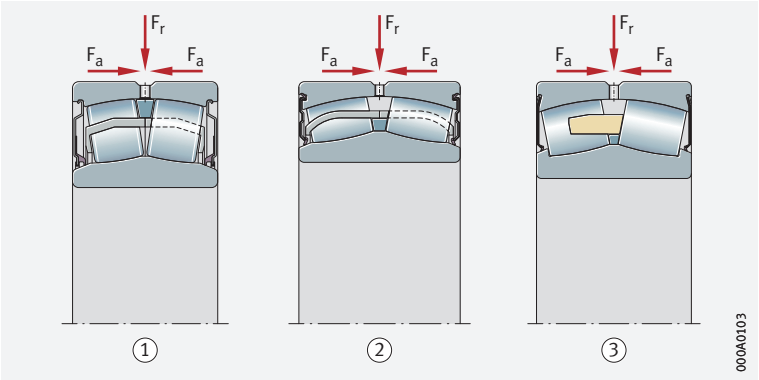
✎ *Series 240, 241*

The main dimensions of sealed bearings of series 240 and 241 correspond to the main dimensions of open bearings.

Further information on sealed spherical roller bearings TPI 218.

6
Spherical roller bearings of basic design, sealed on both sides

① *Bearing with contact seal 2RSR (D < 160)*
② *Bearing with contact seal 2VSR (160 < D ≦ 320)*
③ *Bearing with contact seal 2RSR (320 < D ≦ 620)*



Spherical roller bearings for vibratory machinery

The rolling bearings fitted in vibratory machinery must support not only high loads and high speeds but also accelerations and centrifugal forces. In many cases, these applications involve adverse environmental conditions such as contamination and moisture.

✎ *Spherical roller bearings are matched to the operating conditions of vibratory machinery*

The special spherical roller bearings developed by Schaeffler are matched to the operating conditions in vibratory machinery and have proved highly successful in practical use. In particular, the cages of the rolling bearings are subjected to stresses arising from high radial accelerations. In unfavourable cases, these may be overlaid by axial accelerations as well.

✎ *The support of angular misalignments reduces additional sliding motions*

The rotating imbalance generates a rotating shaft deflection and additional sliding motion within the bearings. This increases the friction and therefore the operating temperature of the bearings. The special spherical roller bearings can support dynamic angular misalignments up to 0,15°.

✎ *Basic designs of special spherical roller bearings*

Schaeffler special spherical roller bearings for vibratory machinery have the main dimensions of dimension series 23 (DIN 616:2000, ISO 15:2017).

✎ *Specification T41A (T41D)*

Schaeffler spherical roller bearings for vibratory machinery are manufactured in accordance with the specification T41A or T41D ➤694|10. This takes into consideration the particular requirements of the application. The specification defines, for example, the tolerances of the bore and outside diameter, as well as the radial internal clearance of the bearings. The other tolerances are in accordance with tolerance class Normal to ISO 492:2014.

Schaeffler spherical roller bearings for vibratory machinery are described in detail in TPI 197. This can be requested from Schaeffler.

Ready-to-fit mounting kits facilitate the ordering and mounting of bearings

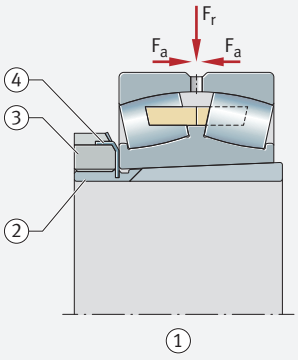
Bearings with adapter sleeve or withdrawal sleeve

Complete bearing mounting kits are also available for use in locating spherical roller bearings with a tapered bore onto a cylindrical shaft journal. These units comprise the bearing, adapter sleeve, tab washer and locknut, or bearing and withdrawal sleeve ➤*684*|*7*. Adapter sleeves and withdrawal sleeves allow bearings to be located on smooth and stepped shafts ➤*701*|*16* and ➤*701*|*17*. The fixing elements are described in the product tables and must also be stated when placing the order.

7
Spherical roller bearing with adapter sleeve

F_r = *radial load*
F_a = *axial load*

① *Spherical roller bearing with rigid central rib on inner ring, with adapter sleeve*
② *Adapter sleeve*
③ *Locknut*
④ *Tab washer*



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X-life premium quality

Spherical roller bearings are available in numerous series and dimensions as X-life bearings ➤*684*|*8*. These bearings exhibit considerably higher performance than conventional spherical roller bearings. This is achieved, for example, through the modified internal construction, higher surface quality of the contact areas, optimised contact geometry between rollers and raceways, new roller dimensions with crowned ends and the optimised cage design, as well as through the higher quality of the steel and rolling elements and a loose central rib ➤*682*|*3*.

8
Spherical roller bearing in X-life design

① *Cage*
② *Barrel roller*
③ *Outer ring*
④ *Inner ring*



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Advantages

Increased customer benefits due to X-life

These technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings ➤679|2
- a higher running accuracy and smooth running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life spherical roller bearings include the suffix XL in the designation ➤695|1.12 and ➤710|▦.

Areas of application

Suitable for a further area of application

Due to their special technical features, X-life spherical roller bearings are highly suitable for bearing arrangements in:

- dryer rolls and calenders
- mining machinery, conveyor belts, crushers, vibrating screens, vertical mills, roller presses
- continuous casting plant
- passenger elevators
- marine propulsion systems

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤10.

1.2 Load carrying capacity

Suitable for very high radial loads and high axial loads

Spherical roller bearings can support high axial loads in both directions and very high radial loads. They are designed for very high load carrying capacity and, since they have the maximum possible number of large and particularly long barrel rollers (bearings in E1 design), are also suitable for the heaviest loads ➤678|1.1.

Axial load carrying capacity of bearings with adapter sleeve or withdrawal sleeve

Due to their internal construction, spherical roller bearings can support high axial loads. Where bearings with adapter sleeves or withdrawal sleeves are located on a smooth shaft without a fixed axial stop (e.g. rigid shoulder), the axial load carrying capacity of the bearing arrangement is dependent on the friction between the shaft and the sleeve.

If there is any doubt about the axial load carrying capacity of the location method, please consult Schaeffler.

Axial load and higher speeds

Friction in the bearing rises with increasing load and speed

Spherical roller bearings support high axial forces from both directions. However, if very high axial loads occur in combination with very high speeds, the resulting increase in friction and temperature in the bearing must be taken into consideration.

1.3 Compensation of angular misalignments

Spherical roller bearings compensate dynamic and static angular misalignments

Due to the concave outer ring raceway, spherical roller bearings are capable of angular adjustment ➤678|1.1. As a result, they permit skewing between the outer and inner ring within certain limits, without causing damage to the bearings, and can thus compensate misalignments, shaft deflections and housing deformations.

Permissible adjustment angle

The possible skewing is dependent on the magnitude of the load

The permissible adjustment angle is stated for loads $P < 0{,}1 \cdot C_r$ ➤686|▦ 4. The adjustment angles apply if:

- the angular deviation is constant (static angular misalignment)
- the rotating component is the inner ring

The extent to which the stated values can be used in practice is essentially dependent on the design of the bearing arrangement, sealing etc.

Reduced adjustment angle

If the rotating component is the outer ring, the inner ring undergoes tumbling motion or the adjustment angles are larger than stated in the table, the angular adjustment facility of the bearings is smaller. In such cases, please consult Schaeffler.

Permissible adjustment angle for sealed bearings

The permissible adjustment angle is smaller for sealed bearings

In sealed spherical roller bearings, the angular adjustment facility is 0,5° from the central position. The sealing function is not adversely affected by misalignments occurring up to this value.

▦ **4**
Permissible adjustment angle of spherical roller bearings

Bearing series	Adjustment angle °
213..-E1, 222..-E1, 222..-BE(BEA), 230, 230..-E1(E1A), 230..-BE(BEA), 238, 239, 240	1,5
223..-E1, 223..-BE(BEA), 231, 231..-E1(E1A), 231..-BE(BEA), 232, 232..-E1(E1A), 232..-BE(BEA), 233..-E1A, 233..-BEA, 240..-BE(BEA), 241, 241..-BE(BEA)	2

1.4 Lubrication

The bearings can be lubricated via a circumferential groove and lubrication holes

In order to ensure good lubrication, most spherical roller bearings have a circumferential groove and three lubrication holes in the outer ring. The lubricant is pressed into the bearing via the groove and holes ➤687|9. Due to the direct and symmetrical feed system, a uniform supply of lubricant to the rows of rollers is achieved. On both sides of the bearing, sufficiently large cavities for collection of the used grease or openings for the escape of grease must be provided.

Series 213

Bearings of series 213 with a bore diameter $d \leqq 35$ mm do not have a lubrication groove and lubrication hole.

Lubrication for ungreased bearings

Open spherical roller bearings are not greased. These bearings must be lubricated with oil or grease.

If shafts with a vertical axis are supported using spherical roller bearings, particular attention must be paid to ensuring the reliable provision of lubricant to the bearings.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

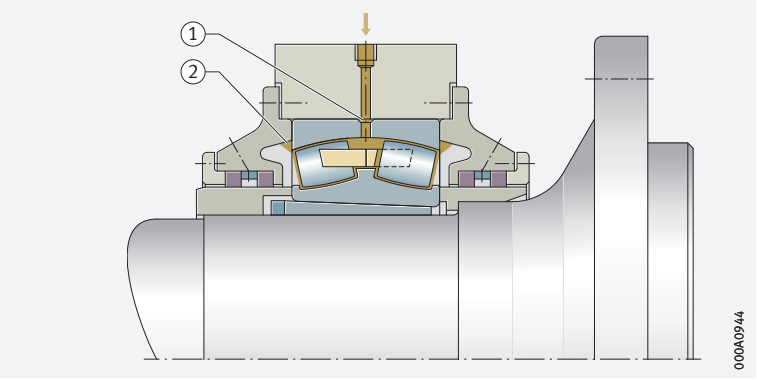
Lubrication-specific suffixes

Suffixes

H40	without lubrication groove and lubrication holes
H40CA	6 lubrication holes in the outer ring
H40AB	6 lubrication holes in the inner ring
H40AC	6 lubrication holes and one lubrication groove in the inner ring
S	lubrication groove and lubrication holes in the outer ring
SY	3 lubrication holes in the outer ring, no lubrication groove

9
Lubrication of the bearing via a lubrication groove and lubrication holes in the outer ring

① *Lubrication groove with lubrication holes*
② *Cavity for collecting grease*



Sealed bearings

Greased bearings are normally maintenance-free

Sealed bearings are supplied already filled with a high quality lithium soap grease with a mineral oil base and are maintenance-free for most applications. Whether or not a bearing requires relubrication during its operating life is dependent on the operating conditions (e.g. on the operating temperatures and operating speeds). Where bearings cannot be relubricated, the grease operating life must be observed.

1.5 Sealing

Certain bearings are also available with seals

Sealed spherical roller bearings have sealing shields on both sides, which protect the bearing reliably against contamination. In order to ensure optimum sealing integrity, various sealing concepts are used, which are determined by size. The bearings should not be heated above +80 °C or washed out prior to mounting.

Series 240, 241

The seal material used is FKM

For spherical roller bearings of series 240 and 241, the standard seal material is fluoro elastomer.

Seals made from fluoro elastomer, such as Viton (FKM, FPM) for example, comprise particularly high performance materials which, when heated above approx. +300 °C, may release vapours and gases that are harmful to health if they are inhaled or come into contact with the eyes. Contact with seals which have been heated to such high temperatures is still dangerous even after cooling. Contact with skin must be avoided in all cases. A doctor must be consulted immediately if such vapours are inhaled. In all cases, the user is responsible for the safe handling of the seals during the operating life, as well as for scrapping the seals and disposing of them correctly.

Such temperatures may occur, for example, if a welding torch is used in the dismantling of a bearing. In these cases, the currently valid safety data sheet must be observed.

1.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

Bearings with contact seals

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤69. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** *https://medias.schaeffler.com*

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals

Possible operating temperatures of spherical roller bearings ➤688|▦5.

▦ **5**
Permissible temperature ranges

Operating temperature	Open spherical roller bearings		Sealed spherical roller bearings	
	with brass, cast-iron or sheet steel cage	with polyamide cage PA66	Series 222, 223	Series 240, 241
	–30 °C to +200 °C	–30 °C to +120 °C	–30 °C to +100 °C, for short periods up to +120 °C, limited by the lubricant and seal material	–30 °C to +180 °C, for short periods up to +200 °C, limited by the lubricant and seal material

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *Solid brass cages are used as standard*

Standard cages for spherical roller bearings ➤*681*|▦*1*, ➤*681*|▦*2*, ➤*682*|▦*3*, ➤*690*|▦*6*. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages. Essential information on cages ➤*111*.

Cages in design B and in bearings without a suffix

✎ *Solid brass cage or sheet metal cage*

Spherical roller bearings with a rigid central rib on the inner ring (design B or bearings without a suffix) have a solid brass cage. Bearings without a cage suffix have sheet metal cages ➤*681*|▦*2* and ➤*690*|▦*6*.

Cages in bearings with the suffix MB/MB1, MA/MA1

✎ *Solid brass cage*

Bearings with the suffix MB or MB1 have solid brass cages, which are guided on the inner ring. In bearings with the suffix MA or MA1, the solid brass cages are guided on the outer ring ➤*681*|▦*2*, ➤*682*|▦*3* and ➤*690*|▦*6*.

Bearings with the suffix M

✎ *Solid brass cage*

Bearings with the suffix M have a roller-guided solid brass cage ➤*681*|▦*1* and ➤*690*|▦*6*.

Bearings with the suffix E1/BE

✎ *Sheet steel cage, solid brass cage or solid cage made from polyamide PA66*

Bearings with the suffix E1 and BE and without a cage suffix have sheet steel cages. The two cage halves are retained by a guiding ring or loose central rib in the outer or inner ring ➤*681*|▦*1* and ➤*690*|▦*6*. The other bearings of E1 design have solid cages made from glass fibre reinforced polyamide PA66 or solid brass cages (suffix TVPB or M). The sheet steel cages are surface hardened or coated and, as a result, are particularly well protected against wear.



Bearings with the suffix GB1

Bearings with the suffix GB1 have solid cast-iron cages, which are guided on the inner ring.

▦6
Cage, cage suffix, bore code

Bearing series	Sheet steel cage				Plastic cage		Table
	Guidance on						
	inner ring –		outer ring –		inner ring TVPB		
	Bore code						
	from	to	from	to	from	to	
213..-E1-XL	–		08	18	04	07	➤*681*|▦ *1*
					19	22	
222..-E1-XL	–		05	36	–		➤*681*|▦ *1*
222..-BE-XL	38	48	–		–		➤*682*|▦ *3*
222..-BEA-XL	–		–		–		–
223..-E1-XL	–		08	30	–		➤*681*|▦ *1*
223..-BE-XL	32	44	–		–		➤*682*|▦ *3*
223..-BE..-XL-JPA	–		32	44	–		➤*682*|▦ *3*
223..-BEA-XL	–		–		–		–
230..-E1-XL	–		–		22	40	➤*681*|▦ *1*
230..-E1A-XL	–		–		–		–
230..-BE-XL	44	60	–		–		➤*682*|▦ *3*
230..-BEA-XL	–		–		–		–
230	–		–		–		–
231..-E1-XL	–		–		20	38	➤*681*|▦ *1*
231..-E1A-XL	–		–		–		–
231..-BE-XL	40	56	–		–		➤*682*|▦ *3*
231..-BEA-XL	–		–		–		–
231	–		–		–		–
232..-E1-XL	–		–		18	36	➤*681*|▦ *1*
232..-E1A-XL	–		–		–		–
232..-BE-XL	38	48	–		–		➤*682*|▦ *3*
232..-BEA-XL	–		–		–		–
232	–		–		–		–
233..-E1A-XL	–		–		–		–
233..-BEA-XL	–		–		–		–
238	–		–		–		–
239	–		–		–		–
240..-BE-XL	24	60	–		–		➤*682*|▦ *3*
240..-BEA-XL	–		–		–		–
240	–		–		–		–
241..-BE-XL	22	88	–		–		➤*682*|▦ *3*
241..-BEA-XL	–		–		–		➤*682*|▦ *3*
241	–		–		–		➤*681*|▦ *2*
248	–		–		–		–
249	–		–		–		–

continued ▼

6
Cage, cage suffix, bore code

Bearing series	Brass cage								Table
	Guid-ance by rollers		Guidance on						
			inner ring				outer ring		
	M		MB1		MB		MA1		
	Bore code								
	from	to	from	to	from	to	from	to	
213..-E1-XL	–		–		–		–		–
222..-E1-XL	–		–		–		–		–
222..-BE-XL	–		–		–		–		–
222..-BEA-XL	–		52	72	–		–		➤682 | 3
223..-E1-XL	–		–		–		–		–
223..-BE-XL	–		–		–		–		–
223..-BE..-XL-JPA	–		–		–		–		–
223..-BEA-XL	–		48	80	–		–		➤682 | 3
230..-E1-XL	–		–		–		–		–
230..-E1A-XL	22	40	–		–		–		➤681 | 1
230..-BE-XL	–		–		–		–		–
230..-BEA-XL	–		64	/950	–		–		➤682 | 3
230	–		–		/1000	/1250	–		➤681 | 2
231..-E1-XL	–		–		–		–		–
231..-E1A-XL	20	38	–		–		–		➤681 | 1
231..-BE-XL	–		–		–		–		–
231..-BEA-XL	–		60	/900	–		–		➤682 | 3
231	–		–		/950	/1000	–		➤681 | 2
232..-E1-XL	–		–		–		–		–
232..-E1A-XL	18	36	–		–		–		➤681 | 1
232..-BE-XL	–		–		–		–		–
232..-BEA-XL	–		52	/900	–		–		➤682 | 3
232	–		–		–		–		➤681 | 2
233..-E1A-XL	–		–		–		22	30	➤681 | 1
233..-BEA-XL	–		–		–		32	44	➤682 | 3
238	–		–		/600	/1180	/630		➤681 | 2
239	–		–		36	/1180	–		➤681 | 2
240..-BE-XL	–		–		–		–		–
240..-BEA-XL	–		64	/1120	–		–		➤682 | 3
240	–		–		–		–		➤681 | 2
241..-BE-XL	–		–		–		–		–
241..-BEA-XL	–		92	/670	/710	/1000	–		–
241	–		–		–		–		–
248	–		–		92	/1800	–		➤681 | 2
249	–		–		/670	/1320	–		➤681 | 2
continued ▲	–		–		–		–		

For high continuous temperatures and applications with difficult operating conditions, bearings with brass or sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

1.10 Internal clearance

Radial internal clearance

The standard is CN

Spherical roller bearings with cylindrical and tapered bore are manufactured as standard with radial internal clearance CN (normal) ➤692|▦7 and ➤693|▦8.

A number of bearings are also available by agreement with the smaller internal clearance C2 and with the larger internal clearance C3 and C4 ➤692|▦7 and ➤693|▦8.

Spherical roller bearings with cylindrical bore

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤692|▦7. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦7 *Radial internal clearance of spherical roller bearings with cylindrical bore*

Nominal bore diameter		Radial internal clearance							
d		C2 (Group 2)		CN (Group N)		C3 (Group 3)		C4 (Group 4)	
mm		µm		µm		µm		µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	10	20	20	35	35	45	45	60
24	30	15	25	25	40	40	55	55	75
30	40	15	30	30	45	45	60	60	80
40	50	20	35	35	55	55	75	75	100
50	65	20	40	40	65	65	90	90	120
65	80	30	50	50	80	80	110	110	145
80	100	35	60	60	100	100	135	135	180
100	120	40	75	75	120	120	160	160	210
120	140	50	95	95	145	145	190	190	240
140	160	60	110	110	170	170	220	220	280
160	180	65	120	120	180	180	240	240	310
180	200	70	130	130	200	200	260	260	340
200	225	80	140	140	220	220	290	290	380
225	250	90	150	150	240	240	320	320	420
250	280	100	170	170	260	260	350	350	460
280	315	110	190	190	280	280	370	370	500
315	355	120	200	200	310	310	410	410	550
355	400	130	220	220	340	340	450	450	600
400	450	140	240	240	370	370	500	500	660
450	500	140	260	260	410	410	550	550	720
500	560	150	280	280	440	440	600	600	780
560	630	170	310	310	480	480	650	650	850
630	710	190	350	350	530	530	700	700	920
710	800	210	390	390	580	580	770	770	1 010
800	900	230	430	430	650	650	860	860	1 120
900	1000	260	480	480	710	710	930	930	1 220
1000	1120	290	530	530	770	770	1050	1050	1 430
1120	1250	320	580	580	840	840	1 140	1140	1 560
1250	1400	350	630	630	910	910	1 240	1240	1 700
1400	1600	380	700	700	1020	1020	1 390	1390	1 890
1600	1800	420	780	780	1 140	1140	1 550	1550	2 090

Spherical roller bearings with tapered bore

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤693| 8. These are valid for bearings which are free from load and measurement forces (without elastic deformation).

8 *Radial internal clearance of spherical roller bearings with tapered bore*

Nominal bore diameter d mm		Radial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	15	25	25	35	35	45	45	60
24	30	20	30	30	40	40	55	55	75
30	40	25	35	35	50	50	65	65	85
40	50	30	45	45	60	60	80	80	100
50	65	40	55	55	75	75	95	95	120
65	80	50	70	70	95	95	120	120	150
80	100	55	80	80	110	110	140	140	180
100	120	65	100	100	135	135	170	170	220
120	140	80	120	120	160	160	200	200	260
140	160	90	130	130	180	180	230	230	300
160	180	100	140	140	200	200	260	260	340
180	200	110	160	160	220	220	290	290	370
200	225	120	180	180	250	250	320	320	410
225	250	140	200	200	270	270	350	350	450
250	280	150	220	220	300	300	390	390	490
280	315	170	240	240	330	330	430	430	540
315	355	190	270	270	360	360	470	470	590
355	400	210	300	300	400	400	520	520	650
400	450	230	330	330	440	440	570	570	720
450	500	260	370	370	490	490	630	630	790
500	560	290	410	410	540	540	680	680	870
560	630	320	460	460	600	600	760	760	980
630	710	350	510	510	670	670	850	850	1 090
710	800	390	570	570	750	750	960	960	1 220
800	900	440	640	640	840	840	1 070	1 070	1 370
900	1000	490	710	710	930	930	1 190	1 190	1 520
1000	1120	540	780	780	1020	1020	1 300	1 300	1 650
1120	1250	600	860	860	1120	1120	1 420	1 420	1 800
1250	1400	660	940	940	1220	1220	1 550	1 550	1 960
1400	1600	740	1060	1060	1380	1380	1 750	1 750	2 200
1600	1800	820	1180	1180	1540	1540	1 950	1 950	2 500

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of spherical roller bearings correspond to DIN 635-2:2009, DIN 616:2000 and ISO 15:2017.

Width tolerances for bearings with the suffixes BE and BEA

For spherical roller bearings with the suffixes BE and BEA, the width tolerances are reduced by half compared to the standard values. Values ➤694| 9. The running accuracy corresponds to tolerance class 5.

9
Width tolerances for spherical roller bearings with the suffixes BE and BEA

Tolerance symbols in accordance with ISO 492 ➤117|6
U = *upper limit deviation*
L = *lower limit deviation*

Nominal bore diameter d mm		Width deviation $t_{\Delta Bs}$ µm	
over	incl.	U	L
18	30	0	−60
30	50	0	−60
50	80	0	−75
80	120	0	−100
120	180	0	−125
180	250	0	−150
250	315	0	−175
315	400	0	−200
400	500	0	−225
500	630	0	−250
630	800	0	−375
800	1000	0	−500

Specification T41A and T41D

✎ The tolerances for d and D are restricted

Spherical roller bearings to specification T41A and T41D have restricted tolerances for the inside and outside diameter ➤*694|10*. In bearings with a tapered bore, the reduced tolerance range applies to the outside diameter only.

10
Restricted diameter tolerances for the inner and outer ring in bearings to specification T41A and T41D

Tolerance symbols in accordance with ISO 492 ➤117|6
U = *upper limit deviation*
L = *lower limit deviation*

Inner ring				Outer ring			
Nominal bore diameter d mm		Bore deviation $t_{\Delta dmp}$ µm		Nominal outer ring diameter D mm		Outside diameter deviation $t_{\Delta Dmp}$ µm	
over	incl.	U	L	over	incl.	U	L
30	50	0	−7	80	150	−5	−13
50	80	0	−9	150	180	−5	−18
80	120	0	−12	180	315	−10	−23
120	180	0	−15	315	400	−13	−28
180	250	0	−18	400	500	−13	−30
250	315	0	−21	500	630	−15	−35

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137|7.11*. Nominal value of chamfer dimension ➤*710|*.

Tolerances

The tolerances for the dimensional and running accuracy of spherical roller bearings correspond to tolerance class Normal in accordance with ISO 492:2014. Tolerance values ➤*124|8*. The tolerance values for tapered bores with a taper angle 1:12 correspond to ISO 492 ➤*134|23*; the tolerance values for tapered bores with a taper angle 1:30 correspond to ➤*134|24*. The running tolerances for spherical roller bearings with the suffixes BE and BEA correspond to tolerance class 5. Tolerance values in accordance with ISO 492 ➤*128|14*.

For bearing arrangements with higher requirements for dimensional and running accuracy, spherical roller bearings are available with the tolerance class 5 to ISO 492:2014. In such cases, please consult Schaeffler.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

11 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
A-MA, AS-MA	Two brass cages, guidance on outer ring, inner ring with two lateral retaining ribs and one central rib	Standard combinations
B-GB1	One cast-iron cage, guidance on inner ring, inner ring with two lateral retaining ribs and one central rib	
BE-XL	Two sheet steel cages, surface hardened, guidance on inner ring, X-life	
BE-XL-JPA	Two sheet steel cages, surface hardened, guidance on outer ring, X-life	
BEA-XL-MB1	One brass double comb cage, guidance on inner ring, inner ring with two lateral retaining ribs, X-life	
BEA-XL-MA1	One brass double comb cage, guidance on outer ring, inner ring with two lateral retaining ribs, X-life	
BEA-XL-GB1	One cast-iron double comb cage, guidance on inner ring, inner ring with two lateral retaining ribs, X-life	
E1-XL	Two sheet steel cages, surface hardened or coated, guidance on outer ring, X-life	
E1-XL-TVPB	Two window cages made from glass fibre reinforced polyamide, guidance on inner ring, X-life	
E1A-XL-M	One brass double comb cage, guided by rollers, inner ring with two lateral retaining ribs, X-life	
E1A-XL-MA1	One brass double comb cage, guidance on outer ring, inner ring with two lateral retaining ribs, X-life	
MB, B-MB	Two brass cages, guidance on inner ring, inner ring with two lateral retaining ribs and one central rib	
MA1	One brass cage, guidance on outer ring, inner ring with two lateral retaining ribs and one central rib	
2RSR	Contact seal (lip seal) on both sides with sheet steel reinforcement, made from nitrile rubber (NBR); grease fill level 25% to 40%, filled with high pressure grease	Standard
2VSR	Contact seal (lip seal) on both sides with sheet steel reinforcement, made from fluoro rubber (FKM); grease fill level 60% to 100%, filled with high temperature grease	

continued ▼



11
Suffixes and corresponding descriptions

Suffix	Description of suffix	
C2	Radial internal clearance C2 (smaller than normal)	Available by agreement
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
H40	Without lubrication groove and lubrication holes	
H40CA	6 lubrication holes in the outer ring	
H40AB	6 lubrication holes in the inner ring	
H40AC	6 lubrication holes and one lubrication groove in the inner ring	
H78(*)	3 uniformly distributed threaded holes in one end face of the outer ring (* weight-oriented module letter, please contact us)	
H151	One 45° retaining slot in the outer ring	
H151B	One 15° retaining slot in the outer ring	
K	Tapered bore, taper 1:12	
K30	Tapered bore, taper 1:30	
P5	Dimensional and running accuracy in accordance with ISO tolerance class 5	
S	Lubrication groove and lubrication holes in outer ring	
SY	3 lubrication holes in the outer ring, no lubrication groove	
T41A	For oscillating load with restricted diameter tolerances, radial internal clearance C4	
T41D	For oscillating load with restricted diameter tolerances, radial internal clearance C4, bore with thin chromium coating	
W209B	Inner ring made from case hardening steel	
XL	X-life bearing	

continued ▲

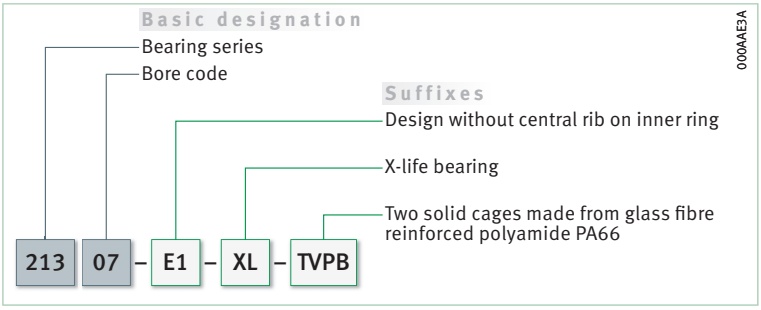
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

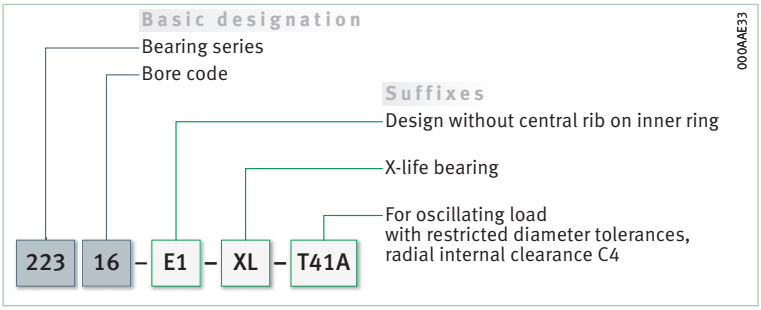
✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*696*|*10* to ➤*697*|*13*. The composition of designations is subject to DIN 623-1 ➤*102*|*10*.

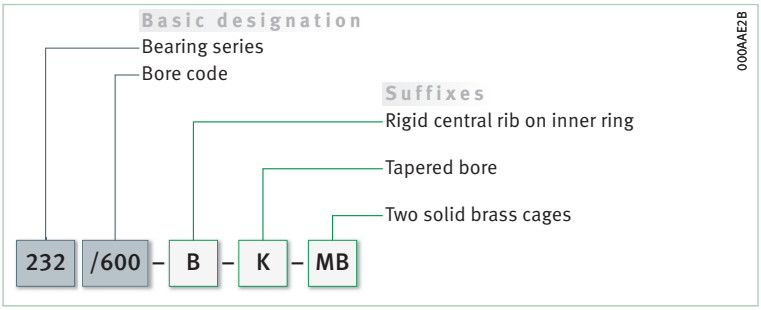
10
Spherical roller bearing with cylindrical bore, without central rib on inner ring: designation structure



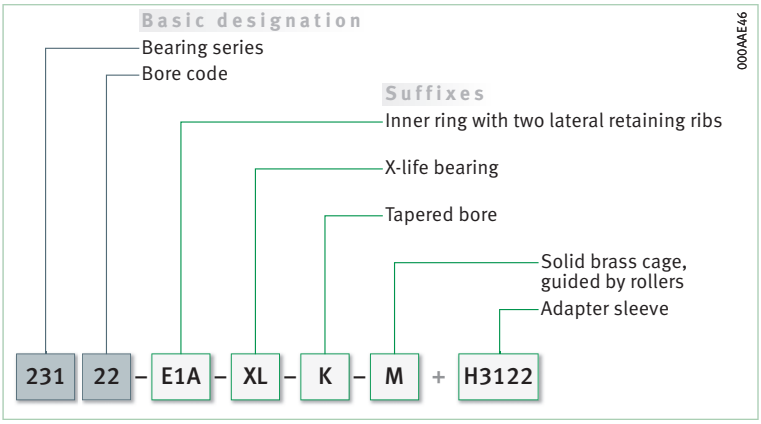
11
Spherical roller bearing for vibratory machinery, with cylindrical bore, without central rib on inner ring, to specification T41A: designation structure



12
Spherical roller bearing with tapered bore, rigid central rib on inner ring: designation structure



13
Spherical roller bearing with tapered bore and adapter sleeve, without central rib on inner ring: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *P = a substitute force for combined load and various load cases*

The basic rating life equation $L = (C/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load. If this condition is not met, an equivalent dynamic bearing load P must be determined for the rating life calculation. In the case of radial bearings, this is a radial load of constant magnitude and direction, which has the same effect on the rating life as the load occurring in practice.

✎ $F_a/F_r \leqq e$ *or* $F_a/F_r > e$

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factor e.

Equivalent dynamic load **1**

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r + Y_1 \cdot F_a$$

Equivalent dynamic load **2**

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}67 \cdot F_r + Y_2 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load
e, Y_1, Y_2	–	Factors ➤*710*|▦.

Equivalent static bearing load

For spherical roller bearings subjected to static load ➤*698*\|*1 3*.

Equivalent static load **3**

$$P_0 = F_{0r} + Y_0 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial static bearing load present (maximum load)
Y_0	–	Factor ➤*710*|▦.

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}, L_{hmr}), it is also always necessary to check the static load safety factor S_0 ➤*698*\|*1 4*.

Static load safety factor **4**

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

Axial load carrying capacity of bearings with adapter sleeve

Where bearings with adapter sleeves are located on a smooth shaft without a fixed axial stop (e.g. rigid shoulder), their axial load carrying capacity is dependent on the friction between the shaft and the sleeve ➤*685*\|*1.2*.

If there is any doubt about the axial load carrying capacity of the location method, please consult Schaeffler.

1.15 Minimum load

In continuous operation, a minimum load of $P = C_{0r}/100$ is required

In order that no slippage occurs between the contact partners, the spherical roller bearings must be constantly subjected to a sufficiently high radial load. Based on experience, a minimum radial load of the order of $P = C_{0r}/100$ is thus necessary for continuous operation.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and thus also achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical or tapered seating surface. The accuracy of mating parts must meet specific requirements ➤ *702* | ▦ *12*, ➤ *702* | ▦ *13*, ➤ *703* | ▦ *14*.

Radial location – bearings with cylindrical bore

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤ *152* | ▦ *6* and ➤ *160* | ▦ *7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤ *146*
- conditions of rotation ➤ *147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤ *149* | ▦ *2*
- shaft fits ➤ *152* | ▦ *6*
- tolerance classes for bearing seats in housings (radial bearings) ➤ *150* | ▦ *4*
- housing fits ➤ *160* | ▦ *7*
- shaft tolerances for adapter sleeves and withdrawal sleeves ➤ *168* | ▦ *8*

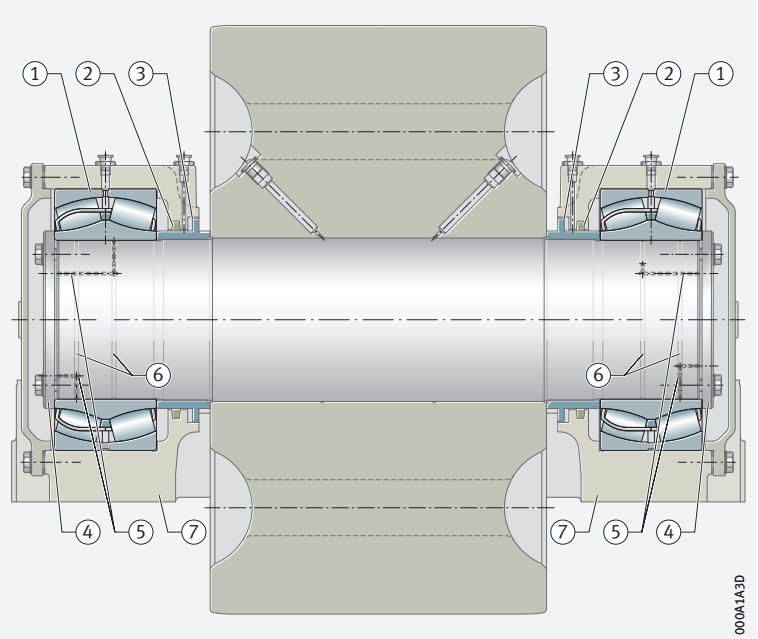
Axial location – bearings with cylindrical bore

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft or in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable ➤ *700* | *14*.

14
Location of a spherical roller bearing in a rotary kiln – example

① *Spherical roller bearing 24164-BE-XL*
② *Felt ring seals*
③ *Labyrinths with relubrication facility*
④ *End cap*
⑤ *Oil feed ducts*
⑥ *Oil grooves*
⑦ *Flake graphite cast iron housing*



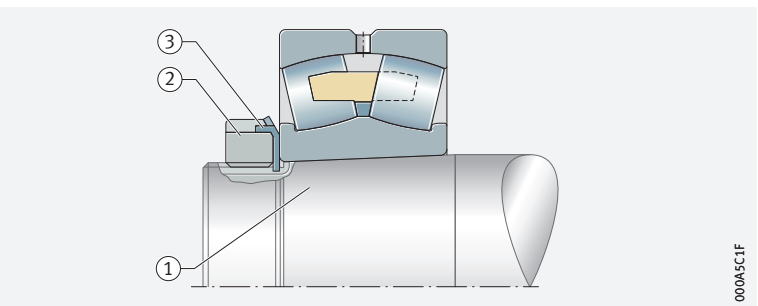
Axial location – bearings with tapered bore

Location by means of locknut and tab washer

If a bearing with a tapered bore is mounted directly on a tapered shaft journal, the bearing can be axially located with ease using a locknut and tab washer ➤*700*|*15*.

15
Spherical roller bearing with tapered bore, mounted directly on the tapered shaft journal

① *Tapered journal with fixing thread*
② *Locknut*
③ *Tab washer*



Location of bearings by means of adapter sleeve or withdrawal sleeve

Mounting can be carried out quickly and reliably by means of wrench sets from Schaeffler

The location of spherical roller bearings by means of adapter sleeve or withdrawal sleeve on a smooth or stepped cylindrical shaft is an easy-to-fit and operationally reliable method ➤*678*|*1.1* ➤*701*|*16*. The adapter sleeve requires no additional means of retention on the shaft. The bearings can be positioned at any point on smooth shafts.

Further information:

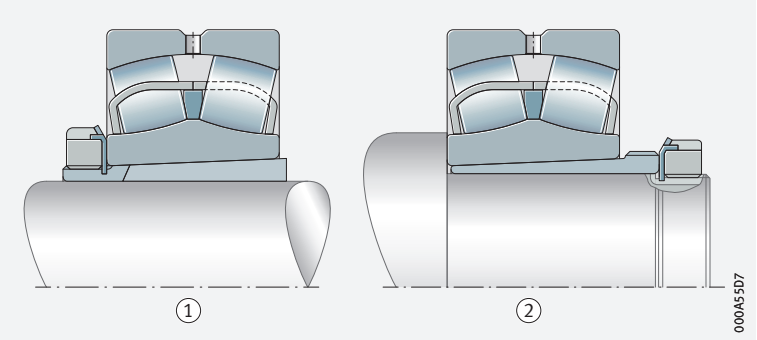
- Axial load carrying capacity of bearing arrangements ➤*685*|*1.2*
- Adapter sleeves ➤*1756*

Mounting of the adapter sleeve and withdrawal sleeve

While the bearing is being slid onto the adapter sleeve, the withdrawal sleeve is pressed into the tapered bearing bore until the required reduction in radial internal clearance is achieved. The position is fixed by means of a locknut. In the case of withdrawal sleeves, the inner ring is abutted against a shoulder on the shaft ➤*701*|*16*. The required adapter sleeves or withdrawal sleeves must be stated additionally in the order ➤*678*|*1.1* ➤*774*|.

16
Location of spherical roller bearings by means of adapter sleeve or withdrawal sleeve

① *Bearing with adapter sleeve, adapter sleeve nut (shaft nut) and tab washer*
② *Bearing with withdrawal sleeve, locknut and tab washer, abutment of the inner ring against a shaft shoulder*

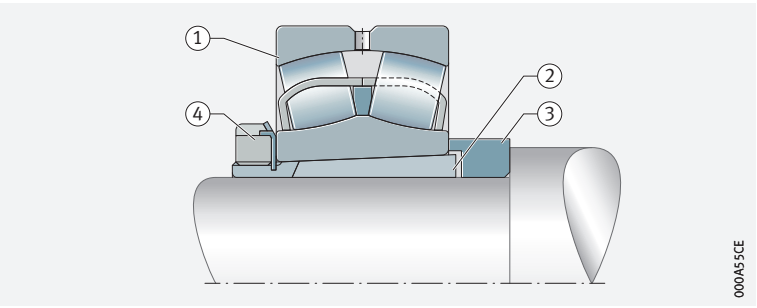


Location by means of adapter sleeve, axial abutment by means of a support ring

If an adapter sleeve connection is used and it is expected that the frictional forces of the sleeve cannot reliably support high axial forces, the bearing inner ring can be abutted by means of a support ring against a shaft shoulder ➤*701*|**16**. Axial guidance forces in the opposing direction are supported by means of force locking. The mounting dimensions of the support ring in the product tables must be observed ➤*774*|▦.

17
Location of a spherical roller bearing by means of adapter sleeve and support ring on a stepped shaft

① *Spherical roller bearing*
② *Adapter sleeve*
③ *Support ring*
④ *Locknut with tab washer*



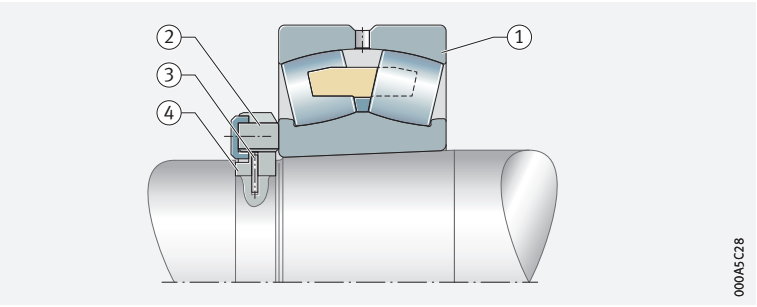
Location of bearings with a tapered bore on a tapered shaft

✎*Axial location by means of fixing nut, ring nut and locking pin*

Where shafts must support high torques, it is not always permissible to cut the thread for the fixing nut of the bearing into the shaft due to the notch effect. In this case, a slot with well rounded transitions is grooved into the shaft. A split ring with an external thread is inserted in the slot and secured by means of a feather key or pin. The fixing nut is screwed onto the ring nut and secured ➤*701*|**18**.

18
Location of a spherical roller bearing on a tapered shaft

① *Spherical roller bearing*
② *Fixing nut with retaining bracket*
③ *Retaining pin*
④ *Ring nut*



Dimensional, geometrical and running accuracy of cylindrical bearing seats

✎A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For spherical roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤*702*| ▦ *12*, tolerances t_1 to t_3 in accordance with ➤*170*| ⧉ *11*. Numerical values for IT grades ➤*702*| ▦ *13*.

▦ 12
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
5	P5	Shaft	IT5	Circumferential load IT2/2	Circumferential load IT2/2	IT2
				Point load IT3/2	Point load IT3/2	
		Housing	IT6	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	

▦ 13
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm							
	over **18**	**30**	**50**	**80**	**120**	**180**	**250**	**315**
	incl. **30**	**50**	**80**	**120**	**180**	**250**	**315**	**400**
	Values in µm							
IT2	2,5	2,5	3	4	5	7	8	9
IT3	4	4	5	6	8	10	12	13
IT4	6	7	8	10	12	14	16	18
IT5	9	11	13	15	18	20	23	25
IT6	13	16	19	22	25	29	32	36
IT7	21	25	30	35	40	46	52	57

continued ▼

13 *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm						
	over **400**	**500**	**630**	**800**	**1 000**	**1 250**	**1 600**
	incl. **500**	**630**	**800**	**1 000**	**1 250**	**1 600**	**2 000**
	Values in µm						
IT2	10	11	13	15	18	21	25
IT3	15	16	18	21	24	29	35
IT4	20	22	25	28	33	39	46
IT5	27	32	36	40	47	55	65
IT6	40	44	50	56	66	78	92
IT7	63	70	80	90	105	125	150

continued ▲

Roughness of cylindrical bearing seating surfaces

✎ Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤ *703* | 14.

14 *Roughness values for cylindrical bearing seating surfaces – guide values*

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4
500	1 250	3,2[1)]	1,6	1,6	0,8

[1)] *For the mounting of bearings using the hydraulic method, a value Ra = 1,6 µm must not be exceeded*

Tolerances for tapered bearing seats

✎ Specifications for tapered bearing seats

For bearings located directly on a tapered shaft journal, the data are in accordance with ➤ *173* | 12.



Mounting dimensions for the contact surfaces of bearing rings

✎ The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders are given in the product tables. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Suitable bearing housings for spherical roller bearings

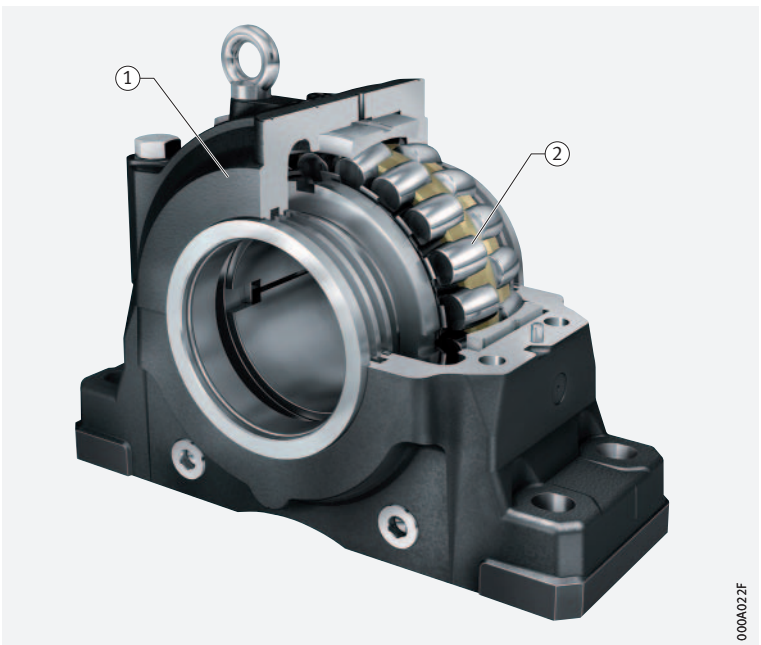
✎ A large range of housings is available

For economical, operationally reliable and easily interchangeable bearing arrangement units, the spherical roller bearings can also be combined with Schaeffler bearing housings ➤ *704* | *19*. These easy-to-fit units fulfil all of the requirements for modern machine and plant designs with favourable maintenance-related characteristics.

Due to the large number of application areas, an extensive range of bearing housings is available for bearings with cylindrical and tapered bores. These include split and unsplit plummer block housings, take-up housings, flanged housings and housings for specific industrial and railway applications. Detailed information on bearing housings can be found in publication GK 1 *https://www.schaeffler.de/std/1D54*. This book can be ordered from Schaeffler.

19
Split plummer block housing SNS with a spherical roller bearing

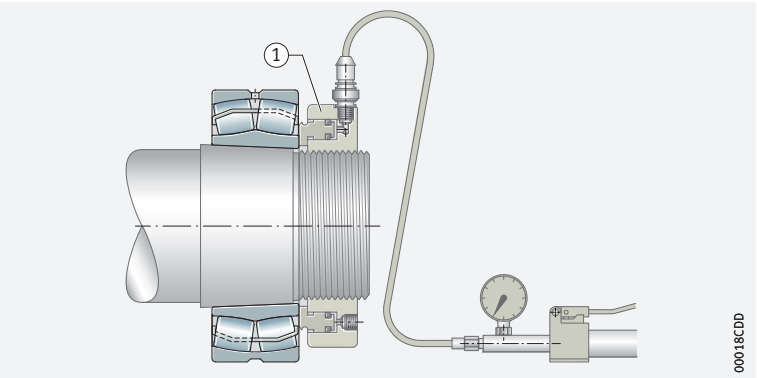
① *Split plummer block housing SNS*
② *Spherical roller bearing*



1.17 Mounting and dismounting

The mounting and dismounting options for spherical roller bearings, by thermal, hydraulic or mechanical methods, must also be taken into consideration in the design of the bearing position.
Example ➤ 705 | 20.

20
Mounting of large bearings with a hydraulic nut



① *Spherical roller bearing with tapered bore mounted directly on the tapered shaft journal*
② *Hydraulic nut*

✎ *Ensure that the bearings are not damaged during mounting*

Spherical roller bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Mounting of bearings with a tapered bore

✎ *Suitable methods*

Bearings with a tapered bore are mounted with a tight fit on the shaft or adapter and withdrawal sleeve. The measurement of the reduction in radial internal clearance or of the axial drive-up distance of the inner ring on the tapered bearing seat serves as an indication of the tight fit.

Measuring the reduction in radial internal clearance during mounting of the bearings

✎ The measurement is usually carried out with a feeler gauge

The reduction in radial internal clearance is the difference between the radial internal clearance before mounting and the bearing clearance after mounting of the bearing ➤*706*|*21*, ➤*707*|*15* and ➤*708*|*16*. The radial internal clearance must be measured first. During pressing on, the radial clearance (bearing clearance) must be checked until the necessary reduction in the radial internal clearance and thus the required tight fit is achieved.

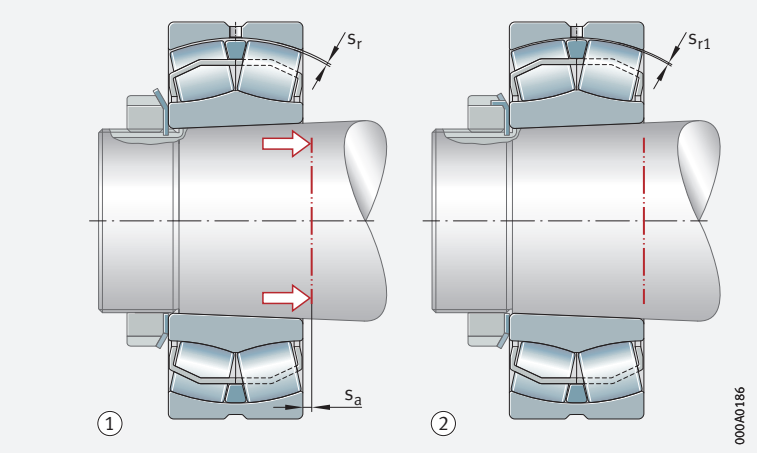
If the values in the table are observed, secure radial location of the bearings will be achieved, i. e. the inner ring will be prevented from creeping under load. However, the mounting method does not ensure that an operating clearance which is appropriate to the application is also achieved simultaneously. In order to select the requisite internal clearance class, other factors influencing the operating clearance, such as the temperature difference between the inner and outer ring and the housing bore tolerance for example, must be taken into consideration.

If there is any uncertainty regarding the selection of an internal clearance class for a specific application, please consult Schaeffler.

21
Reduction in radial internal clearance

s_a = *axial press-on distance (axial drive-up distance of the bearing)*
s_r = *radial internal clearance before mounting*
s_{r1} = *radial internal clearance after mounting*
$s_r - s_{r1}$ = *reduction in radial internal clearance*

① *Before mounting*
② *After mounting*



15
Reduction in radial internal clearance in mounting of spherical roller bearings with tapered bore

Nominal bore diameter d mm		Radial internal clearance before mounting in accordance with DIN 620-4:2004 (ISO 5753-1:2009)						Reduction in radial internal clearance during mounting[1] mm	
		CN (Group N) mm		C3 (Group 3) mm		C4 (Group 4) mm			
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
24	30	0,03	0,04	0,04	0,055	0,055	0,075	0,015	0,02
30	40	0,035	0,05	0,05	0,065	0,065	0,085	0,02	0,025
40	50	0,045	0,06	0,06	0,08	0,08	0,1	0,025	0,03
50	65	0,055	0,075	0,075	0,095	0,095	0,12	0,03	0,04
65	80	0,07	0,095	0,095	0,12	0,12	0,15	0,04	0,05
80	100	0,08	0,11	0,11	0,14	0,14	0,18	0,045	0,06
100	120	0,1	0,135	0,135	0,17	0,17	0,22	0,05	0,07
120	140	0,12	0,16	0,16	0,2	0,2	0,26	0,065	0,09
140	160	0,13	0,18	0,18	0,23	0,23	0,3	0,075	0,1
160	180	0,14	0,2	0,2	0,26	0,26	0,34	0,08	0,11
180	200	0,16	0,22	0,22	0,29	0,29	0,37	0,09	0,13
200	225	0,18	0,25	0,25	0,32	0,32	0,41	0,1	0,14
225	250	0,2	0,27	0,27	0,35	0,35	0,45	0,11	0,15
250	280	0,22	0,3	0,3	0,39	0,39	0,49	0,12	0,17
280	315	0,24	0,33	0,33	0,43	0,43	0,54	0,13	0,19
315	355	0,27	0,36	0,36	0,47	0,47	0,59	0,15	0,21
355	400	0,3	0,4	0,4	0,52	0,52	0,65	0,17	0,23
400	450	0,33	0,44	0,44	0,57	0,57	0,72	0,2	0,26
450	500	0,37	0,49	0,49	0,63	0,63	0,79	0,21	0,28
500	560	0,41	0,54	0,54	0,68	0,68	0,87	0,24	0,32
560	630	0,46	0,6	0,6	0,76	0,76	0,98	0,26	0,35
630	710	0,51	0,67	0,67	0,85	0,85	1,09	0,3	0,4
710	800	0,57	0,75	0,75	0,96	0,96	1,22	0,34	0,45
800	900	0,64	0,84	0,84	1,07	1,07	1,37	0,37	0,5
900	1 000	0,71	0,93	0,93	1,19	1,19	1,52	0,41	0,55
1 000	1 120	0,78	1,02	1,02	1,3	1,3	1,65	0,45	0,6
1 120	1 250	0,86	1,12	1,12	1,42	1,42	1,8	0,49	0,65
1 250	1 400	0,94	1,22	1,22	1,55	1,55	1,96	0,55	0,72

1) *Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter. The following applies: bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for the reduction in radial internal clearance, while bearings in the lower half of the tolerance range are mounted using the smaller value for the reduction in radial internal clearance.*



Measuring the axial drive-up distance of the inner ring

16 *Axial drive-up distance of the inner ring in spherical roller bearings with a tapered bore*

Nominal bore diameter		Drive-up distance on taper 1:12[1]				Drive-up distance on taper 1:30[1]				Minimum radial internal clearance required after mounting, control value		
d		Shaft		Sleeve		Shaft		Sleeve		With CN (Group N)	With C3 (Group 3)	With C4 (Group 4)
mm		mm		mm		mm		mm		mm	mm	mm
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	min.	min.
24	30	0,3	0,35	0,3	0,4	–	–	–	–	0,015	0,02	0,035
30	40	0,35	0,4	0,35	0,45	–	–	–	–	0,015	0,025	0,04
40	50	0,4	0,45	0,45	0,5	–	–	–	–	0,02	0,03	0,05
50	65	0,45	0,6	0,5	0,7	–	–	–	–	0,025	0,035	0,055
65	80	0,6	0,75	0,7	0,85	–	–	–	–	0,025	0,04	0,07
80	100	0,7	0,9	0,75	1	1,7	2,2	1,8	2,4	0,035	0,05	0,08
100	120	0,7	1,1	0,8	1,2	1,9	2,7	2	2,8	0,05	0,065	0,1
120	140	1,1	1,4	1,2	1,5	2,7	3,5	2,8	3,6	0,055	0,08	0,11
140	160	1,2	1,6	1,3	1,7	3	4	3,1	4,2	0,055	0,09	0,13
160	180	1,3	1,7	1,4	1,9	3,2	4,2	3,3	4,6	0,06	0,1	0,15
180	200	1,4	2	1,5	2,2	3,5	4,5	3,6	5	0,07	0,1	0,16
200	225	1,6	2,2	1,7	2,4	4	5,5	4,2	5,7	0,08	0,12	0,18
225	250	1,7	2,4	1,8	2,6	4,2	6	4,6	6,2	0,09	0,13	0,2
250	280	1,9	2,6	2	2,9	4,7	6,7	4,8	6,9	0,1	0,14	0,22
280	315	2	3	2,2	3,2	5	7,5	5,2	7,7	0,11	0,15	0,24
315	355	2,4	3,4	2,6	3,6	6	8,2	6,2	8,4	0,12	0,17	0,26
355	400	2,6	3,6	2,9	3,9	6,5	9	6,8	9,2	0,13	0,19	0,29
400	450	3,1	4,1	3,4	4,4	7,7	10	8	10,4	0,13	0,2	0,31
450	500	3,3	4,4	3,6	4,8	8,2	11	8,4	11,2	0,16	0,23	0,35
500	560	3,7	5	4,1	5,4	9,2	12,5	9,6	12,8	0,17	0,25	0,36
560	630	4	5,4	4,4	5,9	10	13,5	10,4	14	0,2	0,29	0,41
630	710	4,6	6,2	5,1	6,8	11,5	15,5	12	16	0,21	0,31	0,45
710	800	5,3	7	5,8	7,6	13,3	17,5	13,6	18	0,23	0,35	0,51
800	900	5,7	7,8	6,3	8,5	14,3	19,5	14,8	20	0,27	0,39	0,57
900	1 000	6,3	8,5	7	9,4	15,8	21	16,4	22	0,3	0,43	0,64
1 000	1 120	6,8	9	7,6	10,2	17	23	18	24	0,32	0,48	0,7
1 120	1 250	7,4	9,8	8,3	11	18,5	25	19,6	26	0,34	0,54	0,77
1 250	1 400	8,3	10,8	9,3	12,1	21	27	22,2	28,3	0,36	0,59	0,84

[1] *Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter. The following applies: bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for the axial drive-up distance, while bearings in the lower half of the tolerance range are mounted using the smaller value for the axial drive-up distance.*

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

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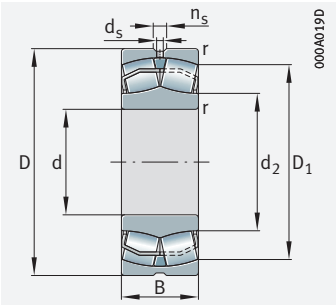
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

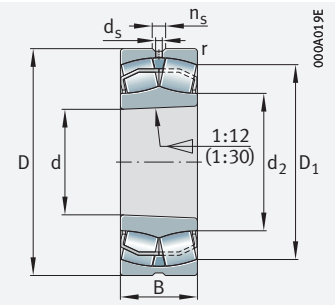
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

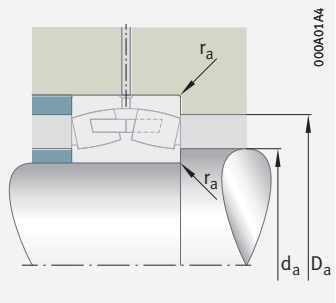


Tapered bore

d = 20 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
20	52	15	41	33	3 800	16 000	9 700	0,16	**21304-E1-XL-TVPB**
25	52	18	48,5	42,5	4 900	14 400	9 200	0,191	**22205-E1-XL**
	52	18	48,5	42,5	4 900	14 400	9 200	0,175	**22205-E1-XL-K**
	62	17	52	43,5	4 900	13 900	8 400	0,254	**21305-E1-XL-TVPB**
30	62	20	64	57	7 000	12 500	7 800	0,275	**22206-E1-XL**
	62	20	64	57	7 000	12 500	7 800	0,275	**22206-E1-XL-K**
	72	19	72	63	7 200	12 000	7 300	0,386	**21306-E1-XL-TVPB**
35	72	23	89	81	9 700	10 700	7 000	0,434	**22207-E1-XL**
	72	23	89	81	9 700	10 700	7 000	0,434	**22207-E1-XL-K**
	80	21	83	74	8 300	10 900	6 800	0,496	**21307-E1-XL-K-TVPB**
	80	21	83	74	8 300	10 900	6 800	0,503	**21307-E1-XL-TVPB**
40	80	23	101	91	12 100	10 500	6 200	0,528	**22208-E1-XL**
	80	23	101	91	12 100	10 500	6 200	0,528	**22208-E1-XL-K**
	90	23	109	107	14 600	9 800	5 200	0,749	**21308-E1-XL**
	90	23	109	107	14 600	9 800	5 200	0,749	**21308-E1-XL-K**
	90	33	156	149	13 500	7 600	5 500	1,05	**22308-E1-XL**
	90	33	156	149	13 500	7 600	5 500	1	**22308-E1-XL-K**
45	85	23	104	99	13 000	10 100	5 600	0,589	**22209-E1-XL**
	85	23	104	99	13 000	10 100	5 600	0,577	**22209-E1-XL-K**
	100	25	129	130	17 700	9 000	4 750	0,999	**21309-E1-XL**
	100	25	129	130	17 700	9 000	4 750	0,999	**21309-E1-XL-K**
	100	36	187	183	16 500	6 800	5 000	1,39	**22309-E1-XL**
	100	36	187	183	16 500	6 800	5 000	1,4	**22309-E1-XL-K**
50	90	23	109	107	14 600	9 800	5 100	0,606	**22210-E1-XL**
	90	23	109	107	14 600	9 800	5 100	0,608	**22210-E1-XL-K**
	110	27	129	130	17 700	9 000	5 400	1,32	**21310-E1-XL**
	110	27	129	130	17 700	9 000	5 400	1,32	**21310-E1-XL-K**
	110	40	229	223	20 700	6 300	4 800	1,9	**22310-E1-XL**
	110	40	229	223	20 700	6 300	4 800	1,9	**22310-E1-XL-K**

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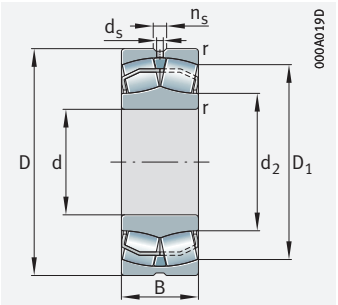


Mounting dimensions

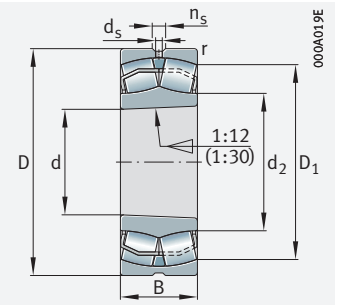
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
20	1,1	43	28,9	–	–	27	45	1	0,3	2,25	3,34	2,2
25	1	44,4	31,5	3,2	4,8	30,6	46,4	1	0,33	2,07	3,09	2,03
	1	44,4	31,5	3,2	4,8	30,6	46,4	1	0,33	2,07	3,09	2,03
	1,1	51	35,2	–	–	32	55	1	0,28	2,43	3,61	2,37
30	1	53,7	38,1	3,2	4,8	35,6	56,4	1	0,3	2,26	3,37	2,21
	1	53,7	38,1	3,2	4,8	35,6	54,6	1	0,3	2,26	3,37	2,21
	1,1	59,9	41,5	–	–	37	65	1	0,27	2,49	3,71	2,43
35	1,1	62,5	43,9	3,2	4,8	42	65	1	0,31	2,21	3,29	2,16
	1,1	62,5	43,9	3,2	4,8	42	65	1	0,31	2,21	3,29	2,16
	1,5	66,6	47,4	–	–	44	71	1,5	0,26	2,55	3,8	2,5
	1,5	66,6	47,4	–	–	44	71	1,5	0,26	2,55	3,8	2,5
40	1,1	70,4	48,8	3,2	4,8	47	73	1	0,27	2,49	3,71	2,43
	1,1	70,4	48,8	3,2	4,8	47	73	1	0,27	2,49	3,71	2,43
	1,5	80,8	59,9	3,2	4,8	49	81	1,5	0,23	2,95	4,4	2,89
	1,5	80,8	59,9	3,2	4,8	49	81	1,5	0,23	2,95	4,4	2,89
	1,5	76	52,4	3,2	6,5	49	81	1,5	0,36	1,86	2,77	1,82
	1,5	76	52,4	3,2	6,5	49	81	1,5	0,36	1,86	2,77	1,82
45	1,1	75,6	55	3,2	4,8	52	78	1	0,25	2,74	4,08	2,68
	1,1	75,6	55	3,2	4,8	52	78	1	0,25	2,74	4,08	2,68
	1,5	89,8	67,6	3,2	4,8	54	91	1,5	0,21	3,17	4,72	3,1
	1,5	89,8	67,6	3,2	4,8	54	91	1,5	0,21	3,17	4,72	3,1
	1,5	84,7	58,9	3,2	6,5	54	91	1,5	0,36	1,9	2,83	1,86
	1,5	84,7	58,9	3,2	6,5	54	91	1,5	0,36	1,9	2,83	1,86
50	1,1	80,8	59,9	3,2	4,8	57	83	1	0,23	2,95	4,4	2,89
	1,1	80,8	59,9	3,2	4,8	57	83	1	0,23	2,95	4,4	2,89
	2	89,8	67,7	3,2	4,8	61	99	2	0,21	3,17	4,72	3,1
	2	89,8	67,7	3,2	4,8	61	99	2	0,21	3,17	4,72	3,1
	2	92,6	63	3,2	6,5	61	99	2	0,36	1,86	2,77	1,82
	2	92,6	63	3,2	6,5	61	99	2	0,36	1,86	2,77	1,82

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

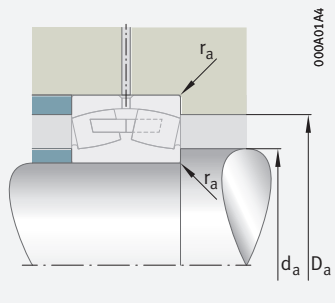


Tapered bore

d = 55 – 75 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
55	100	25	129	130	17 700	9 000	4 650	0,822	**22211-E1-XL**
	100	25	129	130	17 700	9 000	4 650	0,825	**22211-E1-XL-K**
	120	29	160	155	20 700	8 100	5 100	1,28	**21311-E1-XL**
	120	29	160	155	20 700	8 100	5 100	1,28	**21311-E1-XL-K**
	120	43	265	260	24 600	5 800	4 500	2,27	**22311-E1-XL**
	120	43	265	260	24 600	5 800	4 500	2,2	**22311-E1-XL-K**
60	110	28	160	155	20 700	8 100	4 550	1,12	**22212-E1-XL**
	110	28	160	155	20 700	8 100	4 550	1,09	**22212-E1-XL-K**
	130	31	211	226	28 500	6 700	4 100	1,89	**21312-E1-XL**
	130	31	211	226	28 500	6 700	4 100	1,89	**21312-E1-XL-K**
	130	46	310	310	29 000	5 400	4 200	2,97	**22312-E1-XL**
	130	46	310	310	29 000	5 400	4 200	2,8	**22312-E1-XL-K**
65	120	31	202	210	26 500	7 000	4 200	1,55	**22213-E1-XL**
	120	31	202	210	26 500	7 000	4 200	1,52	**22213-E1-XL-K**
	140	33	250	270	34 500	6 200	3 600	2,13	**21313-E1-XL**
	140	33	250	270	34 500	6 200	3 600	2,13	**21313-E1-XL-K**
	140	48	350	365	33 500	5 000	3 800	3,57	**22313-E1-XL**
	140	48	350	365	33 500	5 000	3 800	3,5	**22313-E1-XL-K**
70	125	31	211	226	28 500	6 700	3 950	1,65	**22214-E1-XL**
	125	31	211	226	28 500	6 700	3 950	1,61	**22214-E1-XL-K**
	150	35	250	270	34 500	6 200	3 950	3,13	**21314-E1-XL**
	150	35	250	270	34 500	6 200	3 950	3,13	**21314-E1-XL-K**
	150	51	390	390	37 500	4 800	3 700	4,21	**22314-E1-XL**
	150	51	390	390	37 500	4 800	3 700	4,1	**22314-E1-XL-K**
75	130	31	216	237	30 500	6 500	3 700	1,72	**22215-E1-XL**
	130	31	216	237	30 500	6 500	3 700	1,68	**22215-E1-XL-K**
	160	37	305	325	39 000	5 700	3 750	3,79	**21315-E1-XL**
	160	37	305	325	39 000	5 700	3 750	3,74	**21315-E1-XL-K**
	160	55	445	450	41 500	4 500	3 550	5,38	**22315-E1-XL**
	160	55	445	450	42 000	4 500	3 550	5,3	**22315-E1-XL-K**

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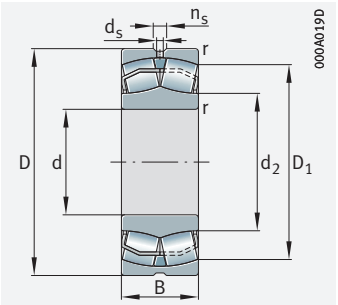


Mounting dimensions

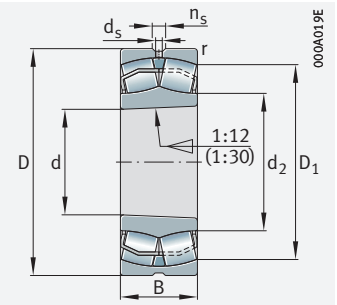
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
55	1,5	89,8	67,6	3,2	4,8	64	91	1,5	0,21	3,17	4,72	3,1
	1,5	89,8	67,6	3,2	4,8	64	91	1,5	0,21	3,17	4,72	3,1
	2	98,3	71,6	3,2	6,5	66	109	2	0,23	2,98	4,44	2,92
	2	98,3	71,6	3,2	6,5	66	109	2	0,23	2,98	4,44	2,92
	2	101,4	68,9	3,2	6,5	66	109	2	0,36	1,89	2,81	1,84
	2	101,4	68,9	3,2	6,5	66	109	2	0,36	1,89	2,81	1,84
60	1,5	98,7	71,6	3,2	6,5	69	101	1,5	0,23	2,98	4,44	2,92
	1,5	98,7	71,6	3,2	6,5	69	101	1,5	0,23	2,98	4,44	2,92
	2,1	112,5	84,4	3,2	6,5	72	118	2,1	0,23	2,95	4,4	2,89
	2,1	112,5	84,4	3,2	6,5	72	118	2,1	0,23	2,95	4,4	2,89
	2,1	110,1	74,8	3,2	6,5	72	118	2,1	0,35	1,91	2,85	1,87
	2,1	110,1	74,8	3,2	6,5	72	118	2,1	0,35	1,91	2,85	1,87
65	1,5	107,3	79,1	3,2	6,5	74	111	1,5	0,24	2,81	4,19	2,75
	1,5	107,3	79,1	3,2	6,5	74	111	1,5	0,24	2,81	4,19	2,75
	2,1	126,8	94,9	3,2	6,5	77	128	2,1	0,22	3,14	4,67	3,07
	2,1	126,8	94,9	3,2	6,5	77	128	2,1	0,22	3,14	4,67	3,07
	2,1	119,3	83,2	4,8	9,5	77	128	2,1	0,34	2	2,98	1,96
	2,1	119,3	83,2	4,8	9,5	77	128	2,1	0,34	2	2,98	1,96
70	1,5	112,5	84,4	3,2	6,5	79	116	1,5	0,23	2,95	4,4	2,89
	1,5	112,5	84,4	3,2	6,5	79	116	1,5	0,23	2,95	4,4	2,89
	2,1	126,2	94,9	3,2	6,5	82	138	2,1	0,22	3,14	4,67	3,07
	2,1	126,2	94,9	3,2	6,5	82	138	2,1	0,22	3,14	4,67	3,07
	2,1	128	86,7	4,8	9,5	82	138	2,1	0,34	2	2,98	1,96
	2,1	128	86,7	4,8	9,5	82	138	2,1	0,34	2	2,98	1,96
75	1,5	117,7	89,8	3,2	6,5	84	121	1,5	0,22	3,1	4,62	3,03
	1,5	117,7	89,8	3,2	6,5	84	121	1,5	0,22	3,1	4,62	3,03
	2,1	135,2	99,7	3,2	6,5	87	148	2,1	0,22	3,04	4,53	2,97
	2,1	135,2	99,7	3,2	6,5	87	148	2,1	0,22	3,04	4,53	2,97
	2,1	136,3	92,4	4,8	9,5	87	148	2,1	0,34	1,99	2,96	1,94
	2,1	136,3	92,4	4,8	9,5	87	148	2,1	0,34	1,99	2,96	1,94

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

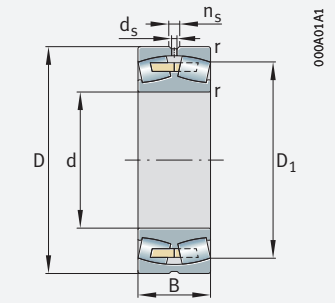


Tapered bore

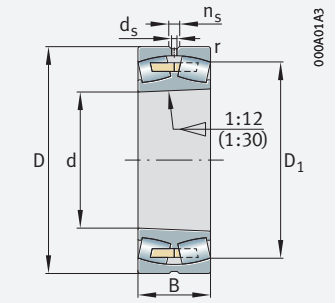
d = 80 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
80	140	33	250	270	34 500	6 200	3 550	2,1	**22216-E1-XL**
	140	33	250	270	34 500	6 200	3 550	2,08	**22216-E1-XL-K**
	170	39	305	325	39 000	5 700	4 050	4,54	**21316-E1-XL**
	170	39	305	325	39 000	5 700	4 050	4,54	**21316-E1-XL-K**
	170	58	495	510	46 500	4 250	3 400	6,27	**22316-E1-XL**
	170	58	495	510	46 500	4 250	3 400	6,1	**22316-E1-XL-K**
85	150	36	305	325	39 000	5 700	3 450	2,65	**22217-E1-XL**
	150	36	305	325	39 000	5 700	3 450	2,59	**22217-E1-XL-K**
	180	41	345	375	43 500	5 200	3 800	5,36	**21317-E1-XL**
	180	41	345	375	43 500	5 200	3 800	5,3	**21317-E1-XL-K**
	180	60	540	560	51 000	4 100	3 200	7,06	**22317-E1-XL**
	180	60	540	560	51 000	4 100	3 200	7,1	**22317-E1-XL-K**
90	160	40	345	375	43 500	5 200	3 400	3,42	**22218-E1-XL**
	160	40	345	375	43 500	5 200	3 400	3,35	**22218-E1-XL-K**
	160	52,4	445	520	50 000	4 250	2 650	4,1	**23218-E1-XL-K-TVPB**
	160	52,4	445	520	50 000	4 250	2 650	4,3	**23218-E1-XL-TVPB**
	160	52,4	445	520	50 000	4 250	2 650	4,3	**23218-E1A-XL-K-M**
	160	52,4	445	520	50 000	4 250	2 650	4,5	**23218-E1A-XL-M**
	190	43	380	415	48 500	4 850	3 600	6,26	**21318-E1-XL**
	190	43	380	415	48 500	4 850	3 600	6,26	**21318-E1-XL-K**
	190	64	610	630	56 000	3 850	3 000	8,69	**22318-E1-XL**
	190	64	610	630	56 000	3 850	3 000	8,5	**22318-E1-XL-K**
95	170	43	380	415	48 500	4 850	3 300	4,13	**22219-E1-XL**
	170	43	380	415	48 000	4 850	3 300	4,04	**22219-E1-XL-K**
	200	45	425	450	48 500	4 600	3 250	6,63	**21319-E1-XL-K-TVPB**
	200	45	425	450	48 500	4 600	3 250	6,81	**21319-E1-XL-TVPB**
	200	67	670	700	61 000	3 700	2 800	9,69	**22319-E1-XL**
	200	67	670	700	61 000	3 700	2 800	9,5	**22319-E1-XL-K**

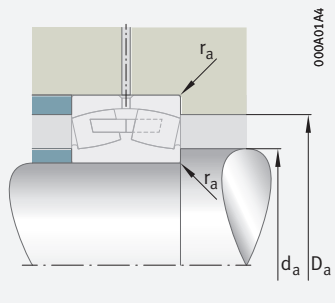
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

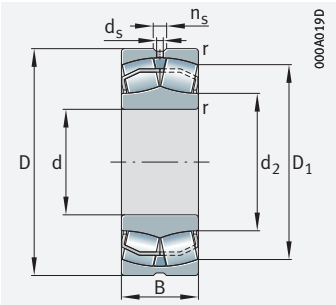


Mounting dimensions

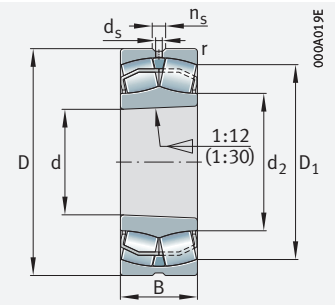
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
80	2	126,8	94,9	3,2	6,5	91	129	2	0,22	3,14	4,67	3,07
	2	126,8	94,9	3,2	6,5	91	129	2	0,22	3,14	4,67	3,07
	2,1	135,4	99,7	3,2	6,5	92	158	2,1	0,22	3,04	4,53	2,97
	2,1	135,4	99,8	3,2	6,5	92	158	2,1	0,22	3,04	4,53	2,97
	2,1	145,1	98,3	4,8	9,5	92	158	2,1	0,34	1,99	2,96	1,94
	2,1	145,1	98,3	4,8	9,5	92	158	2,1	0,34	1,99	2,96	1,94
85	2	135,4	99,7	3,2	6,5	96	139	2	0,22	3,04	4,53	2,97
	2	135,4	99,7	3,2	6,5	96	139	2	0,22	3,04	4,53	2,97
	3	143,9	106,1	4,8	9,5	99	166	2,5	0,23	2,9	4,31	2,83
	3	143,9	106,1	4,8	9,5	99	166	2,5	0,23	2,9	4,31	2,83
	3	154,2	104,4	4,8	9,5	99	166	2,5	0,33	2,04	3,04	2
	3	154,2	104,4	4,8	9,5	99	166	2,5	0,33	2,04	3,04	2
90	2	143,9	106,1	3,2	6,5	101	149	2	0,23	2,9	4,31	2,83
	2	143,9	106,1	3,2	6,5	101	149	2	0,23	2,9	4,31	2,83
	2	140	104,1	3,2	6,5	101	149	2	0,31	2,2	3,27	2,15
	2	140	104,1	3,2	6,5	101	149	2	0,31	2,2	3,27	2,15
	2	140	–	3,2	6,5	101	149	2	0,31	2,2	3,27	2,15
	2	140	–	3,2	6,5	101	149	2	0,31	2,2	3,27	2,15
	3	152,7	112,6	4,8	9,5	104	176	2,5	0,24	2,87	4,27	2,8
	3	152,7	112,6	4,8	9,5	104	176	2,5	0,24	2,87	4,27	2,8
	3	162,5	110,2	6,3	12,2	104	176	2,5	0,33	2,03	3,02	1,98
	3	162,5	110,2	6,3	12,2	104	176	2,5	0,33	2,03	3,02	1,98
95	2,1	152,7	112,6	4,8	9,5	107	158	2,1	0,24	2,87	4,27	2,8
	2,1	152,7	112,6	4,8	9,5	107	158	2,1	0,24	2,87	4,27	2,8
	3	169,4	124,3	4,8	9,5	109	186	2,5	0,22	3,04	4,53	2,97
	3	169,4	124,3	4,8	9,5	109	186	2,5	0,22	3,04	4,53	2,97
	3	171,2	116	6,3	12,2	109	186	2,5	0,33	2,03	3,02	1,98
	3	171,2	116	6,3	12,2	109	186	2,5	0,33	2,03	3,02	1,98

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

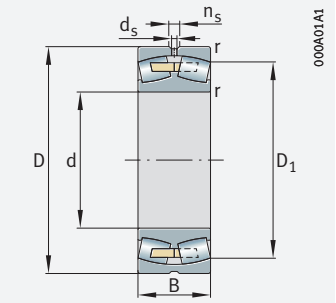


Tapered bore

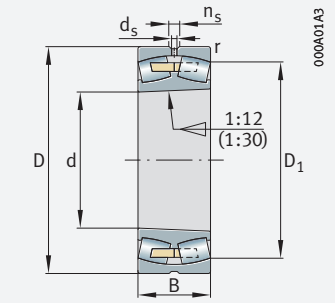
d = 100 – 100 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
100	165	52	450	570	54 000	4 000	2 750	4,1	**23120-E1-XL-K-TVPB**
	165	52	450	570	54 000	4 000	2 750	4,2	**23120-E1-XL-TVPB**
	165	52	450	570	54 000	4 000	2 750	4,2	**23120-E1A-XL-K-M**
	165	52	450	570	54 000	4 000	2 750	4,4	**23120-E1A-XL-M**
	180	46	430	475	53 000	4 550	3 150	4,96	**22220-E1-XL**
	180	46	430	475	53 000	4 550	3 150	4,91	**22220-E1-XL-K**
	180	60,3	560	660	61 000	3 750	2 410	6,1	**23220-E1-XL-K-TVPB**
	180	60,3	560	660	61 000	3 750	2 410	6,3	**23220-E1-XL-TVPB**
	180	60,3	560	660	61 000	3 750	2 410	6,3	**23220-E1A-XL-K-M**
	180	60,3	560	660	61 000	3 750	2 410	6,5	**23220-E1A-XL-M**
	215	47	495	530	62 000	4 400	3 050	8,08	**21320-E1-XL-K-TVPB**
	215	47	495	530	62 000	4 400	3 050	8,19	**21320-E1-XL-TVPB**
	215	73	810	920	77 000	3 300	2 380	13,1	**22320-E1-XL**
	215	73	810	920	77 000	3 300	2 380	13	**22320-E1-XL-K**

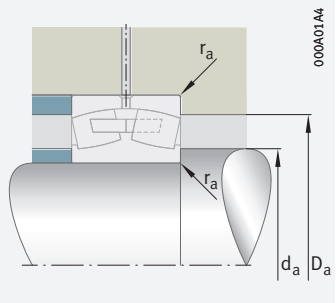
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

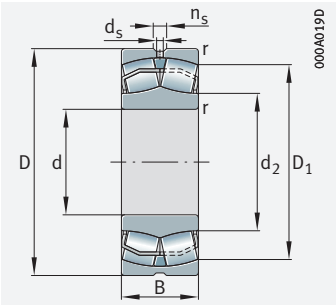


Mounting dimensions

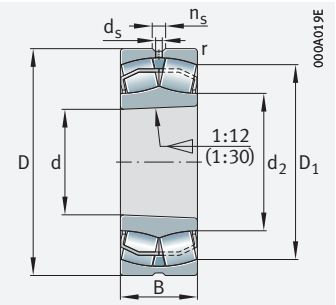
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
100	2	146,3	113,9	3,2	6,5	111	154	2	0,28	2,37	3,53	2,32
	2	146,3	113,9	3,2	6,5	111	154	2	0,28	2,37	3,53	2,32
	2	146,3	–	3,2	6,5	111	154	2	0,28	2,37	3,53	2,32
	2	146,3	–	3,2	6,5	111	154	2	0,28	2,37	3,53	2,32
	2,1	161,4	119	4,8	9,5	112	168	2,1	0,24	2,84	4,23	2,78
	2,1	161,4	119	4,8	9,5	112	168	2,1	0,24	2,84	4,23	2,78
	2,1	156,7	116,7	4,8	9,5	112	168	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	116,7	4,8	9,5	112	168	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	–	4,8	9,5	112	168	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	–	4,8	9,5	112	168	2,1	0,31	2,15	3,2	2,1
	3	182	132	4,8	9,5	114	201	2,5	0,22	3,14	4,67	3,07
	3	182	132	4,8	9,5	114	201	2,5	0,22	3,14	4,67	3,07
	3	184,7	130,2	6,3	12,2	114	201	2,5	0,33	2,03	3,02	1,98
	3	184,7	130,2	6,3	12,2	114	201	2,5	0,33	2,03	3,02	1,98

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

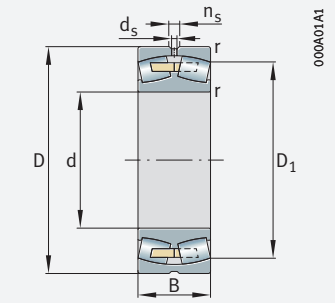


Tapered bore

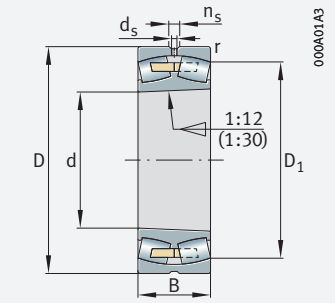
d = 110 – 110 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
110	170	45	400	530	54 000	4 200	3 000	3,4	**23022-E1-XL-K-TVPB**
	170	45	400	530	54 000	4 200	3 000	3,5	**23022-E1-XL-TVPB**
	170	45	400	530	54 000	4 200	3 000	3,8	**23022-E1A-XL-K-M**
	170	45	400	530	54 000	4 200	3 000	3,9	**23022-E1A-XL-M**
	180	56	530	680	62 000	3 700	2 550	4,9	**23122-E1-XL-K-TVPB**
	180	56	530	680	62 000	3 700	2 550	5,3	**23122-E1-XL-TVPB**
	180	56	530	680	62 000	3 700	2 550	5,1	**23122-E1A-XL-K-M**
	180	56	530	680	62 000	3 700	2 550	5,5	**23122-E1A-XL-M**
	180	69	530	750	86 000	3 350	1 960	6,8	**24122-BE-XL**
	180	69	530	750	86 000	3 350	1 960	6,7	**24122-BE-XL-K30**
	200	53	550	600	64 000	4 100	3 000	6,99	**22222-E1-XL**
	200	53	550	600	64 000	4 100	3 000	6,99	**22222-E1-XL-K**
	200	69,8	710	870	73 000	3 250	2 100	8,8	**23222-E1-XL-K-TVPB**
	200	69,8	710	870	73 000	3 250	2 100	9,2	**23222-E1-XL-TVPB**
	200	69,8	710	870	73 000	3 250	2 100	9,3	**23222-E1A-XL-K-M**
	200	69,8	710	870	73 000	3 250	2 100	9,5	**23222-E1A-XL-M**
	240	50	600	640	70 000	4 000	2 700	10,91	**21322-E1-XL-K-TVPB**
	240	50	600	640	70 000	4 000	2 700	11,06	**21322-E1-XL-TVPB**
	240	80	950	1 070	93 000	3 000	2 130	17,7	**22322-E1-XL**
	240	80	950	1 070	93 000	3 000	2 130	17,4	**22322-E1-XL-K**

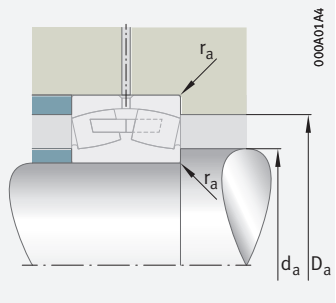
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

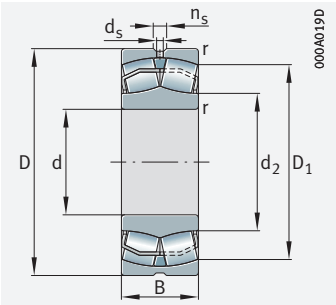


Mounting dimensions

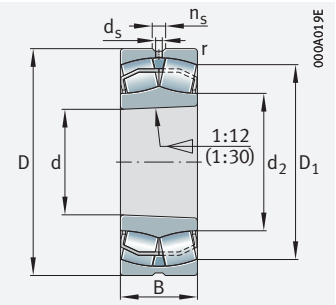
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
110	2	154,6	123,7	3,2	6,5	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	154,6	123,7	3,2	6,5	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	154,6	–	3,2	6,5	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	154,6	–	3,2	6,5	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	160	124,6	4,8	9,5	121	169	2	0,28	2,39	3,56	2,34
	2	160	124,6	4,8	9,5	121	169	2	0,28	2,39	3,56	2,34
	2	160	–	4,8	9,5	121	169	2	0,28	2,41	3,59	2,35
	2	160	–	4,8	9,5	121	169	2	0,28	2,41	3,59	2,35
	2	154,9	125,6	3,2	6,5	121	169	2	0,34	1,96	2,92	1,92
	2	154,9	125,6	3,2	6,5	121	169	2	0,34	1,96	2,92	1,92
	2,1	178,7	129,4	4,8	9,5	122	188	2,1	0,25	2,71	4,04	2,65
	2,1	178,7	129,4	4,8	9,5	122	188	2,1	0,25	2,71	4,04	2,65
	2,1	172,7	129,1	4,8	9,5	122	188	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	129,1	4,8	9,5	122	188	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	–	4,8	9,5	122	188	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	–	4,8	9,5	122	188	2,1	0,33	2,06	3,06	2,01
	3	202,5	146,4	6,3	12,2	124	226	2,5	0,21	3,24	4,82	3,16
	3	202,5	146,4	6,3	12,2	124	226	2,5	0,21	3,24	4,82	3,16
	3	204,9	143,1	8	15	124	226	2,5	0,33	2,07	3,09	2,03
	3	204,9	143,1	8	15	124	226	2,5	0,33	2,07	3,09	2,03

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

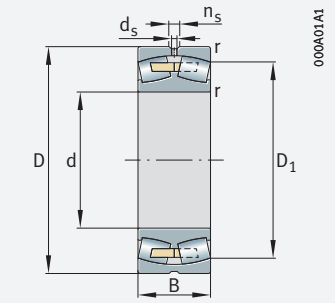


Tapered bore

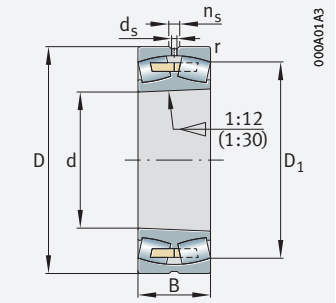
d = 120 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
120	180	46	430	580	60 000	3 950	2 800	3,7	**23024-E1-XL-K-TVPB**
	180	46	430	580	60 000	3 950	2 800	3,9	**23024-E1-XL-TVPB**
	180	46	430	580	60 000	3 950	2 800	4,1	**23024-E1A-XL-K-M**
	180	46	430	580	60 000	3 950	2 800	4,2	**23024-E1A-XL-M**
	180	60	450	690	86 000	3 450	2 360	5,6	**24024-BE-XL**
	180	60	450	690	86 000	3 450	2 360	5,4	**24024-BE-XL-K30**
	200	62	630	800	74 000	3 400	2 290	7,1	**23124-E1-XL-K-TVPB**
	200	62	630	800	74 000	3 400	2 290	7,4	**23124-E1-XL-TVPB**
	200	62	630	800	74 000	3 400	2 290	7,6	**23124-E1A-XL-K-M**
	200	62	630	800	74 000	3 400	2 290	7,7	**23124-E1A-XL-M**
	200	80	680	950	103 000	2 950	1 740	10,4	**24124-BE-XL**
	200	80	680	950	103 000	2 950	1 740	10,2	**24124-BE-XL-K30**
	215	58	640	740	73 000	3 650	2 700	8,84	**22224-E1-XL**
	215	58	640	740	70 000	3 650	2 700	8,84	**22224-E1-XL-K**
	215	76	820	1 020	82 000	3 000	1 910	11,1	**23224-E1-XL-K-TVPB**
	215	76	820	1 020	82 000	3 000	1 910	11,5	**23224-E1-XL-TVPB**
	215	76	820	1 020	82 000	3 000	1 910	11,4	**23224-E1A-XL-K-M**
	215	76	820	1 020	82 000	3 000	1 910	12,1	**23224-E1A-XL-M**
	260	86	1 080	1 170	105 000	2 850	2 000	22,3	**22324-E1-XL**
	260	86	1 080	1 170	105 000	2 850	2 000	22,1	**22324-E1-XL-K**

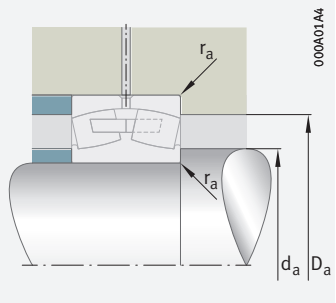
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

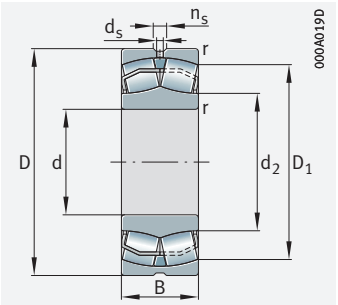


Mounting dimensions

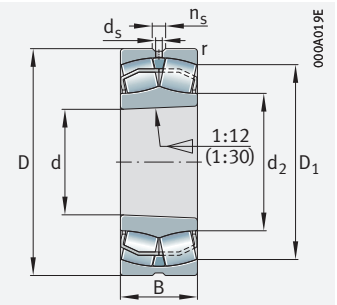
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
120	2	164,7	133	3,2	6,5	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	164,7	133	3,2	6,5	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	164,7	–	3,2	6,5	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	164,7	–	3,2	6,5	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	159,8	134,5	3,2	6,5	128,8	171,2	2	0,29	2,33	3,47	2,28
	2	159,8	134,5	3,2	6,5	128,8	171,2	2	0,29	2,33	3,47	2,28
	2	177,4	136,2	4,8	9,5	131	189	2	0,28	2,39	3,56	2,34
	2	177,4	136,2	4,8	9,5	131	189	2	0,28	2,39	3,56	2,34
	2	177,4	–	4,8	9,5	131	189	2	0,28	2,39	3,56	2,34
	2	177,4	–	4,8	9,5	131	189	2	0,28	2,39	3,56	2,34
	2	170,3	136,6	3,2	6,5	131	189	2	0,37	1,84	2,74	1,8
	2	170,3	136,6	3,2	6,5	131	189	2	0,37	1,84	2,74	1,8
	2,1	192	141,9	6,3	12,2	132	203	2,1	0,25	2,71	4,04	2,65
	2,1	192	141,9	6,3	12,2	132	203	2,1	0,25	2,71	4,04	2,65
	2,1	185,5	139	4,8	9,5	132	203	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	139	4,8	9,5	132	203	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	–	4,8	9,5	132	203	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	–	4,8	9,5	132	203	2,1	0,33	2,03	3,02	1,98
	3	222,4	150,8	8	15	134	246	2,5	0,33	2,06	3,06	2,01
	3	222,4	150,7	8	15	134	246	2,5	0,33	2,06	3,06	2,01

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

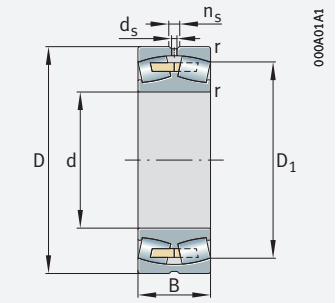


Tapered bore

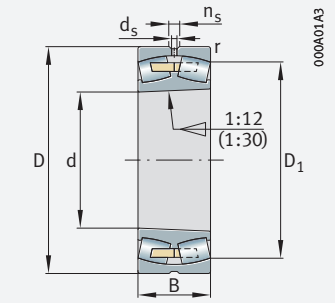
d = 130 – 130 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
130	200	52	540	730	71 000	3 600	2 600	5,4	**23026-E1-XL-K-TVPB**
	200	52	540	730	71 000	3 600	2 600	5,6	**23026-E1-XL-TVPB**
	200	52	540	730	71 000	3 600	2 600	5,7	**23026-E1A-XL-K-M**
	200	52	540	730	71 000	3 600	2 600	6	**23026-E1A-XL-M**
	200	69	570	860	103 000	3 100	2 130	8,4	**24026-BE-XL**
	200	69	570	860	103 000	3 100	2 130	8,1	**24026-BE-XL-K30**
	210	64	680	890	81 000	3 200	2 110	7,8	**23126-E1-XL-K-TVPB**
	210	64	680	890	81 000	3 200	2 110	8,1	**23126-E1-XL-TVPB**
	210	64	680	890	81 000	3 200	2 110	8,1	**23126-E1A-XL-K-M**
	210	64	680	890	81 000	3 200	2 110	8,5	**23126-E1A-XL-M**
	210	80	710	1 050	112 000	2 800	1 560	11	**24126-BE-XL**
	210	80	710	1 050	112 000	2 800	1 560	10,8	**24126-BE-XL-K30**
	230	64	760	890	81 000	3 350	2 500	11,1	**22226-E1-XL**
	230	64	760	890	81 000	3 350	2 500	10,9	**22226-E1-XL-K**
	230	80	910	1 150	91 000	2 850	1 740	12,6	**23226-E1-XL-K-TVPB**
	230	80	910	1 150	91 000	2 850	1 740	13,4	**23226-E1-XL-TVPB**
	230	80	910	1 150	91 000	2 850	1 740	13,6	**23226-E1A-XL-K-M**
	230	80	910	1 150	91 000	2 850	1 740	14	**23226-E1A-XL-M**
	280	93	1 250	1 370	120 000	2 650	1 820	28	**22326-E1-XL**
	280	93	1 250	1 370	120 000	2 650	1 820	27,4	**22326-E1-XL-K**

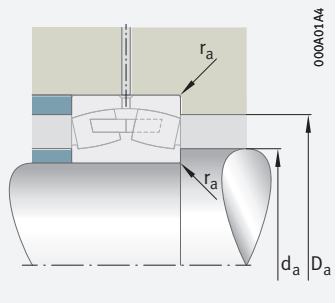
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

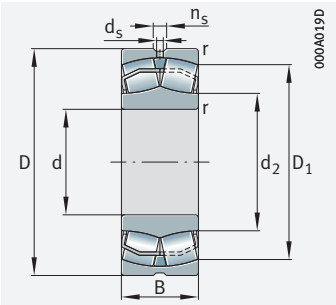


Mounting dimensions

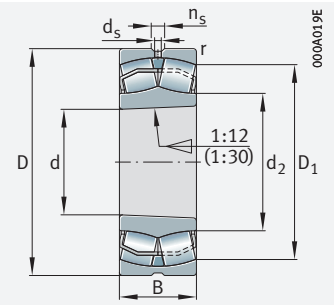
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
130	2	182,3	145,9	4,8	9,5	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	182,3	145,9	4,8	9,5	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	182,3	–	4,8	9,5	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	182,3	–	4,8	9,5	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	176,1	146,2	3,2	6,5	138,8	191,2	2	0,31	2,21	3,29	2,16
	2	176,1	146,2	3,2	6,5	138,8	191,2	2	0,31	2,21	3,29	2,16
	2	187,3	146	4,8	9,5	141	199	2	0,28	2,45	3,64	2,39
	2	187,3	146	4,8	9,5	141	199	2	0,28	2,45	3,64	2,39
	2	187,3	–	4,8	9,5	141	199	2	0,28	2,45	3,64	2,39
	2	187,3	–	4,8	9,5	141	199	2	0,28	2,45	3,64	2,39
	2	181,2	148,3	3,2	6,5	141	199	2	0,34	1,98	2,94	1,93
	2	181,2	148,3	3,2	6,5	141	199	2	0,34	1,98	2,94	1,93
	3	205	151,7	6,3	12,2	144	216	2,5	0,26	2,62	3,9	2,56
	3	205	151,7	6,3	12,2	144	216	2,5	0,26	2,62	3,9	2,56
	3	199,3	150	4,8	9,5	144	216	2,5	0,33	2,07	3,09	2,03
	3	199,3	150	4,8	9,5	144	216	2,5	0,33	2,07	3,09	2,03
	3	–	–	4,8	9,5	144	216	2,5	0,33	2,07	3,09	2,03
	3	199,3	–	4,8	9,5	144	216	2,5	0,33	2,07	3,09	2,03
	4	239,5	162,2	9,5	17,7	147	263	3	0,33	2,06	3,06	2,01
	4	239,5	162,2	9,5	17,7	147	263	3	0,33	2,06	3,06	2,01

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

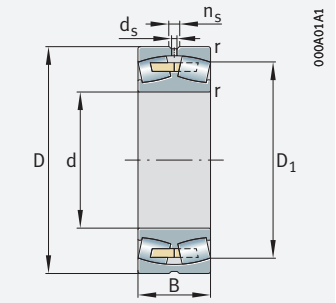


Tapered bore

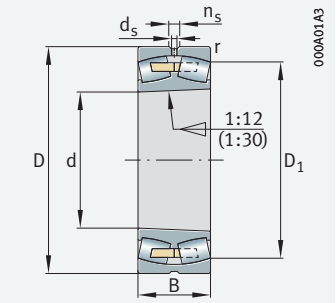
d = 140 – 140 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
140	210	53	570	800	77 000	3 450	2 390	5,8	**23028-E1-XL-K-TVPB**
	210	53	570	800	77 000	3 450	2 390	6	**23028-E1-XL-TVPB**
	210	53	570	800	77 000	3 450	2 390	6	**23028-E1A-XL-K-M**
	210	53	570	800	77 000	3 450	2 390	6,5	**23028-E1A-XL-M**
	210	69	590	930	111 000	2 950	1 950	8,4	**24028-BE-XL**
	210	69	590	930	111 000	2 950	1 950	8,1	**24028-BE-XL-K30**
	225	68	760	1 010	90 000	3 000	1 930	9,5	**23128-E1-XL-K-TVPB**
	225	68	760	1 010	90 000	3 000	1 930	9,8	**23128-E1-XL-TVPB**
	225	68	760	1 010	90 000	3 000	1 930	10,2	**23128-E1A-XL-K-M**
	225	68	760	1 010	90 000	3 000	1 930	10,4	**23128-E1A-XL-M**
	225	85	800	1 190	127 000	2 650	1 430	13,8	**24128-BE-XL**
	225	85	800	1 190	127 000	2 650	1 430	13,5	**24128-BE-XL-K30**
	250	68	870	1 040	100 000	3 150	2 250	14,1	**22228-E1-XL**
	250	68	870	1 040	100 000	3 150	2 250	13,7	**22228-E1-XL-K**
	250	88	1 090	1 400	116 000	2 600	1 550	17,1	**23228-E1-XL-K-TVPB**
	250	88	1 090	1 400	116 000	2 600	1 550	17,1	**23228-E1-XL-TVPB**
	250	88	1 090	1 400	116 000	2 600	1 550	17,6	**23228-E1A-XL-K-M**
	250	88	1 090	1 400	116 000	2 600	1 550	18,3	**23228-E1A-XL-M**
	300	102	1 460	1 630	135 000	2 420	1 660	34,6	**22328-E1-XL**
	300	102	1 460	1 630	135 000	2 420	1 660	34,4	**22328-E1-XL-K**

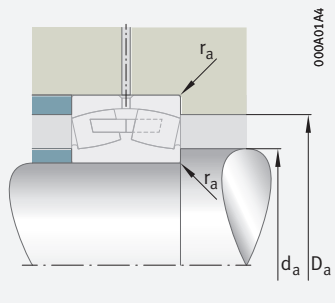
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

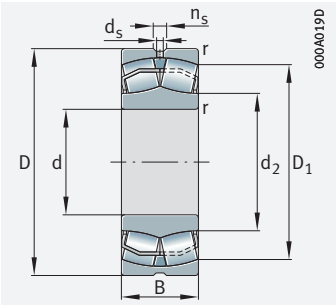


Mounting dimensions

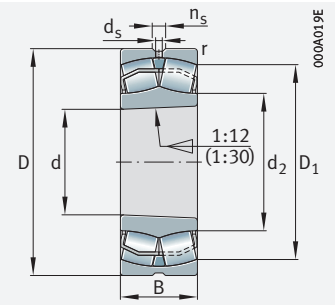
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
140	2	192,3	155,4	4,8	9,5	148,8	201,2	2	0,22	3,07	4,57	3
	2	192,3	155,4	4,8	9,5	148,8	201,2	2	0,22	3,07	4,57	3
	2	192,3	–	4,8	9,5	148,8	201,2	2	0,22	3,07	4,57	3
	2	192,3	–	4,8	9,5	148,8	201,2	2	0,22	3,07	4,57	3
	2	186,4	157,1	3,2	6,5	148,8	201,2	2	0,28	2,37	3,53	2,32
	2	186,4	157,1	3,2	6,5	148,8	201,2	2	0,28	2,37	3,53	2,32
	2,1	201	157,1	4,8	9,5	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	201	157,1	4,8	9,5	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	201	–	4,8	9,5	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	–	–	4,8	9,5	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	194,4	158,9	4,8	9,5	152	213	2,1	0,34	1,99	2,96	1,94
	2,1	194,4	158,9	4,8	9,5	152	213	2,1	0,34	1,99	2,96	1,94
	3	223,1	164,9	6,3	12,2	154	236	2,5	0,25	2,67	3,97	2,61
	3	223,1	164,9	6,3	12,2	154	236	2,5	0,25	2,67	3,97	2,61
	3	216	162	6,3	12,2	154	236	2,5	0,33	2,04	3,04	2
	3	216	162	6,3	12,2	154	236	2,5	0,33	2,04	3,04	2
	3	216	–	6,3	12,2	154	236	2,5	0,33	2,04	3,04	2
	3	216	–	6,3	12,2	154	236	2,5	0,33	2,04	3,04	2
	4	255,7	173,5	9,5	17,7	157	283	3	0,34	2	2,98	1,96
	4	255,7	173,5	9,5	17,7	157	283	3	0,34	2	2,98	1,96

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

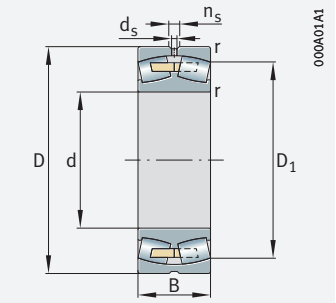


Tapered bore

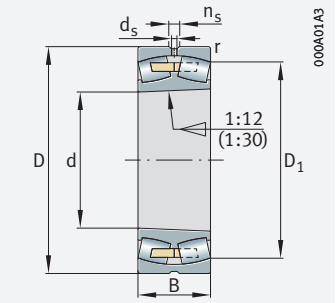
d = 150 – 150 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
150	225	56	630	880	87 000	3 250	2 210	7,3	**23030-E1-XL-K-TVPB**
	225	56	630	880	87 000	3 250	2 210	7,6	**23030-E1-XL-TVPB**
	225	56	630	880	87 000	3 250	2 210	7,3	**23030-E1A-XL-K-M**
	225	56	630	880	87 000	3 250	2 210	7,8	**23030-E1A-XL-M**
	225	75	680	1 090	125 000	2 750	1 790	11,1	**24030-BE-XL**
	225	75	680	1 090	125 000	2 750	1 790	10,7	**24030-BE-XL-K30**
	250	80	1 000	1 330	145 000	2 650	1 720	14,5	**23130-E1-XL-K-TVPB**
	250	80	1 000	1 330	145 000	2 650	1 720	15	**23130-E1-XL-TVPB**
	250	80	1 000	1 330	145 000	2 650	1 720	15,8	**23130-E1A-XL-K-M**
	250	80	1 000	1 330	145 000	2 650	1 720	16,3	**23130-E1A-XL-M**
	250	100	1 050	1 520	153 000	2 370	1 270	20,6	**24130-BE-XL**
	250	100	1 050	1 520	153 000	2 370	1 270	20,2	**24130-BE-XL-K30**
	270	73	1 010	1 210	114 000	2 900	2 050	18,2	**22230-E1-XL**
	270	73	1 010	1 210	114 000	2 900	2 050	17,8	**22230-E1-XL-K**
	270	96	1 280	1 660	133 000	2 400	1 400	22,3	**23230-E1-XL-K-TVPB**
	270	96	1 280	1 660	133 000	2 400	1 400	22,9	**23230-E1-XL-TVPB**
	270	96	1 280	1 660	133 000	2 400	1 400	22,9	**23230-E1A-XL-K-M**
	270	96	1 280	1 660	133 000	2 400	1 400	23,8	**23230-E1A-XL-M**
	320	108	1 640	1 850	151 000	2 290	1 520	42,2	**22330-E1-XL**
	320	108	1 640	1 850	151 000	2 290	1 520	40,9	**22330-E1-XL-K**

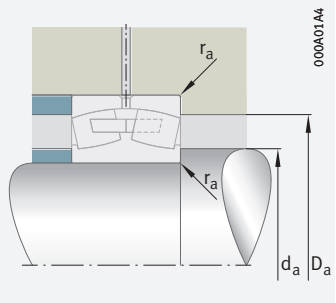
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

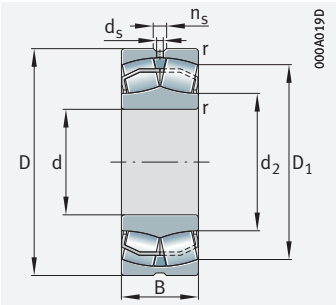


Mounting dimensions

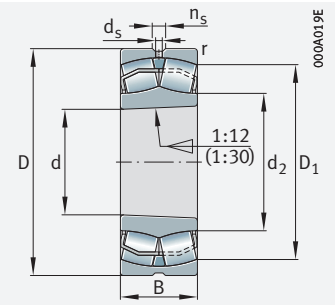
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
150	2,1	206,3	166,6	4,8	9,5	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	166,6	4,8	9,5	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	–	4,8	9,5	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	–	4,8	9,5	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	199,4	168,1	3,2	6,5	160,2	214,8	2,1	0,29	2,32	3,45	2,26
	2,1	199,4	168,1	3,2	6,5	160,2	214,8	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	170,1	6,3	12,2	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	170,2	6,3	12,2	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	–	6,3	12,2	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	–	6,3	12,2	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	213	170,3	4,8	9,5	162	238	2,1	0,37	1,83	2,72	1,79
	2,1	213	170,3	4,8	9,5	162	238	2,1	0,37	1,83	2,72	1,79
	3	240,8	177,9	8	15	164	256	2,5	0,25	2,69	4	2,63
	3	240,8	177,9	8	15	164	256	2,5	0,25	2,69	4	2,63
	3	232,6	174	6,3	12,2	164	256	2,5	0,33	2,02	3	1,97
	3	232,6	174	6,3	12,2	164	256	2,5	0,33	2,02	3	1,97
	3	232,6	–	6,3	12,2	164	256	2,5	0,33	2,02	3	1,97
	3	232,6	–	6,3	12,2	164	256	2,5	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	167	303	3	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	167	303	3	0,33	2,02	3	1,97

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

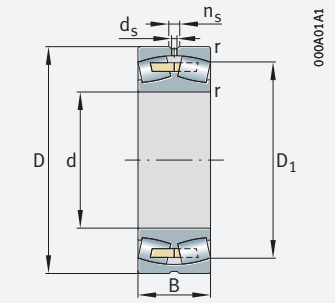


Tapered bore

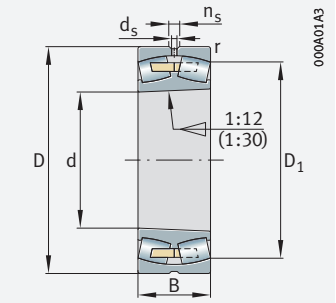
d = 160 – 160 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
160	240	60	720	1 010	98 000	3 050	2 060	8,7	**23032-E1-XL-K-TVPB**
	240	60	720	1 010	98 000	3 050	2 060	9	**23032-E1-XL-TVPB**
	240	60	720	1 010	98 000	3 050	2 060	9,4	**23032-E1A-XL-K-M**
	240	60	720	1 010	98 000	3 050	2 060	9,5	**23032-E1A-XL-M**
	240	80	770	1 240	140 000	2 550	1 660	12,7	**24032-BE-XL**
	240	80	770	1 240	140 000	2 550	1 660	12,2	**24032-BE-XL-K30**
	270	86	1 160	1 550	166 000	2 490	1 560	18,5	**23132-E1-XL-K-TVPB**
	270	86	1 160	1 550	166 000	2 490	1 560	19,1	**23132-E1-XL-TVPB**
	270	86	1 160	1 550	166 000	2 490	1 560	18,6	**23132-E1A-XL-K-M**
	270	86	1 160	1 550	166 000	2 490	1 560	20	**23132-E1A-XL-M**
	270	109	1 220	1 800	173 000	2 180	1 140	25,4	**24132-BE-XL**
	270	109	1 220	1 800	173 000	2 180	1 140	24,9	**24132-BE-XL-K30**
	290	80	1 150	1 400	129 000	2 650	1 900	23,3	**22232-E1-XL**
	290	80	1 150	1 400	129 000	2 650	1 900	22,4	**22232-E1-XL-K**
	290	104	1 460	1 910	150 000	2 210	1 280	27,7	**23232-E1-XL-K-TVPB**
	290	104	1 460	1 910	150 000	2 210	1 280	28,6	**23232-E1-XL-TVPB**
	290	104	1 460	1 910	150 000	2 210	1 280	28,5	**23232-E1A-XL-K-M**
	290	104	1 460	1 910	150 000	2 210	1 280	29,8	**23232-E1A-XL-M**
	340	114	1 680	1 990	162 000	2 250	1 420	48,4	**22332-BE-XL**
	340	114	1 680	1 990	162 000	2 250	1 420	47,3	**22332-BE-XL-K**

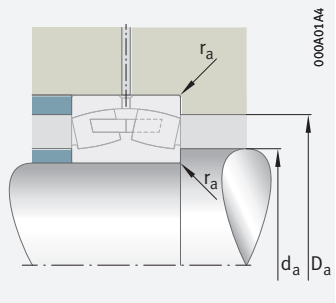
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

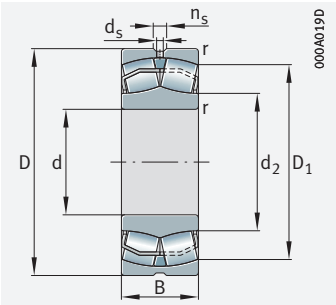


Mounting dimensions

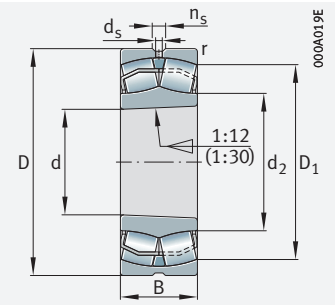
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
160	2,1	219,9	177	6,3	12,2	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	177,5	6,3	12,2	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	–	6,3	12,2	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	–	6,3	12,2	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	212,5	179,3	4,8	9,5	170,2	229,8	2,1	0,29	2,32	3,45	2,26
	2,1	212,5	179,3	4,8	9,5	170,2	229,8	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	183,2	8	15	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	183,2	8	15	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	–	8	15	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	–	8	15	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	228,9	183,4	4,8	9,5	172	258	2,1	0,37	1,8	2,69	1,76
	2,1	228,9	183,4	4,8	9,5	172	258	2,1	0,37	1,8	2,69	1,76
	3	258,2	190,9	8	15	174	276	2,5	0,26	2,64	3,93	2,58
	3	258,2	190,9	8	15	174	276	2,5	0,26	2,64	3,93	2,58
	3	249,3	186,7	8	15	174	276	2,5	0,34	2	2,98	1,96
	3	249,3	186,7	8	15	174	276	2,5	0,34	2	2,98	1,96
	3	249,3	–	8	15	174	276	2,5	0,34	2	2,98	1,96
	3	–	–	8	15	174	276	2,5	0,34	2	2,98	1,96
	4	286,7	201,2	9,5	17,7	177	323	3	0,35	1,94	2,88	1,89
	4	286,7	201,2	9,5	17,7	177	323	3	0,35	1,94	2,88	1,89

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

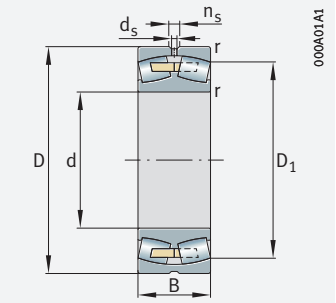


Tapered bore

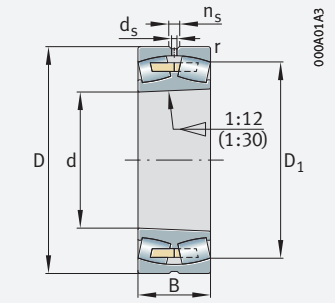
d = 170 – 170 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
170	260	67	880	1 230	151 000	2 800	1 890	11,9	**23034-E1-XL-K-TVPB**
	260	67	880	1 230	151 000	2 800	1 890	12,3	**23034-E1-XL-TVPB**
	260	67	880	1 230	151 000	2 800	1 890	12,5	**23034-E1A-XL-K-M**
	260	67	880	1 230	151 000	2 800	1 890	12,8	**23034-E1A-XL-M**
	260	90	940	1 480	162 000	2 380	1 540	17,2	**24034-BE-XL**
	260	90	940	1 480	162 000	2 380	1 540	16,5	**24034-BE-XL-K30**
	280	88	1 220	1 690	177 000	2 380	1 460	19,9	**23134-E1-XL-K-TVPB**
	280	88	1 220	1 690	177 000	2 380	1 460	20,7	**23134-E1-XL-TVPB**
	280	88	1 220	1 690	177 000	2 380	1 460	19,5	**23134-E1A-XL-K-M**
	280	88	1 220	1 690	177 000	2 380	1 460	22,1	**23134-E1A-XL-M**
	280	109	1 260	1 900	184 000	2 110	1 060	26,4	**24134-BE-XL**
	280	109	1 260	1 900	184 000	2 110	1 060	25,9	**24134-BE-XL-K30**
	310	86	1 320	1 570	144 000	2 550	1 780	27,8	**22234-E1-XL**
	310	86	1 320	1 570	144 000	2 550	1 780	27,1	**22234-E1-XL-K**
	310	110	1 640	2 170	168 000	2 090	1 160	33,1	**23234-E1-XL-K-TVPB**
	310	110	1 640	2 170	168 000	2 090	1 160	34,9	**23234-E1-XL-TVPB**
	310	110	1 640	2 170	168 000	2 090	1 160	34,6	**23234-E1A-XL-K-M**
	310	110	1 640	2 170	168 000	2 090	1 160	35,7	**23234-E1A-XL-M**
	360	120	1 870	2 220	178 000	2 130	1 320	58,2	**22334-BE-XL**
	360	120	1 870	2 220	178 000	2 130	1 320	56,9	**22334-BE-XL-K**

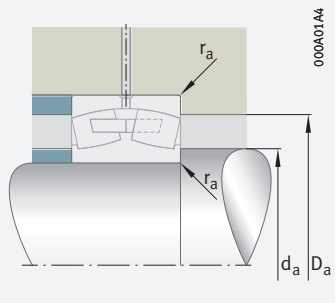
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

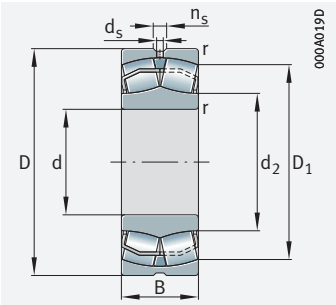


Mounting dimensions

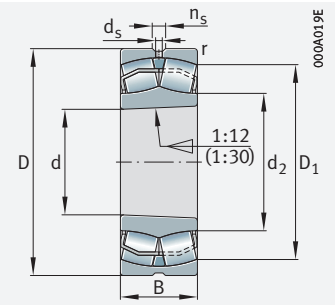
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
170	2,1	237,2	189,8	6,3	12,2	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	237,2	189,8	6,3	12,2	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	–	–	6,3	12,2	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	237,2	–	6,3	12,2	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	228,4	190	4,8	9,5	180,2	249,8	2,1	0,31	2,2	3,27	2,15
	2,1	228,4	190	4,8	9,5	180,2	249,8	2,1	0,31	2,2	3,27	2,15
	2,1	248,1	193,4	8	15	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	248,1	193,4	8	15	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	–	–	8	15	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	248,1	–	8	15	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	240	194,1	4,8	9,5	182	268	2,1	0,36	1,9	2,83	1,86
	2,1	240	194,1	4,8	9,5	182	268	2,1	0,36	1,9	2,83	1,86
	4	275,4	199,8	9,5	17,7	187	293	3	0,26	2,6	3,87	2,54
	4	275,4	199,8	9,5	17,7	187	293	3	0,26	2,6	3,87	2,54
	4	267,4	199,8	8	15	187	293	3	0,33	2,03	3,02	1,98
	4	267,4	199,8	8	15	187	293	3	0,33	2,03	3,02	1,98
	4	267,4	–	8	15	187	293	3	0,33	2,03	3,02	1,98
	4	267,4	–	8	15	187	293	3	0,33	2,03	3,02	1,98
	4	303,9	213,1	9,5	17,7	187	343	3	0,35	1,95	2,9	1,91
	4	303,9	213,1	9,5	17,7	187	343	3	0,35	1,95	2,9	1,91

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

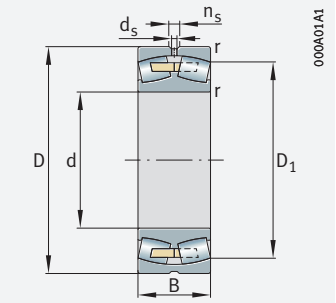


Tapered bore

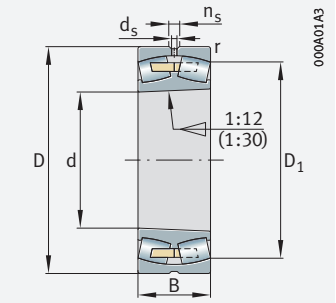
d = 180 – 180 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
180	250	52	445	840	59 000	3 200	1 850	7,8	**23936-S-K-MB**
	250	52	445	840	59 000	3 200	1 850	8	**23936-S-MB**
	280	74	1 040	1 450	173 000	2 600	1 760	15,6	**23036-E1-XL-K-TVPB**
	280	74	1 040	1 450	173 000	2 600	1 760	15,9	**23036-E1-XL-TVPB**
	280	74	1 040	1 450	173 000	2 600	1 760	16	**23036-E1A-XL-K-M**
	280	74	1 040	1 450	173 000	2 600	1 760	16,8	**23036-E1A-XL-M**
	280	100	1 130	1 770	185 000	2 200	1 420	22,7	**24036-BE-XL**
	280	100	1 130	1 770	185 000	2 200	1 420	21,8	**24036-BE-XL-K30**
	300	96	1 420	1 950	199 000	2 230	1 350	25,9	**23136-E1-XL-K-TVPB**
	300	96	1 420	1 950	199 000	2 230	1 350	27,3	**23136-E1-XL-TVPB**
	300	96	1 420	1 950	199 000	2 230	1 350	25,5	**23136-E1A-XL-K-M**
	300	96	1 420	1 950	199 000	2 230	1 350	26,1	**23136-E1A-XL-M**
	300	118	1 460	2 170	208 000	2 000	980	33,2	**24136-BE-XL**
	300	118	1 460	2 170	208 000	2 000	980	32,5	**24136-BE-XL-K30**
	320	86	1 360	1 680	152 000	2 470	1 670	29,2	**22236-E1-XL**
	320	86	1 360	1 680	152 000	2 470	1 670	28,5	**22236-E1-XL-K**
	320	112	1 720	2 340	178 000	2 010	1 090	36	**23236-E1-XL-K-TVPB**
	320	112	1 720	2 340	178 000	2 010	1 090	37,2	**23236-E1-XL-TVPB**
	320	112	1 720	2 340	178 000	2 010	1 090	37	**23236-E1A-XL-K-M**
	320	112	1 720	2 340	178 000	2 010	1 090	38,5	**23236-E1A-XL-M**
	380	126	2 060	2 460	195 000	2 030	1 230	68,1	**22336-BE-XL**
	380	126	2 060	2 460	195 000	2 030	1 230	66,6	**22336-BE-XL-K**

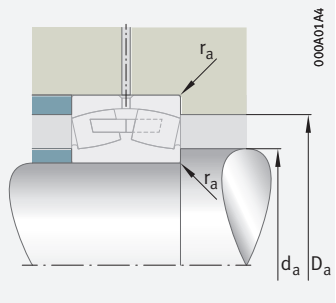
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

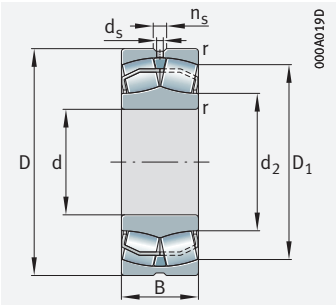


Mounting dimensions

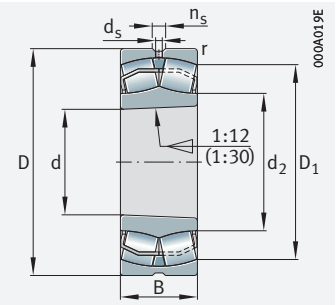
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
180	2	230,9	–	4,8	9,5	188,8	241,2	2	0,2	3,42	5,09	3,34
	2	230,9	–	4,8	9,5	188,8	241,2	2	0,2	3,42	5,09	3,34
	2,1	254,3	201,8	8	15	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	201,8	8	15	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	–	8	15	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	–	8	15	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	244,6	201,7	4,8	9,5	190,2	269,8	2,1	0,32	2,1	3,13	2,06
	2,1	244,6	201,7	4,8	9,5	190,2	269,8	2,1	0,32	2,1	3,13	2,06
	3	264,8	204,1	8	15	194	286	2,5	0,29	2,32	3,45	2,26
	3	264,8	204,1	8	15	194	286	2,5	0,29	2,32	3,45	2,26
	3	264,8	–	8	15	194	286	2,5	0,29	2,32	3,45	2,26
	3	264,8	–	8	15	194	286	2,5	0,29	2,32	3,45	2,26
	3	255,7	204,8	6,3	12,2	194	286	2,5	0,36	1,86	2,77	1,82
	3	255,7	204,8	6,3	12,2	194	286	2,5	0,36	1,86	2,77	1,82
	4	285,9	211,3	9,5	17,7	197	303	3	0,25	2,71	4,04	2,65
	4	285,9	211,3	9,5	17,7	197	303	3	0,25	2,71	4,04	2,65
	4	277,3	210,6	8	15	197	303	3	0,33	2,07	3,09	2,03
	4	277,3	210,6	8	15	197	303	3	0,33	2,07	3,09	2,03
	4	277,3	–	8	15	197	303	3	0,33	2,07	3,09	2,03
	4	277,3	–	8	15	197	303	3	0,33	2,07	3,09	2,03
	4	320,8	224,9	12,5	23,5	197	363	3	0,34	1,96	2,92	1,92
	4	320,8	224,9	12,5	23,5	197	363	3	0,34	1,96	2,92	1,92

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

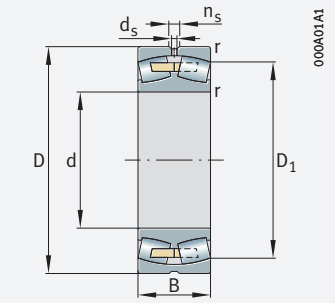


Tapered bore

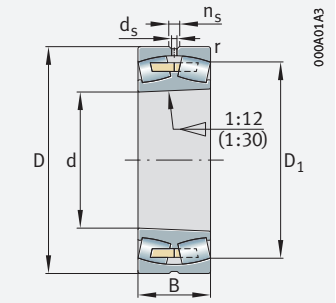
d = 190 – 190 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
190	260	52	470	890	64 000	3 150	1 750	8,1	**23938-S-K-MB**
	260	52	470	890	64 000	3 150	1 750	8,4	**23938-S-MB**
	290	75	1 080	1 550	183 000	2 490	1 660	16,3	**23038-E1-XL-K-TVPB**
	290	75	1 080	1 550	183 000	2 490	1 660	17,2	**23038-E1-XL-TVPB**
	290	75	1 080	1 550	183 000	2 490	1 660	17,7	**23038-E1A-XL-K-M**
	290	75	1 080	1 550	183 000	2 490	1 660	18,3	**23038-E1A-XL-M**
	290	100	1 160	1 860	197 000	2 140	1 330	23,7	**24038-BE-XL**
	290	100	1 160	1 860	197 000	2 140	1 330	22,8	**24038-BE-XL-K30**
	320	104	1 610	2 220	222 000	2 070	1 260	30,3	**23138-E1-XL-K-TVPB**
	320	104	1 610	2 220	222 000	2 070	1 260	32	**23138-E1-XL-TVPB**
	320	104	1 610	2 220	222 000	2 070	1 260	32,4	**23138-E1A-XL-K-M**
	320	104	1 610	2 220	222 000	2 070	1 260	33,9	**23138-E1A-XL-M**
	320	128	1 680	2 550	232 000	1 850	880	41,5	**24138-BE-XL**
	320	128	1 680	2 550	232 000	1 850	880	40,7	**24138-BE-XL-K30**
	340	92	1 360	1 760	164 000	2 480	1 620	36,8	**22238-BE-XL**
	340	92	1 360	1 760	164 000	2 480	1 620	36	**22238-BE-XL-K**
	340	120	1 740	2 400	206 000	1 990	1 070	44,1	**23238-BE-XL**
	340	120	1 740	2 400	206 000	1 990	1 070	42,6	**23238-BE-XL-K**
	400	132	2 220	2 650	213 000	1 940	1 160	78,9	**22338-BE-XL**
	400	132	2 220	2 650	213 000	1 940	1 160	77,2	**22338-BE-XL-K**

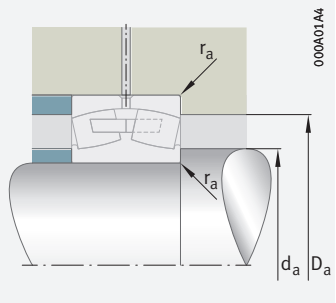
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

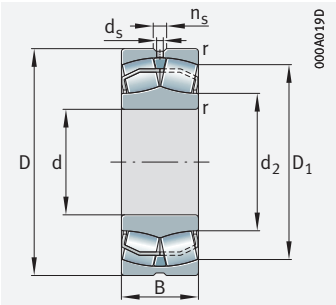


Mounting dimensions

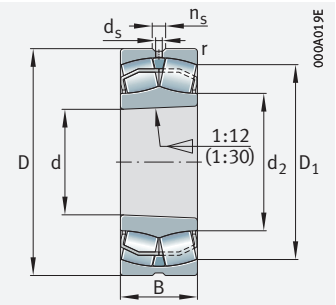
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
190	2	–	–	4,8	9,5	198,8	251,2	2	0,18	3,66	5,46	3,58
	2	240,2	–	4,8	9,5	198,8	251,2	2	0,18	3,66	5,46	3,58
	2,1	264,5	211,9	8	15	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	211,9	8	15	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	–	8	15	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	–	8	15	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	255	211,9	4,8	9,5	200,2	279,8	2,1	0,31	2,2	3,27	2,15
	2,1	255	211,9	4,8	9,5	200,2	279,8	2,1	0,31	2,2	3,27	2,15
	3	281,6	217	8	15	204	306	2,5	0,3	2,28	3,39	2,23
	3	281,6	217	8	15	204	306	2,5	0,3	2,28	3,39	2,23
	3	281,6	–	8	15	204	306	2,5	0,3	2,28	3,39	2,23
	3	281,6	–	8	15	204	306	2,5	0,3	2,28	3,39	2,23
	3	271,6	217,4	6,3	12,2	204	306	2,5	0,37	1,82	2,7	1,78
	3	271,6	217,4	6,3	12,2	204	306	2,5	0,37	1,82	2,7	1,78
	4	295,2	225,2	9,5	17,7	207	323	3	0,26	2,6	3,87	2,54
	4	295,2	225,2	9,5	17,7	207	323	3	0,26	2,6	3,87	2,54
	4	289	222,4	9,5	17,7	207	323	3	0,34	1,98	2,94	1,93
	4	289	222,4	9,5	17,7	207	323	3	0,34	1,98	2,94	1,93
	5	338,1	236,8	12,5	23,5	210	380	4	0,34	1,96	2,92	1,92
	5	338,1	236,8	12,5	23,5	210	380	4	0,34	1,96	2,92	1,92

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

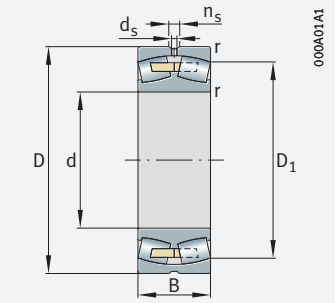


Tapered bore

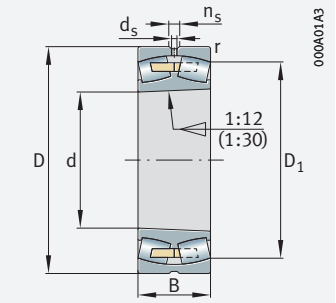
d = 200 – 200 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
200	280	60	550	1 070	73 000	2 800	1 650	11,5	**23940-S-K-MB**
	280	60	550	1 070	73 000	2 800	1 650	11,8	**23940-S-MB**
	310	82	1 270	1 800	206 000	2 330	1 550	20,8	**23040-E1-XL-K-TVPB**
	310	82	1 270	1 800	206 000	2 330	1 550	21,5	**23040-E1-XL-TVPB**
	310	82	1 270	1 800	206 000	2 330	1 550	21,4	**23040-E1A-XL-K-M**
	310	82	1 270	1 800	206 000	2 330	1 550	22,8	**23040-E1A-XL-M**
	310	109	1 350	2 150	221 000	2 010	1 240	30,1	**24040-BE-XL**
	310	109	1 350	2 150	221 000	2 010	1 240	28,9	**24040-BE-XL-K30**
	340	112	1 610	2 270	193 000	2 040	1 230	41,5	**23140-BE-XL**
	340	112	1 610	2 270	193 000	2 040	1 230	40,9	**23140-BE-XL-K**
	340	140	1 880	2 800	260 000	1 780	840	49,5	**24140-BE-XL**
	340	140	1 880	2 800	260 000	1 780	840	48,5	**24140-BE-XL-K30**
	360	98	1 520	1 990	180 000	2 330	1 510	43,3	**22240-BE-XL**
	360	98	1 520	1 990	180 000	2 330	1 510	42,3	**22240-BE-XL-K**
	360	128	1 940	2 700	226 000	1 870	1 000	59	**23240-BE-XL**
	360	128	1 940	2 700	226 000	1 870	1 000	57,3	**23240-BE-XL-K**
	420	138	2 440	2 950	232 000	1 830	1 080	89,4	**22340-BE-XL**
	420	138	2 440	2 950	232 000	1 830	1 080	87,4	**22340-BE-XL-K**

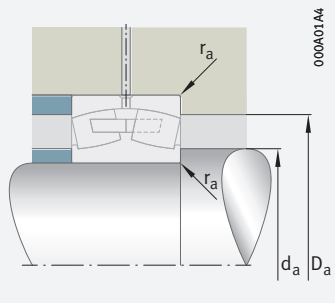
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

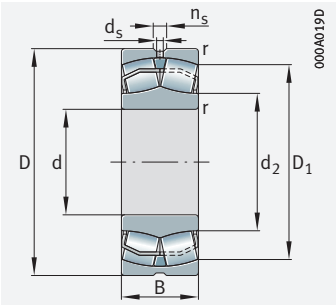


Mounting dimensions

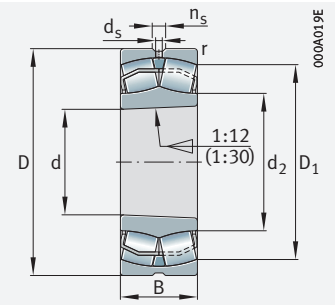
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
200	2,1	256,9	–	6,3	12,2	210,2	269,8	2,1	0,2	3,42	5,09	3,34
	2,1	256,9	–	6,3	12,2	210,2	269,8	2,1	0,2	3,42	5,09	3,34
	2,1	281,6	223,4	8	15	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	223,4	8	15	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	–	8	15	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	–	8	15	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	271,6	223,6	6,3	12,2	210,2	299,8	2,1	0,32	2,13	3,17	2,08
	2,1	271,6	223,6	6,3	12,2	210,2	299,8	2,1	0,32	2,13	3,17	2,08
	3	295,8	230,4	9,5	17,7	214	326	2,5	0,32	2,1	3,13	2,06
	3	295,8	230,4	9,5	17,7	214	326	2,5	0,32	2,1	3,13	2,06
	3	287,9	227,1	6,3	12,2	214	326	2,5	0,39	1,71	2,54	1,67
	3	287,9	227,1	6,3	12,2	214	326	2,5	0,39	1,71	2,54	1,67
	4	310,9	238,2	9,5	17,7	217	343	3	0,26	2,57	3,83	2,52
	4	310,9	238,2	9,5	17,7	217	343	3	0,26	2,57	3,83	2,52
	4	305,3	235	9,5	17,7	217	343	3	0,35	1,95	2,9	1,91
	4	305,3	235	9,5	17,7	217	343	3	0,35	1,95	2,9	1,91
	5	355,1	248,8	12,5	23,5	220	400	4	0,34	1,98	2,94	1,93
	5	355,1	248,8	12,5	23,5	220	400	4	0,34	1,98	2,94	1,93

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

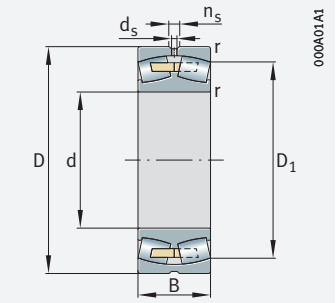


Tapered bore

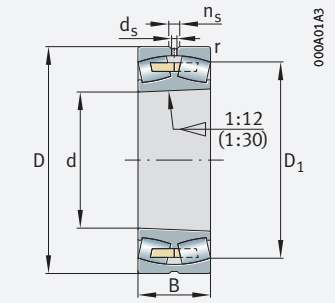
d = 220 – 240 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
220	300	60	610	1 240	74 000	2 600	1 460	12,3	**23944-S-K-MB**
	300	60	610	1 240	74 000	2 600	1 460	12,3	**23944-S-MB**
	340	90	1 260	1 900	182 000	2 230	1 450	29,4	**23044-BE-XL**
	340	90	1 260	1 900	182 000	2 230	1 450	28,5	**23044-BE-XL-K**
	340	118	1 620	2 600	260 000	1 830	1 090	39,3	**24044-BE-XL**
	340	118	1 620	2 600	260 000	1 830	1 090	37,7	**24044-BE-XL-K30**
	370	120	1 860	2 700	223 000	1 860	1 080	52,2	**23144-BE-XL**
	370	120	1 860	2 700	223 000	1 860	1 080	50,5	**23144-BE-XL-K**
	370	150	2 190	3 250	300 000	1 650	750	64	**24144-BE-XL**
	370	150	2 190	3 250	300 000	1 650	750	62,7	**24144-BE-XL-K30**
	400	108	1 840	2 360	216 000	2 140	1 350	59,6	**22244-BE-XL**
	400	108	1 840	2 360	216 000	2 140	1 350	58,3	**22244-BE-XL-K**
	400	144	2 380	3 300	270 000	1 700	880	77,7	**23244-BE-XL**
	400	144	2 380	3 300	270 000	1 700	880	75,3	**23244-BE-XL-K**
	460	145	2 800	3 400	270 000	1 690	950	117	**22344-BE-XL**
	460	145	2 800	3 400	270 000	1 690	950	114	**22344-BE-XL-K**
240	320	60	640	1 370	96 000	2 440	1 310	13,4	**23948-K-MB**
	320	60	640	1 370	96 000	2 440	1 310	13,9	**23948-MB**
	360	92	1 350	2 120	200 000	2 080	1 310	32,6	**23048-BE-XL**
	360	92	1 350	2 120	200 000	2 080	1 310	31,6	**23048-BE-XL-K**
	360	118	1 670	2 850	280 000	1 710	980	44,1	**24048-BE-XL**
	360	118	1 670	2 850	280 000	1 710	980	42,3	**24048-BE-XL-K30**
	400	128	2 130	3 150	255 000	1 700	970	64	**23148-BE-XL**
	400	128	2 130	3 150	255 000	1 700	970	62	**23148-BE-XL-K**
	400	160	2 600	3 900	340 000	1 470	650	83,2	**24148-BE-XL**
	400	160	2 600	3 900	340 000	1 470	650	81,5	**24148-BE-XL-K30**
	440	120	2 230	2 900	255 000	1 900	1 200	83,6	**22248-BE-XL**
	440	120	2 230	2 900	255 000	1 900	1 200	81,8	**22248-BE-XL-K**
	440	160	2 850	4 000	315 000	1 500	770	106	**23248-BE-XL**
	440	160	2 850	4 000	315 000	1 500	770	102	**23248-BE-XL-K**
	500	155	3 200	4 050	315 000	1 510	830	151	**22348-BEA-XL-MB1**
	500	155	3 200	4 050	315 000	1 510	830	148	**22348-BEA-XL-K-MB1**

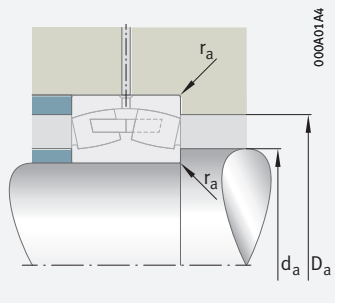
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

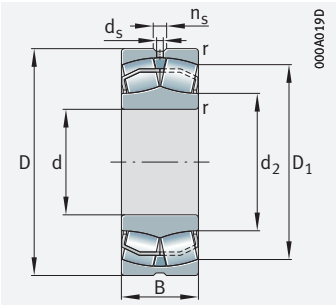


Mounting dimensions

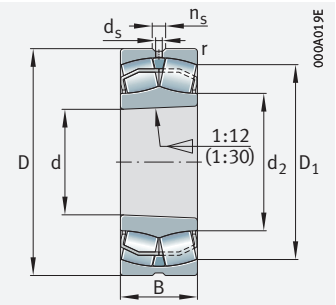
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
220	2,1	277,4	–	6,3	12,2	230,2	289,8	2,1	0,18	3,76	5,59	3,67
	2,1	277,4	–	6,3	12,2	230,2	289,8	2,1	0,18	3,76	5,59	3,67
	3	304,5	248,8	8	15	232,4	327,6	2,5	0,24	2,81	4,19	2,75
	3	304,5	248,8	8	15	232,4	327,6	2,5	0,24	2,81	4,19	2,75
	3	295,7	245	6,3	12,2	232,4	327,6	2,5	0,32	2,1	3,13	2,06
	3	295,7	245	6,3	12,2	232,4	327,6	2,5	0,32	2,1	3,13	2,06
	4	323	254,8	9,5	17,7	237	353	3	0,31	2,15	3,2	2,1
	4	323	254,8	9,5	17,7	237	353	3	0,31	2,15	3,2	2,1
	4	314,3	247,6	6,3	12,2	237	353	3	0,39	1,74	2,59	1,7
	4	314,3	247,6	6,3	12,2	237	353	3	0,39	1,74	2,59	1,7
	4	346,6	260,1	9,5	17,7	237	383	3	0,26	2,57	3,83	2,52
	4	346,6	260,1	9,5	17,7	237	383	3	0,26	2,57	3,83	2,52
	4	338	255,8	9,5	17,7	237	383	3	0,36	1,9	2,83	1,86
	4	338	255,8	9,5	17,7	237	383	3	0,36	1,9	2,83	1,86
	5	391,1	273,4	12,5	23,5	240	440	4	0,33	2,06	3,06	2,01
	5	391,1	273,4	12,5	23,5	240	440	4	0,33	2,06	3,06	2,01
240	2,1	297,8	–	6,3	12,2	250,2	309,8	2,1	0,17	4,05	6,04	3,96
	2,1	297,8	–	6,3	12,2	250,2	309,8	2,1	0,17	4,05	6,04	3,96
	3	324,6	269,5	8	15	252,4	347,6	2,5	0,23	2,98	4,44	2,92
	3	324,6	269,5	8	15	252,4	347,6	2,5	0,23	2,98	4,44	2,92
	3	317,2	268,5	6,3	12,2	252,4	347,6	2,5	0,3	2,28	3,39	2,23
	3	317,2	268,5	6,3	12,2	252,4	347,6	2,5	0,3	2,28	3,39	2,23
	4	349,9	275,9	9,5	17,7	257	383	3	0,31	2,18	3,24	2,13
	4	349,9	275,9	9,5	17,7	257	383	3	0,31	2,18	3,24	2,13
	4	339	267,3	6,3	12,2	257	383	3	0,39	1,71	2,54	1,67
	4	339	267,3	6,3	12,2	257	383	3	0,39	1,71	2,54	1,67
	4	380,4	285,6	12,5	23,5	257	423	3	0,26	2,55	3,8	2,5
	4	380,4	285,6	12,5	23,5	257	423	3	0,26	2,55	3,8	2,5
	4	370,8	280,8	12,5	23,5	257	423	3	0,36	1,87	2,79	1,83
	4	370,8	280,8	12,5	23,5	257	423	3	0,36	1,87	2,79	1,83
	5	426,4	–	12,5	23,5	260	480	4	0,32	2,12	3,15	2,07
	5	426,4	–	12,5	23,5	260	480	4	0,32	2,12	3,15	2,07

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

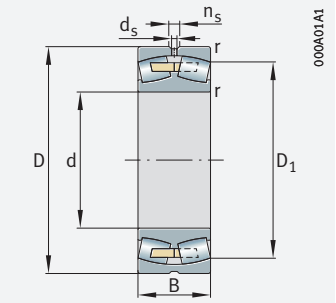


Tapered bore

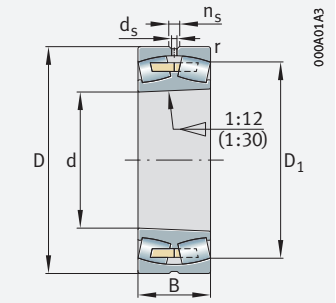
d = 260 – 280 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
260	360	75	940	1 940	111 000	2 100	1 190	22,4	**23952-K-MB**
	360	75	940	1 940	111 000	2 100	1 190	24,1	**23952-MB**
	400	104	1 670	2 600	239 000	1 850	1 170	47,4	**23052-BE-XL**
	400	104	1 670	2 600	239 000	1 850	1 170	45,9	**23052-BE-XL-K**
	400	140	2 210	3 650	345 000	1 510	880	63,8	**24052-BE-XL**
	400	140	2 210	3 650	345 000	1 510	880	61,2	**24052-BE-XL-K30**
	440	144	2 600	3 900	310 000	1 500	860	90	**23152-BE-XL**
	440	144	2 600	3 900	310 000	1 500	860	87,2	**23152-BE-XL-K**
	440	180	3 150	4 900	400 000	1 290	560	110	**24152-BE-XL**
	440	180	3 150	4 900	400 000	1 290	560	108	**24152-BE-XL-K30**
	480	130	2 600	3 450	295 000	1 720	1 070	104	**22252-BEA-XL-K-MB1**
	480	130	2 600	3 450	295 000	1 720	1 070	106	**22252-BEA-XL-MB1**
	480	174	3 350	4 750	370 000	1 360	690	134	**23252-BEA-XL-K-MB1**
	480	174	3 350	4 750	370 000	1 360	690	139	**23252-BEA-XL-MB1**
	540	165	3 650	4 650	360 000	1 390	740	179	**22352-BEA-XL-K-MB1**
	540	165	3 650	4 650	360 000	1 390	740	182	**22352-BEA-XL-MB1**
280	380	75	970	2 040	133 000	2 000	1 100	24,7	**23956-K-MB**
	380	75	970	2 040	133 000	2 000	1 100	25,5	**23956-MB**
	420	106	1 780	2 850	260 000	1 740	1 090	50,9	**23056-BE-XL**
	420	106	1 780	2 850	260 000	1 740	1 090	49,3	**23056-BE-XL-K**
	420	140	2 290	3 950	370 000	1 420	800	70,6	**24056-BE-XL**
	420	140	2 290	3 950	370 000	1 420	800	67,8	**24056-BE-XL-K30**
	460	146	2 750	4 200	325 000	1 420	790	96,3	**23156-BE-XL**
	460	146	2 750	4 200	325 000	1 420	790	93,1	**23156-BE-XL-K**
	460	180	3 300	5 200	435 000	1 230	520	116	**24156-BE-XL**
	460	180	3 300	5 200	435 000	1 230	520	114	**24156-BE-XL-K30**
	500	130	2 750	3 700	320 000	1 650	990	109	**22256-BEA-XL-K-MB1**
	500	130	2 750	3 700	320 000	1 650	990	112	**22256-BEA-XL-MB1**
	500	176	3 550	5 200	395 000	1 280	630	143,7	**23256-BEA-XL-K-MB1**
	500	176	3 550	5 200	395 000	1 280	630	148	**23256-BEA-XL-MB1**
	580	175	4 150	5 300	405 000	1 280	670	223	**22356-BEA-XL-K-MB1**
	580	175	4 150	5 300	405 000	1 280	670	228	**22356-BEA-XL-MB1**

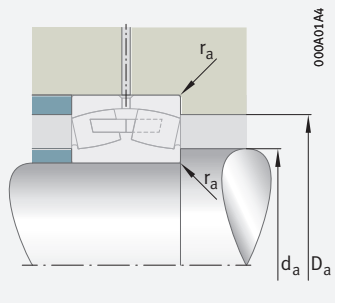
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

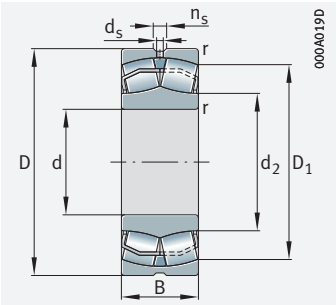


Mounting dimensions

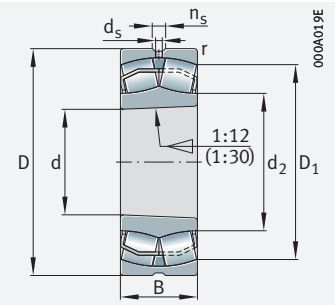
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
260	2,1	330,5	–	8	15	270,2	349,8	2,1	0,19	3,54	5,27	3,46
	2,1	330,5	–	8	15	270,2	349,8	2,1	0,19	3,54	5,27	3,46
	4	358,7	295,5	9,5	17,7	274,6	385,4	3	0,23	2,9	4,31	2,83
	4	358,7	295,5	9,5	17,7	274,6	385,4	3	0,23	2,9	4,31	2,83
	4	349	288,3	6,3	12,2	274,6	385,4	3	0,32	2,09	3,11	2,04
	4	349	288,3	6,3	12,2	274,6	385,4	3	0,32	2,09	3,11	2,04
	4	382,7	301,7	9,5	17,7	277	423	3	0,32	2,12	3,15	2,07
	4	382,7	301,7	9,5	17,7	277	423	3	0,32	2,12	3,15	2,07
	4	370,6	292,2	8	15	277	423	3	0,4	1,67	2,49	1,63
	4	370,6	292,2	8	15	277	423	3	0,4	1,67	2,49	1,63
	5	415,1	–	12,5	23,5	280	460	4	0,26	2,57	3,83	2,52
	5	415,1	–	12,5	23,5	280	460	4	0,26	2,57	3,83	2,52
	5	404,3	–	12,5	23,5	280	460	4	0,36	1,87	2,79	1,83
	5	404,3	–	12,5	23,5	280	460	4	0,36	1,87	2,79	1,83
	6	460,6	–	12,5	23,5	286	514	5	0,31	2,15	3,2	2,1
	6	460,6	–	12,5	23,5	286	514	5	0,31	2,15	3,2	2,1
280	2,1	350	–	8	15	290,2	369,8	2,1	0,18	3,76	5,59	3,67
	2,1	350	–	8	15	290,2	369,8	2,1	0,18	3,76	5,59	3,67
	4	379,2	314,3	9,5	17,7	294,6	405,4	3	0,22	3,01	4,48	2,94
	4	379,2	314,3	9,5	17,7	294,6	405,4	3	0,22	3,01	4,48	2,94
	4	370,5	310,3	6,3	12,2	294,6	405,4	3	0,3	2,23	3,32	2,18
	4	370,5	310,3	6,3	12,2	294,6	405,4	3	0,3	2,23	3,32	2,18
	5	403,4	321,4	9,5	17,7	300	440	4	0,31	2,21	3,29	2,16
	5	403,4	321,4	9,5	17,7	300	440	4	0,31	2,21	3,29	2,16
	5	392,4	312,8	8	15	300	440	4	0,38	1,76	2,62	1,72
	5	392,4	312,8	8	15	300	440	4	0,38	1,76	2,62	1,72
	5	436	–	12,5	23,5	300	480	4	0,25	2,71	4,04	2,65
	5	436	–	12,5	23,5	300	480	4	0,25	2,71	4,04	2,65
	5	425,4	–	12,5	23,5	300	480	4	0,34	1,96	2,92	1,92
	5	425,4	–	12,5	23,5	300	480	4	0,34	1,96	2,92	1,92
	6	495,5	–	12,5	23,5	306	554	5	0,31	2,18	3,24	2,13
	6	495,5	–	12,5	23,5	306	554	5	0,31	2,18	3,24	2,13

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

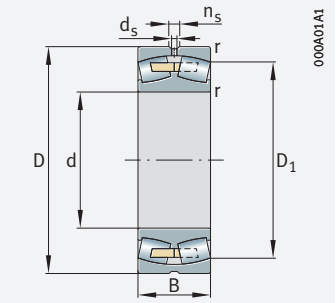


Tapered bore

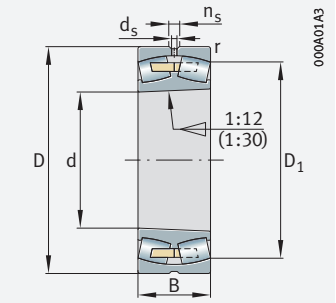
d = 300 – 320 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤695 | 1.12 ➤696 | 1.13 X-life ➤684
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
300	420	90	1 270	2 650	170 000	1 780	1 000	39,1	**23960-B-K-MB**
	420	90	1 270	2 650	170 000	1 780	1 000	40,6	**23960-B-MB**
	460	118	2 160	3 450	305 000	1 570	980	70,5	**23060-BE-XL**
	460	118	2 160	3 450	305 000	1 570	980	68,4	**23060-BE-XL-K**
	460	160	2 850	4 900	435 000	1 250	720	101	**24060-BE-XL**
	460	160	2 850	4 900	435 000	1 250	720	97	**24060-BE-XL-K30**
	500	160	3 250	4 950	375 000	1 300	720	126	**23160-BEA-XL-K-MB1**
	500	160	3 250	4 950	375 000	1 300	720	130	**23160-BEA-XL-MB1**
	500	200	3 950	6 400	500 000	1 100	450	164	**24160-BE-XL**
	500	200	3 950	6 400	500 000	1 100	450	161	**24160-BE-XL-K30**
	540	140	3 100	4 250	360 000	1 500	900	139	**22260-BEA-XL-K-MB1**
	540	140	3 100	4 250	360 000	1 500	900	142	**22260-BEA-XL-MB1**
	540	192	4 100	6 100	450 000	1 160	560	187	**23260-BEA-XL-K-MB1**
	540	192	4 100	6 100	450 000	1 160	560	193	**23260-BEA-XL-MB1**
	620	185	4 650	6 000	450 000	1 190	610	270,4	**22360-BEA-XL-MB1**
	620	185	4 650	6 000	450 000	1 190	610	263,6	**22360-BEA-XL-K-MB1**
320	440	90	1 310	2 750	206 000	1 700	930	41	**23964-K-MB**
	440	90	1 310	2 750	206 000	1 700	930	41,8	**23964-MB**
	480	121	2 300	3 750	330 000	1 480	920	75,6	**23064-BEA-XL-K-MB1**
	480	121	2 300	3 750	330 000	1 480	920	78	**23064-BEA-XL-MB1**
	480	160	2 950	5 200	465 000	1 200	670	99	**24064-BEA-XL-K30-MB1**
	480	160	2 950	5 200	465 000	1 200	670	102	**24064-BEA-XL-MB1**
	540	176	3 800	5 900	425 000	1 170	650	161	**23164-BEA-XL-K-MB1**
	540	176	3 800	5 900	425 000	1 170	650	165	**23164-BEA-XL-MB1**
	540	218	4 600	7 300	570 000	1 010	415	209	**24164-BE-XL**
	540	218	4 600	7 300	570 000	1 010	415	205	**24164-BE-XL-K30**
	580	150	3 550	4 700	405 000	1 410	850	171	**22264-BEA-XL-K-MB1**
	580	150	3 550	4 700	405 000	1 410	850	174	**22264-BEA-XL-MB1**
	580	208	4 650	7 000	510 000	1 060	510	229,6	**23264-BEA-XL-K-MB1**
	580	208	4 650	7 000	510 000	1 060	510	237	**23264-BEA-XL-MB1**

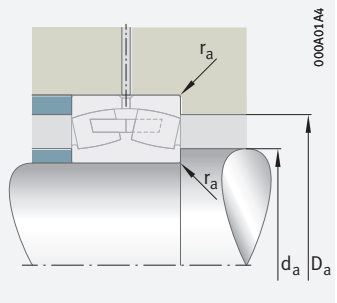
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

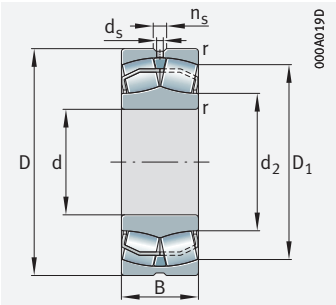


Mounting dimensions

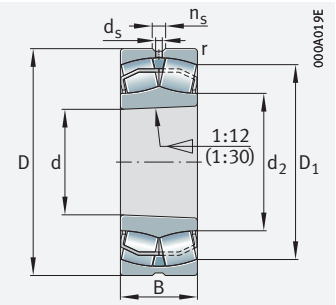
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
300	3	384,6	–	9,5	17,7	312,4	407,6	2,5	0,2	3,42	5,09	3,34
	3	384,6	–	9,5	17,7	312,4	407,6	2,5	0,2	3,42	5,09	3,34
	4	413	340	9,5	17,7	314,6	445,4	3	0,23	2,92	4,35	2,86
	4	413	340	9,5	17,7	314,6	445,4	3	0,23	2,92	4,35	2,86
	4	403	334,8	8	15	314,6	445,4	3	0,32	2,12	3,15	2,07
	4	403	334,8	8	15	314,6	445,4	3	0,32	2,12	3,15	2,07
	5	436,8	–	9,5	17,7	320	480	4	0,31	2,18	3,24	2,13
	5	436,8	–	9,5	17,7	320	480	4	0,31	2,18	3,24	2,13
	5	422,8	338,2	8	15	320	480	4	0,39	1,72	2,56	1,68
	5	422,8	338,2	8	15	320	480	4	0,39	1,72	2,56	1,68
	5	470,5	–	12,5	23,5	320	520	4	0,25	2,71	4,04	2,65
	5	470,5	–	12,5	23,5	320	520	4	0,25	2,71	4,04	2,65
	5	458	–	12,5	23,5	320	520	4	0,35	1,92	2,86	1,88
	5	458	–	12,5	23,5	320	520	4	0,35	1,92	2,86	1,88
	7,5	530,3	–	12,5	23,5	332	588	6	0,31	2,21	3,29	2,16
	7,5	530,3	–	12,5	23,5	332	588	6	0,31	2,21	3,29	2,16
320	3	406,2	–	9,5	17,7	332,4	427,6	2,5	0,19	3,62	5,39	3,54
	3	406,2	–	9,5	17,7	332,4	427,6	2,5	0,19	3,62	5,39	3,54
	4	433	–	9,5	17,7	334,6	465,4	3	0,22	3,01	4,48	2,94
	4	433	–	9,5	17,7	334,6	465,4	3	0,22	3,01	4,48	2,94
	4	422,3	–	8	15	334,6	465,4	3	0,3	2,23	3,32	2,18
	4	422,3	–	8	15	334,6	465,4	3	0,3	2,23	3,32	2,18
	5	469,3	–	12,5	23,5	340	520	4	0,32	2,13	3,17	2,08
	5	469,3	–	12,5	23,5	340	520	4	0,32	2,13	3,17	2,08
	5	455,5	359	9,5	17,7	340	520	4	0,4	1,69	2,52	1,65
	5	455,5	359	9,5	17,7	340	520	4	0,4	1,69	2,52	1,65
	5	505,1	–	12,5	23,5	340	560	4	0,25	2,71	4,04	2,65
	5	505,1	–	12,5	23,5	340	560	4	0,25	2,71	4,04	2,65
	5	490,4	–	12,5	23,5	340	560	4	0,35	1,91	2,85	1,87
	5	490,4	–	12,5	23,5	340	560	4	0,35	1,91	2,85	1,87

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

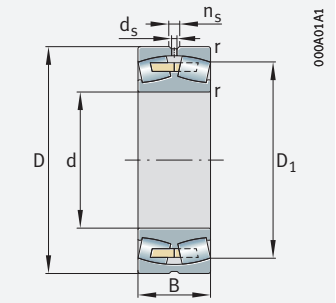


Tapered bore

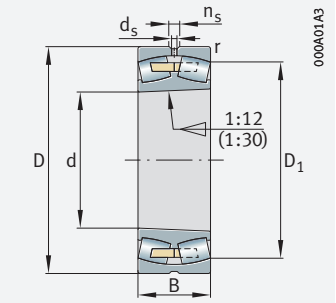
d = 340 – 360 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
340	460	90	1 370	3 000	204 000	1 610	860	42,9	**23968-K-MB**
	460	90	1 370	3 000	204 000	1 610	860	43,7	**23968-MB**
	520	133	2 700	4 400	375 000	1 360	840	101	**23068-BEA-XL-K-MB1**
	520	133	2 700	4 400	375 000	1 360	840	104	**23068-BEA-XL-MB1**
	520	180	3 550	6 200	530 000	1 080	610	136	**24068-BEA-XL-K30-MB1**
	520	180	3 550	6 200	530 000	1 080	610	139	**24068-BEA-XL-MB1**
	580	190	4 350	6 600	480 000	1 090	600	204	**23168-BEA-XL-K-MB1**
	580	190	4 350	6 600	480 000	1 090	600	210	**23168-BEA-XL-MB1**
	580	243	5 400	8 800	640 000	900	370	267	**24168-BE-XL**
	580	243	5 400	8 800	640 000	900	370	263	**24168-BE-XL-K30**
	620	165	4 100	5 600	460 000	1 280	770	217	**22268-BEA-XL-K-MB1**
	620	165	4 100	5 600	460 000	1 280	770	221	**22268-BEA-XL-MB1**
	620	224	5 300	7 900	580 000	1 000	475	292	**23268-BEA-XL-K-MB1**
	620	224	5 300	7 900	580 000	1 000	475	301	**23268-BEA-XL-MB1**
	710	212	6 000	8 000	570 000	1 010	500	407,9	**22368-BEA-XL-MB1**
	710	212	6 000	8 000	570 000	1 010	500	403	**22368-BEA-XL-K-MB1**
360	480	90	1 440	3 200	216 000	1 540	800	45	**23972-K-MB**
	480	90	1 440	3 200	216 000	1 540	800	46,5	**23972-MB**
	540	134	2 800	4 650	400 000	1 300	790	108	**23072-BEA-XL-MB1**
	540	134	2 800	4 650	400 000	1 300	790	104	**23072-BEA-XL-K-MB1**
	540	180	3 650	6 600	570 000	1 040	570	144	**24072-BEA-XL-MB1**
	540	180	3 650	6 600	570 000	1 040	570	141	**24072-BEA-XL-K30-MB1**
	600	192	4 550	7 100	510 000	1 040	560	222	**23172-BEA-XL-MB1**
	600	192	4 550	7 100	510 000	1 040	560	215	**23172-BEA-XL-K-MB1**
	600	243	5 600	9 100	680 000	890	350	277	**24172-BE-XL**
	600	243	5 600	9 100	680 000	890	350	272	**24172-BE-XL-K30**
	650	170	4 450	6 200	500 000	1 190	710	245	**22272-BEA-XL-K-MB1**
	650	170	4 450	6 200	500 000	1 190	710	251	**22272-BEA-XL-MB1**
	650	232	5 700	8 900	630 000	930	430	341	**23272-BEA-XL-MB1**
	650	232	5 700	8 900	630 000	930	430	330,5	**23272-BEA-XL-K-MB1**
	750	224	6 600	8 800	620 000	710	470	476	**22372-BEA-XL-K-MB1**
	750	224	6 600	8 800	620 000	710	470	479	**22372-BEA-XL-MB1**

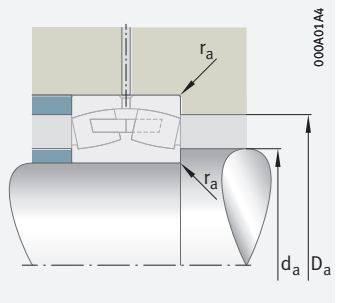
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

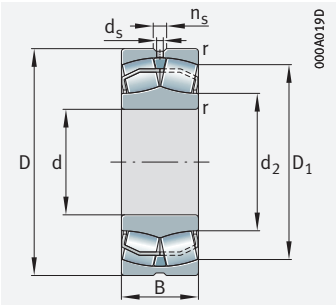


Mounting dimensions

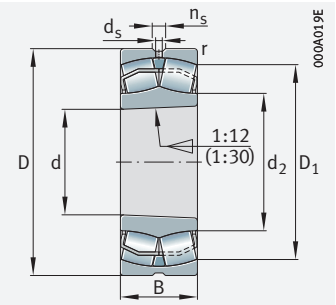
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
340	3	426,7	–	9,5	17,7	352,4	447,6	2,5	0,18	3,85	5,73	3,76
	3	426,7	–	9,5	17,7	352,4	447,6	2,5	0,18	3,85	5,73	3,76
	5	467,1	–	12,5	23,5	358	502	4	0,23	2,92	4,35	2,86
	5	467,1	–	12,5	23,5	358	502	4	0,23	2,92	4,35	2,86
	5	456,1	–	9,5	17,7	358	502	4	0,32	2,12	3,15	2,07
	5	456,1	–	9,5	17,7	358	502	4	0,32	2,12	3,15	2,07
	5	502,6	–	12,5	23,5	360	560	4	0,32	2,1	3,13	2,06
	5	502,6	–	12,5	23,5	360	560	4	0,32	2,1	3,13	2,06
	5	484,1	382,8	9,5	17,7	360	560	4	0,42	1,62	2,42	1,59
	5	484,1	382,8	9,5	17,7	360	560	4	0,42	1,62	2,42	1,59
	6	538,7	–	12,5	23,5	366	594	5	0,26	2,62	3,9	2,56
	6	538,7	–	12,5	23,5	366	594	5	0,26	2,62	3,9	2,56
	6	523,5	–	12,5	23,5	366	594	5	0,36	1,85	2,76	1,81
	6	523,5	–	12,5	23,5	366	594	5	0,36	1,85	2,76	1,81
	7,5	605,95	–	12,5	23,5	372	678	6	0,31	2,2	3,27	2,15
	7,5	605,95	–	12,5	23,5	372	678	6	0,31	2,2	3,27	2,15
360	3	447,1	–	9,5	17,7	372,4	467,6	2,5	0,17	4,05	6,04	3,96
	3	447,1	–	9,5	17,7	372,4	467,6	2,5	0,17	4,05	6,04	3,96
	5	487,6	–	12,5	23,5	378	522	4	0,22	3,04	4,53	2,97
	5	487,6	–	12,5	23,5	378	522	4	0,22	3,04	4,53	2,97
	5	476,4	–	9,5	17,7	378	522	4	0,3	2,23	3,32	2,18
	5	476,4	–	9,5	17,7	378	522	4	0,3	2,23	3,32	2,18
	5	523,3	–	12,5	23,5	380	580	4	0,31	2,18	3,24	2,13
	5	523,3	–	12,5	23,5	380	580	4	0,31	2,18	3,24	2,13
	5	505,9	399,4	9,5	17,7	380	580	4	0,4	1,69	2,52	1,65
	5	505,9	399,4	9,5	17,7	380	580	4	0,4	1,69	2,52	1,65
	6	566,4	–	12,5	23,5	386	624	5	0,25	2,69	4	2,63
	6	566,4	–	12,5	23,5	386	624	5	0,25	2,69	4	2,63
	6	550,8	–	12,5	23,5	386	624	5	0,36	1,9	2,83	1,86
	6	550,8	–	12,5	23,5	386	624	5	0,36	1,9	2,83	1,86
	7,5	640	–	12,5	23,5	392	718	6	0,31	2,2	3,27	2,15
	7,5	640	–	12,5	23,5	392	718	6	0,31	2,2	3,27	2,15

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

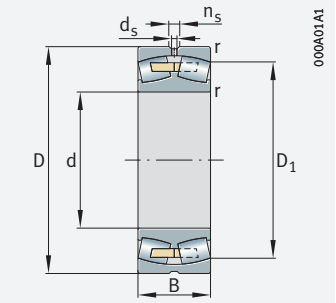


Tapered bore

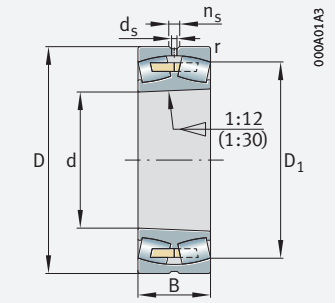
d = 380 – 400 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
380	520	106	1 780	4 000	270 000	1 340	750	66,3	**23976-K-MB**
	520	106	1 780	4 000	270 000	1 340	750	69,1	**23976-MB**
	560	135	2 900	5 000	420 000	1 230	740	114	**23076-BEA-XL-MB1**
	560	135	2 900	5 000	420 000	1 230	740	109	**23076-BEA-XL-K-MB1**
	560	180	3 750	7 000	590 000	990	530	153	**24076-BEA-XL-MB1**
	560	180	3 750	7 000	590 000	990	530	151	**24076-BEA-XL-K30-MB1**
	620	194	4 700	7 600	540 000	990	530	234	**23176-BEA-XL-MB1**
	620	194	4 700	7 600	540 000	990	530	227	**23176-BEA-XL-K-MB1**
	620	243	5 800	9 700	730 000	850	325	290	**24176-BE-XL**
	620	243	5 800	9 700	730 000	850	325	285	**24176-BE-XL-K30**
	680	240	6 200	9 600	680 000	890	400	385	**23276-BEA-XL-MB1**
	680	240	6 200	9 600	680 000	890	400	374	**23276-BEA-XL-K-MB1**
400	540	106	1 830	4 150	280 000	1 290	710	68,2	**23980-B-K-MB**
	540	106	1 830	4 150	280 000	1 290	710	72,9	**23980-B-MB**
	600	148	3 400	5 700	480 000	1 150	690	149	**23080-BEA-XL-MB1**
	600	148	3 400	5 700	480 000	1 150	690	144	**23080-BEA-XL-K-MB1**
	600	200	4 500	8 100	680 000	920	495	200	**24080-BEA-XL-MB1**
	600	200	4 500	8 100	680 000	920	495	196	**24080-BEA-XL-K30-MB1**
	650	200	5 000	8 100	590 000	950	495	255	**23180-BEA-XL-MB1**
	650	200	5 000	8 100	590 000	950	495	246	**23180-BEA-XL-K-MB1**
	650	250	6 200	10 600	790 000	800	300	328	**24180-BE-XL**
	650	250	6 200	10 600	790 000	800	300	323	**24180-BE-XL-K30**
	720	256	7 000	10 900	750 000	820	370	464	**23280-BEA-XL-MB1**
	720	256	7 000	10 900	750 000	820	370	450	**23280-BEA-XL-K-MB1**
	820	243	7 800	10 500	730 000	850	410	615,5	**22380-BEA-XL-MB1**
	820	243	7 800	10 500	730 000	850	410	605	**22380-BEA-XL-K-MB1**

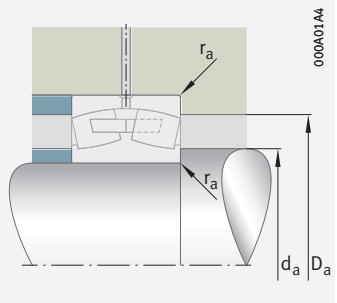
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

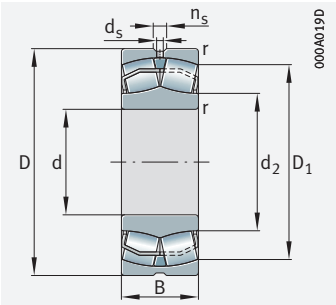


Mounting dimensions

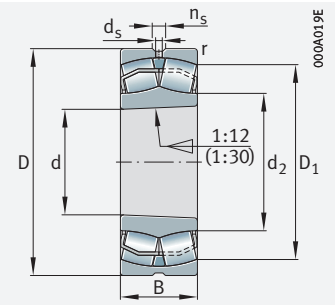
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
380	4	477,6	–	9,5	17,7	394,6	505,4	3	0,19	3,58	5,33	3,5
	4	477,6	–	9,5	17,7	394,6	505,4	3	0,19	3,58	5,33	3,5
	5	508,1	–	12,5	23,5	398	542	4	0,21	3,17	4,72	3,1
	5	508,1	–	12,5	23,5	398	542	4	0,21	3,17	4,72	3,1
	5	497,9	–	9,5	17,7	398	542	4	0,29	2,33	3,47	2,28
	5	497,9	–	9,5	17,7	398	542	4	0,29	2,33	3,47	2,28
	5	543,6	–	12,5	23,5	400	600	4	0,3	2,25	3,34	2,2
	5	543,6	–	12,5	23,5	400	600	4	0,3	2,25	3,34	2,2
	5	528,4	421	9,5	17,7	400	600	4	0,38	1,76	2,62	1,72
	5	528,4	421	9,5	17,7	400	600	4	0,38	1,76	2,62	1,72
	6	578,1	–	12,5	23,5	406	654	5	0,35	1,92	2,86	1,88
	6	578,1	–	12,5	23,5	406	654	5	0,35	1,92	2,86	1,88
400	4	499	–	9,5	17,7	414,6	525,4	3	0,18	3,71	5,52	3,63
	4	499	–	9,5	17,7	414,6	525,4	3	0,18	3,71	5,52	3,63
	5	541,9	–	12,5	23,5	418	582	4	0,22	3,07	4,57	3
	5	541,9	–	12,5	23,5	418	582	4	0,22	3,07	4,57	3
	5	529,4	–	12,5	23,5	418	582	4	0,3	2,23	3,32	2,18
	5	529,4	–	12,5	23,5	418	582	4	0,3	2,23	3,32	2,18
	6	571,4	–	12,5	23,5	426	624	5	0,29	2,3	3,42	2,25
	6	571,4	–	12,5	23,5	426	624	5	0,29	2,3	3,42	2,25
	6	556,5	448,8	12,5	23,5	426	624	5	0,37	1,82	2,7	1,78
	6	556,5	448,8	12,5	23,5	426	624	5	0,37	1,82	2,7	1,78
	6	611,2	–	12,5	23,5	426	694	5	0,36	1,9	2,83	1,86
	6	611,2	–	12,5	23,5	426	694	5	0,36	1,9	2,83	1,86
	7,5	701,3	–	12,5	23,5	432	788	6	0,31	2,21	3,29	2,16
	7,5	701,3	–	12,5	23,5	432	788	6	0,31	2,21	3,29	2,16

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

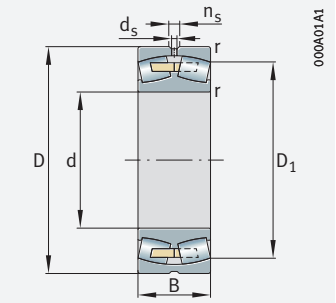


Tapered bore

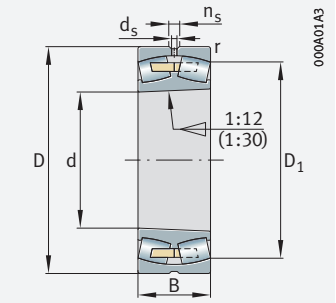
d = 420 – 440 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
420	560	106	1 910	4 450	310 000	1 230	660	72,1	**23984-K-MB**
	560	106	1 910	4 450	310 000	1 230	660	75,5	**23984-MB**
	620	150	3 650	6 300	520 000	1 090	650	153	**23084-BEA-XL-K-MB1**
	620	150	3 650	6 300	520 000	1 090	650	158	**23084-BEA-XL-MB1**
	620	200	4 600	8 500	720 000	890	465	205	**24084-BEA-XL-K30-MB1**
	620	200	4 600	8 500	720 000	890	465	208	**24084-BEA-XL-MB1**
	700	224	6 000	9 600	660 000	860	455	342	**23184-BEA-XL-K-MB1**
	700	224	6 000	9 600	660 000	860	455	353	**23184-BEA-XL-MB1**
	700	280	7 400	12 600	890 000	720	270	437	**24184-BE-XL**
	700	280	7 400	12 600	890 000	720	270	431	**24184-BE-XL-K30**
	760	272	7 800	12 300	820 000	770	340	537	**23284-BEA-XL-K-MB1**
	760	272	7 800	12 300	820 000	770	340	553	**23284-BEA-XL-MB1**
440	600	118	2 230	5 200	305 000	1 130	620	98,3	**23988-K-MB**
	600	118	2 230	5 200	305 000	1 130	620	101	**23988-MB**
	650	157	3 950	6 900	560 000	1 030	610	176	**23088-BEA-XL-K-MB1**
	650	157	3 950	6 900	560 000	1 030	610	182	**23088-BEA-XL-MB1**
	650	212	5 100	9 500	780 000	830	435	238	**24088-BEA-XL-K30-MB1**
	650	212	5 100	9 500	780 000	830	435	243	**24088-BEA-XL-MB1**
	720	226	6 200	10 200	700 000	820	430	358	**23188-BEA-XL-K-MB1**
	720	226	6 200	10 200	700 000	820	430	370	**23188-BEA-XL-MB1**
	720	280	7 600	12 900	940 000	710	260	453	**24188-BE-XL**
	720	280	7 600	12 900	940 000	710	260	446	**24188-BE-XL-K30**
	790	280	8 300	13 200	880 000	730	320	592	**23288-BEA-XL-K-MB1**
	790	280	8 300	13 200	880 000	730	320	610	**23288-BEA-XL-MB1**

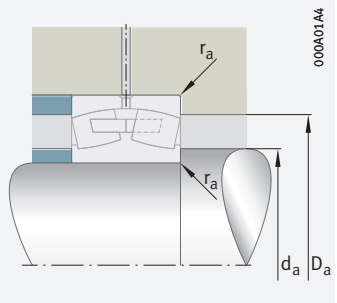
medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

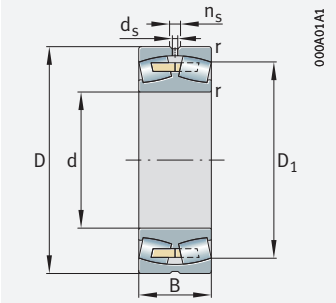


Mounting dimensions

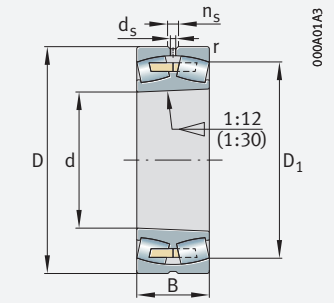
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
420	4	519,5	–	9,5	17,7	434,6	545,4	3	0,18	3,85	5,73	3,76
	4	519,5	–	9,5	17,7	434,6	545,4	3	0,18	3,85	5,73	3,76
	5	560,7	–	12,5	23,5	438	602	4	0,21	3,17	4,72	3,1
	5	560,7	–	12,5	23,5	438	602	4	0,21	3,17	4,72	3,1
	5	529,4	–	12,5	23,5	438	602	4	0,29	2,32	3,45	2,26
	5	551	–	12,5	23,5	438	602	4	0,29	2,32	3,45	2,26
	6	609,8	–	12,5	23,5	446	674	5	0,31	2,18	3,24	2,13
	6	609,8	–	12,5	23,5	446	674	5	0,31	2,18	3,24	2,13
	6	592,2	472,7	12,5	23,5	446	674	5	0,39	1,72	2,56	1,68
	6	592,2	472,7	12,5	23,5	446	674	5	0,39	1,72	2,56	1,68
	7,5	643,4	–	12,5	23,5	452	728	6	0,36	1,89	2,81	1,84
	7,5	643,4	–	12,5	23,5	452	728	6	0,36	1,89	2,81	1,84
440	4	552,8	–	12,5	23,5	454,6	585,4	3	0,18	3,66	5,46	3,58
	4	552,8	–	12,5	23,5	454,6	585,4	3	0,18	3,66	5,46	3,58
	6	589,3	–	12,5	23,5	463	627	5	0,21	3,17	4,72	3,1
	6	589,3	–	12,5	23,5	463	627	5	0,21	3,17	4,72	3,1
	6	578,8	–	12,5	23,5	463	627	5	0,29	2,3	3,42	2,25
	6	578,8	–	12,5	23,5	463	627	5	0,29	2,3	3,42	2,25
	6	630,2	–	12,5	23,5	466	694	5	0,3	2,25	3,34	2,2
	6	630,2	–	12,5	23,5	466	694	5	0,3	2,25	3,34	2,2
	6	614,3	614,2	12,5	23,5	466	694	5	0,38	1,78	2,65	1,74
	6	614,3	614,2	12,5	23,5	466	694	5	0,38	1,78	2,65	1,74
	7,5	670,7	–	12,5	23,5	472	758	6	0,35	1,91	2,85	1,87
	7,5	670,7	–	12,5	23,5	472	758	6	0,35	1,91	2,85	1,87

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

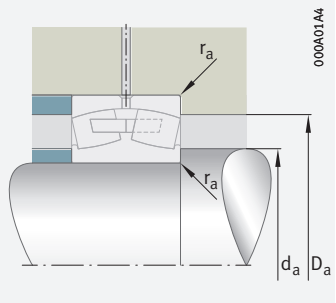


Solid cage, brass or steel; tapered bore

d = 460 – 480 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
460	580	118	1 940	5 100	335 000	1 020	325	71	**24892-B-MB**
	620	118	2 270	5 400	380 000	1 080	590	103	**23992-B-K-MB**
	620	118	2 270	5 400	380 000	1 080	590	111	**23992-B-MB**
	680	163	4 300	7 500	610 000	980	580	201	**23092-BEA-XL-K-MB1**
	680	163	4 300	7 500	610 000	980	580	208	**23092-BEA-XL-MB1**
	680	218	5 500	10 200	840 000	800	410	270	**24092-BEA-XL-K30-MB1**
	680	218	5 500	10 200	840 000	800	410	274	**24092-BEA-XL-MB1**
	760	240	6 900	11 500	760 000	770	395	431	**23192-BEA-XL-K-MB1**
	760	240	6 900	11 500	760 000	770	395	445	**23192-BEA-XL-MB1**
	760	300	8 500	14 500	1 030 000	660	241	531	**24192-BEA-XL-K30-MB1**
	760	300	8 500	14 500	1 030 000	660	241	540	**24192-BEA-XL-MB1**
	830	296	9 200	14 700	960 000	690	295	695	**23292-BEA-XL-K-MB1**
	830	296	9 200	14 700	960 000	690	295	716	**23292-BEA-XL-MB1**
480	600	118	2 000	5 400	370 000	980	305	78,4	**24896-MB**
	650	128	2 550	6 000	470 000	1 040	570	121	**23996-B-K-MB**
	650	128	2 550	6 000	470 000	1 040	570	126	**23996-B-MB**
	700	165	4 450	8 000	640 000	950	550	210	**23096-BEA-XL-K-MB1**
	700	165	4 450	8 000	640 000	950	550	217	**23096-BEA-XL-MB1**
	700	218	5 600	10 700	890 000	770	385	279	**24096-BEA-XL-K30-MB1**
	700	218	5 600	10 700	880 000	770	385	284	**24096-BEA-XL-MB1**
	790	248	7 400	12 400	820 000	740	375	479	**23196-BEA-XL-K-MB1**
	790	248	7 400	12 400	820 000	740	375	494	**23196-BEA-XL-MB1**
	790	308	9 000	15 500	1 100 000	640	227	594	**24196-BEA-XL-K30-MB1**
	790	308	9 000	15 500	1 100 000	640	227	603	**24196-BEA-XL-MB1**
	870	310	10 000	16 200	1 040 000	650	275	804	**23296-BEA-XL-K-MB1**
	870	310	10 000	16 200	1 040 000	650	275	829	**23296-BEA-XL-MB1**

medias *https://www.schaeffler.de/std/1F9A*

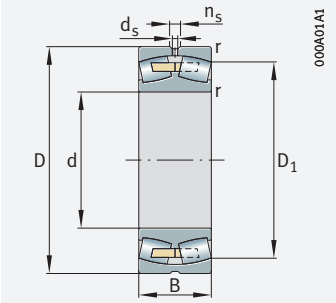


Mounting dimensions

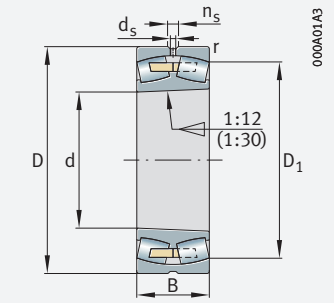
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
460	3	–	6,3	12,2	472,4	567,6	2,5	0,18	3,76	5,59	3,67
	4	573,3	12,5	23,5	474,6	605,4	3	0,18	3,85	5,73	3,76
	4	573,3	12,5	23,5	474,6	605,4	3	0,18	3,85	5,73	3,76
	6	616,7	12,5	23,5	483	657	5	0,21	3,17	4,72	3,1
	6	616,7	12,5	23,5	483	657	5	0,21	3,17	4,72	3,1
	6	606,6	12,5	23,5	483	657	5	0,29	2,33	3,47	2,28
	6	606,6	12,5	23,5	483	657	5	0,29	2,33	3,47	2,28
	7,5	663,4	12,5	23,5	492	728	6	0,31	2,21	3,29	2,16
	7,5	663,4	12,5	23,5	492	728	6	0,31	2,21	3,29	2,16
	7,5	647,1	12,5	23,5	492	728	6	0,38	1,76	2,62	1,72
	7,5	647,1	12,5	23,5	492	728	6	0,38	1,76	2,62	1,72
	7,5	704,9	12,5	23,5	492	798	6	0,36	1,9	2,83	1,86
	7,5	704,9	12,5	23,5	492	798	6	0,36	1,9	2,83	1,86
480	3	–	6,3	12,2	492	588	2,5	0,17	3,9	5,81	3,81
	5	598,8	12,5	23,5	498	632	4	0,18	3,76	5,59	3,67
	5	598,8	12,5	23,5	498	632	4	0,18	3,76	5,59	3,67
	6	637,3	12,5	23,5	503	677	5	0,21	3,27	4,87	3,2
	6	637,3	12,5	23,5	503	677	5	0,21	3,27	4,87	3,2
	6	628,1	12,5	23,5	503	677	5	0,28	2,43	3,61	2,37
	6	628,1	12,5	23,5	503	677	5	0,28	2,43	3,61	2,37
	7,5	690,4	12,5	23,5	512	758	6	0,3	2,23	3,32	2,18
	7,5	690,4	12,5	23,5	512	758	6	0,3	2,23	3,32	2,18
	7,5	673,14	12,5	23,5	512	758	6	0,38	1,79	2,67	1,75
	7,5	673,1	12,5	23,5	512	758	6	0,38	1,79	2,67	1,75
	7,5	737,6	12,5	23,5	512	838	6	0,36	1,9	2,83	1,86
	7,5	737,6	12,5	23,5	512	838	6	0,36	1,9	2,83	1,86

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

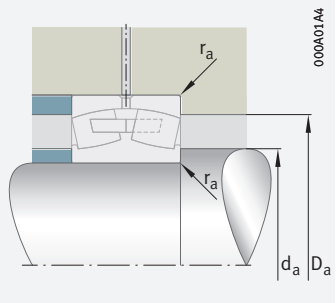


Solid cage, brass or steel; tapered bore

d = 500 – 530 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
500	620	118	2 070	5 700	270 000	930	290	84,3	**248/500-B-MB**
	670	128	2 600	6 300	410 000	990	540	124	**239/500-K-MB**
	670	128	2 600	6 300	410 000	990	540	132	**239/500-MB**
	720	167	4 700	8 700	760 000	890	510	223	**230/500-BEA-XL-K-MB1**
	720	167	4 700	8 700	750 000	890	510	230	**230/500-BEA-XL-MB1**
	720	218	5 700	11 100	880 000	750	370	289	**240/500-BEA-XL-K30-MB1**
	720	218	5 700	11 100	880 000	750	370	294	**240/500-BEA-XL-MB1**
	830	264	8 300	13 900	890 000	690	350	574	**231/500-BEA-XL-K-MB1**
	830	264	8 300	13 900	890 000	690	350	593	**231/500-BEA-XL-MB1**
	830	325	10 000	17 300	1 190 000	600	209	692	**241/500-BEA-XL-K30-MB1**
	830	325	10 000	17 300	1 190 000	600	209	703	**241/500-BEA-XL-MB1**
	920	336	11 300	18 000	1 140 000	610	260	983	**232/500-BEA-XL-K-MB1**
	920	336	11 300	18 000	1 140 000	610	260	1 013	**232/500-BEA-XL-MB1**
530	650	118	2 240	6 400	385 000	880	260	89,7	**248/530-B-MB**
	710	136	2 850	6 900	395 000	930	500	160	**239/530-MB**
	710	136	2 850	6 900	395 000	930	500	146	**239/530-K-MB**
	780	185	5 600	10 100	860 000	820	475	312	**230/530-BEA-XL-MB1**
	780	185	5 600	10 100	860 000	820	475	302	**230/530-BEA-XL-K-MB1**
	780	250	7 000	13 500	1 050 000	670	335	403	**240/530-BEA-XL-K30-MB1**
	780	250	7 000	13 500	1 050 000	670	335	410	**240/530-BEA-XL-MB1**
	870	272	8 900	15 000	960 000	660	325	655	**231/530-BEA-XL-MB1**
	870	272	8 900	15 000	960 000	660	325	634	**231/530-BEA-XL-K-MB1**
	870	335	10 700	19 100	1 290 000	560	190	791	**241/530-BEA-XL-MB1**
	870	335	10 700	19 100	1 290 000	560	190	778	**241/530-BEA-XL-K30-MB1**
	980	355	12 700	20 400	1 270 000	570	235	1 183	**232/530-BEA-XL-K-MB1**
	980	355	12 700	20 400	1 270 000	570	235	1 201	**232/530-BEA-XL-MB1**

medias *https://www.schaeffler.de/std/1F9A*

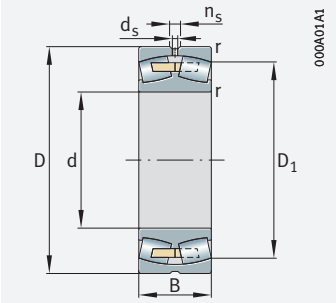


Mounting dimensions

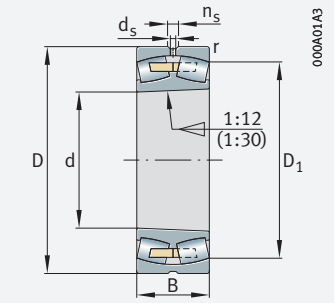
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
500	3	582,7	6,3	12,2	512,4	607,6	2,5	0,17	4	5,96	3,91
	5	619,3	12,5	23,5	518	652	4	0,17	3,9	5,81	3,81
	5	619,3	12,5	23,5	518	652	4	0,17	3,9	5,81	3,81
	6	656,5	12,5	23,5	523	697	5	0,21	3,24	4,82	3,16
	6	656,5	12,5	23,5	523	697	5	0,21	3,24	4,82	3,16
	6	647,3	12,5	23,5	523	697	5	0,27	2,51	3,74	2,45
	6	647,3	12,5	23,5	523	697	5	0,27	2,51	3,74	2,45
	7,5	723,1	12,5	23,5	532	798	6	0,31	2,2	3,27	2,15
	7,5	723,1	12,5	23,5	532	798	6	0,31	2,2	3,27	2,15
	7,5	705,2	12,5	23,5	532	798	6	0,38	1,78	2,65	1,74
	7,5	705,2	12,5	23,5	532	798	6	0,38	1,78	2,65	1,74
	7,5	775	12,5	23,5	532	888	6	0,37	1,83	2,72	1,79
	7,5	775	12,5	23,5	532	888	6	0,37	1,83	2,72	1,79
530	3	614,1	6,3	12,2	542,4	637,6	2,5	0,16	4,22	6,29	4,13
	5	656,5	12,5	23,5	548	692	4	0,18	3,85	5,73	3,76
	5	656,5	12,5	23,5	548	692	4	0,18	3,85	5,73	3,76
	6	708	12,5	23,5	553	757	5	0,22	3,1	4,62	3,03
	6	708	12,5	23,5	553	757	5	0,22	3,1	4,62	3,03
	6	694,4	12,5	23,5	553	757	5	0,29	2,33	3,47	2,28
	6	694,4	12,5	23,5	553	757	5	0,29	2,33	3,47	2,28
	7,5	760,5	12,5	23,5	562	838	6	0,3	2,25	3,34	2,2
	7,5	760,5	12,5	23,5	562	838	6	0,3	2,25	3,34	2,2
	7,5	742,9	12,5	23,5	562	838	6	0,37	1,83	2,72	1,79
	7,5	742,9	12,5	23,5	562	838	6	0,37	1,83	2,72	1,79
	9,5	826,4	12,5	23,5	570	940	8	0,37	1,84	2,74	1,8
	9,5	826,4	12,5	23,5	570	940	8	0,37	1,84	2,74	1,8

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

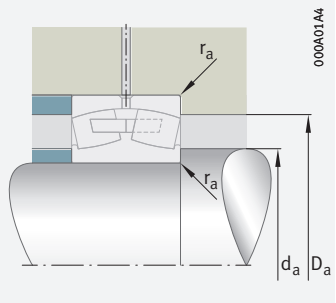


Solid cage, brass or steel; tapered bore

d = 560 – 600 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
560	680	118	2 210	6 300	400 000	840	250	92,7	**248/560-B-MB**
	750	140	3 100	7 600	540 000	880	465	181	**239/560-B-MB**
	750	140	3 100	7 600	540 000	880	465	176	**239/560-B-K-MB**
	820	195	6 100	11 200	940 000	760	440	361	**230/560-BEA-XL-MB1**
	820	195	6 100	11 200	940 000	760	440	350	**230/560-BEA-XL-K-MB1**
	820	258	7 500	14 600	1 150 000	630	315	459	**240/560-BEA-XL-K30-MB1**
	820	258	7 500	14 600	1 150 000	630	315	466	**240/560-BEA-XL-MB1**
	920	280	9 700	16 400	1 060 000	630	300	754	**231/560-BEA-XL-MB1**
	920	280	9 700	16 400	1 060 000	630	300	731	**231/560-BEA-XL-K-MB1**
	920	355	12 000	21 000	1 440 000	530	177	929	**241/560-BEA-XL-MB1**
	920	355	12 000	21 000	1 440 000	530	177	914	**241/560-BEA-XL-K30-MB1**
	1 030	355	13 000	21 800	1 380 000	540	220	1 346	**232/560-BEA-XL-K-MB1**
	1 030	355	13 000	21 800	1 380 000	540	220	1 372	**232/560-BEA-XL-MB1**
600	730	98	1 960	5 300	360 000	980	435	84	**238/600-K-MB**
	730	98	1 960	5 300	360 000	980	435	87	**238/600-MB**
	730	128	2 550	7 300	450 000	780	228	116	**248/600-B-MB**
	800	150	3 450	8 600	640 000	810	430	224	**239/600-B-MB**
	800	150	3 450	8 600	640 000	810	430	210	**239/600-B-K-MB**
	870	200	6 600	12 300	1 020 000	710	405	411	**230/600-BEA-XL-MB1**
	870	200	6 600	12 300	1 020 000	710	405	398	**230/600-BEA-XL-K-MB1**
	870	272	8 300	16 600	1 260 000	580	285	536	**240/600-BEA-XL-K30-MB1**
	870	272	8 300	16 600	1 260 000	580	285	545	**240/600-BEA-XL-MB1**
	920	355	13 300	24 000	1 580 000	485	159	1 099	**241/600-BEA-XL-K30-MB1**
	920	355	13 300	24 000	1 580 000	485	159	1 116	**241/600-BEA-XL-MB1**
	980	300	10 900	18 600	1 180 000	580	275	880	**231/600-BEA-XL-K-MB1**
	980	300	10 900	18 600	1 180 000	580	275	929	**231/600-BEA-XL-MB1**
	1 090	388	15 200	25 500	1 530 000	495	194	1 631	**232/600-BEA-XL-MB1**
	1 090	388	15 200	25 500	1 530 000	495	194	1 584	**232/600-BEA-XL-K-MB1**

medias *https://www.schaeffler.de/std/1F9A*

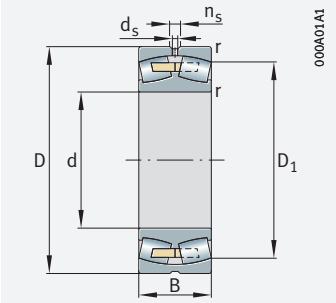


Mounting dimensions

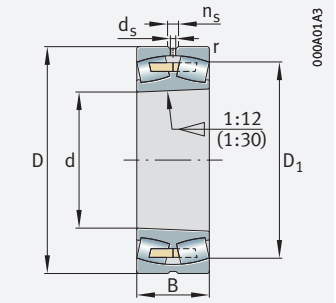
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
560	3	644,6	6,3	12,2	542	638	2,5	0,15	4,47	6,65	4,37
	5	693,4	12,5	23,5	578	732	4	0,17	3,95	5,88	3,86
	5	693,4	12,5	23,5	578	732	4	0,17	3,95	5,88	3,86
	6	745	12,5	23,5	583	797	5	0,22	3,1	4,62	3,03
	6	745	12,5	23,5	583	797	5	0,22	3,1	4,62	3,03
	6	732,4	12,5	23,5	583	797	5	0,28	2,39	3,56	2,34
	6	732,4	12,5	23,5	583	797	5	0,28	2,39	3,56	2,34
	7,5	806,6	12,5	23,5	592	888	6	0,29	2,32	3,45	2,26
	7,5	806,6	12,5	23,5	592	888	6	0,29	2,32	3,45	2,26
	7,5	791,5	12,5	23,5	592	888	6	0,37	1,83	2,72	1,79
	7,5	791,5	12,5	23,5	592	888	6	0,37	1,83	2,72	1,79
	9,5	872,6	12,5	23,5	600	990	8	0,36	1,89	2,81	1,84
	9,5	872,6	12,5	23,5	600	990	8	0,36	1,89	2,81	1,84
600	3	696,3	6,3	12,2	612,4	717,6	2,5	0,12	5,78	8,61	5,65
	3	696,3	6,3	12,2	612,4	717,6	2,5	0,12	5,78	8,61	5,65
	3	691,5	6,3	12,2	612,4	717,6	2,5	0,15	4,4	6,56	4,31
	5	740,5	12,5	23,5	618	782	4	0,17	3,95	5,88	3,86
	5	740,5	12,5	23,5	618	782	4	0,17	3,95	5,88	3,86
	6	793,3	12,5	23,5	623	847	5	0,21	3,24	4,82	3,16
	6	793,3	12,5	23,5	623	847	5	0,21	3,24	4,82	3,16
	6	778,4	12,5	23,5	623	847	5	0,28	2,41	3,59	2,35
	6	778,4	12,5	23,5	623	847	5	0,28	2,41	3,59	2,35
	7,5	791,5	12,5	23,5	592	888	6	0,37	1,84	2,74	1,8
	7,5	791,5	12,5	23,5	592	888	6	0,37	1,84	2,74	1,8
	7,5	859,35	12,5	23,5	632	948	6	0,29	2,3	3,42	2,25
	7,5	859,35	12,5	23,5	632	948	6	0,29	2,3	3,42	2,25
	9,5	924	12,5	23,5	640	1 050	8	0,36	1,9	2,83	1,86
	9,5	924	12,5	23,5	640	1 050	8	0,36	1,9	2,83	1,86

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

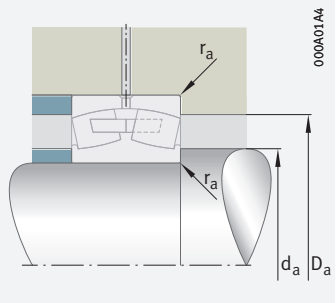


Solid cage, brass or steel; tapered bore

d = 630 – 670 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
630	780	112	2 650	6 400	590 000	860	410	120	**238/630-XL-K-MA1**
	780	112	2 650	6 400	590 000	860	410	122	**238/630-XL-MA1**
	780	150	3 200	9 000	570 000	700	219	163	**248/630-MB**
	850	165	4 100	9 900	720 000	740	405	292	**239/630-B-MB**
	850	165	4 100	9 900	720 000	740	405	283	**239/630-B-K-MB**
	920	212	7 400	13 700	1 130 000	670	380	491	**230/630-BEA-XL-MB1**
	920	212	7 400	13 700	1 130 000	670	380	476	**230/630-BEA-XL-K-MB1**
	920	290	9 400	18 600	1 390 000	550	265	656	**240/630-BEA-XL-MB1**
	920	290	9 400	18 600	1 390 000	550	265	645	**240/630-BEA-XL-K30-MB1**
	1 030	315	12 000	20 600	1 280 000	540	255	1 042	**231/630-BEA-XL-MB1**
	1 030	315	12 000	20 600	1 280 000	540	255	1 025	**231/630-BEA-XL-K-MB1**
	1 030	400	14 800	27 000	1 720 000	455	146	1 292	**241/630-BEA-XL-K30-MB1**
	1 030	400	14 800	27 000	1 720 000	455	146	1 308	**241/630-BEA-XL-MB1**
	1 150	412	16 900	28 500	1 680 000	460	179	1 940	**232/630-BEA-XL-MB1**
	1 150	412	16 900	28 500	1 680 000	460	179	1 885	**232/630-BEA-XL-K-MB1**
670	820	112	2 380	6 900	460 000	810	380	124	**238/670-B-K-MB**
	820	112	2 380	6 900	460 000	810	380	129	**238/670-B-MB**
	820	150	3 350	9 700	600 000	670	191	175	**248/670-B-MB**
	900	170	4 300	10 600	760 000	710	375	310	**239/670-B-K-MB**
	900	170	4 300	10 600	760 000	710	375	320	**239/670-B-MB**
	900	230	5 900	14 900	970 000	580	174	429	**249/670-B-K30-MB**
	900	230	5 900	14 900	970 000	580	174	433	**249/670-B-MB**
	980	230	8 400	15 900	1 100 000	630	480	581	**230/670-BEA-XL-K-MB1**
	980	230	8 400	15 900	1 100 000	630	480	601	**230/670-BEA-XL-MB1**
	980	308	10 500	21 100	1 540 000	510	241	785	**240/670-BEA-XL-MB1**
	980	308	10 500	21 100	1 540 000	510	241	775	**240/670-BEA-XL-K30-MB1**
	1 090	336	13 300	23 800	1 410 000	370	231	1 279	**231/670-BEA-XL-MB1**
	1 090	336	13 300	23 800	1 410 000	370	231	1 211	**231/670-BEA-XL-K-MB1**
	1 090	412	16 100	29 500	1 900 000	430	134	1 513	**241/670-BEA-XL-MB1**
	1 090	412	16 100	29 500	1 900 000	430	134	1 485	**241/670-BEA-XL-K30-MB1**
	1 220	438	19 000	32 500	1 860 000	425	162	2 287	**232/670-BEA-XL-MB1**
	1 220	438	19 000	32 500	1 860 000	425	162	2 240	**232/670-BEA-XL-K-MB1**

medias *https://www.schaeffler.de/std/1F9A*

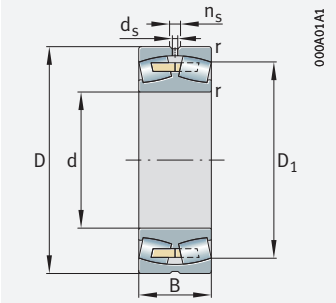


Mounting dimensions

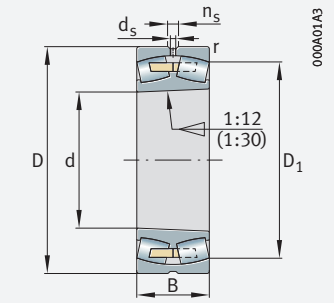
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
630	4	736,8	8	15	644,6	765,4	3	0,12	5,51	8,21	5,39
	4	736,8	8	15	644,6	765,4	3	0,12	5,51	8,21	5,39
	4	–	8	15	645	765	3	0,17	3,95	5,88	3,86
	6	784,5	12,5	23,5	653	827	5	0,18	3,8	5,66	3,72
	6	784,5	12,5	23,5	653	827	5	0,18	3,8	5,66	3,72
	7,5	838,2	12,5	23,5	658	892	6	0,21	3,24	4,82	3,16
	7,5	838,2	12,5	23,5	658	892	6	0,21	3,24	4,82	3,16
	7,5	821,5	12,5	23,5	658	892	6	0,28	2,39	3,56	2,34
	7,5	821,5	12,5	23,5	658	892	6	0,28	2,39	3,56	2,34
	7,5	902,1	12,5	23,5	662	998	6	0,29	2,3	3,42	2,25
	7,5	902,1	12,5	23,5	662	998	6	0,29	2,3	3,42	2,25
	7,5	876,2	12,5	23,5	662	998	6	0,37	1,82	2,7	1,78
	7,5	876,2	12,5	23,5	662	998	6	0,37	1,82	2,7	1,78
	12	973,4	12,5	23,5	678	1 102	10	0,36	1,87	2,79	1,83
	12	973,4	12,5	23,5	678	1 102	10	0,36	1,87	2,79	1,83
670	4	777,2	8	15	684,6	805,4	3	0,12	5,72	8,51	5,59
	4	777,2	8	15	684,6	805,4	3	0,12	5,72	8,51	5,59
	4	775,2	8	15	684,6	805,4	3	0,16	4,22	6,29	4,13
	6	831,5	12,5	23,5	693	877	5	0,17	3,95	5,88	3,86
	6	831,5	12,5	23,5	693	877	5	0,17	3,95	5,88	3,86
	6	826,5	12,5	23,5	693	877	5	0,24	2,81	4,19	2,75
	6	826,5	12,5	23,5	693	877	5	0,24	2,81	4,19	2,75
	7,5	888,7	12,5	23,5	698	952	6	0,22	3,14	4,67	3,07
	7,5	888,7	12,5	23,5	698	952	6	0,22	3,14	4,67	3,07
	7,5	878,2	12,5	23,5	698	952	6	0,28	2,39	3,56	2,34
	7,5	878,2	12,5	23,5	698	952	6	0,28	2,39	3,56	2,34
	7,5	954,85	12,5	23,5	702	1 058	6	0,29	2,3	3,42	2,25
	7,5	954,85	12,5	23,5	702	1 058	6	0,29	2,3	3,42	2,25
	7,5	937	12,5	23,5	702	1 058	6	0,36	1,87	2,79	1,83
	7,5	937	12,5	23,5	702	1 058	6	0,36	1,87	2,79	1,83
	12	1 032,6	12,5	23,5	718	1 172	12	0,36	1,87	2,79	1,83
	12	1 032,6	12,5	23,5	718	1 172	12	0,36	1,87	2,79	1,83

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

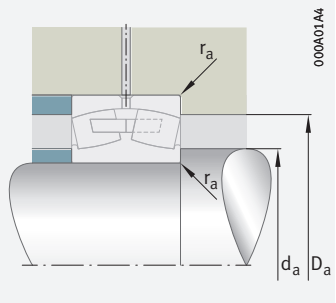


Solid cage, brass or steel; tapered bore

d = 710 – 750 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
710	870	118	2 650	7 500	550 000	770	355	148	**238/710-K-MB**
	870	118	2 650	7 500	550 000	770	355	153	**238/710-MB**
	870	160	3 700	11 000	800 000	610	175	215	**248/710-B-MB**
	950	180	4 800	12 100	740 000	670	350	336	**239/710-K-MB**
	950	180	4 800	12 100	740 000	670	350	355	**239/710-MB**
	950	243	6 600	16 900	1 080 000	550	159	488	**249/710-B-K30-MB**
	950	243	6 600	16 900	1 080 000	550	159	494	**249/710-B-MB**
	1 030	236	9 000	17 300	1 390 000	580	320	679	**230/710-BEA-XL-MB1**
	1 030	236	9 000	17 300	1 390 000	580	320	658	**230/710-BEA-XL-K-MB1**
	1 030	315	11 000	22 500	1 660 000	485	225	874	**240/710-BEA-XL-MB1**
	1 030	315	11 000	22 500	1 660 000	485	225	866	**240/710-BEA-XL-K30-MB1**
	1 150	345	14 400	25 500	1 550 000	470	216	1 383	**231/710-BEA-XL-K-MB1**
	1 150	345	14 400	25 500	1 550 000	470	216	1 425	**231/710-BEA-XL-MB1**
	1 150	438	15 600	35 500	2 340 000	395	116	1 791	**241/710-B-K30-MB**
	1 150	438	15 600	35 500	2 340 000	395	116	1 818	**241/710-B-MB**
	1 280	450	20 500	35 000	2 020 000	410	151	2 600	**232/710-BEA-XL-MB1**
	1 280	450	20 500	35 000	2 020 000	410	151	2 474	**232/710-BEA-XL-K-MB1**
750	920	128	3 000	8 700	610 000	720	330	180	**238/750-B-K-MB**
	920	128	3 000	8 700	610 000	720	330	186	**238/750-B-MB**
	920	170	4 150	12 500	760 000	570	160	254	**248/750-B-MB**
	1 000	185	5 200	13 000	810 000	640	325	394	**239/750-K-MB**
	1 000	185	5 200	13 000	810 000	640	325	426	**239/750-MB**
	1 000	250	7 200	18 900	1 200 000	510	143	558	**249/750-B-K30-MB**
	1 000	250	7 200	18 900	1 200 000	510	143	571	**249/750-B-MB**
	1 090	250	10 100	19 300	1 540 000	550	300	803	**230/750-BEA-XL-MB1**
	1 090	250	10 100	19 300	1 540 000	550	300	797,4	**230/750-BEA-XL-K-MB1**
	1 090	355	12 300	25 500	1 860 000	450	207	1 067	**240/750-BEA-XL-MB1**
	1 090	355	12 300	25 500	1 860 000	450	207	1 053	**240/750-BEA-XL-K30-MB1**
	1 220	365	16 000	28 500	1 720 000	440	198	1 640	**231/750-BEA-XL-K-MB1**
	1 220	365	16 000	28 500	1 720 000	440	198	1 672	**231/750-BEA-XL-MB1**
	1 220	475	17 800	41 000	2 700 000	360	104	2 298	**241/750-B-K30-MB**
	1 220	475	17 800	41 000	2 700 000	360	104	2 276	**241/750-B-MB**
	1 360	475	22 800	39 500	2 240 000	380	137	2 969	**232/750-BEA-XL-K-MB1**
	1 360	475	22 800	39 500	2 240 000	380	137	3 030	**232/750-BEA-XL-MB1**

medias *https://www.schaeffler.de/std/1F9A*

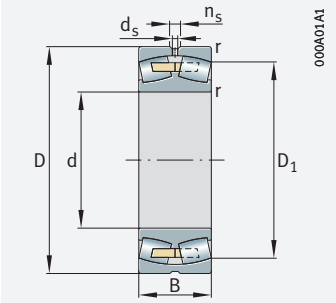


Mounting dimensions

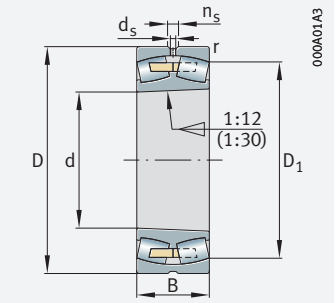
Dimensions					Mounting dimensions			Calculation factors			
d	r	D_1	d_s	n_s	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈			min.	max.	max.				
710	4	824,9	8	15	724,6	855,4	3	0,12	5,72	8,51	5,59
	4	824,9	8	15	724,6	855,4	3	0,12	5,72	8,51	5,59
	4	–	8	15	725	855	3	0,16	4,22	6,29	4,13
	6	877,5	12,5	23,5	733	927	5	0,18	3,85	5,73	3,76
	6	877,5	12,5	23,5	733	927	5	0,18	3,85	5,73	3,76
	6	–	12,5	23,5	733	927	5	0,24	2,81	4,19	2,75
	6	–	12,5	23,5	733	927	5	0,24	2,81	4,19	2,75
	7,5	939,6	12,5	23,5	738	1 002	6	0,21	3,24	4,82	3,16
	7,5	939,6	12,5	23,5	738	1 002	6	0,21	3,24	4,82	3,16
	7,5	925	12,5	23,5	738	1 002	6	0,28	2,43	3,61	2,37
	7,5	925	12,5	23,5	738	1 002	6	0,28	2,43	3,61	2,37
	9,5	1 010,8	12,5	23,5	750	1 110	8	0,29	2,35	3,5	2,3
	9,5	1 010,8	12,5	23,5	750	1 110	8	0,29	2,35	3,5	2,3
	9,5	980,2	12,5	23,5	750	1 110	8	0,38	1,79	2,67	1,75
	9,5	980,2	12,5	23,5	750	1 110	8	0,38	1,79	2,67	1,75
	12	1 089	12,5	23,5	758	1 232	10	0,35	1,92	2,86	1,88
	12	1 089	12,5	23,5	758	1 232	10	0,35	1,92	2,86	1,88
750	5	872,1	8	15	768	902	4	0,12	5,61	8,36	5,49
	5	872,1	8	15	768	902	4	0,12	5,61	8,36	5,49
	5	868,2	8	15	768	902	4	0,16	4,11	6,12	4,02
	6	923,2	12,5	23,5	773	977	5	0,17	3,95	5,88	3,86
	6	923,2	12,5	23,5	773	977	5	0,17	3,95	5,88	3,86
	6	921,7	12,5	23,5	773	977	5	0,22	3,1	4,62	3,03
	6	921,7	12,5	23,5	773	977	5	0,22	3,1	4,62	3,03
	7,5	992,8	12,5	23,5	778	1 062	6	0,21	3,24	4,82	3,16
	7,5	992,8	12,5	23,5	778	1 062	6	0,21	3,24	4,82	3,16
	7,5	977,5	12,5	23,5	778	1 062	6	0,28	2,41	3,59	2,35
	7,5	977,5	12,5	23,5	778	1 062	6	0,28	2,41	3,59	2,35
	9,5	1 070,8	12,5	23,5	790	1 180	8	0,28	2,37	3,53	2,32
	9,5	1 070,8	12,5	23,5	790	1 180	8	0,28	2,37	3,53	2,32
	9,5	1 035,8	12,5	23,5	790	1 180	8	0,38	1,76	2,62	1,72
	9,5	1 035,8	12,5	23,5	790	1 180	8	0,38	1,76	2,62	1,72
	15	1 157,6	12,5	23,5	808	1 302	12	0,35	1,94	2,88	1,89
	15	1 157,6	12,5	23,5	808	1 302	12	0,35	1,94	2,88	1,89

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

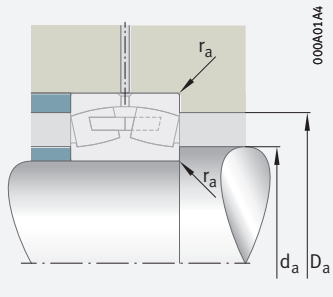


Solid cage, brass or steel; tapered bore

d = 800 – 850 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
800	980	136	3 400	9 900	690 000	660	305	216	**238/800-B-K-MB**
	980	136	3 400	9 900	690 000	660	305	223	**238/800-B-MB**
	980	180	4 650	14 000	850 000	540	146	301	**248/800-B-MB**
	1 060	195	5 900	15 100	1 030 000	580	295	490	**239/800-B-K-MB**
	1 060	195	5 900	15 100	1 030 000	580	295	506	**239/800-B-MB**
	1 060	258	7 700	20 300	1 390 000	480	133	639	**249/800-B-K30-MB**
	1 060	258	7 700	20 300	1 390 000	480	133	650	**249/800-B-MB**
	1 150	258	10 900	21 200	1 680 000	520	275	865,4	**230/800-BEA-XL-K-MB1**
	1 150	258	10 900	21 200	1 680 000	520	275	896,7	**230/800-BEA-XL-MB1**
	1 150	345	13 300	28 000	1 980 000	420	189	1 187	**240/800-BEA-XL-MB1**
	1 150	345	13 300	28 000	1 980 000	420	189	1 168	**240/800-BEA-XL-K30-MB1**
	1 280	375	17 100	31 500	1 850 000	415	181	1 861	**231/800-BEA-XL-K-MB1**
	1 280	375	17 100	31 500	1 850 000	415	181	1 919	**231/800-BEA-XL-MB1**
	1 280	475	18 700	43 500	2 500 000	345	96	2 530	**241/800-B-K30-MB**
	1 280	475	18 700	43 500	2 500 000	345	96	2 530	**241/800-B-MB**
	1 420	488	24 400	43 500	2 420 000	355	125	3 437	**232/800-BEA-XL-MB1**
	1 420	488	24 400	43 500	2 420 000	355	125	3 339	**232/800-BEA-XL-K-MB1**
850	1 030	136	3 500	10 600	730 000	620	285	228	**238/850-K-MB**
	1 030	136	3 500	10 600	730 000	620	285	236	**238/850-MB**
	1 030	180	4 900	14 900	900 000	530	144	312	**248/850-MB**
	1 120	200	6 300	16 400	980 000	550	275	554	**239/850-K-MB**
	1 120	200	6 300	16 400	980 000	550	275	579	**239/850-MB**
	1 120	272	8 400	22 500	1 400 000	445	123	743	**249/850-B-K30-MB**
	1 120	272	8 400	22 500	1 400 000	445	123	756	**249/850-B-MB**
	1 220	272	11 900	24 000	1 840 000	475	255	1 038	**230/850-BEA-XL-K-MB1**
	1 220	272	11 900	24 000	1 840 000	475	255	1 069	**230/850-BEA-XL-MB1**
	1 220	365	14 800	31 500	2 210 000	390	173	1 401	**240/850-BEA-XL-MB1**
	1 220	365	14 800	31 500	2 210 000	390	173	1 375	**240/850-BEA-XL-K30-MB1**
	1 360	400	19 200	36 000	2 060 000	385	164	2 241	**231/850-BEA-XL-K-MB1**
	1 360	400	19 200	36 000	2 060 000	385	164	2 311	**231/850-BEA-XL-MB1**
	1 360	500	21 200	48 500	3 150 000	330	88	2 836	**241/850-B-K30-MB**
	1 360	500	21 200	48 500	3 150 000	330	88	2 948	**241/850-B-MB**
	1 500	515	27 000	48 500	2 650 000	335	115	4 021	**232/850-BEA-XL-MB1**
	1 500	515	27 000	48 500	2 650 000	335	115	3 905	**232/850-BEA-XL-K-MB1**

medias *https://www.schaeffler.de/std/1F9A*

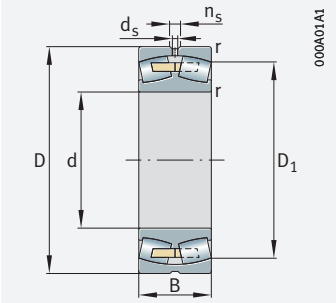


Mounting dimensions

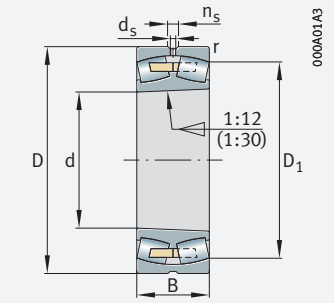
Dimensions					Mounting dimensions			Calculation factors			
d	r	D_1	d_s	n_s	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈			min.	max.	max.				
800	5	927,6	8	15	818	962	4	0,12	5,72	8,51	5,59
	5	927,6	8	15	818	962	4	0,12	5,72	8,51	5,59
	5	925,4	8	15	818	962	4	0,16	4,11	6,12	4,02
	6	983,7	12,5	23,5	823	1 037	5	0,17	4,05	6,04	3,96
	6	983,7	12,5	23,5	823	1 037	5	0,17	4,05	6,04	3,96
	6	978,6	12,5	23,5	823	1 037	5	0,23	2,98	4,44	2,92
	6	978,6	12,5	23,5	823	1 037	5	0,23	2,98	4,44	2,92
	7,5	1 050,4	12,5	23,5	828	1 122	6	0,2	3,31	4,92	3,23
	7,5	1 050,4	12,5	23,5	828	1 122	6	0,2	3,31	4,92	3,23
	7,5	1 035,7	12,5	23,5	828	1 122	6	0,27	2,49	3,71	2,43
	7,5	1 035,7	12,5	23,5	828	1 122	6	0,27	2,49	3,71	2,43
	9,5	1 129,5	12,5	23,5	840	1 240	8	0,28	2,43	3,61	2,37
	9,5	1 129,45	12,5	23,5	840	1 240	8	0,28	2,43	3,61	2,37
	9,5	1 099,5	12,5	23,5	840	1 240	8	0,36	1,86	2,77	1,82
	9,5	1 099,5	12,5	23,5	840	1 240	8	0,36	1,86	2,77	1,82
	15	1 215,3	12,5	23,5	858	1 362	12	0,34	1,99	2,96	1,94
	15	1 215,3	12,5	23,5	858	1 362	12	0,34	1,99	2,96	1,94
850	5	978,1	8	15	868	1 012	4	0,11	6,06	9,02	5,92
	5	978,1	8	15	868	1 012	4	0,11	6,06	9,02	5,92
	5	973,9	8	15	868	1 012	4	0,15	4,4	6,56	4,31
	6	1 039,9	12,5	23,5	873	1 097	5	0,16	4,11	6,12	4,02
	6	1 039,9	12,5	23,5	873	1 097	5	0,16	4,11	6,12	4,02
	6	1 033,9	12,5	23,5	873	1 097	5	0,23	2,98	4,44	2,92
	6	1 033,9	12,5	23,5	873	1 097	5	0,23	2,98	4,44	2,92
	7,5	1 115,1	12,5	23,5	878	1 192	6	0,2	3,34	4,98	3,27
	7,5	1 115,1	12,5	23,5	878	1 192	6	0,2	3,34	4,98	3,27
	7,5	1 099,4	12,5	23,5	878	1 192	6	0,27	2,51	3,74	2,45
	7,5	1 099,4	12,5	23,5	878	1 192	6	0,27	2,51	3,74	2,45
	12	1 199,1	12,5	23,5	898	1 312	10	0,28	2,43	3,61	2,37
	12	1 199,1	12,5	23,5	898	1 312	10	0,28	2,43	3,61	2,37
	12	1 171,7	12,5	23,5	898	1 312	10	0,36	1,89	2,81	1,84
	12	1 171,7	12,5	23,5	898	1 312	10	0,36	1,89	2,81	1,84
	15	1 285,3	12,5	23,5	908	1 442	12	0,34	1,99	2,96	1,94
	15	1 285,3	12,5	23,5	908	1 442	12	0,34	1,99	2,96	1,94

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

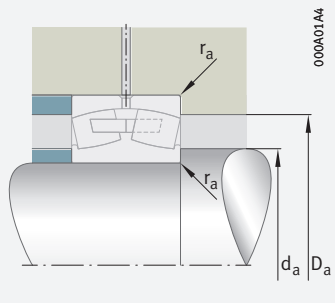


Solid cage, brass or steel; tapered bore

d = 900 – 950 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
900	1 090	140	3 750	11 600	780 000	590	260	262	**238/900-B-K-MB**
	1 090	140	3 750	11 600	780 000	590	260	271	**238/900-B-MB**
	1 090	190	5 200	16 700	990 000	465	124	382	**248/900-B-MB**
	1 180	206	6 500	17 200	1 030 000	520	260	641	**239/900-K-MB**
	1 180	206	6 500	17 200	1 030 000	520	260	653	**239/900-MB**
	1 280	280	12 800	25 500	1 990 000	340	239	1 163	**230/900-BEA-XL-K-MB1**
	1 280	280	12 800	25 500	1 990 000	340	239	1 200	**230/900-BEA-XL-MB1**
	1 280	375	13 500	34 500	2 430 000	370	160	1 574	**240/900-BEA-XL-MB1**
	1 280	375	13 500	34 500	2 430 000	370	160	1 560	**240/900-BEA-XL-K30-MB1**
	1 420	412	20 700	38 500	2 230 000	365	155	2 532	**231/900-BEA-XL-MB1**
	1 420	412	20 700	38 500	2 230 000	365	155	2 456	**231/900-BEA-XL-K-MB1**
	1 580	515	28 500	52 000	2 900 000	320	105	4 459	**232/900-BEA-XL-MB1**
	1 580	515	28 500	52 000	2 900 000	320	105	4 336	**232/900-BEA-XL-K-MB1**
950	1 150	200	5 700	18 500	1 060 000	430	114	431	**248/950-MB**
	1 250	224	7 500	19 900	1 310 000	475	239	747	**239/950-B-K-MB**
	1 250	224	7 500	19 900	1 310 000	475	239	769	**239/950-B-MB**
	1 250	300	10 300	28 500	1 750 000	385	101	1 013	**249/950-B-K30-MB**
	1 250	300	10 300	28 500	1 750 000	385	101	1 031	**249/950-B-MB**
	1 360	300	14 400	29 000	2 160 000	420	220	1 425	**230/950-BEA-XL-K-MB1**
	1 360	300	14 400	29 000	2 160 000	420	220	1 469	**230/950-BEA-XL-MB1**
	1 360	412	18 400	40 000	2 650 000	340	147	1 999	**240/950-BEA-XL-MB1**
	1 360	412	18 400	40 000	2 650 000	340	147	1 966	**240/950-BEA-XL-K30-MB1**
	1 500	545	23 700	54 000	3 100 000	300	81	3 777	**241/950-B-K30-MB**
	1 500	545	23 700	54 000	3 100 000	300	81	3 819	**241/950-B-MB**

medias *https://www.schaeffler.de/std/1F9A*

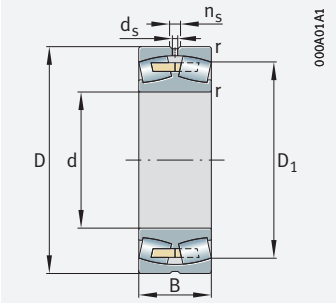


Mounting dimensions

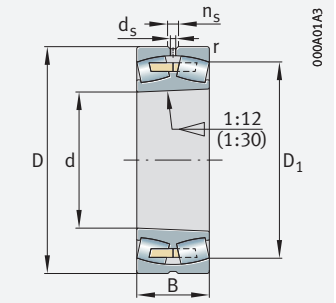
Dimensions					Mounting dimensions			Calculation factors			
d	r	D_1	d_s	n_s	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈			min.	max.	max.				
900	5	1 036,1	8	15	918	1 072	4	0,11	6,06	9,02	5,92
	5	1 036,1	8	15	918	1 072	4	0,11	6,06	9,02	5,92
	5	1 030,5	8	15	918	1 072	4	0,15	4,4	6,56	4,31
	6	1 098,8	12,5	23,5	923	1 157	5	0,16	4,28	6,37	4,19
	6	1 098,8	12,5	23,5	923	1 157	5	0,16	4,28	6,37	4,19
	7,5	1 174,3	12,5	23,5	928	1 252	6	0,2	3,42	5,09	3,34
	7,5	1 174,3	12,5	23,5	928	1 252	6	0,2	3,42	5,09	3,34
	7,5	1 157,4	12,5	23,5	928	1 252	6	0,26	2,57	3,83	2,52
	7,5	1 157,4	12,5	23,5	928	1 252	6	0,26	2,57	3,83	2,52
	12	1 256,15	12,5	23,5	948	1 372	10	0,27	2,47	3,67	2,41
	12	1 256,2	12,5	23,5	948	1 372	10	0,27	2,47	3,67	2,41
	15	1 365,5	12,5	23,5	958	1 522	12	0,32	2,12	3,15	2,07
	15	1 365,5	12,5	23,5	958	1 522	12	0,32	2,12	3,15	2,07
950	5	1 087,1	8	15	968	1 132	4	0,15	4,4	6,56	4,31
	7,5	1 162,5	12,5	23,5	978	1 222	6	0,16	4,22	6,29	4,13
	7,5	1 162,5	12,5	23,5	978	1 222	6	0,16	4,22	6,29	4,13
	7,5	1 155	12,5	23,5	978	1 222	6	0,22	3,01	4,48	2,94
	7,5	1 155	12,5	23,5	978	1 222	6	0,22	3,01	4,48	2,94
	7,5	1 245,7	12,5	23,5	978	1 332	6	0,2	3,38	5,03	3,31
	7,5	1 245,75	12,5	23,5	978	1 332	6	0,2	3,38	5,03	3,31
	7,5	1 220,4	12,5	23,5	978	1 332	6	0,27	2,47	3,67	2,41
	7,5	1 220,4	12,5	23,5	978	1 332	6	0,27	2,47	3,67	2,41
	12	1 304,8	12,5	23,5	998	1 452	10	0,35	1,92	2,86	1,88
	12	1 304,8	12,5	23,5	998	1 452	10	0,35	1,92	2,86	1,88

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

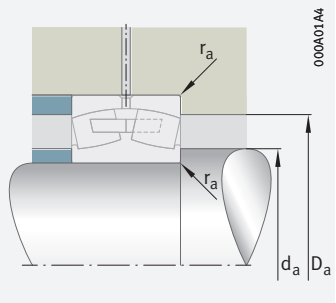


Solid cage, brass or steel; tapered bore

d = 1 000 – 1 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
1 000	1 220	165	4 900	14 900	980 000	510	231	399	**238/1000-K-MB**
	1 220	165	4 900	14 900	980 000	510	231	413	**238/1000-MB**
	1 220	218	6 700	21 500	1 240 000	405	104	546	**248/1000-B-MB**
	1 320	315	11 400	31 000	1 890 000	370	95	1 192	**249/1000-B-K30-MB**
	1 320	315	11 400	31 000	1 890 000	370	95	1 212	**249/1000-B-MB**
	1 420	308	13 100	31 500	1 620 000	405	206	1 590	**230/1000-K-MB**
	1 420	308	13 100	31 500	1 620 000	405	206	1 590	**230/1000-MB**
	1 420	412	19 100	42 000	2 850 000	325	137	2 145	**240/1000-BEA-XL-MB1**
	1 420	412	19 100	42 000	2 850 000	325	137	2 115	**240/1000-BEA-XL-K30-MB1**
	1 580	462	22 000	51 000	3 200 000	320	126	3 474	**231/1000-B-K-MB**
	1 580	462	22 000	51 000	3 200 000	320	126	3 474	**231/1000-B-MB**
	1 580	580	27 500	64 000	4 050 000	275	70	4 379	**241/1000-B-K30-MB**
	1 580	580	27 500	64 000	4 050 000	275	70	4 429	**241/1000-B-MB**
1 060	1 280	165	5 100	16 100	1 000 000	480	213	421	**238/1060-B-K-MB**
	1 280	165	5 100	16 100	1 000 000	480	213	435	**238/1060-B-MB**
	1 280	218	7 000	22 700	1 300 000	385	97	599	**248/1060-B-MB**
	1 400	250	9 900	26 000	1 450 000	420	202	1 060	**239/1060-K-MB1**
	1 400	250	9 900	26 000	1 450 000	420	202	1 081	**239/1060-MB1**
	1 400	335	12 900	36 000	2 290 000	345	84	1 411	**249/1060-B-K30-MB**
	1 400	335	12 900	36 000	2 290 000	345	84	1 436	**249/1060-B-MB**
	1 500	325	13 700	34 000	2 160 000	375	193	1 896	**230/1060-B-MB**
	1 500	438	21 400	47 500	3 150 000	305	126	2 525	**240/1060-BEA-XL-MB1**
	1 500	438	21 400	47 500	3 150 000	305	126	2 470	**240/1060-BEA-XL-K30-MB1**
1 120	1 360	243	8 000	26 000	1 490 000	365	90	791	**248/1120-B-MB**
	1 460	335	12 800	35 500	2 220 000	340	83	1 518	**249/1120-B-K30-MB**
	1 460	335	12 800	35 500	2 220 000	340	83	1 545	**249/1120-B-MB**
	1 580	345	14 900	37 500	2 300 000	350	181	2 210	**230/1120-B-MB**
	1 580	462	21 800	58 000	3 500 000	285	116	2 920	**240/1120-BEA-XL-MB1**
	1 580	462	21 800	58 000	3 500 000	285	116	2 884	**240/1120-BEA-XL-K30-MB1**

medias *https://www.schaeffler.de/std/1F9A*

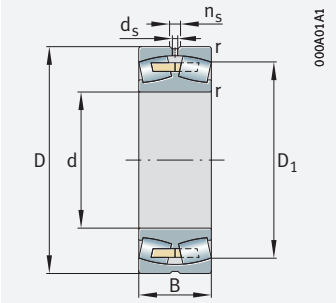


Mounting dimensions

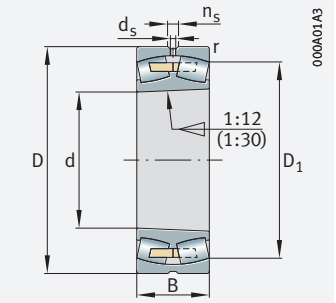
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
1 000	6	1 158	9,5	17,7	1 023	1 197	5	0,12	5,72	8,51	5,59
	6	1 158	9,5	17,7	1 023	1 197	5	0,12	5,72	8,51	5,59
	6	1 151,4	9,5	17,7	1 023	1 197	5	0,16	4,28	6,37	4,19
	7,5	1 218,4	12,5	23,5	1 028	1 292	6	0,22	3,01	4,48	2,94
	7,5	1 218,4	12,5	23,5	1 028	1 292	6	0,22	3,01	4,48	2,94
	7,5	1 300,3	12,5	23,5	1 028	1 392	6	0,21	3,2	4,77	3,13
	7,5	1 300,3	12,5	23,5	1 028	1 392	6	0,21	3,2	4,77	3,13
	7,5	1 282,25	12,5	23,5	1 028	1 392	6	0,26	2,6	3,87	2,54
	7,5	1 282,2	12,5	23,5	1 028	1 392	6	0,26	2,6	3,87	2,54
	12	1 391,8	12,5	23,5	1 048	1 532	10	0,29	2,33	3,47	2,28
	12	1 391,8	12,5	23,5	1 048	1 532	10	0,29	2,33	3,47	2,28
	12	1 372,6	12,5	23,5	1 048	1 532	10	0,35	1,91	2,85	1,87
	12	1 372,6	12,5	23,5	1 048	1 532	10	0,35	1,91	2,85	1,87
1 060	6	1 218,6	9,5	17,7	1 083	1 257	5	0,11	6,18	9,2	6,04
	6	1 218,6	9,5	17,7	1 083	1 257	5	0,11	6,18	9,2	6,04
	6	1 212,7	9,5	17,7	1 083	1 257	5	0,15	4,53	6,75	4,43
	7,5	1 307,6	12,5	23,5	1 088	1 372	6	0,17	4,05	6,04	3,96
	7,5	1 307,6	12,5	23,5	1 088	1 372	6	0,17	4,05	6,04	3,96
	7,5	1 290,7	12,5	23,5	1 088	1 372	6	0,21	3,17	4,72	3,1
	7,5	1 290,7	12,5	23,5	1 088	1 372	6	0,21	3,17	4,72	3,1
	9,5	1 374,6	12,5	23,5	1 094	1 466	8	0,2	3,38	5,03	3,31
	9,5	1 354	12,5	23,5	1 094	1 466	8	0,26	2,57	3,83	2,52
	9,5	1 354	12,5	23,5	1 094	1 466	8	0,26	2,57	3,83	2,52
1 120	6	1 285	9,5	17,7	1 143	1 337	5	0,15	4,47	6,65	4,37
	7,5	1 352,6	12,5	23,5	1 148	1 432	6	0,21	3,27	4,87	3,2
	7,5	1 352,6	12,5	23,5	1 148	1 432	6	0,21	3,27	4,87	3,2
	9,5	1 445,4	12,5	23,5	1 154	1 546	8	0,2	3,42	5,09	3,34
	9,5	1 429,7	12,5	23,5	1 154	1 546	8	0,26	2,57	3,83	2,52
	9,5	1 429,7	12,5	23,5	1 154	1 546	8	0,26	2,57	3,83	2,52

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

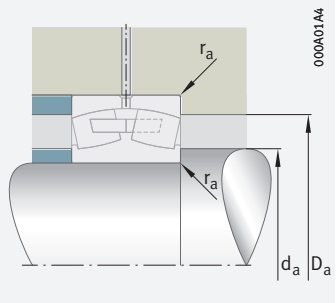


Solid cage, brass or steel; tapered bore

d = 1 180 – 1 800 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695|1.12* ➤*696|1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
1 180	1 420	180	6 000	19 200	1 130 000	430	187	556	**238/1180-B-K-MB**
	1 420	180	6 000	19 200	1 130 000	430	187	576	**238/1180-B-MB**
	1 420	243	8 400	28 000	1 580 000	335	83	790	**248/1180-B-MB**
	1 540	272	11 300	31 000	1 810 000	370	177	1 340	**239/1180-B-K-MB**
	1 540	272	11 300	31 000	1 810 000	370	177	1 385	**239/1180-B-MB**
	1 540	355	14 700	42 000	2 460 000	305	73	1 751	**249/1180-B-K30-MB**
	1 540	355	14 700	42 000	2 460 000	305	73	1 788	**249/1180-B-MB**
	1 660	355	16 600	42 000	2 550 000	330	166	2 513	**230/1180-B-MB**
1 250	1 500	250	9 000	30 500	1 260 000	320	76	918	**248/1250-B-MB**
	1 630	375	16 000	45 500	2 750 000	295	69	2 096	**249/1250-B-K30-MB**
	1 630	375	16 000	45 500	2 750 000	295	69	2 132	**249/1250-B-MB**
	1 750	375	18 100	46 500	2 750 000	310	154	2 923	**230/1250-B-K-MB**
	1 750	375	18 100	46 500	2 440 000	310	154	2 933	**230/1250-B-MB**
1 320	1 600	280	10 300	35 000	1 950 000	295	71	1 235	**248/1320-B-MB**
	1 720	400	17 700	52 000	3 050 000	265	62	2 515	**249/1320-B-K30-MB**
	1 720	400	17 700	52 000	3 050 000	265	62	2 558	**249/1320-B-MB**
1 400	1 700	300	12 100	41 000	2 280 000	270	63	1 470	**248/1400-B-MB**
1 500	1 820	315	13 000	44 500	2 440 000	255	58	1 660	**248/1500-B-MB**
1 600	1 950	345	16 000	54 000	3 050 000	240	51	2 222	**248/1600-B-MB**
1 700	2 060	355	17 100	60 000	2 950 000	218	46	2 573	**248/1700-MB**
1 800	2 180	375	18 700	67 000	3 500 000	201	42	2 992	**248/1800-B-MB**

medias *https://www.schaeffler.de/std/1F9A*

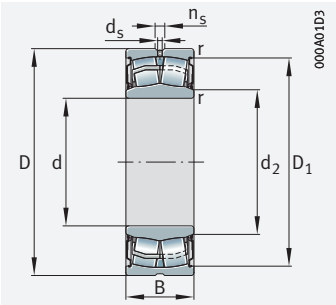


Mounting dimensions

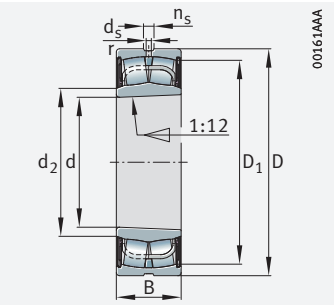
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
1 180	6	1 353,9	9,5	17,7	1 203	1 397	5	0,11	6,18	9,2	6,04
	6	1 353,9	9,5	17,7	1 203	1 397	5	0,11	6,18	9,2	6,04
	6	1 345	9,5	17,7	1 203	1 397	5	0,15	4,53	6,75	4,43
	7,5	1 438,3	12,5	23,5	1 208	1 512	6	0,17	4,05	6,04	3,96
	7,5	1 438,3	12,5	23,5	1 208	1 512	6	0,17	4,05	6,04	3,96
	7,5	1 428,9	12,5	23,5	1 208	1 512	6	0,22	3,14	4,67	3,07
	7,5	1 428,9	12,5	23,5	1 208	1 512	6	0,22	3,14	4,67	3,07
	9,5	1 522,2	12,5	23,5	1 214	1 626	8	0,2	3,38	5,03	3,31
1 250	6	1 423,5	9,5	17,7	1 273	1 477	5	0,14	4,67	6,96	4,57
	7,5	1 510,5	12,5	23,5	1 278	1 602	6	0,21	3,24	4,82	3,16
	7,5	1 510,5	12,5	23,5	1 278	1 602	6	0,21	3,24	4,82	3,16
	9,5	1 607,6	12,5	23,5	1 284	1 716	8	0,2	3,34	4,98	3,27
	9,5	1 607,6	12,5	23,5	1 284	1 716	8	0,2	3,34	4,98	3,27
1 320	7,5	1 512,8	12,5	23,5	1 343	1 577	5	0,15	4,4	6,56	4,31
	7,5	1 595,5	12,5	23,5	1 348	1 640	6	0,2	3,31	4,92	3,23
	7,5	1 595,5	12,5	23,5	1 348	1 640	6	0,2	3,31	4,92	3,23
1 400	7,5	1 606,9	12,5	23,5	1 428	1 672	6	0,16	4,34	6,46	4,25
1 500	7,5	1 722,1	12,5	23,5	1 528	1 792	6	0,15	4,47	6,65	4,37
1 600	7,5	1 846,9	12,5	23,5	1 628	1 922	6	0,15	4,53	6,75	4,43
1 700	7,5	1 946,7	12,5	23,5	1 728	2 032	6	0,15	4,47	6,65	4,37
1 800	9,5	2 060	12,5	23,5	1 834	2 146	8	0,15	4,47	6,65	4,37

Spherical roller bearings

Sealed



D ≦ 180 mm
with seal 2RSR

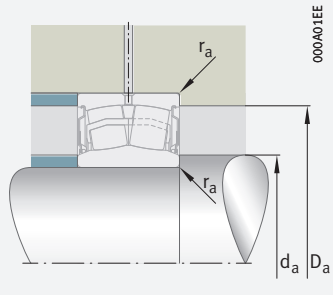


Tapered bore;
with seal

d = 25 – 75 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	≈ kg	
25	52	23	48,5	42,5	4 900	3 600	0,235	**WS22205-E1-XL-2RSR**
	52	23	48,5	42,5	4 900	3 600	0,235	**WS22205-E1-XL-K-2RSR**
30	62	25	64	57	7 000	3 150	0,4	**WS22206-E1-XL-2RSR**
	62	25	64	57	7 000	3 150	0,4	**WS22206-E1-XL-K-2RSR**
35	72	28	89	81	9 700	2 700	0,6	**WS22207-E1-XL-2RSR**
	72	28	89	81	9 700	2 700	0,6	**WS22207-E1-XL-K-2RSR**
40	80	28	101	91	12 100	2 600	0,7	**WS22208-E1-XL-2RSR**
	80	28	101	91	12 100	2 600	0,7	**WS22208-E1-XL-K-2RSR**
	90	38	156	149	13 500	1 890	1,16	**WS22308-E1-XL-2RSR**
	90	38	156	149	13 500	1 890	1,16	**WS22308-E1-XL-K-2RSR**
45	85	28	104	99	13 000	2 550	0,67	**WS22209-E1-XL-2RSR**
	85	28	104	99	13 000	2 550	0,67	**WS22209-E1-XL-K-2RSR**
50	90	28	109	107	14 600	2 440	0,8	**WS22210-E1-XL-2RSR**
	90	28	109	107	14 600	2 440	0,8	**WS22210-E1-XL-K-2RSR**
55	100	31	129	130	17 700	2 250	1,1	**WS22211-E1-XL-2RSR**
	100	31	129	130	17 700	2 250	1,1	**WS22211-E1-XL-K-2RSR**
	120	49	265	260	24 600	1 460	2,9	**WS22311-E1-XL-2RSR**
	120	49	265	260	24 600	1 460	2,9	**WS22311-E1-XL-K-2RSR**
60	110	34	160	155	20 700	2 030	1,5	**WS22212-E1-XL-2RSR**
	110	34	160	155	20 700	2 030	1,5	**WS22212-E1-XL-K-2RSR**
	130	53	310	310	29 000	1 350	3,4	**WS22312-E1-XL-2RSR**
	130	53	310	310	29 000	1 350	3,4	**WS22312-E1-XL-K-2RSR**
65	120	38	202	210	26 500	1 740	2	**WS22213-E1-XL-2RSR**
	120	38	202	210	26 500	1 740	2	**WS22213-E1-XL-K-2RSR**
70	125	38	211	226	28 500	1 670	2,1	**WS22214-E1-XL-2RSR**
	125	38	211	226	28 500	1 670	2,1	**WS22214-E1-XL-K-2RSR**
	150	60	390	390	37 500	1 210	5,4	**WS22314-E1-XL-2RSR**
	150	60	390	390	37 500	1 210	5,4	**WS22314-E1-XL-K-2RSR**
75	130	38	216	237	30 500	1 630	2,2	**WS22215-E1-XL-2RSR**
	130	38	216	237	30 500	1 630	2,2	**WS22215-E1-XL-K-2RSR**

medias *https://www.schaeffler.de/std/1F9A*

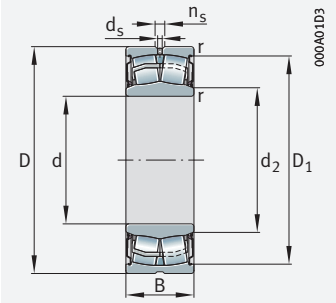


Mounting dimensions

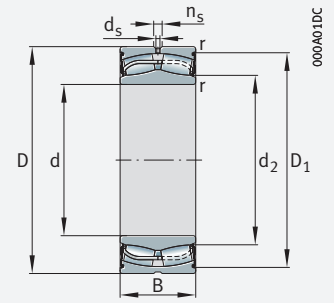
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
25	1	46,1	29,8	3,2	4,8	29,8	46,4	1	0,33	2,07	3,09	2,03
	1	46,1	29,8	3,2	4,8	29,8	46,4	1	0,33	2,07	3,09	2,03
30	1	55,5	35	3,2	4,8	35	56,4	1	0,3	2,26	3,37	2,21
	1	55,5	35	3,2	4,8	35	56,4	1	0,3	2,26	3,37	2,21
35	1,1	64,2	40,1	3,2	4,8	40,1	65	1	0,31	2,21	3,29	2,16
	1,1	64,2	40,1	3,2	4,8	40,1	65	1	0,31	2,21	3,29	2,16
40	1,1	72,6	45,9	3,2	4,8	45,9	73	1	0,27	2,49	3,71	2,43
	1,1	72,6	45,9	3,2	4,8	45,9	73	1	0,27	2,49	3,71	2,43
	1,5	78,1	48,9	3,2	6,5	48,9	81	1,5	0,36	1,86	2,77	1,82
	1,5	78,1	48,9	3,2	6,5	48,9	81	1,5	0,36	1,86	2,77	1,82
45	1,1	77,8	51,4	3,2	4,8	51,4	78	1	0,25	2,74	4,08	2,68
	1,1	77,8	51,4	3,2	4,8	51,4	78	1	0,25	2,74	4,08	2,68
50	1,1	83,1	56	3,2	4,8	56	83,1	1	0,23	2,95	4,4	2,89
	1,1	83,1	56	3,2	4,8	56	83,1	1	0,23	2,95	4,4	2,89
55	1,5	91,9	63,5	3,2	4,8	63,5	91,9	1,5	0,21	3,17	4,72	3,1
	1,5	91,9	63,5	3,2	4,8	63,5	91,9	1,5	0,21	3,17	4,72	3,1
	2	104,1	64,8	3,2	6,5	64,8	109	2	0,36	1,89	2,81	1,84
	2	104,1	64,8	3,2	6,5	64,8	109	2	0,36	1,89	2,81	1,84
60	1,5	100,7	67,6	3,2	6,5	67,6	101	1,5	0,23	2,98	4,44	2,92
	1,5	100,7	67,6	3,2	6,5	67,6	101	1,5	0,23	2,98	4,44	2,92
	2,1	110,2	71,4	3,2	6,5	71,4	118	2,1	0,35	1,91	2,85	1,87
	2,1	110,2	71,4	3,2	6,5	71,4	118	2,1	0,35	1,91	2,85	1,87
65	1,5	110,2	76,2	3,2	6,5	76,2	111	1,5	0,24	2,81	4,19	2,75
	1,5	110,2	76,2	3,2	6,5	76,2	111	1,5	0,24	2,81	4,19	2,75
70	1,5	113,5	82,5	3,2	6,5	82,5	116	1,5	0,23	2,95	4,4	2,89
	1,5	113,5	82,5	3,2	6,5	82,5	116	1,5	0,23	2,95	4,4	2,89
	2,1	130,4	80,7	4,8	9,5	80,7	138	2,1	0,34	2	2,98	1,96
	2,1	130,4	80,7	4,8	9,5	80,7	138	2,1	0,34	2	2,98	1,96
75	1,5	120,2	85,6	3,2	6,5	84	121	1,5	0,22	3,1	4,62	3,03
	1,5	120,2	85,6	3,2	6,5	84	121	1,5	0,22	3,1	4,62	3,03

Spherical roller bearings

Sealed



D ≦ 180 mm
with seal 2RSR

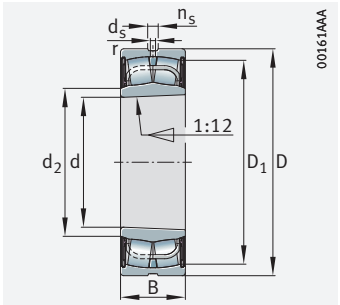


180 mm < D ≦ 320 mm
with seal 2VSR

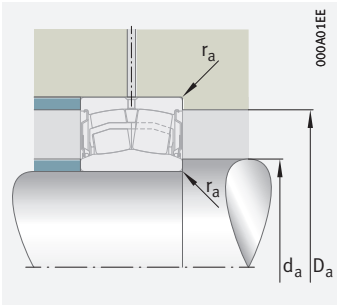
d = 80 – 170 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*695* | *1.12* ➤*696* | *1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	≈ kg	
80	140	40	250	270	34 500	1 540	2,7	**WS22216-E1-XL-2RSR**
	140	40	250	270	34 500	1 540	2,7	**WS22216-E1-XL-K-2RSR**
85	150	44	305	325	39 000	1 420	3,4	**WS22217-E1-XL-2RSR**
	150	44	305	325	39 000	1 420	3,4	**WS22217-E1-XL-K-2RSR**
90	160	48	345	375	43 500	1 300	4,3	**WS22218-E1-XL-2RSR**
	160	48	345	375	43 500	1 300	4,3	**WS22218-E1-XL-K-2RSR**
100	180	55	430	475	53 000	1 140	6,3	**WS22220-E1-XL-2RSR**
	180	55	430	475	53 000	1 140	6,25	**WS22220-E1-XL-K-2RSR**
110	180	69	530	750	86 000	830	6,8	**24122-BE-XL-2VSR**
	200	63	550	600	64 000	1 020	9	**WS22222-E1-XL-2RSR**
	200	63	550	600	64 000	1 020	9	**WS22222-E1-XL-K-2RSR**
120	180	60	450	690	86 000	860	5,6	**24024-BE-XL-2VSR**
	200	80	680	950	103 000	740	10,4	**24124-BE-XL-2VSR**
	215	69	640	740	73 000	920	11,3	**WS22224-E1-XL-2RSR**
	215	69	640	740	73 000	920	11,3	**WS22224-E1-XL-K-2RSR**
130	200	69	570	860	103 000	780	8,4	**24026-BE-XL-2VSR**
	210	80	710	1 050	112 000	700	11	**24126-BE-XL-2VSR**
	230	75	760	890	81 000	840	12,8	**WS22226-E1-XL-2RSR**
	230	75	760	890	81 000	840	12,8	**WS22226-E1-XL-K-2RSR**
140	210	69	590	930	111 000	740	8,4	**24028-BE-XL-2VSR**
	225	85	800	1 190	127 000	660	13,8	**24128-BE-XL-2VSR**
	250	68	830	970	100 000	820	14,1	**22228-E1A-XL-2RSR-M**
	250	68	830	970	100 000	820	13,7	**22228-E1A-XL-K-2RSR-M**
150	225	75	680	1 090	125 000	690	11,1	**24030-BE-XL-2VSR**
	250	100	1 050	1 520	153 000	590	20,6	**24130-BE-XL-2VSR**
160	240	80	770	1 240	140 000	640	12,7	**24032-BE-XL-2VSR**
	270	109	1 220	1 800	173 000	540	25,4	**24132-BE-XL-2VSR**
	290	80	1 080	1 300	128 000	700	23,3	**22232-E1A-XL-2RSR-M**
	290	80	1 080	1 300	128 000	700	22,4	**22232-E1A-XL-K-2RSR-M**
170	260	90	940	1 480	162 000	600	17,2	**24034-BE-XL-2VSR**
	280	109	1 260	1 900	184 000	530	26,4	**24134-BE-XL-2VSR**

medias *https://www.schaeffler.de/std/1F9A*



Tapered bore; with seal

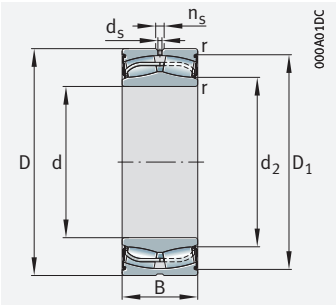


Mounting dimensions

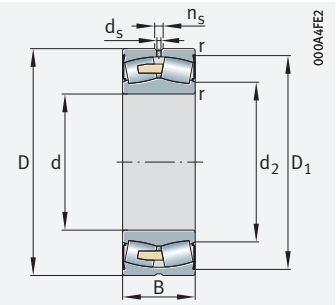
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
80	2	128,6	91,3	3,2	6,5	91	129	2	0,22	3,14	4,67	3,07
	2	128,6	91,3	3,2	6,5	91	129	2	0,22	3,14	4,67	3,07
85	2	137,1	96,5	3,2	6,5	96	139	2	0,22	3,04	4,53	2,97
	2	137,1	96,5	3,2	6,5	96	139	2	0,22	3,04	4,53	2,97
90	2	146,7	101,4	3,2	6,5	101	149	2	0,23	2,9	4,31	2,83
	2	146,7	101,4	3,2	6,5	101	149	2	0,23	2,9	4,31	2,83
100	2,1	169,1	115	4,8	9,5	112	169,1	2,1	0,24	2,84	4,23	2,78
	2,1	169,1	115	4,8	9,5	112	169,1	2,1	0,24	2,84	4,23	2,78
110	2	167,1	120,8	3,2	6,5	121	169	2	0,34	1,96	2,92	1,92
	2,1	182,6	124,9	4,8	9,5	122	188	2,1	0,25	2,71	4,04	2,65
	2,1	182,6	124,9	4,8	9,5	122	188	2,1	0,25	2,71	4,04	2,65
120	2	170,5	131	3,2	6,5	128,8	171,2	2	0,29	2,33	3,47	2,28
	2	184,5	131,1	3,2	6,5	131	189	2	0,37	1,84	2,74	1,8
	2,1	203,4	136,8	6,3	12,2	132	203,4	2,1	0,25	2,71	4,04	2,65
	2,1	203,4	136,8	6,3	12,2	132	203,4	2,1	0,25	2,71	4,04	2,65
130	2	187,2	142,1	3,2	6,5	138,8	191,2	2	0,31	2,21	3,29	2,16
	2	196,1	143,1	3,2	6,5	141	199	2	0,34	1,98	2,94	1,93
	3	217,5	146,6	6,3	12,2	144	217,5	2,5	0,26	2,62	3,9	2,56
	3	217,5	146,6	6,3	12,2	144	217,5	2,5	0,26	2,62	3,9	2,56
140	2	198,5	153,3	3,2	6,5	148,8	201,2	2	0,28	2,37	3,53	2,32
	2,1	209,9	153,5	4,8	9,5	152	213	2,1	0,34	1,99	2,96	1,94
	3	–	–	6,3	12,2	154	236	2,5	0,24	2,81	4,19	2,75
	3	–	–	6,3	12,2	154	236	2,5	0,24	2,81	4,19	2,75
150	2,1	213,2	164	3,2	6,5	160,2	214,8	2,1	0,29	2,32	3,45	2,26
	2,1	228,9	163,1	4,8	9,5	162	238	2,1	0,37	1,83	2,72	1,79
160	2,1	226,9	174,8	4,8	9,5	170,2	229,8	2,1	0,29	2,32	3,45	2,26
	2,1	245,6	175,5	4,8	9,5	172	258	2,1	0,37	1,8	2,69	1,76
	3	–	–	8	15	174	276	2,5	0,24	2,79	4,15	2,73
	3	–	–	8	15	174	276	2,5	0,24	2,79	4,15	2,73
170	2,1	243,3	184,8	4,8	9,5	180,2	249,8	2,1	0,31	2,2	3,27	2,15
	2,1	257,3	186,7	4,8	9,5	182	268	2,1	0,36	1,9	2,83	1,86

Spherical roller bearings

Sealed



D ≦ 370 mm
with seal 2RSR or 2VSR

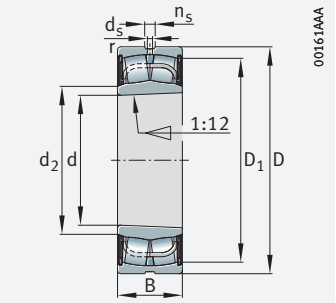


320 mm < D ≦ 650 mm
with seal 2RSR

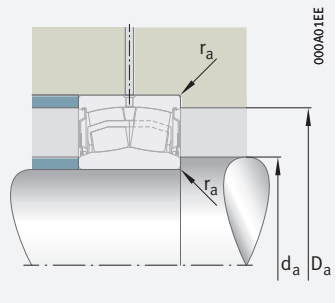
d = 180 – 400 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤695 | 1.12 ➤696 | 1.13 X-life ➤684
			kN	kN	N	min^{-1}	≈ kg	
180	280	100	1 130	1 770	185 000	550	22,7	**24036-BE-XL-2VSR**
	300	118	1 460	2 170	208 000	500	33,2	**24136-BE-XL-2VSR**
190	290	100	1 160	1 860	197 000	540	23,7	**24038-BE-XL-2VSR**
	320	128	1 680	2 550	232 000	460	41,5	**24138-BE-XL-2VSR**
200	310	109	1 350	2 150	221 000	500	30,1	**24040-BE-XL-2VSR**
	340	112	1 620	2 270	194 000	510	41,5	**23140-BE-XL-2RSR**
	340	112	1 620	2 270	194 000	510	40,9	**23140-BE-XL-K-2RSR**
	340	140	1 880	2 800	260 000	445	49,5	**24140-BE-XL-2VSR**
220	370	120	1 860	2 700	224 000	465	52,2	**23144-BE-XL-2RSR**
	370	120	1 860	2 700	224 000	465	50,5	**23144-BE-XL-K-2RSR**
	370	150	2 190	3 250	300 000	410	64	**24144-BE-XL-2VSR**
240	400	128	2 140	3 150	255 000	425	64	**23148-BE-XL-2RSR**
	400	128	2 140	3 150	255 000	425	62	**23148-BE-XL-K-2RSR**
260	440	144	2 600	3 900	300 000	375	90	**23152-BE-XL-2RSR**
	440	144	2 600	3 900	300 000	375	87,2	**23152-BE-XL-K-2RSR**
280	460	146	2 750	4 200	325 000	355	96,3	**23156-BE-XL-2RSR**
	460	146	2 750	4 200	325 000	355	93,1	**23156-BE-XL-K-2RSR**
300	500	160	3 250	4 950	375 000	325	130	**23160-BEA-XL-2RSR-MB1**
	500	160	3 250	4 950	375 000	325	126	**23160-BEA-XL-K-2RSR-MB1**
320	540	176	3 800	5 900	425 000	290	165	**23164-BEA-XL-2RSR-MB1**
	540	176	3 800	5 900	425 000	290	161	**23164-BEA-XL-K-2RSR-MB1**
340	580	190	4 400	6 600	480 000	270	210	**23168-BEA-XL-2RSR-MB1**
	580	190	4 400	6 600	480 000	270	204	**23168-BEA-XL-K-2RSR-MB1**
360	600	192	4 550	7 100	510 000	260	222	**23172-BEA-XL-2RSR-MB1**
	600	192	4 550	7 100	510 000	260	215	**23172-BEA-XL-K-2RSR-MB1**
380	620	194	4 750	7 600	540 000	248	234	**23176-BEA-XL-2RSR-MB1**
	620	194	4 750	7 600	540 000	248	227	**23176-BEA-XL-K-2RSR-MB1**
400	650	200	5 100	8 100	590 000	236	255	**23180-BEA-XL-2RSR-MB1**
	650	200	5 100	8 100	590 000	236	246	**23180-BEA-XL-K-2RSR-MB1**

medias *https://www.schaeffler.de/std/1F9A*



Tapered bore; with seal

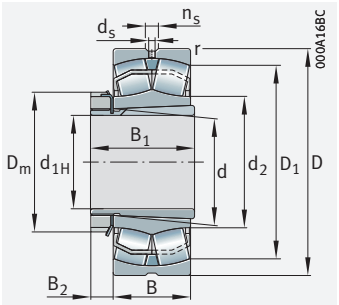


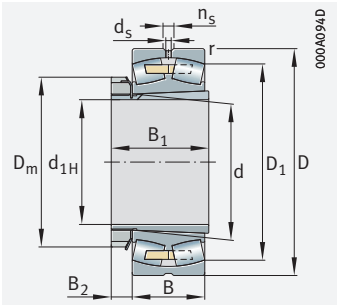
Mounting dimensions

Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
180	2,1	259,6	195,6	4,8	9,5	190,2	269,8	2,1	0,32	2,1	3,13	2,06
	3	276,3	196,2	6,3	12,2	194	286	2,5	0,36	1,86	2,77	1,82
190	2,1	271,1	206,2	4,8	9,5	200,2	279,8	2,1	0,31	2,2	3,27	2,15
	3	292,6	208	6,3	12,2	204	306	2,5	0,37	1,82	2,7	1,78
200	2,1	287,8	217	6,3	12,2	210,2	299,8	2,1	0,32	2,13	3,17	2,08
	3	319	224,6	9,5	17,7	214	326	2,5	0,3	2,25	3,34	2,2
	3	319	224,6	9,5	17,7	214	326	2,5	0,3	2,25	3,34	2,2
	3	309,5	216,2	6,3	12,2	214	326	2,5	0,39	1,71	2,54	1,67
220	4	345	249	9,5	17,7	237	353	3	0,29	2,3	3,42	2,25
	4	345	249	9,5	17,7	237	353	3	0,29	2,3	3,42	2,25
	4	338,5	236,2	6,3	12,2	237	353	3	0,39	1,74	2,59	1,7
240	4	374	269	9,5	17,7	257	383	3	0,29	2,35	3,5	2,3
	4	374	269	9,5	17,7	257	383	3	0,29	2,35	3,5	2,3
260	4	412	295	9,5	17,7	277	423	3	0,3	2,26	3,37	2,21
	4	412	295	9,5	17,7	277	423	3	0,3	2,26	3,37	2,21
280	5	431	315	9,5	17,7	300	440	4	0,28	2,37	3,53	2,32
	5	431	315	9,5	17,7	300	440	4	0,28	2,37	3,53	2,32
300	5	436,8	–	9,5	17,7	320	480	4	0,29	2,3	3,42	2,25
	5	436,8	–	9,5	17,7	320	480	4	0,29	2,3	3,42	2,25
320	5	470,5	–	12,5	23,5	340	520	4	0,3	2,26	3,37	2,21
	5	470,5	–	12,5	23,5	340	520	4	0,3	2,26	3,37	2,21
340	5	503,9	–	12,5	23,5	360	560	4	0,3	2,23	3,32	2,18
	5	503,9	–	12,5	23,5	360	560	4	0,3	2,23	3,32	2,18
360	5	524,5	–	12,5	23,5	380	580	4	0,29	2,3	3,42	2,25
	5	524,5	–	12,5	23,5	380	580	4	0,29	2,3	3,42	2,25
380	5	544,9	–	12,5	23,5	400	600	4	0,28	2,37	3,53	2,32
	5	544,9	–	12,5	23,5	400	600	4	0,28	2,37	3,53	2,32
400	6	573,3	–	12,5	23,5	426	624	5	0,28	2,41	3,59	2,35
	6	573,3	–	12,5	23,5	426	624	5	0,28	2,41	3,59	2,35

Spherical roller bearings

With adapter sleeve



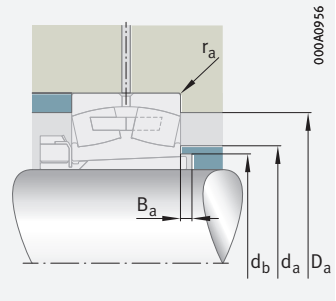


With solid cage, brass or steel

d_{1H} = 20 – 75 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
20	25	52	18	48,5	42,5	4 900	14 400	9 200	0,175	0,07	**22205-E1-XL-K**	**H305**
25	30	62	20	64	57	7 000	12 500	7 800	0,275	0,11	**22206-E1-XL-K**	**H306**
30	35	72	23	89	81	9 700	10 700	7 000	0,434	0,153	**22207-E1-XL-K**	**H307**
	35	80	21	83	74	8 300	10 900	6 800	0,496	0,153	**21307-E1-XL-K-TVPB**	**H307**
35	40	80	23	101	91	12 100	10 500	6 200	0,528	0,192	**22208-E1-XL-K**	**H308**
	40	90	23	109	107	14 600	9 800	5 200	0,749	0,192	**21308-E1-XL-K**	**H308**
	40	90	33	156	149	13 500	7 600	5 500	1	0,23	**22308-E1-XL-K**	**H2308**
40	45	85	23	104	99	13 000	10 100	5 600	0,577	0,253	**22209-E1-XL-K**	**H309**
	45	100	25	129	130	17 700	9 000	4 750	0,999	0,253	**21309-E1-XL-K**	**H309**
	45	100	36	187	183	16 500	6 800	5 000	1,4	0,298	**22309-E1-XL-K**	**H2309**
45	50	90	23	109	107	14 600	9 800	5 100	0,608	0,306	**22210-E1-XL-K**	**H310**
	50	110	27	129	130	17 700	9 000	5 400	1,32	0,306	**21310-E1-XL-K**	**H310**
	50	110	40	229	223	20 700	6 300	4 800	1,9	0,36	**22310-E1-XL-K**	**H2310**
50	55	100	25	129	130	17 700	9 000	4 650	0,825	0,358	**22211-E1-XL-K**	**H311**
	55	120	29	160	155	20 700	8 100	5 100	1,28	0,358	**21311-E1-XL-K**	**H311**
	55	120	43	265	260	24 600	5 800	4 500	2,2	0,435	**22311-E1-XL-K**	**H2311**
55	60	110	28	160	155	20 700	8 100	4 550	1,09	0,401	**22212-E1-XL-K**	**H312**
	60	130	31	211	226	28 500	6 700	4 100	1,89	0,401	**21312-E1-XL-K**	**H312**
	60	130	46	310	310	29 000	5 400	4 200	2,8	0,493	**22312-E1-XL-K**	**H2312**
60	65	120	31	202	210	26 500	7 000	4 200	1,52	0,471	**22213-E1-XL-K**	**H313**
	65	140	33	250	270	34 500	6 200	3 600	2,13	0,471	**21313-E1-XL-K**	**H313**
	65	140	48	350	365	33 500	5 000	3 800	3,5	0,57	**22313-E1-XL-K**	**H2313**
	70	125	31	211	226	28 500	6 700	3 950	1,61	0,74	**22214-E1-XL-K**	**H314**
	70	150	35	250	270	34 500	6 200	3 950	3,13	0,74	**21314-E1-XL-K**	**H314**
	70	150	51	390	390	37 500	4 800	3 700	4,1	0,92	**22314-E1-XL-K**	**H2314**
65	75	130	31	216	237	30 500	6 500	3 700	1,68	0,86	**22215-E1-XL-K**	**H315**
	75	160	37	305	325	39 000	5 700	3 750	3,74	0,86	**21315-E1-XL-K**	**H315**
	75	160	55	445	450	42 000	4 500	3 550	5,3	1,06	**22315-E1-XL-K**	**H2315**
70	80	140	33	250	270	34 500	6 200	3 550	2,08	1,06	**22216-E1-XL-K**	**H316**
	80	170	39	305	325	39 000	5 700	4 050	4,54	1,06	**21316-E1-XL-K**	**H316**
	80	170	58	495	510	46 500	4 250	3 400	6,1	1,31	**22316-E1-XL-K**	**H2316**
75	85	150	36	305	325	39 000	5 700	3 450	2,59	1,21	**22217-E1-XL-K**	**H317**
	85	180	41	345	375	43 500	5 200	3 800	5,3	1,21	**21317-E1-XL-K**	**H317**
	85	180	60	540	560	51 000	4 100	3 200	7,1	1,47	**22317-E1-XL-K**	**H2317**

medias *https://www.schaeffler.de/std/1F9A*

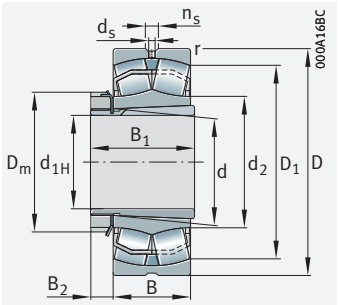


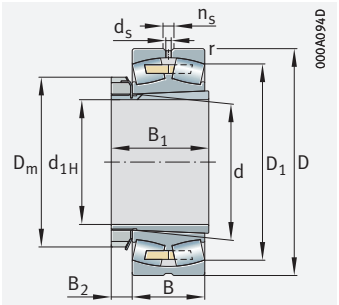
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	D_m	B_1	B_2	d_a	D_a	d_b	B_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈					≈	max.	max.	min.	min.	max.				
20	1	44,4	31,5	3,2	4,8	38	29	8,25	31	46,4	28	5	1	0,33	2,07	3,09	2,03
25	1	53,7	38,1	3,2	4,8	45	31	8,25	37	54,6	33	5	1	0,3	2,26	3,37	2,21
30	1,1	62,5	43,9	3,2	4,8	52	35	9,25	43	65	39	5	1	0,31	2,21	3,29	2,16
	1,5	66,6	47,4	–	–	52	35	9,25	47	71	39	8	1,5	0,26	2,55	3,8	2,5
35	1,1	70,4	48,8	3,2	4,8	58	36	10,25	48	73	44	5	1	0,27	2,49	3,71	2,43
	1,5	80,8	59,9	3,2	4,8	58	36	10,25	59	81	44	5	1,5	0,23	2,95	4,4	2,89
	1,5	76	52,4	3,2	6,5	58	46	10,25	52	81	45	5	1,5	0,36	1,86	2,77	1,82
40	1,1	75,6	55	3,2	4,8	65	39	11,25	54	78	50	8	1	0,25	2,74	4,08	2,68
	1,5	89,8	67,6	3,2	4,8	65	39	11,25	67	91	50	5	1,5	0,21	3,17	4,72	3,1
	1,5	84,7	58,9	3,2	6,5	65	50	11,25	58	91	50	5	1,5	0,36	1,9	2,83	1,86
45	1,1	80,8	59,9	3,2	4,8	70	42	12,25	59	83	55	10	1	0,23	2,95	4,4	2,89
	2	89,8	67,7	3,2	4,8	70	42	12,25	67	99	55	5	2	0,21	3,17	4,72	3,1
	2	92,6	63	3,2	6,5	70	55	12,25	63	99	56	5	2	0,36	1,86	2,77	1,82
50	1,5	89,8	67,6	3,2	4,8	75	45	12,5	67	91	60	10	1,5	0,21	3,17	4,72	3,1
	2	98,3	71,6	3,2	6,5	75	45	12,5	71	109	60	6	2	0,23	2,98	4,44	2,92
	2	101,4	68,9	3,2	6,5	75	59	12,5	67	109	61	6	2	0,36	1,89	2,81	1,84
55	1,5	98,7	71,6	3,2	6,5	80	47	12,5	71	101	65	8	1,5	0,23	2,98	4,44	2,92
	2,1	112,5	84,4	3,2	6,5	80	47	12,5	84	118	65	5	2,1	0,23	2,95	4,4	2,89
	2,1	110,1	74,8	3,2	6,5	80	62	12,5	74	118	66	5	2,1	0,35	1,91	2,85	1,87
60	1,5	107,3	79,1	3,2	6,5	85	50	13,5	79	111	70	8	1,5	0,24	2,81	4,19	2,75
	2,1	126,8	94,9	3,2	6,5	85	50	13,5	94	128	70	5	2,1	0,22	3,14	4,67	3,07
	2,1	119,3	83,2	4,8	9,5	85	65	13,5	83	128	72	5	2,1	0,34	2	2,98	1,96
	1,5	112,5	84,4	3,2	6,5	92	52	13,5	84	116	75	11	1,5	0,23	2,95	4,4	2,89
	2,1	126,2	94,9	3,2	6,5	92	52	13,5	94	138	75	6	2,1	0,22	3,14	4,67	3,07
	2,1	128	86,7	4,8	9,5	92	68	13,5	86	138	77	5	2,1	0,34	2	2,98	1,96
65	1,5	117,7	89,8	3,2	6,5	98	55	14,5	89	121	80	12	1,5	0,22	3,1	4,62	3,03
	2,1	135,2	99,7	3,2	6,5	98	55	14,5	99	148	80	5	2,1	0,22	3,04	4,53	2,97
	2,1	136,3	92,4	4,8	9,5	98	73	14,5	92	148	82	5	2,1	0,34	1,99	2,96	1,94
70	2	126,8	94,9	3,2	6,5	105	59	16,75	94	129	85	12	2	0,22	3,14	4,67	3,07
	2,1	135,4	99,8	3,2	6,5	105	59	16,75	99	158	85	5	2,1	0,22	3,04	4,53	2,97
	2,1	145,1	98,3	4,8	9,5	105	78	16,75	98	158	88	5	2,1	0,34	1,99	2,96	1,94
75	2	135,4	99,7	3,2	6,5	110	63	17,75	99	139	91	12	2	0,22	3,04	4,53	2,97
	3	143,9	106,1	4,8	9,5	110	63	17,75	106	166	91	6	2,5	0,23	2,9	4,31	2,83
	3	154,2	104,4	4,8	9,5	110	82	17,75	104	166	94	6	2,5	0,33	2,04	3,04	2

Spherical roller bearings

With adapter sleeve



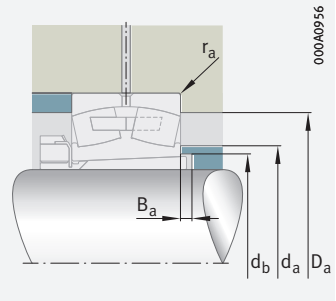


With solid cage, brass or steel

d_{1H} = 80 – 110 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
80	90	160	40	345	375	43 500	5 200	3 400	3,35	1,41	**22218-E1-XL-K**	**H318**
	90	160	52,4	445	520	50 000	4 250	2 650	4,1	1,71	**23218-E1-XL-K-TVPB**	**H2318**
	90	160	52,4	445	520	50 000	4 250	2 650	4,3	1,71	**23218-E1A-XL-K-M**	**H2318**
	90	190	43	380	415	48 500	4 850	3 600	6,26	1,41	**21318-E1-XL-K**	**H318**
	90	190	64	610	630	56 000	3 850	3 000	8,5	1,71	**22318-E1-XL-K**	**H2318**
85	95	170	43	380	415	48 000	4 850	3 300	4,04	1,58	**22219-E1-XL-K**	**H319**
	95	200	45	425	450	48 500	4 600	3 250	6,63	1,58	**21319-E1-XL-K-TVPB**	**H319**
	95	200	67	670	700	61 000	3 700	2 800	9,5	1,95	**22319-E1-XL-K**	**H2319**
90	100	165	52	450	570	54 000	4 000	2 750	4,1	1,81	**23120-E1-XL-K-TVPB**	**H3120**
	100	165	52	450	570	54 000	4 000	2 750	4,2	1,81	**23120-E1A-XL-K-M**	**H3120**
	100	180	46	430	475	53 000	4 550	3 150	4,91	1,76	**22220-E1-XL-K**	**H320**
	100	180	60,3	560	660	61 000	3 750	2 410	6,1	2,2	**23220-E1-XL-K-TVPB**	**H2320**
	100	180	60,3	560	660	61 000	3 750	2 410	6,3	2,2	**23220-E1A-XL-K-M**	**H2320**
	100	215	47	495	530	62 000	4 400	3 050	8,08	1,76	**21320-E1-XL-K-TVPB**	**H320**
	100	215	73	810	920	77 000	3 300	2 380	13	2,2	**22320-E1-XL-K**	**H2320**
100	110	170	45	400	530	54 000	4 200	3 000	3,4	2,25	**23022-E1-XL-K-TVPB**	**H322**
	110	170	45	400	530	54 000	4 200	3 000	3,8	2,25	**23022-E1A-XL-K-M**	**H322**
	110	180	56	530	680	62 000	3 700	2 550	4,9	2,32	**23122-E1-XL-K-TVPB**	**H3122**
	110	180	56	530	680	62 000	3 700	2 550	5,1	2,32	**23122-E1A-XL-K-M**	**H3122**
	110	200	53	550	600	64 000	4 100	3 000	6,99	2,25	**22222-E1-XL-K**	**H322**
	110	200	69,8	710	870	73 000	3 250	2 100	8,8	2,78	**23222-E1-XL-K-TVPB**	**H2322**
	110	200	69,8	710	870	73 000	3 250	2 100	9,3	2,78	**23222-E1A-XL-K-M**	**H2322**
	110	240	50	600	640	70 000	4 000	2 700	10,91	2,25	**21322-E1-XL-K-TVPB**	**H322**
	110	240	80	950	1 070	93 000	3 000	2 130	17,4	2,78	**22322-E1-XL-K**	**H2322**
110	120	180	46	430	580	60 000	3 950	2 800	3,7	2,01	**23024-E1-XL-K-TVPB**	**H3024**
	120	180	46	430	580	60 000	3 950	2 800	4,1	2,01	**23024-E1A-XL-K-M**	**H3024**
	120	200	62	630	800	74 000	3 400	2 290	7,1	2,7	**23124-E1-XL-K-TVPB**	**H3124**
	120	200	62	630	800	74 000	3 400	2 290	7,6	2,7	**23124-E1A-XL-K-M**	**H3124**
	120	215	58	640	740	70 000	3 650	2 700	8,84	2,7	**22224-E1-XL-K**	**H3124**
	120	215	76	820	1 020	82 000	3 000	1 910	11,1	3,24	**23224-E1-XL-K-TVPB**	**H2324**
	120	215	76	820	1 020	82 000	3 000	1 910	11,4	3,24	**23224-E1A-XL-K-M**	**H2324**
	120	260	86	1 080	1 170	105 000	2 850	2 000	22,1	3,24	**22324-E1-XL-K**	**H2324**

medias *https://www.schaeffler.de/std/1F9A*

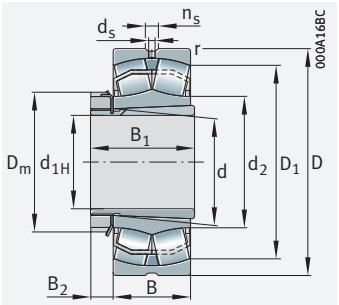


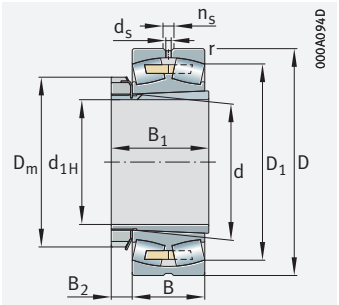
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	D_m	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
80	2	143,9	106,1	3,2	6,5	120	65	17,75	106	149	96	10	2	0,23	2,9	4,31	2,83
	2	140	104,1	3,2	6,5	120	86	17,75	104	149	100	18	2	0,31	2,2	3,27	2,15
	2	140	–	3,2	6,5	120	86	17,75	107	149	100	18	2	0,31	2,2	3,27	2,15
	3	152,7	112,6	4,8	9,5	120	65	17,75	112	176	96	6	2,5	0,24	2,87	4,27	2,8
	3	162,5	110,2	6,3	12,2	120	86	17,75	110	176	100	6	2,5	0,33	2,03	3,02	1,98
85	2,1	152,7	112,6	4,8	9,5	125	68	18,75	112	158	102	9	2,1	0,24	2,87	4,27	2,8
	3	169,4	124,3	4,8	9,5	125	68	18,75	124	186	102	7	2,5	0,22	3,04	4,53	2,97
	3	171,2	116	6,3	12,2	125	90	18,75	115	186	105	7	2,5	0,33	2,03	3,02	1,98
90	2	146,3	113,9	3,2	6,5	130	76	19,75	113	154	107	7	2	0,28	2,37	3,53	2,32
	2	146,3	–	3,2	6,5	130	76	19,75	115	154	107	7	2	0,28	2,37	3,53	2,32
	2,1	161,4	119	4,8	9,5	130	71	19,75	118	168	108	8	2,1	0,24	2,84	4,23	2,78
	2,1	156,7	116,7	4,8	9,5	130	97	19,75	116	168	110	19	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	–	4,8	9,5	130	97	19,75	120	168	110	19	2,1	0,31	2,15	3,2	2,1
	3	182	132	4,8	9,5	130	71	19,75	131	201	108	7	2,5	0,22	3,14	4,67	3,07
	3	184,7	130,2	6,3	12,2	130	97	19,75	129	201	110	7	2,5	0,33	2,03	3,02	1,98
100	2	154,6	123,7	3,2	6,5	145	77	20,75	123	161,2	118	14	2	0,23	2,9	4,31	2,83
	2	154,6	–	3,2	6,5	145	77	20,75	123	161,2	118	14	2	0,23	2,9	4,31	2,83
	2	160	124,6	4,8	9,5	145	81	20,75	124	169	117	7	2	0,28	2,39	3,56	2,34
	2	160	–	4,8	9,5	145	81	20,75	127	169	117	7	2	0,28	2,41	3,59	2,35
	2,1	178,7	129,4	4,8	9,5	145	77	20,75	129	188	118	6	2,1	0,25	2,71	4,04	2,65
	2,1	172,7	129,1	4,8	9,5	145	105	20,75	129	188	121	17	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	–	4,8	9,5	145	105	20,75	130	188	121	17	2,1	0,33	2,06	3,06	2,01
	3	202,5	146,4	6,3	12,2	145	77	20,75	146	226	118	9	2,5	0,21	3,24	4,82	3,16
	3	204,9	143,1	8	15	145	105	20,75	135	226	121	7	2,5	0,33	2,07	3,09	2,03
110	2	164,7	133	3,2	6,5	155	72	22	133	171,2	127	7	2	0,22	3,04	4,53	2,97
	2	164,7	–	3,2	6,5	155	72	22	133	171,2	127	7	2	0,22	3,04	4,53	2,97
	2	177,4	136,2	4,8	9,5	155	88	22	136	189	128	7	2	0,28	2,39	3,56	2,34
	2	177,4	–	4,8	9,5	155	88	22	139	189	128	7	2	0,28	2,39	3,56	2,34
	2,1	192	141,9	6,3	12,2	155	88	22	141	203	128	11	2,1	0,25	2,71	4,04	2,65
	2,1	185,5	139	4,8	9,5	155	112	22	139	203	131	17	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	–	4,8	9,5	155	112	22	141	203	131	17	2,1	0,33	2,03	3,02	1,98
	3	222,4	150,7	8	15	155	112	22	150	246	131	7	2,5	0,33	2,06	3,06	2,01

Spherical roller bearings

With adapter sleeve



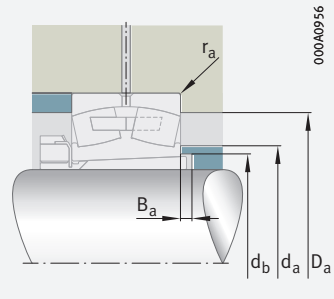


With solid cage, brass or steel

d_{1H} = 115 – 135 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
115	130	200	52	540	730	71 000	3 600	2 600	5,4	2,96	**23026-E1-XL-K-TVPB**	**H3026**
	130	200	52	540	730	71 000	3 600	2 600	5,7	2,96	**23026-E1A-XL-K-M**	**H3026**
	130	210	64	680	890	81 000	3 200	2 110	7,8	3,74	**23126-E1-XL-K-TVPB**	**H3126**
	130	210	64	680	890	81 000	3 200	2 110	8,1	3,74	**23126-E1A-XL-K-M**	**H3126**
	130	230	64	760	890	81 000	3 350	2 500	10,9	3,74	**22226-E1-XL-K**	**H3126**
	130	230	80	910	1 150	91 000	2 850	1 740	12,6	4,69	**23226-E1-XL-K-TVPB**	**H2326**
	130	230	80	910	1 150	91 000	2 850	1 740	13,6	4,69	**23226-E1A-XL-K-M**	**H2326**
	130	280	93	1 250	1 370	120 000	2 650	1 820	27,4	4,69	**22326-E1-XL-K**	**H2326**
125	140	210	53	570	800	77 000	3 450	2 390	5,8	3,3	**23028-E1-XL-K-TVPB**	**H3028**
	140	210	53	570	800	77 000	3 450	2 390	6	3,3	**23028-E1A-XL-K-M**	**H3028**
	140	225	68	760	1 010	90 000	3 000	1 930	9,5	4,46	**23128-E1-XL-K-TVPB**	**H3128**
	140	225	68	760	1 010	90 000	3 000	1 930	10,2	4,46	**23128-E1A-XL-K-M**	**H3128**
	140	250	68	870	1 040	100 000	3 150	2 250	13,7	4,46	**22228-E1-XL-K**	**H3128**
	140	250	88	1 090	1 400	116 000	2 600	1 550	17,1	5,66	**23228-E1-XL-K-TVPB**	**H2328**
	140	250	88	1 090	1 400	116 000	2 600	1 550	17,6	5,66	**23228-E1A-XL-K-M**	**H2328**
	140	300	102	1 460	1 630	135 000	2 420	1 660	34,4	5,66	**22328-E1-XL-K**	**H2328**
135	150	225	56	630	880	87 000	3 250	2 210	7,3	4,02	**23030-E1-XL-K-TVPB**	**H3030**
	150	225	56	630	880	87 000	3 250	2 210	7,3	4,02	**23030-E1A-XL-K-M**	**H3030**
	150	250	80	1 000	1 330	145 000	2 650	1 720	14,5	5,7	**23130-E1-XL-K-TVPB**	**H3130**
	150	250	80	1 000	1 330	145 000	2 650	1 720	15,8	5,7	**23130-E1A-XL-K-M**	**H3130**
	150	270	73	1 010	1 210	114 000	2 900	2 050	17,8	5,7	**22230-E1-XL-K**	**H3130**
	150	270	96	1 280	1 660	133 000	2 400	1 400	22,3	6,76	**23230-E1-XL-K-TVPB**	**H2330**
	150	270	96	1 280	1 660	133 000	2 400	1 400	22,9	6,76	**23230-E1A-XL-K-M**	**H2330**
	150	320	108	1 640	1 850	151 000	2 290	1 520	40,9	6,76	**22330-E1-XL-K**	**H2330**

medias *https://www.schaeffler.de/std/1F9A*

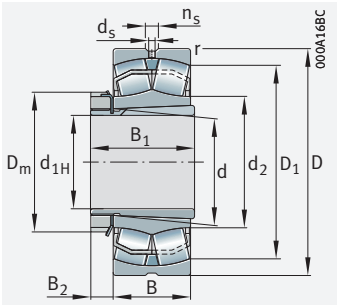


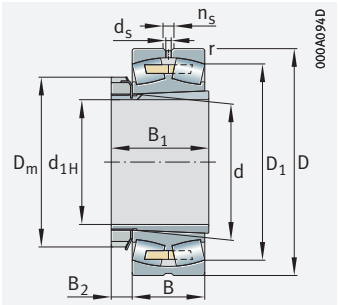
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	D_m	B_1	B_2	d_a	D_a	d_b	B_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈					≈	max.	max.	min.	min.	max.				
115	2	182,3	145,9	4,8	9,5	165	80	23	145	191,2	137	8	2	0,23	2,95	4,4	2,89
	2	182,3	–	4,8	9,5	165	80	23	146	191,2	137	8	2	0,23	2,95	4,4	2,89
	2	187,3	146	4,8	9,5	165	92	23	145	199	138	8	2	0,28	2,45	3,64	2,39
	2	187,3	–	4,8	9,5	165	92	23	149	199	138	8	2	0,28	2,45	3,64	2,39
	3	205	151,7	6,3	12,2	165	92	23	151	216	138	8	2,5	0,26	2,62	3,9	2,56
	3	199,3	150	4,8	9,5	165	121	23	150	216	142	21	2,5	0,33	2,07	3,09	2,03
	3	–	–	4,8	9,5	165	121	23	152	216	142	21	2,5	0,33	2,07	3,09	2,03
	4	239,5	162,2	9,5	17,7	165	121	23	162	263	142	8	3	0,33	2,06	3,06	2,01
125	2	192,3	155,4	4,8	9,5	180	82	24	155	201,2	147	8	2	0,22	3,07	4,57	3
	2	192,3	–	4,8	9,5	180	82	24	155	201,2	147	8	2	0,22	3,07	4,57	3
	2,1	201	157,1	4,8	9,5	180	97	24	157	213	149	8	2,1	0,27	2,49	3,71	2,43
	2,1	201	–	4,8	9,5	180	97	24	159	213	149	8	2,1	0,27	2,49	3,71	2,43
	3	223,1	164,9	6,3	12,2	180	97	24	164	236	149	8	2,5	0,25	2,67	3,97	2,61
	3	216	162	6,3	12,2	180	131	24	162	236	152	22	2,5	0,33	2,04	3,04	2
	3	216	–	6,3	12,2	180	131	24	162	236	152	22	2,5	0,33	2,04	3,04	2
	4	255,7	173,5	9,5	17,7	180	131	24	169	283	152	8	3	0,34	2	2,98	1,96
135	2,1	206,3	166,6	4,8	9,5	195	87	26	166	214,8	158	8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	–	4,8	9,5	195	87	26	166	214,8	158	8	2,1	0,22	3,1	4,62	3,03
	2,1	220,8	170,1	6,3	12,2	195	111	26	170	238	160	8	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	–	6,3	12,2	195	111	26	170	238	160	8	2,1	0,29	2,32	3,45	2,26
	3	240,8	177,9	8	15	195	111	26	177	256	160	15	2,5	0,25	2,69	4	2,63
	3	232,6	174	6,3	12,2	195	139	26	174	256	163	20	2,5	0,33	2,02	3	1,97
	3	232,6	–	6,3	12,2	195	139	26	174	256	163	20	2,5	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	195	139	26	185	303	163	8	3	0,33	2,02	3	1,97

Spherical roller bearings

With adapter sleeve



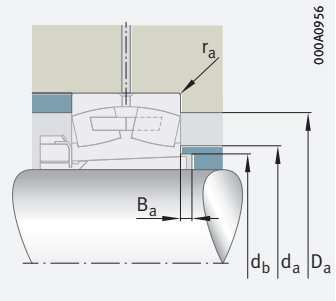


With solid cage, brass or steel

d_{1H} = 140 – 170 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
140	160	240	60	720	1 010	98 000	3 050	2 060	8,7	5,44	**23032-E1-XL-K-TVPB**	**H3032**
	160	240	60	720	1 010	98 000	3 050	2 060	9,4	5,44	**23032-E1A-XL-K-M**	**H3032**
	160	270	86	1 160	1 550	166 000	2 490	1 560	18,5	7,81	**23132-E1-XL-K-TVPB**	**H3132**
	160	270	86	1 160	1 550	166 000	2 490	1 560	18,6	7,81	**23132-E1A-XL-K-M**	**H3132**
	160	290	80	1 150	1 400	129 000	2 650	1 900	22,4	7,81	**22232-E1-XL-K**	**H3132**
	160	290	104	1 460	1 910	150 000	2 210	1 280	27,7	9,32	**23232-E1-XL-K-TVPB**	**H2332**
	160	290	104	1 460	1 910	150 000	2 210	1 280	28,5	9,32	**23232-E1A-XL-K-M**	**H2332**
	160	340	114	1 680	1 990	162 000	2 250	1 420	47,3	9,32	**22332-BE-XL-K**	**H2332**
150	170	260	67	880	1 230	151 000	2 800	1 890	11,9	6,25	**23034-E1-XL-K-TVPB**	**H3034**
	170	260	67	880	1 230	151 000	2 800	1 890	12,5	6,25	**23034-E1A-XL-K-M**	**H3034**
	170	280	88	1 220	1 690	177 000	2 380	1 460	19,9	8,6	**23134-E1-XL-K-TVPB**	**H3134**
	170	280	88	1 220	1 690	177 000	2 380	1 460	19,5	8,6	**23134-E1A-XL-K-M**	**H3134**
	170	310	86	1 320	1 570	144 000	2 550	1 780	27,1	8,6	**22234-E1-XL-K**	**H3134**
	170	310	110	1 640	2 170	168 000	2 090	1 160	33,1	10,4	**23234-E1-XL-K-TVPB**	**H2334**
	170	310	110	1 640	2 170	168 000	2 090	1 160	34,6	10,4	**23234-E1A-XL-K-M**	**H2334**
	170	360	120	1 870	2 220	178 000	2 130	1 320	56,9	10,4	**22334-BE-XL-K**	**H2334**
160	180	250	52	445	840	59 000	3 200	1 850	7,8	6,01	**23936-S-K-MB**	**H3936**
	180	280	74	1 040	1 450	173 000	2 600	1 760	15,6	7,18	**23036-E1-XL-K-TVPB**	**H3036**
	180	280	74	1 040	1 450	173 000	2 600	1 760	16	7,18	**23036-E1A-XL-K-M**	**H3036**
	180	300	96	1 420	1 950	199 000	2 230	1 350	25,9	9,8	**23136-E1-XL-K-TVPB**	**H3136**
	180	300	96	1 420	1 950	199 000	2 230	1 350	25,5	9,8	**23136-E1A-XL-K-M**	**H3136**
	180	320	86	1 360	1 680	152 000	2 470	1 670	28,5	9,8	**22236-E1-XL-K**	**H3136**
	180	320	112	1 720	2 340	178 000	2 010	1 090	36	11,6	**23236-E1-XL-K-TVPB**	**H2336**
	180	320	112	1 720	2 340	178 000	2 010	1 090	37	11,6	**23236-E1A-XL-K-M**	**H2336**
	180	380	126	2 060	2 460	195 000	2 030	1 230	66,6	11,6	**22336-BE-XL-K**	**H2336**
170	190	290	75	1 080	1 550	183 000	2 490	1 660	16,3	7,8	**23038-E1-XL-K-TVPB**	**H3038**
	190	290	75	1 080	1 550	183 000	2 490	1 660	17,7	7,8	**23038-E1A-XL-K-M**	**H3038**
	190	320	104	1 610	2 220	222 000	2 070	1 260	30,3	7,8	**23138-E1-XL-K-TVPB**	**H3138**
	190	320	104	1 610	2 220	222 000	2 070	1 260	32,4	7,8	**23138-E1A-XL-K-M**	**H3138**
	190	340	92	1 360	1 760	164 000	2 480	1 620	36	7,8	**22238-BE-XL-K**	**H3138**
	190	340	120	1 740	2 400	206 000	1 990	1 070	42,6	12,9	**23238-BE-XL-K**	**H2338**
	190	400	132	2 220	2 650	213 000	1 940	1 160	77,2	12,9	**22338-BE-XL-K**	**H2338**

medias *https://www.schaeffler.de/std/1F9A*

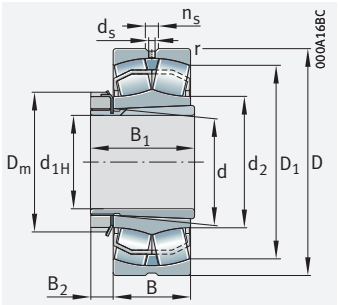


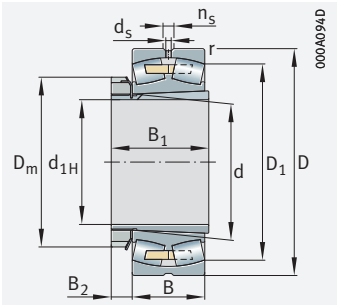
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	D_m	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
140	2,1	219,9	177	6,3	12,2	210	93	27,5	177	229,8	168	8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	–	6,3	12,2	210	93	27,5	177	229,8	168	8	2,1	0,22	3,1	4,62	3,03
	2,1	238,3	183,2	8	15	210	119	27,5	183	258	170	8	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	–	8	15	210	119	27,5	183	258	170	8	2,1	0,29	2,32	3,45	2,26
	3	258,2	190,9	8	15	210	119	27,5	190	276	170	14	2,5	0,26	2,64	3,93	2,58
	3	249,3	186,7	8	15	210	147	27,5	186	276	174	18	2,5	0,34	2	2,98	1,96
	3	249,3	–	8	15	210	147	27,5	186	276	174	18	2,5	0,34	2	2,98	1,96
	4	286,7	201,2	9,5	17,7	210	147	27,5	191	323	174	8	3	0,35	1,94	2,88	1,89
150	2,1	237,2	189,8	6,3	12,2	220	101	28,5	189	249,8	179	8	2,1	0,23	2,98	4,44	2,92
	2,1	–	–	6,3	12,2	220	101	28,5	190	249,8	179	8	2,1	0,23	2,98	4,44	2,92
	2,1	248,1	193,4	8	15	220	122	28,5	193	268	180	8	2,1	0,28	2,37	3,53	2,32
	2,1	–	–	8	15	220	122	28,5	193	268	180	8	2,1	0,28	2,37	3,53	2,32
	4	275,4	199,8	9,5	17,7	220	122	28,5	199	293	180	10	3	0,26	2,6	3,87	2,54
	4	267,4	199,8	8	15	220	154	28,5	199	293	185	18	3	0,33	2,03	3,02	1,98
	4	267,4	–	8	15	220	154	28,5	199	293	185	18	3	0,33	2,03	3,02	1,98
	4	303,9	213,1	9,5	17,7	220	154	28,5	204	343	185	8	3	0,35	1,95	2,9	1,91
160	2	230,9	–	4,8	9,5	230	87	29,5	198	241,2	188	8	2	0,2	3,42	5,09	3,34
	2,1	254,3	201,8	8	15	230	109	29,5	201	269,8	189	8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	–	8	15	230	109	29,5	201	269,8	189	8	2,1	0,23	2,9	4,31	2,83
	3	264,8	204,1	8	15	230	131	29,5	204	286	191	8	2,5	0,29	2,32	3,45	2,26
	3	264,8	–	8	15	230	131	29,5	204	286	180	8	2,5	0,29	2,32	3,45	2,26
	4	285,9	211,3	9,5	17,7	230	131	29,5	211	303	191	18	3	0,25	2,71	4,04	2,65
	4	277,3	210,6	8	15	230	161	29,5	210	303	195	22	3	0,33	2,07	3,09	2,03
	4	277,3	–	8	15	230	161	29,5	210	303	195	22	3	0,33	2,07	3,09	2,03
	4	320,8	224,9	12,5	23,5	230	161	29,5	217	363	195	8	3	0,34	1,96	2,92	1,92
170	2,1	264,5	211,9	8	15	240	112	30,5	211	279,8	199	9	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	–	8	15	240	112	30,5	211	279,8	199	9	2,1	0,23	2,98	4,44	2,92
	3	281,6	217	8	15	240	112	30,5	216	306	202	9	2,5	0,3	2,28	3,39	2,23
	3	281,6	–	8	15	240	112	30,5	216	306	202	9	2,5	0,3	2,28	3,39	2,23
	4	295,2	225,2	9,5	17,7	240	112	30,5	223	323	202	21	3	0,26	2,6	3,87	2,54
	4	289	222,4	9,5	17,7	240	169	30,5	222	323	206	21	3	0,34	1,98	2,94	1,93
	5	338,1	236,8	12,5	23,5	240	169	30,5	228	380	206	9	4	0,34	1,96	2,92	1,92

Spherical roller bearings

With adapter sleeve



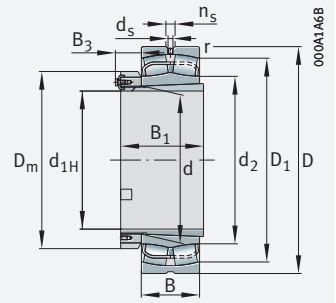


With solid cage, brass or steel

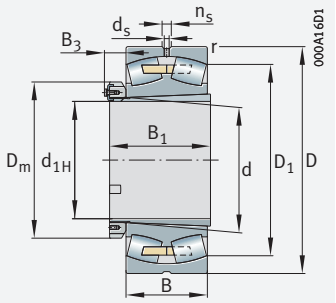
d_{1H} = 180 – 260 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695 | 1.12 ➤696 | 1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
180	200	280	60	550	1 070	73 000	2 800	1 650	11,5	8,2	**23940-S-K-MB**	**H3940**
	200	310	82	1 270	1 800	206 000	2 330	1 550	20,8	9,5	**23040-E1-XL-K-TVPB**	**H3040**
	200	310	82	1 270	1 800	206 000	2 330	1 550	21,4	9,5	**23040-E1A-XL-K-M**	**H3040**
	200	340	112	1 610	2 270	193 000	2 040	1 230	40,9	12,5	**23140-BE-XL-K**	**H3140**
	200	360	98	1 520	1 990	180 000	2 330	1 510	42,3	12,5	**22240-BE-XL-K**	**H3140**
	200	360	128	1 940	2 700	226 000	1 870	1 000	57,3	14,2	**23240-BE-XL-K**	**H2340**
	200	420	138	2 440	2 950	232 000	1 830	1 080	87,4	14,2	**22340-BE-XL-K**	**H2340**
200	220	300	60	610	1 240	74 000	2 600	1 460	12,3	8,45	**23944-S-K-MB**	**H3944**
	220	340	90	1 260	1 900	182 000	2 230	1 450	28,5	10,5	**23044-BE-XL-K**	**H3044X**
	220	370	120	1 860	2 700	223 000	1 860	1 080	50,5	16	**23144-BE-XL-K**	**H3144X**
	220	400	108	1 840	2 360	216 000	2 140	1 350	58,3	16	**22244-BE-XL-K**	**H3144X**
	220	400	144	2 380	3 300	270 000	1 700	880	75,3	17,8	**23244-BE-XL-K**	**H2344X**
	220	460	145	2 800	3 400	270 000	1 690	950	114	17,8	**22344-BE-XL-K**	**H2344X**
220	240	320	60	640	1 370	96 000	2 440	1 310	13,4	11,3	**23948-K-MB**	**H3948**
	240	360	92	1 350	2 120	200 000	2 080	1 310	31,6	13,7	**23048-BE-XL-K**	**H3048**
	240	400	128	2 130	3 150	255 000	1 700	970	62	18,7	**23148-BE-XL-K**	**H3148X**
	240	440	120	2 230	2 900	255 000	1 900	1 200	81,8	18,7	**22248-BE-XL-K**	**H3148X**
	240	440	160	2 850	4 000	315 000	1 500	770	102	20,9	**23248-BE-XL-K**	**H2348X**
	240	500	155	3 200	4 050	315 000	1 510	830	148	20,9	**22348-BEA-XL-K-MB1**	**H2348X**
240	260	360	75	940	1 940	111 000	2 100	1 190	22,4	13,6	**23952-K-MB**	**H3952**
	260	400	104	1 670	2 600	239 000	1 850	1 170	45,9	16	**23052-BE-XL-K**	**H3052X**
	260	440	144	2 600	3 900	310 000	1 500	860	87,2	23,6	**23152-BE-XL-K**	**H3152X**
	260	480	130	2 600	3 450	295 000	1 720	1 070	104	23,6	**22252-BEA-XL-K-MB1**	**H3152X**
	260	480	174	3 350	4 750	370 000	1 360	690	134	25,8	**23252-BEA-XL-K-MB1**	**H2352X**
	260	540	165	3 650	4 650	360 000	1 390	740	179	25,8	**22352-BEA-XL-K-MB1**	**H2352X**
260	280	380	75	970	2 040	133 000	2 000	1 100	24,7	15,6	**23956-K-MB**	**H3956**
	280	420	106	1 780	2 850	260 000	1 740	1 090	49,3	18,5	**23056-BE-XL-K**	**H3056**
	280	460	146	2 750	4 200	325 000	1 420	790	93,1	26,3	**23156-BE-XL-K**	**H3156X**
	280	500	130	2 750	3 700	320 000	1 650	990	109	26,3	**22256-BEA-XL-K-MB1**	**H3156X**
	280	500	176	3 550	5 200	395 000	1 280	630	143,7	29,8	**23256-BEA-XL-K-MB1**	**H2356X**
	280	580	175	4 150	5 300	405 000	1 280	670	223	29,8	**22356-BEA-XL-K-MB1**	**H2356X**

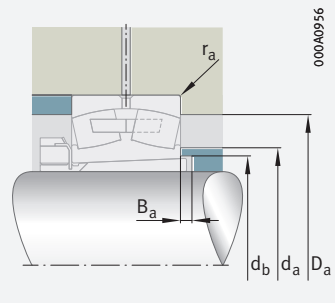
medias *https://www.schaeffler.de/std/1F9A*



With locknut and retaining bracket



With solid cage, brass or steel; with locknut and retaining bracket

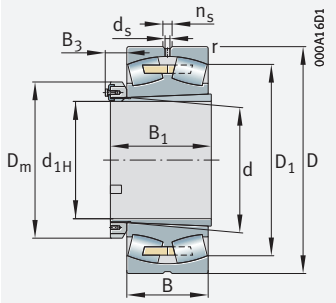


Mounting dimensions

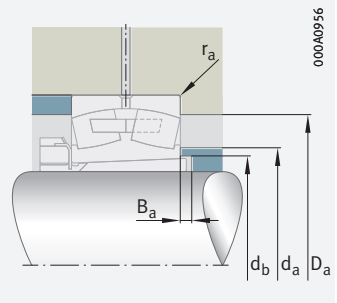
Dimensions										Mounting dimensions					Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	D_m	B_1	B_2	B_3	d_a	D_a	d_b	B_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈					≈	≈	max.	max.	min.	min.	max.				
180	2,1	256,9	–	6,3	12,2	250	98	31,5	–	220	269,8	210	9	2,1	0,2	3,42	5,09	3,34
	2,1	281,6	223,4	8	15	250	120	31,5	–	223	299,8	210	10	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	–	8	15	250	120	31,5	–	223	299,8	210	10	2,1	0,23	2,9	4,31	2,83
	3	295,8	230,4	9,5	17,7	250	150	31,5	–	231	326	212	10	2,5	0,32	2,1	3,13	2,06
	4	310,9	238,2	9,5	17,7	250	150	31,5	–	234	343	212	24	3	0,26	2,57	3,83	2,52
	4	305,3	235	9,5	17,7	250	176	31,5	–	237	343	216	20	3	0,35	1,95	2,9	1,91
	5	355,1	248,8	12,5	23,5	250	176	31,5	–	240	400	216	10	4	0,34	1,98	2,94	1,93
200	2,1	277,4	–	6,3	12,2	260	96	–	39	241	289,8	230	9	2,1	0,18	3,76	5,59	3,67
	3	304,5	248,8	8	15	260	126	–	39	247	327,6	231	12	2,5	0,24	2,81	4,19	2,75
	4	323	254,8	9,5	17,7	260	161	35	–	253	353	233	10	3	0,31	2,15	3,2	2,1
	4	346,6	260,1	9,5	17,7	260	161	35	–	258	383	233	22	3	0,26	2,57	3,83	2,52
	4	338	255,8	9,5	17,7	260	186	35	–	259	383	236	11	3	0,36	1,9	2,83	1,86
	5	391,1	273,4	12,5	23,5	260	186	35	–	272	440	236	10	4	0,33	2,06	3,06	2,01
220	2,1	297,8	–	6,3	12,2	290	101	–	45	261	309,8	250	11	2,1	0,17	4,05	6,04	3,96
	3	324,6	269,5	8	15	290	133	–	45	268	347,6	251	11	2,5	0,23	2,98	4,44	2,92
	4	349,9	275,9	9,5	17,7	290	172	37	–	276	383	254	11	3	0,31	2,18	3,24	2,13
	4	380,4	285,6	12,5	23,5	290	172	37	–	283	423	254	19	3	0,26	2,55	3,8	2,5
	4	370,8	280,8	12,5	23,5	290	199	37	–	284	423	257	6	3	0,36	1,87	2,79	1,83
	5	426,4	–	12,5	23,5	290	199	37	–	296	480	257	11	4	0,32	2,12	3,15	2,07
240	2,1	330,5	–	8	15	310	116	–	45	285	349,8	270	11	2,1	0,19	3,54	5,27	3,46
	4	358,7	295,5	9,5	17,7	310	145	–	45	291	385,4	272	13	3	0,23	2,9	4,31	2,83
	4	382,7	301,7	9,5	17,7	310	190	38	–	302	423	276	11	3	0,32	2,12	3,15	2,07
	5	415,1	–	12,5	23,5	310	190	38	–	308	460	276	25	4	0,26	2,57	3,83	2,52
	5	404,3	–	12,5	23,5	310	211	38	–	309	460	278	2	4	0,36	1,87	2,79	1,83
	6	460,6	–	12,5	23,5	310	211	38	–	322	514	278	11	5	0,31	2,15	3,2	2,1
260	2,1	350	–	8	15	330	121	–	49	303	369,8	290	12	2,1	0,18	3,76	5,59	3,67
	4	379,2	314,3	9,5	17,7	330	152	–	49	310	405,4	292	12	3	0,22	3,01	4,48	2,94
	5	403,4	321,4	9,5	17,7	330	195	39	–	321	440	296	12	4	0,31	2,21	3,29	2,16
	5	436	–	12,5	23,5	330	195	39	–	324	480	296	28	4	0,25	2,71	4,04	2,65
	5	425,4	–	12,5	23,5	330	224	39	–	329	480	299	11	4	0,34	1,96	2,92	1,92
	6	495,5	–	12,5	23,5	330	224	39	–	349	554	299	12	5	0,31	2,18	3,24	2,13

Spherical roller bearings

With adapter sleeve



With solid cage, brass or steel; with locknut and retaining bracket

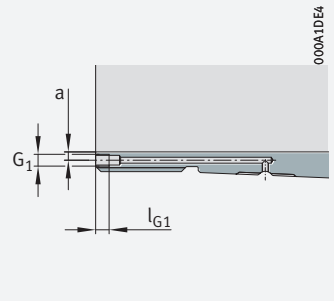


Mounting dimensions

d_{1H} = 280 – 400 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
280	300	420	90	1 270	2 650	170 000	1 780	1 000	39,1	20,9	**23960-B-K-MB**	**H3960**
	300	460	118	2 160	3 450	305 000	1 570	980	68,4	23,7	**23060-BE-XL-K**	**H3060**
	300	500	160	3 250	4 950	375 000	1 300	720	126	31,1	**23160-BEA-XL-K-MB1**	**H3160**
	300	540	140	3 100	4 250	360 000	1 500	900	139	31,1	**22260-BEA-XL-K-MB1**	**H3160**
	300	540	192	4 100	6 100	450 000	1 160	560	187	35,1	**23260-BEA-XL-K-MB1**	**H3260**
	300	620	185	4 650	6 000	450 000	1 190	610	263,6	35,1	**22360-BEA-XL-K-MB1**	**H3260-HG**
300	320	440	90	1 310	2 750	206 000	1 700	930	41	22,1	**23964-K-MB**	**H3964-HG**
	320	480	121	2 300	3 750	330 000	1 480	920	75,6	25,7	**23064-BEA-XL-K-MB1**	**H3064-HG**
	320	540	176	3 800	5 900	425 000	1 170	650	161	36,2	**23164-BEA-XL-K-MB1**	**H3164-HG**
	320	580	150	3 550	4 700	405 000	1 410	850	171	36,2	**22264-BEA-XL-K-MB1**	**H3164-HG**
	320	580	208	4 650	7 000	510 000	1 060	510	229,6	40,6	**23264-BEA-XL-K-MB1**	**H3264-HG**
320	340	520	133	2 700	4 400	375 000	1 360	840	101	30	**23068-BEA-XL-K-MB1**	**H3068-HG**
	340	580	190	4 350	6 600	480 000	1 090	600	204	51,8	**23168-BEA-XL-K-MB1**	**H3168-HG**
	340	620	224	5 300	7 900	580 000	1 000	475	292	57,2	**23268-BEA-XL-K-MB1**	**H3268-HG**
	340	710	212	6 000	8 000	570 000	1 010	500	403	57,2	**22368-BEA-XL-K-MB1**	**H3268-HG**
340	360	480	90	1 440	3 200	216 000	1 540	800	45	25,9	**23972-K-MB**	**H3972-HG**
	360	540	134	2 800	4 650	400 000	1 300	790	104	31,6	**23072-BEA-XL-K-MB1**	**H3072-HG**
	360	600	192	4 550	7 100	510 000	1 040	560	215	54,3	**23172-BEA-XL-K-MB1**	**H3172-HG**
	360	650	232	5 700	8 900	630 000	930	430	330,5	63,8	**23272-BEA-XL-K-MB1**	**H3272-HG**
	360	750	224	6 600	8 800	620 000	710	470	476	63,8	**22372-BEA-XL-K-MB1**	**H3272-HG**
360	380	520	106	1 780	4 000	270 000	1 340	750	66,3	32,1	**23976-K-MB**	**H3976-HG**
	380	560	135	2 900	5 000	420 000	1 230	740	109	36,2	**23076-BEA-XL-K-MB1**	**H3076-HG**
	380	620	194	4 700	7 600	540 000	990	530	227	64,1	**23176-BEA-XL-K-MB1**	**H3176-HG**
	380	680	240	6 200	9 600	680 000	890	400	374	72,4	**23276-BEA-XL-K-MB1**	**H3276-HG**
380	400	540	106	1 830	4 150	280 000	1 290	710	68,2	35,4	**23980-B-K-MB**	**H3980-HG**
	400	600	148	3 400	5 700	480 000	1 150	690	144	41,7	**23080-BEA-XL-K-MB1**	**H3080-HG**
	400	650	200	5 000	8 100	590 000	950	495	246	71,3	**23180-BEA-XL-K-MB1**	**H3180-HG**
	400	720	256	7 000	10 900	750 000	820	370	450	83,7	**23280-BEA-XL-K-MB1**	**H3280-HG**
	400	820	243	7 800	10 500	730 000	850	410	605	83,7	**22380-BEA-XL-K-MB1**	**H3280-HG**
400	420	560	106	1 910	4 450	310 000	1 230	660	72,1	38,6	**23984-K-MB**	**H3984-HG**
	420	620	150	3 650	6 300	520 000	1 090	650	153	45,7	**23084-BEA-XL-K-MB1**	**H3084X-HG**
	420	700	224	6 000	9 600	660 000	860	455	342	88,4	**23184-BEA-XL-K-MB1**	**H3184-HG**
	420	760	272	7 800	12 300	820 000	770	340	537	98,7	**23284-BEA-XL-K-MB1**	**H3284-HG**

medias *https://www.schaeffler.de/std/1F9A*

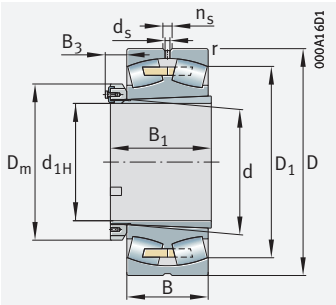


Hydraulic adapter sleeve (..-HG)
Mounting dimensions

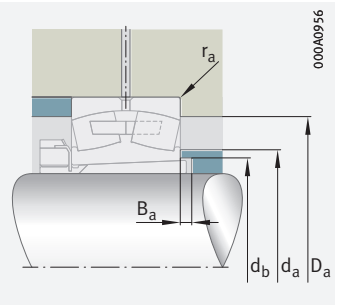
Dimensions									Mounting dimensions								Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	D_m	B_1	B_3	d_a	D_a	d_b	B_a	r_a	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
	min.	≈	≈					≈	max.	max.	min.	min.	max.							
280	3	384,6	–	9,5	17,7	360	140	53	329	407,6	311	12	2,5	–	–	–	0,2	3,42	5,09	3,34
	4	413	340	9,5	17,7	360	168	53	337	445,4	313	12	3	–	–	–	0,23	2,92	4,35	2,86
	5	436,8	–	9,5	17,7	360	208	52	347	480	318	12	4	–	–	–	0,31	2,18	3,24	2,13
	5	470,5	–	12,5	23,5	360	208	52	352	520	318	32	4	–	–	–	0,25	2,71	4,04	2,65
	5	458	–	12,5	23,5	360	240	52	353	520	321	12	4	–	–	–	0,35	1,92	2,86	1,88
	7,5	530,3	–	12,5	23,5	380	240	52	332	588	321	12	6	M6	4,2	7	0,31	2,21	3,29	2,16
300	3	406,2	–	9,5	17,7	380	140	54	349	427,6	332	12	2,5	M6	3,5	7	0,19	3,62	5,39	3,54
	4	433	–	9,5	17,7	380	171	54	357	465,4	334	13	3	M6	3,5	7	0,22	3,01	4,48	2,94
	5	469,3	–	12,5	23,5	380	226	55	369	520	338	13	4	M6	3,5	7	0,32	2,13	3,17	2,08
	5	505,1	–	12,5	23,5	380	226	55	378	560	338	39	4	M6	3,5	7	0,25	2,71	4,04	2,65
	5	490,4	–	12,5	23,5	380	258	55	378	560	343	13	4	M6	3,5	7	0,35	1,91	2,85	1,87
320	5	467,1	–	12,5	23,5	320	187	57	382	502	355	14	4	M6	3,5	7	0,23	2,92	4,35	2,86
	5	502,6	–	12,5	23,5	320	254	70	395	560	360	14	4	M6	3,5	7	0,32	2,1	3,13	2,06
	6	523,5	–	12,5	23,5	320	288	70	402	594	364	14	5	M6	3,5	7	0,36	1,85	2,76	1,81
	7,5	605,95	–	12,5	23,5	440	288	70	372	678	364	14	6	M6	3,5	7	0,31	2,2	3,27	2,15
340	3	447,1	–	9,5	17,7	420	144	57	389	467,6	372	14	2,5	M6	3,5	7	0,17	4,05	6,04	3,96
	5	487,6	–	12,5	23,5	420	188	57	402	522	375	14	4	M6	3,5	7	0,22	3,04	4,53	2,97
	5	523,3	–	12,5	23,5	420	259	73	416	580	380	14	4	M6	3,5	7	0,31	2,18	3,24	2,13
	6	550,8	–	12,5	23,5	420	299	73	424	624	385	14	5	M6	3,5	7	0,36	1,9	2,83	1,86
	7,5	640	–	12,5	23,5	460	299	73	392	718	385	14	6	M6	3,5	7	0,31	2,2	3,27	2,15
360	4	477,6	–	9,5	17,7	450	164	61	415	505,4	393	15	3	M6	3,5	7	0,19	3,58	5,33	3,5
	5	508,1	–	12,5	23,5	450	193	61	422	542	396	15	4	M6	3,5	7	0,21	3,17	4,72	3,1
	5	543,6	–	12,5	23,5	450	264	75	436	600	401	15	4	M6	3,5	7	0,3	2,25	3,34	2,2
	6	578,1	–	12,5	23,5	450	310	75	447	654	405	15	5	M6	3,5	7	0,35	1,92	2,86	1,88
380	4	499	–	9,5	17,7	470	168	65	435	525,4	413	15	3	M6	3,5	7	0,18	3,71	5,52	3,63
	5	541,9	–	12,5	23,5	470	210	65	448	582	417	15	4	M6	3,5	7	0,22	3,07	4,57	3
	6	571,4	–	12,5	23,5	470	272	80	457	624	421	15	5	M6	3,5	7	0,29	2,3	3,42	2,25
	6	611,2	–	12,5	23,5	470	328	80	473	694	427	15	5	M6	3,5	7	0,36	1,9	2,83	1,86
	7,5	701,3	–	12,5	23,5	520	328	80	432	788	427	15	6	M6	3,5	7	0,31	2,21	3,29	2,16
400	4	519,5	–	9,5	17,7	490	168	65	455	545,4	433	15	3	M6	3,5	7	0,18	3,85	5,73	3,76
	5	560,7	–	12,5	23,5	490	212	65	468	602	437	16	4	M6	3,5	7	0,21	3,17	4,72	3,1
	6	609,8	–	12,5	23,5	490	304	88	483	674	443	16	5	M6	3,5	7	0,31	2,18	3,24	2,13
	7,5	643,4	–	12,5	23,5	490	352	88	495	728	449	16	6	M6	3,5	7	0,36	1,89	2,81	1,84

Spherical roller bearings

With adapter sleeve



With solid cage, brass or steel; with locknut and retaining bracket

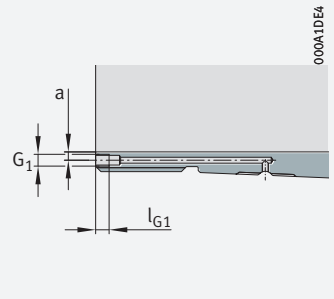


Mounting dimensions

d_{1H} = 410 – 560 mm

Main dimensions				Basic load ratings		C_{ur}	n_G	$n_{\vartheta r}$	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}				Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	kN	min^{-1}	min^{-1}	≈ kg	≈ kg		
410	440	600	118	2 230	5 200	305	1 130	620	98,3	59	**23988-K-MB**	**H3988-HG**
	440	650	157	3 950	6 900	560	1 030	610	176	67,7	**23088-BEA-XL-K-MB1**	**H3088-HG**
	440	720	226	6 200	10 200	700	820	430	358	108	**23188-BEA-XL-K-MB1**	**H3188-HG**
	440	790	280	8 300	13 200	880	730	320	592	123	**23288-BEA-XL-K-MB1**	**H3288-HG**
430	460	620	118	2 270	5 400	380	1 080	590	103	62,4	**23992-B-K-MB**	**H3992-HG**
	460	680	163	4 300	7 500	610	980	580	201	71,8	**23092-BEA-XL-K-MB1**	**H3092-HG**
	460	760	240	6 900	11 500	760	770	395	431	118	**23192-BEA-XL-K-MB1**	**H3192-HG**
	460	830	296	9 200	14 700	960	690	295	695	138,9	**23292-BEA-XL-K-MB1**	**H3292-HG**
450	480	650	128	2 550	6 000	470	1 040	570	121	66,8	**23996-B-K-MB**	**H3996-HG**
	480	700	165	4 450	8 000	640	950	550	210	76,8	**23096-BEA-XL-K-MB1**	**H3096-HG**
	480	790	248	7 400	12 400	820	740	375	479	135	**23196-BEA-XL-K-MB1**	**H3196-HG**
	480	870	310	10 000	16 200	1 040	650	275	804	159,2	**23296-BEA-XL-K-MB1**	**H3296-HG**
470	500	670	128	2 600	6 300	410	990	540	124	76,1	**239/500-K-MB**	**H39/500-HG**
	500	720	167	4 700	8 700	760	890	510	223	85,2	**230/500-BEA-XL-K-MB1**	**H30/500-HG**
	500	830	264	8 300	13 900	890	690	350	574	149,9	**231/500-BEA-XL-K-MB1**	**H31/500-HG**
500	530	710	136	2 850	6 900	395	930	500	146	91,6	**239/530-K-MB**	**H39/530-HG**
	530	780	185	5 600	10 100	860	820	475	302	103	**230/530-BEA-XL-K-MB1**	**H30/530-HG**
	530	870	272	8 900	15 000	960	660	325	634	161	**231/530-BEA-XL-K-MB1**	**H31/530-HG**
	530	980	355	12 700	20 400	1 270	570	235	1 183	192	**232/530-BEA-XL-K-MB1**	**H32/530-HG**
530	560	750	140	3 100	7 600	540	880	465	176	98,5	**239/560-B-K-MB**	**H39/560-HG**
	560	820	195	6 100	11 200	940	760	440	350	112	**230/560-BEA-XL-K-MB1**	**H30/560-HG**
	560	920	280	9 700	16 400	1 060	630	300	731	184	**231/560-BEA-XL-K-MB1**	**H31/560-HG**
	560	1 030	355	13 000	21 800	1 380	540	220	1 346	218	**232/560-BEA-XL-K-MB1**	**H32/560-HG**
560	600	800	150	3 450	8 600	640	810	430	210	132,2	**239/600-B-K-MB**	**H39/600-HG**
	600	870	200	6 600	12 300	1 020	710	405	398	152,3	**230/600-BEA-XL-K-MB1**	**H30/600-HG**
	600	920	355	13 300	24 000	1 580	485	159	1 099	249	**241/600-BEA-XL-K30-MB1**	**H241/600-HG**
	600	980	300	10 900	18 600	1 180	580	275	880	241,8	**231/600-BEA-XL-K-MB1**	**H31/600-HG**
	600	1 090	388	15 200	25 500	1 530	495	194	1 584	279	**232/600-BEA-XL-K-MB1**	**H32/600-HG**

medias *https://www.schaeffler.de/std/1F9A*

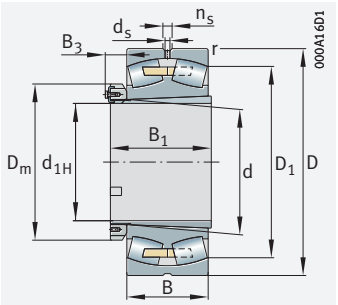


Hydraulic adapter sleeve (..-HG)
Mounting dimensions

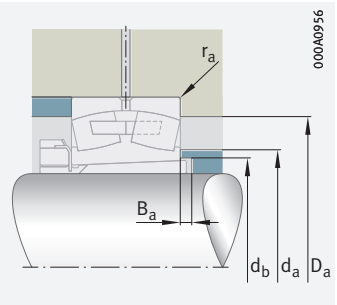
Dimensions								Mounting dimensions							Calculation factors			
d_{1H}	r	D_1	d_s	n_s	D_m	B_1	B_3	d_a	D_a	d_b	B_a	r_a	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
	min.	≈					≈	max.	max.	min.	min.	max.							
410	4	552,8	12,5	23,5	520	189	75	482	585,4	454	17	3	M8	6,5	12	0,18	3,66	5,46	3,58
	6	589,3	12,5	23,5	520	228	75	488	627	458	17	5	M8	6,5	12	0,21	3,17	4,72	3,1
	6	630,2	12,5	23,5	520	307	88	504	694	463	17	5	M8	6,5	12	0,3	2,25	3,34	2,2
	7,5	670,7	12,5	23,5	520	361	88	516	758	469	17	6	M8	6,5	12	0,35	1,91	2,85	1,87
430	4	573,3	12,5	23,5	540	189	75	500	605,4	474	17	3	M8	6,5	12	0,18	3,85	5,73	3,76
	6	616,7	12,5	23,5	540	234	75	509	657	478	17	5	M8	6,5	12	0,21	3,17	4,72	3,1
	7,5	663,4	12,5	23,5	540	326	93	533	728	484	17	6	M8	6,5	12	0,31	2,21	3,29	2,16
	7,5	704,9	12,5	23,5	540	382	93	541	798	490	17	6	M8	6,5	12	0,36	1,9	2,83	1,86
450	5	598,8	12,5	23,5	560	200	75	523	632	496	18	4	M8	6,5	12	0,18	3,76	5,59	3,67
	6	637,3	12,5	23,5	560	237	75	529	677	499	18	5	M8	6,5	12	0,21	3,27	4,87	3,2
	7,5	690,4	12,5	23,5	560	335	93	554	758	505	18	6	M8	6,5	12	0,3	2,23	3,32	2,18
	7,5	737,6	12,5	23,5	560	397	93	568	838	512	18	6	M8	6,5	12	0,36	1,9	2,83	1,86
470	5	619,3	12,5	23,5	580	208	83	543	652	516	18	4	M8	6,5	12	0,17	3,9	5,81	3,81
	6	656,5	12,5	23,5	580	247	83	550	697	519	18	5	M8	6,5	12	0,21	3,24	4,82	3,16
	7,5	723,1	12,5	23,5	580	356	98	578	798	527	18	6	M8	6,5	12	0,31	2,2	3,27	2,15
500	5	656,5	12,5	23,5	630	216	88	576	692	546	18	4	M8	6	12	0,18	3,85	5,73	3,76
	6	708	12,5	23,5	630	265	88	589	757	550	18	5	M8	6	12	0,22	3,1	4,62	3,03
	7,5	760,5	12,5	23,5	630	364	102	609	838	558	18	6	M8	6	12	0,3	2,25	3,34	2,2
	9,5	826,4	12,5	23,5	670	447	102	570	940	566	20	8	M8	6	12	0,37	1,84	2,74	1,8
530	5	693,4	12,5	23,5	650	227	95	609	732	577	18	4	M8	6	12	0,17	3,95	5,88	3,86
	6	745	12,5	23,5	650	282	95	619	797	581	18	5	M8	6	12	0,22	3,1	4,62	3,03
	7,5	806,6	12,5	23,5	650	377	107	644	888	589	18	6	M8	6	12	0,29	2,32	3,45	2,26
	9,5	872,6	12,5	23,5	710	462	107	600	990	596	20	8	M8	6	12	0,36	1,89	2,81	1,84
560	5	740,5	12,5	23,5	700	239	95	653	782	618	20	4	$G^1/_8$	8	12	0,17	3,95	5,88	3,86
	6	793,3	12,5	23,5	700	289	95	661	847	622	20	5	$G^1/_8$	8	12	0,21	3,24	4,82	3,16
	7,5	791,5	12,5	23,5	750	490	108	592	888	–	–	6	$G^1/_8$	8	12	0,37	1,84	2,74	1,8
	7,5	859,35	12,5	23,5	750	399	108	632	948	632	22	6	$G^1/_8$	8	12	0,29	2,3	3,42	2,25
	9,5	924	12,5	23,5	750	487	108	640	1 050	639	22	8	$G^1/_8$	8	12	0,36	1,9	2,83	1,86

Spherical roller bearings

With adapter sleeve



With solid cage, brass or steel; with locknut and retaining bracket

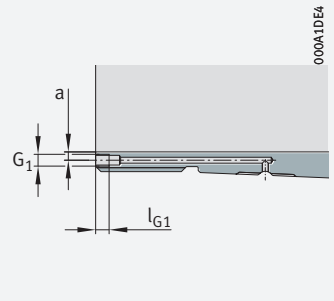


Mounting dimensions

d_{1H} = 600 – 750 mm

Main dimensions				Basic load ratings		C_{ur}	n_G	$n_{\vartheta r}$	Mass m		Designation ➤695 | 1.12 ➤696 | 1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}				Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	kN	min^{-1}	min^{-1}	≈ kg	≈ kg		
600	630	850	165	4 100	9 900	720	740	405	283	126,3	**239/630-B-K-MB**	**H39/630-HG**
	630	920	212	7 400	13 700	1 130	670	380	476	143,1	**230/630-BEA-XL-K-MB1**	**H30/630-HG**
	630	1 030	315	12 000	20 600	1 280	540	255	1 025	261,9	**231/630-BEA-XL-K-MB1**	**H31/630-HG**
	630	1 030	400	14 800	27 000	1 720	455	146	1 292	273,1	**241/630-BEA-XL-K30-MB1**	**H241/630-HG**
	630	1 150	412	16 900	28 500	1 680	460	179	1 885	297	**232/630-BEA-XL-K-MB1**	**H32/630-HG**
630	670	900	170	4 300	10 600	760	710	375	310	166	**239/670-B-K-MB**	**H39/670-HG**
	670	980	230	8 400	15 900	1 100	630	480	581	194	**230/670-BEA-XL-K-MB1**	**H30/670-HG**
	670	980	308	10 500	21 100	1 540	510	241	775	218	**240/670-BEA-XL-K30-MB1**	**H240/670-HG**
	670	1 090	336	13 300	23 800	1 410	370	231	1 211	353,3	**231/670-BEA-XL-K-MB1**	**H31/670-HG**
	670	1 090	412	16 100	29 500	1 900	430	134	1 485	355	**241/670-BEA-XL-K30-MB1**	**H241/670-HG**
	670	1 220	438	19 000	32 500	1 860	425	162	2 240	402	**232/670-BEA-XL-K-MB1**	**H32/670-HG**
670	710	950	180	4 800	12 100	740	670	350	336	206	**239/710-K-MB**	**H39/710-HG**
	710	1 030	236	9 000	17 300	1 390	580	320	658	234,2	**230/710-BEA-XL-K-MB1**	**H30/710-HG**
	710	1 030	315	11 000	22 500	1 660	485	225	866	254	**240/710-BEA-XL-K30-MB1**	**H240/710-HG**
	710	1 150	345	14 400	25 500	1 550	470	216	1 383	376	**231/710-BEA-XL-K-MB1**	**H31/710-HG**
	710	1 280	450	20 500	35 000	2 020	410	151	2 474	444	**232/710-BEA-XL-K-MB1**	**H32/710-HG**
710	750	1 000	185	5 200	13 000	810	640	325	394	219,6	**239/750-K-MB**	**H39/750-HG**
	750	1 090	250	10 100	19 300	1 540	550	300	797,4	248	**230/750-BEA-XL-K-MB1**	**H30/750-HG**
	750	1 090	355	12 300	25 500	1 860	450	207	1 053	278	**240/750-BEA-XL-K30-MB1**	**H240/750-HG**
	750	1 220	365	16 000	28 500	1 720	440	198	1 640	432	**231/750-BEA-XL-K-MB1**	**H31/750-HG**
	750	1 360	475	22 800	39 500	2 240	380	137	2 969	508	**232/750-BEA-XL-K-MB1**	**H32/750-HG**
750	800	1 060	195	5 900	15 100	1 030	580	295	490	268,9	**239/800-B-K-MB**	**H39/800-HG**
	800	1 150	258	10 900	21 200	1 680	520	275	865,4	311,6	**230/800-BEA-XL-K-MB1**	**H30/800-HG**
	800	1 150	345	13 300	28 000	1 980	420	189	1 168	349	**240/800-BEA-XL-K30-MB1**	**H240/800-HG**
	800	1 280	375	17 100	31 500	1 850	415	181	1 861	515	**231/800-BEA-XL-K-MB1**	**H31/800-HG**
	800	1 420	488	24 400	43 500	2 420	355	125	3 339	611	**232/800-BEA-XL-K-MB1**	**H32/800-HG**

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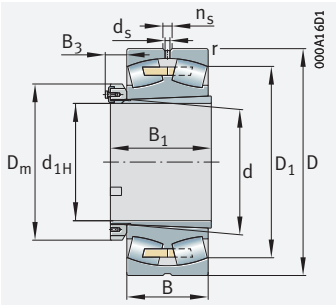


Hydraulic adapter sleeve (..-HG)
Mounting dimensions

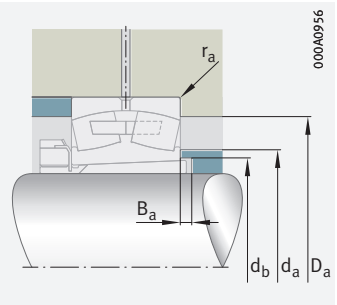
Dimensions								Mounting dimensions								Calculation factors			
d_{1H}	r min.	D_1 ≈	d_s	n_s	D_m	B_1	B_3 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
600	6	784,5	12,5	23,5	730	254	95	688	827	649	20	5	M8	6	12	0,18	3,8	5,66	3,72
	7,5	838,2	12,5	23,5	730	301	95	696	892	653	20	6	M8	6	12	0,21	3,24	4,82	3,16
	7,5	902,1	12,5	23,5	800	424	118	662	998	663	22	6	M8	6	12	0,29	2,3	3,42	2,25
	7,5	876,2	12,5	23,5	800	525	118	662	998	–	–	6	M8	6	12	0,37	1,82	2,7	1,78
	12	973,4	12,5	23,5	800	521	118	678	1 102	672	22	10	M8	6	12	0,36	1,87	2,79	1,83
630	6	831,5	12,5	23,5	780	264	101	730	877	689	20	5	$G^1/_8$	8	12	0,17	3,95	5,88	3,86
	7,5	888,7	12,5	23,5	780	324	101	698	952	695	22	6	$G^1/_8$	8	12	0,22	3,14	4,67	3,07
	7,5	878,2	12,5	23,5	780	418	101	698	952	–	–	6	$G^1/_8$	8	12	0,28	2,39	3,56	2,34
	7,5	954,85	12,5	23,5	850	456	129	702	1 058	704	22	6	$G^1/_8$	8	12	0,29	2,3	3,42	2,25
	7,5	937	12,5	23,5	850	548	129	702	1 058	–	–	6	$G^1/_8$	8	12	0,36	1,87	2,79	1,83
	12	1 032,6	12,5	23,5	850	558	129	718	1 172	712	22	12	$G^1/_8$	8	12	0,36	1,87	2,79	1,83
670	6	877,5	12,5	23,5	830	286	110	770	927	730	22	5	$G^1/_8$	8	12	0,18	3,85	5,73	3,76
	7,5	939,6	12,5	23,5	830	342	110	738	1 002	736	26	6	$G^1/_8$	8	12	0,21	3,24	4,82	3,16
	7,5	925	12,5	23,5	830	438	110	738	1 002	–	–	6	$G^1/_8$	8	12	0,28	2,43	3,61	2,37
	9,5	1 010,8	12,5	23,5	900	467	132	750	1 110	745	26	8	$G^1/_8$	8	12	0,29	2,35	3,5	2,3
	12	1 089	12,5	23,5	900	572	132	758	1 232	753	26	10	$G^1/_8$	8	12	0,35	1,92	2,86	1,88
710	6	923,2	12,5	23,5	870	291	110	810	977	771	23	5	$G^1/_8$	8	12	0,17	3,95	5,88	3,86
	7,5	992,8	12,5	23,5	870	356	110	778	1 062	778	26	6	$G^1/_8$	8	12	0,21	3,24	4,82	3,16
	7,5	977,5	12,5	23,5	870	460	110	778	1 062	–	–	6	$G^1/_8$	8	12	0,28	2,41	3,59	2,35
	9,5	1 070,8	12,5	23,5	950	493	137	790	1 180	787	26	8	$G^1/_8$	8	12	0,28	2,37	3,53	2,32
	15	1 157,6	12,5	23,5	950	603	137	808	1 302	796	26	12	$G^1/_8$	8	12	0,35	1,94	2,88	1,89
750	6	983,7	12,5	23,5	920	303	110	865	1 037	822	25	5	$G^1/_8$	10	12	0,17	4,05	6,04	3,96
	7,5	1 050,4	12,5	23,5	920	366	110	828	1 122	829	28	6	$G^1/_8$	10	12	0,2	3,31	4,92	3,23
	7,5	1 035,7	12,5	23,5	920	475	110	828	1 122	–	–	6	$G^1/_8$	10	12	0,27	2,49	3,71	2,43
	9,5	1 129,5	12,5	23,5	1 000	505	137	840	1 240	838	28	8	$G^1/_8$	10	12	0,28	2,43	3,61	2,37
	15	1 215,3	12,5	23,5	1 000	618	137	858	1 362	848	28	12	$G^1/_8$	10	12	0,34	1,99	2,96	1,94

Spherical roller bearings

With adapter sleeve



With solid cage, brass or steel; with locknut and retaining bracket

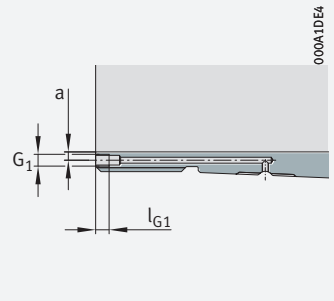


Mounting dimensions

d_{1H} = 800 – 1 060 mm

Main dimensions				Basic load ratings		C_{ur}	n_G	$n_{\vartheta r}$	Mass m		Designation ➤695 | 1.12 ➤696 | 1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}				Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	kN	min^{-1}	min^{-1}	≈ kg	≈ kg		
800	850	1 120	200	6 300	16 400	980	550	275	554	298,5	**239/850-K-MB**	**H39/850-HG**
	850	1 220	272	11 900	24 000	1 840	475	255	1 038	350,8	**230/850-BEA-XL-K-MB1**	**H30/850-HG**
	850	1 220	365	14 800	31 500	2 210	390	173	1 375	393	**240/850-BEA-XL-K30-MB1**	**H240/850-HG**
	850	1 360	400	19 200	36 000	2 060	385	164	2 241	590	**231/850-BEA-XL-K-MB1**	**H31/850-HG**
	850	1 500	515	27 000	48 500	2 650	335	115	3 905	696	**232/850-BEA-XL-K-MB1**	**H32/850-HG**
850	900	1 180	206	6 500	17 200	1 030	520	260	641	335	**239/900-K-MB**	**H39/900-HG**
	900	1 280	280	12 800	25 500	1 990	340	239	1 163	392	**230/900-BEA-XL-K-MB1**	**H30/900-HG**
	900	1 280	375	13 500	34 500	2 430	370	160	1 560	446	**240/900-BEA-XL-K30-MB1**	**H240/900-HG**
	900	1 420	412	20 700	38 500	2 230	365	155	2 456	674	**231/900-BEA-XL-K-MB1**	**H31/900-HG**
	900	1 580	515	28 500	52 000	2 900	320	105	4 336	775	**232/900-BEA-XL-K-MB1**	**H32/900-HG**
900	950	1 360	300	14 400	29 000	2 160	420	220	1 425	432	**230/950-BEA-XL-K-MB1**	**H30/950-HG**
	950	1 360	412	18 400	40 000	2 650	340	147	1 966	499	**240/950-BEA-XL-K30-MB1**	**H240/950-HG**
950	1 000	1 420	412	19 100	42 000	2 850	325	137	2 115	539	**240/1000-BEA-XL-K30-MB1**	**H240/1000-HG**
1 000	1 060	1 500	438	21 400	47 500	3 150	305	126	2 470	665	**240/1060-BEA-XL-K30-MB1**	**H240/1060-HG**
1 060	1 120	1 580	462	21 800	58 000	3 500	285	116	2 884	728	**240/1120-BEA-XL-K30-MB1**	**H240/1120-HG**

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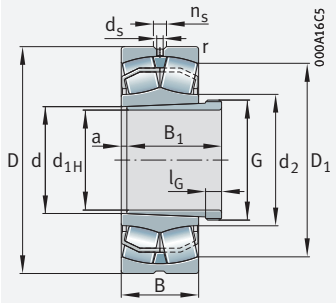


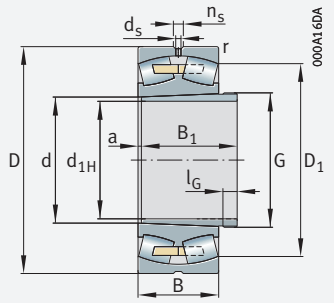
Hydraulic adapter sleeve (..-HG)
Mounting dimensions

Dimensions								Mounting dimensions							Calculation factors			
d_{1H}	r min.	D_1 ≈	d_s	n_s	D_m	B_1	B_3 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
800	6	1 039,9	12,5	23,5	980	308	113	917	1 097	873	25	5	$G^1/_8$	10	12	0,16	4,11	6,12	4,02
	7,5	1 115,1	12,5	23,5	980	380	113	878	1 192	880	28	6	$G^1/_8$	10	12	0,2	3,34	4,98	3,27
	7,5	1 099,4	12,5	23,5	980	495	113	878	1 192	–	–	6	$G^1/_8$	10	12	0,27	2,51	3,74	2,45
	12	1 199,1	12,5	23,5	1 060	536	144	898	1 312	890	28	10	$G^1/_8$	10	12	0,28	2,43	3,61	2,37
	15	1 285,3	12,5	23,5	1 060	651	144	908	1 442	900	28	12	$G^1/_8$	10	12	0,34	1,99	2,96	1,94
850	6	1 098,8	12,5	23,5	1 030	326	122	972	1 157	923	27	5	$G^1/_8$	10	12	0,16	4,28	6,37	4,19
	7,5	1 174,3	12,5	23,5	1 030	400	122	928	1 252	931	30	6	$G^1/_8$	10	12	0,2	3,42	5,09	3,34
	7,5	1 157,4	12,5	23,5	1 030	520	122	928	1 252	–	–	6	$G^1/_8$	10	12	0,26	2,57	3,83	2,52
	12	1 256,2	12,5	23,5	1 120	557	150	948	1 372	942	30	10	$G^1/_8$	10	12	0,27	2,47	3,67	2,41
	15	1 365,5	12,5	23,5	1 120	660	150	958	1 522	950	30	12	$G^1/_8$	10	12	0,32	2,12	3,15	2,07
900	7,5	1 245,7	12,5	23,5	1 080	420	122	978	1 332	983	30	6	$G^1/_8$	10	12	0,2	3,38	5,03	3,31
	7,5	1 220,4	12,5	23,5	1 080	557	122	978	1 332	–	–	6	$G^1/_8$	10	12	0,27	2,47	3,67	2,41
950	7,5	1 282,2	12,5	23,5	1 140	562	122	1 028	1 392	–	–	6	$G^1/_8$	10	12	0,26	2,6	3,87	2,54
1 000	9,5	1 354	12,5	23,5	1 200	588	122	1 094	1 466	–	–	8	$G^1/_4$	12	15	0,26	2,57	3,83	2,52
1 060	9,5	1 429,7	12,5	23,5	1 260	612	122	1 154	1 546	–	–	8	$G^1/_4$	12	15	0,26	2,57	3,83	2,52

Spherical roller bearings

With withdrawal sleeve



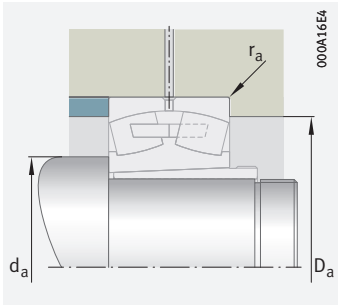


With solid cage, brass or steel

d_{1H} = 35 – 75 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
35	40	80	23	101	91	12 100	10 500	6 200	0,528	0,09	**22208-E1-XL-K**	**AH308**
	40	90	23	109	107	14 600	9 800	5 200	0,749	0,09	**21308-E1-XL-K**	**AH308**
	40	90	33	156	149	13 500	7 600	5 500	1	0,13	**22308-E1-XL-K**	**AH2308**
40	45	85	23	104	99	13 000	10 100	5 600	0,577	0,11	**22209-E1-XL-K**	**AH309**
	45	100	25	129	130	17 700	9 000	4 750	0,999	0,11	**21309-E1-XL-K**	**AH309**
	45	100	36	187	183	16 500	6 800	5 000	1,4	0,17	**22309-E1-XL-K**	**AH2309**
45	50	90	23	109	107	14 600	9 800	5 100	0,608	0,14	**22210-E1-XL-K**	**AHX310**
	50	110	27	129	130	17 700	9 000	5 400	1,32	0,14	**21310-E1-XL-K**	**AHX310**
	50	110	40	229	223	20 700	6 300	4 800	1,9	0,22	**22310-E1-XL-K**	**AHX2310**
50	55	100	25	129	130	17 700	9 000	4 650	0,825	0,17	**22211-E1-XL-K**	**AHX311**
	55	120	29	160	155	20 700	8 100	5 100	1,28	0,17	**21311-E1-XL-K**	**AHX311**
	55	120	43	265	260	24 600	5 800	4 500	2,2	0,26	**22311-E1-XL-K**	**AHX2311**
55	60	110	28	160	155	20 700	8 100	4 550	1,09	0,2	**22212-E1-XL-K**	**AHX312**
	60	130	31	211	226	28 500	6 700	4 100	1,89	0,2	**21312-E1-XL-K**	**AHX312**
	60	130	46	310	310	29 000	5 400	4 200	2,8	0,32	**22312-E1-XL-K**	**AHX2312**
60	65	120	31	202	210	26 500	7 000	4 200	1,52	0,23	**22213-E1-XL-K**	**AH313G**
	65	140	33	250	270	34 500	6 200	3 600	2,13	0,23	**21313-E1-XL-K**	**AH313G**
	65	140	48	350	365	33 500	5 000	3 800	3,5	0,36	**22313-E1-XL-K**	**AH2313G**
65	70	125	31	211	226	28 500	6 700	3 950	1,61	0,26	**22214-E1-XL-K**	**AH314G**
	70	150	35	250	270	34 500	6 200	3 950	3,13	0,26	**21314-E1-XL-K**	**AH314G**
	70	150	51	390	390	37 500	4 800	3 700	4,1	0,42	**22314-E1-XL-K**	**AHX2314G**
70	75	130	31	216	237	30 500	6 500	3 700	1,68	0,29	**22215-E1-XL-K**	**AH315G**
	75	160	37	305	325	39 000	5 700	3 750	3,74	0,29	**21315-E1-XL-K**	**AH315G**
	75	160	55	445	450	42 000	4 500	3 550	5,3	0,48	**22315-E1-XL-K**	**AHX2315G**
75	80	140	33	250	270	34 500	6 200	3 550	2,08	0,38	**22216-E1-XL-K**	**AH316**
	80	170	39	305	325	39 000	5 700	4 050	4,54	0,38	**21316-E1-XL-K**	**AH316**
	80	170	58	495	510	46 500	4 250	3 400	6,1	0,61	**22316-E1-XL-K**	**AHX2316**

medias *https://www.schaeffler.de/std/1F9A*

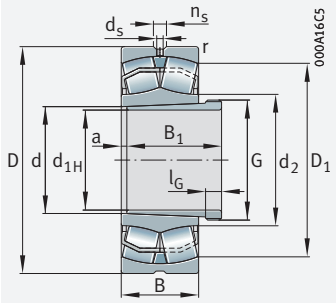


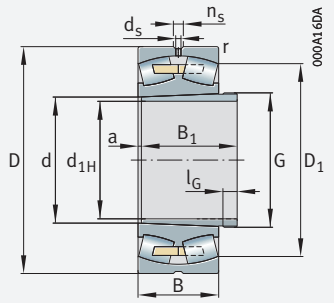
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
35	1,1	70,4	48,8	3,2	4,8	3	6	M45×1,5	29	47	73	1	0,27	2,49	3,71	2,43
	1,5	80,8	59,9	3,2	4,8	3	6	M45×1,5	29	49	81	1,5	0,23	2,95	4,4	2,89
	1,5	76	52,4	3,2	6,5	3	7	M45×1,5	40	49	81	1,5	0,36	1,86	2,77	1,82
40	1,1	75,6	55	3,2	4,8	3	6	M50×1,5	31	52	78	1	0,25	2,74	4,08	2,68
	1,5	89,8	67,6	3,2	4,8	3	6	M50×1,5	31	54	91	1,5	0,21	3,17	4,72	3,1
	1,5	84,7	58,9	3,2	6,5	3	7	M50×1,5	44	54	91	1,5	0,36	1,9	2,83	1,86
45	1,1	80,8	59,9	3,2	4,8	3	7	M55×2	35	57	83	1	0,23	2,95	4,4	2,89
	2	89,8	67,7	3,2	4,8	3	7	M55×2	35	61	99	2	0,21	3,17	4,72	3,1
	2	92,6	63	3,2	6,5	3	9	M55×2	50	61	99	2	0,36	1,86	2,77	1,82
50	1,5	89,8	67,6	3,2	4,8	3	7	M60×2	37	64	91	1,5	0,21	3,17	4,72	3,1
	2	98,3	71,6	3,2	6,5	3	7	M60×2	37	66	109	2	0,23	2,98	4,44	2,92
	2	101,4	68,9	3,2	6,5	3	10	M60×2	54	66	109	2	0,36	1,89	2,81	1,84
55	1,5	98,7	71,6	3,2	6,5	3	8	M65×2	40	69	101	1,5	0,23	2,98	4,44	2,92
	2,1	112,5	84,4	3,2	6,5	3	8	M65×2	40	72	118	2,1	0,23	2,95	4,4	2,89
	2,1	110,1	74,8	3,2	6,5	3	11	M65×2	58	72	118	2,1	0,35	1,91	2,85	1,87
60	1,5	107,3	79,1	3,2	6,5	3	8	M70×2	42	74	111	1,5	0,24	2,81	4,19	2,75
	2,1	126,8	94,9	3,2	6,5	3	8	M70×2	42	77	128	2,1	0,22	3,14	4,67	3,07
	2,1	119,3	83,2	4,8	9,5	3	12	M70×2	61	77	128	2,1	0,34	2	2,98	1,96
65	1,5	112,5	84,4	3,2	6,5	4	8	M75×2	43	79	116	1,5	0,23	2,95	4,4	2,89
	2,1	126,2	94,9	3,2	6,5	4	8	M75×2	43	82	138	2,1	0,22	3,14	4,67	3,07
	2,1	128	86,7	4,8	9,5	4	12	M75×2	64	82	138	2,1	0,34	2	2,98	1,96
70	1,5	117,7	89,8	3,2	6,5	4	8	M80×2	45	84	121	1,5	0,22	3,1	4,62	3,03
	2,1	135,2	99,7	3,2	6,5	4	8	M80×2	45	87	148	2,1	0,22	3,04	4,53	2,97
	2,1	136,3	92,4	4,8	9,5	4	12	M80×2	68	87	148	2,1	0,34	1,99	2,96	1,94
75	2	126,8	94,9	3,2	6,5	4	8	M90×2	48	91	129	2	0,22	3,14	4,67	3,07
	2,1	135,4	99,8	3,2	6,5	4	8	M90×2	48	92	158	2,1	0,22	3,04	4,53	2,97
	2,1	145,1	98,3	4,8	9,5	4	12	M90×2	71	92	158	2,1	0,34	1,99	2,96	1,94

Spherical roller bearings

With withdrawal sleeve



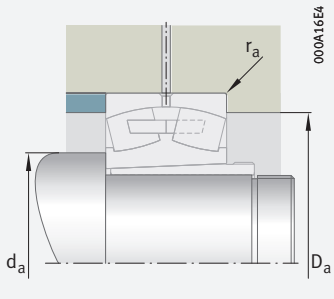


With solid cage, brass or steel

d_{1H} = 80 – 105 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
80	85	150	36	305	325	39 000	5 700	3 450	2,59	0,44	**22217-E1-XL-K**	**AHX317**
	85	180	41	345	375	43 500	5 200	3 800	5,3	0,44	**21317-E1-XL-K**	**AHX317**
	85	180	60	540	560	51 000	4 100	3 200	7,1	0,68	**22317-E1-XL-K**	**AHX2317**
85	90	160	40	345	375	43 500	5 200	3 400	3,35	0,48	**22218-E1-XL-K**	**AHX318**
	90	160	52,4	445	520	50 000	4 250	2 650	4,1	0,58	**23218-E1-XL-K-TVPB**	**AHX3218**
	90	160	52,4	445	520	50 000	4 250	2 650	4,3	0,58	**23218-E1A-XL-K-M**	**AHX3218**
	90	190	43	380	415	48 500	4 850	3 600	6,26	0,48	**21318-E1-XL-K**	**AHX318**
	90	190	64	610	630	56 000	3 850	3 000	8,5	0,78	**22318-E1-XL-K**	**AHX2318**
90	95	170	43	380	415	48 000	4 850	3 300	4,04	0,55	**22219-E1-XL-K**	**AHX319**
	95	200	45	425	450	48 500	4 600	3 250	6,63	0,55	**21319-E1-XL-K-TVPB**	**AHX319**
	95	200	67	670	700	61 000	3 700	2 800	9,5	0,91	**22319-E1-XL-K**	**AHX2319**
95	100	165	52	450	570	54 000	4 000	2 750	4,1	0,67	**23120-E1-XL-K-TVPB**	**AHX3120**
	100	165	52	450	570	54 000	4 000	2 750	4,2	0,67	**23120-E1A-XL-K-M**	**AHX3120**
	100	180	46	430	475	53 000	4 550	3 150	4,91	0,6	**22220-E1-XL-K**	**AHX320**
	100	180	60,3	560	660	61 000	3 750	2 410	6,1	0,78	**23220-E1-XL-K-TVPB**	**AHX3220**
	100	180	60,3	560	660	61 000	3 750	2 410	6,3	0,78	**23220-E1A-XL-K-M**	**AHX3220**
	100	215	47	495	530	62 000	4 400	3 050	8,08	0,6	**21320-E1-XL-K-TVPB**	**AHX320**
	100	215	73	810	920	77 000	3 300	2 380	13	1,03	**22320-E1-XL-K**	**AHX2320**
105	110	170	45	400	530	54 000	4 200	3 000	3,4	0,73	**23022-E1-XL-K-TVPB**	**AHX322**
	110	170	45	400	530	54 000	4 200	3 000	3,8	0,73	**23022-E1A-XL-K-M**	**AHX322**
	110	180	56	530	680	62 000	3 700	2 550	4,9	0,79	**23122-E1-XL-K-TVPB**	**AHX3122**
	110	180	56	530	680	62 000	3 700	2 550	5,1	0,79	**23122-E1A-XL-K-M**	**AHX3122**
	110	180	69	530	750	86 000	3 350	1 960	6,7	0,73	**24122-BE-XL-K30**	**AH24122**
	110	200	53	550	600	64 000	4 100	3 000	6,99	0,79	**22222-E1-XL-K**	**AHX3122**
	110	200	69,8	710	870	73 000	3 250	2 100	8,8	0,98	**23222-E1-XL-K-TVPB**	**AHX3222A**
	110	200	69,8	710	870	73 000	3 250	2 100	9,3	0,98	**23222-E1A-XL-K-M**	**AHX3222A**
	110	240	50	600	640	70 000	4 000	2 700	10,91	0,73	**21322-E1-XL-K-TVPB**	**AHX322**
	110	240	80	950	1 070	93 000	3 000	2 130	17,4	1,26	**22322-E1-XL-K**	**AHX2322G**

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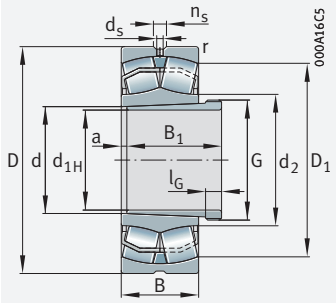


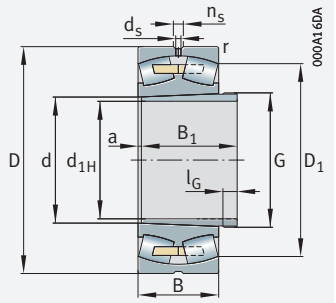
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
80	2	135,4	99,7	3,2	6,5	4	9	M95×2	52	96	139	2	0,22	3,04	4,53	2,97
	3	143,9	106,1	4,8	9,5	4	9	M95×2	52	99	166	2,5	0,23	2,9	4,31	2,83
	3	154,2	104,4	4,8	9,5	4	13	M95×2	74	99	166	2,5	0,33	2,04	3,04	2
85	2	143,9	106,1	3,2	6,5	4	9	M100×2	53	101	149	2	0,23	2,9	4,31	2,83
	2	140	104,1	3,2	6,5	4	10	M100×2	63	101	149	2	0,31	2,2	3,27	2,15
	2	140	–	3,2	6,5	4	10	M100×2	63	101	149	2	0,31	2,2	3,27	2,15
	3	152,7	112,6	4,8	9,5	4	9	M100×2	53	104	176	2,5	0,24	2,87	4,27	2,8
	3	162,5	110,2	6,3	12,2	4	14	M100×2	79	104	176	2,5	0,33	2,03	3,02	1,98
90	2,1	152,7	112,6	4,8	9,5	4	10	M105×2	57	107	158	2,1	0,24	2,87	4,27	2,8
	3	169,4	124,3	4,8	9,5	4	10	M105×2	57	109	186	2,5	0,22	3,04	4,53	2,97
	3	171,2	116	6,3	12,2	4	16	M105×2	85	109	186	2,5	0,33	2,03	3,02	1,98
95	2	146,3	113,9	3,2	6,5	4	11	M110×2	64	111	154	2	0,28	2,37	3,53	2,32
	2	146,3	–	3,2	6,5	4	11	M110×2	64	111	154	2	0,28	2,37	3,53	2,32
	2,1	161,4	119	4,8	9,5	4	10	M110×2	59	112	168	2,1	0,24	2,84	4,23	2,78
	2,1	156,7	116,7	4,8	9,5	4	11	M110×2	73	112	168	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	–	4,8	9,5	4	11	M110×2	73	112	168	2,1	0,31	2,15	3,2	2,1
	3	182	132	4,8	9,5	4	10	M110×2	59	114	201	2,5	0,22	3,14	4,67	3,07
	3	184,7	130,2	6,3	12,2	4	16	M110×2	90	114	201	2,5	0,33	2,03	3,02	1,98
105	2	154,6	123,7	3,2	6,5	4	12	M120×2	63	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	154,6	–	3,2	6,5	4	12	M120×2	63	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	160	124,6	4,8	9,5	4	11	M120×2	68	121	169	2	0,28	2,39	3,56	2,34
	2	160	–	4,8	9,5	4	11	M120×2	68	121	169	2	0,28	2,41	3,59	2,35
	2	154,9	125,6	3,2	6,5	9	13	M115×2	82	121	169	2	0,34	1,96	2,92	1,92
	2,1	178,7	129,4	4,8	9,5	4	11	M120×2	68	122	188	2,1	0,25	2,71	4,04	2,65
	2,1	172,7	129,1	4,8	9,5	4	11	M120×2	82	122	188	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	–	4,8	9,5	4	11	M120×2	82	122	188	2,1	0,33	2,06	3,06	2,01
	3	202,5	146,4	6,3	12,2	4	12	M120×2	63	124	226	2,5	0,21	3,24	4,82	3,16
	3	204,9	143,1	8	15	4	16	M120×2	98	124	226	2,5	0,33	2,07	3,09	2,03

Spherical roller bearings

With withdrawal sleeve



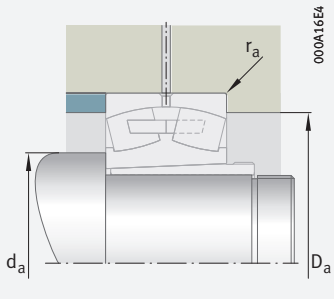


With solid cage, brass or steel

d_{1H} = 115 – 135 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
115	120	180	46	430	580	60 000	3 950	2 800	3,7	0,77	**23024-E1-XL-K-TVPB**	**AHX3024**
	120	180	46	430	580	60 000	3 950	2 800	4,1	0,77	**23024-E1A-XL-K-M**	**AHX3024**
	120	180	60	450	690	86 000	3 450	2 360	5,4	0,71	**24024-BE-XL-K30**	**AH24024**
	120	200	62	630	800	74 000	3 400	2 290	7,1	0,97	**23124-E1-XL-K-TVPB**	**AHX3124**
	120	200	62	630	800	74 000	3 400	2 290	7,6	0,97	**23124-E1A-XL-K-M**	**AHX3124**
	120	200	80	680	950	103 000	2 950	1 740	10,2	1,02	**24124-BE-XL-K30**	**AH24124**
	120	215	58	640	740	70 000	3 650	2 700	8,84	0,97	**22224-E1-XL-K**	**AHX3124**
	120	215	76	820	1 020	82 000	3 000	1 910	11,1	1,22	**23224-E1-XL-K-TVPB**	**AHX3224A**
	120	215	76	820	1 020	82 000	3 000	1 910	11,4	1,22	**23224-E1A-XL-K-M**	**AHX3224A**
	120	260	86	1 080	1 170	105 000	2 850	2 000	22,1	1,5	**22324-E1-XL-K**	**AHX2324G**
125	130	200	52	540	730	71 000	3 600	2 600	5,4	0,94	**23026-E1-XL-K-TVPB**	**AHX3026**
	130	200	52	540	730	71 000	3 600	2 600	5,7	0,94	**23026-E1A-XL-K-M**	**AHX3026**
	130	200	69	570	860	103 000	3 100	2 130	8,1	0,89	**24026-BE-XL-K30**	**AH24026**
	130	210	64	680	890	81 000	3 200	2 110	7,8	1,1	**23126-E1-XL-K-TVPB**	**AHX3126**
	130	210	64	680	890	81 000	3 200	2 110	8,1	1,1	**23126-E1A-XL-K-M**	**AHX3126**
	130	210	80	710	1 050	112 000	2 800	1 560	10,8	1,13	**24126-BE-XL-K30**	**AH24126**
	130	230	64	760	890	81 000	3 350	2 500	10,9	1,1	**22226-E1-XL-K**	**AHX3126**
	130	230	80	910	1 150	91 000	2 850	1 740	12,6	1,48	**23226-E1-XL-K-TVPB**	**AHX3226G**
	130	230	80	910	1 150	91 000	2 850	1 740	13,6	1,48	**23226-E1A-XL-K-M**	**AHX3226G**
	130	280	93	1 250	1 370	120 000	2 650	1 820	27,4	1,84	**22326-E1-XL-K**	**AHX2326G**
135	140	210	53	570	800	77 000	3 450	2 390	5,8	1,03	**23028-E1-XL-K-TVPB**	**AHX3028**
	140	210	53	570	800	77 000	3 450	2 390	6	1,03	**23028-E1A-XL-K-M**	**AHX3028**
	140	210	69	590	930	111 000	2 950	1 950	8,1	0,96	**24028-BE-XL-K30**	**AH24028**
	140	225	68	760	1 010	90 000	3 000	1 930	9,5	1,29	**23128-E1-XL-K-TVPB**	**AHX3128**
	140	225	68	760	1 010	90 000	3 000	1 930	10,2	1,29	**23128-E1A-XL-K-M**	**AHX3128**
	140	225	85	800	1 190	127 000	2 650	1 430	13,5	1,29	**24128-BE-XL-K30**	**AH24128**
	140	250	68	870	1 040	100 000	3 150	2 250	13,7	1,29	**22228-E1-XL-K**	**AHX3128**
	140	250	88	1 090	1 400	116 000	2 600	1 550	17,1	1,72	**23228-E1-XL-K-TVPB**	**AHX3228G**
	140	250	88	1 090	1 400	116 000	2 600	1 550	17,6	1,72	**23228-E1A-XL-K-M**	**AHX3228G**
	140	300	102	1 460	1 630	135 000	2 420	1 660	34,4	2,21	**22328-E1-XL-K**	**AHX2328G**

medias *https://www.schaeffler.de/std/1F9A*

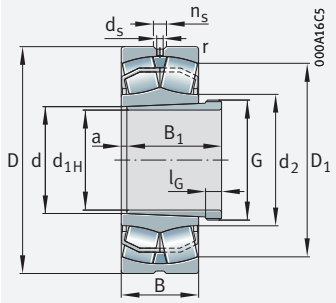


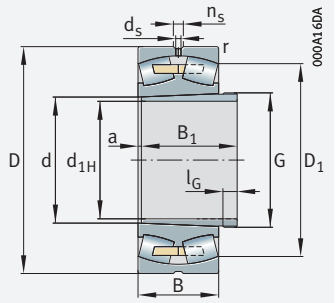
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
115	2	164,7	133	3,2	6,5	4	13	M130×2	60	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	164,7	–	3,2	6,5	4	13	M130×2	60	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	159,8	134,5	3,2	6,5	9	13	M125×2	73	128,8	171,2	2	0,29	2,33	3,47	2,28
	2	177,4	136,2	4,8	9,5	4	12	M130×2	75	131	189	2	0,28	2,39	3,56	2,34
	2	177,4	–	4,8	9,5	4	12	M130×2	75	131	189	2	0,28	2,39	3,56	2,34
	2	170,3	136,6	3,2	6,5	9	13	M130×2	93	131	189	2	0,37	1,84	2,74	1,8
	2,1	192	141,9	6,3	12,2	4	12	M130×2	75	132	203	2,1	0,25	2,71	4,04	2,65
	2,1	185,5	139	4,8	9,5	4	13	M130×2	90	132	203	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	–	4,8	9,5	4	13	M130×2	90	132	203	2,1	0,33	2,03	3,02	1,98
	3	222,4	150,7	8	15	4	17	M130×2	105	134	246	2,5	0,33	2,06	3,06	2,01
125	2	182,3	145,9	4,8	9,5	4	14	M140×2	67	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	182,3	–	4,8	9,5	4	14	M140×2	67	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	176,1	146,2	3,2	6,5	10	14	M135×2	83	138,8	191,2	2	0,31	2,21	3,29	2,16
	2	187,3	146	4,8	9,5	4	12	M140×2	78	141	199	2	0,28	2,45	3,64	2,39
	2	187,3	–	4,8	9,5	4	12	M140×2	78	141	199	2	0,28	2,45	3,64	2,39
	2	181,2	148,3	3,2	6,5	10	14	M140×2	94	141	199	2	0,34	1,98	2,94	1,93
	3	205	151,7	6,3	12,2	4	12	M140×2	78	144	216	2,5	0,26	2,62	3,9	2,56
	3	199,3	150	4,8	9,5	4	15	M140×2	98	144	216	2,5	0,33	2,07	3,09	2,03
	3	–	–	4,8	9,5	4	15	M140×2	98	144	216	2,5	0,33	2,07	3,09	2,03
	4	239,5	162,2	9,5	17,7	4	19	M140×2	115	147	263	3	0,33	2,06	3,06	2,01
135	2	192,3	155,4	4,8	9,5	5	14	M150×2	68	148,8	201,2	2	0,22	3,07	4,57	3
	2	192,3	–	4,8	9,5	5	14	M150×2	68	148,8	201,2	2	0,22	3,07	4,57	3
	2	186,4	157,1	3,2	6,5	10	14	M145×2	83	148,8	201,2	2	0,28	2,37	3,53	2,32
	2,1	201	157,1	4,8	9,5	5	14	M150×2	83	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	201	–	4,8	9,5	5	14	M150×2	83	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	194,4	158,9	4,8	9,5	10	14	M150×2	99	152	213	2,1	0,34	1,99	2,96	1,94
	3	223,1	164,9	6,3	12,2	5	14	M150×2	83	154	236	2,5	0,25	2,67	3,97	2,61
	3	216	162	6,3	12,2	5	15	M150×2	104	154	236	2,5	0,33	2,04	3,04	2
	3	216	–	6,3	12,2	5	15	M150×2	104	154	236	2,5	0,33	2,04	3,04	2
	4	255,7	173,5	9,5	17,7	5	20	M150×2	125	157	283	3	0,34	2	2,98	1,96

Spherical roller bearings

With withdrawal sleeve



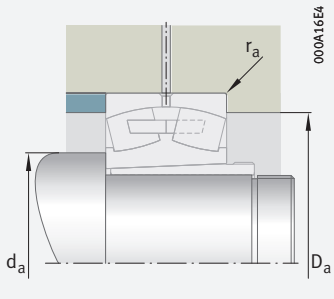


With solid cage, brass or steel

d_{1H} = 145 – 160 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
145	150	225	56	630	880	87 000	3 250	2 210	7,3	1,18	**23030-E1-XL-K-TVPB**	**AHX3030**
	150	225	56	630	880	87 000	3 250	2 210	7,3	1,18	**23030-E1A-XL-K-M**	**AHX3030**
	150	225	75	680	1 090	125 000	2 750	1 790	10,7	1,12	**24030-BE-XL-K30**	**AH24030**
	150	250	80	1 000	1 330	145 000	2 650	1 720	14,5	1,66	**23130-E1-XL-K-TVPB**	**AHX3130G**
	150	250	80	1 000	1 330	145 000	2 650	1 720	15,8	1,66	**23130-E1A-XL-K-M**	**AHX3130G**
	150	250	100	1 050	1 520	153 000	2 370	1 270	20,2	1,63	**24130-BE-XL-K30**	**AH24130**
	150	270	73	1 010	1 210	114 000	2 900	2 050	17,8	1,66	**22230-E1-XL-K**	**AHX3130G**
	150	270	96	1 280	1 660	133 000	2 400	1 400	22,3	2,09	**23230-E1-XL-K-TVPB**	**AHX3230G**
	150	270	96	1 280	1 660	133 000	2 400	1 400	22,9	2,09	**23230-E1A-XL-K-M**	**AHX3230G**
	150	320	108	1 640	1 850	151 000	2 290	1 520	40,9	2,64	**22330-E1-XL-K**	**AHX2330G**
150	160	240	60	720	1 010	98 000	3 050	2 060	8,7	2,09	**23032-E1-XL-K-TVPB**	**AH3032**
	160	240	60	720	1 010	98 000	3 050	2 060	9,4	2,09	**23032-E1A-XL-K-M**	**AH3032**
	160	240	80	770	1 240	140 000	2 550	1 660	12,2	2,31	**24032-BE-XL-K30**	**AH24032**
	160	270	86	1 160	1 550	166 000	2 490	1 560	18,5	2,9	**23132-E1-XL-K-TVPB**	**AH3132A**
	160	270	86	1 160	1 550	166 000	2 490	1 560	18,6	2,9	**23132-E1A-XL-K-M**	**AH3132A**
	160	270	109	1 220	1 800	173 000	2 180	1 140	24,9	3,04	**24132-BE-XL-K30**	**AH24132**
	160	290	80	1 150	1 400	129 000	2 650	1 900	22,4	2,9	**22232-E1-XL-K**	**AH3132A**
	160	290	104	1 460	1 910	150 000	2 210	1 280	27,7	3,65	**23232-E1-XL-K-TVPB**	**AH3232G**
	160	290	104	1 460	1 910	150 000	2 210	1 280	28,5	3,65	**23232-E1A-XL-K-M**	**AH3232G**
	160	340	114	1 680	1 990	162 000	2 250	1 420	47,3	4,26	**22332-BE-XL-K**	**AH2332G**
160	170	260	67	880	1 230	151 000	2 800	1 890	11,9	2,48	**23034-E1-XL-K-TVPB**	**AH3034**
	170	260	67	880	1 230	151 000	2 800	1 890	12,5	2,48	**23034-E1A-XL-K-M**	**AH3034**
	170	260	90	940	1 480	162 000	2 380	1 540	16,5	2,76	**24034-BE-XL-K30**	**AH24034**
	170	280	88	1 220	1 690	177 000	2 380	1 460	19,9	3,12	**23134-E1-XL-K-TVPB**	**AH3134A**
	170	280	88	1 220	1 690	177 000	2 380	1 460	19,5	3,12	**23134-E1A-XL-K-M**	**AH3134A**
	170	280	109	1 260	1 900	184 000	2 110	1 060	25,9	3,27	**24134-BE-XL-K30**	**AH24134**
	170	310	86	1 320	1 570	144 000	2 550	1 780	27,1	3,12	**22234-E1-XL-K**	**AH3134A**
	170	310	110	1 640	2 170	168 000	2 090	1 160	33,1	4,29	**23234-E1-XL-K-TVPB**	**AH3234G**
	170	310	110	1 640	2 170	168 000	2 090	1 160	34,6	4,29	**23234-E1A-XL-K-M**	**AH3234G**
	170	360	120	1 870	2 220	178 000	2 130	1 320	56,9	4,78	**22334-BE-XL-K**	**AH2334G**

medias *https://www.schaeffler.de/std/1F9A*

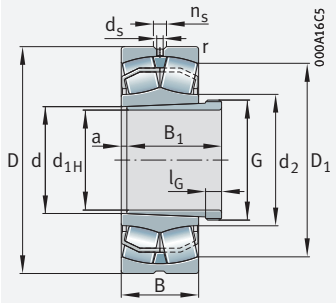


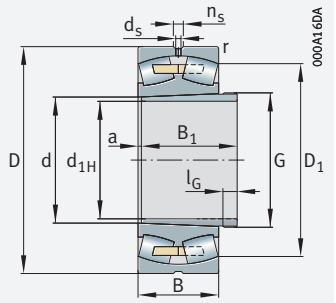
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
145	2,1	206,3	166,6	4,8	9,5	5	15	M160×3	72	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	–	4,8	9,5	5	15	M160×3	72	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	199,4	168,1	3,2	6,5	11	15	M155×3	90	160,2	214,8	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	170,1	6,3	12,2	5	15	M160×3	96	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	–	6,3	12,2	5	15	M160×3	96	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	213	170,3	4,8	9,5	11	15	M160×3	115	162	238	2,1	0,37	1,83	2,72	1,79
	3	240,8	177,9	8	15	5	15	M160×3	96	164	256	2,5	0,25	2,69	4	2,63
	3	232,6	174	6,3	12,2	5	17	M160×3	114	164	256	2,5	0,33	2,02	3	1,97
	3	232,6	–	6,3	12,2	5	17	M160×3	114	164	256	2,5	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	5	24	M160×3	135	167	303	3	0,33	2,02	3	1,97
150	2,1	219,9	177	6,3	12,2	5	16	M170×3	77	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	–	6,3	12,2	5	16	M170×3	77	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	212,5	179,3	4,8	9,5	11	15	M170×3	95	170,2	229,8	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	183,2	8	15	5	16	M170×3	103	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	–	8	15	5	16	M170×3	103	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	228,9	183,4	4,8	9,5	11	15	M170×3	124	172	258	2,1	0,37	1,8	2,69	1,76
	3	258,2	190,9	8	15	5	16	M170×3	103	174	276	2,5	0,26	2,64	3,93	2,58
	3	249,3	186,7	8	15	6	20	M170×3	124	174	276	2,5	0,34	2	2,98	1,96
	3	249,3	–	8	15	6	20	M170×3	124	174	276	2,5	0,34	2	2,98	1,96
	4	286,7	201,2	9,5	17,7	6	24	M170×3	140	177	323	3	0,35	1,94	2,88	1,89
160	2,1	237,2	189,8	6,3	12,2	5	17	M180×3	85	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	–	–	6,3	12,2	5	17	M180×3	85	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	228,4	190	4,8	9,5	11	16	M180×3	106	180,2	249,8	2,1	0,31	2,2	3,27	2,15
	2,1	248,1	193,4	8	15	5	16	M180×3	104	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	–	–	8	15	5	16	M180×3	104	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	240	194,1	4,8	9,5	11	16	M180×3	125	182	268	2,1	0,36	1,9	2,83	1,86
	4	275,4	199,8	9,5	17,7	5	16	M180×3	104	187	293	3	0,26	2,6	3,87	2,54
	4	267,4	199,8	8	15	6	24	M180×3	134	187	293	3	0,33	2,03	3,02	1,98
	4	267,4	–	8	15	6	24	M180×3	134	187	293	3	0,33	2,03	3,02	1,98
	4	303,9	213,1	9,5	17,7	6	24	M180×3	146	187	343	3	0,35	1,95	2,9	1,91

Spherical roller bearings

With withdrawal sleeve



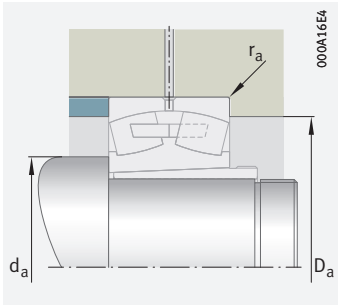


With solid cage, brass or steel

d_{1H} = 170 – 190 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
170	180	250	52	445	840	59 000	3 200	1 850	7,8	1,96	**23936-S-K-MB**	**AH3936**
	180	280	74	1 040	1 450	173 000	2 600	1 760	15,6	2,87	**23036-E1-XL-K-TVPB**	**AH3036**
	180	280	74	1 040	1 450	173 000	2 600	1 760	16	2,87	**23036-E1A-XL-K-M**	**AH3036**
	180	280	100	1 130	1 770	185 000	2 200	1 420	21,8	3,21	**24036-BE-XL-K30**	**AH24036**
	180	300	96	1 420	1 950	199 000	2 230	1 350	25,9	3,79	**23136-E1-XL-K-TVPB**	**AH3136A**
	180	300	96	1 420	1 950	199 000	2 230	1 350	25,5	3,79	**23136-E1A-XL-K-M**	**AH3136A**
	180	300	118	1 460	2 170	208 000	2 000	980	32,5	3,74	**24136-BE-XL-K30**	**AH24136**
	180	320	86	1 360	1 680	152 000	2 470	1 670	28,5	3,35	**22236-E1-XL-K**	**AH2236G**
	180	320	112	1 720	2 340	178 000	2 010	1 090	36	4,8	**23236-E1-XL-K-TVPB**	**AH3236G**
	180	320	112	1 720	2 340	178 000	2 010	1 090	37	4,8	**23236-E1A-XL-K-M**	**AH3236G**
	180	380	126	2 060	2 460	195 000	2 030	1 230	66,6	5,42	**22336-BE-XL-K**	**AH2336G**
180	190	290	75	1 080	1 550	183 000	2 490	1 660	16,3	3,19	**23038-E1-XL-K-TVPB**	**AH3038G**
	190	290	75	1 080	1 550	183 000	2 490	1 660	17,7	3,19	**23038-E1A-XL-K-M**	**AH3038G**
	190	290	100	1 160	1 860	197 000	2 140	1 330	22,8	3,48	**24038-BE-XL-K30**	**AH24038**
	190	320	104	1 610	2 220	222 000	2 070	1 260	30,3	4,39	**23138-E1-XL-K-TVPB**	**AH3138G**
	190	320	104	1 610	2 220	222 000	2 070	1 260	32,4	4,39	**23138-E1A-XL-K-M**	**AH3138G**
	190	320	128	1 680	2 550	232 000	1 850	880	40,7	4,37	**24138-BE-XL-K30**	**AH24138**
	190	340	92	1 360	1 760	164 000	2 480	1 620	36	3,83	**22238-BE-XL-K**	**AH2238G**
	190	340	120	1 740	2 400	206 000	1 990	1 070	42,6	5,3	**23238-BE-XL-K**	**AH3238G**
	190	400	132	2 220	2 650	213 000	1 940	1 160	77,2	6,02	**22338-BE-XL-K**	**AH2338G**
190	200	280	60	550	1 070	73 000	2 800	1 650	11,5	2,62	**23940-S-K-MB**	**AH3940**
	200	310	82	1 270	1 800	206 000	2 330	1 550	20,8	3,62	**23040-E1-XL-K-TVPB**	**AH3040G**
	200	310	82	1 270	1 800	206 000	2 330	1 550	21,4	3,62	**23040-E1A-XL-K-M**	**AH3040G**
	200	310	109	1 350	2 150	221 000	2 010	1 240	28,9	3,96	**24040-BE-XL-K30**	**AH24040**
	200	340	112	1 610	2 270	193 000	2 040	1 230	40,9	5,6	**23140-BE-XL-K**	**AH3140**
	200	340	140	1 880	2 800	260 000	1 780	840	48,5	5,02	**24140-BE-XL-K30**	**AH24140**
	200	360	98	1 520	1 990	180 000	2 330	1 510	42,3	4,8	**22240-BE-XL-K**	**AH2240**
	200	360	128	1 940	2 700	226 000	1 870	1 000	57,3	6,61	**23240-BE-XL-K**	**AH3240**
	200	420	138	2 440	2 950	232 000	1 830	1 080	87,4	7,64	**22340-BE-XL-K**	**AH2340**

medias *https://www.schaeffler.de/std/1F9A*

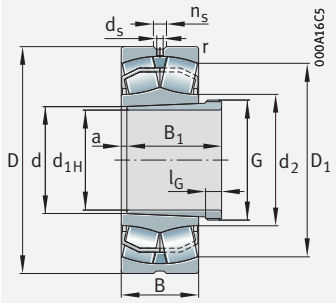


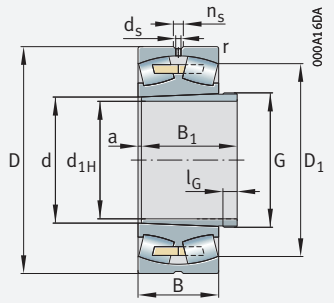
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
170	2	230,9	–	4,8	9,5	5	13	M190×3	66	188,8	241,2	2	0,2	3,42	5,09	3,34
	2,1	254,3	201,8	8	15	6	17	M190×3	92	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	–	8	15	6	17	M190×3	92	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	244,6	201,7	4,8	9,5	11	16	M190×3	116	190,2	269,8	2,1	0,32	2,1	3,13	2,06
	3	264,8	204,1	8	15	6	19	M190×3	116	194	286	2,5	0,29	2,32	3,45	2,26
	3	264,8	–	8	15	6	19	M190×3	116	194	286	2,5	0,29	2,32	3,45	2,26
	3	255,7	204,8	6,3	12,2	11	16	M190×3	134	194	286	2,5	0,36	1,86	2,77	1,82
	4	285,9	211,3	9,5	17,7	5	17	M190×3	105	197	303	3	0,25	2,71	4,04	2,65
	4	277,3	210,6	8	15	6	25	M190×3	140	197	303	3	0,33	2,07	3,09	2,03
	4	277,3	–	8	15	6	25	M190×3	140	197	303	3	0,33	2,07	3,09	2,03
	4	320,8	224,9	12,5	23,5	6	26	M190×3	154	197	363	3	0,34	1,96	2,92	1,92
180	2,1	264,5	211,9	8	15	6	18	M200×3	96	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	–	8	15	6	18	M200×3	96	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	255	211,9	4,8	9,5	13	18	M200×3	118	200,2	279,8	2,1	0,31	2,2	3,27	2,15
	3	281,6	217	8	15	6	20	M200×3	125	204	306	2,5	0,3	2,28	3,39	2,23
	3	281,6	–	8	15	6	20	M200×3	125	204	306	2,5	0,3	2,28	3,39	2,23
	3	271,6	217,4	6,3	12,2	13	18	M200×3	146	204	306	2,5	0,37	1,82	2,7	1,78
	4	295,2	225,2	9,5	17,7	5	18	M200×3	112	207	323	3	0,26	2,6	3,87	2,54
	4	289	222,4	9,5	17,7	7	25	M200×3	145	207	323	3	0,34	1,98	2,94	1,93
	5	338,1	236,8	12,5	23,5	7	26	M200×3	160	210	380	4	0,34	1,96	2,92	1,92
190	2,1	256,9	–	6,3	12,2	6	16	Tr210×4	77	210,2	269,8	2,1	0,2	3,42	5,09	3,34
	2,1	281,6	223,4	8	15	6	19	Tr210×4	102	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	–	8	15	6	19	Tr210×4	102	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	271,6	223,6	6,3	12,2	13	18	Tr210×4	127	210,2	299,8	2,1	0,32	2,13	3,17	2,08
	3	295,8	230,4	9,5	17,7	6	21	Tr220×4	134	214	326	2,5	0,32	2,1	3,13	2,06
	3	287,9	227,1	6,3	12,2	13	18	Tr210×4	158	214	326	2,5	0,39	1,71	2,54	1,67
	4	310,9	238,2	9,5	17,7	5	19	Tr220×4	118	217	343	3	0,26	2,57	3,83	2,52
	4	305,3	235	9,5	17,7	7	24	Tr220×4	153	217	343	3	0,35	1,95	2,9	1,91
	5	355,1	248,8	12,5	23,5	7	30	Tr220×4	170	220	400	4	0,34	1,98	2,94	1,93

Spherical roller bearings

With withdrawal sleeve



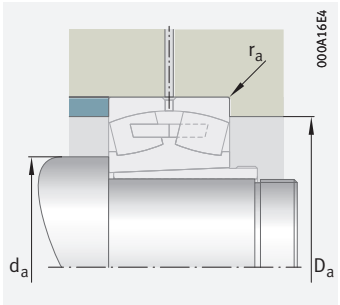


With solid cage, brass or steel

d_{1H} = 200 – 260 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
200	220	300	60	610	1 240	74 000	2 600	1 460	12,3	4,81	**23944-S-K-MB**	**AH3944**
	220	340	90	1 260	1 900	182 000	2 230	1 450	28,5	7,18	**23044-BE-XL-K**	**AH3044G**
	220	340	118	1 620	2 600	260 000	1 830	1 090	37,7	8,22	**24044-BE-XL-K30**	**AH24044**
	220	370	120	1 860	2 700	223 000	1 860	1 080	50,5	10,4	**23144-BE-XL-K**	**AH3144**
	220	370	150	2 190	3 250	300 000	1 650	750	62,7	10,3	**24144-BE-XL-K30**	**AH24144**
	220	400	108	1 840	2 360	216 000	2 140	1 350	58,3	9,17	**22244-BE-XL-K**	**AH2244**
	220	400	144	2 380	3 300	270 000	1 700	880	75,3	13,6	**23244-BE-XL-K**	**AH2344**
	220	460	145	2 800	3 400	270 000	1 690	950	114	13,6	**22344-BE-XL-K**	**AH2344**
220	240	320	60	640	1 370	96 000	2 440	1 310	13,4	5,26	**23948-K-MB**	**AH3948**
	240	360	92	1 350	2 120	200 000	2 080	1 310	31,6	8,92	**23048-BE-XL-K**	**AH3048**
	240	360	118	1 670	2 850	280 000	1 710	980	42,3	9,03	**24048-BE-XL-K30**	**AH24048**
	240	400	128	2 130	3 150	255 000	1 700	970	62	12,3	**23148-BE-XL-K**	**AH3148**
	240	400	160	2 600	3 900	340 000	1 470	650	81,5	12,6	**24148-BE-XL-K30**	**AH24148**
	240	440	120	2 230	2 900	255 000	1 900	1 200	81,8	11,3	**22248-BE-XL-K**	**AH2248**
	240	440	160	2 850	4 000	315 000	1 500	770	102	15,6	**23248-BE-XL-K**	**AH2348**
	240	500	155	3 200	4 050	315 000	1 510	830	148	15,6	**22348-BEA-XL-K-MB1**	**AH2348**
240	260	360	75	940	1 940	111 000	2 100	1 190	22,4	7,7	**23952-K-MB**	**AH3952G**
	260	400	104	1 670	2 600	239 000	1 850	1 170	45,9	10,8	**23052-BE-XL-K**	**AH3052**
	260	400	140	2 210	3 650	345 000	1 510	880	61,2	11,6	**24052-BE-XL-K30**	**AH24052**
	260	440	144	2 600	3 900	310 000	1 500	860	87,2	15,1	**23152-BE-XL-K**	**AH3152G**
	260	440	180	3 150	4 900	400 000	1 290	560	108	15,5	**24152-BE-XL-K30**	**AH24152**
	260	480	130	2 600	3 450	295 000	1 720	1 070	104	13,3	**22252-BEA-XL-K-MB1**	**AH2252G**
	260	480	174	3 350	4 750	370 000	1 360	690	134	18,7	**23252-BEA-XL-K-MB1**	**AH2352G**
	260	540	165	3 650	4 650	360 000	1 390	740	179	18,7	**22352-BEA-XL-K-MB1**	**AH2352G**
260	280	380	75	970	2 040	133 000	2 000	1 100	24,7	8,3	**23956-K-MB**	**AH3956G**
	280	420	106	1 780	2 850	260 000	1 740	1 090	49,3	12	**23056-BE-XL-K**	**AH3056**
	280	420	140	2 290	3 950	370 000	1 420	800	67,8	12,6	**24056-BE-XL-K30**	**AH24056**
	280	460	146	2 750	4 200	325 000	1 420	790	93,1	16,7	**23156-BE-XL-K**	**AH3156G**
	280	460	180	3 300	5 200	435 000	1 230	520	114	16,7	**24156-BE-XL-K30**	**AH24156**
	280	500	130	2 750	3 700	320 000	1 650	990	109	14,4	**22256-BEA-XL-K-MB1**	**AH2256G**
	280	500	176	3 550	5 200	395 000	1 280	630	143,7	20,9	**23256-BEA-XL-K-MB1**	**AH2356G**
	280	580	175	4 150	5 300	405 000	1 280	670	223	20,9	**22356-BEA-XL-K-MB1**	**AH2356G**

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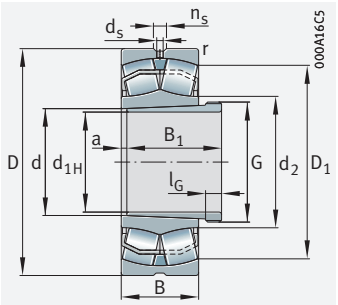


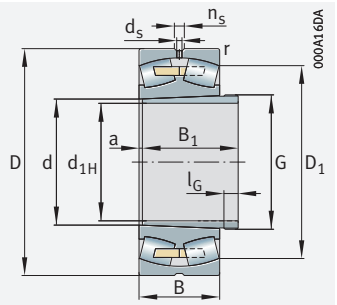
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
200	2,1	277,4	–	6,3	12,2	6	16	Tr230×4	77	230,2	289,8	2,1	0,18	3,76	5,59	3,67
	3	304,5	248,8	8	15	6	20	Tr230×4	111	232,4	327,6	2,5	0,24	2,81	4,19	2,75
	3	295,7	245	6,3	12,2	14	18	Tr230×4	138	232,4	327,6	2,5	0,32	2,1	3,13	2,06
	4	323	254,8	9,5	17,7	6	23	Tr240×4	145	237	353	3	0,31	2,15	3,2	2,1
	4	314,3	247,6	6,3	12,2	14	20	Tr230×4	170	237	353	3	0,39	1,74	2,59	1,7
	4	346,6	260,1	9,5	17,7	6	20	Tr240×4	130	237	383	3	0,26	2,57	3,83	2,52
	4	338	255,8	9,5	17,7	8	30	Tr240×4	181	237	383	3	0,36	1,9	2,83	1,86
	5	391,1	273,4	12,5	23,5	8	30	Tr240×4	181	240	440	4	0,33	2,06	3,06	2,01
220	2,1	297,8	–	6,3	12,2	6	16	Tr250×4	77	250,2	309,8	2,1	0,17	4,05	6,04	3,96
	3	324,6	269,5	8	15	7	21	Tr260×4	116	252,4	347,6	2,5	0,23	2,98	4,44	2,92
	3	317,2	268,5	6,3	12,2	15	20	Tr250×4	138	252,4	347,6	2,5	0,3	2,28	3,39	2,23
	4	349,9	275,9	9,5	17,7	7	25	Tr260×4	154	257	383	3	0,31	2,18	3,24	2,13
	4	339	267,3	6,3	12,2	15	20	Tr260×4	180	257	383	3	0,39	1,71	2,54	1,67
	4	380,4	285,6	12,5	23,5	6	21	Tr260×4	144	257	423	3	0,26	2,55	3,8	2,5
	4	370,8	280,8	12,5	23,5	8	30	Tr260×4	189	257	423	3	0,36	1,87	2,79	1,83
	5	426,4	–	12,5	23,5	8	30	Tr260×4	189	260	480	4	0,32	2,12	3,15	2,07
240	2,1	330,5	–	8	15	6	18	Tr280×4	94	270,2	349,8	2,1	0,19	3,54	5,27	3,46
	4	358,7	295,5	9,5	17,7	7	23	Tr280×4	128	274,6	385,4	3	0,23	2,9	4,31	2,83
	4	349	288,3	6,3	12,2	16	20	Tr270×4	162	274,6	385,4	3	0,32	2,09	3,11	2,04
	4	382,7	301,7	9,5	17,7	7	26	Tr280×4	172	277	423	3	0,32	2,12	3,15	2,07
	4	370,6	292,2	8	15	16	22	Tr280×4	202	277	423	3	0,4	1,67	2,49	1,63
	5	415,1	–	12,5	23,5	6	23	Tr280×4	155	280	460	4	0,26	2,57	3,83	2,52
	5	404,3	–	12,5	23,5	8	30	Tr280×4	205	280	460	4	0,36	1,87	2,79	1,83
	6	460,6	–	12,5	23,5	8	30	Tr280×4	205	286	514	5	0,31	2,15	3,2	2,1
260	2,1	350	–	8	15	6	18	Tr300×4	94	290,2	369,8	2,1	0,18	3,76	5,59	3,67
	4	379,2	314,3	9,5	17,7	8	24	Tr300×4	131	294,6	405,4	3	0,22	3,01	4,48	2,94
	4	370,5	310,3	6,3	12,2	17	22	Tr290×4	162	294,6	405,4	3	0,3	2,23	3,32	2,18
	5	403,4	321,4	9,5	17,7	8	28	Tr300×4	175	300	440	4	0,31	2,21	3,29	2,16
	5	392,4	312,8	8	15	17	22	Tr300×4	202	300	440	4	0,38	1,76	2,62	1,72
	5	436	–	12,5	23,5	8	24	Tr300×4	155	300	480	4	0,25	2,71	4,04	2,65
	5	425,4	–	12,5	23,5	8	30	Tr300×4	212	300	480	4	0,34	1,96	2,92	1,92
	6	495,5	–	12,5	23,5	8	30	Tr300×4	212	306	554	5	0,31	2,18	3,24	2,13

Spherical roller bearings

With withdrawal sleeve



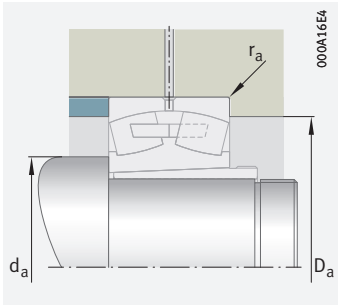


With solid cage, brass or steel

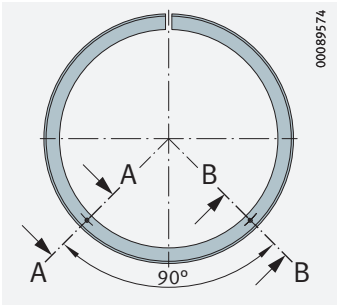
d_{1H} = 280 – 360 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	With-drawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
280	300	420	90	1 270	2 650	170 000	1 780	1 000	39,1	10,8	**23960-B-K-MB**	**AH3960G**
	300	460	118	2 160	3 450	305 000	1 570	980	68,4	14,4	**23060-BE-XL-K**	**AH3060**
	300	460	160	2 850	4 900	435 000	1 250	720	97	15,5	**24060-BE-XL-K30**	**AH24060**
	300	500	160	3 250	4 950	375 000	1 300	720	126	20	**23160-BEA-XL-K-MB1**	**AH3160G**
	300	500	200	3 950	6 400	500 000	1 100	450	161	20,1	**24160-BE-XL-K30**	**AH24160**
	300	540	140	3 100	4 250	360 000	1 500	900	139	17,2	**22260-BEA-XL-K-MB1**	**AH2260G**
	300	540	192	4 100	6 100	450 000	1 160	560	187	24,6	**23260-BEA-XL-K-MB1**	**AH3260G-H**
	300	620	185	4 650	6 000	450 000	1 190	610	263,6	26	**22360-BEA-XL-K-MB1**	**AH3260-H**
300	320	440	90	1 310	2 750	206 000	1 700	930	41	11,5	**23964-K-MB**	**AH3964G-H**
	320	480	121	2 300	3 750	330 000	1 480	920	75,6	15,9	**23064-BEA-XL-K-MB1**	**AH3064G-H**
	320	480	160	2 950	5 200	465 000	1 200	670	99	16,6	**24064-BEA-XL-K30-MB1**	**AH24064-H**
	320	540	176	3 800	5 900	425 000	1 170	650	161	23,6	**23164-BEA-XL-K-MB1**	**AH3164G-H**
	320	540	218	4 600	7 300	570 000	1 010	415	205	23,4	**24164-BE-XL-K30**	**AH24164-H**
	320	580	150	3 550	4 700	405 000	1 410	850	171	19,6	**22264-BEA-XL-K-MB1**	**AH2264G-H**
	320	580	208	4 650	7 000	510 000	1 060	510	229,6	28,9	**23264-BEA-XL-K-MB1**	**AH3264G-H**
320	340	520	133	2 700	4 400	375 000	1 360	840	101	18,6	**23068-BEA-XL-K-MB1**	**AH3068G-H**
	340	520	180	3 550	6 200	530 000	1 080	610	136	21,1	**24068-BEA-XL-K30-MB1**	**AH24068-H**
	340	580	190	4 350	6 600	480 000	1 090	600	204	27,5	**23168-BEA-XL-K-MB1**	**AH3168G-H**
	340	580	243	5 400	8 800	640 000	900	370	263	28	**24168-BE-XL-K30**	**AH24168-H**
	340	620	224	5 300	7 900	580 000	1 000	475	292	33,6	**23268-BEA-XL-K-MB1**	**AH3268G-H**
	340	710	212	6 000	8 000	570 000	1 010	500	403	35,3	**22368-BEA-XL-K-MB1**	**AH3268-H**
340	360	480	90	1 440	3 200	216 000	1 540	800	45	13	**23972-K-MB**	**AH3972G-H**
	360	540	134	2 800	4 650	400 000	1 300	790	104	20,5	**23072-BEA-XL-K-MB1**	**AH3072G-H**
	360	540	180	3 650	6 600	570 000	1 040	570	141	22,3	**24072-BEA-XL-K30-MB1**	**AH24072-H**
	360	600	192	4 550	7 100	510 000	1 040	560	215	29,8	**23172-BEA-XL-K-MB1**	**AH3172G-H**
	360	600	243	5 600	9 100	680 000	890	350	272	29,7	**24172-BE-XL-K30**	**AH24172-H**
	360	650	232	5 700	8 900	630 000	930	430	330,5	37,3	**23272-BEA-XL-K-MB1**	**AH3272G-H**
	360	750	224	6 600	8 800	620 000	710	470	476	41,1	**22372-BEA-XL-K-MB1**	**AH3272-H**
360	380	520	106	1 780	4 000	270 000	1 340	750	66,3	16,1	**23976-K-MB**	**AH3976G-H**
	380	560	135	2 900	5 000	420 000	1 230	740	109	22,1	**23076-BEA-XL-K-MB1**	**AH3076G-H**
	380	560	180	3 750	7 000	590 000	990	530	151	24	**24076-BEA-XL-K30-MB1**	**AH24076-H**
	380	620	194	4 700	7 600	540 000	990	530	227	32	**23176-BEA-XL-K-MB1**	**AH3176G-H**
	380	620	243	5 800	9 700	730 000	850	325	285	31,8	**24176-BE-XL-K30**	**AH24176-H**
	380	680	240	6 200	9 600	680 000	890	400	374	41,3	**23276-BEA-XL-K-MB1**	**AH3276G-H**

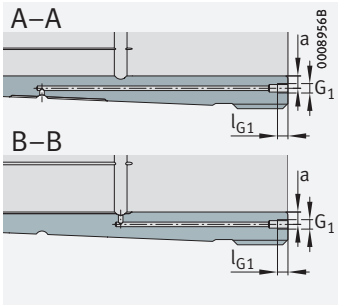
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Mounting dimensions



Pump connectors for hydraulic withdrawal sleeve

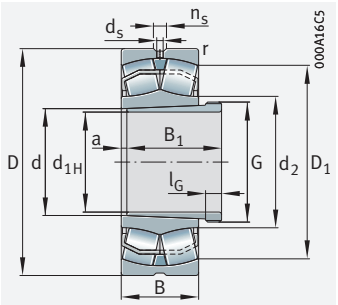


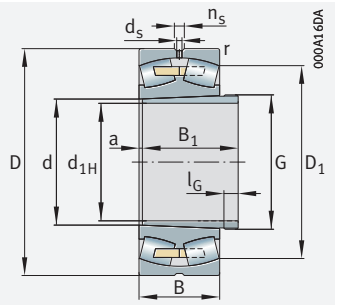
Hydraulic withdrawal sleeve (..-H) Mounting dimensions

Dimensions										Mounting dimensions						Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
280	3	384,6	–	9,5	17,7	7	21	Tr320×5	112	312,4	407,6	2,5	–	–	–	0,2	3,42	5,09	3,34
	4	413	340	9,5	17,7	8	26	Tr320×5	145	314,6	445,4	3	–	–	–	0,23	2,92	4,35	2,86
	4	403	334,8	8	15	18	24	Tr310×5	184	314,6	445,4	3	–	–	–	0,32	2,12	3,15	2,07
	5	436,8	–	9,5	17,7	8	30	Tr320×5	192	320	480	4	–	–	–	0,31	2,18	3,24	2,13
	5	422,8	338,2	8	15	18	24	Tr320×5	224	320	480	4	–	–	–	0,39	1,72	2,56	1,68
	5	470,5	–	12,5	23,5	8	26	Tr320×5	170	320	520	4	–	–	–	0,25	2,71	4,04	2,65
	5	458	–	12,5	23,5	8	34	Tr320×5	228	320	520	4	$G^1/_8$	8,5	12	0,35	1,92	2,86	1,88
	7,5	530,3	–	12,5	23,5	8	34	Tr330×5	228	332	588	6	$G^1/_8$	8,5	12	0,31	2,21	3,29	2,16
300	3	406,2	–	9,5	17,7	7	21	Tr340×5	112	332,4	427,6	2,5	M8	8,5	12	0,19	3,62	5,39	3,54
	4	433	–	9,5	17,7	8	27	Tr340×5	149	334,6	465,4	3	$G^1/_8$	8,5	12	0,22	3,01	4,48	2,94
	4	422,3	–	8	15	18	24	Tr330×5	184	334,6	465,4	3	M6	8,5	7	0,3	2,23	3,32	2,18
	5	469,3	–	12,5	23,5	8	31	Tr340×5	209	340	520	4	$G^1/_8$	8,5	12	0,32	2,13	3,17	2,08
	5	455,5	359	9,5	17,7	18	24	Tr340×5	242	340	520	4	$G^1/_8$	8,5	12	0,4	1,69	2,52	1,65
	5	505,1	–	12,5	23,5	10	27	Tr340×5	180	340	560	4	$G^1/_8$	8,5	12	0,25	2,71	4,04	2,65
	5	490,4	–	12,5	23,5	8	36	Tr340×5	246	340	560	4	$G^1/_8$	8,5	12	0,35	1,91	2,85	1,87
320	5	467,1	–	12,5	23,5	9	28	Tr360×5	162	358	502	4	$G^1/_8$	8,5	12	0,23	2,92	4,35	2,86
	5	456,1	–	9,5	17,7	19	26	Tr360×5	206	358	502	4	$G^1/_8$	8,5	12	0,32	2,12	3,15	2,07
	5	502,6	–	12,5	23,5	9	33	Tr360×5	225	360	560	4	$G^1/_8$	8,5	12	0,32	2,1	3,13	2,06
	5	484,1	382,8	9,5	17,7	19	26	Tr360×5	269	360	560	4	$G^1/_8$	8,5	12	0,42	1,62	2,42	1,59
	6	523,5	–	12,5	23,5	9	38	Tr360×5	264	366	594	5	$G^1/_8$	8,5	12	0,36	1,85	2,76	1,81
	7,5	605,95	–	12,5	23,5	9	38	Tr370×5	264	372	678	6	$G^1/_8$	8,5	12	0,31	2,2	3,27	2,15
340	3	447,1	–	9,5	17,7	7	21	Tr380×5	112	372,4	467,6	2,5	M8	8,5	12	0,17	4,05	6,04	3,96
	5	487,6	–	12,5	23,5	9	30	Tr380×5	167	378	522	4	$G^1/_8$	8,5	12	0,22	3,04	4,53	2,97
	5	476,4	–	9,5	17,7	20	26	Tr380×5	206	378	522	4	$G^1/_8$	8,5	12	0,3	2,23	3,32	2,18
	5	523,3	–	12,5	23,5	9	35	Tr380×5	229	380	580	4	$G^1/_8$	8,5	12	0,31	2,18	3,24	2,13
	5	505,9	399,4	9,5	17,7	20	26	Tr380×5	269	380	580	4	$G^1/_8$	8,5	12	0,4	1,69	2,52	1,65
	6	550,8	–	12,5	23,5	9	40	Tr380×5	274	386	624	5	$G^1/_8$	8,5	12	0,36	1,9	2,83	1,86
	7,5	640	–	12,5	23,5	9	40	Tr400×5	274	392	718	6	$G^1/_8$	8,5	12	0,31	2,2	3,27	2,15
360	4	477,6	–	9,5	17,7	8	22	Tr400×5	130	394,6	505,4	3	M8	8,5	12	0,19	3,58	5,33	3,5
	5	508,1	–	12,5	23,5	10	31	Tr400×5	170	398	542	4	$G^1/_8$	8,5	12	0,21	3,17	4,72	3,1
	5	497,9	–	9,5	17,7	20	28	Tr400×5	208	398	542	4	$G^1/_8$	8,5	12	0,29	2,33	3,47	2,28
	5	543,6	–	12,5	23,5	10	36	Tr400×5	232	400	600	4	$G^1/_8$	8,5	12	0,3	2,25	3,34	2,2
	5	528,4	421	9,5	17,7	20	28	Tr400×5	271	400	600	4	$G^1/_8$	8,5	12	0,38	1,76	2,62	1,72
	6	578,1	–	12,5	23,5	10	42	Tr400×5	284	406	654	5	$G^1/_8$	8,5	12	0,35	1,92	2,86	1,88

Spherical roller bearings

With withdrawal sleeve



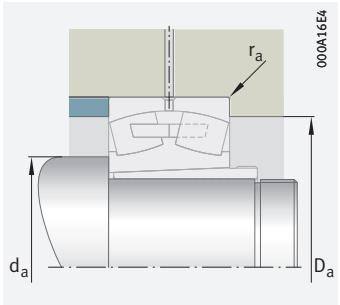


With solid cage, brass or steel

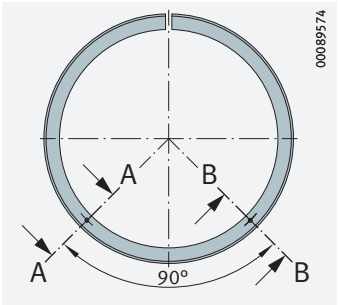
d_{1H} = 380 – 480 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695 | 1.12 ➤696 | 1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
380	400	540	106	1 830	4 150	280 000	1 290	710	68,2	17	**23980-B-K-MB**	**AH3980G-H**
	400	600	148	3 400	5 700	480 000	1 150	690	144	25,4	**23080-BEA-XL-K-MB1**	**AH3080G-H**
	400	600	200	4 500	8 100	680 000	920	495	196	27,8	**24080-BEA-XL-K30-MB1**	**AH24080-H**
	400	650	200	5 000	8 100	590 000	950	495	246	35,1	**23180-BEA-XL-K-MB1**	**AH3180G-H**
	400	650	250	6 200	10 600	790 000	800	300	323	34,4	**24180-BE-XL-K30**	**AH24180-H**
	400	720	256	7 000	10 900	750 000	820	370	450	47,1	**23280-BEA-XL-K-MB1**	**AH3280G-H**
	400	820	243	7 800	10 500	730 000	850	410	605	51,7	**22380-BEA-XL-K-MB1**	**AH3280-H**
400	420	560	106	1 910	4 450	310 000	1 230	660	72,1	17,8	**23984-K-MB**	**AH3984G-H**
	420	620	150	3 650	6 300	520 000	1 090	650	153	27,2	**23084-BEA-XL-K-MB1**	**AH3084G-H**
	420	620	200	4 600	8 500	720 000	890	465	205	29,6	**24084-BEA-XL-K30-MB1**	**AH24080-H**
	420	700	224	6 000	9 600	660 000	860	455	342	42	**23184-BEA-XL-K-MB1**	**AH3184G-H**
	420	700	280	7 400	12 600	890 000	720	270	431	41	**24184-BE-XL-K30**	**AH24184-H**
	420	760	272	7 800	12 300	820 000	770	340	537	53,6	**23284-BEA-XL-K-MB1**	**AH3284G-H**
420	440	600	118	2 230	5 200	305 000	1 130	620	98,3	21,2	**23988-K-MB**	**AH3988-H**
	440	650	157	3 950	6 900	560 000	1 030	610	176	30	**23088-BEA-XL-K-MB1**	**AHX3088G-H**
	440	650	212	5 100	9 500	780 000	830	435	238	32,8	**24088-BEA-XL-K30-MB1**	**AH24088-H**
	440	720	226	6 200	10 200	700 000	820	430	358	44,9	**23188-BEA-XL-K-MB1**	**AHX3188G-H**
	440	720	280	7 600	12 900	940 000	710	260	446	42,9	**24188-BE-XL-K30**	**AH24188-H**
	440	790	280	8 300	13 200	880 000	730	320	592	58,2	**23288-BEA-XL-K-MB1**	**AHX3288G-H**
440	460	620	118	2 270	5 400	380 000	1 080	590	103	22,2	**23992-B-K-MB**	**AH3992-H**
	460	680	163	4 300	7 500	610 000	980	580	201	32,9	**23092-BEA-XL-K-MB1**	**AHX3092G-H**
	460	760	240	6 900	11 500	760 000	770	395	431	50,3	**23192-BEA-XL-K-MB1**	**AHX3192G-H**
	460	760	300	8 500	14 500	1 030 000	660	241	531	48,7	**24192-BEA-XL-K30-MB1**	**AH24192-H**
	460	830	296	9 200	14 700	960 000	690	295	695	65,6	**23292-BEA-XL-K-MB1**	**AHX3292G-H**
460	480	650	128	2 550	6 000	470 000	1 040	570	121	25,7	**23996-B-K-MB**	**AH3996-H**
	480	700	165	4 450	8 000	640 000	950	550	210	35	**23096-BEA-XL-K-MB1**	**AHX3096G-H**
	480	700	218	5 600	10 700	890 000	770	385	279	37,2	**24096-BEA-XL-K30-MB1**	**AH24096-H**
	480	790	248	7 400	12 400	820 000	740	375	479	54,8	**23196-BEA-XL-K-MB1**	**AHX3196G-H**
	480	790	308	9 000	15 500	1 100 000	640	227	594	52,9	**24196-BEA-XL-K30-MB1**	**AH24196-H**
	480	870	310	10 000	16 200	1 040 000	650	275	804	72,4	**23296-BEA-XL-K-MB1**	**AHX3296G-H**
480	500	670	128	2 600	6 300	410 000	990	540	124	27,7	**239/500-K-MB**	**AH39/500-H**
	500	720	167	4 700	8 700	760 000	890	510	223	42,5	**230/500-BEA-XL-K-MB1**	**AHX30/500-H**
	500	830	264	8 300	13 900	890 000	690	350	574	70,9	**231/500-BEA-XL-K-MB1**	**AHX31/500-H**
	500	830	325	10 000	17 300	1 190 000	600	209	692	58,8	**241/500-BEA-XL-K30-MB1**	**AH241/500-H**

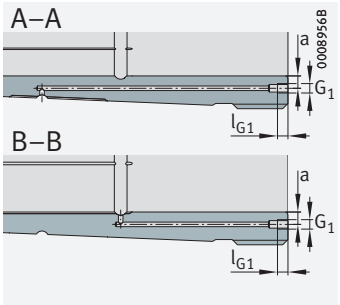
medias *https://www.schaeffler.de/std/1F9A*



Mounting dimensions



Pump connectors for hydraulic withdrawal sleeve

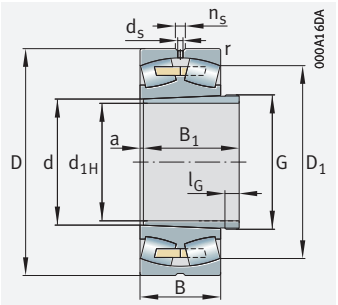


Hydraulic withdrawal sleeve (..-H) Mounting dimensions

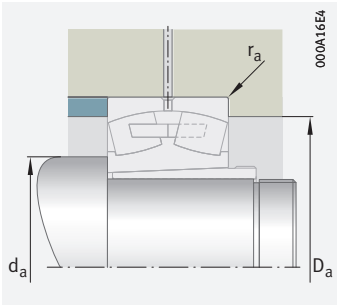
Dimensions										Mounting dimensions						Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
380	4	499	–	9,5	17,7	8	22	Tr420×5	130	414,6	525,4	3	M8	8,5	12	0,18	3,71	5,52	3,63
	5	541,9	–	12,5	23,5	10	33	Tr420×5	183	418	582	4	$G^1/_8$	8,5	12	0,22	3,07	4,57	3
	5	529,4	–	12,5	23,5	20	28	Tr420×5	228	418	582	4	$G^1/_8$	8,5	12	0,3	2,23	3,32	2,18
	6	571,4	–	12,5	23,5	10	38	Tr420×5	240	426	624	5	$G^1/_8$	8,5	12	0,29	2,3	3,42	2,25
	6	556,5	448,8	12,5	23,5	20	28	Tr420×5	278	426	624	5	$G^1/_8$	8,5	12	0,37	1,82	2,7	1,78
	6	611,2	–	12,5	23,5	10	44	Tr420×5	302	426	694	5	$G^1/_8$	8,5	12	0,36	1,9	2,83	1,86
	7,5	701,3	–	12,5	23,5	10	44	Tr440×5	302	432	788	6	$G^1/_8$	8,5	12	0,31	2,21	3,29	2,16
400	4	519,5	–	9,5	17,7	8	22	Tr440×5	130	434,6	545,4	3	M8	8,5	12	0,18	3,85	5,73	3,76
	5	560,7	–	12,5	23,5	10	34	Tr440×5	186	438	602	4	$G^1/_8$	8,5	12	0,21	3,17	4,72	3,1
	5	529,4	–	12,5	23,5	22	30	Tr440×5	230	438	602	4	$G^1/_8$	8,5	12	0,29	2,32	3,45	2,26
	6	609,8	–	12,5	23,5	10	40	Tr440×5	266	446	674	5	$G^1/_8$	8,5	12	0,31	2,18	3,24	2,13
	6	592,2	472,7	12,5	23,5	22	30	Tr440×5	310	446	674	5	$G^1/_8$	8,5	12	0,39	1,72	2,56	1,68
	7,5	643,4	–	12,5	23,5	10	46	Tr440×5	321	452	728	6	$G^1/_8$	8,5	12	0,36	1,89	2,81	1,84
420	4	552,8	–	12,5	23,5	8	25	Tr460×5	145	454,6	585,4	3	$G^1/_8$	8,5	12	0,18	3,66	5,46	3,58
	6	589,3	–	12,5	23,5	11	35	Tr460×5	194	463	627	5	$G^1/_8$	8,5	12	0,21	3,17	4,72	3,1
	6	578,8	–	12,5	23,5	22	30	Tr460×5	242	463	627	5	$G^1/_8$	8,5	12	0,29	2,3	3,42	2,25
	6	630,2	–	12,5	23,5	11	42	Tr460×5	270	466	694	5	$G^1/_8$	8,5	12	0,3	2,25	3,34	2,2
	6	614,3	614,2	12,5	23,5	22	30	Tr460×5	310	466	694	5	$G^1/_8$	8,5	12	0,38	1,78	2,65	1,74
	7,5	670,7	–	12,5	23,5	11	48	Tr460×5	330	472	758	6	$G^1/_8$	8,5	12	0,35	1,91	2,85	1,87
440	4	573,3	–	12,5	23,5	8	25	Tr480×5	145	474,6	605,4	3	$G^1/_8$	8,5	12	0,18	3,85	5,73	3,76
	6	616,7	–	12,5	23,5	11	37	Tr480×5	202	483	657	5	$G^1/_8$	8,5	12	0,21	3,17	4,72	3,1
	7,5	663,4	–	12,5	23,5	11	43	Tr480×5	285	492	728	6	$G^1/_8$	8,5	12	0,31	2,21	3,29	2,16
	7,5	647,1	–	12,5	23,5	23	32	Tr480×5	332	492	728	6	$G^1/_8$	8,5	12	0,38	1,76	2,62	1,72
	7,5	704,9	–	12,5	23,5	11	50	Tr480×5	349	492	798	6	$G^1/_8$	8,5	12	0,36	1,9	2,83	1,86
460	5	598,8	–	12,5	23,5	9	28	Tr500×5	158	498	632	4	$G^1/_8$	8,5	12	0,18	3,76	5,59	3,67
	6	637,3	–	12,5	23,5	12	38	Tr500×5	205	503	677	5	$G^1/_8$	8,5	12	0,21	3,27	4,87	3,2
	6	628,1	–	12,5	23,5	23	32	Tr500×5	250	503	677	5	$G^1/_8$	8,5	12	0,28	2,43	3,61	2,37
	7,5	690,4	–	12,5	23,5	12	45	Tr500×5	295	512	758	6	$G^1/_8$	8,5	12	0,3	2,23	3,32	2,18
	7,5	673,14	–	12,5	23,5	25	35	Tr500×5	343	512	758	6	$G^1/_8$	8,5	12	0,38	1,79	2,67	1,75
	7,5	737,6	–	12,5	23,5	12	52	Tr500×5	364	512	838	6	$G^1/_8$	8,5	12	0,36	1,9	2,83	1,86
480	5	619,3	–	12,5	23,5	10	32	Tr520×6	162	518	652	4	$G^1/_8$	8,5	12	0,17	3,9	5,81	3,81
	6	656,5	–	12,5	23,5	12	40	Tr540×6	209	523	697	5	$G^1/_8$	8,5	12	0,21	3,24	4,82	3,16
	7,5	723,1	–	12,5	23,5	12	47	Tr550×6	313	532	798	6	$G^1/_8$	8,5	12	0,31	2,2	3,27	2,15
	7,5	705,2	–	12,5	23,5	25	37	Tr520×6	362	532	798	6	$G^1/_8$	8,5	12	0,38	1,78	2,65	1,74

Spherical roller bearings

With withdrawal sleeve



With solid cage, brass or steel

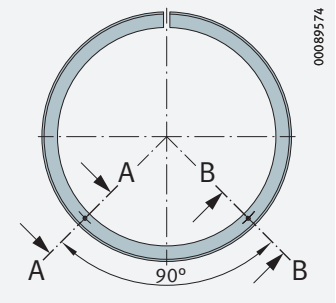


Mounting dimensions

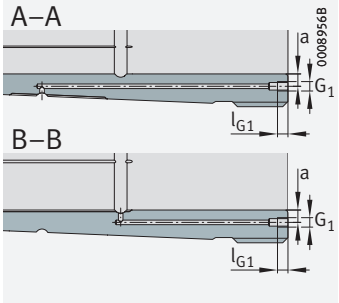
d_{1H} = 500 – 630 mm

Main dimensions				Basic load ratings		C_{ur}	n_G	$n_{\vartheta r}$	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}				Bearing	With-drawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	kN	min^{-1}	min^{-1}	≈ kg	≈ kg		
500	530	710	136	2 850	6 900	395	930	500	146	43,1	**239/530-K-MB**	**AH39/530-H**
	530	780	185	5 600	10 100	860	820	475	302	61,7	**230/530-BEA-XL-K-MB1**	**AH30/530A-H**
	530	870	272	8 900	15 000	960	660	325	634	92,3	**231/530-BEA-XL-K-MB1**	**AH31/530A-H**
	530	870	335	10 700	19 100	1 290	560	190	778	88,2	**241/530-BEA-XL-K30-MB1**	**AH241/530-H**
	530	980	355	12 700	20 400	1 270	570	235	1 183	132	**232/530-BEA-XL-K-MB1**	**AH32/530A-H**
530	560	750	140	3 100	7 600	540	880	465	176	47	**239/560-B-K-MB**	**AH39/560-H**
	560	820	195	6 100	11 200	940	760	440	350	68,4	**230/560-BEA-XL-K-MB1**	**AH30/560A-H**
	560	920	280	9 700	16 400	1 060	630	300	731	101	**231/560-BEA-XL-K-MB1**	**AH31/560A-H**
	560	920	355	12 000	21 000	1 440	530	177	914	101	**241/560-BEA-XL-K30-MB1**	**AH241/560-H**
	560	1 030	355	13 000	21 800	1 380	540	220	1 346	144	**232/560-BEA-XL-K-MB1**	**AH32/560A-H**
570	600	800	150	3 450	8 600	640	810	430	210	55,6	**239/600-B-K-MB**	**AH39/600-H**
	600	870	200	6 600	12 300	1 020	710	405	398	75	**230/600-BEA-XL-K-MB1**	**AH30/600A-H**
	600	920	355	13 300	24 000	1 580	485	159	1 099	118	**241/600-BEA-XL-K30-MB1**	**AH241/600-H**
	600	980	300	10 900	18 600	1 180	580	275	880	116	**231/600-BEA-XL-K-MB1**	**AH31/600A-H**
	600	1 090	388	15 200	25 500	1 530	495	194	1 584	164	**232/600-BEA-XL-K-MB1**	**AH32/600A-H**
600	630	850	165	4 100	9 900	720	740	405	283	64,5	**239/630-B-K-MB**	**AH39/630-H**
	630	920	212	7 400	13 700	1 130	670	380	476	87,3	**230/630-BEA-XL-K-MB1**	**AH30/630A-H**
	630	920	290	9 400	18 600	1 390	550	265	645	95,1	**240/630-BEA-XL-K30-MB1**	**AH240/630-H**
	630	1 030	315	12 000	20 600	1 280	540	255	1 025	136	**231/630-BEA-XL-K-MB1**	**AH31/630A-H**
	630	1 030	400	14 800	27 000	1 720	455	146	1 292	132	**241/630-BEA-XL-K30-MB1**	**AH241/630-H**
	630	1 150	412	16 900	28 500	1 680	460	179	1 885	188	**232/630-BEA-XL-K-MB1**	**AH32/630A-H**
630	670	900	170	4 300	10 600	760	710	375	310	87,7	**239/670-B-K-MB**	**AH39/670-H**
	670	980	230	8 400	15 900	1 100	630	480	581	124	**230/670-BEA-XL-K-MB1**	**AH30/670A-H**
	670	980	308	10 500	21 100	1 540	510	241	775	137	**240/670-BEA-XL-K30-MB1**	**AH240/670-H**
	670	1 090	336	13 300	23 800	1 410	370	231	1 211	185	**231/670-BEA-XL-K-MB1**	**AH31/670A-H**
	670	1 090	412	16 100	29 500	1 900	430	134	1 485	183	**241/670-BEA-XL-K30-MB1**	**AH241/670-H**
	670	1 220	438	19 000	32 500	1 860	425	162	2 240	252	**232/670-BEA-XL-K-MB1**	**AH32/670A-H**

medias *https://www.schaeffler.de/std/1F9A*



Pump connectors for hydraulic withdrawal sleeve

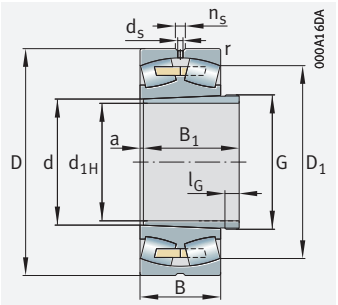


Hydraulic withdrawal sleeve (..-H)
Mounting dimensions

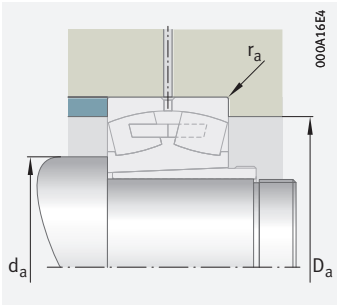
Dimensions									Mounting dimensions						Calculation factors			
d_{1H}	r min.	D_1 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
500	5	656,5	12,5	23,5	10	37	Tr550×6	175	548	692	4	$G^1/_4$	10	15	0,18	3,85	5,73	3,76
	6	708	12,5	23,5	12	45	Tr560×6	230	553	757	5	$G^1/_4$	10	15	0,22	3,1	4,62	3,03
	7,5	760,5	12,5	23,5	12	53	Tr560×6	325	562	838	6	$G^1/_4$	10	15	0,3	2,25	3,34	2,2
	7,5	742,9	12,5	23,5	25	40	Tr550×6	375	562	838	6	$G^1/_4$	10	15	0,37	1,83	2,72	1,79
	9,5	826,4	12,5	23,5	12	57	Tr580×6	412	570	940	8	$G^1/_4$	10	15	0,37	1,84	2,74	1,8
530	5	693,4	12,5	23,5	10	37	Tr580×6	180	578	732	4	$G^1/_4$	12	15	0,17	3,95	5,88	3,86
	6	745	12,5	23,5	12	45	Tr590×6	240	583	797	5	$G^1/_4$	12	15	0,22	3,1	4,62	3,03
	7,5	806,6	12,5	23,5	12	55	Tr590×6	335	592	888	6	$G^1/_4$	12	15	0,29	2,32	3,45	2,26
	7,5	791,5	12,5	23,5	28	45	Tr580×6	400	592	888	6	$G^1/_4$	12	15	0,37	1,83	2,72	1,79
	9,5	872,6	12,5	23,5	12	57	Tr610×6	422	600	990	8	$G^1/_4$	12	15	0,36	1,89	2,81	1,84
570	5	740,5	12,5	23,5	10	38	Tr625×6	192	618	782	4	$G^1/_4$	12	15	0,17	3,95	5,88	3,86
	6	793,3	12,5	23,5	14	45	Tr630×6	245	623	847	5	$G^1/_4$	12	15	0,21	3,24	4,82	3,16
	7,5	791,5	12,5	23,5	30	50	Tr625×6	425	592	888	6	$G^1/_4$	12	15	0,37	1,84	2,74	1,8
	7,5	859,35	12,5	23,5	14	55	Tr630×6	355	632	948	6	$G^1/_4$	12	15	0,29	2,3	3,42	2,25
	9,5	924	12,5	23,5	14	57	Tr650×6	445	640	1 050	8	$G^1/_4$	12	15	0,36	1,9	2,83	1,86
600	6	784,5	12,5	23,5	12	40	Tr655×6	210	653	827	5	$G^1/_4$	12	15	0,18	3,8	5,66	3,72
	7,5	838,2	12,5	23,5	14	46	Tr670×6	258	658	892	6	$G^1/_4$	12	15	0,21	3,24	4,82	3,16
	7,5	821,5	12,5	23,5	30	45	Tr655×6	335	658	892	6	$G^1/_4$	12	15	0,28	2,39	3,56	2,34
	7,5	902,1	12,5	23,5	14	60	Tr670×6	375	662	998	6	$G^1/_4$	12	15	0,29	2,3	3,42	2,25
	7,5	876,2	12,5	23,5	30	50	Tr655×6	450	662	998	6	$G^1/_4$	12	15	0,37	1,82	2,7	1,78
	12	973,4	12,5	23,5	14	63	Tr680×6	475	678	1 102	10	$G^1/_4$	12	15	0,36	1,87	2,79	1,83
630	6	831,5	12,5	23,5	12	41	Tr695×6	216	693	877	5	$G^1/_4$	12	15	0,17	3,95	5,88	3,86
	7,5	888,7	12,5	23,5	14	50	Tr710×7	280	698	952	6	$G^1/_4$	12	15	0,22	3,14	4,67	3,07
	7,5	878,2	12,5	23,5	30	50	Tr695×6	358	698	952	6	$G^1/_4$	12	15	0,28	2,39	3,56	2,34
	7,5	954,85	12,5	23,5	14	60	Tr710×7	395	702	1 058	6	$G^1/_4$	12	15	0,29	2,3	3,42	2,25
	7,5	937	12,5	23,5	30	55	Tr695×6	467	702	1 058	6	$G^1/_4$	12	15	0,36	1,87	2,79	1,83
	12	1 032,6	12,5	23,5	14	63	Tr720×7	500	718	1 172	12	$G^1/_4$	12	15	0,36	1,87	2,79	1,83

Spherical roller bearings

With withdrawal sleeve



With solid cage, brass or steel

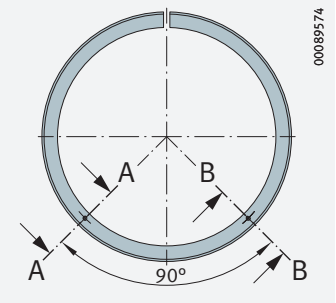


Mounting dimensions

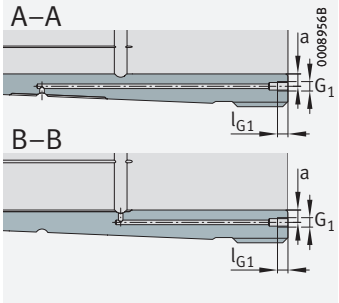
d_{1H} = 670 – 1 060 mm

Main dimensions				Basic load ratings		C_{ur}	n_G	$n_{\vartheta r}$	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}				Bearing	AH	Bearing	Withdrawal sleeve AH
				kN	kN	kN	min^{-1}	min^{-1}	≈ kg	≈ kg		
670	710	950	180	4 800	12 100	740	670	350	336	101	**239/710-K-MB**	**AH39/710-H**
	710	1 030	236	9 000	17 300	1 390	580	320	658	135	**230/710-BEA-XL-K-MB1**	**AH30/710A-H**
	710	1 030	315	11 000	22 500	1 660	485	225	866	151	**240/710-BEA-XL-K30-MB1**	**AH240/710-H**
	710	1 150	438	15 600	35 500	2 340	395	116	1 791	209	**241/710-B-K30-MB**	**AH241/710-H**
	710	1 150	345	14 400	25 500	1 550	470	216	1 383	202	**231/710-BEA-XL-K-MB1**	**AH31/710A-H**
	710	1 280	450	20 500	35 000	2 020	410	151	2 474	278	**232/710-BEA-XL-K-MB1**	**AH32/710A-H**
710	750	1 000	185	5 200	13 000	810	640	325	394	110	**239/750-K-MB**	**AH39/750-H**
	750	1 090	250	10 100	19 300	1 540	550	300	797,4	155	**230/750-BEA-XL-K-MB1**	**AH30/750A-H**
	750	1 090	355	12 300	25 500	1 860	450	207	1 053	169	**240/750-BEA-XL-K30-MB1**	**AH240/750-H**
	750	1 220	365	16 000	28 500	1 720	440	198	1 640	232	**231/750-BEA-XL-K-MB1**	**AH31/750A-H**
	750	1 360	475	22 800	39 500	2 240	380	137	2 969	312	**232/750-BEA-XL-K-MB1**	**AH32/750A-H**
750	800	1 060	195	5 900	15 100	1 030	580	295	490	146	**239/800-B-K-MB**	**AH39/800-H**
	800	1 150	258	10 900	21 200	1 680	520	275	865,4	198	**230/800-BEA-XL-K-MB1**	**AH30/800A-H**
	800	1 150	345	13 300	28 000	1 980	420	189	1 168	221	**240/800-BEA-XL-K30-MB1**	**AH240/800-H**
	800	1 280	375	17 100	31 500	1 850	415	181	1 861	297	**231/800-BEA-XL-K-MB1**	**AH31/800A-H**
	800	1 420	488	24 400	43 500	2 420	355	125	3 339	396	**232/800-BEA-XL-K-MB1**	**AH32/800A-H**
800	850	1 120	200	6 300	16 400	980	550	275	554	165	**239/850-K-MB**	**AH39/850-H**
	850	1 220	272	11 900	24 000	1 840	475	255	1 038	224	**230/850-BEA-XL-K-MB1**	**AH30/850A-H**
	850	1 220	365	14 800	31 500	2 210	390	173	1 375	250	**240/850-BEA-XL-K30-MB1**	**AH240/850-H**
	850	1 360	400	19 200	36 000	2 060	385	164	2 241	336	**231/850-BEA-XL-K-MB1**	**AH31/850A-H**
	850	1 500	515	27 000	48 500	2 650	335	115	3 905	450	**232/850-BEA-XL-K-MB1**	**AH32/850A-H**
850	900	1 180	206	6 500	17 200	1 030	520	260	641	180	**239/900-K-MB**	**AH39/900-H**
	900	1 280	280	12 800	25 500	1 990	340	239	1 163	246	**230/900-BEA-XL-K-MB1**	**AH30/900A-H**
	900	1 280	375	13 500	34 500	2 430	370	160	1 560	274	**240/900-BEA-XL-K30-MB1**	**AH240/900-H**
	900	1 420	412	20 700	38 500	2 230	365	155	2 456	368	**231/900-BEA-XL-K-MB1**	**AH31/900A-H**
	900	1 580	515	28 500	52 000	2 900	320	105	4 336	476	**232/900-BEA-XL-K-MB1**	**AH32/900A-H**
900	950	1 360	300	14 400	29 000	2 160	420	220	1 425	277	**230/950-BEA-XL-K-MB1**	**AH30/950A-H**
	950	1 360	412	18 400	40 000	2 650	340	147	1 966	316	**240/950-BEA-XL-K30-MB1**	**AH240/950-H**
950	1 000	1 420	412	19 100	42 000	2 850	325	137	2 115	339	**240/1000-BEA-XL-K30-MB1**	**AH240/1000-H**
1 000	1 060	1 500	438	21 400	47 500	3 150	305	126	2 470	445	**240/1060-BEA-XL-K30-MB1**	**AH240/1060-H**
1 060	1 120	1 580	462	21 800	58 000	3 500	285	116	2 884	501	**240/1120-BEA-XL-K30-MB1**	**AH240/1120-H**

medias *https://www.schaeffler.de/std/1F9A*



Pump connectors for hydraulic withdrawal sleeve

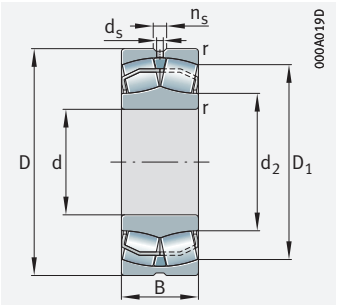


Hydraulic withdrawal sleeve (..-H) Mounting dimensions

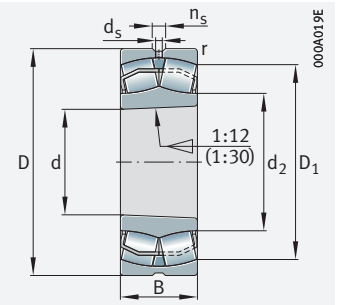
Dimensions									Mounting dimensions						Calculation factors			
d_{1H}	r min.	D_1 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
670	6	877,5	12,5	23,5	12	43	Tr740×7	228	733	927	5	$G1/4$	15	15	0,18	3,85	5,73	3,76
	7,5	939,6	12,5	23,5	16	50	Tr750×7	286	738	1 002	6	$G1/4$	15	15	0,21	3,24	4,82	3,16
	7,5	925	12,5	23,5	33	50	Tr740×7	365	738	1 002	6	$G1/4$	15	15	0,28	2,43	3,61	2,37
	9,5	980,2	12,5	23,5	33	55	Tr740×7	493	750	1 110	8	$G1/4$	15	15	0,38	1,79	2,67	1,75
	9,5	1 010,8	12,5	23,5	16	60	Tr750×7	405	750	1 110	8	$G1/4$	15	15	0,29	2,35	3,5	2,3
	12	1 089	12,5	23,5	16	65	Tr760×7	515	758	1 232	10	$G1/4$	15	15	0,35	1,92	2,86	1,88
710	6	923,2	12,5	23,5	12	44	Tr780×7	234	773	977	5	$G1/4$	15	15	0,17	3,95	5,88	3,86
	7,5	992,8	12,5	23,5	16	50	Tr800×7	300	778	1 062	6	$G1/4$	15	15	0,21	3,24	4,82	3,16
	7,5	977,5	12,5	23,5	35	50	Tr780×7	385	778	1 062	6	$G1/4$	15	15	0,28	2,41	3,59	2,35
	9,5	1 070,8	12,5	23,5	16	60	Tr800×7	425	790	1 180	8	$G1/4$	15	15	0,28	2,37	3,53	2,32
	15	1 157,6	12,5	23,5	16	65	Tr800×7	540	808	1 302	12	$G1/4$	15	15	0,35	1,94	2,88	1,89
750	6	983,7	12,5	23,5	12	45	Tr830×7	245	823	1 037	5	$G1/4$	15	15	0,17	4,05	6,04	3,96
	7,5	1 050,4	12,5	23,5	18	50	Tr850×7	308	828	1 122	6	$G1/4$	15	15	0,2	3,31	4,92	3,23
	7,5	1 035,7	12,5	23,5	40	50	Tr830×7	395	828	1 122	6	$G1/4$	15	15	0,27	2,49	3,71	2,43
	9,5	1 129,5	12,5	23,5	18	63	Tr850×7	438	840	1 240	8	$G1/4$	15	15	0,28	2,43	3,61	2,37
	15	1 215,3	12,5	23,5	18	67	Tr850×7	555	858	1 362	12	$G1/4$	15	15	0,34	1,99	2,96	1,94
800	6	1 039,9	12,5	23,5	12	50	Tr880×7	258	873	1 097	5	$G1/4$	15	15	0,16	4,11	6,12	4,02
	7,5	1 115,1	12,5	23,5	18	53	Tr900×7	325	878	1 192	6	$G1/4$	15	15	0,2	3,34	4,98	3,27
	7,5	1 099,4	12,5	23,5	40	53	Tr880×7	418	878	1 192	6	$G1/4$	15	15	0,27	2,51	3,74	2,45
	12	1 199,1	12,5	23,5	18	63	Tr900×7	462	898	1 312	10	$G1/4$	15	15	0,28	2,43	3,61	2,37
	15	1 285,3	12,5	23,5	18	70	Tr900×7	585	908	1 442	12	$G1/4$	15	15	0,34	1,99	2,96	1,94
850	6	1 098,8	12,5	23,5	12	51	Tr930×8	265	923	1 157	5	$G1/4$	15	15	0,16	4,28	6,37	4,19
	7,5	1 174,3	12,5	23,5	20	55	Tr950×8	335	928	1 252	6	$G1/4$	15	15	0,2	3,42	5,09	3,34
	7,5	1 157,4	12,5	23,5	45	55	Tr930×8	430	928	1 252	6	$G1/4$	15	15	0,26	2,57	3,83	2,52
	12	1 256,2	12,5	23,5	20	63	Tr950×8	475	948	1 372	10	$G1/4$	15	15	0,27	2,47	3,67	2,41
	15	1 365,5	12,5	23,5	20	70	Tr950×8	585	958	1 522	12	$G1/4$	15	15	0,32	2,12	3,15	2,07
900	7,5	1 245,7	12,5	23,5	20	55	Tr1000×8	355	978	1 332	6	$G1/4$	15	15	0,2	3,38	5,03	3,31
	7,5	1 220,4	12,5	23,5	45	55	Tr980×8	467	978	1 332	6	$G1/4$	15	15	0,27	2,47	3,67	2,41
950	7,5	1 282,2	12,5	23,5	50	57	Tr1035×8	469	1 028	1 392	6	$G1/4$	15	15	0,26	2,6	3,87	2,54
1 000	9,5	1 354	12,5	23,5	50	60	Tr1095×8	498	1 094	1 466	8	$G1/4$	15	15	0,26	2,57	3,83	2,52
1 060	9,5	1 429,7	12,5	23,5	50	65	Tr1155×8	527	1 154	1 546	8	$G1/4$	15	15	0,26	2,57	3,83	2,52

Spherical roller bearings

For vibratory machinery
Cylindrical or tapered bore



Cylindrical bore

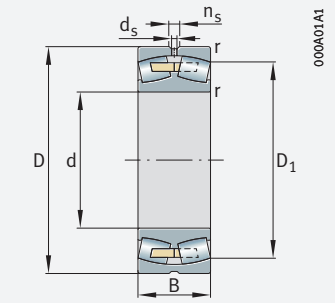


Tapered bore

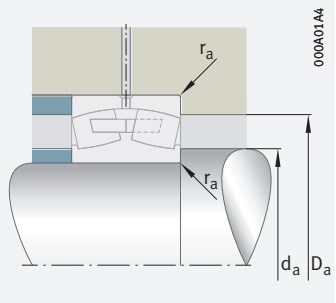
d = 40 – 110 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
40	90	33	156	149	13 500	7 600	5 500	1,05	**22308-E1-XL-T41A**
	90	33	156	149	13 500	7 600	5 500	1	**22308-E1-XL-K-T41A**
45	100	36	187	183	16 500	6 800	5 000	1,39	**22309-E1-XL-T41A**
	100	36	187	183	16 500	6 800	5 000	1,4	**22309-E1-XL-K-T41A**
50	110	40	229	223	20 700	6 300	4 800	1,9	**22310-E1-XL-T41A**
	110	40	229	223	20 700	6 300	4 800	1,9	**22310-E1-XL-K-T41A**
55	120	43	265	260	24 600	5 800	4 500	2,27	**22311-E1-XL-T41A**
	120	43	265	260	24 600	5 800	4 500	2,2	**22311-E1-XL-K-T41A**
60	130	46	310	310	29 000	5 400	4 200	2,97	**22312-E1-XL-T41A**
	130	46	310	310	29 000	5 400	4 200	2,8	**22312-E1-XL-K-T41A**
65	140	48	350	365	33 500	5 000	3 800	3,57	**22313-E1-XL-T41A**
	140	48	350	365	33 500	5 000	3 800	3,5	**22313-E1-XL-K-T41A**
70	150	51	390	390	37 500	4 800	3 700	4,21	**22314-E1-XL-T41A**
	150	51	390	390	37 500	4 800	3 700	4,1	**22314-E1-XL-K-T41A**
75	160	55	445	450	41 500	4 500	3 550	5,38	**22315-E1-XL-T41A**
	160	55	445	450	42 000	4 500	3 550	5,3	**22315-E1-XL-K-T41A**
80	170	58	495	510	46 500	4 250	3 400	6,27	**22316-E1-XL-T41A**
	170	58	495	510	46 500	4 250	3 400	6,1	**22316-E1-XL-K-T41A**
85	180	60	540	560	51 000	4 100	3 200	7,06	**22317-E1-XL-T41D**
	180	60	540	560	51 000	4 100	3 200	7,1	**22317-E1-XL-K-T41A**
90	190	64	610	630	56 000	3 850	3 000	8,69	**22318-E1-XL-T41D**
	190	64	610	630	56 000	3 850	3 000	8,5	**22318-E1-XL-K-T41A**
95	200	67	670	700	61 000	3 700	2 800	9,69	**22319-E1-XL-T41D**
	200	67	670	700	61 000	3 700	2 800	9,5	**22319-E1-XL-K-T41A**
100	215	82,6	680	900	69 000	2 800	–	15,5	**23320-AS-MA-T41A**
	215	73	810	920	77 000	3 300	2 380	13,1	**22320-E1-XL-T41D**
	215	73	810	920	77 000	3 300	2 380	13	**22320-E1-XL-K-T41A**
110	240	80	950	1 070	93 000	3 000	2 130	17,7	**22322-E1-XL-T41D**
	240	80	950	1 070	93 000	3 000	2 130	17,4	**22322-E1-XL-K-T41A**

medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore

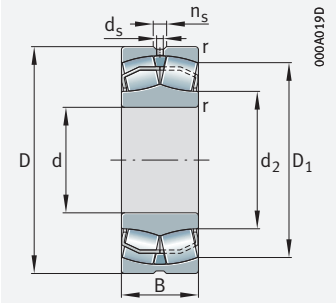


Mounting dimensions

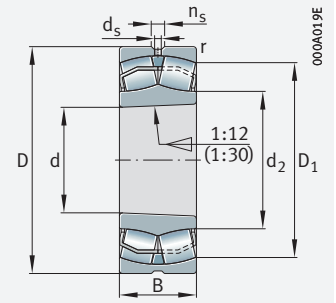
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
40	1,5	76	52,4	3,2	6,5	49	81	1,5	0,36	1,86	2,77	1,82
	1,5	76	52,4	3,2	6,5	49	81	1,5	0,36	1,86	2,77	1,82
45	1,5	84,7	58,9	3,2	6,5	54	91	1,5	0,36	1,9	2,83	1,86
	1,5	84,7	58,9	3,2	6,5	54	91	1,5	0,36	1,9	2,83	1,86
50	2	92,6	63	3,2	6,5	61	99	2	0,36	1,86	2,77	1,82
	2	92,6	63	3,2	6,5	61	99	2	0,36	1,86	2,77	1,82
55	2	101,4	68,9	3,2	6,5	66	109	2	0,36	1,89	2,81	1,84
	2	101,4	68,9	3,2	6,5	66	109	2	0,36	1,89	2,81	1,84
60	2,1	110,1	74,8	3,2	6,5	72	118	2,1	0,35	1,91	2,85	1,87
	2,1	110,1	74,8	3,2	6,5	72	118	2,1	0,35	1,91	2,85	1,87
65	2,1	119,3	83,2	4,8	9,5	77	128	2,1	0,34	2	2,98	1,96
	2,1	119,3	83,2	4,8	9,5	77	128	2,1	0,34	2	2,98	1,96
70	2,1	128	86,7	4,8	9,5	82	138	2,1	0,34	2	2,98	1,96
	2,1	128	86,7	4,8	9,5	82	138	2,1	0,34	2	2,98	1,96
75	2,1	136,3	92,4	4,8	9,5	87	148	2,1	0,34	1,99	2,96	1,94
	2,1	136,3	92,4	4,8	9,5	87	148	2,1	0,34	1,99	2,96	1,94
80	2,1	145,1	98,3	4,8	9,5	92	158	2,1	0,34	1,99	2,96	1,94
	2,1	145,1	98,3	4,8	9,5	92	158	2,1	0,34	1,99	2,96	1,94
85	3	154,2	104,4	4,8	9,5	99	166	2,5	0,33	2,04	3,04	2
	3	154,2	104,4	4,8	9,5	99	166	2,5	0,33	2,04	3,04	2
90	3	162,5	110,2	6,3	12,2	104	176	2,5	0,33	2,03	3,02	1,98
	3	162,5	110,2	6,3	12,2	104	176	2,5	0,33	2,03	3,02	1,98
95	3	171,2	116	6,3	12,2	109	186	2,5	0,33	2,03	3,02	1,98
	3	171,2	116	6,3	12,2	109	186	2,5	0,33	2,03	3,02	1,98
100	3	–	–	4,8	9,5	114	201	2,5	0,43	1,57	2,34	1,53
	3	184,7	130,2	6,3	12,2	114	201	2,5	0,33	2,03	3,02	1,98
	3	184,7	130,2	6,3	12,2	114	201	2,5	0,33	2,03	3,02	1,98
110	3	204,9	143,1	8	15	124	226	2,5	0,33	2,07	3,09	2,03
	3	204,9	143,1	8	15	124	226	2,5	0,33	2,07	3,09	2,03

Spherical roller bearings

For vibratory machinery
Cylindrical or tapered bore



Cylindrical bore

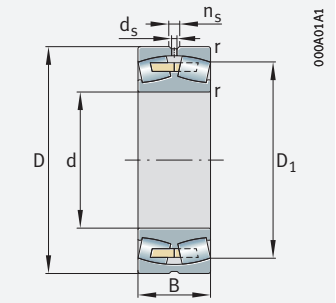


Tapered bore

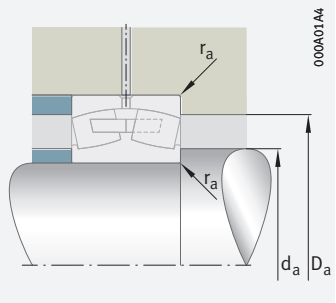
d = 120 – 220 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*695*|*1.12* ➤*696*|*1.13* X-life ➤*684*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
120	260	86	1 080	1 170	105 000	2 850	2 000	22,3	**22324-E1-XL-T41D**
	260	86	1 080	1 170	105 000	2 850	2 000	22,1	**22324-E1-XL-K-T41A**
130	280	93	1 250	1 370	120 000	2 650	1 820	28	**22326-E1-XL-T41D**
	280	93	1 250	1 370	120 000	2 650	1 820	27,4	**22326-E1-XL-K-T41A**
140	300	102	1 460	1 630	135 000	2 420	1 660	34,6	**22328-E1-XL-T41D**
	300	102	1 460	1 630	135 000	2 420	1 660	34,4	**22328-E1-XL-K-T41A**
150	320	108	1 640	1 850	151 000	2 290	1 520	42,2	**22330-E1-XL-T41D**
	320	108	1 640	1 850	151 000	2 290	1 520	40,9	**22330-E1-XL-K-T41A**
160	340	114	1 680	1 990	162 000	2 250	1 420	47,3	**22332-BE-XL-K-JPA-T41A**
	340	136	2 000	2 370	186 000	2 010	–	60,4	**23332-BEA-XL-MA1-T41A**
	340	114	1 680	1 990	162 000	2 250	1 420	48,4	**22332-BE-XL-JPA-T41A**
170	360	120	1 870	2 220	178 000	2 130	1 320	56,9	**22334-BE-XL-K-JPA-T41A**
	360	140	2 190	2 700	207 000	1 890	–	69	**23334-BEA-XL-MA1-T41A**
	360	120	1 870	2 220	178 000	2 130	1 320	58,2	**22334-BE-XL-JPA-T41A**
180	380	126	2 060	2 460	195 000	2 030	1 230	66,6	**22336-BE-XL-K-JPA-T41A**
	380	150	2 460	3 100	227 000	1 780	–	81	**23336-BEA-XL-MA1-T41A**
	380	126	2 060	2 460	195 000	2 030	1 230	68,1	**22336-BE-XL-JPA-T41A**
190	400	132	2 220	2 650	213 000	1 940	1 160	77,2	**22338-BE-XL-K-JPA-T41A**
	400	155	2 650	3 350	248 000	1 710	–	93,5	**23338-BEA-XL-MA1-T41A**
	400	132	2 220	2 650	213 000	1 940	1 160	78,9	**22338-BE-XL-JPA-T41A**
200	420	138	2 440	2 950	232 000	1 830	1 080	87,4	**22340-BE-XL-K-JPA-T41A**
	420	165	2 950	3 700	270 000	1 600	–	112,6	**23340-BEA-XL-MA1-T41A**
	420	138	2 440	2 950	232 000	1 830	1 080	89,4	**22340-BE-XL-JPA-T41A**
220	460	145	2 800	3 400	270 000	1 690	950	114	**22344-BE-XL-K-JPA-T41A**
	460	180	3 450	4 450	315 000	1 430	–	147,1	**23344-BEA-XL-MA1-T41A**
	460	145	2 800	3 400	270 000	1 690	950	117	**22344-BE-XL-JPA-T41A**

medias *https://www.schaeffler.de/std/1F9A*



Solid cage, brass or steel; cylindrical bore

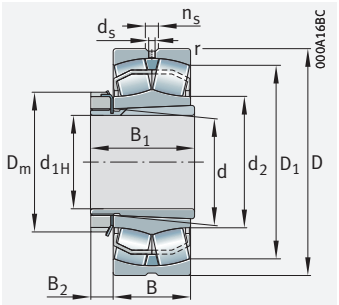


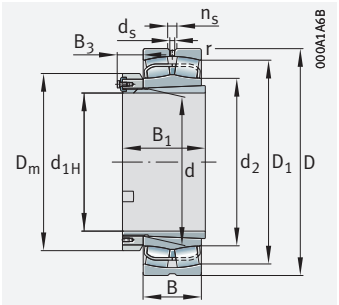
Mounting dimensions

Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
120	3	222,4	150,8	8	15	134	246	2,5	0,33	2,06	3,06	2,01
	3	222,4	150,7	8	15	134	246	2,5	0,33	2,06	3,06	2,01
130	4	239,5	162,2	9,5	17,7	147	263	3	0,33	2,06	3,06	2,01
	4	239,5	162,2	9,5	17,7	147	263	3	0,33	2,06	3,06	2,01
140	4	255,7	173,5	9,5	17,7	157	283	3	0,34	2	2,98	1,96
	4	255,7	173,5	9,5	17,7	157	283	3	0,34	2	2,98	1,96
150	4	273,2	185,3	9,5	17,7	167	303	3	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	167	303	3	0,33	2,02	3	1,97
160	4	286,7	201,2	9,5	17,7	177	323	3	0,35	1,94	2,88	1,89
	4	280,8	–	9,5	17,7	192	323	3	0,42	1,6	2,38	1,56
	4	286,7	201,2	9,5	17,7	177	323	3	0,35	1,94	2,88	1,89
170	4	303,9	213,1	9,5	17,7	187	343	3	0,35	1,95	2,9	1,91
	4	299,4	–	9,5	17,7	210	343	3	0,4	1,67	2,49	1,63
	4	303,9	213,1	9,5	17,7	187	343	3	0,35	1,95	2,9	1,91
180	4	320,8	224,9	12,5	23,5	197	363	3	0,34	1,96	2,92	1,92
	4	315	–	9,5	17,7	197	363	3	0,41	1,64	2,44	1,6
	4	320,8	224,9	12,5	23,5	197	363	3	0,34	1,96	2,92	1,92
190	5	338,1	236,8	12,5	23,5	210	380	4	0,34	1,96	2,92	1,92
	5	333,1	–	9,5	17,7	210	380	4	0,4	1,67	2,49	1,63
	5	338,1	236,8	12,5	23,5	210	380	4	0,34	1,96	2,92	1,92
200	5	355,1	248,8	12,5	23,5	220	400	4	0,34	1,98	2,94	1,93
	5	348,6	–	9,5	17,7	220	400	4	0,41	1,64	2,44	1,6
	5	355,1	248,8	12,5	23,5	220	400	4	0,34	1,98	2,94	1,93
220	5	391,1	273,4	12,5	23,5	240	440	4	0,33	2,06	3,06	2,01
	5	382,4	–	9,5	17,7	240	440	4	0,41	1,65	2,46	1,61
	5	391,1	273,4	12,5	23,5	240	440	4	0,33	2,06	3,06	2,01

Spherical roller bearings

For vibratory machinery
With adapter sleeve



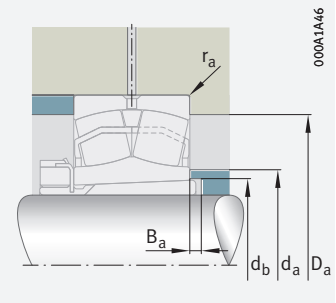


With locknut and retaining bracket

d_{1H} = 35 – 200 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
35	40	90	33	156	149	13 500	7 600	5 500	1	0,23	**22308-E1-XL-K-T41A**	**H2308**
40	45	100	36	187	183	16 500	6 800	5 000	1,4	0,298	**22309-E1-XL-K-T41A**	**H2309**
45	50	110	40	229	223	20 700	6 300	4 800	1,9	0,36	**22310-E1-XL-K-T41A**	**H2310**
50	55	120	43	265	260	24 600	5 800	4 500	2,2	0,435	**22311-E1-XL-K-T41A**	**H2311**
55	60	130	46	310	310	29 000	5 400	4 200	2,8	0,493	**22312-E1-XL-K-T41A**	**H2312**
60	65	140	48	350	365	33 500	5 000	3 800	3,5	0,57	**22313-E1-XL-K-T41A**	**H2313**
	70	150	51	390	390	37 500	4 800	3 700	4,1	0,92	**22314-E1-XL-K-T41A**	**H2314**
65	75	160	55	445	450	42 000	4 500	3 550	5,3	1,06	**22315-E1-XL-K-T41A**	**H2315**
70	80	170	58	495	510	46 500	4 250	3 400	6,1	1,31	**22316-E1-XL-K-T41A**	**H2316**
75	85	180	60	540	560	51 000	4 100	3 200	7,1	1,47	**22317-E1-XL-K-T41A**	**H2317**
80	90	190	64	610	630	56 000	3 850	3 000	8,5	1,71	**22318-E1-XL-K-T41A**	**H2318**
85	95	200	67	670	700	61 000	3 700	2 800	9,5	1,95	**22319-E1-XL-K-T41A**	**H2319**
90	100	215	73	810	920	77 000	3 300	2 380	13	2,2	**22320-E1-XL-K-T41A**	**H2320**
100	110	240	80	950	1 070	93 000	3 000	2 130	17,4	2,78	**22322-E1-XL-K-T41A**	**H2322**
110	120	260	86	1 080	1 170	105 000	2 850	2 000	22,1	3,24	**22324-E1-XL-K-T41A**	**H2324**
115	130	280	93	1 250	1 370	120 000	2 650	1 820	27,4	4,69	**22326-E1-XL-K-T41A**	**H2326**
125	140	300	102	1 460	1 630	135 000	2 420	1 660	34,4	5,66	**22328-E1-XL-K-T41A**	**H2328**
135	150	320	108	1 640	1 850	151 000	2 290	1 520	40,9	6,76	**22330-E1-XL-K-T41A**	**H2330**
140	160	340	114	1 680	1 990	162 000	2 250	1 420	47,3	9,32	**22332-BE-XL-K-JPA-T41A**	**H2332**
150	170	360	120	1 870	2 220	178 000	2 130	1 320	56,9	10,4	**22334-BE-XL-K-JPA-T41A**	**H2334**
160	180	380	126	2 060	2 460	195 000	2 030	1 230	66,6	11,6	**22336-BE-XL-K-JPA-T41A**	**H2336**
170	190	400	132	2 220	2 650	213 000	1 940	1 160	77,2	12,9	**22338-BE-XL-K-JPA-T41A**	**H2338**
180	200	420	138	2 440	2 950	232 000	1 830	1 080	87,4	14,2	**22340-BE-XL-K-JPA-T41A**	**H2340**
200	220	460	145	2 800	3 400	270 000	1 690	950	114	17,8	**22344-BE-XL-K-JPA-T41A**	**H2344X**

medias *https://www.schaeffler.de/std/1F9A*

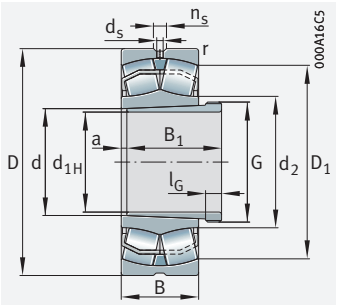


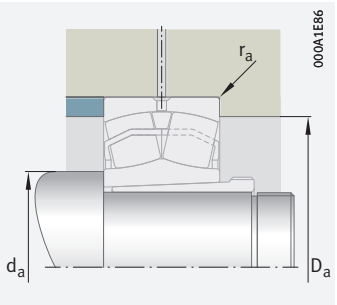
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	D_m	B_1	B_2	d_a	D_a	d_b	B_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈					≈	max.	max.	min.	min.	max.				
35	1,5	76	52,4	3,2	6,5	58	46	10,25	49	81	45	5	1,5	0,36	1,86	2,77	1,82
40	1,5	84,7	58,9	3,2	6,5	65	50	11,25	54	91	50	5	1,5	0,36	1,9	2,83	1,86
45	2	92,6	63	3,2	6,5	70	55	12,25	61	99	56	5	2	0,36	1,86	2,77	1,82
50	2	101,4	68,9	3,2	6,5	75	59	12,5	66	109	61	6	2	0,36	1,89	2,81	1,84
55	2,1	110,1	74,8	3,2	6,5	80	62	12,5	72	118	66	5	2,1	0,35	1,91	2,85	1,87
60	2,1	119,3	83,2	4,8	9,5	85	65	13,5	77	128	72	5	2,1	0,34	2	2,98	1,96
	2,1	128	86,7	4,8	9,5	92	68	13,5	82	138	77	5	2,1	0,34	2	2,98	1,96
65	2,1	136,3	92,4	4,8	9,5	98	73	14,5	87	148	82	5	2,1	0,34	1,99	2,96	1,94
70	2,1	145,1	98,3	4,8	9,5	105	78	16,75	92	158	88	5	2,1	0,34	1,99	2,96	1,94
75	3	154,2	104,4	4,8	9,5	110	82	17,75	99	166	94	6	2,5	0,33	2,04	3,04	2
80	3	162,5	110,2	6,3	12,2	120	86	17,75	104	176	100	6	2,5	0,33	2,03	3,02	1,98
85	3	171,2	116	6,3	12,2	125	90	18,75	109	186	105	7	2,5	0,33	2,03	3,02	1,98
90	3	184,7	130,2	6,3	12,2	130	97	19,75	114	201	110	7	2,5	0,33	2,03	3,02	1,98
100	3	204,9	143,1	8	15	145	105	20,75	124	226	121	7	2,5	0,33	2,07	3,09	2,03
110	3	222,4	150,7	8	15	155	112	22	134	246	131	7	2,5	0,33	2,06	3,06	2,01
115	4	239,5	162,2	9,5	17,7	165	121	23	147	263	142	8	3	0,33	2,06	3,06	2,01
125	4	255,7	173,5	9,5	17,7	180	131	24	157	283	152	8	3	0,34	2	2,98	1,96
135	4	273,2	185,3	9,5	17,7	195	139	26	167	303	163	8	3	0,33	2,02	3	1,97
140	4	286,7	201,2	9,5	17,7	210	147	27,5	177	323	174	8	3	0,35	1,94	2,88	1,89
150	4	303,9	213,1	9,5	17,7	220	154	28,5	187	343	185	8	3	0,35	1,95	2,9	1,91
160	4	320,8	224,9	12,5	23,5	230	161	29,5	197	363	195	8	3	0,34	1,96	2,92	1,92
170	5	338,1	236,8	12,5	23,5	240	169	30,5	210	380	206	9	4	0,34	1,96	2,92	1,92
180	5	355,1	248,8	12,5	23,5	250	176	31,5	220	400	216	10	4	0,34	1,98	2,94	1,93
200	5	391,1	273,4	12,5	23,5	280	186	35	240	440	236	10	4	0,33	2,06	3,06	2,01

Spherical roller bearings

For vibratory machinery
With withdrawal sleeve





Mounting dimensions

d_{1H} = 35 – 200 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤695|1.12 ➤696|1.13 X-life ➤684	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
35	40	90	33	156	149	13 500	7 600	5 500	1	0,13	**22308-E1-XL-K-T41A**	**AH2308**
40	45	100	36	187	183	16 500	6 800	5 000	1,4	0,17	**22309-E1-XL-K-T41A**	**AH2309**
45	50	110	40	229	223	20 700	6 300	4 800	1,9	0,22	**22310-E1-XL-K-T41A**	**AHX2310**
50	55	120	43	265	260	24 600	5 800	4 500	2,2	0,26	**22311-E1-XL-K-T41A**	**AHX2311**
55	60	130	46	310	310	29 000	5 400	4 200	2,8	0,32	**22312-E1-XL-K-T41A**	**AHX2312**
60	65	140	48	350	365	33 500	5 000	3 800	3,5	0,36	**22313-E1-XL-K-T41A**	**AH2313G**
65	70	150	51	390	390	37 500	4 800	3 700	4,1	0,42	**22314-E1-XL-K-T41A**	**AHX2314G**
70	75	160	55	445	450	42 000	4 500	3 550	5,3	0,48	**22315-E1-XL-K-T41A**	**AHX2315G**
75	80	170	58	495	510	46 500	4 250	3 400	6,1	0,61	**22316-E1-XL-K-T41A**	**AHX2316**
80	85	180	60	540	560	51 000	4 100	3 200	7,1	0,68	**22317-E1-XL-K-T41A**	**AHX2317**
85	90	190	64	610	630	56 000	3 850	3 000	8,5	0,78	**22318-E1-XL-K-T41A**	**AHX2318**
90	95	200	67	670	700	61 000	3 700	2 800	9,5	0,91	**22319-E1-XL-K-T41A**	**AHX2319**
95	100	215	73	810	920	77 000	3 300	2 380	13	1,03	**22320-E1-XL-K-T41A**	**AHX2320**
105	110	240	80	950	1 070	93 000	3 000	2 130	17,4	1,26	**22322-E1-XL-K-T41A**	**AHX2322G**
115	120	260	86	1 080	1 170	105 000	2 850	2 000	22,1	1,5	**22324-E1-XL-K-T41A**	**AHX2324G**
125	130	280	93	1 250	1 370	120 000	2 650	1 820	27,4	1,84	**22326-E1-XL-K-T41A**	**AHX2326G**
135	140	300	102	1 460	1 630	135 000	2 420	1 660	34,4	2,21	**22328-E1-XL-K-T41A**	**AHX2328G**
145	150	320	108	1 640	1 850	151 000	2 290	1 520	40,9	2,64	**22330-E1-XL-K-T41A**	**AHX2330G**
150	160	340	114	1 680	1 990	162 000	2 250	1 420	47,3	4,26	**22332-BE-XL-K-JPA-T41A**	**AH2332G**
160	170	360	120	1 870	2 220	178 000	2 130	1 320	56,9	4,78	**22334-BE-XL-K-JPA-T41A**	**AH2334G**
170	180	380	126	2 060	2 460	195 000	2 030	1 230	66,6	5,42	**22336-BE-XL-K-JPA-T41A**	**AH2336G**
180	190	400	132	2 220	2 650	213 000	1 940	1 160	77,2	6,02	**22338-BE-XL-K-JPA-T41A**	**AH2338G**
190	200	420	138	2 440	2 950	232 000	1 830	1 080	87,4	7,64	**22340-BE-XL-K-JPA-T41A**	**AH2340**
200	220	460	145	2 800	3 400	270 000	1 690	950	114	13,6	**22344-BE-XL-K-JPA-T41A**	**AH2344**

medias *https://www.schaeffler.de/std/1F9A*

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	B_1	l_G	Thread G	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
35	1,5	76	52,4	3,2	6,5	3	7	40	M45×1,5	49	81	1,5	0,36	1,86	2,77	1,82
40	1,5	84,7	58,9	3,2	6,5	3	7	44	M50×1,5	54	91	1,5	0,36	1,9	2,83	1,86
45	2	92,6	63	3,2	6,5	3	9	50	M55×2	61	99	2	0,36	1,86	2,77	1,82
50	2	101,4	68,9	3,2	6,5	3	10	54	M60×2	66	109	2	0,36	1,89	2,81	1,84
55	2,1	110,1	74,8	3,2	6,5	3	11	58	M65×2	72	118	2,1	0,35	1,91	2,85	1,87
60	2,1	119,3	83,2	4,8	9,5	3	12	61	M70×2	77	128	2,1	0,34	2	2,98	1,96
65	2,1	128	86,7	4,8	9,5	4	12	64	M75×2	82	138	2,1	0,34	2	2,98	1,96
70	2,1	136,3	92,4	4,8	9,5	4	12	68	M80×2	87	148	2,1	0,34	1,99	2,96	1,94
75	2,1	145,1	98,3	4,8	9,5	4	12	71	M90×2	92	158	2,1	0,34	1,99	2,96	1,94
80	3	154,2	104,4	4,8	9,5	4	13	74	M95×2	99	166	2,5	0,33	2,04	3,04	2
85	3	162,5	110,2	6,3	12,2	4	14	79	M100×2	104	176	2,5	0,33	2,03	3,02	1,98
90	3	171,2	116	6,3	12,2	4	16	85	M105×2	109	186	2,5	0,33	2,03	3,02	1,98
95	3	184,7	130,2	6,3	12,2	4	16	90	M110×2	114	201	2,5	0,33	2,03	3,02	1,98
105	3	204,9	143,1	8	15	4	16	98	M120×2	124	226	2,5	0,33	2,07	3,09	2,03
115	3	222,4	150,7	8	15	4	17	105	M130×2	134	246	2,5	0,33	2,06	3,06	2,01
125	4	239,5	162,2	9,5	17,7	4	19	115	M140×2	147	263	3	0,33	2,06	3,06	2,01
135	4	255,7	173,5	9,5	17,7	5	20	125	M150×2	157	283	3	0,34	2	2,98	1,96
145	4	273,2	185,3	9,5	17,7	5	24	135	M160×3	167	303	3	0,33	2,02	3	1,97
150	4	286,7	201,2	9,5	17,7	6	24	140	M170×3	177	323	3	0,35	1,94	2,88	1,89
160	4	303,9	213,1	9,5	17,7	6	24	146	M180×3	187	343	3	0,35	1,95	2,9	1,91
170	4	320,8	224,9	12,5	23,5	6	26	154	M190×3	197	363	3	0,34	1,96	2,92	1,92
180	5	338,1	236,8	12,5	23,5	7	26	160	M200×3	210	380	4	0,34	1,96	2,92	1,92
190	5	355,1	248,8	12,5	23,5	7	30	170	Tr220×4	220	400	4	0,34	1,98	2,94	1,93
200	5	391,1	273,4	12,5	23,5	8	30	181	Tr240×4	240	440	4	0,33	2,06	3,06	2,01

Toroidal roller bearings



Matrix for bearing preselection 823

1 Toroidal roller bearings 824

1.1 Bearing design 824
1.2 Load carrying capacity 829
1.3 Compensation of angular misalignments 829
1.4 Lubrication 829
1.5 Sealing 829
1.6 Speeds 830

FAG

1.7 Noise _____ *830*
1.8 Temperature range _____ *830*
1.9 Cages _____ *830*
1.10 Internal clearance _____ *831*
1.11 Dimensions, tolerances _____ *832*
1.12 Suffixes _____ *833*
1.13 Structure of bearing designation _____ *833*
1.14 Dimensioning _____ *834*
1.15 Minimum load _____ *835*
1.16 Design of bearing arrangements _____ *839*
1.17 Mounting and dismounting _____ *850*
1.18 Legal notice regarding data freshness _____ *854*
1.19 Further information _____ *855*

Product tables _____ *856*

Toroidal roller bearings _____ *856*



Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

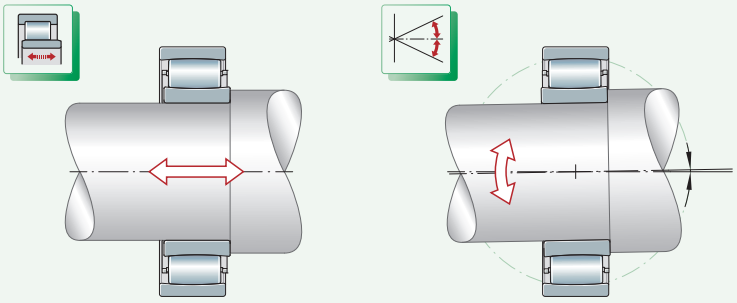
Design features and suitability			Toroidal roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			with cage	detailed information ➤ 824
Load carrying capacity	radial		+++	➤ 829 | 1.2
	axial, one direction		–	➤ 829 | 1.2
	axial, both directions		–	➤ 829 | 1.2
	moments		–	➤ 829 | 1.2
Compensation of angular misalignments	static		+++	➤ 829 | 1.3
	dynamic		++	➤ 829 | 1.3
Bearing design	cylindrical bore		✓	➤ 824 | 1.1
	tapered bore		✓	➤ 824 | 1.1
	separable		–	➤ 824 | 1.1
Lubrication	greased		–	➤ 829 | 1.4
Sealing	open		✓	➤ 829 | 1.5
	non-contact		–	➤ 829 | 1.5
	contact		–	➤ 829 | 1.5
Operating temperature in °C	from to		–30 +200	➤ 830 | 1.8
Suitability for	high speeds		+	➤ 830 | 1.6
	high running accuracy		++	➤ 832 | 1.11 ➤ 115
	low-noise running		+	➤ 830 | 1.7 ➤ 27
	high rigidity		++	➤ 54
	reduced friction		+	➤ 56
	length compensation within bearing		+++	➤ 824 | 1.1 ➤ 25
	non-locating bearing arrangement		+++	➤ 141
	locating bearing arrangement		–	➤ 141
X-life bearings		X-life	✓	➤ 828
Bearing bore d in mm	from to		70 900	➤ 856
Product tables	from page ➤		856	

1 Toroidal roller bearings

Toroidal roller bearings:
- combine the angular adjustment facility of spherical roller bearings with the unconstrained axial displacement facility of cylindrical roller bearings in one bearing ➤*824*|*1.1*
- have a very high radial load carrying capacity ➤*856*|▦
- support radial loads only ➤*829*|*1.2*
- are used solely as non-locating bearings (compensate axial displacements of the shaft relative to the housing)
- compensate misalignments between the shaft and housing ➤*824*|🗀*1*, ➤*829*|*1.3*
- permit high speeds in spite of line contact ➤*856*|▦
- are available in numerous sizes and designs ➤*856*|▦
- result in particularly compact and economical bearing arrangements

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*823*.

🗀**1**
Axial displacement facility and angular adjustment facility in one bearing



1.1 Bearing design

✎ *Design variants*

Toroidal roller bearings are X-life bearings.
The standard product range comprises:
- bearings with cage ➤*825*|🗀*3*
- bearings with cylindrical or tapered bore

The bearings described here constitute the basic product range of Schaeffler toroidal roller bearings. These bearings are, however, also available in many other designs and sizes, as well as for specific applications. Related information is available from Schaeffler on request.

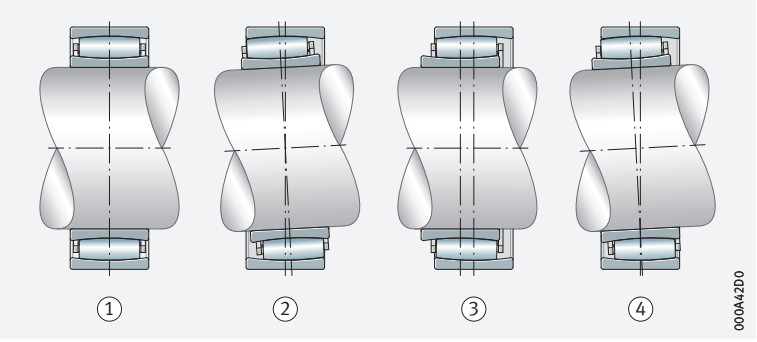
Toroidal roller bearings

✎ *Suitable for misalignments and where axial displacements of the shaft relative to the housing must be compensated without constraint in the bearing*

Toroidal roller bearings are single row radial roller bearings with a low radial section height and very high load carrying capacity, which are part of the group of self-aligning bearings ➤*825*|*2*, ➤*825*|*3* and ➤*826*|*4*. The outer ring has a toroidal raceway, which is centric relative to the centre of the bearing. Correspondingly, the inner ring raceway is concave. This raceway design allows the bearings to compensate static and dynamic angular misalignments (skewing between the inner and outer ring) within certain limits ➤*829*|*1.3* and ➤*856*. The relatively long and slightly crowned symmetrical rollers have self-aligning characteristics (they are “self-guiding”); i. e. they will always automatically adopt the position at which the load is distributed uniformly over the length of the roller, irrespective of whether the bearing rings are displaced or skewed relative to each other ➤*825*|*2*.
As this “self-guiding” of the rollers improves the load distribution in the bearing, the bearing is able to run with less friction and, as a result, at lower temperatures. This in turn has a positive effect on the operating life of the bearing and lubricant.

2
Operating modes of the inner ring – with tilting and axial displacement

① *Initial position*
② *Inner ring with tilting*
③ *Inner ring with axial displacement*
④ *Inner ring with displacement and tilting*



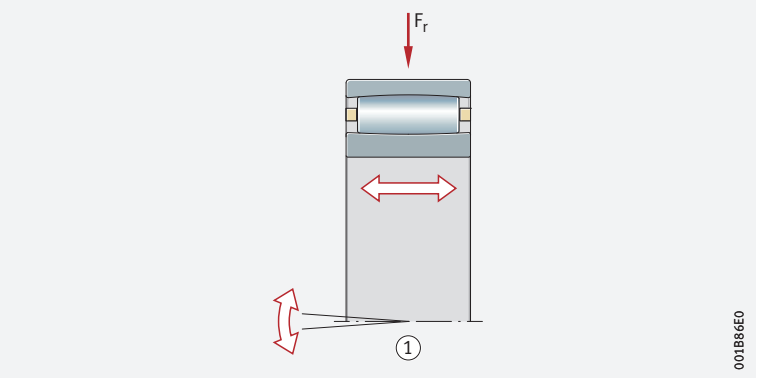
✎ *With cage*

The bearings are available with a sheet steel cage and brass cage (suffix M or M1B).

3
Toroidal roller bearings with cage

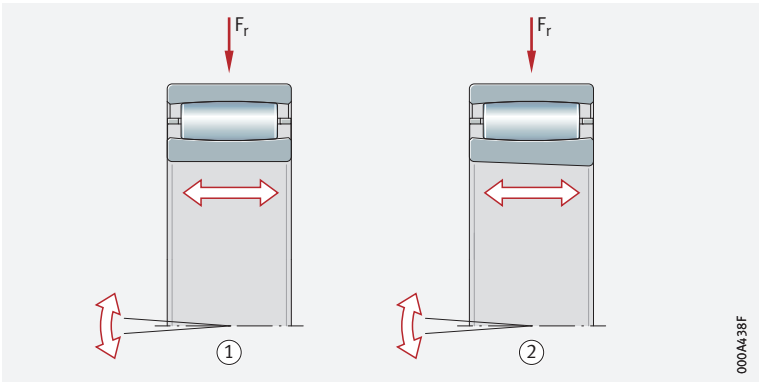
F_r = *radial load*

① *Bearing with solid brass cage*



✎ *The bore is cylindrical or tapered*

With only a few exceptions, the bearings are available with a cylindrical bore as well as with a tapered bore ➤*826*|*4*. Bearings with a tapered bore have the bore taper 1:12 (suffix K) and 1:30 (suffix K30) ➤*833*|*4* and ➤*830*|*1.9*.



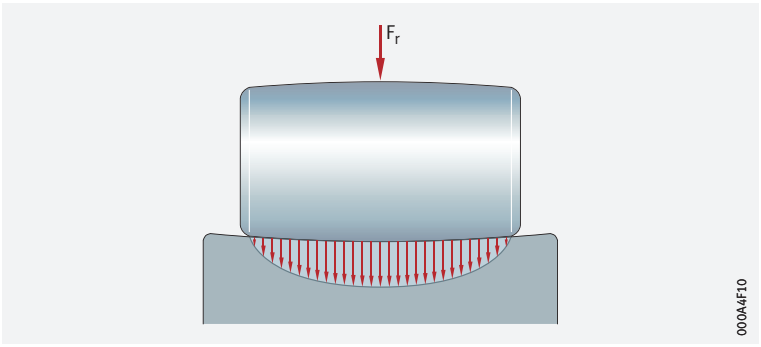
4 *Toroidal roller bearings with cylindrical or tapered bore*

F_r = *radial load*

① *Bearing with cylindrical bore*
② *Bearing with tapered bore, taper angle 1:12*

Roller profile design

The stress distribution at the contact points between the rollers and raceways is determined by the contact profile of the rollers. As a result, the roller profile is matched to the raceway profiles. In addition, the rollers exhibit high dimensional and geometrical accuracy. Consequently, the rollers in an individual rolling element set are practically identical in terms of their size and shape. This gives a favourable and even load distribution across all rollers and over the entire length of the roller, thus preventing edge stresses and stress peaks at the ends of the roller ➤*826* | *5*.



5 *Uniform load distribution due to optimised roller profile*

F_r = *radial load*

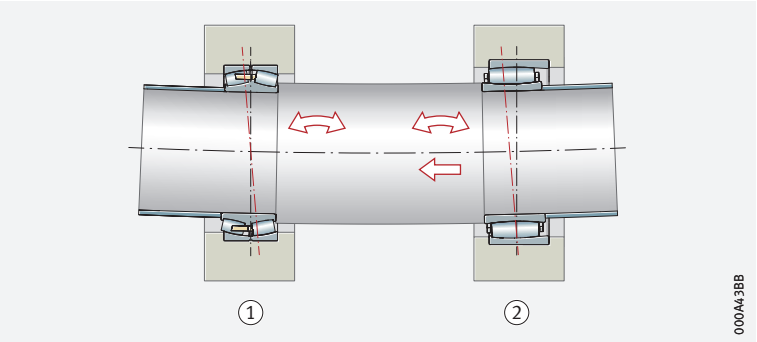
Length compensation takes place without constraint in the bearing

Bearings with non-locating bearing function

Toroidal roller bearings simplify the design of locating/non-locating bearing arrangements, as they compensate temperature-induced changes in length and skewing between the inner and outer ring with hardly any friction in the bearing ➤*827* | *6*.

Axial displacements of the shaft relative to the housing are possible in both directions and within certain limits. Even more considerable axial displacements have no effect on the locating bearing. Length compensation takes place during rotary motion. The constraining forces occurring are so slight that they can be disregarded during operation.

The maximum axial displacement distance s_1 is given in the product tables ➤*856* |. s_1 is valid for bearings with cages.

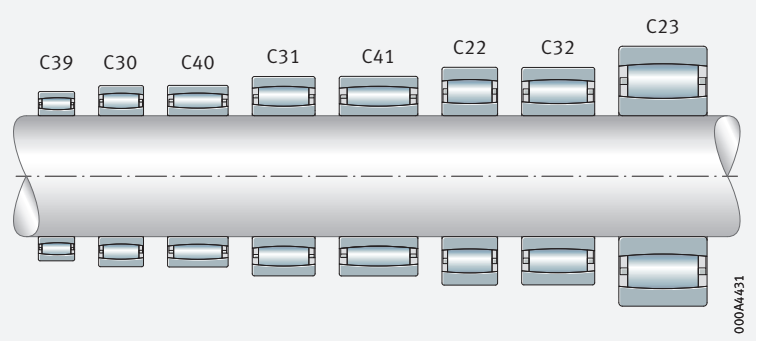


6
Locating/non-locating bearing arrangement, angular adjustment facility and axial displacement facility

① *Spherical roller bearing (locating bearing)*
② *Toroidal roller bearing (non-locating bearing)*

Product range

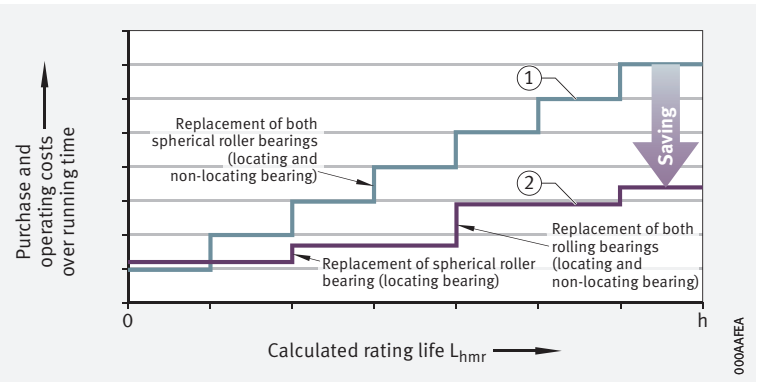
The range of toroidal roller bearings comprises eight series ➤*827*|*7*.



7
Product range – cross-sectional comparison of available series

Interchangeable with spherical roller bearings and cylindrical roller bearings

Substituting bearing arrangements composed of two spherical roller bearings for one spherical roller bearing (locating bearing) and one toroidal roller bearing (non-locating bearing) can significantly reduce the overall operating costs of the locating/non-locating system ➤*827*|*6* and ➤*827*|*8*. The interchangeability of the bearings is ensured, as toroidal roller bearings are manufactured as standard in the same ISO dimension series and sizes as spherical roller bearings.



8
Comparison of the overall operating costs of locating/non-locating bearing systems

① *Bearing arrangement with two spherical roller bearings*
② *Bearing arrangement with one spherical roller bearing (locating bearing) and one toroidal roller bearing (non-locating bearing)*

X-life premium quality

The toroidal roller bearings described here are X-life bearings. These products exhibit considerably higher performance than toroidal roller bearings that are not X-life. This is achieved, for example, through the optimised contact geometry between the rollers and raceways, as well as through the higher quality of the steel and rolling elements, higher surface quality and appropriate heat treatment.

Advantages

Increased customer benefits due to X-life

The technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings (higher basic dynamic load ratings C_r)
- quieter running and higher running accuracy
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and, consequently, longer maintenance intervals
- significantly reduced maintenance requirements
- a measurably longer operating life ➤*827*|*8*
- high operational security
- compact, environmentally-friendly bearing arrangements

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life toroidal roller bearings include the suffix XL in the designation ➤*824*|*1.1* and ➤*856*|.

Areas of application

Wide application range

Due to their special technical features, X-life toroidal roller bearings are highly suitable for bearing arrangements in:

- paper machinery

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

1.2 Load carrying capacity

The bearings are radial bearings

Toroidal roller bearings support very high radial forces due to the line contact of the rollers. They may, however, only be subjected to purely radial load ➤*825*|*3*, ➤*826*|*4* and ➤*824*|*1.1*. As non-locating bearings, they cannot guide the shaft axially in either direction. Combining toroidal roller bearings with a spherical roller bearing on the locating bearing side results in bearing arrangements with a smaller design envelope, a lower mass and only low maintenance requirements ➤*827*|*6*.

1.3 Compensation of angular misalignments

Toroidal roller bearings compensate angular misalignments

Toroidal roller bearings can be tilted by an angle of up to 0,5° between the centre axes of the inner ring and outer ring without impairing the function and rating life. This allows the toroidal roller bearing to easily compensate a slight geometrical deviation of the housing bore or a shaft that is not precisely aligned.

Depending on the series and size, skewing of more than 0,5° is possible, but may be associated with a reduction in the rating life. In the case of such applications, please contact our technical advisory service in order to achieve an optimum design of the bearing arrangement.

Roller offset under skewing

Skewing of the bearing rings relative to each other causes a degree of roller offset in the bearing, which can cause the rollers to protrude beyond the rings. In order to prevent this, the axial displacement facility of the rings relative to each other is restricted ➤*846*.

If there is any uncertainty regarding possible skewing in a specific application, please consult Schaeffler.

1.4 Lubrication

Oil or grease lubrication is possible

Open toroidal roller bearings are not greased. They must be lubricated with oil or grease. Lubricant is introduced from one side and exits on the opposing side.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

1.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed; i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing



1.6 Speeds

Limiting speeds and reference speeds in the product tables

The product tables give two speeds for most bearings ➤*856*|▦:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** *https://medias.schaeffler.com*

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rollers
- the cage
- the lubricant

Toroidal roller bearings are dimensionally stable up to +200 °C. Possible operating temperatures of bearings ➤*830*|▦ *1*.

▦ ***1***
Permissible temperature ranges

Operating temperature	Toroidal roller bearings
	with cage
	–30 °C to +200 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Sheet steel and brass cages are used as standard

Depending on the series and bearing size, toroidal roller bearings are supplied with the following cages ➤*833*|▦ *4*:

- roller-guided sheet steel cage, single-piece (no suffix)
- roller-guided brass window cage (suffix M)
- brass window cage, guided on inner ring (suffix M1B)

1.10 Internal clearance

Radial internal clearance

✎ *The standard is CN*

Toroidal roller bearings are manufactured as standard with radial internal clearance CN (normal). CN is not stated in the designation. Values for bearings with a cylindrical bore ➤*831*|▦*2*, values for bearings with a tapered bore ➤*832*|▦*3*.

Toroidal roller bearings are also available with the smaller internal clearance C2 and with the larger internal clearance C3, C4 and C5 ➤*831*|▦*2* and ➤*832*|▦*3*.

The values for radial internal clearance correspond to ISO 5753-1:2009 ➤*831*|▦*2* and ➤*832*|▦*3*. They are valid for unmounted bearings which are free from load and measurement forces (without elastic deformation).

Axial displacements of the bearing rings relative to each other will reduce the internal clearance of toroidal roller bearings. This reduction can be determined by way of calculation ➤*845*|*f*13.

▦*2*
Radial internal clearance of toroidal roller bearings with cylindrical bore

Nominal bore diameter		Radial internal clearance									
d		C2 (Group 2)		CN (Group N)		C3 (Group 3)		C4 (Group 4)		C5 (Group 5)	
mm		µm		µm		µm		µm		µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	15	30	25	40	35	55	50	65	65	85
24	30	15	35	30	50	45	60	60	80	75	95
30	40	20	40	35	55	55	75	70	95	90	120
40	50	25	45	45	65	65	85	85	110	105	140
50	65	30	55	50	80	75	105	100	140	135	175
65	80	40	70	65	100	95	125	120	165	160	210
80	100	50	85	80	120	120	160	155	210	205	260
100	120	60	100	100	145	140	190	185	245	240	310
120	140	75	120	115	170	165	215	215	280	280	350
140	160	85	140	135	195	195	250	250	325	320	400
160	180	95	155	150	220	215	280	280	365	360	450
180	200	105	175	170	240	235	310	305	395	390	495
200	225	115	190	185	265	260	340	335	435	430	545
225	250	125	205	200	285	280	370	365	480	475	605
250	280	135	225	220	310	305	410	405	520	515	655
280	315	150	240	235	330	330	435	430	570	570	715
315	355	160	260	255	360	360	485	480	620	620	790
355	400	175	280	280	395	395	530	525	675	675	850
400	450	190	310	305	435	435	580	575	745	745	930
450	500	205	335	335	475	475	635	630	815	810	1 015
500	560	220	360	360	520	510	690	680	890	890	1 110
560	630	240	400	390	570	560	760	750	980	970	1 220
630	710	260	440	430	620	610	840	830	1 080	1 070	1 340
710	800	300	500	490	680	680	920	920	1 200	1 200	1 480
800	900	320	540	530	760	750	1 020	1 010	1 330	1 320	1 660
900	1 000	370	600	590	830	830	1 120	1 120	1 460	1 460	1 830
1 000	1 120	410	660	660	930	930	1 260	1 260	1 640	1 640	2 040
1 120	1 250	450	720	720	1 020	1 020	1 380	1 380	1 800	1 800	2 240
1 250	1 400	490	800	800	1 130	1 130	1 510	1 540	1 970	1 970	2 460
1 400	1 600	570	890	890	1 250	1 250	1 680	1 680	2 200	2 200	2 740
1 600	1 800	650	1 010	1 010	1 390	1 390	1 870	1 870	2 430	2 430	3 000

3 *Radial internal clearance of toroidal roller bearings with tapered bore*

Nominal bore diameter d mm		Radial internal clearance									
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm		C5 (Group 5) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	15	35	30	45	40	55	55	70	65	85
24	30	20	40	35	55	50	65	65	85	80	100
30	40	25	50	45	65	60	80	80	100	100	125
40	50	30	55	50	75	70	95	90	120	115	145
50	65	40	65	60	90	85	115	110	150	145	185
65	80	50	80	75	110	105	140	135	180	175	220
80	100	60	100	95	135	130	175	170	220	215	275
100	120	75	115	115	155	155	205	200	255	255	325
120	140	90	135	135	180	180	235	230	295	290	365
140	160	100	155	155	215	210	270	265	340	335	415
160	180	115	175	170	240	235	305	300	385	380	470
180	200	130	195	190	260	260	330	325	420	415	520
200	225	140	215	210	290	285	365	360	460	460	575
225	250	160	235	235	315	315	405	400	515	510	635
250	280	170	260	255	345	340	445	440	560	555	695
280	315	195	285	280	380	375	485	480	620	615	765
315	355	220	320	315	420	415	545	540	680	675	850
355	400	250	350	350	475	470	600	595	755	755	920
400	450	280	385	380	525	525	655	650	835	835	1 005
450	500	305	435	435	575	575	735	730	915	910	1 115
500	560	330	480	470	640	630	810	800	1 010	1 000	1 230
560	630	380	530	530	710	700	890	880	1 110	1 110	1 350
630	710	420	590	590	780	770	990	980	1 230	1 230	1 490
710	800	480	680	670	860	860	1 100	1 100	1 380	1 380	1 660
800	900	520	740	730	960	950	1 220	1 210	1 530	1 520	1 860
900	1 000	580	820	810	1 040	1 040	1 340	1 340	1 670	1 670	2 050
1 000	1 120	640	900	890	1 170	1 160	1 500	1 490	1 880	1 870	2 280
1 120	1 250	700	980	970	1 280	1 270	1 640	1 630	2 060	2 050	2 500
1 250	1 400	770	1 080	1 080	1 410	1 410	1 790	1 780	2 250	2 250	2 740
1 400	1 600	870	1 200	1 200	1 550	1 550	1 990	1 990	2 500	2 500	3 050
1 600	1 800	950	1 320	1 320	1 690	1 690	2 180	2 180	2 730	2 730	3 310

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of toroidal roller bearings correspond to ISO 15:2017 (DIN 616:2000).

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*137|7.11*. Nominal value of chamfer dimension ➤*856|*.

Tolerances

The dimensional tolerances of toroidal roller bearings with a cylindrical and tapered bore correspond to the tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*124|8*.

✎ *Running accuracy*

The running accuracy of the inner and outer ring corresponds to tolerance class 5 in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*128|14*.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

4 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
C2	Radial internal clearance C2 (smaller than normal)	Available by agreement
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
C5	Radial internal clearance C5 (larger than C4)	
K	Tapered bore, taper 1:12	Standard
K30	Tapered bore, taper 1:30	
M	Brass window cage, guided by rollers	
M1B	Brass window cage, guided on inner ring	
W209B	Inner ring made from case hardening steel	
XL	X-life bearing	

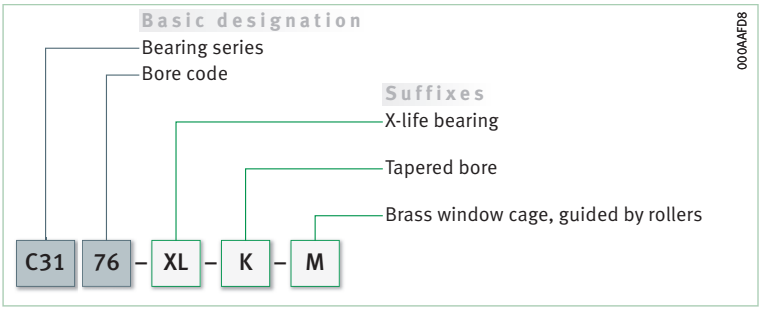
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

Examples of composition of bearing designation

The designation of bearings follows a set model.
The composition of designations is subject to DIN 623-1 ➤ *102* | *10*.

9 *Toroidal roller bearing, series 31, with cage, tapered bore: designation structure*



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r.
If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$) ➤*834| 1*.

1
Equivalent dynamic load

$$P = F_r$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load.

Permissible dynamic bearing load

Maximum values in accordance with ➤*834| 5* apply to dynamic bearing load P.

5
Permissible dynamic bearing load

Fundamentally valid for	Valid up to bore diameter d ≦ 200 mm for
P	
$P \leqq 0{,}33\ C_r$	$P \leqq 0{,}18\ C_{0r}$

In applications with very high dynamic loads, the rating life calculation must be carried out in greater detail.
In such cases, please consult Schaeffler.

Equivalent static bearing load

For toroidal bearings subjected to static load ➤*834| 2*.

2
Equivalent static load

$$P_0 = F_r$$

Legend

P_0	N	Equivalent static bearing load
F_r	N	Largest radial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*834| 3*.

3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

In order to prevent damage due to slippage, a minimum radial load is required

In order that no slippage occurs between the contact partners, the toroidal roller bearings must be constantly subjected to a sufficiently high radial load. This applies in particular to high speed bearings since, if the radial load is not present, damaging sliding motion may occur between the rolling elements and raceways. Based on experience, a minimum load is thus necessary ➤*835*| *4*. In most cases, however, the radial load is already higher than the requisite minimum load $F_{r\,min}$ due to the weight of the supported parts and the external forces.

4
Minimum radial load

$$F_{r\,min} = 0{,}0135 \cdot C_0$$

Legend

$F_{r\,min}$	kN	Minimum radial load
C_0	kN	Basic static load rating ➤*856*|

If the minimum radial load $F_{r\,min} \leqq 0{,}0135 \cdot C_0$, please consult Schaeffler.

Minimum radial load with oil lubrication

Values can be determined from a diagram or by calculation

If oil lubrication is used, the requisite minimum load $F_{r\,min}$ is reduced as a function of the bearing type and speed. $F_{r\,min}$ can be determined for this operating condition:

- with the aid of a diagram, whereby $F_{r\,min}$ is read off relative to C_0 ➤*835*| *10*
- by calculation ➤*836*| *6* and ➤*836*| *6*

Determining the minimum radial load with the aid of a diagram

Determining ancillary value k_r

In order to calculate $F_{r\,min}$, the ancillary value k_r must first be determined ➤*835*| *5*.

5
Ancillary value

$$k_r = k_\delta \cdot d_M$$

Legend

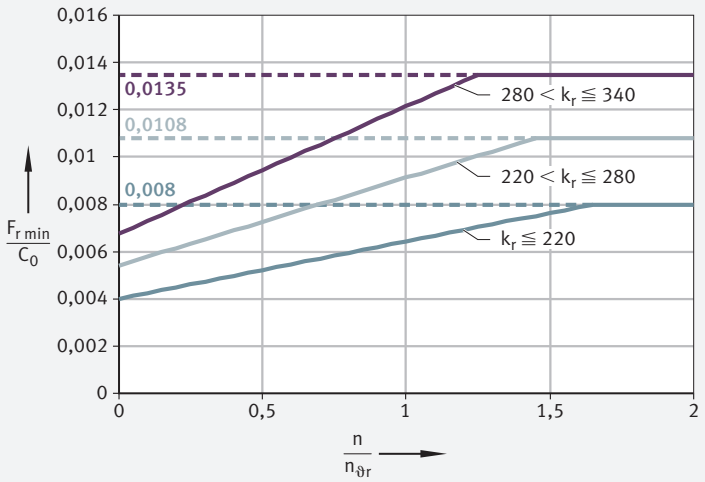
k_r	–	Ancillary value
k_δ	–	Operating clearance factor ➤*856*|
d_M	mm	Mean bearing diameter (d+D)/2.

Reading off the minimum radial load from a diagram

With the aid of the ancillary value k_r and the speed ratio $n/n_{\vartheta r}$, the requisite minimum load can be read off relative to the basic static load rating C_0 ➤*835*| *10*.

10
Minimum radial load with oil lubrication

$F_{r\,min}$ = *minimum radial load*
C_0 = *basic static load rating* ➤*856*|
n = *operating speed*
$n_{\vartheta r}$ = *speed rating* ➤*856*|
k_r = *ancillary value* ➤*835*| *5*



Determining the minimum radial load by calculation

As an alternative to using a diagram, the requisite minimum radial load can also be determined by calculation ➤*836*| *f*6 to ➤*836*| *f*8.

*f*6 *Factor f_n, if $n < n_K \cdot n_{\vartheta r}$*

$$f_n = 0{,}5 \cdot \left(1 + \frac{n}{n_{\vartheta r} \cdot n_K}\right)$$

*f*7 *Factor f_n, if $n \geqq n_K \cdot n_{\vartheta r}$*

$$f_n = 1$$

Legend

f_n	–	Factor for determining the influence of speed.
n	min^{-1}	Operating speed
$n_{\vartheta r}$	min^{-1}	Speed rating ➤*856*|
n_K	–	Speed parameter ➤*836*| *6*.

*f*8 *Minimum radial load*

$$F_{r\,min} = f_F \cdot f_n \cdot C_0$$

Legend

$F_{r\,min}$	kN	Minimum radial load
f_F	–	Factor due to influence of load ➤*836*| *6*
f_n	–	Factor due to influence of speed ➤*836*| *f*6 and ➤*836*| *f*7
C_0	kN	Basic static load rating ➤*856*|.

Higher minimum radial loads may also be necessary under certain conditions when starting up at low temperature, when using greases with a high base oil viscosity and where bearings have been regreased.

As a function of k_r, the factors for calculation of the minimum load should be selected as follows ➤*836*| *6*.

6 *Factors for calculation of minimum radial load*

Ancillary value k_r		Factor due to influence of load f_F	Speed parameter n_K
over	incl.		
–	220	0,0080	1,65
220	280	0,0108	1,45
280	340	0,0135	1,25

Calculation example 1:
Determining the minimum radial load $F_{r\,min}$ with the aid of a diagram

Task

The aim is to determine the minimum radial load $F_{r\,min}$ for toroidal roller bearing C3144-XL-K-C4 using a diagram ➤*837*| *9* and ➤*837*| *11*. The operating speed n = 260 min^{-1}, the static load carrying capacity of the bearing C_{0r} = 2 900 kN.

9
Ancillary value

$$k_r = k_\delta \cdot d_M$$

Calculation factor ➤*856*|

$$k_\delta = 0{,}791$$

Mean bearing diameter ➤*856*|

$$d_M = \frac{220\ mm + 370\ mm}{2} = 295\ mm$$

Ancillary value ➤*837*| *9*

$$k_r = 0{,}791 \cdot 295\ mm = 233{,}345\ mm \approx 233\ mm$$

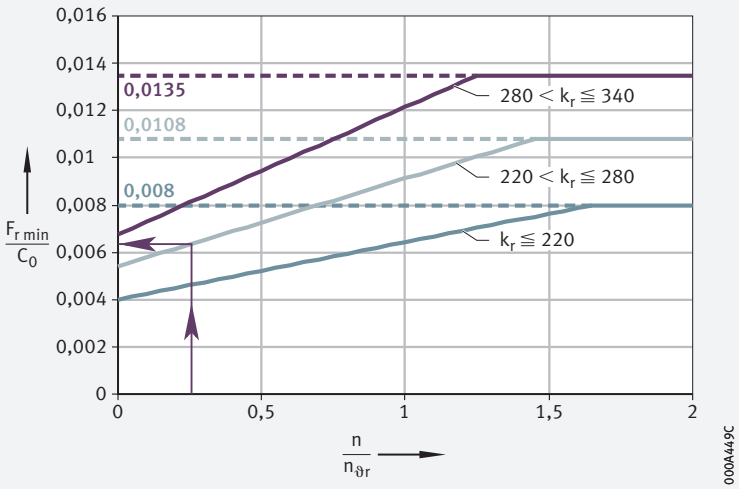
Speed ratio ➤*837*| *11*

$$\frac{n}{n_{\vartheta r}} = \frac{260\ min^{-1}}{960\ min^{-1}} = 0{,}27$$

The middle curve applies

k_r = 233 mm, therefore the middle (grey) curve is selected in the diagram ➤*837*| *11*. $n/n_{\vartheta r}$ = 0,27 for $F_{r\,min}/C_0$ = 0,0064.

11
Minimum radial load with oil lubrication



$F_{r\,min}$ = *minimum radial load*
C_0 = *basic static load rating* ➤*856*|
n = *operating speed*
$n_{\vartheta r}$ = *speed rating* ➤*856*|
k_r = *ancillary value* ➤*837*| *9*

$F_{r\,min}$

Calculate the minimum radial load for C3144-XL-K-C4:

$$F_{r\,min} = 0{,}0064 \cdot 2\,900\ kN = 18{,}6\ kN$$

Calculation example 2:
Determining the minimum radial load $F_{r\,min}$ by calculation

Task

The aim is to determine the minimum radial load $F_{r\,min}$ for toroidal roller bearing C3144-XL-K-C4 by calculation ➤*838*| *f 10*, ➤*838*| *f 11* and ➤*836*| *6*. The operating speed n = 260 min^{-1}, the static load carrying capacity of the bearing C_{0r} = 2 900 kN.

If $k_r \approx 233$ mm is taken from Example 1, this gives:

- $n_K = 1{,}45$ ➤*836*| *6*
- $f_F = 0{,}0108$ ➤*836*| *6*

If $n_{\vartheta r} \cdot n_K = 960\ min^{-1} \cdot 1{,}45 = 1\,392\ min^{-1} > 260\ min^{-1}$, this gives ➤*838*| *f 10* and ➤*838*| *f 11*.

f 10
Factor for determining the influence of speed

$$f_n = 0{,}5 \cdot \left(1 + \frac{n}{n_{\vartheta r} \cdot n_K}\right)$$

$$f_n = 0{,}5 \cdot \left(1 + \frac{260\ min^{-1}}{960\ min^{-1} \cdot 1{,}45}\right) = 0{,}593$$

f 11
Minimum radial load

$$F_{r\,min} = f_F \cdot f_n \cdot C_0$$

$$F_{r\,min} = 0{,}0108 \cdot 0{,}593 \cdot 2\,900\ kN \approx 18{,}6\ kN$$

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical or tapered seating surface ➤*840*|*12* to ➤*844*|*15*. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤*841*|*7* to ➤*842*|*9*.

Radial location – fit recommendations for bearings with cylindrical bore

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤*152*|*6* and ➤*160*|*7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- criteria for selection of fits ➤*146*
- conditions of rotation ➤*147*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*149*|*2*
- shaft fits ➤*152*|*6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*150*|*4*
- housing fits ➤*160*|*7*
- shaft tolerances for adapter sleeves and withdrawal sleeves ➤*168*|*8*

Axial location – bearings with cylindrical bore

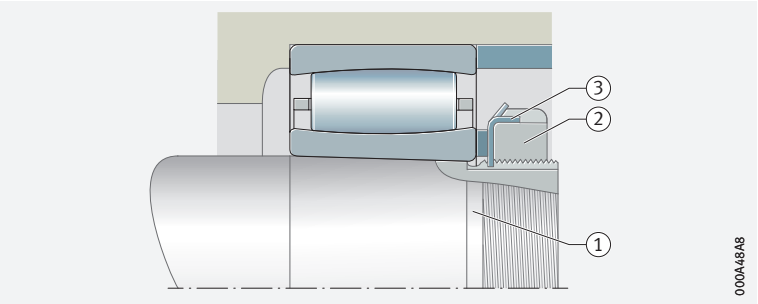
The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable.

Axial location – bearings with tapered bore

✎ Location by means of locknut and tab washer

If a bearing with a tapered bore is mounted directly on a tapered journal, the bearing can be axially located with ease using a locknut and tab washer ➤*840*|*12*.



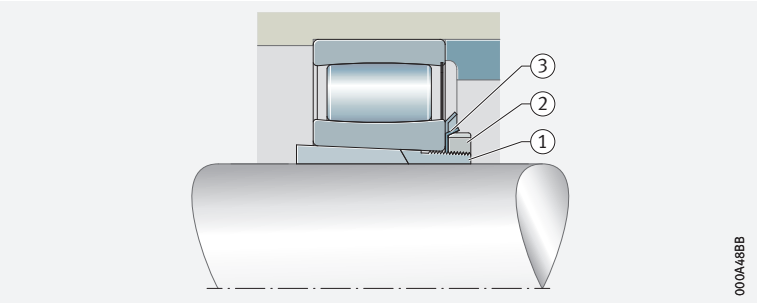
12
Toroidal roller bearing with tapered bore, mounted directly on the tapered shaft journal

① *Tapered journal with fixing thread*
② *Locknut*
③ *Tab washer*

Location of bearings by means of adapter sleeve or withdrawal sleeve

✎ Mounting can be carried out quickly and reliably by means of wrench sets from Schaeffler

Toroidal roller bearings with a tapered bore can be located easily and with operational reliability on smooth or stepped cylindrical shafts by means of an adapter sleeve or withdrawal sleeve ➤*840*|*13*. The adapter sleeve does not need to be secured on the shaft by any additional means. The bearings can be positioned at any point on smooth shafts.



13
Toroidal roller bearing with adapter sleeve, located on smooth shaft

① *Adapter sleeve*
② *Locknut*
③ *Tab washer*

Dimensional, geometrical and running accuracy of cylindrical bearing seats

✎A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For toroidal roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤841|▦7, tolerances t_1 to t_3 in accordance with ➤170|⧉11. Numerical values for IT grades ➤841|▦8.

▦**7**
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
5	P5	Shaft	IT5	Circumferential load IT2/2	Circumferential load IT2/2	IT2
				Point load IT3/2	Point load IT3/2	
		Housing	IT6	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	

▦**8**
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm									
	over	**50**	**80**	**120**	**180**	**250**	**315**	**400**	**500**	**630**	**800**
	incl.	**80**	**120**	**180**	**250**	**315**	**400**	**500**	**630**	**800**	**1 000**
	Values in µm										
IT4		8	10	12	14	16	18	20	22	25	28
IT5		13	15	18	20	23	25	27	32	36	40
IT6		19	22	25	29	32	36	40	44	50	56
IT7		30	35	40	46	52	57	63	70	80	90

Roughness of cylindrical bearing seating surfaces

✎ *Ra must not be too high*

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*842*|▦ *9*.

▦ **9**
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4
500	1 250	3,2[1)]	1,6	1,6	0,8

1) *For the mounting of bearings using the hydraulic method, a value Ra = 1,6 µm must not be exceeded.*

Tolerances for tapered bearing seats

✎ *Specifications for tapered bearing seats*

For bearings located directly on a tapered shaft journal ➤*840*|⧉ *12*, the data are in accordance with ➤*173*|⧉ *12*.

Mounting dimensions for the contact surfaces of bearing rings

✎ *The contact surfaces for the rings must be of sufficient height*

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders ➤*856*|▦. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Required axial free space

Calculating minimum values

Toroidal roller bearings can compensate thermally-induced changes in the length of the shaft relative to the housing within the bearing. In order to ensure the function of the bearings, free space must be provided on both end faces of the bearings ➤*843*|*14*.

The minimum values recommended by Schaeffler for the depth of the free space are in accordance with ➤*843*|*12*.

12
Requisite value for the depth of the free space

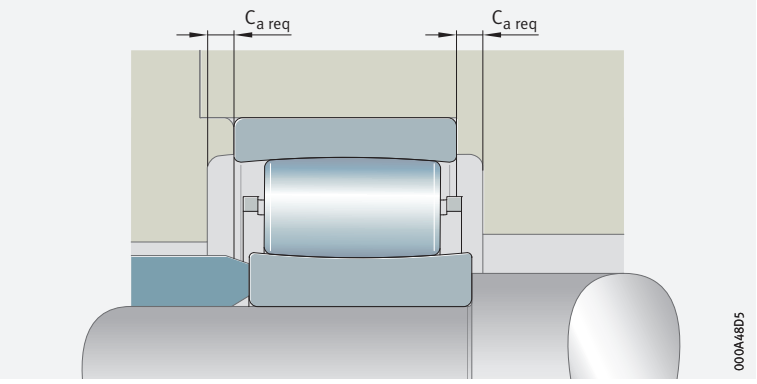
$$C_{a\,req} = C_a + 0{,}5 \cdot \left(\delta_{ax} + s_\varphi\right)$$

Legend

$C_{a\,req}$	mm	Requisite value for the depth of the free space ➤*843*|*14*
C_a	mm	Minimum value for depth of free space in the case of bearing rings without offset ➤*856*
δ_{ax}	mm	Axial displacement from central position
s_φ	mm	Reduction in axial displacement facility as a result of tilting ➤*847*|*16*.

14
Free space in the housing for toroidal roller bearings with a cage

$C_{a\,req}$ = *requisite value for the depth of the free space*



Offset mounting

Suitable for significant changes in length in one direction

In standard mounting, the bearing rings are fitted concentrically in relation to each other. If significant changes in length occur in one direction
in the application due to heat, the inner ring can be fitted offset relative to the outer ring in the opposing direction by up to the maximum permissible axial displacement. As a result, there is a significant increase in the possible axial displacement.

Axial fixing elements

Toroidal roller bearings can be axially located by means of shaft nuts KML or KM and tab washers MBL or MB ➤*844*| *15*. For bearings with a bore diameter larger than 200 mm, nuts of series HM30 should be used with retaining bracket MS30.

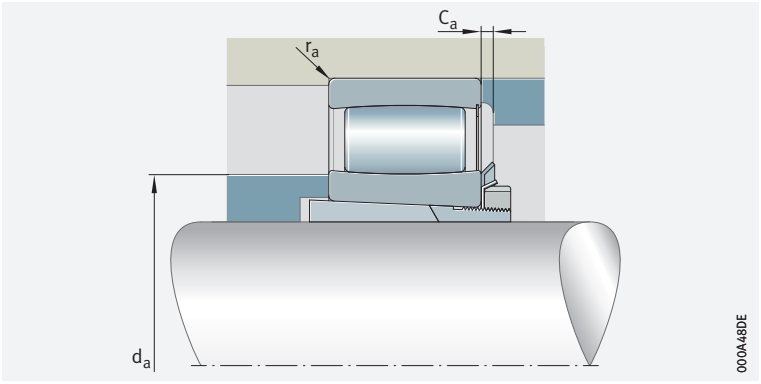
In the axial location of toroidal roller bearings with retaining nuts, it must be ensured that the cage of the bearing does not graze the retaining nut or tab washer if the shaft undergoes axial displacement. The outside diameter of the retaining nut should always be smaller than the stated mounting dimension $d_{a\ max}$. If this is not possible, an intermediate ring can be arranged between the bearing and means of retention and the thread on the shaft can be made correspondingly longer.

15
Toroidal roller bearing on adapter sleeve

C_a = *minimum value for free space in the case of bearings with cage and rings without offset, or required free space with offset bearing rings*

r_a = *maximum chamfer dimension* ➤*856*|

d_a = *maximum or minimum abutment height for inner ring* ➤*856*|



Possible axial displacement of the bearing rings relative to each other from the central position

Conditions for s_1 and s_2

Toroidal roller bearings compensate axial displacement of the shaft relative to the housing within the bearing ➤*824*|*1.1*. As a result, they can accommodate thermal expansion or deviations from the required bearing position within certain limits. The maximum displacement distances s_1 and s_2 in the product tables apply only where a sufficiently large operating clearance is present and to untilted bearing rings.

Axial displacement and tilting of the bearing rings changes the position of the rolling element in the bearing and thus also the operating clearance.

In order to ensure that the axial displacement distance is available, the free space on both sides of the bearing must be maintained ➤*843*| *14* and ➤*843*| *12*.

Factors which restrict the axial displacement of the bearing rings

Roller offset and operating clearance restrict the axial displacement of the bearing rings

The possible axial displacement of one bearing ring relative to the other from the central position is limited by:

- the restriction of the roller offset (geometrical restriction)
- the restriction of the operating clearance

Parameters which must be fulfilled for a reliable function

In order to ensure the function of toroidal roller bearings in operation, the following must always be checked when designing the bearing position:

- The axial displacement of the bearing rings in combination with any tilting lies within the permitted displacement distance s_1 or s_2 ➤*856*| respectively
- Sufficient operating clearance is present under axial displacement, tilting and under axial displacement and tilting (since the axial displacement and tilting of the bearing rings changes the bearing clearance

Determining the resulting bearing clearance

The resulting bearing clearance can be determined using the following equation:

12 *Resulting bearing clearance*

$$s_{res} = s_{ini} - k_{\delta} \cdot \left(\delta_{ax} + k_{\varphi} \cdot \varphi\right)^2$$

Legend

s_{res}	µm	Resulting bearing clearance after tilting and axial displacement
s_{ini}	µm	Radial internal clearance after mounting
k_{δ}	–	Operating clearance factor ➤*856*|
δ_{ax}	mm	Axial displacement from central position
k_{φ}	–	Tilting factor ➤*856*|
φ	°	Tilting between inner ring and outer ring (misalignment ± shaft deflection).

Other influences such as differences in temperature between the inner ring and outer ring must also be taken into consideration.



Restriction of the axial displacement facility by the roller offset

✎ *The axial displacement facility is reduced here*

Tilting causes axial displacement of the rollers from the central position. This means that the axial displacement facility of the bearing rings relative to each other is reduced by s_φ. The reduction in the axial displacement facility due to tilting can be calculated ➤*846*| *14*.

14
Reduction in the axial displacement facility

$$s_\varphi = k_\varphi \cdot \varphi$$

Legend

s_φ	mm	Reduction in axial displacement facility as a result of tilting
k_φ	–	Tilting factor ➤*856*|
φ	°	Tilting between inner ring and outer ring (misalignment ± shaft deflection).

This gives the maximum possible axial displacement facility under tilting.

15
Maximum axial displacement facility

$$s_{red} = s_1 - s_\varphi$$

Legend

s_{red}	mm	Maximum axial displacement facility under tilting
s_1	mm	Maximum axial displacement facility ➤*856*|
s_φ	mm	Reduction in axial displacement facility as a result of tilting

Restriction of axial displacement due to reduction in radial bearing clearance

Influences on the reduction of the bearing clearance

The bearing clearance is reduced in the following cases:

- axial displacement
- tilting of the bearing from the central position
- axial displacement and tilting of the bearing from the central position

Depending on the necessary operating clearance, it must be checked whether the required axial displacement is possible under the tilting present.

The reduction in operating clearance is calculated in accordance with ➤*847*| *f 16*.

f 16
Reduction in radial bearing clearance

$$\Delta s = k_\delta \cdot \left(\delta_{ax} + k_\varphi \cdot \varphi\right)^2$$

Legend

Δs	µm	Reduction in radial bearing clearance
k_δ	–	Operating clearance factor ➤*856*|
δ_{ax}	mm	Axial displacement
k_φ	–	Tilting factor ➤*856*|
φ	°	Tilting between inner ring and outer ring (misalignment ± shaft deflection).

Calculation example

Bearing data

The toroidal roller bearing C3144-XL-K-C4 with a tapered bore is supplied with a radial internal clearance of 390 µm. The operating clearance in the central position is only 240 µm due to mounting.

k_φ = 13,67 ➤*856*|
φ = 0,2
s_1 = 22,3 ➤*856*|

Dryer roll application

In the dryer roll, the misalignment is 0,2° and the shaft also undergoes thermal elongation of 6,3 mm.

Questions:

- Is this displacement permissible in addition to the tilting?
- What is the change in the operating clearance?

f 17
Reduction in the axial displacement facility

$$s_\varphi = k_\varphi \cdot \varphi$$

$$s_\varphi = 13{,}67 \cdot 0{,}2 \approx 2{,}73 \text{ mm}$$

Legend

s_φ	mm	Reduction in axial displacement facility as a result of tilting
k_φ	–	Tilting factor ➤*856*|
φ	°	Tilting between inner ring and outer ring (misalignment ± shaft deflection).

f 18
Maximum axial displacement

$$s_{red} = s_1 - s_\varphi$$

$$s_{red} = 22{,}30\ \text{mm} - 2{,}73\ \text{mm} = 19{,}57\ \text{mm}$$

The axial displacement by 6,3 mm is in the permissible range of 19,57 mm in combination with tilting by 0,2°. The application must now be checked in relation to the reduction in operating clearance.

k_δ = 0,791 ➤ *856*
δ_{ax} = 6,30 mm

f 19
Resulting operating clearance

$$s_{res} = s_{ini} - k_\delta \cdot \left(\delta_{ax} + k_\varphi \cdot \varphi\right)^2$$

$$s_{res} = 240\ \mu\text{m} - 0{,}791 \cdot \left(6{,}3 + 2{,}73\right)^2 \approx 175\ \mu\text{m}$$

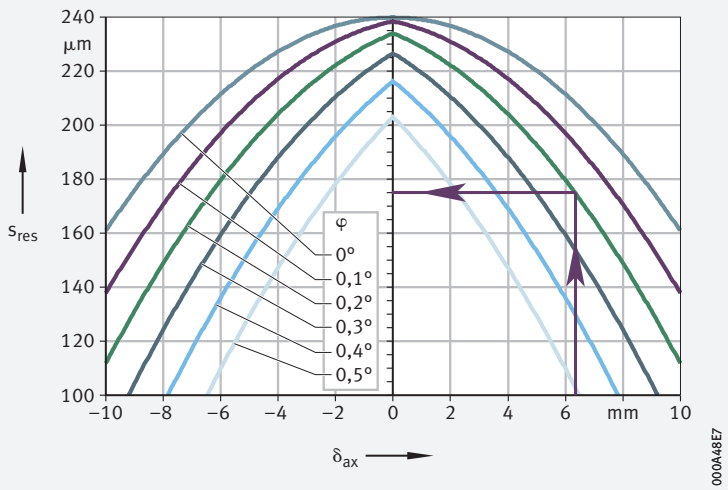
The resulting operating clearance after tilting and axial displacement is 175 µm.

The influence of the difference in temperature between the inner ring and outer ring must also be taken into consideration.

The axial displacement facility for the bearing C3144-XL-K-C4 is shown as an example ➤ *848* | 16. The actual internal clearance as a function of axial displacement is shown in relation to the bearing width.

16
Resulting operating clearance s_{res}, shown using the example of toroidal roller bearing C3144-XL-K-C4, as a function of tilting and axial displacement

s_{res} = *operating clearance*
δ_{ax} = *axial displacement*
φ = *tilting*



Suitable bearing housings for toroidal roller bearings

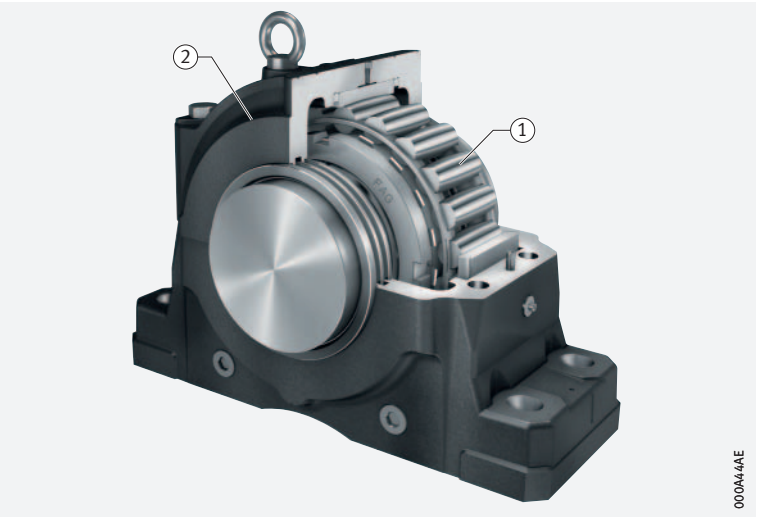
✎A large range of housings is available

For economical, operationally reliable and easily interchangeable bearing arrangement units, toroidal roller bearings can also be combined with Schaeffler bearing housings ➤*849*|*17*. These easy-to-fit units fulfil all of the requirements for modern machine and plant designs with favourable maintenance-related characteristics.

Due to the large number of application areas, an extensive range of bearing housings is available for bearings with cylindrical and tapered bores. These include split and unsplit plummer block housings, take-up housings, flanged housings and housings for specific industrial and railway applications. Detailed information on bearing housings can be found in publication GK 1 *https://www.schaeffler.de/std/1D54*.

17
Bearing housing with toroidal roller bearing

① *Toroidal roller bearing*
② *Bearing housing*



1.17 Mounting and dismounting

The mounting and dismounting options for toroidal roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position. The hydraulic method should be used in preference for the mounting and dismounting of larger bearings on a tapered journal and on adapter or withdrawal sleeves.
In cases where a bearing failure may result in a production stoppage and incur high costs, monitoring of rolling bearings is advisable.

Using the special tool

A special extractor must be used to remove spherical roller bearings and toroidal roller bearings. The extractor can be requested from Schaeffler. The special tool grips behind the end faces of the rollers. The extractor then presses against the shaft using a hydraulic cylinder and pulls the bearing out.

Ensure that the bearings are not damaged during mounting

Toroidal roller bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Mounting on a horizontally aligned shaft

During mounting of the bearings, the bearing rings can become axially displaced from the central position. For this reason, toroidal roller bearings should be mounted on horizontally aligned shafts and in appropriately aligned housing bores. In order that the bearing rings and roller set can achieve concentric alignment during mounting, the inner and outer ring should be rotated a couple of times on assembly.

If the intention is to mount the toroidal roller bearings on a vertically aligned shaft or in a vertically aligned housing bore, it should be noted that the outer and inner ring, complete with roller and cage assembly, will be displaced downwards. This will, in turn, have an effect on the internal clearance. If the user has no experience in the design of such bearing arrangements, please consult Schaeffler.

Mounting of bearings with a tapered bore

Suitable methods for checking the fit strength

Bearings with a tapered bore are mounted with a tight fit on the shaft or on the adapter or withdrawal sleeve. Proven methods for checking the strength of the fit involve measuring:

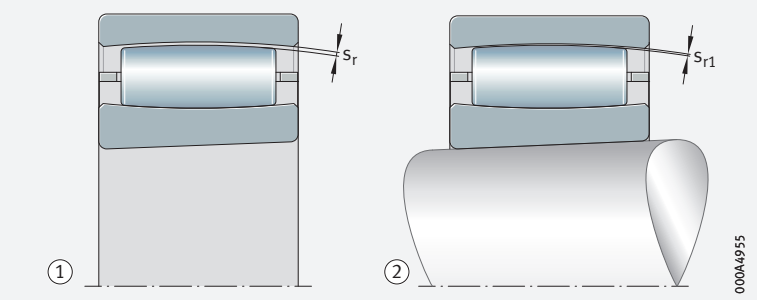
- the reduction in radial internal clearance
- the axial drive-up distance of the inner ring on the tapered bearing seat
- the tightening angle of the fixing nut

Measuring the reduction in radial internal clearance

Measurement with a feeler gauge

The reduction in radial internal clearance is the difference between the radial internal clearance before mounting and the bearing clearance after mounting of the bearing ➤*850*| *18* and ➤*852*| *10*. The radial internal clearance must be measured first. During pressing on, the radial clearance (bearing clearance) must be checked until the necessary reduction in the radial internal clearance and thus the required tight fit is achieved ➤*852*| *10*.

18
Reduction in radial internal clearance



s_r = *radial internal clearance before mounting*
s_{r1} = *radial internal clearance after mounting*
$s_r - s_{r1}$ = *reduction in radial internal clearance*

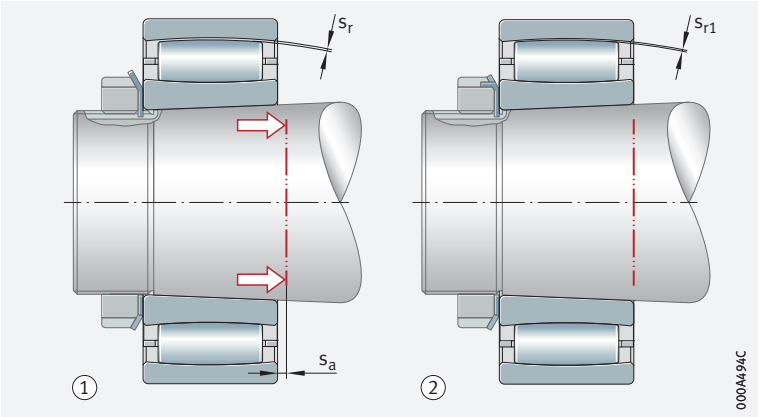
① *Before mounting*
② *After mounting*

Measuring the axial drive-up distance

The axial drive-up distance can also be measured in place of the reduction in radial internal clearance ➤*387*|*14*.

19
Axial drive-up distance

s_a = *axial press-on distance (axial drive-up distance of the bearing)*
s_r = *radial internal clearance before pressing on*
s_{r1} = *radial internal clearance after pressing on*
$s_r - s_{r1}$ = *reduction in radial internal clearance*
① *Before pressing on*
② *After pressing on*



Example of calculation of the axial drive-up distance

Principal procedure

Toroidal roller bearing C2226-XL-K with adapter sleeve H3126:

- Radial internal clearance before mounting
  – 0,135 mm to 0,180 mm ➤*852*|*10*
- Reduction in radial internal clearance during mounting
  – 0,060 mm to 0,083 mm ➤*852*|*10*
- Control value for radial internal clearance after mounting
  – 0,075 mm ➤*853*|*10*
- Axial drive-up distance, taper angle 1:12
  – 0,91 mm to 1,05 mm ➤*853*|*10*

The malfunction-free operation of toroidal roller bearings presupposes that these have been mounted correctly. An insufficient operating clearance or inadequately tight fit on the shaft generally leads to bearing damage.

If there is any uncertainty regarding the practical application of the methods, Schaeffler must always be consulted.

✎ *Reduced radial internal clearance in mounting*

Guide values for the reduction in radial internal clearance

When bearings with a tapered bore are mounted, there is a reduction in the radial internal clearance. Adherence to the indicated values ensures that the bearings or sleeve are securely seated on the shaft and prevents the inner ring from creeping on the shaft ➤*852*|▦ *10*. The setting should not, however, be equated to the later appropriate operating clearance.

▦ ***10***
Reduction in radial internal clearance in mounting of toroidal roller bearings with tapered bore

Nominal bore diameter d mm		Radial internal clearance before mounting in accordance with DIN 620-4:2004 (ISO 5753-1:2009)						Reduction in radial internal clearance during mounting[1]	
		CN (Group N) mm		C3 (Group 3) mm		C4 (Group 4) mm			
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
24	**30**	0,035	0,055	0,050	0,065	0,065	0,085	0,010	0,017
30	**40**	0,045	0,065	0,060	0,080	0,080	0,100	0,014	0,021
40	**50**	0,050	0,075	0,070	0,095	0,090	0,120	0,018	0,028
50	**65**	0,060	0,090	0,085	0,115	0,110	0,150	0,024	0,035
65	**80**	0,075	0,110	0,105	0,140	0,135	0,180	0,030	0,046
80	**100**	0,095	0,135	0,130	0,175	0,170	0,220	0,040	0,056
100	**120**	0,115	0,155	0,155	0,205	0,200	0,255	0,049	0,069
120	**140**	0,135	0,180	0,180	0,235	0,230	0,295	0,060	0,083
140	**160**	0,155	0,215	0,210	0,270	0,265	0,340	0,072	0,095
160	**180**	0,170	0,240	0,235	0,305	0,300	0,385	0,081	0,107
180	**200**	0,190	0,260	0,260	0,330	0,325	0,420	0,090	0,121
200	**225**	0,210	0,290	0,285	0,365	0,360	0,460	0,101	0,134
225	**250**	0,235	0,315	0,315	0,405	0,400	0,515	0,113	0,151
250	**280**	0,255	0,345	0,340	0,445	0,440	0,560	0,126	0,168
280	**315**	0,280	0,380	0,375	0,485	0,480	0,620	0,142	0,188
315	**355**	0,315	0,420	0,415	0,545	0,540	0,680	0,160	0,211
355	**400**	0,350	0,475	0,470	0,600	0,595	0,755	0,180	0,238
400	**450**	0,380	0,525	0,525	0,655	0,650	0,835	0,203	0,268
450	**500**	0,435	0,575	0,575	0,735	0,730	0,915	0,225	0,300
500	**560**	0,470	0,640	0,630	0,810	0,800	1,010	0,250	0,335
560	**630**	0,530	0,710	0,700	0,890	0,880	1,110	0,285	0,375
630	**710**	0,590	0,780	0,770	0,990	0,980	1,230	0,320	0,420
710	**800**	0,670	0,860	0,860	1,100	1,100	1,380	0,360	0,475
800	**900**	0,730	0,960	0,950	1,220	1,210	1,530	0,405	0,535
900	**1 000**	0,810	1,040	1,040	1,340	1,340	1,670	0,450	0,605
1 000	**1 120**	0,890	1,170	1,160	1,500	1,490	1,880	0,505	0,670
1 120	**1 250**	0,970	1,280	1,270	1,640	1,630	2,060	0,565	0,750
1 250	**1 400**	1,080	1,410	1,410	1,790	1,780	2,250	0,630	0,840
1 400	**1 600**	1,200	1,550	1,550	1,990	1,990	2,500	0,720	0,940
1 600	**1 800**	1,320	1,690	1,690	2,180	2,180	2,730	0,810	1,070

continued ▼

[1] *Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter. The following applies: bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for the reduction in radial internal clearance or the axial drive-up distance, while bearings in the lower half of the tolerance range are mounted using the smaller value for the reduction in radial internal clearance or the axial drive-up distance.*

10
Axial drive-up distance of the inner ring in mounting of toroidal roller bearings with tapered bore

Nominal bore diameter d		Drive-up distance on taper 1:12[1] Shaft		Drive-up distance on taper 1:30[1] Shaft		Minimum radial internal clearance required after mounting, control value with		
						CN (Group N)	C3 (Group 3)	C4 (Group 4)
mm		mm		mm		mm	mm	mm
over	incl.	min.	max.	min.	max.	min.	min.	min.
24	**30**	0,24	0,29	0,61	0,72	0,025	0,035	0,048
30	**40**	0,30	0,34	0,76	0,84	0,031	0,041	0,059
40	**50**	0,37	0,42	0,91	1,04	0,033	0,046	0,062
50	**65**	0,46	0,50	1,14	1,24	0,036	0,054	0,075
65	**80**	0,55	0,61	1,37	1,53	0,045	0,065	0,090
80	**100**	0,67	0,73	1,68	1,83	0,056	0,080	0,114
100	**120**	0,79	0,89	1,98	2,23	0,066	0,093	0,131
120	**140**	0,91	1,05	2,29	2,62	0,075	0,105	0,147
140	**160**	1,04	1,21	2,59	3,02	0,083	0,123	0,170
160	**180**	1,16	1,36	2,90	3,41	0,089	0,137	0,193
180	**200**	1,28	1,52	3,20	3,81	0,100	0,150	0,204
200	**225**	1,43	1,68	3,58	4,20	0,109	0,162	0,226
225	**250**	1,59	1,88	3,96	4,69	0,123	0,177	0,249
250	**280**	1,77	2,08	4,42	5,19	0,129	0,186	0,273
280	**315**	1,98	2,31	4,95	5,78	0,138	0,203	0,292
315	**355**	2,23	2,59	5,56	6,47	0,155	0,221	0,329
355	**400**	2,50	2,90	6,25	7,26	0,170	0,251	0,357
400	**450**	2,81	3,26	7,01	8,15	0,178	0,279	0,382
450	**500**	3,11	3,66	7,78	9,14	0,210	0,300	0,430
500	**560**	3,48	4,05	8,69	10,13	0,220	0,325	0,465
560	**630**	3,90	4,52	9,76	11,31	0,245	0,355	0,505
630	**710**	4,39	5,08	10,98	12,69	0,270	0,380	0,560
710	**800**	4,94	5,71	12,35	14,27	0,310	0,425	0,625
800	**900**	5,55	6,42	13,88	16,05	0,325	0,460	0,675
900	**1 000**	6,16	7,21	15,40	18,03	0,360	0,490	0,735
1 000	**1 120**	6,89	8,00	17,23	20,00	0,385	0,545	0,820
1 120	**1 250**	7,69	8,95	19,21	22,37	0,410	0,580	0,880
1 250	**1 400**	8,60	9,98	21,50	24,94	0,450	0,640	0,940
1 400	**1 600**	9,82	11,16	24,55	27,90	0,480	0,685	1,050
1 600	**1 800**	11,04	12,74	27,60	31,85	0,510	0,705	1,110

continued ▲

1) *Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter. The following applies: bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for the reduction in radial internal clearance or the axial drive-up distance, while bearings in the lower half of the tolerance range are mounted using the smaller value for the reduction in radial internal clearance or the axial drive-up distance.*



Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

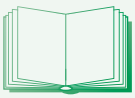
Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

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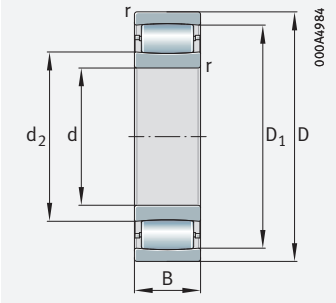
1.19 Further information



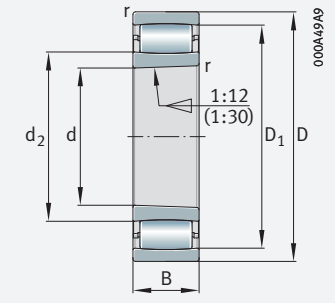
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *185*
- Design of bearing arrangements ➤ *141*
- Mounting and dismounting ➤ *194*

Toroidal roller bearings



Cylindrical bore



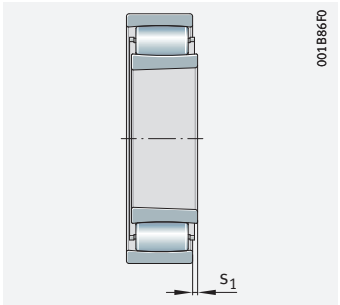
Tapered bore

d = 75 – 160 mm

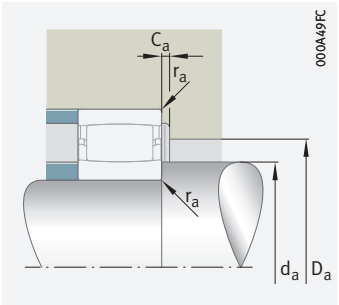
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*833|1.12* ➤*833|1.13* X-life ➤*828*
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
75	160	55	430 000	470 000	56 000	5 600	3 200	5,3	**C2315-XL-M**
	160	55	430 000	470 000	56 000	5 600	3 200	5,16	**C2315-XL-K-M**
80	170	58	510 000	550 000	62 000	5 100	3 050	6,3	**C2316-XL-M**
	170	58	510 000	550 000	62 000	5 100	3 050	6,1	**C2316-XL-K-M**
85	180	60	550 000	610 000	68 000	4 800	2 850	7,29	**C2317-XL-M**
	180	60	550 000	610 000	68 000	4 800	2 850	7,1	**C2317-XL-K-M**
90	160	40	330 000	380 000	55 000	5 300	2 650	3,29	**C2218-XL-K-M**
	160	40	330 000	380 000	55 000	5 300	2 650	3,38	**C2218-XL-M**
	190	64	650 000	740 000	77 000	4 350	2 500	8,4	**C2318-XL-K-M**
	190	64	650 000	740 000	77 000	4 350	2 500	8,65	**C2318-XL-M**
95	170	43	370 000	405 000	61 000	5 000	2 750	4,01	**C2219-XL-K-M**
	170	43	370 000	405 000	61 000	5 000	2 750	4,12	**C2219-XL-M**
	200	67	660 000	750 000	78 000	4 350	2 600	9,75	**C2319-XL-K-M**
	200	67	660 000	750 000	78 000	4 350	2 600	10	**C2319-XL-M**
100	180	46	420 000	470 000	68 000	4 700	2 700	4,97	**C2220-XL-M**
	180	46	420 000	470 000	68 000	4 700	2 700	4,84	**C2220-XL-K-M**
	215	73	820 000	920 000	97 000	3 850	2 290	12,4	**C2320-XL-K-M**
	215	73	820 000	920 000	97 000	3 850	2 290	12,8	**C2320-XL-M**
110	200	53	550 000	650 000	89 000	4 050	2 330	6,95	**C2222-XL-K-M**
	200	53	550 000	650 000	89 000	4 050	2 330	7,14	**C2222-XL-M**
120	215	58	630 000	740 000	101 000	3 700	2 200	8,91	**C2224-XL-M**
	215	58	630 000	740 000	101 000	3 700	2 200	8,68	**C2224-XL-K-M**
	215	76	760 000	1 000 000	92 000	3 700	1 960	11,3	**C3224-XL-K-M**
	215	76	760 000	1 000 000	92 000	3 700	1 960	11,7	**C3224-XL-M**
130	230	64	760 000	970 000	119 000	3 550	2 040	11,1	**C2226-XL-M**
	230	64	760 000	970 000	119 000	3 550	2 040	10,8	**C2226-XL-K-M**
140	250	68	830 000	1 080 000	126 000	3 050	1 750	14,1	**C2228-XL-M**
	250	68	830 000	1 080 000	126 000	3 050	1 750	13,7	**C2228-XL-K-M**
160	270	86	1 010 000	1 410 000	147 000	2 800	1 550	19,1	**C3132-XL-K-M1B**
	270	86	1 010 000	1 410 000	147 000	2 800	1 550	19,6	**C3132-XL-M1B**

medias *https://www.schaeffler.de/std/1F9A*

Before ordering, availability for delivery must be checked.



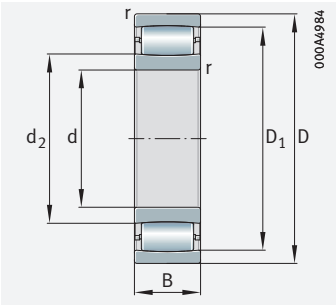
Axial displacement distance



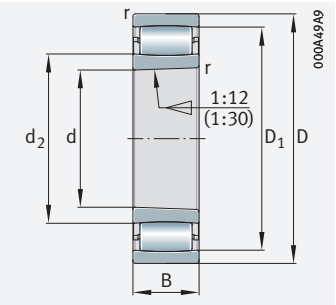
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
75	2,1	136,5	99	13,1	–	148	127	111	87	1,5	2	5,53	1,941
	2,1	136,5	99	13,1	–	148	127	111	87	1,5	2	5,53	1,941
80	2,1	145,5	103,5	10,1	–	158	135	117	92	1,7	2	6,094	1,745
	2,1	145,5	103,5	10,1	–	158	135	117	92	1,7	2	6,094	1,745
85	3	153,9	111,1	12,1	–	166	143	125	99	1,72	2,5	6,144	1,752
	3	153,9	111,1	12,1	–	166	143	125	99	1,72	2,5	6,144	1,752
90	2	143,9	112,1	9,5	–	149	137	122	101	1,3	2	4,103	2,924
	2	143,9	112,1	9,5	–	149	137	122	101	1,3	2	4,103	2,924
	3	167,4	119,6	9,6	–	176	154	136	104	1,9	2,5	6,754	1,589
	3	167,4	119,6	9,6	–	176	154	136	104	1,9	2,5	6,754	1,589
95	2,1	149,7	112,3	10,5	–	158	140	125	107	1,5	2	4,75	2,42
	2,1	149,7	112,3	10,5	–	158	140	125	107	1,5	2	4,75	2,42
	3	167,6	120,4	12,6	–	186	155	137	109	1,9	2,5	6,758	1,589
	3	167,6	120,4	12,6	–	186	155	137	109	1,9	2,5	6,758	1,589
100	2,1	156,9	118,1	10,1	–	168	147	131	112	1,6	2	4,849	2,393
	2,1	156,9	118,1	10,1	–	168	147	131	112	1,6	2	4,849	2,393
	3	184	129	11,2	–	201	169	148	114	2,2	2,5	8,026	1,312
	3	184	129	11,2	–	201	169	148	114	2,2	2,5	8,026	1,312
110	2,1	178,5	135,9	11,1	–	188	168	150	122	2	2	5,866	1,941
	2,1	178,5	135,9	11,1	–	188	168	150	122	2	2	5,866	1,941
120	2,1	190,2	144,8	13	–	203	178	160	132	1,9	2	6,372	1,778
	2,1	190,2	144,8	13	–	203	178	160	132	1,9	2	6,372	1,778
	2,1	190	149	17,1	–	203	180	162	132	1,5	2	7,65	1,423
	2,1	190	149	17,1	–	203	180	162	132	1,5	2	7,65	1,423
130	3	199,3	151,7	9,6	–	216	188	167	144	2	2,5	6,983	1,602
	3	199,3	151,7	9,6	–	216	188	167	144	2	2,5	6,983	1,602
140	3	221,4	174,6	13,7	–	236	210	190	154	1,9	2,5	7,191	1,598
	3	221,4	174,6	13,7	–	236	210	190	154	1,9	2,5	7,191	1,598
160	2,1	238,2	191,8	10,3	–	258	227	189	172	1,73	2	9,469	1,15
	2,1	238,2	191,8	10,3	–	258	227	189	172	1,73	2	9,469	1,15

Toroidal roller bearings



Cylindrical bore



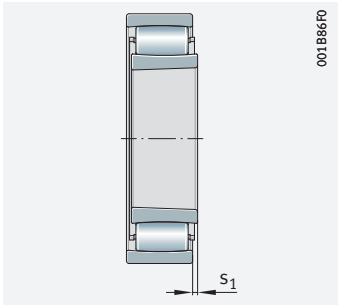
Tapered bore

d = 180 – 300 mm

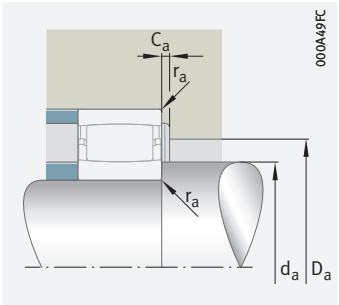
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*833|1.12* ➤*833|1.13* X-life ➤*828*
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
180	280	74	900 000	1 360 000	150 000	2 650	1 420	16,4	**C3036-XL-M**
	280	74	900 000	1 360 000	150 000	2 650	1 420	16	**C3036-XL-K-M**
	300	96	1 300 000	1 780 000	216 000	2 380	1 310	26	**C3136-XL-K-M**
	300	96	1 300 000	1 780 000	216 000	2 380	1 310	26,7	**C3136-XL-M**
200	310	82	1 170 000	1 760 000	181 000	2 250	1 180	22,2	**C3040-XL-M**
	310	82	1 170 000	1 760 000	181 000	2 250	1 180	21,6	**C3040-XL-K-M**
	340	112	1 600 000	2 330 000	265 000	2 060	1 120	39,8	**C3140-XL-K-M**
	340	112	1 600 000	2 330 000	265 000	2 060	1 120	40,8	**C3140-XL-M**
220	340	90	1 370 000	2 130 000	221 000	2 030	1 050	28,4	**C3044-XL-K-M**
	340	90	1 370 000	2 130 000	221 000	2 030	1 050	29,2	**C3044-XL-M**
	370	120	1 930 000	2 900 000	280 000	1 850	960	49,9	**C3144-XL-K-M**
	370	120	1 930 000	2 900 000	280 000	1 850	960	51,3	**C3144-XL-M**
240	360	92	1 400 000	2 230 000	228 000	1 880	980	31,1	**C3048-XL-K-M**
	360	92	1 400 000	2 230 000	228 000	1 880	980	32	**C3048-XL-M**
	400	128	2 380 000	3 500 000	370 000	1 690	870	61,6	**C3148-XL-K-M**
	400	128	2 380 000	3 500 000	370 000	1 690	870	63,2	**C3148-XL-M**
260	400	104	1 830 000	2 950 000	280 000	1 650	830	45,2	**C3052-XL-K-M**
	400	104	1 830 000	2 950 000	280 000	1 650	830	46,4	**C3052-XL-M**
	440	144	2 750 000	4 250 000	435 000	1 480	740	85,3	**C3152-XL-K-M**
	440	144	2 750 000	4 250 000	435 000	1 480	740	87,5	**C3152-XL-M**
280	420	106	1 870 000	3 100 000	290 000	1 530	770	48,8	**C3056-XL-K-M**
	420	106	1 870 000	3 100 000	290 000	1 530	770	50,1	**C3056-XL-M**
	460	146	2 850 000	4 500 000	455 000	1 400	700	93,8	**C3156-XL-M**
	460	146	2 850 000	4 500 000	455 000	1 400	700	91,4	**C3156-XL-K-M**
300	460	118	2 220 000	3 800 000	330 000	1 400	690	67,4	**C3060-XL-K-M**
	460	118	2 220 000	3 800 000	330 000	1 400	690	69,2	**C3060-XL-M**
	500	160	3 350 000	5 300 000	510 000	1 280	630	120	**C3160-XL-K-M**
	500	160	3 350 000	5 300 000	510 000	1 280	630	124	**C3160-XL-M**

medias *https://www.schaeffler.de/std/1F9A*

Before ordering, availability for delivery must be checked.



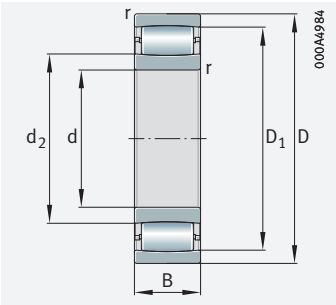
Axial displacement distance



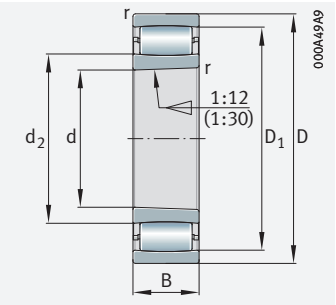
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
180	2,1	251	208,9	15,1	–	269	241	223	191	1,4	2	9,696	1,136
	2,1	251	208,9	15,1	–	269	241	223	191	1,4	2	9,696	1,136
	3	270,8	215,2	23,2	–	286	257	234	194	2,1	2,5	9,634	1,162
	3	270,8	215,2	23,2	–	286	257	234	194	2,1	2,5	9,634	1,162
200	2,1	285,2	234,8	15,2	–	299	272	252	211	1,6	2	10,083	1,117
	2,1	285,2	234,8	15,2	–	299	272	252	211	1,6	2	10,083	1,117
	3	304,4	245,6	27,3	–	326	290	265	214	2,1	2,5	11,861	0,923
	3	304,4	245,6	27,3	–	326	290	265	214	2,1	2,5	11,861	0,923
220	3	310	256,7	17,2	–	327	297	274	233	1,7	2,5	11,851	0,931
	3	310	256,7	17,2	–	327	297	274	233	1,7	2,5	11,851	0,931
	4	333,1	269,2	22,3	–	353	316	291	237	1,4	3	13,667	0,791
	4	333,1	269,2	22,3	–	353	316	291	237	1,4	3	13,667	0,791
240	3	329,2	275,8	19,2	–	347	316	293	253	1,7	2,5	12,016	0,931
	3	329,2	275,8	19,2	–	347	316	293	253	1,7	2,5	12,016	0,931
	4	365,8	281,2	20,4	–	383	337	307	257	2,9	3	14,559	0,741
	4	356,8	281,2	20,4	–	383	337	307	257	2,9	3	14,559	0,741
260	4	366,1	305,8	19,3	–	385	351	326	275	1,9	3	12,381	0,924
	4	366,1	305,8	19,3	–	385	351	326	275	1,9	3	12,381	0,924
	4	397	318,9	26,4	–	423	377	346	277	1,7	3	16,223	0,667
	4	397	318,9	26,4	–	423	377	346	277	1,7	3	16,223	0,667
280	4	388,5	328,5	21,3	–	405	374	348	295	1,9	3	12,577	0,924
	4	388,5	328,5	21,3	–	405	374	348	295	1,9	3	12,577	0,924
	5	415	337	28,4	–	440	394	364	300	1,7	4	16,385	0,666
	5	415	337	28,4	–	440	394	364	300	1,7	4	16,385	0,666
300	4	416	353	20	–	445	400	369	315	1,6	3	14,109	0,812
	4	416	353	20	–	445	400	369	315	1,6	3	14,109	0,812
	5	447,6	362,4	30,5	–	480	426	391	320	1,9	4	17,019	0,647
	5	447,6	362,4	30,5	–	480	426	391	320	1,9	4	17,019	0,647

Toroidal roller bearings



Cylindrical bore



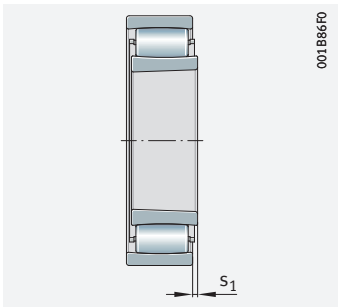
Tapered bore

d = 320 – 500 mm

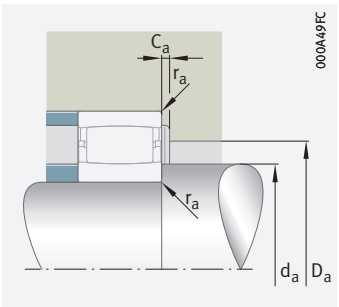
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*833 | 1.12* ➤*833 | 1.13* X-life ➤*828*
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
320	540	176	4 150 000	6 300 000	610 000	1 180	590	157	**C3164-XL-M**
	540	176	4 150 000	6 300 000	610 000	1 180	590	157	**C3164-XL-K-M**
340	580	190	4 900 000	7 500 000	710 000	1 060	510	202	**C3168-XL-M**
	580	190	4 900 000	7 500 000	710 000	1 060	510	197	**C3168-XL-K-M**
380	620	194	5 000 000	8 500 000	720 000	990	455	225	**C3176-XL-M**
	620	194	5 000 000	8 500 000	720 000	990	455	219	**C3176-XL-K-M**
400	650	200	4 800 000	8 300 000	750 000	910	435	253	**C3180-XL-M**
	650	200	4 800 000	8 300 000	750 000	910	435	247	**C3180-XL-K-M**
420	700	224	6 000 000	10 600 000	890 000	860	390	339	**C3184-XL-M**
	700	224	6 000 000	10 600 000	890 000	860	390	330	**C3184-XL-K-M**
440	720	226	6 900 000	11 600 000	960 000	810	360	345	**C3188-XL-K-M1B**
	720	226	6 900 000	11 600 000	960 000	810	360	354	**C3188-XL-M1B**
460	760	240	6 800 000	12 000 000	1 010 000	760	350	424	**C3192-XL-M**
	760	240	6 800 000	12 000 000	1 010 000	760	350	413	**C3192-XL-K-M**
	760	300	8 700 000	14 900 000	1 190 000	770	280	516	**C4192-XL-K30-M1B**
	760	300	8 700 000	14 900 000	1 190 000	770	280	530	**C4192-XL-M1B**
500	670	128	3 350 000	6 500 000	620 000	830	375	120	**C39/500-XL-K-M**
	670	128	3 350 000	6 500 000	620 000	830	375	123	**C39/500-XL-M**
	720	167	4 300 000	8 300 000	700 000	790	370	216	**C30/500-XL-M**
	720	167	4 300 000	8 300 000	700 000	790	370	211	**C30/500-XL-K-M**
	830	264	7 500 000	12 900 000	1 090 000	680	330	545	**C31/500-XL-K-M**
	830	264	7 500 000	12 900 000	1 090 000	680	330	559	**C31/500-XL-M**
	830	325	10 700 000	19 100 000	1 410 000	680	225	670	**C41/500-XL-K30-M1B**
	830	325	10 700 000	19 100 000	1 410 000	680	225	688	**C41/500-XL-M1B**

medias *https://www.schaeffler.de/std/1F9A*

Before ordering, availability for delivery must be checked.



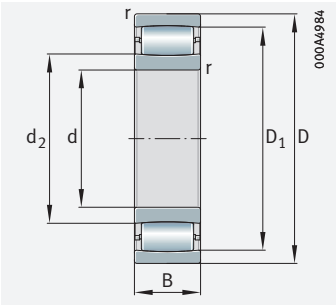
Axial displacement distance



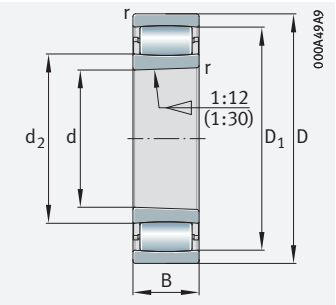
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
320	5	475,9	372,1	26,7	–	520	448	400	340	4	4	19,823	0,542
	5	475,9	372,1	26,7	–	520	448	400	340	4	4	19,823	0,542
340	5	517,6	404,4	25,9	–	560	485	437	360	2,7	4	22,159	0,481
	5	517,6	404,4	25,9	–	560	485	437	360	2,7	4	22,159	0,481
380	5	548,6	448,4	25,4	–	600	523	474	400	2,1	4	20,403	0,544
	5	548,6	448,4	25,4	–	600	523	474	400	2,1	4	20,403	0,544
400	6	586,1	490,9	50,7	–	624	563	514	426	1,8	5	20,809	0,542
	6	586,1	490,9	50,7	–	624	563	514	426	1,8	5	20,809	0,542
420	6	615,7	510,3	34,8	–	674	587	539	446	1,9	5	24,992	0,435
	6	615,7	510,3	34,8	–	674	587	539	446	1,9	5	24,992	0,435
440	6	646,2	521,1	16	–	694	615	518	466	6,3	5	25,092	0,347
	6	646,2	521,1	16	–	694	615	518	466	6,3	5	25,092	0,347
460	7,5	679,2	558,8	51	–	728	649	589	492	2,1	6	25,204	0,441
	7,5	679,2	558,8	51	–	728	649	589	492	2,1	6	25,204	0,441
	7,5	668,3	539,6	23,3	–	728	634	588	477	6,9	6	32,219	0,324
	7,5	668,3	539,6	23,3	–	728	634	588	477	6,9	6	32,219	0,324
500	5	634,6	552,4	20,4	–	652	615	573	518	3,1	4	19,736	0,6
	5	634,6	552,4	20,4	–	652	615	573	518	3,1	4	19,736	0,6
	6	655,8	572,2	37,5	–	697	635	593	523	2,1	5	18,843	0,647
	6	655,8	572,2	37,5	–	697	635	593	523	2,1	5	18,843	0,647
	7,5	734,2	608,8	75,3	–	798	702	641	532	4,4	6	25,64	0,441
	7,5	734,2	608,8	75,3	–	798	702	641	532	4,4	6	25,64	0,441
	7,5	739,2	598,7	15	–	798	708	594	532	7,5	6	36,213	0,287
	7,5	739,2	598,7	15	–	798	708	594	532	7,5	6	36,213	0,287

Toroidal roller bearings



Cylindrical bore



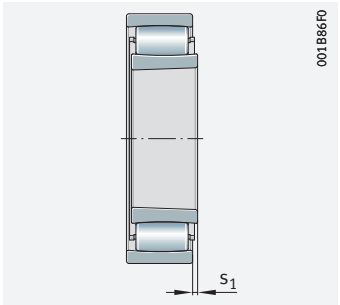
Tapered bore

d = 530 – 850 mm

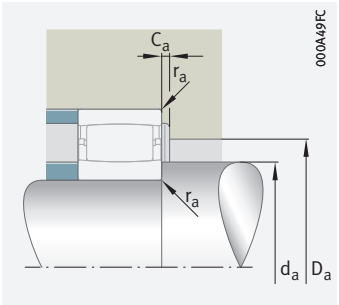
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*833* | *1.12* ➤*833* | *1.13* X-life ➤*828*
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
530	780	185	5 200 000	9 700 000	790 000	730	340	292	**C30/530-XL-M**
	780	185	5 200 000	9 700 000	790 000	730	340	285	**C30/530-XL-K-M**
	870	272	9 100 000	16 100 000	1 310 000	640	280	625	**C31/530-XL-M**
	870	272	9 100 000	16 100 000	1 310 000	640	280	609	**C31/530-XL-K-M**
560	750	140	3 650 000	7 500 000	700 000	730	335	164	**C39/560-XL-K-M**
	750	140	3 650 000	7 500 000	700 000	730	335	168	**C39/560-XL-M**
	820	195	5 700 000	11 200 000	890 000	660	295	338	**C30/560-XL-M**
	820	195	5 700 000	11 200 000	890 000	660	295	329	**C30/560-XL-K-M**
	920	280	9 600 000	17 400 000	1 350 000	610	265	701	**C31/560-XL-K-M1B**
	920	280	9 600 000	17 400 000	1 350 000	610	265	720	**C31/560-XL-M1B**
600	800	150	4 100 000	8 800 000	790 000	680	305	197	**C39/600-XL-K-M**
	800	150	4 100 000	8 800 000	790 000	680	305	203	**C39/600-XL-M**
	870	200	6 300 000	12 200 000	970 000	620	275	383	**C30/600-XL-M**
	870	200	6 300 000	12 200 000	970 000	620	275	373	**C30/600-XL-K-M**
	980	300	11 100 000	19 100 000	1 490 000	550	247	847	**C31/600-XL-K-M1B**
	980	300	11 100 000	19 100 000	1 490 000	550	247	869	**C31/600-XL-M1B**
	980	375	13 600 000	24 500 000	1 780 000	560	186	1 058	**C41/600-XL-K30-M1B**
	980	375	13 600 000	24 500 000	1 780 000	560	186	1 086	**C41/600-XL-M1B**
630	920	212	6 900 000	12 900 000	1 050 000	580	270	460	**C30/630-XL-M**
	920	212	6 900 000	12 900 000	1 050 000	580	270	448	**C30/630-XL-K-M**
	1 030	315	12 200 000	22 000 000	1 660 000	520	222	983	**C31/630-XL-K-M1B**
	1 030	315	12 200 000	22 000 000	1 660 000	520	222	1 009	**C31/630-XL-M1B**
670	980	230	8 300 000	16 500 000	1 250 000	530	226	568	**C30/670-XL-M**
	980	230	8 300 000	16 500 000	1 250 000	530	226	553	**C30/670-XL-K-M**
	1 090	336	12 600 000	22 300 000	1 740 000	490	220	1 167	**C31/670-XL-K-M1B**
	1 090	336	12 600 000	22 300 000	1 740 000	490	220	1 198	**C31/670-XL-M1B**
750	1 000	185	6 400 000	14 000 000	1 120 000	510	216	380	**C39/750-XL-K-M**
	1 000	185	6 400 000	14 000 000	1 120 000	510	216	391	**C39/750-XL-M**
	1 090	250	9 500 000	19 300 000	1 430 000	475	201	735	**C30/750-XL-K-M1B**
	1 090	250	9 500 000	19 300 000	1 430 000	475	201	755	**C30/750-XL-M1B**
850	1 120	200	7 800 000	17 000 000	1 390 000	440	182	500	**C39/850-XL-K-M**
	1 120	200	7 800 000	17 000 000	1 390 000	440	182	513	**C39/850-XL-M**

medias *https://www.schaeffler.de/std/1F9A*

Before ordering, availability for delivery must be checked.



Axial displacement distance



Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
530	6	702,9	602,1	35,7	–	757	677	628	553	2,5	5	21,626	0,548
	6	702,9	602,1	35,7	–	757	677	628	553	2,5	5	21,626	0,548
	7,5	779,2	636,8	44,4	–	838	738	678	562	3	6	30,734	0,356
	7,5	779,2	636,8	44,4	–	838	738	678	562	3	6	30,734	0,356
560	5	701,7	621,3	32,4	–	732	683	650	578	2,9	4	20,33	0,6
	5	701,7	621,3	32,4	–	732	683	650	578	2,9	4	20,33	0,6
	6	758,9	662,1	45,7	–	793	735	686	583	2,4	5	22,141	0,548
	6	758,9	662,1	45,7	–	793	735	686	583	2,4	5	22,141	0,548
	7,5	805,2	663,4	28	–	888	778	660	592	7,3	6	30,983	0,355
	7,5	805,2	663,4	28	–	888	778	660	592	7,3	6	30,983	0,355
600	5	745,3	664,7	32,4	–	782	726	685	618	1,7	4	21,712	0,561
	5	745,3	664,7	32,4	–	782	726	685	618	1,7	4	21,712	0,561
	6	805,6	691,4	35,9	–	847	773	724	623	2	5	28,196	0,403
	6	805,6	691,4	35,9	–	847	773	724	623	2	5	28,196	0,403
	7,5	869,9	702,9	26,1	–	948	837	699	632	8,8	6	30,953	0,363
	7,5	869,9	702,9	26,1	–	948	837	699	632	8,8	6	30,953	0,363
	7,5	864,7	701,2	24,6	–	948	828	695	632	9	6	40,44	0,26
	7,5	864,7	701,2	24,6	–	948	828	695	632	9	6	40,44	0,26
630	7,5	841,7	715,2	48,1	–	892	809	748	658	3,9	6	29,154	0,39
	7,5	841,7	715,2	48,1	–	892	809	748	658	3,9	6	29,154	0,39
	7,5	910,9	743,4	23,8	–	998	878	739	662	8,8	6	34,168	0,324
	7,5	910,9	743,4	23,8	–	998	878	739	662	8,8	6	34,168	0,324
670	7,5	902,3	776,7	41,1	–	952	870	809	698	3,1	6	27,163	0,44
	7,5	902,3	776,7	41,1	–	952	870	809	698	3,1	6	27,163	0,44
	7,5	963,7	786	41	–	1 058	930	782	702	12	6	34,543	0,325
	7,5	963,7	786	41	–	1 058	930	782	702	12	6	34,543	0,325
750	6	933,5	829,5	35,7	–	977	906	869	773	3,8	5	25,91	0,479
	6	933,5	829,5	35,7	–	977	906	869	773	3,8	5	25,91	0,479
	7,5	991,7	856,3	25	–	1 062	965	852	778	6,9	6	29,669	0,404
	7,5	991,7	856,3	25	–	1 062	965	852	778	6,9	6	29,669	0,404
850	6	1 056,9	936,1	35,9	–	1 097	1 027	981	873	4,5	5	30,626	0,398
	6	1 056,9	936,1	35,9	–	1 097	1 027	981	873	4,5	5	30,626	0,398

Axial deep groove ball bearings



Matrix for bearing preselection 1051

1 Axial deep groove ball bearings 1052

1.1 Bearing design 1052
1.2 Load carrying capacity 1054
1.3 Compensation of angular misalignments 1054
1.4 Lubrication 1054
1.5 Sealing 1055
1.6 Speeds 1055

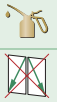
1.7 Noise *1055*
1.8 Temperature range *1056*
1.9 Cages *1056*
1.10 Internal clearance *1057*
1.11 Dimensions, tolerances *1057*
1.12 Suffixes *1058*
1.13 Structure of bearing designation *1058*
1.14 Dimensioning *1058*
1.15 Minimum load *1059*
1.16 Design of bearing arrangements *1059*
1.17 Mounting and dismounting *1060*
1.18 Legal notice regarding data freshness *1061*
1.19 Further information *1061*
Product tables *1062*
Axial deep groove ball bearings, single direction *1062*
Axial deep groove ball bearings, double direction *1074*

Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Axial deep groove ball bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			single direction	double direction	detailed information ➤ 1052
Load carrying capacity	radial		–	–	➤ 1054|1.2
	axial, one direction		++	++	➤ 1054|1.2
	axial, both directions		–	++	➤ 1054|1.2
	moments		–	–	➤ 1054|1.2
Compensation of angular misalignments	static		(+)[1]	(+)[1]	➤ 1054|1.3
	dynamic		–	–	➤ 1054|1.3
Bearing design	cylindrical bore		✓	✓	➤ 1052|1.1
	tapered bore		–	–	➤ 1052|1.1
	separable		✓	✓	➤ 1060|1.17
Lubrication	greased		–	–	➤ 1054|1.4
Sealing	open		✓	✓	➤ 1055|1.5
	non-contact		–	–	–
	contact		–	–	–
Operating temperature in °C	from to		–30 +150[1]	–30 +150[1]	➤ 1056|1.8
Suitability for	high speeds		+	+	➤ 1055|1.6
	high running accuracy		+	+	➤ 1057|1.11 ➤ 115
	low-noise running		(+)	(+)	➤ 1055|1.7 ➤ 27
	high rigidity		++	++	➤ 54
	reduced friction		+	+	➤ 56
	length compensation within bearing		–	–	–
	non-locating bearing arrangement		–	–	➤ 141
	locating bearing arrangement		+++	+++	➤ 141
X-life bearings		X-life	–	–	–
Bearing bore d in mm	from to		10 260[2]	10 190	➤ 1062 ➤ 1074
Product tables	from page ➤		1062	1074	

[1] Valid for bearings with spherical housing locating washer

[2] Larger catalogue bearings GL 1

1 Axial deep groove ball bearings

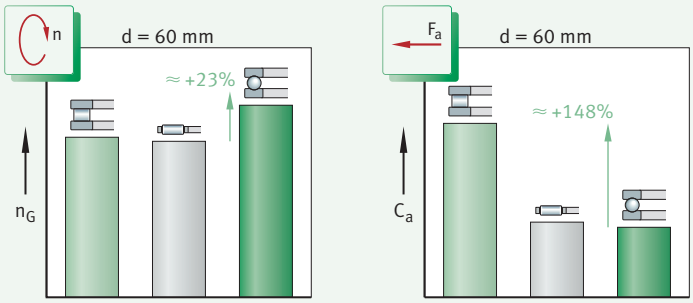
Axial deep groove ball bearings:

- are standardised, ready-to-fit units with high axial load carrying capacity ➤*1053*|*2* and ➤*1053*|*3*
- are suitable exclusively for the support of predominantly axial loads ➤*1054*|*1.2*
- are particularly suitable where the bearing position is subjected to high axial loads from one or both sides, but the requirements for axial load carrying capacity of the bearings are not so high that axial cylindrical roller bearings with even higher load carrying capacity must be used
- permit higher speeds than roller or needle roller and cage assemblies ➤*1052*|*1*
- compensate, in conjunction with a spherical housing locating washer, static misalignments between the shaft and housing ➤*1054*|*1.3*

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1051*.

1
Axial deep groove ball bearing: comparison of speed and load carrying capacity with axial cylindrical roller bearing and axial needle roller and cage assembly

n_G = *limiting speed*
F_a = *axial load*
C_a = *basic axial dynamic load rating*



1.1 Bearing design

Design variants

Axial deep groove ball bearings are available as:

- single direction bearings ➤*1053*|*2*
- double direction bearings ➤*1053*|*3*

Basic bearing design

Non-self-retaining, easy-to-fit bearing units

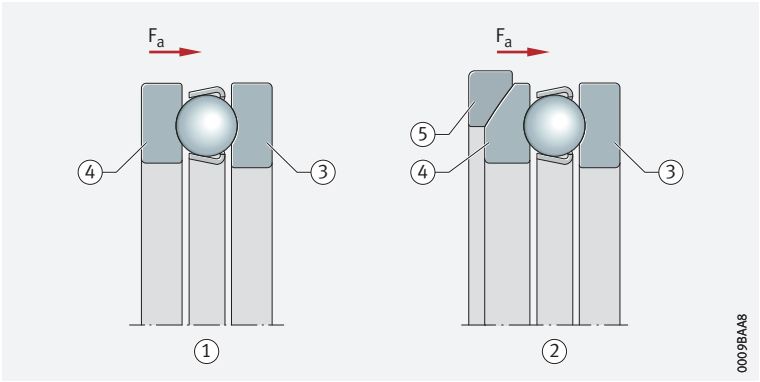
Axial deep groove ball bearings are part of the group of axial ball bearings. The bearings are of a multi-piece construction and, due to their design, are not self-retaining. As a result, it is possible to mount the bearing parts (shaft locating washer, housing locating washer, ball and cage assembly, support washer) separately from each other. In order to guide the balls, the shaft and housing locating washer have raceway grooves (formed rolling element raceways) with a defined osculation, in which the rolling elements circulate. The ball set is retained by a sheet steel cage or a solid brass cage ➤*1056*|*2*. When using these bearings, the designer does not need to produce the bearing parts for his bearing arrangement and match these to each other himself, but can instead use a standarised, ready-to-fit unit.

Single direction axial deep groove ball bearings

Ready-to-fit bearing unit for compact axial designs

These axial deep groove ball bearings comprise a shaft locating washer, a housing locating washer and a ball and cage assembly ➤*1053*|*2*. In order to ensure centring of the washers with a precise fit, the bore of the shaft locating washer (d) is ground. In contrast, the bore of the housing locating washer (D_1) is more generously dimensioned and is turned. The housing locating washer can be flat or spherical and can be configured with or without a support washer. The support washers U2 and U3 must be ordered in addition to the bearing. Load carrying capacity of single direction bearings ➤*1054*|*1.2*.

2
Axial deep groove ball bearings, single direction



F_a = *axial load*

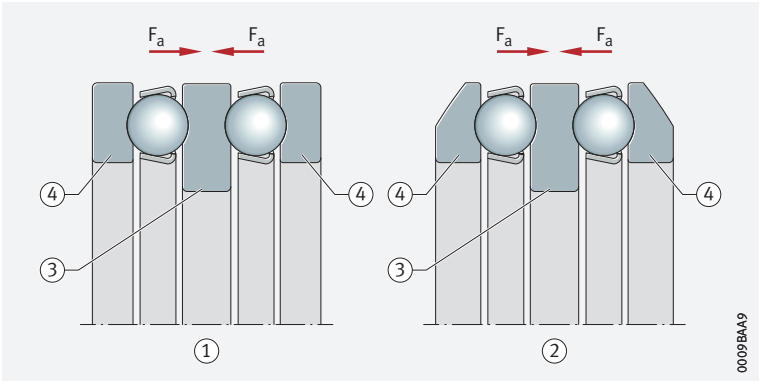
① *Axial deep groove ball bearing with flat housing locating washer*
② *Axial deep groove ball bearing with spherical housing locating washer and support washer*
③ *Shaft locating washer*
④ *Housing locating washer (flat or spherical)*
⑤ *Support washer*

Double direction axial deep groove ball bearings

Ready-to-fit bearing unit, suitable for combination with support washers

Double direction bearings comprise a shaft locating washer, two housing locating washers and two ball and cage assemblies ➤*1053*|*3*. They can also be combined with support washers U2 and U3. The housing locating washers and ball sets correspond to the designs of the single direction bearings. Load carrying capacity of double direction bearings ➤*1054*|*1.2*.

3
Axial deep groove ball bearings, double direction



F_a = *axial load*

① *Axial deep groove ball bearing with flat housing locating washers*
② *Axial deep groove ball bearing with spherical housing locating washers, without support washer*
③ *Shaft locating washer*
④ *Housing locating washer (flat or spherical)*

1.2 Load carrying capacity

Axial deep groove ball bearings are suitable for the support of predominantly axial loads. They must not be subjected to predominantly radial loads.

✎ *Single direction bearings*

Single direction axial deep groove ball bearings can support axial forces in one direction and support the shaft on one side ➤*1053*|*2*.

✎ *Double direction bearings*

Double direction axial deep groove ball bearings support axial forces in both directions and can guide the shaft on both sides ➤*1053*|*3*.

1.3 Compensation of angular misalignments

Axial deep groove ball bearings react with high sensitivity to angular misalignments. In cases where the contact face for the housing locating washer is not vertical (perpendicular) to the bearing axis, the angular misalignment can be compensated by means of bearings with a spherical housing locating washer and support washer ➤*1053*|*2*.

Single direction bearings

✎ *Series 511, 512, 513, 514 do not permit angular adjustment*

Bearings of series 511, 512, 513 and 514 have a flat housing locating washer. As a result, they do not permit angular misalignment or skewing between the shaft and housing.

✎ *Series 532, 533 permit angular adjustment*

Bearings of series 532 and 533 have a spherical housing locating washer. With an appropriate housing design and in conjunction with support washers U2 and U3, they are variable in angle as a result and can therefore tolerate static misalignments of the shaft relative to the housing within certain limits.

Double direction bearings

✎ *Series 522, 523 do not permit angular adjustment*

Bearings of series 522 and 523 have two flat housing locating washers and do not permit angular adjustment.

✎ *Series 542, 543 permit angular adjustment*

Bearings of series 542 and 543 have spherical housing locating washers. With an appropriate housing design and in conjunction with support washers U2 and U3, they are variable in angle as a result and can therefore tolerate static misalignments of the shaft relative to the housing within certain limits.

1.4 Lubrication

✎ *Oil or grease lubrication is possible*

The bearings are not greased. In order to prevent direct metallic contact between rolling elements, raceways and cages, they must be lubricated. Oil or grease lubrication is suitable. The lubricant reduces the wear and also protects the surfaces against corrosion. The choice of lubricant is essentially dependent on the operating temperatures and the speeds; it is also influenced, however, by the load, mounting position, osculations etc.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

1.5 Sealing

The bearings are of an open design

Axial deep groove ball bearings are supplied without seals. As a result, sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

1.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

The values in the product tables are valid for oil lubrication.

Values for grease lubrication

For grease lubrication, 75% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤69. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** *https://medias.schaeffler.com*

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing washers and rolling elements
- the support washers
- the cage
- the lubricant

✎ *–30 °C to +150 °C*

Possible operating temperatures for axial deep groove ball bearings ➤*1056*|▦ *1*. The support washers are made from rolling bearing steel and are suitable for the same temperatures as the bearing washers and rolling elements. The temperature limit values of the lubricant must be observed.

▦ **1**
Permissible temperature ranges

Operating temperature	Axial deep groove ball bearings with sheet steel or brass cages
	–30 °C to +150 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *Sheet steel cages or solid brass cages are used as standard*

Standard cages for axial deep groove ball bearings ➤*1056*|▦ *2*. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages. Bearings with sheet steel cages do not have a cage suffix ➤*1056*|▦ *2*.

If there is any uncertainty regarding cage suitability for a specific application, please consult Schaeffler.

▦ **2**
Cage, cage suffix, bore code

Bearing series	Sheet steel cage –	Solid brass cage MP
	Bore code	
511	up to 28	from 30
512	up to 28	from 30
513	up to 20	from 22
514	up to 11	from 12
522	up to 28	from 30
523	up to 20	from 22
524	06 to 11	–
532	up to 28	from 30
533	up to 20	from 22
534	06 to 11	–
542	up to 28	from 30
543	up to 20	22, 24
544	06 to 11	–

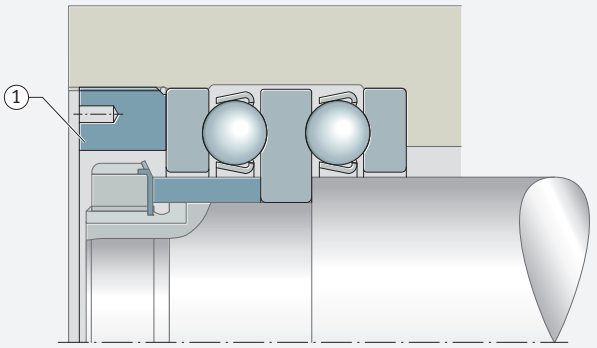
1.10 Internal clearance

✎ Axial clearance and preload is determined by the application

In the case of axial deep groove ball bearings, the internal clearance (axial clearance) is only achieved when the bearings are mounted. The requisite axial clearance of the bearing arrangement is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load. If axial deep groove ball bearings are subjected to vibrations while under predominantly static load for example, they must be lightly preloaded. Preload can be applied, for example, using housing nuts ➤*1057*|⧉ *4*. Other suitable means include shaft nuts, disc springs, calibrated sheets (shims) etc. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways ➤*1059*|*1.15*. It must also be ensured that the preload does not exceed the optimum value, otherwise there will be an increase in friction and therefore in heat generation in the bearing. These will both have a negative effect on the operating life of the bearings.

If there is any uncertainty regarding the setting of the axial clearance, Schaeffler must always be consulted.

⧉ **4**
Setting the axial clearance of a double direction axial deep groove ball bearing by means of a housing nut



① *Housing nut*

1.11 Dimensions, tolerances

Dimension standards

Bearings with a flat locating surface on the housing locating washer correspond to ISO 104:2015 or DIN 616:2000 and DIN 711:2010 as well as DIN 715:2011.

Bearings with a spherical locating surface on the housing locating washer correspond to ISO 20516:2007 and DIN 711:2010 as well as DIN 715:2011.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*140*. Nominal value of chamfer dimension ➤*1062*|▦.

Tolerances

The tolerances for the dimensional and running accuracy of axial deep groove ball bearings correspond to tolerance class Normal in accordance with ISO 199:2014. Tolerance values in accordance with ISO 199 ➤*135*|▦ *25* to ➤*137*|▦ *28*.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

3 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
MP	Solid brass cage, ball-guided	Standard
P5	Bearing in tolerance class 5	Special design, available by agreement
P6	Bearing in tolerance class 6	

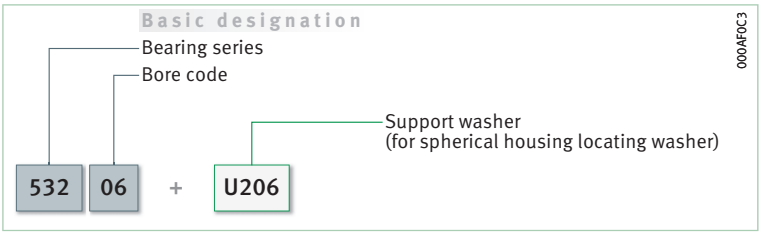
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

Examples of composition of bearing designation

The designation of bearings follows a set model.
Examples ➤*1058*|*5* and ➤*1058*|*6*.
The composition of designations is subject to DIN 623-1 ➤*102*|*10*.

5 *Axial deep groove ball bearing, single direction, with spherical housing locating washer and support washer: designation structure*



6 *Axial deep groove ball bearing, double direction, with spherical housing locating washers: designation structure*



1.14 Dimensioning

Equivalent dynamic bearing load

$P = F_a$

Axial deep groove ball bearings can only support axial forces ➤*1054*|*1.2*.
As a result, $P = F_a$ ➤*1058*|*f 1*.

f 1 *Equivalent dynamic load*

$$P = F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_a	N	Axial load.

Equivalent static bearing load

$P_0 = F_{0a}$

Since the bearings can only support axial loads, $P_0 = F_{0a}$ ➤*1058*|*f 2*.

f 2 *Equivalent static load*

$$P_0 = F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0a}	N	Largest axial load present (maximum load).

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤ *1059* | *f 3*.

f 3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum axial load of $F_{a\,min}$ is required*

Under axial load, the balls are guided under favourable rolling conditions at the base of the groove. This deteriorates, however, if the centrifugal force occurring at higher speeds and very low loads presses the balls outwards. In this case, detrimental sliding motions can occur between the rolling elements and the raceways due to centrifugal forces and gyroscopic moments. In order to prevent these sliding motions, the bearings must be subjected to the minimum axial load $F_{a\,min}$ ➤ *1059* | *f 4*.
This can also be achieved by means of preloading, for example using springs. The minimum load factor A is given in the product tables.
For n_{max}, the maximum operating speed must be used.

f 4
Minimum axial load

$$F_{a\,min} = 1000 \cdot A \cdot \left(\frac{n_{max}}{1000}\right)^2$$

Legend

$F_{a\,min}$	N	Minimum axial load
A	–	Minimum load factor ➤ *1062*
n_{max}	min^{-1}	Maximum operating speed.

1.16 Design of bearing arrangements

✎ *In the case of misalignments: use spherical support washers or produce the locating surface in the housing to a spherical design*

Bearings with spherical housing locating washers can compensate, in conjunction with a spherical bearing seating surface, misalignments between the locating surface in the housing and on the shaft ➤ *1054* | *1.3*. These bearings can be mounted together with support washers also of a spherical design or directly in the housing. In this case, however, the locating surface in the housing must also be of a spherical design.

✎ *Shaft tolerances*

Single direction bearings should have the shaft tolerance j6 Ⓔ, while k6 Ⓔ should be selected for double direction bearings.

✎ *Tolerances for the housing bore*

The tolerance of the locating bore is dependent on the running accuracy to be achieved. For normal running accuracy, it should be in the tolerance class E8 Ⓔ, for high running accuracy, it should be in the tolerance class H6 Ⓔ.

Mounting dimensions for the contact surfaces of bearing rings

✎ *The contact surfaces for the washers must be of sufficient height*

The shoulders on the adjacent construction (shaft and housing) must be sufficiently high that the shaft and housing locating washers are supported over at least half their height. The abutment shoulders should be rigid, flat and perpendicular to the axis of rotation. Proven mounting dimensions for the radii and diameters of abutment shoulders are given in the product tables ➤ *1062*. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

1.17 Mounting and dismounting

Do not transpose the shaft and housing locating washer

In the case of single direction bearings, it must be ensured that the shaft and housing locating washer are not exchanged with each other but are mounted in the correct position.

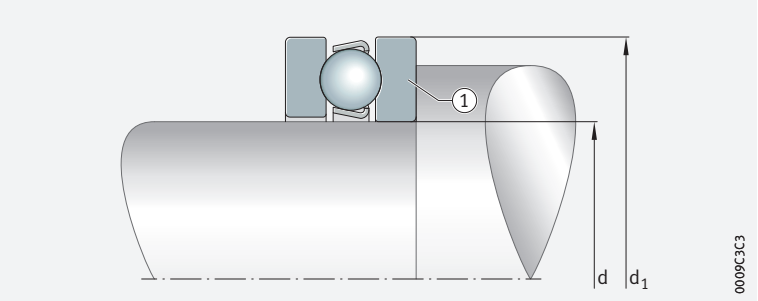
On the shaft locating washer, the bore d is ground and the outside diameter d_1 is not ground ➤*1060*| *7*. For reliable operation, the shaft locating washer should always abut a shoulder of corresponding dimensions or a support ring securely located on the shaft.

As the bearings are not self-retaining, they are easy to mount

Axial deep groove ball bearings are not self-retaining. As a result, the bearing washers and the ball and cage assembly can be mounted separately from each other ➤*1052*| *1.1*. This gives simplified mounting of the bearings.

7
Axial deep groove ball bearing, single direction

① *Shaft locating washer, bore d ground, outside diameter d_1 not ground*



Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

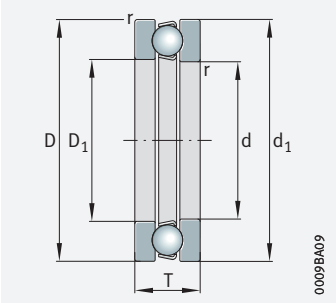
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

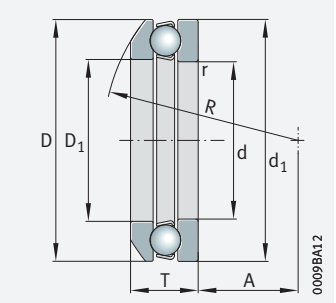
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

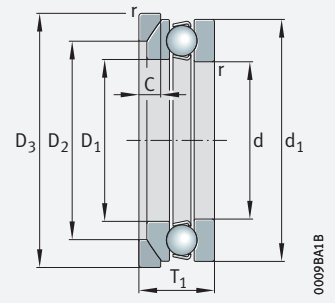


532, 533
Spherical housing locating washer

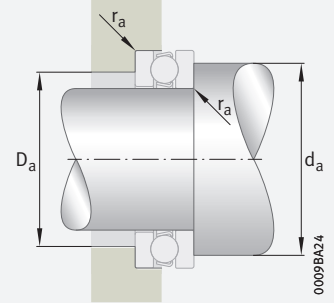
d = 10 – 30 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T	dyn. C_a N	stat. C_{0a} N	C_{ua} N	A	n_G min^{-1}	$n_{\vartheta r}$ min^{-1}	Bearing ≈ kg	Support washer ≈ kg	Bearing	Support washer
10	24	9	10 000	14 000	640	0,001	12 700	19 200	0,018	–	**51100**	**–**
	26	11	12 700	17 100	780	0,002	10 900	19 100	0,03	–	**51200**	**–**
	26	11,6	12 700	17 100	780	0,002	10 900	19 100	0,028	0,008	**53200**	**U200**
12	26	9	10 300	15 400	710	0,001	13 100	16 900	0,021	–	**51101**	**–**
	28	11	13 200	19 000	870	0,002	11 300	16 900	0,03	–	**51201**	**–**
	28	11,4	13 200	19 000	870	0,002	11 300	16 900	0,03	0,009	**53201**	**U201**
15	28	9	10 500	16 800	770	0,002	13 100	14 000	0,027	–	**51102**	**–**
	32	12	16 600	24 800	1 130	0,003	9 800	14 300	0,049	–	**51202**	**–**
	32	13,3	16 600	24 800	1 130	0,003	9 800	14 300	0,048	0,013	**53202**	**U202**
17	30	9	11 300	19 600	900	0,002	12 900	12 500	0,028	–	**51103**	**–**
	35	12	17 200	27 500	1 240	0,004	9 700	13 200	0,052	–	**51203**	**–**
	35	13,2	17 200	27 500	1 240	0,004	9 700	13 200	0,055	0,015	**53203**	**U203**
20	35	10	15 000	26 500	1 210	0,004	10 900	11 100	0,04	–	**51104**	**–**
	40	14	21 100	37 500	1 700	0,007	8 500	11 600	0,082	–	**51204**	**–**
	40	14,7	21 100	37 500	1 700	0,007	8 500	11 600	0,081	0,02	**53204**	**U204**
25	42	11	18 100	35 500	1 620	0,006	9 700	9 500	0,055	–	**51105**	**–**
	47	15	26 500	50 000	2 280	0,013	7 500	9 800	0,114	–	**51205**	**–**
	47	16,7	26 500	50 000	2 280	0,013	7 500	9 800	0,121	0,031	**53205**	**U205**
	52	18	34 500	55 000	2 500	0,019	6 000	10 400	0,154	–	**51305**	**–**
	52	19,8	34 500	55 000	2 500	0,019	6 000	10 400	0,203	0,043	**53305**	**U305**
	60	24	43 000	66 000	3 000	0,032	4 700	10 900	0,295	–	**51405**	**–**
30	47	11	18 800	40 000	1 820	0,008	9 300	8 100	0,063	–	**51106**	**–**
	52	16	23 900	46 000	2 100	0,014	7 300	8 600	0,136	–	**51206**	**–**
	52	17,8	23 900	46 000	2 100	0,014	7 300	8 600	0,147	0,032	**53206**	**U206**
	60	21	35 500	65 000	2 950	0,028	5 700	9 300	0,244	–	**51306**	**–**
	60	22,6	35 500	65 000	2 950	0,028	5 700	9 300	0,303	0,055	**53306**	**U306**
	70	28	70 000	112 000	5 200	0,077	3 850	9 100	0,49	–	**51406**	**–**

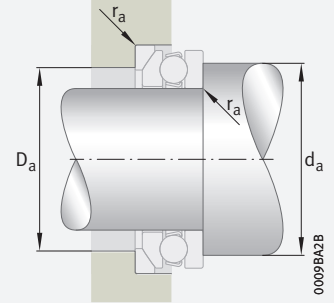
medias *https://www.schaeffler.de/std/1F9A*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

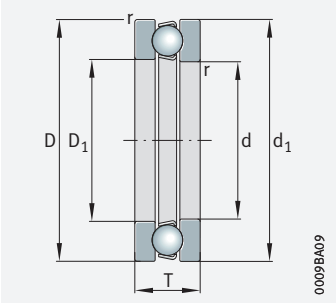


Mounting dimensions

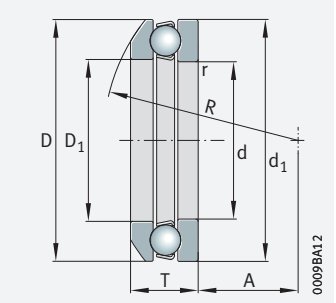
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
10	11	24	0,3	–	–	–	–	–	–	18	16	0,3
	12	26	0,6	–	–	–	–	–	–	20	16	0,6
	12	26	0,6	22	8,5	18	28	3,5	13	20	18	0,6
12	13	26	0,3	–	–	–	–	–	–	20	18	0,3
	14	28	0,6	–	–	–	–	–	–	22	18	0,6
	14	28	0,6	25	11,5	20	30	3,5	13	22	20	0,6
15	16	28	0,3	–	–	–	–	–	–	23	20	0,3
	17	32	0,6	–	–	–	–	–	–	25	22	0,6
	17	32	0,6	28	12	24	35	4	15	25	24	0,6
17	18	30	0,3	–	–	–	–	–	–	25	22	0,3
	19	35	0,6	–	–	–	–	–	–	28	24	0,6
	19	35	0,6	32	16	26	38	4	15	28	26	0,6
20	21	35	0,3	–	–	–	–	–	–	29	26	0,3
	22	40	0,6	–	–	–	–	–	–	32	28	0,6
	22	40	0,6	36	18	30	42	5	17	32	30	0,6
25	26	42	0,6	–	–	–	–	–	–	35	32	0,6
	27	47	0,6	–	–	–	–	–	–	38	34	0,6
	27	47	0,6	40	19	36	50	5,5	19	38	36	0,6
	27	52	1	–	–	–	–	–	–	41	36	1
	27	52	1	45	21	38	55	6	22	41	38	1
	27	60	1	–	–	–	–	–	–	46	39	1
30	32	47	0,6	–	–	–	–	–	–	40	37	0,6
	32	52	0,6	–	–	–	–	–	–	43	39	0,6
	32	52	0,6	45	22	42	55	5,5	20	43	42	0,6
	32	60	1	–	–	–	–	–	–	48	42	1
	32	60	1	50	22	45	62	7	25	48	45	1
	32	70	1	–	–	–	–	–	–	54	46	1

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

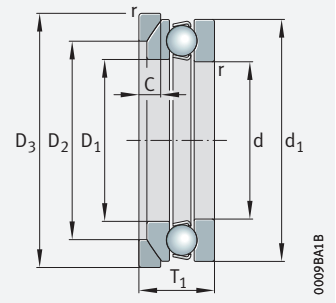


532, 533
Spherical housing locating washer

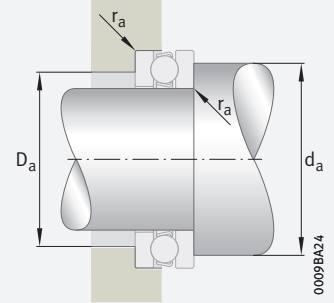
d = 35 – 55 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
35	52	12	20 000	46 500	2 120	0,011	8 800	6 800	0,089	–	**51107**	**–**
	62	18	35 500	67 000	3 100	0,028	6 000	8 000	0,198	–	**51207**	**–**
	62	19,9	35 500	67 000	3 100	0,028	6 000	8 000	0,265	0,057	**53207**	**U207**
	68	24	50 000	89 000	4 050	0,05	4 850	8 200	0,351	–	**51307**	**–**
	68	25,6	50 000	89 000	4 050	0,05	4 850	8 200	0,437	0,082	**53307**	**U307**
	80	32	76 000	126 000	5 700	0,11	3 600	8 500	0,709	–	**51407**	**–**
40	60	13	25 500	62 000	2 850	0,02	7 400	6 400	0,119	–	**51108**	**–**
	68	19	44 000	97 000	4 400	0,05	5 500	6 900	0,257	–	**51208**	**–**
	68	20,3	44 000	97 000	4 400	0,05	5 500	6 900	0,259	0,07	**53208**	**U208**
	78	26	61 000	112 000	5 100	0,081	4 250	7 600	0,536	–	**51308**	**–**
	78	28,5	61 000	112 000	5 100	0,081	4 250	7 600	0,561	0,114	**53308**	**U308**
	90	36	96 000	170 000	7 700	0,18	3 250	7 600	1,03	–	**51408**	**–**
45	65	14	26 500	69 000	3 100	0,025	7 100	5 800	0,15	–	**51109**	**–**
	73	20	39 000	80 000	3 650	0,043	5 500	6 600	0,279	–	**51209**	**–**
	73	21,3	39 000	80 000	3 650	0,043	5 500	6 600	0,278	0,087	**53209**	**U209**
	85	28	75 000	140 000	6 500	0,12	3 800	6 800	0,612	–	**51309**	**–**
	85	30,1	75 000	140 000	6 500	0,12	3 800	6 800	0,783	0,171	**53309**	**U309**
	100	39	123 000	222 000	10 100	0,29	2 850	6 900	1,36	–	**51409**	**–**
50	70	14	27 000	75 000	3 400	0,029	6 800	5 200	0,162	–	**51110**	**–**
	78	22	50 000	106 000	4 850	0,069	4 950	5 700	0,346	–	**51210**	**–**
	78	23,5	50 000	106 000	4 850	0,069	4 950	5 700	0,341	0,098	**53210**	**U210**
	95	31	82 000	169 000	7 700	0,18	3 550	6 400	0,932	–	**51310**	**–**
	95	34,3	82 000	169 000	7 700	0,18	3 550	6 400	0,97	0,22	**53310**	**U310**
	110	43	138 000	255 000	11 700	0,4	2 650	6 500	1,81	–	**51410**	**–**
55	78	16	30 500	75 000	3 400	0,036	6 100	5 200	0,208	–	**51111**	**–**
	90	25	58 000	133 000	6 000	0,11	4 350	5 700	0,382	–	**51211**	**–**
	90	27,3	58 000	133 000	6 000	0,11	4 350	5 700	0,609	0,152	**53211**	**U211**
	105	35	102 000	207 000	9 500	0,26	3 200	6 000	1,3	–	**51311**	**–**
	105	39,3	102 000	207 000	9 500	0,26	3 200	6 000	1,38	0,27	**53311**	**U311**
	120	48	167 000	315 000	14 400	0,59	2 340	6 000	2,83	–	**51411**	**–**

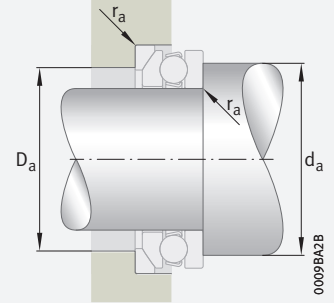
medias *https://www.schaeffler.de/std/1F9A*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

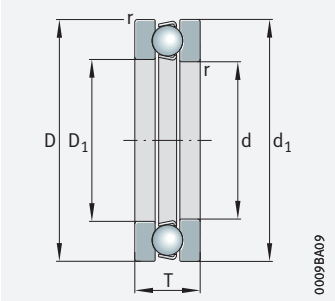


Mounting dimensions

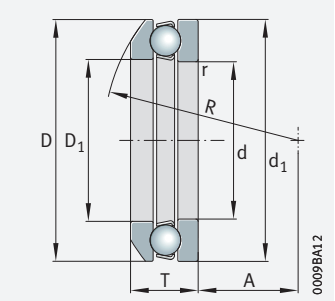
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
35	37	52	0,6	–	–	–	–	–	–	45	42	0,6
	37	62	1	–	–	–	–	–	–	51	46	1
	37	62	1	50	24	48	65	7	22	51	48	1
	37	68	1	–	–	–	–	–	–	55	48	1
	37	68	1	56	24	52	72	7,5	28	55	52	1
	37	80	1,1	–	–	–	–	–	–	62	53	1
40	42	60	0,6	–	–	–	–	–	–	52	48	0,6
	42	68	1	–	–	–	–	–	–	57	51	1
	42	68	1	56	28,5	55	72	7	23	57	55	1
	42	78	1	–	–	–	–	–	–	63	55	1
	42	78	1	64	28	60	82	8,5	31	63	60	1
	42	90	1,1	–	–	–	–	–	–	70	60	1
45	47	65	0,6	–	–	–	–	–	–	57	53	0,6
	47	73	1	–	–	–	–	–	–	62	56	1
	47	73	1	56	26	60	78	7,5	24	62	60	1
	47	85	1	–	–	–	–	–	–	69	61	1
	47	85	1	64	25	65	90	10	33	69	65	1
	47	100	1,1	–	–	–	–	–	–	78	67	1
50	52	70	0,6	–	–	–	–	–	–	62	58	0,6
	52	78	1	–	–	–	–	–	–	67	61	1
	52	78	1	64	32,5	62	82	7,5	26	67	62	1
	52	95	1,1	–	–	–	–	–	–	77	68	1
	52	95	1,1	72	28	72	100	11	37	77	72	1
	52	110	1,5	–	–	–	–	–	–	86	74	1,5
55	57	78	0,6	–	–	–	–	–	–	69	64	0,6
	57	90	1	–	–	–	–	–	–	76	69	1
	57	90	1	72	35	72	95	9	30	76	72	1
	57	105	1,1	–	–	–	–	–	–	85	75	1
	57	105	1,1	80	30	80	110	11,5	42	85	80	1
	57	120	1,5	–	–	–	–	–	–	94	81	1,5

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

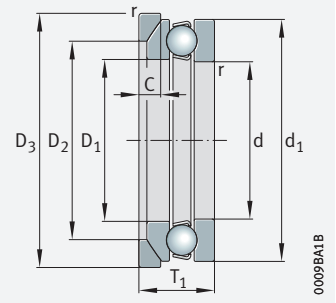


532, 533
Spherical housing locating washer

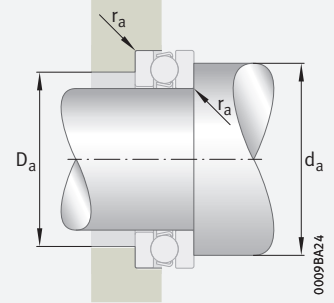
d = 60 – 80 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T	dyn. C_a N	stat. C_{0a} N	C_{ua} N	A	n_G min^{-1}	$n_{\vartheta r}$ min^{-1}	Bearing ≈ kg	Support washer ≈ kg	Bearing	Support washer
60	85	17	41 500	113 000	5 200	0,065	5 500	4 650	0,278	–	**51112**	**–**
	95	26	62 000	139 000	6 300	0,12	4 200	5 300	0,649	–	**51212**	**–**
	95	28	62 000	139 000	6 300	0,12	4 200	5 300	0,655	0,163	**53212**	**U212**
	110	35	101 000	207 000	9 500	0,28	3 150	5 700	1,36	–	**51312**	**–**
	110	38,3	101 000	207 000	9 500	0,28	3 150	5 700	1,41	0,31	**53312**	**U312**
	130	51	201 000	395 000	18 200	0,87	2 190	5 500	3,57	–	**51412-MP**	**–**
65	90	18	38 500	100 000	4 550	0,063	5 300	4 450	0,3	–	**51113**	**–**
	100	27	64 000	149 000	6 800	0,14	4 100	4 900	0,684	–	**51213**	**–**
	100	28,7	64 000	149 000	6 800	0,14	4 100	4 900	0,855	0,183	**53213**	**U213**
	115	36	105 000	220 000	10 000	0,32	3 050	5 300	1,39	–	**51313**	**–**
	115	39,4	105 000	220 000	10 000	0,32	3 050	5 300	1,78	0,34	**53313**	**U313**
	140	56	217 000	450 000	20 500	1,1	2 050	5 200	4,47	–	**51413-MP**	**–**
70	95	18	40 000	110 000	5 000	0,074	5 100	4 100	0,352	–	**51114**	**–**
	105	27	66 000	159 000	7 200	0,16	4 000	4 550	0,727	–	**51214**	**–**
	105	28,8	66 000	159 000	7 200	0,16	4 000	4 550	0,903	0,185	**53214**	**U214**
	125	40	134 000	290 000	13 300	0,51	2 750	4 950	1,9	–	**51314**	**–**
	125	44,2	134 000	290 000	13 300	0,51	2 750	4 950	2,09	0,4	**53314**	**U314**
	150	60	222 000	500 000	21 700	1,4	1 920	5 000	5,49	–	**51414-MP**	**–**
75	100	19	44 500	123 000	5 600	0,093	4 800	3 800	0,365	–	**51115**	**–**
	110	27	67 000	169 000	7 700	0,18	3 950	4 300	0,825	–	**51215**	**–**
	110	28,3	67 000	169 000	7 700	0,18	3 950	4 300	1,01	0,21	**53215**	**U215**
	135	44	163 000	360 000	15 900	0,75	2 480	4 650	2,59	–	**51315**	**–**
	135	48,1	163 000	360 000	15 900	0,75	2 480	4 650	3,19	0,54	**53315**	**U315**
	160	65	238 000	560 000	23 400	1,8	1 810	4 750	6,82	–	**51415-MP**	**–**
80	105	19	45 000	129 000	5 900	0,1	4 650	3 600	0,384	–	**51116**	**–**
	115	28	75 000	191 000	8 800	0,23	3 700	3 950	0,908	–	**51216**	**–**
	115	29,5	75 000	191 000	8 800	0,23	3 700	3 950	0,903	0,22	**53216**	**U216**
	140	44	160 000	360 000	15 500	0,79	2 460	4 450	2,69	–	**51316**	**–**
	140	47,6	160 000	360 000	15 500	0,79	2 460	4 450	2,75	0,56	**53316**	**U316**
	170	68	270 000	620 000	25 500	2,2	1 710	4 550	7,97	–	**51416-MP**	**–**

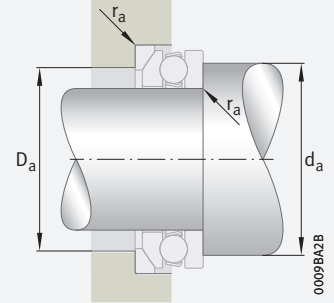
medias *https://www.schaeffler.de/std/1F9A*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

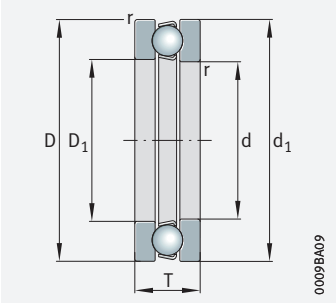


Mounting dimensions

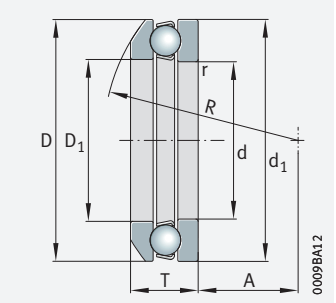
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
60	62	85	1	–	–	–	–	–	–	75	70	1
	62	95	1	–	–	–	–	–	–	81	74	1
	62	95	1	72	32,5	78	100	9	31	81	78	1
	62	110	1,1	–	–	–	–	–	–	90	80	1
	62	110	1,1	90	41	85	115	11,5	42	90	85	1
	62	130	1,5	–	–	–	–	–	–	102	88	1,5
65	67	90	1	–	–	–	–	–	–	80	75	1
	67	100	1	–	–	–	–	–	–	86	79	1
	67	100	1	80	40	82	105	9	32	86	82	1
	67	115	1,1	–	–	–	–	–	–	95	85	1
	67	115	1,1	90	38,5	90	120	12,5	43	95	90	1
	68	140	2	–	–	–	–	–	–	110	95	2
70	72	95	1	–	–	–	–	–	–	85	80	1
	72	105	1	–	–	–	–	–	–	91	84	1
	72	105	1	80	38	88	110	9	32	91	88	1
	72	125	1,1	–	–	–	–	–	–	103	92	1
	72	125	1,1	100	43	98	130	13	48	103	98	1
	73	150	2	–	–	–	–	–	–	118	102	2
75	77	100	1	–	–	–	–	–	–	90	85	1
	77	110	1	–	–	–	–	–	–	96	89	1
	77	110	1	90	49	92	115	9,5	32	96	92	1
	77	135	1,5	–	–	–	–	–	–	111	99	1,5
	77	135	1,5	100	37	105	140	15	52	111	105	1,5
	78	160	2	–	–	–	–	–	–	126	109	2
80	82	105	1	–	–	–	–	–	–	95	90	1
	82	115	1	–	–	–	–	–	–	101	94	1
	82	115	1	90	46	98	120	10	33	101	98	1
	82	140	1,5	–	–	–	–	–	–	116	104	1,5
	82	140	1,5	112	50	110	145	15	52	116	110	1,5
	83	170	2,1	–	–	–	–	–	–	134	116	2,1

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

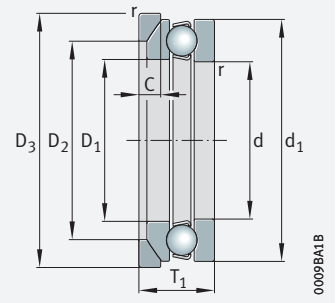


532, 533
Spherical housing locating washer

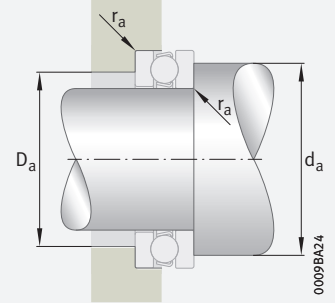
d = 85 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T	dyn. C_a N	stat. C_{0a} N	C_{ua} N	A	n_G min^{-1}	$n_{\vartheta r}$ min^{-1}	Bearing ≈ kg	Support washer ≈ kg	Bearing	Support washer
85	110	19	45 500	134 000	6 200	0,11	4 500	3 400	0,404	–	**51117**	**–**
	125	31	98 000	250 000	11 200	0,37	3 250	3 850	1,21	–	**51217**	**–**
	125	33,1	98 000	250 000	11 200	0,37	3 250	3 850	1,22	0,29	**53217**	**U217**
	150	49	186 000	420 000	17 700	1,1	2 260	4 250	3,48	–	**51317**	**–**
	150	53,1	186 000	420 000	17 700	1,1	2 260	4 250	3,51	0,8	**53317**	**U317**
	180	72	305 000	750 000	30 000	3	1 620	4 250	9,3	–	**51417-MP**	**–**
90	120	22	45 500	140 000	6 300	0,12	4 300	3 500	0,617	–	**51118**	**–**
	135	35	119 000	300 000	13 000	0,54	2 900	3 750	1,66	–	**51218**	**–**
	135	38,5	119 000	300 000	13 000	0,54	2 900	3 750	1,7	0,42	**53218**	**U218**
	155	50	193 000	455 000	18 800	1,2	2 240	4 050	3,75	–	**51318**	**–**
	155	54,6	193 000	455 000	18 800	1,2	2 240	4 050	3,81	0,82	**53318**	**U318**
	190	77	325 000	830 000	32 000	3,7	1 540	4 100	11,2	–	**51418-MP**	**–**
100	135	25	85 000	270 000	11 300	0,36	3 500	3 100	0,992	–	**51120**	**–**
	150	38	119 000	325 000	13 300	0,68	2 700	3 600	2,21	–	**51220**	**–**
	150	40,9	119 000	325 000	13 300	0,68	2 700	3 600	2,23	0,5	**53220**	**U220**
	170	55	238 000	580 000	23 200	1,9	1 970	3 650	4,94	–	**51320**	**–**
	170	59,2	238 000	580 000	23 200	1,9	1 970	3 650	4,99	0,93	**53320**	**U320**
	210	85	375 000	1 060 000	38 500	6	1 350	3 650	15	–	**51420-MP**	**–**
110	145	25	87 000	290 000	11 600	0,42	3 350	2 800	1,08	–	**51122**	**–**
	160	38	126 000	365 000	14 400	0,83	2 650	3 250	2,28	–	**51222**	**–**
	160	40,2	126 000	365 000	14 400	0,83	2 650	3 250	2,24	0,56	**53222**	**U222**
	190	63	280 000	740 000	28 000	3	1 790	3 400	7,85	–	**51322-MP**	**–**
	190	67,2	280 000	740 000	28 000	3	1 790	3 400	7,85	1,26	**53322-MP**	**U322**
	230	95	405 000	1 130 000	39 500	7,1	1 300	3 400	20	–	**51422-MP**	**–**
120	155	25	89 000	310 000	12 000	0,49	3 200	2 600	1,16	–	**51124**	**–**
	170	39	128 000	385 000	14 600	0,94	2 550	3 000	2,66	–	**51224**	**–**
	170	40,8	128 000	385 000	14 600	0,94	2 550	3 000	2,58	0,65	**53224**	**U224**
	210	70	325 000	910 000	32 500	4,4	1 610	3 200	10,7	–	**51324-MP**	**–**
	210	74,1	325 000	910 000	32 500	4,4	1 610	3 200	10,6	2,01	**53324-MP**	**U324**
	250	102	455 000	1 340 000	45 000	10	1 180	3 050	25,4	–	**51424-MP**	**–**

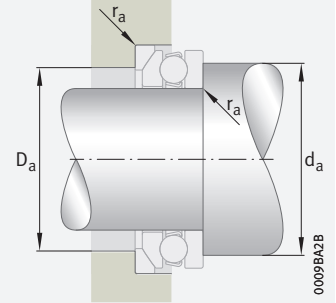
medias *https://www.schaeffler.de/std/1F9A*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

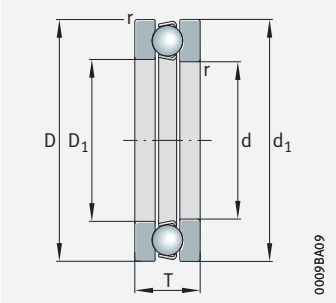


Mounting dimensions

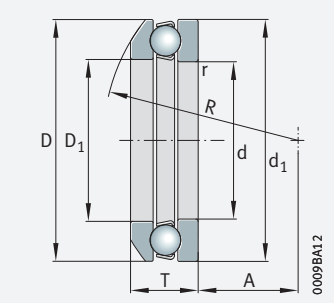
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
85	87	110	1	–	–	–	–	–	–	100	95	1
	88	125	1	–	–	–	–	–	–	109	101	1
	88	125	1	100	52	105	130	11	37	109	105	1
	88	150	1,5	–	–	–	–	–	–	124	111	1,5
	88	150	1,5	112	43	115	155	17,5	58	124	115	1,5
	88	177	2,1	–	–	–	–	–	–	142	123	2,1
90	92	120	1	–	–	–	–	–	–	108	102	1
	93	135	1,1	–	–	–	–	–	–	117	108	1
	93	135	1,1	100	45	110	140	13,5	42	117	110	1
	93	155	1,5	–	–	–	–	–	–	129	116	1,5
	93	155	1,5	112	40	120	160	18	59	129	120	1,5
	93	187	2,1	–	–	–	–	–	–	150	130	2,1
100	102	135	1	–	–	–	–	–	–	121	114	1
	103	150	1,1	–	–	–	–	–	–	130	120	1
	103	150	1,1	112	52	125	155	14	45	130	125	1
	103	170	1,5	–	–	–	–	–	–	142	128	1,5
	103	170	1,5	125	46	135	175	18	64	142	135	1,5
	103	205	3	–	–	–	–	–	–	166	144	2,5
110	112	145	1	–	–	–	–	–	–	131	124	1
	113	160	1,1	–	–	–	–	–	–	140	130	1
	113	160	1,1	125	65	135	165	14	45	140	135	1
	113	187	2	–	–	–	–	–	–	158	142	2
	113	187	2	140	51	150	195	20,5	72	158	150	2
	113	225	3	–	–	–	–	–	–	182	158	2,5
120	122	155	1	–	–	–	–	–	–	141	134	1
	123	170	1,1	–	–	–	–	–	–	150	140	1
	123	170	1,1	125	61	145	175	15	46	150	145	1
	123	205	2,1	–	–	–	–	–	–	174	156	2,1
	123	205	2,1	160	63	165	220	22	80	174	165	2,1
	123	245	4	–	–	–	–	–	–	198	172	3

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

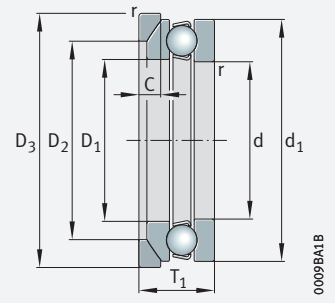


532, 533
Spherical housing locating washer

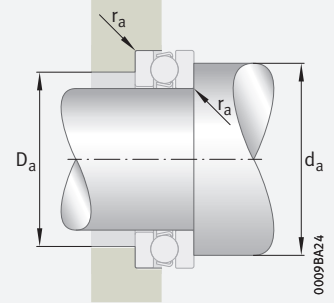
d = 130 – 180 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
130	170	30	111 000	390 000	14 600	0,76	2 850	2 490	1,75	–	**51126**	**–**
	190	45	184 000	540 000	19 500	1,7	2 210	2 850	3,96	–	**51226**	**–**
	190	47,9	184 000	540 000	19 500	1,7	2 210	2 850	3,9	0,9	**53226**	**U226**
	225	75	360 000	1 050 000	36 000	5,9	1 490	2 950	13	–	**51326-MP**	**–**
	270	110	560 000	1 750 000	57 000	16	1 030	2 650	32	–	**51426-MP**	**–**
140	180	31	111 000	400 000	14 600	0,83	2 750	2 330	1,9	–	**51128**	**–**
	200	46	191 000	570 000	19 800	1,9	2 110	2 700	4,3	–	**51228**	**–**
	200	48,6	191 000	570 000	19 800	1,9	2 110	2 700	4,25	1,22	**53228**	**U228**
	240	80	385 000	1 240 000	41 000	8,2	1 360	2 700	15,6	–	**51328-MP**	**–**
	240	84,9	385 000	1 240 000	41 000	8,2	1 360	2 700	15,5	2,92	**53328-MP**	**U328**
150	190	31	109 000	400 000	14 200	0,89	2 650	2 200	2,17	–	**51130-MP**	**–**
	215	50	236 000	730 000	24 900	2,9	1 950	2 500	6,08	–	**51230-MP**	**–**
	215	53,3	236 000	730 000	24 900	2,9	1 950	2 500	5,95	1,69	**53230-MP**	**U230**
	250	80	395 000	1 330 000	43 000	9,3	1 340	2 480	16,2	–	**51330-MP**	**–**
	250	83,7	395 000	1 330 000	43 000	9,3	1 340	2 480	12,8	3,11	**53330-MP**	**U330**
160	200	31	112 000	425 000	14 600	1	2 550	2 060	2,29	–	**51132-MP**	**–**
	225	51	240 000	770 000	25 500	3,2	1 900	2 350	6,53	–	**51232-MP**	**–**
	225	54,7	240 000	770 000	25 500	3,2	1 900	2 350	6,45	1,8	**53232-MP**	**U232**
	270	87	445 000	1 560 000	48 500	13	1 230	2 280	21,2	–	**51332-MP**	**–**
	270	91,7	445 000	1 560 000	48 500	13	1 230	2 280	20,8	4	**53332-MP**	**U332**
170	215	34	127 000	510 000	16 700	1,4	2 330	2 010	3,02	–	**51134-MP**	**–**
	240	55	285 000	930 000	29 500	4,5	1 740	2 230	8,12	–	**51234-MP**	**–**
	240	58,7	285 000	930 000	29 500	4,5	1 740	2 230	7,91	2,14	**53234-MP**	**U234**
	280	87	440 000	1 560 000	47 500	13	1 220	2 170	22,2	–	**51334-MP**	**–**
	280	91,3	440 000	1 560 000	47 500	13	1 220	2 170	21,6	4,42	**53334-MP**	**U334**
180	225	34	127 000	520 000	16 800	1,5	2 250	1 910	3,06	–	**51136-MP**	**–**
	250	56	305 000	1 030 000	32 500	5,4	1 670	2 080	8,56	–	**51236-MP**	**–**
	250	58,2	305 000	1 030 000	32 500	5,4	1 670	2 080	8,19	2,33	**53236-MP**	**U236**
	300	95	520 000	1 830 000	54 000	18	1 130	2 000	24,8	–	**51336-MP**	**–**
	300	99,3	520 000	1 830 000	54 000	18	1 130	2 000	24,1	5,32	**53336-MP**	**U336**

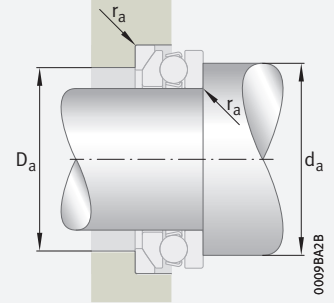
medias *https://www.schaeffler.de/std/1F9A*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

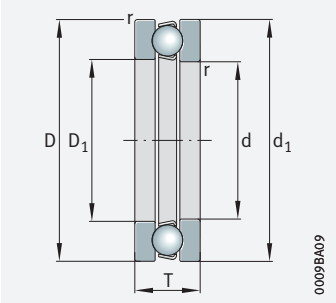


Mounting dimensions

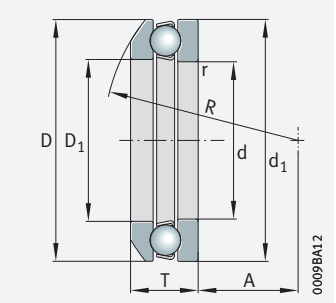
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
130	132	170	1	–	–	–	–	–	–	154	146	1
	133	187	1,5	–	–	–	–	–	–	166	154	1,5
	133	187	1,5	140	67	160	195	17	53	166	160	1,5
	134	220	2,1	–	–	–	–	–	–	187	168	2,1
	134	265	4	–	–	–	–	–	–	214	186	3
140	142	178	1	–	–	–	–	–	–	164	156	1
	143	197	1,5	–	–	–	–	–	–	176	164	1,5
	143	197	1,5	160	87	170	210	17	55	176	170	1,5
	144	235	2,1	–	–	–	–	–	–	200	180	2,1
	144	235	2,1	180	68	190	250	26	92	200	190	2,1
150	152	188	1	–	–	–	–	–	–	174	166	1
	153	212	1,5	–	–	–	–	–	–	189	176	1,5
	153	212	1,5	160	79	180	225	20,5	60	189	180	1,5
	154	245	2,1	–	–	–	–	–	–	210	190	2,1
	154	245	2,1	200	89,5	200	260	26	92	210	200	2,1
160	162	198	1	–	–	–	–	–	–	184	176	1
	163	222	1,5	–	–	–	–	–	–	199	186	1,5
	163	222	1,5	160	74	190	235	21	61	199	190	1,5
	164	265	3	–	–	–	–	–	–	226	204	2,5
	164	265	3	200	77	215	280	29	100	226	215	2,5
170	172	213	1,1	–	–	–	–	–	–	197	188	1
	173	237	1,5	–	–	–	–	–	–	212	198	1,5
	173	237	1,5	180	91	200	250	21,5	65	212	200	1,5
	174	275	3	–	–	–	–	–	–	236	214	2,5
	174	275	3	225	105	220	290	29	100	236	220	2,5
180	183	222	1,1	–	–	–	–	–	–	207	198	1
	183	245	1,5	–	–	–	–	–	–	222	208	1,5
	183	245	1,5	200	112	210	260	21,5	66	222	210	1,5
	184	295	3	–	–	–	–	–	–	252	228	2,5
	184	295	3	225	91	240	310	32	109	252	240	2,5

Axial deep groove ball bearings

Single direction



511, 512, 513

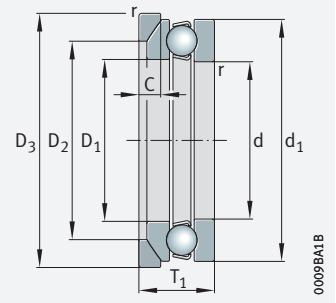


532, 533
Spherical housing locating washer

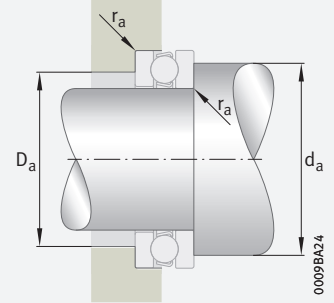
d = 190 – 260 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
190	240	37	161 000	650 000	20 200	2,3	2 040	1 850	4,06	–	**51138-MP**	**–**
	270	62	335 000	1 170 000	35 500	7,2	1 540	2 010	11,6	–	**51238-MP**	**–**
	270	65,7	335 000	1 170 000	35 500	7,2	1 540	2 010	11,5	2,63	**53238-MP**	**U238**
	320	105	590 000	2 170 000	63 000	24	1 040	1 840	36,7	–	**51338-MP**	**–**
	320	111	590 000	2 170 000	63 000	24	1 040	1 840	36,5	6,16	**53338-MP**	**U338**
200	250	37	162 000	670 000	20 400	2,5	1 980	1 760	4,12	–	**51140-MP**	**–**
	280	62	340 000	1 220 000	36 000	7,8	1 510	1 890	12	–	**51240-MP**	**–**
	280	65,3	340 000	1 220 000	36 000	7,8	1 510	1 890	11,8	2,79	**53240-MP**	**U240**
220	270	37	168 000	730 000	21 300	3	1 870	1 600	4,54	–	**51144-MP**	**–**
	300	63	335 000	1 330 000	37 500	9,6	1 420	1 690	13,1	–	**51244-MP**	**–**
	300	65,6	335 000	1 330 000	37 500	9,6	1 420	1 690	13,1	3,31	**53244-MP**	**U244**
240	300	45	237 000	990 000	27 500	5,2	1 640	1 540	7,41	–	**51148-MP**	**–**
260	320	45	245 000	1 070 000	29 000	6,1	1 560	1 390	7,89	–	**51152-MP**	**–**

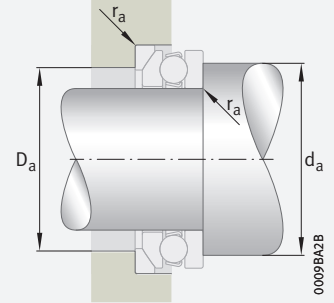
medias *https://www.schaeffler.de/std/1F9A*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

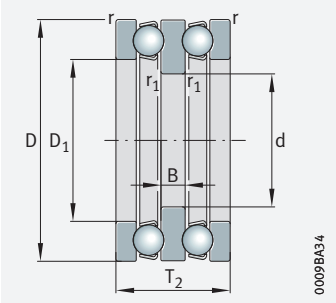


Mounting dimensions

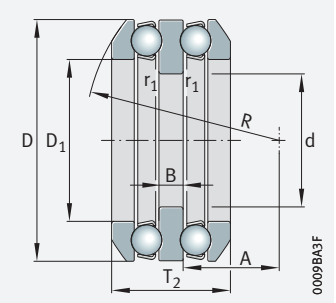
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
190	193	237	1,1	–	–	–	–	–	–	220	210	1
	194	265	2	–	–	–	–	–	–	238	222	2
	195	265	2	200	98	230	280	23	73	238	230	2
	195	315	4	–	–	–	–	–	–	268	242	3
	195	315	4	250	104	255	330	33	121	268	255	3
200	203	247	1,1	–	–	–	–	–	–	230	220	1
	204	275	2	–	–	–	–	–	–	248	232	2
	204	275	2	225	125	240	290	23	74	248	240	2
220	223	267	1,1	–	–	–	–	–	–	250	240	1
	224	295	2	–	–	–	–	–	–	268	252	2
	224	295	2	225	118	260	310	25	75	268	260	2
240	243	297	1,5	–	–	–	–	–	–	276	264	1,5
260	263	317	1,5	–	–	–	–	–	–	296	284	1,5

Axial deep groove ball bearings

Double direction



522, 523

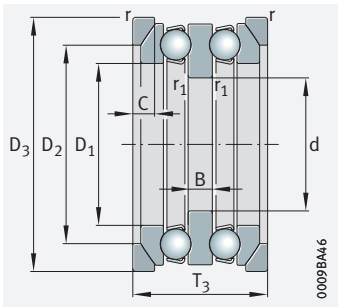


542, 543
Spherical housing locating washers

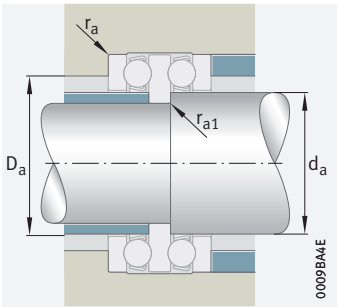
d = 10 – 40 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T_2	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
10	32	22	16 600	24 800	1 130	0,003	9 800	13 700	0,085	–	**52202**	**–**
15	40	26	21 100	37 500	1 700	0,007	8 500	11 100	0,15	–	**52204**	**–**
20	47	28	26 500	50 000	2 280	0,013	7 500	9 400	0,23	–	**52205**	**–**
	47	31,4	26 500	50 000	2 280	0,013	7 500	9 400	0,221	0,031	**54205**	**U205**
	52	34	34 500	55 000	2 500	0,019	6 000	9 700	0,29	–	**52305**	**–**
	52	37,6	34 500	55 000	2 500	0,019	6 000	9 700	0,303	0,043	**54305**	**U305**
	70	52	70 000	112 000	5 200	0,077	3 850	8 700	0,912	–	**52406**	**–**
25	52	29	23 900	46 000	2 100	0,014	7 300	8 200	0,249	–	**52206**	**–**
	52	32,6	23 900	46 000	2 100	0,014	7 300	8 200	0,269	0,032	**54206**	**U206**
	60	38	35 500	65 000	2 950	0,028	5 700	8 600	0,435	–	**52306**	**–**
	60	41,2	35 500	65 000	2 950	0,028	5 700	8 600	0,553	0,055	**54306**	**U306**
	80	59	76 000	126 000	5 700	0,11	3 600	8 000	1,44	–	**52407**	**–**
30	62	34	35 500	67 000	3 100	0,028	6 000	7 500	0,405	–	**52207**	**–**
	62	37,8	35 500	67 000	3 100	0,028	6 000	7 500	0,423	0,082	**54207**	**U207**
	68	36	44 000	97 000	4 400	0,05	5 500	6 900	0,54	–	**52208**	**–**
	68	44	50 000	89 000	4 050	0,05	4 850	7 600	0,63	–	**52307**	**–**
	68	38,6	44 000	97 000	4 400	0,05	5 500	6 900	0,513	0,07	**54208**	**U208**
	68	47,2	50 000	89 000	4 050	0,05	4 850	7 600	0,683	0,082	**54307**	**U307**
	78	49	61 000	112 000	5 100	0,081	4 250	7 200	1,02	–	**52308**	**–**
	78	54	61 000	112 000	5 100	0,081	4 250	7 200	1,1	0,114	**54308**	**U308**
	90	65	96 000	170 000	7 700	0,18	3 250	7 100	2,03	–	**52408**	**–**
35	73	37	39 000	80 000	3 650	0,043	5 500	6 500	0,58	–	**52209**	**–**
	73	39,6	39 000	80 000	3 650	0,043	5 500	6 500	0,537	0,087	**54209**	**U209**
	85	52	75 000	140 000	6 500	0,12	3 800	6 500	1,24	–	**52309**	**–**
	85	56,2	75 000	140 000	6 500	0,12	3 800	6 500	1,28	0,171	**54309**	**U309**
	100	72	123 000	222 000	10 100	0,29	2 850	6 500	2,71	–	**52409**	**–**
40	78	39	50 000	106 000	4 850	0,069	4 950	5 800	0,684	–	**52210**	**–**
	78	42	50 000	106 000	4 850	0,069	4 950	5 800	0,625	0,098	**54210**	**U210**
	95	58	82 000	169 000	7 700	0,18	3 550	6 100	1,76	–	**52310**	**–**
	95	64,6	82 000	169 000	7 700	0,18	3 550	6 100	1,84	0,22	**54310**	**U310**
	110	78	138 000	255 000	11 700	0,4	2 650	6 000	3,56	–	**52410**	**–**

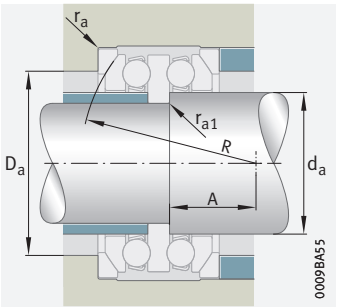
medias *https://www.schaeffler.de/std/1F9A*



542, 543
Spherical housing locating washers
Support washers U2, U3



Mounting dimensions

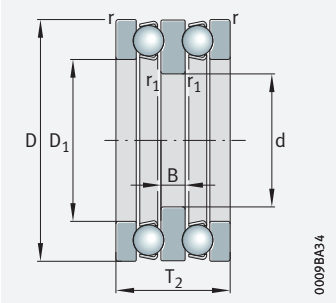


Mounting dimensions

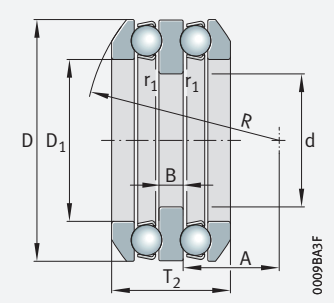
Dimensions											Mounting dimensions			
d	D_1	B	r min.	r_1 min.	R	A	D_2	D_3	C	T_3	d_a	D_a max.	r_a max.	r_{a1} max.
10	17	5	0,6	0,3	–	–	–	–	–	–	15	22	0,6	0,3
15	22	6	0,6	0,3	–	–	–	–	–	–	20	28	0,6	0,3
20	27	7	0,6	0,3	–	–	–	–	–	–	25	34	0,6	0,3
	27	7	0,6	0,3	40	16,5	36	50	5,5	36	25	36	0,6	0,3
	27	8	1	0,3	–	–	–	–	–	–	25	36	1	0,3
	27	8	1	0,3	45	18	42	55	6	38	25	38	1	0,3
	32	12	1	0,6	–	–	–	–	–	–	30	46	1	0,6
25	32	7	0,6	0,3	–	–	–	–	–	–	30	39	0,6	0,3
	32	7	0,6	0,3	45	20	37	55	5,5	42	30	42	0,6	0,3
	32	9	1	0,3	–	–	–	–	–	–	30	42	1	0,3
	32	9	1	0,3	50	19,5	46	62	7	45	30	45	1	0,3
	37	14	1,1	0,6	–	–	–	–	–	–	35	53	1	0,6
30	37	8	1	0,3	–	–	–	–	–	–	35	46	1	0,3
	37	8	1	0,3	50	21	42	72	7,5	52	35	48	1	0,3
	42	9	1	0,6	–	–	–	–	–	–	40	51	1	0,6
	37	10	1	0,3	–	–	–	–	–	–	35	48	1	0,3
	42	9	1	0,6	56	25	44	72	7	55	40	55	1	0,6
	37	10	1	0,3	56	21	52	72	7,5	52	35	52	1	0,3
	42	12	1	0,6	–	–	–	–	–	–	40	55	1	0,6
	42	12	1	0,6	64	23,5	59	82	8,5	60	40	60	1	0,6
	42	15	1,1	0,6	–	–	–	–	–	–	40	60	1	0,6
35	47	9	1	0,6	–	–	–	–	–	–	45	56	1	0,6
	47	9	1	0,6	56	23	45	78	7,5	60	45	60	1	0,6
	47	12	1	0,6	–	–	–	–	–	–	45	61	1	0,6
	47	12	1	0,6	64	21	62	90	10	65	45	65	1	0,6
	47	17	1,1	0,6	–	–	–	–	–	–	45	67	1	0,6
40	52	9	1	0,6	–	–	–	–	–	–	50	61	1	0,6
	52	9	1	0,6	64	30,5	47	82	7,5	62	50	62	1	0,6
	52	14	1,1	0,6	–	–	–	–	–	–	50	68	1	0,6
	52	14	1,1	0,6	72	23	70	100	11	72	50	72	1	0,6
	52	18	1,5	0,6	–	–	–	–	–	–	50	74	1,5	0,6

Axial deep groove ball bearings

Double direction



522, 523

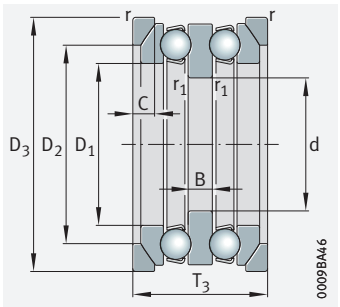


542, 543
Spherical housing locating washers

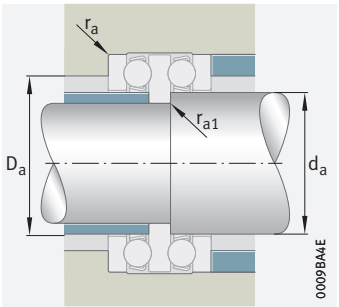
d = 45 – 70 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T_2	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
45	90	45	58 000	133 000	6 000	0,11	4 350	5 600	1,05	–	**52211**	**–**
	90	49,6	58 000	133 000	6 000	0,11	4 350	5 600	1,02	0,152	**54211**	**U211**
	105	64	102 000	207 000	9 500	0,26	3 200	5 700	2,37	–	**52311**	**–**
	105	72,6	102 000	207 000	9 500	0,26	3 200	5 700	2,53	0,27	**54311**	**U311**
	120	87	167 000	315 000	14 400	0,59	2 340	5 600	4,7	–	**52411**	**–**
50	95	46	62 000	139 000	6 300	0,12	4 200	5 200	1,1	–	**52212**	**–**
	95	50	62 000	139 000	6 300	0,12	4 200	5 200	1,17	0,163	**54212**	**U212**
	110	64	101 000	207 000	9 500	0,28	3 150	5 400	2,49	–	**52312**	**–**
	110	70,6	101 000	207 000	9 500	0,28	3 150	5 400	2,59	0,31	**54312**	**U312**
	115	70,6	101 000	207 000	9 500	0,28	3 150	5 800	2,98	0,34	**54313**	**U313**
55	100	47	64 000	149 000	6 800	0,14	4 100	4 800	1,28	–	**52213**	**–**
	100	50,4	64 000	149 000	6 800	0,14	4 100	4 800	1,53	0,183	**54213**	**U213**
	105	47	66 000	159 000	7 200	0,16	4 000	4 750	1,4	–	**52214**	**–**
	105	50,6	66 000	159 000	7 200	0,16	4 000	4 750	1,46	0,185	**54214**	**U214**
	115	65	105 000	220 000	10 000	0,32	3 050	5 000	2,68	–	**52313**	**–**
	125	72	134 000	290 000	13 300	0,51	2 750	4 800	3,55	–	**52314**	**–**
	125	80,4	134 000	290 000	13 300	0,51	2 750	4 800	3,77	0,4	**54314**	**U314**
60	110	47	67 000	169 000	7 700	0,18	3 950	4 450	1,45	–	**52215**	**–**
	110	49,6	67 000	169 000	7 700	0,18	3 950	4 450	1,87	0,21	**54215**	**U215**
	135	79	163 000	360 000	15 900	0,75	2 480	4 500	4,72	–	**52315**	**–**
	135	87,2	163 000	360 000	15 900	0,75	2 480	4 500	4,98	0,54	**54315**	**U315**
65	115	48	75 000	191 000	8 800	0,23	3 700	4 150	1,55	–	**52216**	**–**
	115	51	75 000	191 000	8 800	0,23	3 700	4 150	1,6	0,22	**54216**	**U216**
	140	79	160 000	360 000	15 500	0,79	2 460	4 350	4,82	–	**52316**	**–**
	140	86,2	160 000	360 000	15 500	0,79	2 460	4 350	5,22	0,56	**54316**	**U316**
70	125	55	98 000	250 000	11 200	0,37	3 250	3 950	2,23	–	**52217**	**–**
	125	59,2	98 000	250 000	11 200	0,37	3 250	3 950	2,25	0,29	**54217**	**U217**
	150	87	186 000	420 000	17 700	1,1	2 260	4 150	6,2	–	**52317**	**–**
	150	95,2	186 000	420 000	17 700	1,1	2 260	4 150	6,41	0,8	**54317**	**U317**

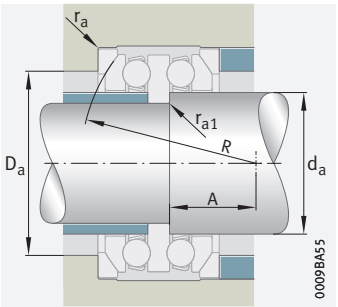
medias *https://www.schaeffler.de/std/1F9A*



542, 543
Spherical housing locating washers
Support washers U2, U3



Mounting dimensions

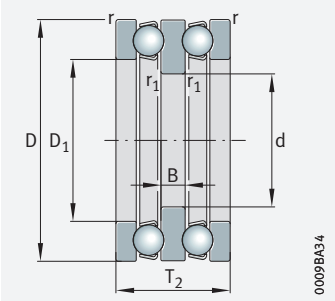


Mounting dimensions

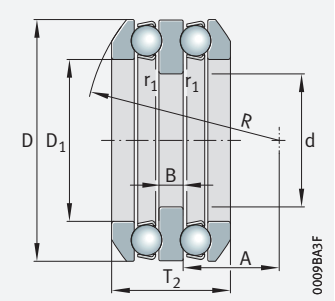
Dimensions											Mounting dimensions			
d	D_1	B	r min.	r_1 min.	R	A	D_2	D_3	C	T_3	d_a	D_a max.	r_a max.	r_{a1} max.
45	57	10	1	0,6	–	–	–	–	–	–	55	69	1	0,6
	57	10	1	0,6	72	32,5	55	95	9	72	55	72	1	0,6
	57	15	1,1	0,6	–	–	–	–	–	–	55	75	1	0,6
	57	15	1,1	0,6	80	25,5	78	110	11,5	80	55	80	1	0,6
	57	20	1,5	0,6	–	–	–	–	–	–	55	81	1,5	0,6
50	62	10	1	0,6	–	–	–	–	–	–	60	74	1	0,6
	62	10	1	0,6	72	30,5	56	100	9	78	60	78	1	0,6
	62	15	1,1	0,6	–	–	–	–	–	–	60	80	1	0,6
	62	15	1,1	0,6	90	36,5	78	115	11,5	85	60	85	1	0,6
	67	15	1,1	0,6	90	34,5	79	120	12,5	90	60	85	1	0,6
55	67	10	1	0,6	–	–	–	–	–	–	65	79	1	0,6
	67	10	1	0,6	80	38,5	57	105	9	82	65	82	1	0,6
	72	10	1	1	–	–	–	–	–	–	70	84	1	1
	72	10	1	1	80	36,5	57	110	9	88	70	88	1	1
	67	15	1,1	0,6	–	–	–	–	–	–	65	85	1	0,6
	72	16	1,1	1	–	–	–	–	–	–	70	92	1	1
	72	16	1,1	1	100	39	88	130	13	98	70	98	1	1
60	77	10	1	1	–	–	–	–	–	–	75	89	1	1
	77	10	1	1	90	47,5	57	115	9,5	92	75	92	1	1
	77	18	1,5	1	–	–	–	–	–	–	75	99	1,5	1
	77	18	1,5	1	100	32,5	95	140	15	105	75	105	1,5	1
65	82	10	1	1	–	–	–	–	–	–	80	94	1	1
	82	10	1	1	90	45	58	120	10	98	80	98	1	1
	82	18	1,5	1	–	–	–	–	–	–	80	104	1,5	1
	82	18	1,5	1	112	45,5	95	145	15	110	80	110	1,5	1
70	88	12	1	1	–	–	–	–	–	–	85	101	1	1
	88	12	1	1	100	49,5	67	130	11	105	85	105	1	1
	88	19	1,5	1	–	–	–	–	–	–	85	111	1,5	1
	88	19	1,5	1	112	39	105	155	17,5	115	85	115	1,5	1

Axial deep groove ball bearings

Double direction



522, 523

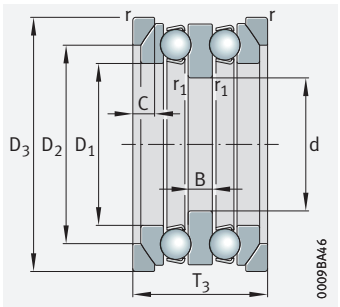


542, 543
Spherical housing locating washers

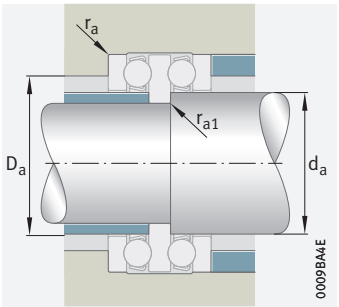
d = 75 – 130 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T_2	dyn. C_a N	stat. C_{0a} N	C_{ua} N	A	n_G min^{-1}	$n_{\vartheta r}$ min^{-1}	Bearing ≈ kg	Support washer ≈ kg	Bearing	Support washer
75	135	62	119 000	300 000	13 000	0,54	2 900	3 800	3,05	–	**52218**	**–**
	135	69	119 000	300 000	13 000	0,54	2 900	3 800	3,11	0,42	**54218**	**U218**
	155	88	193 000	455 000	18 800	1,2	2 240	3 900	6,62	–	**52318**	**–**
	155	97,2	193 000	455 000	18 800	1,2	2 240	3 900	6,76	0,82	**54318**	**U318**
85	150	67	119 000	325 000	13 300	0,68	2 700	3 550	3,95	–	**52220**	**–**
	150	72,8	119 000	325 000	13 300	0,68	2 700	3 550	3,87	0,5	**54220**	**U220**
	170	97	238 000	580 000	23 200	1,9	1 970	3 550	8,71	–	**52320**	**–**
	170	105,4	238 000	580 000	23 200	1,9	1 970	3 550	8,93	0,93	**54320**	**U320**
95	160	67	126 000	365 000	14 400	0,83	2 650	3 250	4,06	–	**52222**	**–**
	160	71,4	126 000	365 000	14 400	0,83	2 650	3 250	4,55	0,56	**54222**	**U222**
	190	110	280 000	740 000	28 000	3	1 790	3 300	14	–	**52322-MP**	**–**
	190	118,4	280 000	740 000	28 000	3	1 790	3 300	13,7	1,26	**54322-MP**	**U322**
100	170	68	128 000	385 000	14 600	0,94	2 550	3 100	4,82	–	**52224**	**–**
	170	71,6	128 000	385 000	14 600	0,94	2 550	3 100	4,66	0,65	**54224**	**U224**
	210	123	325 000	910 000	32 500	4,4	1 610	3 100	19,3	–	**52324-MP**	**–**
	210	131,2	325 000	910 000	32 500	4,4	1 610	3 100	18,8	2,01	**54324-MP**	**U324**
110	190	80	184 000	540 000	19 500	1,7	2 210	2 950	7,26	–	**52226**	**–**
	190	85,8	184 000	540 000	19 500	1,7	2 210	2 950	7,51	0,9	**54226**	**U226**
120	200	81	191 000	570 000	19 800	1,9	2 110	2 750	7,9	–	**52228**	**–**
	200	86,2	191 000	570 000	19 800	1,9	2 110	2 750	16,9	1,22	**54228**	**U228**
	240	140	385 000	1 240 000	41 000	8,2	1 360	2 550	28,3	–	**52328-MP**	**–**
130	215	89	236 000	730 000	24 900	2,9	1 950	2 550	11,46	–	**52230-MP**	**–**
	215	95,6	236 000	730 000	24 900	2,9	1 950	2 550	10,4	1,69	**54230-MP**	**U230**
	250	140	395 000	1 330 000	43 000	9,3	1 340	2 360	29,4	–	**52330-MP**	**–**

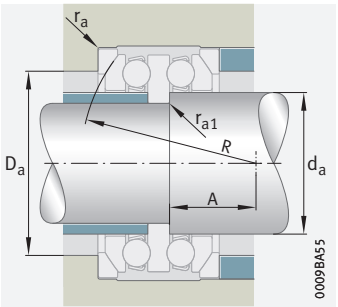
medias *https://www.schaeffler.de/std/1F9A*



542, 543
Spherical housing locating washers
Support washers U2, U3



Mounting dimensions

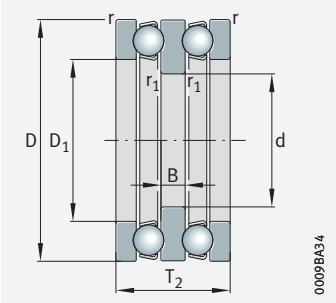


Mounting dimensions

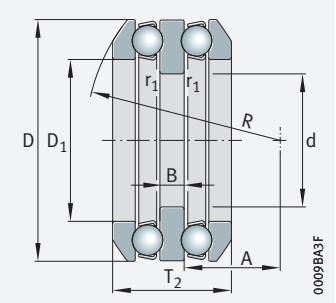
Dimensions											Mounting dimensions			
d	D_1	B	r min.	r_1 min.	R	A	D_2	D_3	C	T_3	d_a	D_a max.	r_a max.	r_{a1} max.
75	93	14	1,1	1	–	–	–	–	–	–	90	108	1	1
	93	14	1,1	1	100	42	76	140	13,5	110	90	110	1	1
	93	19	1,5	1	–	–	–	–	–	–	90	116	1,5	1
	93	19	1,5	1	112	36,5	106	160	18	120	90	120	1,5	1
85	103	15	1,1	1	–	–	–	–	–	–	100	120	1	1
	103	15	1,1	1	112	49	81	155	14	125	100	125	1	1
	103	21	1,5	1	–	–	–	–	–	–	100	128	1,5	1
	103	21	1,5	1	125	42	115	175	18	135	100	135	1,5	1
95	113	15	1,1	1	–	–	–	–	–	–	110	130	1	1
	113	15	1,1	1	125	62	81	165	14	135	110	135	1	1
	113	24	2	1	–	–	–	–	–	–	110	142	2	1
	113	24	2	1	140	47	128	195	20,5	150	110	150	2	1
100	123	15	1,1	1,1	–	–	–	–	–	–	120	140	1	1
	123	15	1,1	1,1	125	58,5	82	175	15	145	120	145	1	1
	123	27	2,1	1,1	–	–	–	–	–	–	120	156	2,1	1
	123	27	2,1	1,1	160	58	143	220	22	165	120	165	2,1	1
110	133	18	1,5	1,1	–	–	–	–	–	–	130	154	1,5	1
	133	18	1,5	1,1	140	63	96	195	17	160	130	160	1,5	1
120	143	18	1,5	1,1	–	–	–	–	–	–	140	164	1,5	1
	143	18	1,5	1,1	160	83,5	99	210	17	170	140	170	1,5	1
	144	31	2,1	1,1	–	–	–	–	–	–	140	180	2,1	1
130	153	20	1,5	1,1	–	–	–	–	–	–	150	176	1,5	1
	153	20	1,5	1,1	160	74,5	109	225	20,5	180	150	180	1,5	1
	154	31	2,1	1,1	–	–	–	–	–	–	150	190	2,1	1

Axial deep groove ball bearings

Double direction



522, 523

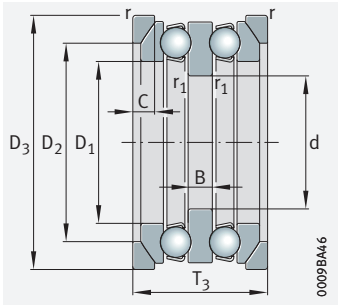


542
Spherical housing locating washers

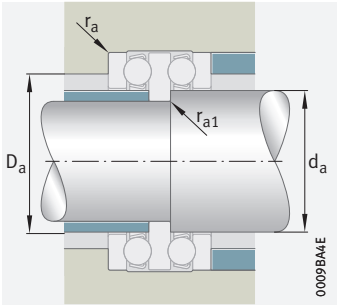
d = 140 – 190 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1058|1.12 ➤1058|1.13	
d	D	T_2	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
140	225	90	240 000	770 000	25 500	3,2	1 900	2 400	12,2	–	**52232-MP**	**–**
	225	97,4	240 000	770 000	25 500	3,2	1 900	2 400	11,2	1,8	**54232-MP**	**U232**
	270	153	445 000	1 560 000	48 500	13	1 230	2 160	38,2	–	**52332-MP**	**–**
150	240	97	285 000	930 000	29 500	4,5	1 740	2 210	14	–	**52234-MP**	**–**
	240	104,4	285 000	930 000	29 500	4,5	1 740	2 210	13,6	2,14	**54234-MP**	**U234**
	250	98	305 000	1 030 000	32 500	5,4	1 670	2 120	16,2	–	**52236-MP**	**–**
	250	102,4	305 000	1 030 000	32 500	5,4	1 670	2 120	15,5	2,33	**54236-MP**	**U236**
	280	153	440 000	1 560 000	47 500	13	1 220	2 060	39,9	–	**52334-MP**	**–**
160	270	109	335 000	1 170 000	35 500	7,2	1 540	1 990	21,9	–	**52238-MP**	**–**
	270	116,4	335 000	1 170 000	35 500	7,2	1 540	1 990	20	2,63	**54238-MP**	**U238**
	320	183	590 000	2 170 000	63 000	24	1 040	1 770	66,4	–	**52338-MP**	**–**
170	280	109	340 000	1 220 000	36 000	7,8	1 510	1 880	23,2	–	**52240-MP**	**–**
	280	115,6	340 000	1 220 000	36 000	7,8	1 510	1 880	21	2,79	**54240-MP**	**U240**
190	300	110	335 000	1 330 000	37 500	9,6	1 420	1 680	25,2	–	**52244-MP**	**–**
	300	115,2	335 000	1 330 000	37 500	9,6	1 420	1 680	23	3,31	**54244-MP**	**U244**

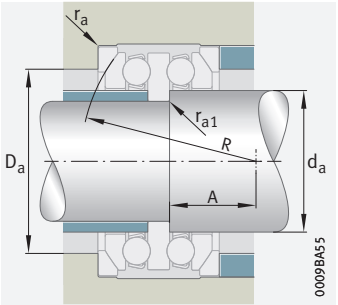
medias *https://www.schaeffler.de/std/1F9A*



542
Spherical housing locating washers
Support washers U2



Mounting dimensions



Mounting dimensions

Dimensions											Mounting dimensions			
d	D_1	B	r min.	r_1 min.	R	A	D_2	D_3	C	T_3	d_a	D_a max.	r_a max.	r_{a1} max.
140	163	20	1,5	1,1	–	–	–	–	–	–	160	186	1,5	1
	163	20	1,5	1,1	160	70	110	235	21	190	160	190	1,5	1
	164	33	3	1,1	–	–	–	–	–	–	160	204	2,5	1
150	173	21	1,5	1,1	–	–	–	–	–	–	170	198	1,5	1
	173	21	1,5	1,1	180	87	117	250	21,5	200	170	200	1,5	1
	183	21	1,5	2	–	–	–	–	–	–	180	208	1,5	1
	183	21	1,5	2	200	108,5	118	260	21,5	210	180	210	1,5	1
	174	33	3	1,1	–	–	–	–	–	–	170	214	2,5	1
160	194	24	2	2	–	–	–	–	–	–	190	222	2	2
	194,7	24	2	2	200	93,5	131	280	23	230	190	230	2	2
	195	40	4	2	–	–	–	–	–	–	190	242	3	2
170	204	24	2	2	–	–	–	–	–	–	200	232	2	2
	204	24	2	2	225	120,5	133	290	23	240	200	240	2	2
190	224	24	2	2	–	–	–	–	–	–	220	252	2	2
	224	24	2	2	225	114	134	310	25	260	220	260	2	2

Axial cylindrical roller bearings



Matrix for bearing preselection 1085

1 Axial cylindrical roller bearings 1086

1.1 Bearing design 1086
1.2 Load carrying capacity 1089
1.3 Compensation of angular misalignments 1089
1.4 Lubrication 1089
1.5 Sealing 1089
1.6 Speeds 1090

1.7 Noise ____ *1090*
1.8 Temperature range ____ *1090*
1.9 Cages ____ *1091*
1.10 Internal clearance ____ *1091*
1.11 Dimensions, tolerances ____ *1092*
1.12 Suffixes ____ *1092*
1.13 Structure of bearing designation ____ *1093*
1.14 Dimensioning ____ *1093*
1.15 Minimum load ____ *1094*
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1.18 Legal notice regarding data freshness ____ *1096*
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Axial cylindrical roller bearings, axial cylindrical roller and cage assemblies, axial bearing washers ____ *1098*

Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Axial cylindrical roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available				detailed information ➤ **1086**
Load carrying capacity	radial		–	➤ *1089|1.2*
	axial, one direction		++	➤ *1089|1.2*
	axial, both directions		–	➤ *1089|1.2*
	moments		–	
Compensation of angular misalignments	static		–	➤ *1089|1.3*
	dynamic		–	➤ *1089|1.3*
Bearing design	cylindrical bore		✓	➤ *1086|1.1*
	tapered bore		–	
	separable		✓	➤ *1095|1.17*
Lubrication	greased		–	➤ *1089|1.4*
Sealing	open		✓	➤ *1089|1.5*
	non-contact		–	*1089*
	contact		–	➤ *1089|1.5*
Operating temperature in °C	from to		–20 +120	➤ *1090|1.8*
Suitability for	high speeds		(+)	➤ *1090|1.6*
	high running accuracy		++	➤ *1092|1.11* ➤ *115*
	low-noise running		(+)	➤ *1090|1.7* ➤ *27*
	high rigidity		++	➤ *54*
	reduced friction		(+)	➤ *56*
	length compensation within bearing		–	
	non-locating bearing arrangement		–	
	locating bearing arrangement		++	➤ *141*
X-life bearings		X-life	–	
Bearing bore d in mm	from to		15 320[1]	➤ *1098*
Product tables	from page ➤		**1098**	

[1] Larger catalogue bearings GL 1

1 Axial cylindrical roller bearings

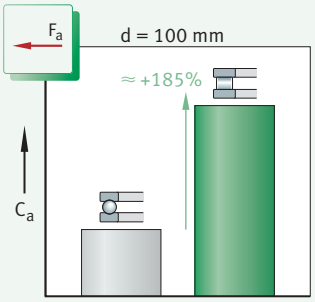
Single and double row axial cylindrical roller bearings are particularly suitable where:

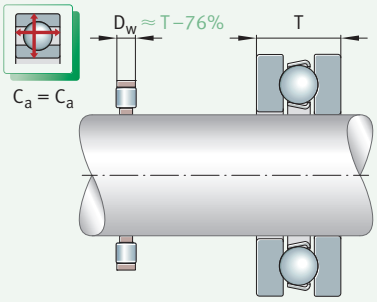
- high axial and shock loads occur in one direction but no radial loads are present ➤*1086*|*1* and ➤*1089*|*1.2*
- the load carrying capacity of the corresponding axial deep groove ball bearings is no longer adequate (in this case, bearings of series 811 and 812 are especially suitable) ➤*1086*|*1*
- the bearing arrangement must have very high axial rigidity
- the axial space available is very small ➤*1086*|*1* and ➤*1098*|
- the bearing arrangement can be configured, where the axial space is very small, as a direct bearing arrangement ➤*1086*|*1.1*
- the bearing parts can or must be mounted separately
- the bearing arrangement is not configured in itself but, for cost reasons, ready-to-fit standard bearings are to be used

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1085*.

1
Axial cylindrical roller bearing and axial ball bearing – comparison of load carrying capacity and design envelope

F_a = *axial load*
C_a = *basic dynamic load rating*
D_w = *roller diameter*
T = *axial section height of axial deep groove ball bearing*





1.1 Bearing design

✎ *Design variants*

Axial cylindrical roller bearings are available as:

- single and double row bearings
- individual bearing parts for combination, comprising
  - axial cylindrical roller and cage assembly (prefix K)
  - housing locating washer (prefix GS)
  - shaft locating washer (prefix WS)
  - bearing washers (prefix LS, alternatively for shaft and housing locating washer)

Larger catalogue bearings and other bearing designs GL 1.

Axial cylindrical roller bearings

Designed for bearing arrangements with very small axial space

Axial cylindrical roller bearings are part of the group of axial roller bearings. In contrast to the ball, the roller has a larger contact area perpendicular to the roller axis. As a result, it can transmit higher forces, has greater rigidity and allows smaller rolling element diameters under the same load. The single and double row bearings comprise flat, ribless washers (housing and shaft locating washers) between which axial cylindrical roller and cage assemblies are arranged ➤*1087*|🗀 *2* and ➤*1088*|🗀 *5*. Their axial section height T corresponds only to the diameter of the rollers plus the thickness of the washers. Due to this design, the bearings are particularly small in axial height ➤*1098*|▦. The axial cages are made from brass or plastic and are fitted with one or two rows of cylindrical rollers. Since sliding occurs towards the ends of the rollers during rolling of the rolling elements and this increases with the length of the roller, bearings with a wide cross-section have several short rollers arranged adjacent to each other, e.g. double row designs ➤*1087*|🗀 *2*.

Rollers with profiled ends increase the operating life of the bearings

The cylindrical rollers have profiled ends, i.e. they have a slight lateral curvature towards the ends. This modified line contact between the rollers and raceways prevents damaging edge stresses ➤*1087*|🗀 *3*. This in turn has a positive effect on the operating life of the bearings.

The use of complete axial cylindrical roller bearings (shaft locating washer, axial cylindrical roller and cage assembly and housing locating washer) is then advisable if, for example, high speeds occur and the bearing washers must therefore be centred precisely.

Roller and cage assembly and bearing washers are also available individually

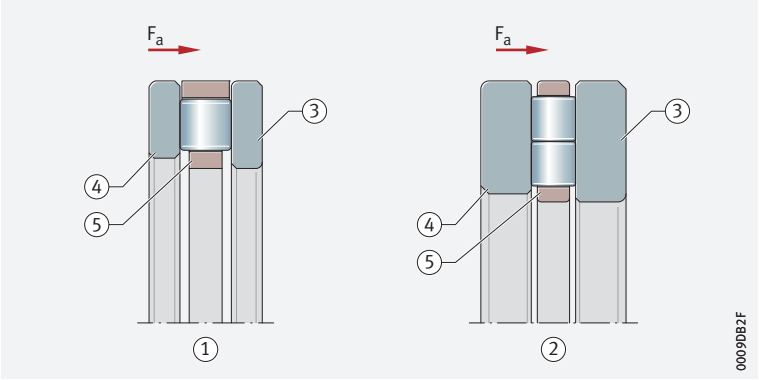
The bearing parts for axial cylindrical roller bearings are also available individually ➤*1088*|🗀 *4* and ➤*1088*|🗀 *5*. Axial cylindrical roller and cage assemblies (without shaft and housing locating washers) are suitable, for example, for bearing arrangements with very small axial design space.

Cylindrical roller bearings 811 and 812 are of a single row design and correspond to DIN 722:2005 and ISO 104:2015. The bearings 893 and 894 are of a double row design and are configured in accordance with DIN 616:2000 and ISO 104:2015.

🗀 *2*
Axial cylindrical roller bearings

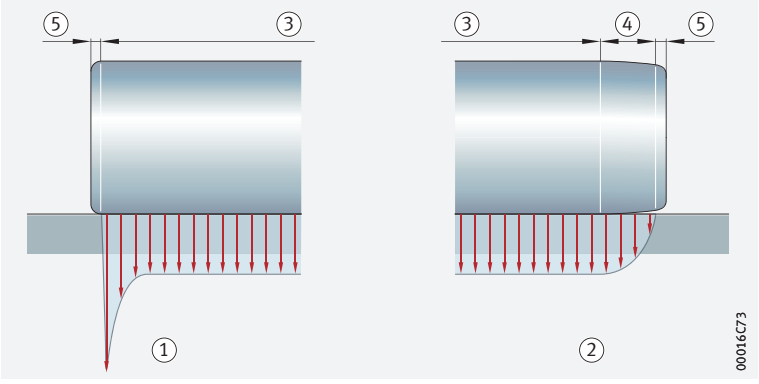
F_a = *axial load*

① *Single row bearing*
② *Double row bearing*
③ *Shaft locating washer*
④ *Housing locating washer*
⑤ *Axial cylindrical roller and cage assembly*



🗀 *3*
Roller profile and stress distribution

① *Cylindrical roller profile (high stress peaks)*
② *Roller with profiled ends (no stress peak)*
③ *Cylindrical outside surface region*
④ *Region of logarithmic tapering*
⑤ *Rounding of edge*



Axial cylindrical roller and cage assemblies

Very high axial load carrying capacity with low section height

The cage assemblies comprise axial cages and one or two rows of cylindrical rollers ➤*1088*|*4*. They have a particularly small axial section height and high axial load carrying capacity. The cages are made from polyamide or brass and are guided on the shaft.

For direct bearing arrangements, running surfaces must be produced as a rolling bearing raceway

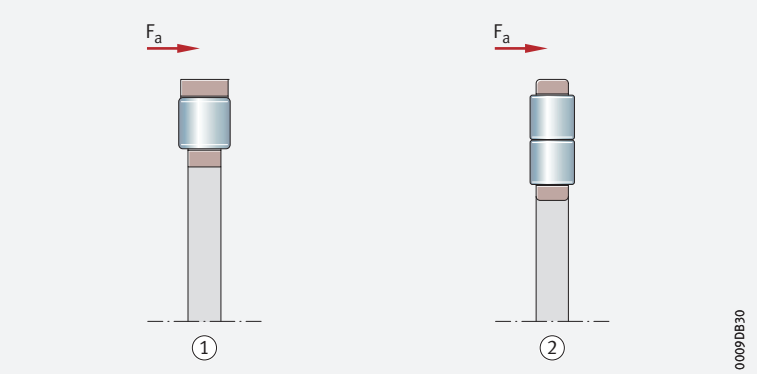
Axial cylindrical roller and cage assemblies are generally combined with one housing locating washer and one shaft locating washer. If they are to be used directly – i.e. without axial bearing washers – in the adjacent construction, the raceway for the rollers must be produced as a rolling bearing raceway ➤*1094*|*1.16*. It is also possible to use two shaft locating washers or two housing locating washers in combination with one axial cylindrical roller and cage assembly.

The diameter series 1, 2, 3, 4 of the axial cylindrical roller and cage assemblies correspond to DIN 616:2000 and ISO 104:2015.

4
Axial cylindrical roller and cage assemblies

F_a = *axial load*

① *Single row*
② *Double row*



Axial bearing washers

Housing and shaft locating washers

Housing locating washers are externally centred, shaft locating washers are internally centred ➤*1088*|*5* and ➤*1094*|*1.16*. They must be used if the adjacent construction cannot be used as a raceway for the rolling elements. The washers are made from through hardening rolling bearing steel. The bore and outside diameter are precision machined, the raceways are ground to high accuracy.

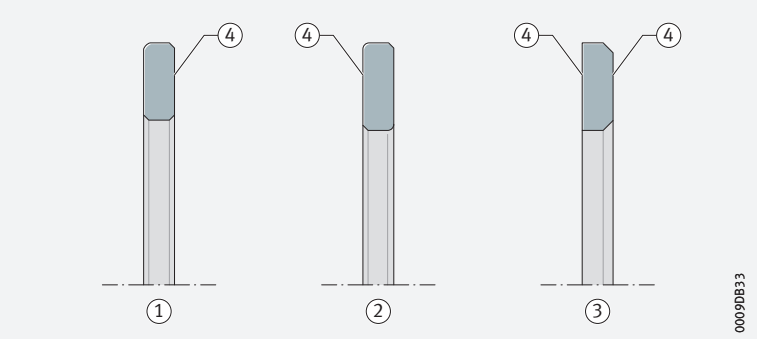
The diameter series 1, 2, 3, 4 of the axial bearing washers correspond to DIN 616:2000 and ISO 104:2015.

Bearing washers

Bearing washers are suitable for use as a housing or shaft locating washer. They are used in applications that do not require precise centring of the axial bearing washers. The raceway of the bearing washers is hardened and ground. The bearing washers are suitable for axial cylindrical roller and cage assemblies K811 and axial needle roller and cage assemblies AXK.

5
Axial bearing washers

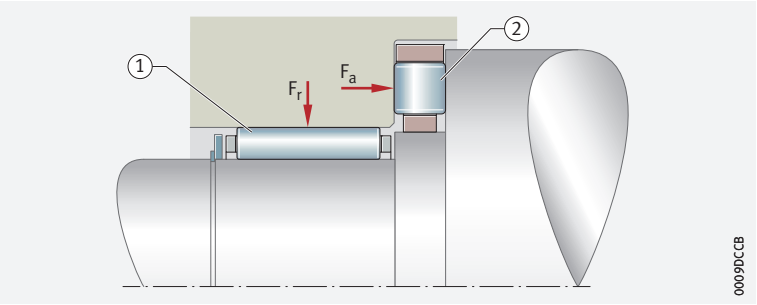
① *Housing locating washer, externally centred*
② *Shaft locating washer, internally centred*
③ *Bearing washer*
④ *Raceway*



1.2 Load carrying capacity

For very high axial loads acting in one direction

Single and double row axial cylindrical roller bearings can support high axial loads as well as axial shock loads in one direction, but must not be subjected to radial load ➤*1093*|*1.14*. If radial loads do occur, these forces must be supported by an additional bearing (e.g. by a needle roller and cage assembly) ➤*1089*|🗗*6*.



6 *Axial and radial loads*

F_r = *radial load*
F_a = *axial load*

① *Needle roller and cage assembly as radial bearing (direct bearing arrangement)*

② *Axial cylindrical roller and cage assembly as axial bearing (direct bearing arrangement)*

1.3 Compensation of angular misalignments

The bearings do not permit any skewing between the shaft and the housing. If angular misalignments occur between the locating surfaces on the shaft and in the housing, this will cause damage to the bearing and considerably reduce its operating life.

1.4 Lubrication

Oil or grease lubrication is possible

Axial cylindrical roller bearings are not greased. The bearings must be lubricated with oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed; i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position

1.6 Speeds

Speeds in the product tables

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

The values in the product tables are valid for oil lubrication.

Values for grease lubrication

For grease lubrication, 25% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤69. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** *https://medias.schaeffler.com*

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing washers and cylindrical rollers
- the cage
- the lubricant

Possible operating temperatures of axial cylindrical roller bearings ➤1090|▦1.

▦1
Permissible temperature range

Operating temperature	Axial cylindrical roller bearings with brass or polyamide cage PA66
	–20 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Solid cages made from brass and polyamide PA66 are used as standard

Standard cages ➤*1091*| 2. The cage design is dependent on the bearing series and the bearing size. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with brass cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

2 *Cage, cage suffix, bore code*

Bearing series	Solid cage made from polyamide PA66	Solid brass cage
	TV	M
	standard	standard
	Bore code	
811, K811	up to 34	from 36
812, K812	06 to 26	from 28
893, K893	06 to 16	17 to 30
894, K894	12 to 14	from 15

1.10 Internal clearance

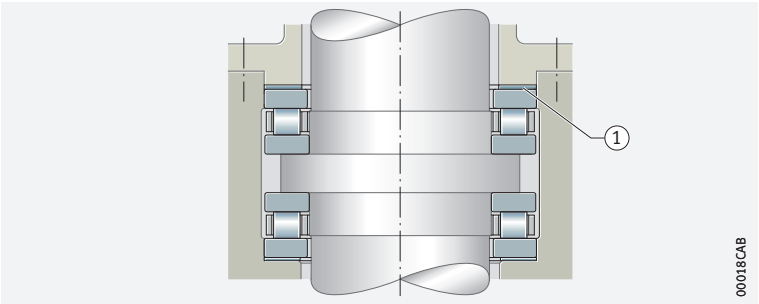
Axial clearance and preload are determined by the application

In the case of axial cylindrical roller bearings, the internal clearance (axial clearance) is only achieved when the bearings are mounted. The requisite axial clearance of the bearing arrangement is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load.
If axial cylindrical roller bearings are subjected to vibrations while under predominantly static load, for example, they must be lightly preloaded. Preload can be applied, for example, using calibrated sheets (shims) ➤*1091*| 7. Other suitable means include shaft nuts, disc springs, etc. ➤*1094*| *1.15*. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways ➤*1094*| *1.15*. It must also be ensured that the preload does not exceed the optimum value, otherwise there will be an increase in friction and therefore in heat generation in the bearing. These will both have a negative effect on the operating life of the bearings.

If there is any uncertainty regarding correct setting, please consult Schaeffler.

7 *Setting the axial clearance by means of shims*

① *Calibrated sheet (shim)*



1.11 Dimensions, tolerances

Dimension standards

The main dimensions of axial cylindrical roller bearings correspond to ISO 104:2015.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤140. Nominal value of chamfer dimension ➤1098.

Tolerances

The dimensional and running tolerances of axial bearing washers GS and WS correspond to the tolerance class Normal in accordance with ISO 199:2014 ➤135 25 to ➤137 28.

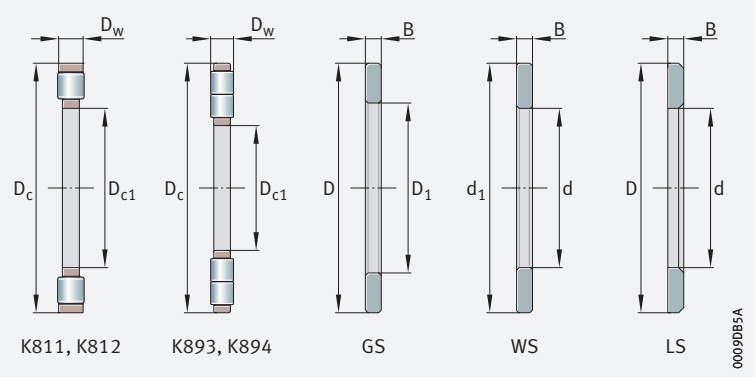
Tolerances of the bore and outside diameter as well as of the width of the bearing parts ➤1092 3 and ➤1092 8.

3 *Dimensions and tolerances of bearing parts*

Bearing component	Dimension	Tolerance
Axial cylindrical roller and cage assembly K	D_{c1}	E11[1)]
	D_c	a13[1)]
	D_w	to DIN 5402-1
Housing locating washer GS	D_1	–
	D	to ISO 199
	B	h11
Shaft locating washer WS	d	to ISO 199
	d_1	–
	B	h11
Bearing washer LS	d	E12[1)]
	D	a12[1)]
	B	h11

1) *Deviation of the bore diameter Δ_{dmp} and deviation of the outside diameter Δ_{Dmp} ➤140.*

8 *Bearing parts – axial cylindrical roller and cage assemblies and bearing washers*



1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

4 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
M	Solid brass cage	Standard, dependent on bore code
TV	Solid cage made from glass fibre reinforced polyamide PA66	
P5	High dimensional, geometrical and running accuracy	Special design for axial bearing washers GS, WS; available by agreement

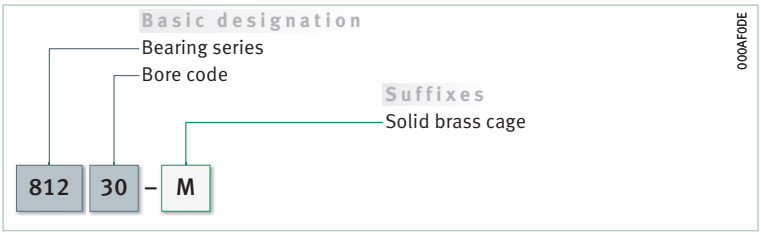
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

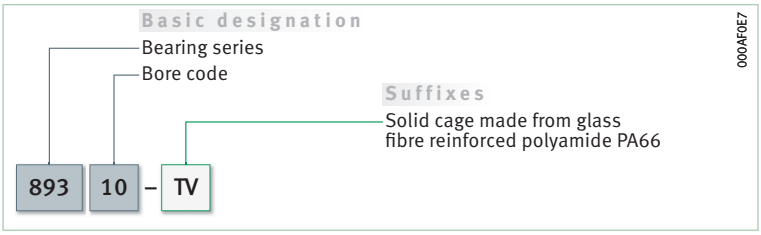
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ➤*1093*|*9* and ➤*1093*|*10*. The composition of the designation is subject to DIN 623-1 ➤*102*|*10*.

9
Single row axial cylindrical roller bearing, comprising axial roller and cage assembly, shaft locating washer and housing locating washer: designation structure



10
Double row axial cylindrical roller bearing, comprising axial roller and cage assembly, shaft locating washer and housing locating washer: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

Axial cylindrical roller bearings can only support axial forces ➤*1089*|*1.2*. In the rating life equation, P is therefore substituted by the value for F_a ➤*1093*|*1*.

1
Equivalent dynamic load

$$P = F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_a	N	Axial load.

Equivalent static bearing load

Combined loads are not possible

In relation to the direction of load, the same conditions apply as for the equivalent dynamic bearing load, i.e. combined loads are not permissible.

Since the bearings can only support axial loads, the following applies:

2
Equivalent static load

$$P_0 = F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0a}	N	Largest axial load present (maximum load).

Static load safety factor

$S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*1093*|*3*.

3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

Rolling bearings under low loads are particularly prone to slippage

In order to prevent slippage damage, the bearing must be subjected to a minimum axial load $F_{a\,min}$ ➤*1094*| *4 and ➤*1094*| *5.
In vertical bearing arrangements in particular, the requisite minimum axial load $F_{a\,min}$ is normally achieved, however, simply by the weight of the bearing parts and the external forces. If this is not the case, the bearing arrangement must be preloaded, for example by means of springs or
a housing nut.

*4
Minimum axial load

$$F_{a\,min} = 0{,}0005 \cdot C_{0a} + k_a \left(\frac{C_{0a} \cdot n}{10^8} \right)^2$$

Legend

$F_{a\,min}$	N	Minimum axial load
C_{0a}	N	Basic static load rating ➤*1098*
k_a	–	Factor for determining the minimum axial load ➤*1094* *5*
n	min^{-1}	Speed.

*5
Factor k_a for calculating the minimum axial load

Series	Factor k_a
K811	1,4
K812	0,9
K893	0,7
K894	0,5

1.16 Design of bearing arrangements

Design of adjacent parts

Axial cylindrical roller bearings cannot tolerate angular misalignments ➤*1089*|*1.3*. The locating surfaces for the bearing parts on the shaft and in the housing must therefore be vertical to the shaft axis, while the adjacent parts must be rigid and flat. They must be configured such that the bearing washers are supported as far as possible over the whole circumference and over the whole raceway width; values ➤*1098*|. The radial cage guidance surfaces must be precision machined and wear-resistant (Ramax 0,8 (Rzmax 4)).

Mounting diameter on the shaft and in the housing

For the mounting dimensions, the following values apply ➤*1098*|:

- mounting diameter on the shaft ≧ d_a
- mounting diameter in the housing ≦ D_a

Tolerances for shaft and housing bore

Proven tolerances are given in ➤*1094*| *6*. If the data are observed, this will give correct radial guidance of the bearing elements.

*6
Tolerances for shafts and housing bores

Bearing component		Tolerance class[1] for	
		Shaft	Bore
Axial cylindrical roller bearings	Shaft guided	h8	–
Housing locating washers	–	–	H9
Shaft locating washers	–	h8	–
Bearing washers	Externally centred as housing locating washer	Shaft released	H9
	Internally centred as shaft locating washer	h8	Bore released

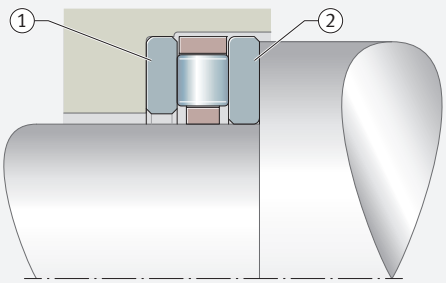
[1] *The envelope requirement Ⓔ applies.*

Guidance of bearing parts

Release of shaft and housing locating washers, as a function of centring

If the bearing washers are centred on the shaft, they must have radial clearance in the housing bore while, if they are centred in the housing, there must be radial clearance between the washer bore and the shaft ➤1095|11.

11
Guidance and release of shaft and housing locating washers



① *Housing locating washer (guidance in the housing), radial clearance on the shaft*
② *Shaft locating washer (guidance on the shaft), radial clearance in the housing*

Guidance of axial roller and cage assemblies

In order to achieve the lowest possible sliding speeds on the guidance surfaces, the axial cylindrical roller and cage assemblies are generally guided on the shaft. This is particularly important in the case of high speeds.

For a direct bearing arrangement of roller and cage assemblies: harden and grind the raceways for the rollers

If the axial design space is particularly small, axial cylindrical roller and cage assemblies can also run directly (without axial bearing washers) on the adjacent construction. In this case – and if the load carrying capacity of the axial cylindrical roller and cage assemblies is to be fully utilised – the raceways on the shaft and in the housing must be produced as a rolling bearing raceway or must correspond to the quality and hardness of axial bearing washers. The surface hardness of the raceway must be 670 HV to 840 HV, the hardening depth CHD or SHD must be sufficiently large ➤182. The surface roughness Ra must be $\leqq$ 0,2 µm. At a mean roughness value of Ra $>$ 0,2 µm, it is no longer possible to utilise the full load carrying capacity of the bearings. When designing the raceway on the shaft and in the housing, the raceway dimensions E_a and E_b must be observed ➤1098|▦. If the values are observed, this will ensure that the raceways for the cylindrical rollers – taking account of any possible axial offset of the roller and cage assembly – are adequately dimensioned.

1.17 Mounting and dismounting

The mounting and dismounting options for the bearings must be taken into consideration in the design of the bearing position.

As the bearings are not self-retaining, they are easy to mount

Axial cylindrical roller bearings are not self-retaining. As a result, the bearing parts (shaft locating washer, housing locating washer and axial cylindrical roller and cage assembly) can be mounted separately from each other. This gives simplified mounting of the bearings.

Mounting position of the bearing washers

The correct mounting position has a considerable influence on the function of the bearing arrangement. Axial bearing washers must always be mounted with the raceway side facing the rolling elements.

Shaft locating washers

On shaft locating washers, the raceway side is indicated by the smaller chamfer on the bore diameter of the washer.

Housing locating washers

On housing locating washers, the raceway side is indicated by the smaller chamfer on the outside diameter of the washer.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

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1.19 Further information

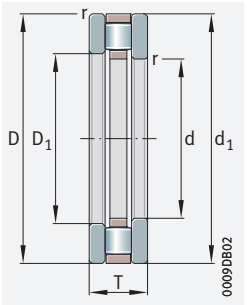
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*

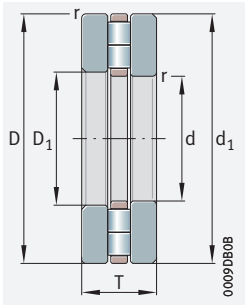


Axial cylindrical roller bearings

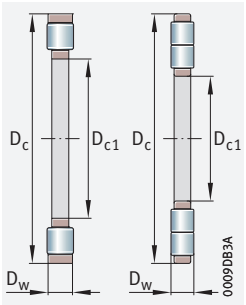
Axial cylindrical roller and cage assemblies
Axial bearing washers



811, 812



893, 894

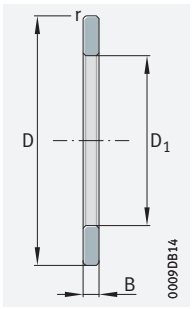


Single row: K811, K812
Double row: K893, K894

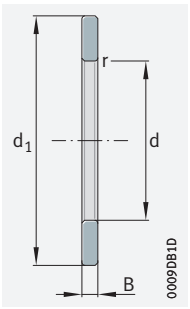
d = 15 – 60 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Axial cylindrical roller bearings		Axial cylindrical roller and cage assemblies	
								Mass	Designation ➤*1092|1.12* ➤*1093|1.13*	Mass	Designation ➤*1092|1.12* ➤*1093|1.13*
d D_{c1}	D D_c	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m		m	
			N	N	N	min^{-1}	min^{-1}	≈ kg		≈ kg	
15	28	9	14 400	28 500	4 050	13 600	6 400	0,024	**81102-TV**	0,006	**K81102-TV**
17	30	9	16 000	33 500	4 700	12 800	5 800	0,027	**81103-TV**	0,009	**K81103-TV**
20	35	10	25 000	53 000	7 500	10 800	4 500	0,037	**81104-TV**	0,013	**K81104-TV**
25	42	11	33 500	76 000	7 200	8 900	3 650	0,053	**81105-TV**	0,015	**K81105-TV**
30	47	11	35 500	86 000	8 200	7 700	3 150	0,057	**81106-TV**	0,017	**K81106-TV**
	52	16	64 000	141 000	14 400	7 200	2 700	0,123	**81206-TV**	0,033	**K81206-TV**
	60	18	69 000	197 000	19 200	6 400	2 650	0,24	**89306-TV**	0,04	**K89306-TV**
35	52	12	39 000	101 000	9 600	6 800	2 700	0,073	**81107-TV**	0,019	**K81107-TV**
	62	18	80 000	199 000	20 400	6 000	2 360	0,195	**81207-TV**	0,043	**K81207-TV**
	68	20	80 000	237 000	23 600	5 700	2 420	0,34	**89307-TV**	0,053	**K89307-TV**
40	60	13	56 000	148 000	14 800	5 900	2 240	0,105	**81108-TV**	0,031	**K81108-TV**
	68	19	107 000	265 000	23 700	5 200	1 820	0,249	**81208-TV**	0,081	**K81208-TV**
	78	22	123 000	385 000	39 500	4 850	1 770	0,484	**89308-TV**	0,098	**K89308-TV**
45	65	14	59 000	163 000	16 300	5 300	2 020	0,13	**81109-TV**	0,035	**K81109-TV**
	73	20	105 000	265 000	23 700	4 950	1 840	0,287	**81209-TV**	0,085	**K81209-TV**
	85	24	139 000	445 000	45 500	4 400	1 600	0,615	**89309-TV**	0,121	**K89309-TV**
50	70	14	62 000	177 000	17 700	4 900	1 840	0,14	**81110-TV**	0,038	**K81110-TV**
	78	22	118 000	315 000	28 000	4 550	1 570	0,356	**81210-TV**	0,098	**K81210-TV**
	95	27	168 000	560 000	59 000	3 950	1 450	0,887	**89310-TV**	0,175	**K89310-TV**
55	78	16	90 000	300 000	31 500	4 350	1 350	0,218	**81111-TV**	0,045	**K81111-TV**
	90	25	155 000	405 000	39 000	4 050	1 540	0,568	**81211-TV**	0,166	**K81211-TV**
	105	30	184 000	600 000	53 000	3 600	1 500	1,18	**89311-TV**	0,195	**K89311-TV**
60	85	17	103 000	315 000	32 500	4 000	1 360	0,266	**81112-TV**	0,082	**K81112-TV**
	95	26	172 000	480 000	46 500	3 700	1 290	0,642	**81212-TV**	0,176	**K81212-TV**
	110	30	197 000	670 000	59 000	3 400	1 350	1,26	**89312-TV**	0,21	**K89312-TV**
	130	42	390 000	1 220 000	132 000	3 050	1 080	2,818	**89412-TV**	0,538	**K89412-TV**

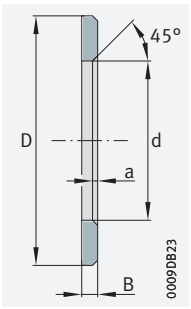
medias *https://www.schaeffler.de/std/1F9A*



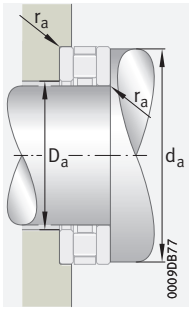
GS



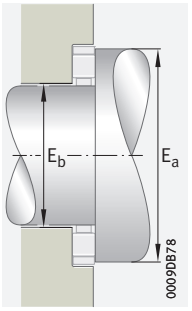
WS



LS



Mounting dimensions

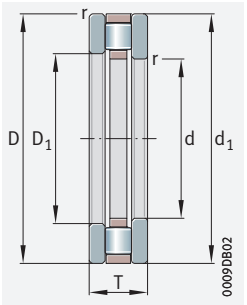


Mounting dimensions, direct bearing arrangement

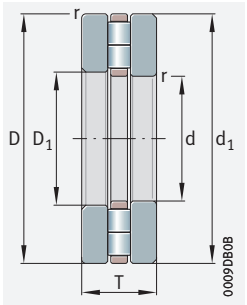
	Axial bearing washers				Dimensions					Mounting dimensions			Raceway dimensions	
	Mass	Designation ➤*1092*|*1.12* ➤*1093*|*1.13*												
d D_{c1}	m ≈ kg	Housing locating washer	Shaft locating washer	Bearing washer	D_1	d_1	D_w	B	a r min.	d_a	D_a	r_a	E_b	E_a
15	0,008	**GS81102**	**WS81102**	**LS1528**	16	28	3,5	2,75	0,3	27	16	0,3	16	27
17	0,009	**GS81103**	**WS81103**	**LS1730**	18	30	3,5	2,75	0,3	29	18	0,3	18	29
20	0,011	**GS81104**	**WS81104**	**LS2035**	21	35	4,5	2,75	0,3	34	21	0,3	21	34
25	0,019	**GS81105**	**WS81105**	**LS2542**	26	42	5	3	0,6	41	26	0,6	26	41
30	0,02	**GS81106**	**WS81106**	**LS3047**	32	47	5	3	0,6	46	31	0,6	31	46
	0,045	**GS81206**	**WS81206**	–	32	52	7,5	4,25	0,6	50	31	0,6	31	50
	0,095	**GS89306**	**WS89306**	–	32	60	5,5	6,25	1	59	33	1	33	59
35	0,027	**GS81107**	**WS81107**	**LS3552**	37	52	5	3,5	0,6	51	36	0,6	36	51
	0,076	**GS81207**	**WS81207**	–	37	62	7,5	5,25	1	58	39	1	39	58
	0,134	**GS89307**	**WS89307**	–	37	68	6	7	1	67	38	1	38	67
40	0,037	**GS81108**	**WS81108**	**LS4060**	42	60	6	3,5	0,6	58	42	0,6	42	58
	0,084	**GS81208**	**WS81208**	–	42	68	9	5	1	66	43	1	43	66
	0,193	**GS89308**	**WS89308**	–	42	78	7	7,5	1	77	44	1	44	77
45	0,047	**GS81109**	**WS81109**	**LS4565**	47	65	6	4	0,6	63	47	0,6	47	63
	0,101	**GS81209**	**WS81209**	–	47	73	9	5,5	1	70	48	1	48	70
	0,247	**GS89309**	**WS89309**	–	47	85	7,5	8,25	1	83	49	1	49	83
50	0,051	**GS81110**	**WS81110**	**LS5070**	52	70	6	4	0,6	68	52	0,6	52	68
	0,129	**GS81210**	**WS81210**	–	52	78	9	6,5	1	75	53	1	53	75
	0,356	**GS89310**	**WS89310**	–	52	95	8	9,5	1,1	92	56	1,1	56	92
55	0,082	**GS81111**	**WS81111**	**LS5578**	57	78	6	5	0,6	77	56	0,6	57	77
	0,201	**GS81211**	**WS81211**	–	57	90	11	7	1	85	59	1	59	85
	0,485	**GS89311**	**WS89311**	–	57	105	9	10,5	1,1	103	61	1,1	61	103
60	0,092	**GS81112**	**WS81112**	**LS6085**	62	85	7,5	4,75	1	82	62	1	62	82
	0,233	**GS81212**	**WS81212**	–	62	95	11	7,5	1	91	64	1	64	91
	0,55	**GS89312**	**WS89312**	–	62	110	9	10,5	1,1	108	66	1,1	66	108
	1,115	**GS89412**	**WS89412**	–	62	130	14	14	1,5	126	65	1,5	65	126

Axial cylindrical roller bearings

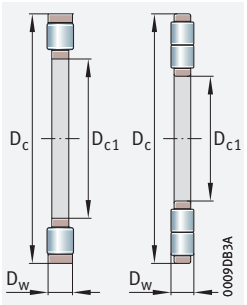
Axial cylindrical roller and cage assemblies
Axial bearing washers



811, 812



893, 894

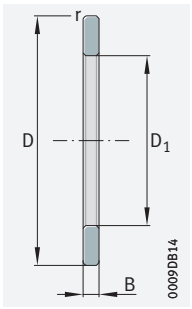


Single row: K811, K812
Double row: K893, K894

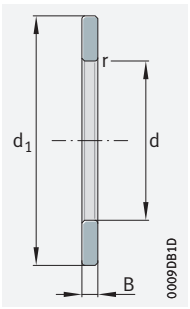
d = 65 – 100 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Axial cylindrical roller bearings		Axial cylindrical roller and cage assemblies	
								Mass	Designation ➤1092|1.12 ➤1093|1.13	Mass	Designation ➤1092|1.12 ➤1093|1.13
d D_{c1}	D D_c	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m		m	
			N	N	N	min^{-1}	min^{-1}	≈ kg		≈ kg	
65	90	18	107 000	340 000	34 500	3 700	1 260	0,31	**81113-TV**	0,09	**K81113-TV**
	100	27	177 000	500 000	49 000	3 550	1 250	0,721	**81213-TV**	0,185	**K81213-TV**
	115	30	194 000	670 000	59 000	3 200	1 330	1,33	**89313-TV**	0,21	**K89313-TV**
	140	45	445 000	1 410 000	151 000	2 850	1 010	3,52	**89413-TV**	0,72	**K89413-TV**
70	95	18	111 000	365 000	37 000	3 500	1 170	0,332	**81114-TV**	0,092	**K81114-TV**
	105	27	187 000	550 000	54 000	3 250	1 120	0,768	**81214-TV**	0,212	**K81214-TV**
	125	34	239 000	830 000	76 000	2 950	1 200	1,82	**89314-TV**	0,29	**K89314-TV**
	150	48	475 000	1 500 000	161 000	2 650	1 010	4,18	**89414-TV**	0,76	**K89414-TV**
75	100	19	107 000	350 000	36 000	3 300	1 190	0,393	**81115-TV**	0,096	**K81115-TV**
	110	27	173 000	500 000	49 000	3 150	1 220	0,8	**81215-TV**	0,195	**K81215-TV**
	135	36	290 000	1 010 000	94 000	2 750	1 090	2,23	**89315-TV**	0,375	**K89315-TV**
	160	51	500 000	1 580 000	163 000	2 440	1 000	5,96	**89415-M**	1,78	**K89415-M**
80	105	19	106 000	350 000	36 000	3 150	1 180	0,4	**81116-TV**	0,095	**K81116-TV**
	115	28	201 000	630 000	61 000	2 900	980	0,9	**81216-TV**	0,234	**K81216-TV**
	140	36	305 000	1 110 000	102 000	2 650	1 000	2,37	**89316-TV**	0,42	**K89316-TV**
	170	54	560 000	1 770 000	183 000	2 280	940	7,04	**89416-M**	2,04	**K89416-M**
85	110	19	113 000	385 000	39 500	3 000	1 090	0,42	**81117-TV**	0,118	**K81117-TV**
	125	31	217 000	660 000	66 000	2 800	1 080	1,26	**81217-TV**	0,28	**K81217-TV**
	150	39	325 000	1 140 000	106 000	2 450	1 030	3,39	**89317-M**	0,93	**K89317-M**
	180	58	620 000	1 980 000	203 000	2 160	890	8,65	**89417-M**	2,71	**K89417-M**
90	120	22	141 000	465 000	41 000	2 750	1 070	0,62	**81118-TV**	0,15	**K81118-TV**
	135	35	290 000	890 000	96 000	2 550	910	1,77	**81218-TV**	0,54	**K81218-TV**
	155	39	335 000	1 200 000	111 000	2 350	980	3,63	**89318-M**	0,97	**K89318-M**
	190	60	680 000	2 200 000	225 000	2 040	840	9,94	**89418-M**	3,04	**K89418-M**
100	135	25	199 000	650 000	61 000	2 480	930	0,95	**81120-TV**	0,25	**K81120-TV**
	150	38	340 000	1 080 000	113 000	2 300	840	2,2	**81220-TV**	0,6	**K81220-TV**
	170	42	380 000	1 400 000	125 000	2 130	910	4,56	**89320-M**	1,18	**K89320-M**
	210	67	850 000	2 850 000	285 000	1 830	710	13,42	**89420-M**	3,92	**K89420-M**

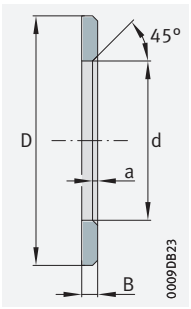
medias *https://www.schaeffler.de/std/1F9A*



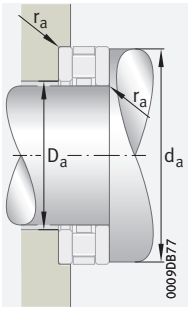
GS



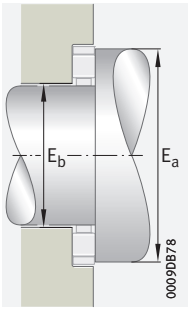
WS



LS



Mounting dimensions

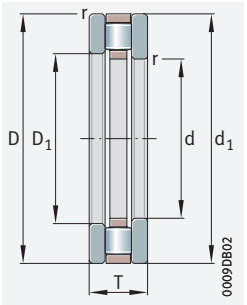


Mounting dimensions, direct bearing arrangement

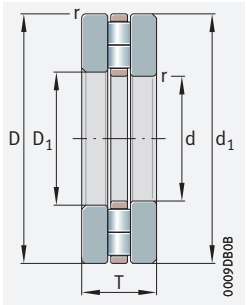
	Axial bearing washers				Dimensions					Mounting dimensions			Raceway dimensions	
	Mass	Designation ➤1092|1.12 ➤1093|1.13												
d D_{c1}	m ≈ kg	Housing locating washer	Shaft locating washer	Bearing washer	D_1	d_1	D_w	B	a r min.	d_a	D_a	r_a	E_b	E_a
65	0,11	**GS81113**	**WS81113**	**LS6590**	67	90	7,5	5,25	1	87	67	1	67	87
	0,268	**GS81213**	**WS81213**	**–**	67	100	11	8	1	96	69	1	69	96
	0,535	**GS89313**	**WS89313**	**–**	67	115	9	10,5	1,1	113	71	1,1	71	113
	1,4	**GS89413**	**WS89413**	**–**	68	140	15	15	2	135	70	2	70	135
70	0,12	**GS81114**	**WS81114**	**LS7095**	72	95	7,5	5,25	1	92	72	1	72	92
	0,278	**GS81214**	**WS81214**	**–**	72	105	11	8	1	102	74	1	74	102
	0,8	**GS89314**	**WS89314**	**–**	72	125	10	12	1,1	123	76	1,1	76	123
	1,73	**GS89414**	**WS89414**	**–**	73	150	16	16	2	147	76	2	76	147
75	0,136	**GS81115**	**WS81115**	**LS75100**	77	100	7,5	5,75	1	97	78	1	78	97
	0,293	**GS81215**	**WS81215**	**–**	77	110	11	8	1	106	79	1	79	106
	0,97	**GS89315**	**WS89315**	**–**	77	135	11	12,5	1,5	132	81	1,5	81	132
	2,09	**GS89415**	**WS89415**	**–**	78	160	17	17	2	156	82	2	82	156
80	0,144	**GS81116**	**WS81116**	**LS80105**	82	105	7,5	5,75	1	102	83	1	83	102
	0,333	**GS81216**	**WS81216**	**–**	82	115	11	8,5	1	112	84	1	84	112
	1,02	**GS89316**	**WS89316**	**–**	82	140	11	12,5	1,5	137	86	1,5	86	137
	2,5	**GS89416**	**WS89416**	**–**	83	170	18	18	2,1	165	88	2,1	88	165
85	0,151	**GS81117**	**WS81117**	**LS85110**	87	110	7,5	5,75	1	108	87	1	87	108
	0,49	**GS81217**	**WS81217**	**–**	88	125	12	9,5	1	119	90	1	90	119
	1,23	**GS89317**	**WS89317**	**–**	88	150	12	13,5	1,5	147	93	1,5	93	146
	2,97	**GS89417**	**WS89417**	**–**	88	180	19	19,5	2,1	175	93	2,1	93	175
90	0,225	**GS81118**	**WS81118**	**LS90120**	92	120	9	6,5	1	117	93	1	93	117
	0,614	**GS81218**	**WS81218**	**–**	93	135	14	10,5	1,1	129	95	1,1	95	129
	1,33	**GS89318**	**WS89318**	**–**	93	155	12	13,5	1,5	152	98	1,5	98	151
	3,45	**GS89418**	**WS89418**	**–**	93	190	20	20	2,1	185	99	2,1	99	185
100	0,35	**GS81120**	**WS81120**	**LS100135**	102	135	11	7	1	131	104	1	104	131
	0,8	**GS81220**	**WS81220**	**–**	103	150	15	11,5	1,1	142	107	1,1	107	142
	1,69	**GS89320**	**WS89320**	**–**	103	170	13	14,5	1,5	167	107	1,5	109	166
	4,75	**GS89420**	**WS89420**	**–**	103	210	22	22,5	3	205	111	3	111	205

Axial cylindrical roller bearings

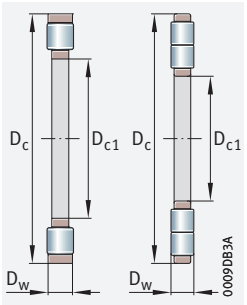
Axial cylindrical roller and cage assemblies
Axial bearing washers



811, 812



893, 894

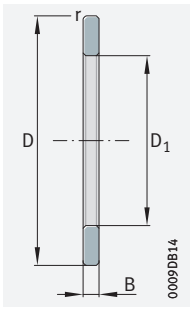


Single row: K811, K812
Double row: K893, K894

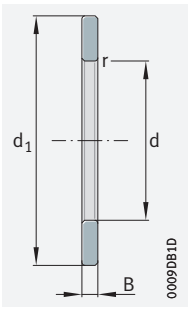
d = 110 – 170 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Axial cylindrical roller bearings		Axial cylindrical roller and cage assemblies	
								Mass	Designation ➤1092|1.12 ➤1093|1.13	Mass	Designation ➤1092|1.12 ➤1093|1.13
d D_{c1}	D D_c	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m		m	
			N	N	N	min^{-1}	min^{-1}	≈ kg		≈ kg	
110	145	25	207 000	700 000	64 000	2 280	860	1,04	**81122-TV**	0,27	**K81122-TV**
	160	38	325 000	1 030 000	106 000	2 150	870	2,29	**81222-TV**	0,53	**K81222-TV**
	190	48	500 000	1 870 000	180 000	1 900	780	6,7	**89322-M**	1,83	**K89322-M**
	230	73	1 010 000	3 400 000	340 000	1 680	640	17,41	**89422-M**	5,11	**K89422-M**
120	155	25	214 000	760 000	67 000	2 110	790	1,12	**81124-TV**	0,29	**K81124-TV**
	170	39	340 000	1 120 000	113 000	2 000	800	2,54	**81224-TV**	0,58	**K81224-TV**
	210	54	640 000	2 420 000	228 000	1 730	690	9,44	**89324-M**	2,64	**K89324-M**
	250	78	1 170 000	4 000 000	395 000	1 540	570	21,9	**89424-M**	6,37	**K89424-M**
130	170	30	255 000	900 000	81 000	1 940	770	1,67	**81126-TV**	0,38	**K81126-TV**
	190	45	480 000	1 520 000	154 000	1 820	720	3,98	**81226-TV**	0,92	**K81226-TV**
	225	58	720 000	2 700 000	255 000	1 620	650	11,2	**89326-M**	2,09	**K89326-M**
	270	85	1 330 000	4 600 000	435 000	1 420	520	27,1	**89426-M**	7,96	**K89426-M**
140	180	31	260 000	960 000	84 000	1 820	720	1,9	**81128-TV**	0,4	**K81128-TV**
	200	46	455 000	1 450 000	143 000	1 690	730	5,07	**81228-M**	1,8	**K81228-M**
	240	60	820 000	3 200 000	300 000	1 520	570	13,2	**89328-M**	2,57	**K89328-M**
	280	85	1 390 000	4 950 000	460 000	1 350	480	29,8	**89428-M**	8,53	**K89428-M**
150	190	31	270 000	1 020 000	88 000	1 710	670	2,2	**81130-TV**	0,43	**K81130-TV**
	215	50	590 000	1 940 000	191 000	1 580	610	7,17	**81230-M**	2,81	**K81230-M**
	250	60	840 000	3 350 000	310 000	1 440	540	13,9	**89330-M**	3,75	**K89330-M**
	300	90	1 580 000	5 700 000	530 000	1 250	440	35,4	**89430-M**	10,4	**K89430-M**
160	200	31	270 000	1 050 000	89 000	1 610	640	2,12	**81132-TV**	0,44	**K81132-TV**
	225	51	600 000	2 030 000	197 000	1 500	580	7,6	**81232-M**	3,01	**K81232-M**
	320	95	1 780 000	6 500 000	600 000	1 170	400	42	**89432-M**	12,4	**K89432-M**
170	215	34	360 000	1 380 000	126 000	1 510	570	2,41	**81134-TV**	0,66	**K81134-TV**
	240	55	680 000	2 340 000	226 000	1 400	540	9,3	**81234-M**	3,5	**K81234-M**
	340	103	1 990 000	7 400 000	670 000	1 100	365	51,9	**89434-M**	14,9	**K89434-M**

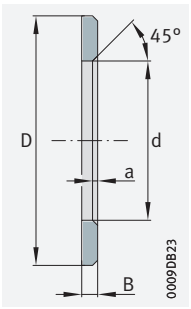
medias *https://www.schaeffler.de/std/1F9A*



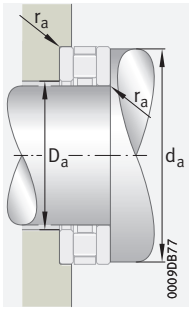
GS



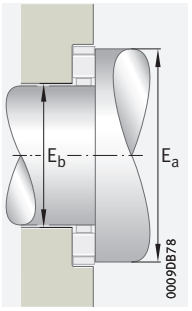
WS



LS



Mounting dimensions

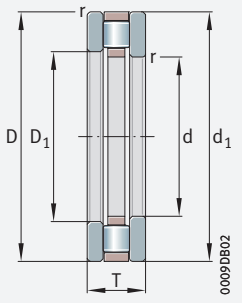


Mounting dimensions, direct bearing arrangement

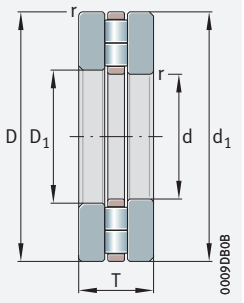
	Axial bearing washers				Dimensions					Mounting dimensions			Raceway dimensions	
	Mass	Designation ➤1092|1.12 ➤1093|1.13												
d D_{c1}	m ≈ kg	Housing locating washer	Shaft locating washer	Bearing washer	D_1	d_1	D_w	B	a r min.	d_a	D_a	r_a	E_b	E_a
110	0,385	**GS81122**	**WS81122**	**LS110145**	112	145	11	7	1	141	114	1	114	141
	0,88	**GS81222**	**WS81222**	–	113	160	15	11,5	1,1	152	117	1,1	117	152
	2,44	**GS89322**	**WS89322**	–	113	190	15	16,5	2	186	120	2	120	185
	6,15	**GS89422**	**WS89422**	–	113	230	24	24,5	3	223	121	3	121	223
120	0,415	**GS81124**	**WS81124**	**LS120155**	122	155	11	7	1	151	124	1	124	151
	0,98	**GS81224**	**WS81224**	–	123	170	15	12	1,1	162	127	1,1	127	162
	3,4	**GS89324**	**WS89324**	–	123	210	17	18,5	2,1	206	130	2,1	132	205
	7,7	**GS89424**	**WS89424**	–	123	250	26	26	4	243	133	4	133	243
130	0,643	**GS81126**	**WS81126**	**LS130170**	132	170	12	9	1	165	135	1	135	165
	1,53	**GS81226**	**WS81226**	–	133	187	19	13	1,5	181	137	1,5	137	181
	4,045	**GS89326**	**WS89326**	–	134	225	18	20	2,1	220	141	2,1	141	219
	9,5	**GS89426**	**WS89426**	–	134	270	28	28,5	4	263	145	4	145	263
140	0,749	**GS81128**	**WS81128**	**LS140180**	142	178	12	9,5	1	175	145	1	145	175
	1,635	**GS81228**	**WS81228**	–	143	197	19	13,5	1,5	191	147	1,5	151	195
	4,8	**GS89328**	**WS89328**	–	144	240	19	20,5	2,1	235	152	2,1	152	234
	10,6	**GS89428**	**WS89428**	–	144	280	28	28,5	4	273	155	4	155	273
150	0,796	**GS81130**	**WS81130**	**LS150190**	152	188	12	9,5	1	185	155	1	155	185
	2,18	**GS81230**	**WS81230**	–	153	212	21	14,5	1,5	211	158	1,5	162	210
	5,06	**GS89330**	**WS89330**	–	154	250	19	20,5	2,1	245	162	2,1	162	244
	12,5	**GS89430**	**WS89430**	–	154	300	30	30	4	293	167	4	167	293
160	0,842	**GS81132**	**WS81132**	**LS160200**	162	198	12	9,5	1	195	165	1	165	195
	2,3	**GS81232**	**WS81232**	–	163	222	21	15	1,5	220	168	1,5	171	219
	14,8	**GS89432**	**WS89432**	–	164	320	32	31,5	5	313	179	5	179	313
170	1,1	**GS81134**	**WS81134**	–	172	213	14	10	1,1	209	176	1,1	176	209
	2,9	**GS81234**	**WS81234**	–	173	237	22	16,5	1,5	235	180	1,5	184	233
	18,5	**GS89434**	**WS89434**	–	174	340	34	34,5	5	333	191	5	191	333

Axial cylindrical roller bearings

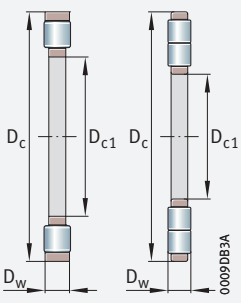
Axial cylindrical roller and cage assemblies
Axial bearing washers



811, 812



893, 894

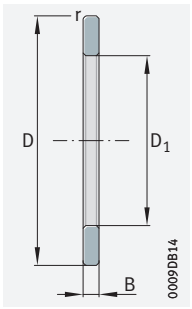


Single row: K811, K812
Double row: K893, K894

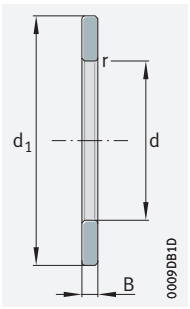
d = 180 – 320 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Axial cylindrical roller bearings		Axial cylindrical roller and cage assemblies	
								Mass	Designation ➤1092|1.12 ➤1093|1.13	Mass	Designation ➤1092|1.12 ➤1093|1.13
d D_{c1}	D D_c	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m		m	
			N	N	N	min^{-1}	min^{-1}	≈ kg		≈ kg	
180	225	34	340 000	1 300 000	117 000	1 430	590	3,3	**81136-M**	1,46	**K81136-M**
	250	56	700 000	2 440 000	232 000	1 340	520	9,9	**81236-M**	3,67	**K81236-M**
	360	109	2 210 000	8 200 000	730 000	1 050	345	60	**89436-M**	17,6	**K89436-M**
190	240	37	390 000	1 500 000	134 000	1 340	570	4,74	**81138-M**	1,84	**K81138-M**
	270	62	880 000	3 000 000	290 000	1 250	475	12,8	**81238-M**	5,17	**K81238-M**
	380	115	2 460 000	9 200 000	820 000	1 010	330	72,1	**89438-M**	20,9	**K89438-M**
200	250	37	395 000	1 550 000	136 000	1 290	550	4,95	**81140-M**	1,93	**K81140-M**
	280	62	900 000	3 150 000	300 000	1 190	450	14,2	**81240-M**	5,4	**K81240-M**
	400	122	2 700 000	10 200 000	900 000	960	305	82,6	**89440-M**	24	**K89440-M**
220	270	37	420 000	1 730 000	149 000	1 180	490	5,22	**81144-M**	2,04	**K81144-M**
	300	63	950 000	3 450 000	320 000	1 100	405	15,3	**81244-M**	5,8	**K81244-M**
	420	122	2 900 000	11 500 000	990 000	880	265	90,1	**89444-M**	25,7	**K89444-M**
240	300	45	600 000	2 500 000	216 000	1 070	420	8,45	**81148-M**	3,32	**K81148-M**
	340	78	1 370 000	5 000 000	450 000	970	330	26,2	**81248-M**	9,94	**K81248-M**
	440	122	3 000 000	12 200 000	1 040 000	850	250	95,9	**89448-M**	27,3	**K89448-M**
260	320	45	620 000	2 650 000	223 000	990	390	9,08	**81152-M**	3,55	**K81152-M**
	360	79	1 440 000	5 400 000	480 000	910	305	28,6	**81252-M**	10,8	**K81252-M**
	480	132	3 600 000	14 700 000	1 220 000	780	224	125	**89452-M**	36,8	**K89452-M**
280	350	53	870 000	3 650 000	310 000	910	330	12,6	**81156-M**	5,31	**K81156-M**
	380	80	1 460 000	5 600 000	490 000	860	290	31	**81256-M**	11,5	**K81256-M**
	520	145	4 250 000	17 600 000	1 440 000	700	195	159	**89456-M**	48,5	**K89456-M**
300	380	62	1 070 000	4 500 000	380 000	840	295	19,4	**81160-M**	7,6	**K81160-M**
	420	95	1 930 000	7 300 000	630 000	780	255	48,25	**81260-M**	17,8	**K81260-M**
	540	145	4 350 000	18 500 000	1 500 000	670	184	170	**89460-M**	49,8	**K89460-M**
320	400	63	1 100 000	4 750 000	395 000	800	280	20,7	**81164-M**	8,04	**K81164-M**
	580	155	5 500 000	19 900 000	1 490 000	640	184	203	**89464-M**	80,3	**K89464-M**

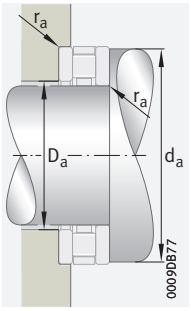
medias *https://www.schaeffler.de/std/1F9A*



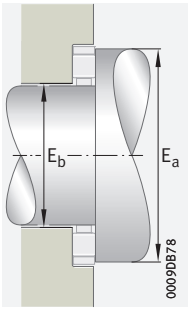
GS



WS



Mounting dimensions



Mounting dimensions, direct bearing arrangement

	Axial bearing washers			Dimensions					Mounting dimensions			Raceway dimensions	
	Mass	Designation ➤1092|1.12 ➤1093|1.13											
d D_{c1}	m ≈ kg	Housing locating washer	Shaft locating washer	D_1	d_1	D_w	B	a r min.	d_a	D_a	r_a	E_b	E_a
180	1,12	**GS81136**	**WS81136**	183	222	14	10	1,1	219	185	1,1	186	220
	3,13	**GS81236**	**WS81236**	183	247	22	17	1,5	245	190	1,5	194	243
	21,3	**GS89436**	**WS89436**	184	360	36	36,5	5	351	200	5	200	351
190	1,45	**GS81138**	**WS81138**	193	237	15	11	1,1	233	197	1,1	198	234
	3,835	**GS81238**	**WS81238**	194	267	26	18	2	265	200	2	205	263
	25,6	**GS89438**	**WS89438**	195	380	38	38,5	5	373	214	5	212	371
200	1,51	**GS81140**	**WS81140**	203	247	15	11	1,1	243	206	1,1	208	244
	4,41	**GS81240**	**WS81240**	204	277	26	18	2	275	210	2	215	273
	29,3	**GS89440**	**WS89440**	205	400	40	41	5	393	226	5	224	391
220	1,59	**GS81144**	**WS81144**	223	267	15	11	1,1	263	226	1,1	228	264
	4,75	**GS81244**	**WS81244**	224	297	26	18,5	2	296	230	2	236	294
	32,2	**GS89444**	**WS89444**	225	420	40	41	6	411	244	6	244	411
240	2,57	**GS81148**	**WS81148**	243	297	18	13,5	1,5	296	248	1,5	253	294
	8,15	**GS81248**	**WS81248**	244	335	32	23	2,1	335	261	2,1	263	333
	34,3	**GS89448**	**WS89448**	245	440	40	41	6	433	266	6	264	431
260	2,765	**GS81152**	**WS81152**	263	317	18	13,5	1,5	316	268	1,5	272	314
	8,9	**GS81252**	**WS81252**	264	355	32	23,5	2,1	353	280	2,1	281	351
	44,25	**GS89452**	**WS89452**	265	480	44	44	6	472	288	6	286	468
280	3,65	**GS81156**	**WS81156**	283	347	22	15,5	1,5	346	288	1,5	294	344
	9,75	**GS81256**	**WS81256**	284	375	32	24	2,1	373	300	2,1	301	371
	55,6	**GS89456**	**WS89456**	285	520	48	48,5	6	512	311	6	309	508
300	5,92	**GS81160**	**WS81160**	304	376	25	18,5	2	373	315	2	316	372
	15,2	**GS81260**	**WS81260**	304	415	38	28,5	3	413	328	3	329	412
	60,15	**GS89460**	**WS89460**	305	540	48	48,5	6	533	331	6	329	528
320	6,35	**GS81164**	**WS81164**	324	396	25	19	2	394	334	2	336	392
	61,5	**GS89464**	**WS89464**	325	575	68	43,5	6	573	340	6	343	566

Axial spherical roller bearings





Matrix for bearing preselection 1127

1 Axial spherical roller bearings 1128

1.1 Bearing design 1128
1.2 Load carrying capacity 1130
1.3 Compensation of angular misalignments 1131
1.4 Lubrication 1131
1.5 Sealing 1132
1.6 Speeds 1132

FAG



1.7 Noise _____ *1132*
1.8 Temperature range _____ *1133*
1.9 Cages _____ *1133*
1.10 Internal clearance _____ *1133*
1.11 Dimensions, tolerances _____ *1134*
1.12 Suffixes _____ *1134*
1.13 Structure of bearing designation _____ *1135*
1.14 Dimensioning _____ *1136*
1.15 Minimum load _____ *1137*
1.16 Design of bearing arrangements _____ *1138*
1.17 Mounting and dismounting _____ *1139*
1.18 Legal notice regarding data freshness _____ *1140*
1.19 Further information _____ *1140*

Product tables

Axial spherical roller bearings _____ *1142*

Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

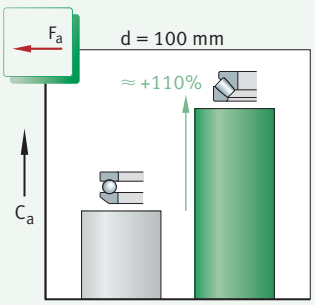
Design features and suitability			Axial spherical roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available				detailed information ➤ 1128
Load carrying capacity	radial		+	➤ 1130|1.2
	axial, one direction		+++	➤ 1130|1.2
	axial, both directions		–	➤ 1130|1.2
	moments		–	
Compensation of angular misalignments	static		+++	➤ 1131|1.3
	dynamic		+	➤ 1131|1.3
Bearing design	cylindrical bore		✓	➤ 1128|1.1
	tapered bore		–	
	separable		✓	➤ 1139|1.17
Lubrication	greased		–	➤ 1131|1.4
Sealing	open		✓	➤ 1132|1.5
	non-contact		–	➤ 1132|1.5
	contact		–	➤ 1132|1.5
Operating temperature in °C	from to		–30 +200	➤ 1133|1.8
Suitability for	high speeds		+	➤ 1132|1.6
	high running accuracy		+	➤ 1134|1.11 ➤ 115
	low-noise running		(+)	➤ 1132|1.7 ➤ 27
	high rigidity		++	➤ 54
	reduced friction		++	➤ 56
	length compensation within bearing		–	
	non-locating bearing arrangement		–	
	locating bearing arrangement		(+)	➤ 141
X-life bearings			✓	➤ 1129
Bearing bore d in mm	from to		60 1600	➤ 1142
Product tables	from page ➤		1142	

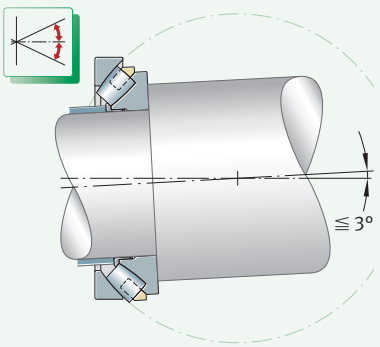
1 Axial spherical roller bearings

Axial spherical roller bearings are suitable where:

- bearing arrangements are subjected to high and very high axial loads ➤*1130*|*1.2*
- dynamic or static misalignments of the shaft relative to the housing, or deflections of the shaft, must be compensated by the bearing under axial loads ➤*1131*|*1.3*
- radial loads occur in addition to axial forces (maximum 55% of F_a) ➤*1130*|*1.2*
- a relatively high speed suitability is required in addition to a high load carrying capacity ➤*1132*|*1.6*
- high shock type loads must be supported
- bearing parts are to be mounted separately (the bearings are not self-retaining) ➤*1128*|*1.1*

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1127*.





1 *Axial spherical roller bearing: comparison of load carrying capacity with axial deep groove ball bearing, compensation of misalignments*

F_a = *axial load*
C_a = *basic axial dynamic load rating*

1.1 Bearing design

Design variants

Axial spherical roller bearings are available in the basic design as:

- an increased capacity design with sheet steel cage or solid brass cage ➤*1129*|*2*

X-life bearings

The bearings are available in the majority of sizes as X-life bearings ➤*1129*|*3*.

The bearing design is dependent on the bearing series and the bearing size. It essentially differs in the configuration and guidance of the cage ➤*1133*|*1.9*.

Bearings of basic design

The raceway in the housing locating washer has a curved form

Axial spherical roller bearings are part of the group of axial roller bearings. These single row, non-self-retaining rolling bearings comprise solid shaft and housing locating washers with raceways for the rolling elements. Cages guide the large number of asymmetrical barrel rollers ➤*1133*|*1.9*. The cage, roller and cage assembly, and shaft locating washer form a self-retaining unit. The raceways are arranged oblique to the bearing axis, the raceway in the housing locating washer is of a concave design. This design allows these bearings to combine a range of characteristics, which are essential to many applications, in one bearing, such as angular adjustability for example ➤*1131*|*1.3*.

Roller contact design

The stress distribution at the contact points between the rollers and raceways is determined by the contact surface of the rollers. As a result, the roller geometry is matched to the raceway. This gives a favourable load distribution over the entire length of the roller and thus prevents both edge stresses and stress peaks at the ends of the roller.

Increased capacity design with sheet steel cage or solid brass cage

Bearings with sheet steel cage

Bearings without a cage suffix have coated sheet steel cages, which are guided by rollers ➤*1129*|*2* and ➤*1133*|*1.9*. These designs are available as X-life bearings ➤*1129*.

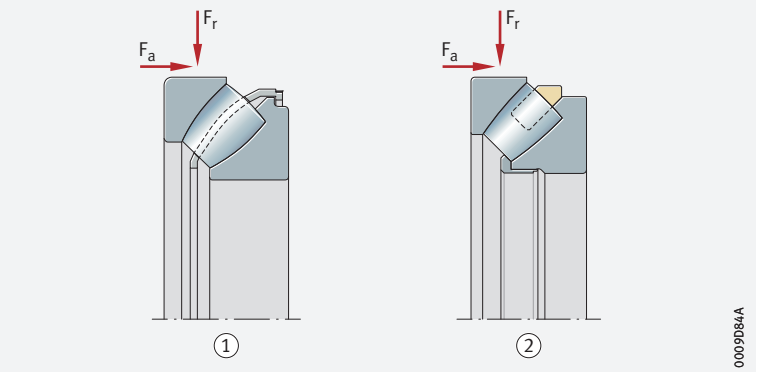
Bearings with solid brass cage

Bearings with the cage suffix MB have solid brass cages that are guided on the shaft locating washer or by the rollers ➤*1129*|*2* and ➤*1133*|*1.9*. The MB design is also available in numerous sizes as X-life bearings ➤*1129*.

2
Axial spherical roller bearings of basic design

F_r = *radial load*
F_a = *axial load*

① *Increased capacity design, with sheet steel cage*
② *Increased capacity design, with solid brass cage*



X-life premium quality

X-life

X-life bearings exhibit considerably higher performance than conventional axial spherical roller bearings. This is achieved, for example, through the modified internal construction, the optimised contact geometry between the rollers and raceways, the new cage design, a higher steel quality, better surface quality and optimised roller guidance and lubricant film formation.

3
Axial spherical roller bearing in X-life design

① *Cage*
② *Barrel roller*
③ *Housing locating washer*
④ *Shaft locating washer*



Advantages

Increased customer benefits due to X-life

These technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings
- downsizing possible, increased performance density
- a higher fatigue limit load
- a higher running accuracy and smooth running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life axial spherical roller bearings include the suffix XL in the designation ➤*1134*|*1.12* and ➤*1142*|▦.

Areas of application

Wide application range

Due to their special technical features, X-life axial spherical roller bearings are highly suitable for bearing arrangements in:

- refiners and worm extruders in the pulp and paper industry
- drilling rigs and roll pressers in the cement industry, mining and raw material processing
- work rolls and back-up rolls in cold rolling mills
- extruder gearboxes in chemical plant and refineries
- air preheaters in thermal power stations
- POD and azimuth drives in marine propulsion systems

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

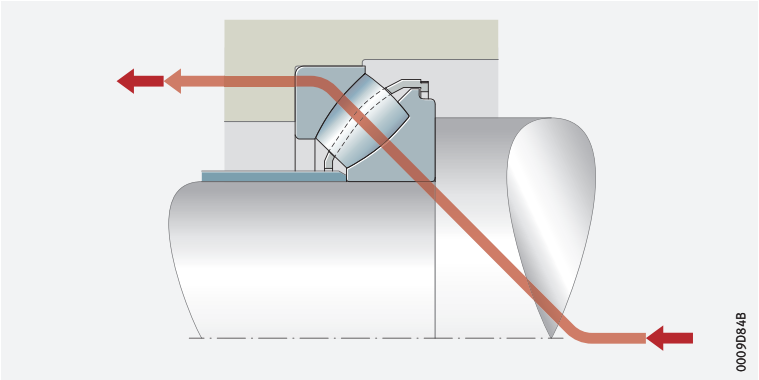
1.2 Load carrying capacity

Designed for very high axial loads and high radial loads

Axial spherical roller bearings can support very high axial loads in one direction and – since the raceways are inclined relative to the bearing axis – radial loads acting simultaneously. They are designed for very high load carrying capacity and, since they have the maximum possible number of large and long barrel rollers, are also suitable for the heaviest loads.

As a result of the inclined raceways, the load is transmitted from one raceway to the other oblique to the bearing axis ➤*1131*|*4*. Due to the optimised osculation conditions between the rollers and raceways, uniform stress distribution is achieved in the bearing.

The radial load (F_r, F_{0r}) must not exceed 55% of the axial load ➤*1136*|*1* and ➤*1136*|*2*.



4
Force flow under axial load

The load is transmitted from one raceway to the other oblique to the bearing axis.

1.3 Compensation of angular misalignments

Axial spherical roller bearings compensate dynamic and static angular misalignments

Due to the concave rolling element raceway in the housing locating washer, axial spherical roller bearings are capable of angular adjustment. As a result, they permit skewing between the shaft locating washer and housing locating washer within certain limits, without causing damage to the bearings or impairing their function. In this way, they can compensate misalignment, shaft deflection and housing deformation ➤*1131*|▦ *1*. The extent to which these table values can be used in practice is, however, essentially dependent on the design of the bearing arrangement, the type of seal and other factors.

Permissible adjustment angle

The adjustment angles given in the table are permissible under the following conditions:

- P or $P_0 \leqq 0{,}05 \cdot C_{0a}$.
- The angular deviation is constant (static angular misalignment).
- The rotating component is the shaft locating washer

▦ 1
Permissible skewing under static misalignment

D = *bearing outside diameter*

Bearing series	Permissible skewing	
	D < 320 mm	D ≧ 320 mm
292..-E1	1,5°	1°
293..-E1	2,5°	1,5°
294..-E1	3°	2°

If the rotating component is the housing locating washer or the shaft locating washer undergoes tumbling motion, the angular adjustment facility is smaller. In such cases, please consult Schaeffler.

1.4 Lubrication

Oil lubrication is predominantly used

Axial spherical roller bearings are not greased. They are generally lubricated using oil. In some cases, lubrication with greases containing EP additives is also possible. In this instance, however, it must be ensured that the contact points between the rollers and the guidance rib are always adequately supplied with grease. This is best achieved if the bearing is completely filled with grease and regularly relubricated.

Pay attention to the pumping action in bearings with oil lubrication

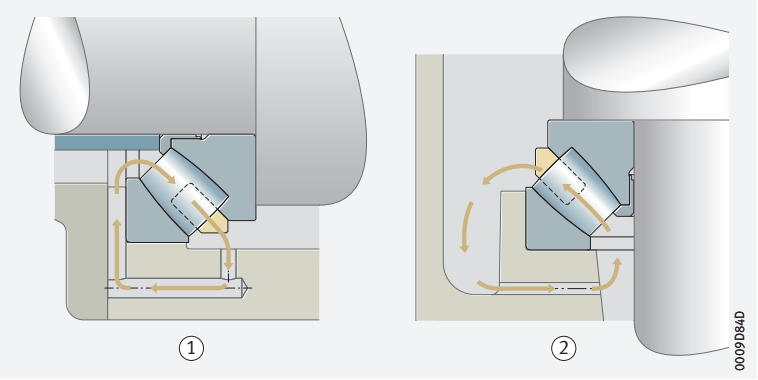
Due to their internal construction, a pumping action occurs in bearings with an asymmetrical cross-section. This pumping action, which is heavily dependent on the circumferential speed, can be used under certain conditions to generate oil recirculation in the bearing ➤*1132*|⧉ *5*. The pumping action is present in bearing arrangements with a horizontal and vertical shaft and must be taken into account when selecting the lubrication and sealing method.

The volume flow generated by the bearings can easily reach a throughput of $>$ 50 l/min. In order to give appropriate possibilities for compensation, ducts for the purposes of oil return must therefore be included in the housing ➤*1132*| 5.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

5
Oil recirculation by means of pumping action, ducts for the purposes of oil return

① *Bearing arrangement with horizontal shaft*
② *Bearing arrangement with vertical shaft*



1.5 Sealing

✎ The bearings are of an open design; provide seals in the adjacent construction

Axial spherical roller bearings are supplied without seals. In the case of unsealed bearings, sealing of the bearing position must be carried out in the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position

1.6 Speeds

✎ Speeds in the product tables

The achievable operating speed is dependent on the application, the associated loads and the lubrication.

The product tables generally give two speeds for the bearings:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

Reference speeds

✎ $n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** *https://medias.schaeffler.com*

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant

Possible operating temperatures of axial spherical roller bearings ➤*1133*|▦*2*.

▦*2* *Permissible temperature ranges*

Operating temperature	Axial spherical roller bearings with sheet steel or brass cage
	–30 °C to +200 °C, limited by the lubricant

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Sheet steel cages or solid brass cages are used as standard

Axial spherical roller bearings essentially differ in terms of their cage design ➤*1129*|⧉*2*. The design is dependent on the bearing series and the bearing size ➤*1133*|▦*3*. Sheet steel cages do not have a cage suffix in the designation ➤*1133*|▦*3*. The cages have a high strength. They are suitable for high temperatures and all conventional lubricants.

If there is any uncertainty regarding cage suitability for a specific application, please consult Schaeffler.

▦*3* *Cage, cage suffix, bore code*

Bearing series	Sheet steel cage	Solid brass cage MB
	Bore code	
292..-E1	–	30 to /1180
293..-E1-XL	17 to 64	68 to /800
293..-E1	–	/850 to /1600
294..-E1-XL	12 to 68	72 to /710
294..-E1	–	/750 to /1060

1.10 Internal clearance

The possible preload is determined by the application

In the case of axial spherical roller bearings, the axial preload is achieved when the bearings are mounted. The requisite preload is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways. A specific minimum axial load $F_{a\,min}$ must be acting on axial spherical roller bearings at all times ➤*1137*|*1.15*.

If there is any uncertainty regarding preload, please consult Schaeffler.

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of axial spherical roller bearings correspond to ISO 104:2015 and DIN 728:1991.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤140.
Nominal value of chamfer dimension ➤1142.

Tolerances

The dimensional and running tolerances of shaft and housing locating washers correspond to the tolerance class Normal in accordance with ISO 199:2014 ➤135 25 to ➤137 28.

Restricted section height tolerance

The tolerances for section height T are considerably restricted for all axial spherical roller bearings compared to the standard values ➤1134 4 and ➤1142.

4 *Tolerances for bearing section height*

Nominal bore diameter mm		Deviation of bearing section height T µm	
over	incl.	upper	lower
50	80	0	−100
80	120	0	−100
120	180	0	−125
180	250	0	−125
250	315	0	−150
315	400	0	−200
400	500	0	−420
500	630	0	−500
630	800	0	−630
800	1 000	0	−800
1 000	1 250	0	−1 000
1 250	1 600	0	−1 200

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

5 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
E1	Increased capacity design	Standard
MB	Solid brass cage	
N1	One retaining slot in the housing locating washer	
N2	Two retaining slots offset by 180° in the housing locating washer	
THI	3 uniformly distributed threaded holes in one end face of the shaft locating washer	
THIE	3 uniformly distributed threaded holes in one end face of the shaft locating washer, incl. suitable eye bolts	
THO	3 uniformly distributed threaded holes in one end face of the housing locating washer	
THOE	3 uniformly distributed threaded holes in one end face of the housing locating washer, incl. suitable eye bolts	
XL	X-life bearing	

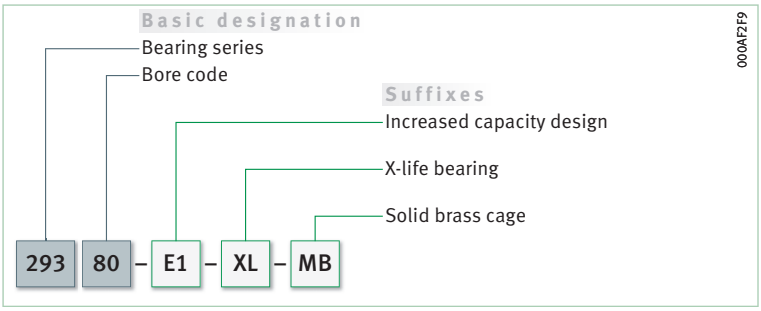
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

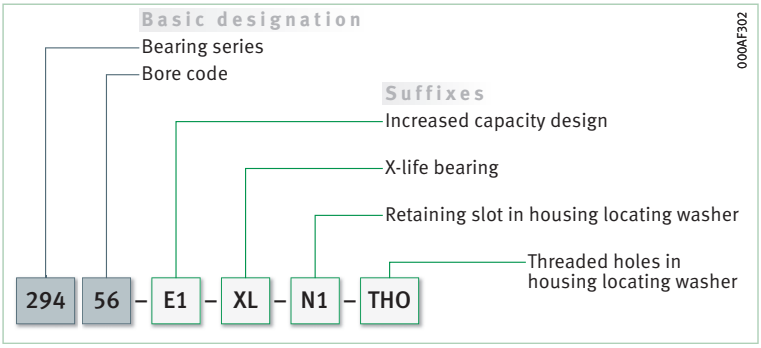
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ➤*1135*|*6* and ➤*1135*|*7*. The composition of designations is subject to DIN 623-1 ➤*102*|*10*.

6
Axial spherical roller bearing, X-life design: designation structure



7
Axial spherical roller bearing, X-life design, with retaining slot and threaded holes: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *P = a substitute force for combined load and various load cases*

The basic rating life equation $L = (C/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In axial bearings, this is a purely axial and concentrically acting load. If this condition is not met, an equivalent dynamic bearing load P must be determined for the rating life calculation. In the case of axial bearings,
this is a concentrically acting axial load of constant magnitude and direction, which has the same effect on the rating life as the load occurring in practice. Calculation ➤*1136*| *1*.

1
Equivalent dynamic load

$$P = F_a + 1{,}2 \cdot F_r$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load.

The radial bearing load F_r must not exceed 55% of the axial load F_a:
$F_r \leqq 0{,}55 \cdot F_a$

Equivalent static bearing load

For axial spherical roller bearings subjected to static load ➤*1136*| *2*.

2
Equivalent static load

$$P_0 = F_{0a} + 2{,}7 \cdot F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

The radial bearing load F_{0r} must not exceed 55% of the axial load F_{0a}:
$F_{0r} \leqq 0{,}55 \cdot F_{0a}$

Static load safety factor

In addition to the basic rating life $L(L_{10h})$, it is also always necessary to check the static load safety factor S_0. The following values must be observed here ➤*1136*| *6*. Calculation of S_0 ➤*1136*| *3*.

3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

6
Values for static load safety factor

Static load safety factor S_0	Conditions
$S_0 \geqq 8$	Axial support by the abutment shoulders in accordance with the product tables (d_a and D_a) ➤*1142*|
$S_0 \geqq 6$	Full axial support of the housing and shaft locating washers by the entire mating surface, dimensions D_1 and d_1 ➤*1142*|
$S_0 \geqq 4$	Full axial support, dimensions D_1 and d_1 ➤*1142*| together with good radial support of the housing locating washer (housing tolerance K7)

1.15 Minimum load

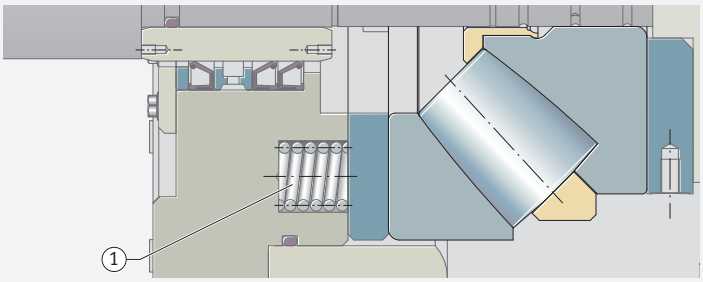
Rolling bearings under low loads are particularly prone to slippage

If the lubricant film is interrupted between the rolling elements and raceways as a result of slippage, the contact partners will come into contact at high relative velocity and the wear in the bearing will increase abruptly. The risk of slippage is particularly high where bearings are subjected to low loads. In order to prevent slippage damage and guarantee kinematics, a minimum axial load $F_{a\,min}$ must therefore be applied to the bearing ➤*1137*| *f* 4 and ➤*1137*| ▦ *7*.

Preload the bearings, if the minimum axial load is not achieved

In vertical bearing arrangements in particular, the requisite minimum axial load $F_{a\,min}$ is normally already achieved by the weight of the supported parts and the external forces. If this is not the case, the bearing arrangement must be preloaded, for example by means of springs or a shaft nut ➤*1137*| *8* and ➤*1133*| *1.10*. The minimum axial load must be ensured in all operating modes.

8
Minimum axial load applied to an axial spherical roller bearing by means of spring preload



① *Pressure springs distributed uniformly around the circumference of the housing locating washer*

f 4
Minimum axial load

$$F_{a\,min} = 0{,}0005 \cdot C_{0a} + k_a \left(\frac{C_{0a} \cdot n}{10^8} \right)^2$$

Legend

$F_{a\,min}$	N	Minimum axial load
C_{0a}	N	Basic static load rating ➤*1142*| ▦
k_a	–	Factor for determining the minimum load ➤*1137*| ▦ *7*
n	min^{-1}	Speed.

▦ 7
Factor k_a for calculating the minimum axial load

Bearing series	Factor k_a
292..-E1	0,6
293..-E1	0,9
294..-E1	0,7

1.16 Design of bearing arrangements

Design of adjacent parts

Support bearing washers over the circumference and width

The adjacent parts to the shaft and housing locating washers must be rigid, flat and perpendicular to the axis of rotation. They must be configured such that the bearing washers are supported over the whole circumference and over the whole raceway width; in particular, this must be observed under high loads. The axial runout tolerances of the contact surfaces for axial spherical roller bearings should be designed to IT5 or better ➤ *1138* | 8.

The housing bore must have a recess with a diameter $D_{b\ min}$ above the housing locating washer, otherwise the rollers may graze the housing in the event of shaft misalignments ➤ *1138* | 9. Dimensions for $D_{b\ min}$ ➤ *1142*.

E1 = bearings with new internal construction

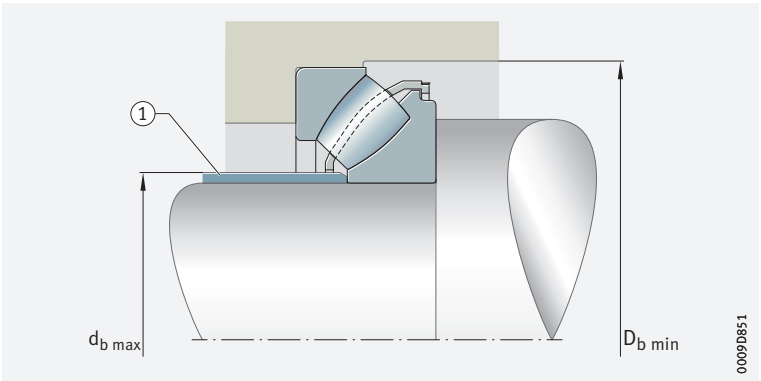
Due to the new internal construction of the E1 bearings, attention must be paid to the mounting dimensions. This also applies to the configuration of the spacer sleeve on the shaft locating washer (dimensions d_b, d_{b1}) ➤ *1142*.

9
Release in the housing and maximum height of spacer sleeve

$D_{b\ min}$ = *minimum dimension of recess in the housing*

d_{max} = *maximum height of spacer sleeve*

① *Spacer sleeve*



8
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm					
	over **50**	**80**	**120**	**180**	**250**	**315**
	incl. **80**	**120**	**180**	**250**	**315**	**400**
	Values in µm					
IT5	13	15	18	20	23	25

continued ▼

8
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm					
	over **400**	**500**	**630**	**800**	**1000**	**1250**
	incl. **500**	**630**	**800**	**1000**	**1250**	**1600**
	Values in µm					
IT5	27	32	36	40	47	55

continued ▲

Tolerances for shaft and housing bore

Observe point or circumferential load of bearing washers

Fits for the bearing rings of axial spherical roller bearings, as a function of the condition of rotation ➤*1139*|▦*9*. The conditions of rotation for shaft and housing locating washers must be taken into consideration when defining the fits (point or circumferential load).

▦*9*
Conditions of rotation and fits

Adjacent part	Type of load	Operating conditions	Tolerance class[1)]
Shaft	Combined load	Point load for shaft locating washer	j6
		Circumferential load for shaft locating washer, shaft diameter up to 200 mm	j6 (k6)
		Circumferential load for shaft locating washer, shaft diameter from 200 mm	k6 (m6)
Housing	Axial load	Normal load	E8
		High load	G7
	Combined load	Point load for housing locating washer	H7
		Circumferential load for housing locating washer	K7

1) *The envelope requirement Ⓔ applies.*

If there is any uncertainty regarding the design of adjacent parts, please consult Schaeffler.

1.17 Mounting and dismounting

The mounting and dismounting options for the bearings must be taken into consideration in the design of the bearing position.

As the bearings are not self-retaining, they are easy to mount

Axial spherical roller bearings are not self-retaining.
As a result, the bearing parts can be mounted separately from each other. This gives simplified mounting of the bearings.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*.
It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

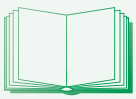
Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: *https://medias.schaeffler.com*.

1.19 Further information

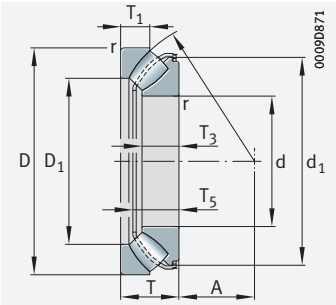


In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

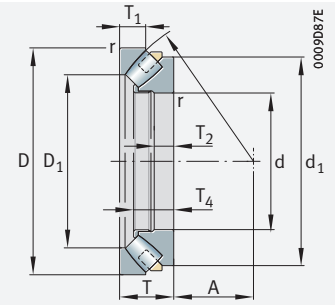
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*



Axial spherical roller bearings



With sheet steel cage

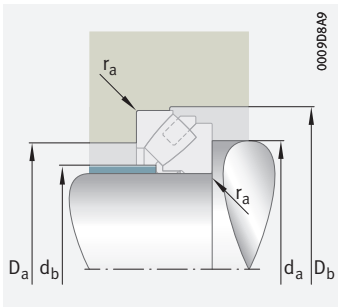


With solid brass cage

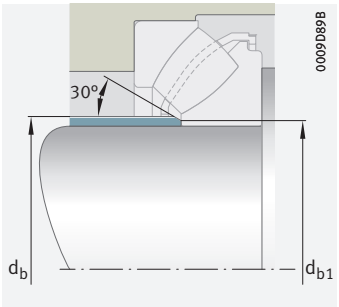
d = 60 – 190 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1134*|*1.12* ➤*1135*|*1.13* X-life ➤*1129*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
60	130	42	410 000	940 000	117 000	6 000	2 850	2,5	**29412-E1-XL**
65	140	45	495 000	1 160 000	139 000	5 500	2 600	3,1	**29413-E1-XL**
70	150	48	550 000	1 290 000	154 000	5 000	2 430	3,8	**29414-E1-XL**
75	160	51	650 000	1 540 000	179 000	4 700	2 260	4,6	**29415-E1-XL**
80	170	54	720 000	1 720 000	199 000	4 350	2 140	5,5	**29416-E1-XL**
85	150	39	420 000	1 110 000	158 000	4 850	2 260	2,7	**29317-E1-XL**
	180	58	800 000	1 910 000	224 000	4 100	2 010	6,5	**29417-E1-XL**
90	155	39	420 000	1 130 000	164 000	4 650	2 140	2,8	**29318-E1-XL**
	190	60	880 000	2 130 000	244 000	3 850	1 920	7,5	**29418-E1-XL**
100	170	42	495 000	1 340 000	194 000	4 200	1 960	3,6	**29320-E1-XL**
	210	67	1 060 000	2 600 000	290 000	3 400	1 740	10,1	**29420-E1-XL**
110	190	48	620 000	1 760 000	235 000	3 750	1 830	5,2	**29322-E1-XL**
	230	73	1 260 000	3 150 000	350 000	3 100	1 600	12,8	**29422-E1-XL**
120	210	54	800 000	2 210 000	290 000	3 350	1 700	7,2	**29324-E1-XL**
	250	78	1 470 000	3 700 000	400 000	2 800	1 460	15,9	**29424-E1-XL**
130	225	58	900 000	2 600 000	325 000	3 100	1 590	8,8	**29326-E1-XL**
	270	85	1 700 000	4 350 000	460 000	2 600	1 360	21	**29426-E1-XL**
140	240	60	1 010 000	2 900 000	365 000	2 900	1 490	10,3	**29328-E1-XL**
	280	85	1 720 000	4 500 000	495 000	2 460	1 290	22,1	**29428-E1-XL**
150	215	39	425 000	1 720 000	207 000	3 150	1 540	4,4	**29230-E1-MB**
	250	60	1 020 000	2 900 000	385 000	2 750	1 400	10,5	**29330-E1-XL**
	300	90	2 000 000	5 300 000	560 000	2 290	1 180	27,2	**29430-E1-XL**
160	225	39	420 000	1 720 000	218 000	3 000	1 450	4,7	**29232-E1-MB**
	270	67	1 220 000	3 550 000	445 000	2 500	1 320	14	**29332-E1-XL**
	320	95	2 240 000	6 000 000	630 000	2 120	1 090	32,1	**29432-E1-XL**
170	240	42	470 000	1 940 000	242 000	2 800	1 390	5,8	**29234-E1-MB**
	280	67	1 230 000	3 500 000	455 000	2 390	1 260	14,2	**29334-E1-XL**
	340	103	2 550 000	6 900 000	700 000	1 990	1 020	39,6	**29434-E1-XL**
180	250	42	485 000	2 070 000	255 000	2 650	1 350	6,1	**29236-E1-MB**
	300	73	1 460 000	4 300 000	530 000	2 240	1 170	18,4	**29336-E1-XL**
	360	109	2 850 000	7 700 000	770 000	1 860	940	47,6	**29436-E1-XL**
190	270	48	600 000	2 500 000	300 000	2 440	1 300	8,5	**29238-E1-MB**
	320	78	1 680 000	4 850 000	600 000	2 070	1 090	22,3	**29338-E1-XL**
	380	115	3 100 000	8 500 000	870 000	1 750	910	54,6	**29438-E1-XL**

medias *https://www.schaeffler.de/std/1F9A*



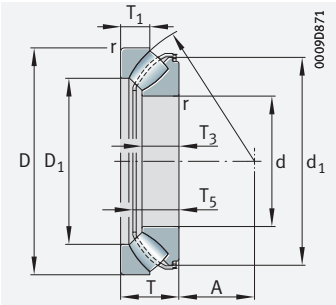
Mounting dimensions



With sheet steel cage
Mounting dimensions

Dimensions										Mounting dimensions					
d	D_1	d_1	r	T_1	T_2	T_3	T_4	T_5	A	d_a	D_a	D_b	d_b	d_{b1}	r_a
			min.					≈		min.	max.	min.	max.	max.	max.
60	85,5	116,5	1,5	21	–	27	–	37,5	38	95	107	133	67	–	1,5
65	91,5	125,2	2	22	–	29,5	–	40,5	42	100	115	143	72	–	2
70	99	133,8	2	23,8	–	31	–	42,5	44,8	110	124	153	78,5	–	2
75	105,5	142,3	2	24,5	–	33,5	–	46	47	115	132	163	82,5	–	2
80	112,5	150,9	2,1	26,5	–	35	–	48,5	50	125	141	173	88	–	2,1
85	109,5	138,5	1,5	20	–	24,5	–	34,5	50	120	129	153	92	–	1,5
	121	159,3	2,1	28	–	37	–	51	54	130	150	183	94	–	2,1
90	115	142,3	1,5	19,5	–	24,5	–	34,5	52	125	135	158	97	–	1,5
	127,5	167,7	2,1	28,5	–	39	–	54	56	135	158	193	99,5	–	2,1
100	127,5	156	1,5	20,5	–	26,2	–	37,5	58	135	148	173	107	–	1,5
	141,5	184,5	3	32	–	43	–	59,5	62	150	175	214	110,5	–	2,5
110	140	175,6	2	24,8	–	30,3	–	42	64	150	165	193	120	–	2
	155,5	201,9	3	34,7	–	47	–	64,5	69	165	192	234	129	121	2,5
120	154	192,6	2,1	27	–	34	–	48	70	165	182	213	129	–	2,1
	171	218,8	4	36,5	–	50,5	–	70	74	180	210	254	142	132	3
130	165,5	207,9	2,1	30,1	–	36,7	–	50,5	76	180	195	228	143	139	2,1
	184,5	240	4	40,9	–	54	–	75	81	195	227	275	153	143	3
140	177	220,6	2,1	30	–	38,5	–	53,5	82	190	208	244	154	149	2,1
	194,5	251,1	4	41	–	54	–	74,5	86	205	237	285	162	154	3
150	176	200	1,5	20,5	14	25	37	–	82	185	193	219	157	–	1,5
	190	228,4	2,1	28	–	38	–	54,5	87	195	220	254	163	159	2,1
	207,5	267,4	4	43,4	–	58	–	80,5	92	220	253	306	175	164	3
160	188	210	1,5	20	14	25	37	–	87	195	204	229	168	–	1,5
	203	248	3	33	–	42	–	59,5	92	215	236	274	176	170	2,5
	223,5	283,5	5	45,5	–	60,5	–	84,5	99	235	271	326	189	176	4
170	201	225	1,5	22	15	26	40	–	93	205	218	244	180	–	1,5
	215	255,7	3	30,5	–	42,2	–	60,5	96	220	247	284	188	180	2,5
	236	305	5	50	–	65,5	–	89,5	104	250	288	346	199	186	4
180	208	235	1,5	22	15	26	40	–	97	215	226	254	190	–	1,5
	227	274,5	3	35,5	–	46	–	64,5	103	235	263	304	195	190	2,5
	250	315,5	5	53	–	69,5	–	96	110	265	305	366	210	197	4
190	226	255	2	25,5	17	29	45	–	103	230	243	274	203	–	2
	243,5	290,1	4	36	–	49	–	70	110	250	281	325	211	201	3
	264,5	340	5	55,5	–	73	–	100,9	117	280	322	386	223	209	4

Axial spherical roller bearings

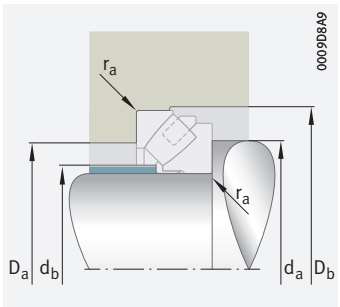


With sheet steel cage *With solid brass cage*

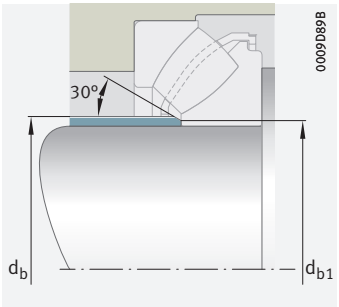
d = 200 – 380 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1134*|*1.12* ➤*1135*|*1.13* X-life ➤*1129*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
200	280	48	650 000	2 650 000	320 000	2 340	1 280	9	**29240-E1-MB**
	340	85	1 900 000	5 600 000	670 000	1 940	1 030	27,3	**29340-E1-XL**
	400	122	3 450 000	9 500 000	950 000	1 660	860	63,7	**29440-E1-XL**
220	300	48	690 000	3 000 000	355 000	2 170	1 160	9,8	**29244-E1-MB**
	360	85	1 990 000	6 200 000	730 000	1 820	950	30,6	**29344-E1-XL**
	420	122	3 500 000	10 000 000	1 020 000	1 560	790	69	**29444-E1-XL**
240	340	60	1 010 000	4 150 000	470 000	1 890	1 060	16,9	**29248-E1-MB**
	380	85	2 040 000	6 500 000	770 000	1 710	880	32,8	**29348-E1-XL**
	440	122	3 600 000	10 500 000	1 080 000	1 470	740	74,1	**29448-E1-XL**
260	360	60	1 040 000	4 550 000	510 000	1 780	970	17,6	**29252-E1-MB**
	420	95	2 550 000	8 300 000	930 000	1 540	790	45,8	**29352-E1-XL**
	480	132	4 400 000	13 200 000	1 310 000	1 350	660	96,6	**29452-E1-XL**
280	380	60	1 020 000	4 700 000	530 000	1 670	900	19	**29256-E1-MB**
	440	95	2 650 000	8 800 000	980 000	1 460	740	49,1	**29356-E1-XL**
	520	145	5 200 000	15 800 000	1 500 000	1 230	600	126	**29456-E1-XL**
300	420	73	1 400 000	6 200 000	660 000	1 500	830	29,9	**29260-E1-MB**
	480	109	3 200 000	10 500 000	1 160 000	1 320	680	65,1	**29360-E1-XL**
	540	145	5 200 000	16 200 000	1 550 000	1 180	570	130	**29460-E1-XL**
320	440	73	1 410 000	6 500 000	690 000	1 420	780	31,6	**29264-E1-MB**
	500	109	3 350 000	11 000 000	1 210 000	1 260	650	72,4	**29364-E1-XL**
	580	155	6 000 000	19 100 000	1 790 000	1 090	530	163	**29464-E1-XL**
340	460	73	1 410 000	6 600 000	720 000	1 350	740	33,3	**29268-E1-MB**
	540	122	3 750 000	12 600 000	1 390 000	1 150	600	101	**29368-E1-XL-MB**
	620	170	7 200 000	23 100 000	2 090 000	1 020	475	208	**29468-E1-XL**
360	500	85	1 870 000	8 500 000	890 000	1 230	690	49	**29272-E1-MB**
	560	122	3 750 000	13 000 000	1 430 000	1 110	570	105	**29372-E1-XL-MB**
	640	170	6 800 000	21 900 000	2 060 000	970	470	230	**29472-E1-XL-MB**
380	520	85	2 000 000	9 000 000	950 000	1 180	660	50,3	**29276-E1-MB**
	600	132	4 500 000	15 400 000	1 650 000	1 030	530	136	**29376-E1-XL-MB**
	670	175	7 200 000	24 200 000	2 200 000	930	445	260	**29476-E1-XL-MB**

medias *https://www.schaeffler.de/std/1F9A*



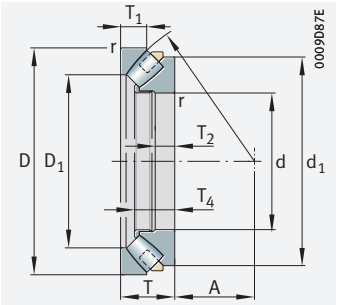
Mounting dimensions



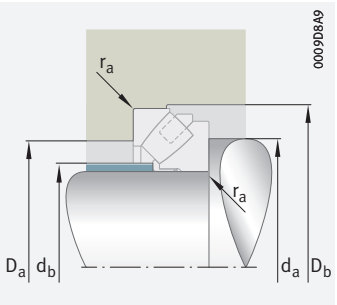
With sheet steel cage
Mounting dimensions

Dimensions										Mounting dimensions					
d	D_1	d_1	r min.	T_1	T_2	T_3	T_4	T_5 ≈	A	d_a min.	D_a max.	D_b min.	d_b max.	d_{b1} max.	r_a max.
200	232,5	265	2	24	17	30	45	–	108	240	258	284	209	–	2
	257	308,8	4	40	–	53,5	–	75,5	116	265	298	348	224	213	3
	277,5	360	5	59,4	–	77	–	106,9	122	295	338	406	234	220	4
220	251,5	285	2	24,5	17	30	45	–	117	260	277	304	229	–	2
	275,5	331,8	4	41	–	55	–	75,8	125	285	316	368	240	231	3
	300	379,8	6	58,5	–	77	–	107,5	132	315	360	428	254	241	5
240	283	320	2,1	30	22	37	57	–	130	290	311	344	250	–	2,1
	295,5	350,6	4	40,5	–	54	–	76,1	135	305	337	390	259	252	3
	322	400	6	59	–	76	–	106,9	142	335	381	448	276	261	5
260	302	340	2,1	30	22	38	57	–	139	310	331	365	271	–	2
	324	387,7	5	46	–	61	–	85,2	148	340	372	430	286	275	4
	346	435	6	63	–	86	–	118,9	154	365	419	488	296	280	5
280	323	360	2,1	30	22	38	57	–	150	330	351	385	293	–	2
	343	406,5	5	45,5	–	62	–	86,1	158	355	394	450	305	293	4
	372	473,1	6	70	–	95	–	130,5	166	395	446	530	320	302	5
300	353	395	3	38	26	44	69	–	162	360	386	426	315	–	2,5
	372	439,6	5	51	–	70	–	97,9	168	385	429	490	329	318	4
	392	490	6	70	–	95	–	129,5	175	420	471	550	340	324	5
320	372	415	3	38	26	44,5	69	–	172	380	406	450	336	–	2,5
	391	460	5	53	–	68	–	96,6	180	405	449	510	347	333	4
	422	534,4	7,5	74,5	–	102	–	139,7	191	445	507	590	367	346	6
340	395	435	3	37	26	45	69	–	183	400	427	470	356	–	2,5
	428	500	5	59,5	44	75	117	–	192	440	484	550	365	–	4
	445	564,9	7,5	84	–	112	–	151,3	201	480	541	630	386	364	6
360	423	470	4	44	31	51	81	–	194,5	430	461	510	379	–	3
	448	520	5	59,5	44	75	117	–	202	455	504	572	385	–	4
	474	585	7,5	83,5	63	110	164	–	210	500	560	650	388	–	6
380	441	490	4	42	31	51,5	81	–	202	445	480	530	394	–	3
	477	555	6	63,5	48	83	127	–	216	485	538	612	404	–	5
	494	615	7,5	87,5	67	115	168	–	222	530	587	682	413	–	6

Axial spherical roller bearings



With solid brass cage



Mounting dimensions

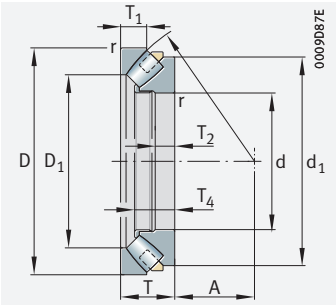
d = 400 – 670 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1134* | *1.12* ➤*1135* | *1.13* X-life ➤*1129*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
400	540	85	2 040 000	9 600 000	990 000	1 130	620	52,6	**29280-E1-MB**
	620	132	4 550 000	16 300 000	1 720 000	990	500	142	**29380-E1-XL-MB**
	710	185	8 200 000	26 500 000	2 440 000	870	425	308	**29480-E1-XL-MB**
420	580	95	2 460 000	11 100 000	1 130 000	1 040	600	70,3	**29284-E1-MB**
	650	140	5 000 000	17 500 000	1 850 000	940	480	163	**29384-E1-XL-MB**
	730	185	8 200 000	28 500 000	2 550 000	840	395	325	**29484-E1-XL-MB**
440	600	95	2 500 000	12 400 000	1 200 000	1 010	560	77,1	**29288-E1-MB**
	680	145	5 200 000	18 300 000	1 930 000	890	470	185	**29388-E1-XL-MB**
	780	206	9 700 000	32 500 000	2 900 000	780	375	418	**29488-E1-XL-MB**
460	620	95	2 550 000	12 200 000	1 240 000	970	540	77,6	**29292-E1-MB**
	710	150	5 900 000	21 400 000	2 160 000	850	430	207	**29392-E1-XL-MB**
	800	206	9 800 000	33 500 000	3 000 000	760	360	435	**29492-E1-XL-MB**
480	650	103	2 650 000	13 700 000	1 330 000	920	520	97,5	**29296-E1-MB**
	730	150	5 800 000	21 400 000	2 190 000	820	415	219	**29396-E1-XL-MB**
	850	224	11 700 000	39 500 000	3 450 000	710	335	531	**29496-E1-XL-MB**
500	670	103	2 750 000	14 700 000	1 400 000	890	495	102	**292/500-E1-MB**
	750	150	5 900 000	22 000 000	2 250 000	800	400	228	**293/500-E1-XL-MB**
	870	224	11 600 000	40 000 000	3 500 000	690	325	551	**294/500-E1-XL-MB**
530	710	109	3 000 000	15 400 000	1 520 000	830	475	120	**292/530-E1-MB**
	800	160	6 800 000	25 500 000	2 550 000	740	375	274	**293/530-E1-XL-MB**
	920	236	12 700 000	44 500 000	3 850 000	650	305	653	**294/530-E1-XL-MB**
560	750	115	3 450 000	18 100 000	1 710 000	790	440	142	**292/560-E1-MB**
	980	250	14 600 000	51 000 000	4 300 000	610	285	783	**294/560-E1-XL-MB**
600	800	122	3 650 000	19 400 000	1 850 000	730	415	167	**292/600-E1-MB**
	900	180	8 700 000	34 000 000	3 250 000	660	325	392	**293/600-E1-XL-MB**
	1 030	258	15 200 000	56 000 000	4 700 000	580	265	889	**294/600-E1-XL-MB**
630	850	132	4 650 000	23 600 000	2 190 000	690	390	208	**292/630-E1-MB**
	950	190	9 700 000	37 500 000	3 550 000	620	305	462	**293/630-E1-XL-MB**
	1 090	280	17 300 000	62 000 000	5 200 000	540	250	1 073	**294/630-E1-XL-MB**
670	900	140	4 750 000	24 900 000	2 300 000	640	370	247	**292/670-E1-MB**
	1 000	200	10 600 000	41 000 000	3 850 000	580	285	526	**293/670-E1-XL-MB**
	1 150	290	18 400 000	66 000 000	5 500 000	510	241	1 214	**294/670-E1-XL-MB**

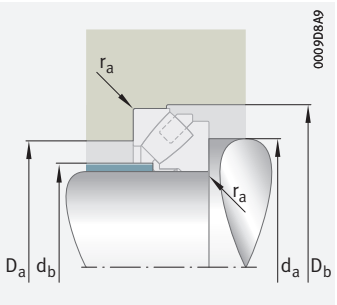
medias *https://www.schaeffler.de/std/1F9A*

Dimensions									Mounting dimensions				
d	D_1	d_1	r min.	T_1	T_2	T_3	T_4	A	d_a min.	D_a max.	D_b min.	d_b max.	r_a max.
400	460	510	4	42	31	53,5	81	212	465	500	550	414	3
	494	575	6	64	48	83	127	225	510	557	634	429	5
	525	650	7,5	89,5	69	120	178	234	555	622	722	434	6
420	489	545	5	46	34	58,5	91	225	495	534	590	439	4
	520	600	6	67,5	50	85	135	235	530	585	664	449	5
	545	670	7,5	90,5	70	124	178	244	580	643	742	457	6
440	508	570	5	49	34	61	91	235	520	554	610	458	4
	540	631,5	6	70,5	52	87	140	245	555	614	695	473	5
	577	715	9,5	101	77	134	199	257	610	684	794	477	8
460	530	585	5	46	34	59	91	245	535	575	632	479	4
	567	660	6	72,5	54	94,5	144	257	585	638	726	491	5
	596	735	9,5	101,5	77	135	199	268	630	704	815	497	8
480	556	620	5	55	37	62	99	259	565	603	662	507	4
	591	680	6	73,5	54	94	144	270	605	660	746	511	5
	625	780	9,5	108	88	147	216	280	660	744	865	516	8
500	574	640	5	55	37	65	99	268	585	622	682	524	4
	611	700	6	74	54	92	144	280	625	683	768	534	5
	648	800	9,5	110	86,6	147	216	290	685	765	886	539	8
530	608	675	5	57	39	64	105	285	620	661	722	561	4
	648	745	7,5	76	58	101,5	154	295	660	724	818	564	6
	686	845	9,5	116	89	156	228	308	725	810	937	570	8
560	644	715	5	60	41	71	111	302	655	697	762	587	4
	727	900	12	122	99	168	241	328	770	860	997	602	10
600	688	760	5	65	44	71,5	117	321	700	744	814	634	4
	720	840	7,5	89	65	113,5	174	335	745	815	920	634	6
	769	950	12	128	99	172	249	349	820	900	1 055	649	10
630	723	805	6	67	48	80	127	338	735	789	864	658	5
	761	885,5	9,5	92	68	122	183	345	785	856	970	666	8
	815	1 000	12	137	107	183	270	365	860	960	1 115	678	10
670	773	855	6	74	50	81	135	361	785	836	915	707	5
	809	930	9,5	96	72	126	193	372	825	906	1 020	703	8
	864	1 060	15	141	110	191	280	387	910	1 015	1 175	723	12

Axial spherical roller bearings



With solid brass cage



Mounting dimensions

d = 710 – 1 600 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1134* | *1.12* ➤*1135* | *1.13* X-life ➤*1129*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
710	950	145	5 500 000	29 500 000	2 600 000	610	335	281	**292/710-E1-MB**
	1 060	212	11 800 000	46 000 000	4 250 000	550	265	635	**293/710-E1-XL-MB**
	1 220	308	21 000 000	76 000 000	6 200 000	475	220	1 469	**294/710-E1-XL-MB**
750	1 000	150	5 700 000	31 500 000	2 800 000	570	320	326	**292/750-E1-MB**
	1 120	224	12 700 000	50 000 000	4 550 000	510	250	735	**293/750-E1-XL-MB**
	1 280	315	19 000 000	84 000 000	6 700 000	455	206	1 654	**294/750-E1-MB**
800	1 060	155	6 400 000	35 500 000	3 100 000	540	300	365	**292/800-E1-MB**
	1 180	230	13 500 000	54 000 000	4 900 000	485	237	824	**293/800-E1-XL-MB**
	1 360	335	20 600 000	93 000 000	7 500 000	425	191	1 964	**294/800-E1-MB**
850	1 120	160	7 100 000	40 500 000	3 450 000	510	275	422	**292/850-E1-MB**
	1 250	243	12 900 000	62 000 000	5 500 000	455	218	972	**293/850-E1-MB**
	1 440	354	24 000 000	110 000 000	8 600 000	400	174	2 348	**294/850-E1-MB**
900	1 180	170	7 700 000	42 000 000	3 700 000	475	265	478	**292/900-E1-MB**
	1 520	372	25 500 000	120 000 000	9 100 000	375	166	2 744	**294/900-E1-MB**
950	1 250	180	8 800 000	48 500 000	4 150 000	445	248	577	**292/950-E1-MB**
	1 600	390	28 500 000	132 000 000	10 100 000	355	155	3 170	**294/950-E1-MB**
1 000	1 320	190	9 600 000	55 000 000	4 600 000	420	233	689	**292/1000-E1-MB**
	1 670	402	30 500 000	146 000 000	10 800 000	340	145	3 575	**294/1000-E1-MB**
1 060	1 400	206	10 700 000	62 000 000	5 100 000	395	219	852	**292/1060-E1-MB**
	1 770	426	33 000 000	155 000 000	11 900 000	315	139	4 201	**294/1060-E1-MB**
1 120	1 460	206	10 700 000	64 000 000	5 300 000	375	207	896	**292/1120-E1-MB**
1 180	1 520	206	10 700 000	67 000 000	5 500 000	360	196	945	**292/1180-E1-MB**
1 250	1 800	330	23 700 000	125 000 000	10 000 000	305	142	2 654	**293/1250-E1-MB**
1 600	2 280	408	36 000 000	192 000 000	14 600 000	233	107	5 137	**293/1600-E1-MB**

medias *https://www.schaeffler.de/std/1F9A*



Dimensions									Mounting dimensions				
d	D_1	d_1	r min.	T_1	T_2	T_3	T_4	A	d_a min.	D_a max.	D_b min.	d_b max.	r_a max.
710	815	900	6	75	52	88	140	380	825	882	966	741	5
	855	985	9,5	103	76	132,5	205	394	875	962	1 082	746	8
	917	1 120	15	149	117	202	298	415	960	1 073	1 250	762	12
750	858	950	6	81	54	89	144	409	875	930	1 017	789	5
	910	1 040	9,5	109	81	140	216	415	925	1 015	1 142	790	8
	964	1 180	15	153	121	210	305	436	1 015	1 130	1 310	811	12
800	911	1 010	7,5	81	56	94	149	434	925	987	1 078	837	6
	965	1 100	9,5	111	83	145,5	222	440	980	1 070	1 202	840	8
	1 034	1 255	15	165	123	219	324	462	1 085	1 200	1 390	870	12
850	967	1 070	7,5	82	58	101,5	154	455	985	1 043	1 138	886	6
	1 021	1 165	12	118	87	152	235	468	1 045	1 137	1 273	896	10
	1 077	1 325	15	172	142,9	239	342	490	1 145	1 275	1 470	915	12
900	1 023	1 120	7,5	84	61	102,5	167	477	1 025	1 089	1 198	933	6
	1 137	1 405	15	186	147	251	360	518	1 215	1 345	1 555	969	12
950	1 081	1 190	7,5	90	65	110	174	507	1 090	1 147	1 268	985	6
	1 209	1 475	15	191	153	260	377	546	1 275	1 372	1 635	1 020	12
1 000	1 139	1 255	9,5	98	68	117,5	182	540	1 155	1 216	1 340	1 042	8
	1 250	1 540	15	200	160	277	390	581	1 340	1 435	1 705	1 071	12
1 060	1 211	1 336,3	9,5	108	74	124	199	566	1 225	1 290	1 422	1 106	8
	1 349	1 630	15	207	192	280	412	610	1 410	1 521	1 815	1 141	12
1 120	1 272	1 395	9,5	108	74	125	199	601	1 285	1 350	1 482	1 168	8
1 180	1 331	1 455	9,5	108	74	125	199	625	1 345	1 415	1 542	1 227	8
1 250	1 465	1 690,5	15	161	119	208	319	690	1 515	1 640	1 823	1 315	12
1 600	1 885	2 135,5	19	195	147	255	395	894	1 915	2 090	2 303	1 675	15

Crossed roller bearings



Matrix for bearing preselection 1153

1 Crossed roller bearings 1154

1.1 Bearing design 1154
1.2 Load carrying capacity 1155
1.3 Angular adjustment facility 1156
1.4 Lubrication 1156
1.5 Sealing 1157
1.6 Speeds 1158

1.7 Noise *1158*
1.8 Temperature range *1158*
1.9 Cages *1159*
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1.11 Dimensions, tolerances *1159*
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Product tables *1180*
Crossed roller bearings *1180*

Matrix for bearing preselection

The matrix gives an overview of the types and design features.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Crossed roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available				detailed information ➤ **1154**
Load carrying capacity	radial		++	➤ *1155|1.2*
	axial, one direction		+++	➤ *1155|1.2*
	axial, both directions		+++	➤ *1155|1.2*
	moments		++	➤ *1155|1.2*
Compensation of angular misalignments	static		–	➤ *1156|1.3*
	dynamic		–	➤ *1156|1.3*
Bearing design	cylindrical bore		–	➤ *1154|1.1*
	tapered bore		–	
	separable		–	➤ *1175|1.17*
Lubrication	greased		✓	➤ *1156|1.4*
Sealing	open		✓	➤ *1157|1.5*
	non-contact		–	➤ *1157|1.5*
	contact		–	➤ *1157|1.5*
Operating temperature in °C	from to		–30 +100	➤ *1158|1.8*
Suitability for	high speeds		(+)	➤ *1158|1.6*
	high running accuracy		++	➤ *1162* ➤ *1159|1.11*
	low-noise running		+	➤ *1158|1.7*
	high rigidity		+	➤ *1162*
	reduced friction		+	➤ *56*
	length compensation within bearing		–	
	non-locating bearing arrangement		–	➤ *141*
	locating bearing arrangement		+	➤ *141*
X-life bearings		X-life	–	
Bearing bore d_i in mm	from to		70 500	➤ *1180*
Product tables	from page ➤		**1180**	

1 Crossed roller bearings

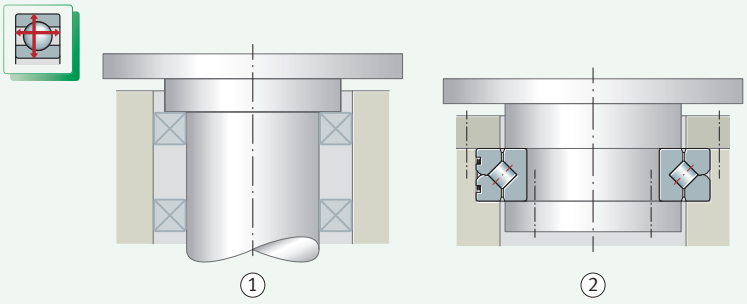
Crossed roller bearings SX:

- are suitable, due to their high running accuracy, as bearings for high precision applications (such as those in robots, machine tools, handling systems, precision mechanical and medical devices, vehicle components)
- correspond in their main dimensions to the ISO dimension series 18 with very small section height
- can support axial forces in both directions, radial loads, tilting moments and any combination of loads ➤*1155*|*1.2*
- usually allow designs with two bearing positions to be replaced by one bearing position ➤*1154*|🗀*1*
- are very rigid (they can be supplied with normal clearance, clearance-free or preloaded)
- are suitable for supported and suspended loads
- are always a good choice for a technically and economically leading bearing solution if compact and easy-to-fit rolling bearings with high tilting moment carrying capacity and rigidity, with uniform running free from stick-slip, low rotational resistance as well as high axial and radial runout accuracy are required in only one bearing position

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1153*.

🗀 ***1***
Comparison: bearing arrangement with two bearing positions/ bearing arrangement with a crossed roller bearing SX

① *Bearing arrangement with two bearing positions*
② *Bearing arrangement with one crossed roller bearing SX*



1.1 Bearing design

✎ *Crossed roller bearings SX are compact locating bearings with high axial rigidity*

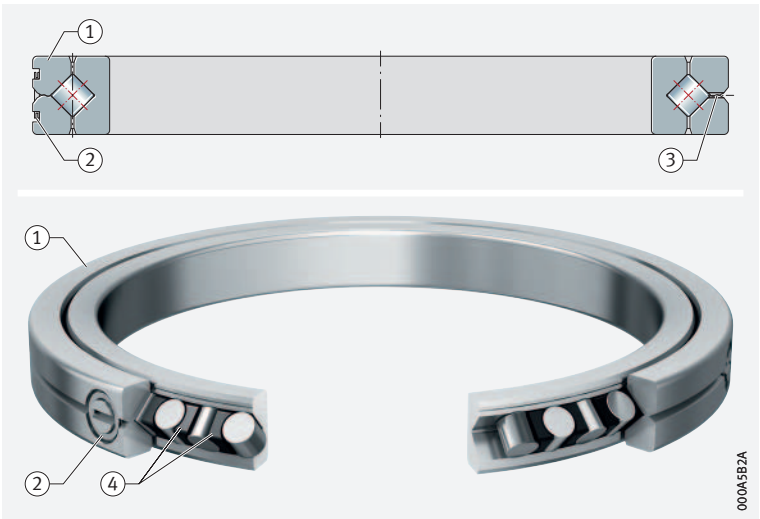
Crossed roller bearings SX are bearings for high precision applications, whose main dimensions correspond to the ISO dimension series 18 with very small section height in accordance with DIN 616. They comprise outer rings, inner rings, rolling elements and plastic spacers.
The outer ring is split in the circumferential direction and is held together by three sheet metal retaining rings ➤*1155*|🗀*2*. The cylindrical rollers correspond to DIN 5402 and are in an X arrangement with each other on the raceways. The bearings are very rigid, have high running accuracy and are supplied with normal clearance, low clearance or preload. Bearings with preload have the suffix VSP, while bearings with low clearance have the suffix RL0 ➤*1159*|▦*3*. The bearing outer rings are easily fixed to the adjacent construction using clamping rings ➤*1171*.

✎ *Also available in a corrosion-resistant design*

For applications requiring high corrosion protection, the bearings are also available in a corrosion-resistant design with the special coating Corrotect ➤ *109*.

2
Crossed roller bearing SX

① *Split outer ring*
② *Sheet metal retaining ring*
③ *Lubrication hole (3 lubrication holes distributed over the circumference)*
④ *Plastic spacers*



Permissible circumferential velocities

✎ *Influencing factors*

The possible circumferential velocity is dependent on the bearing (normal clearance or preloaded) and on the lubrication (grease or oil) ➤ *1155* | ▦ *1*.

1
Permissible circumferential velocities

D_M = *rolling element pitch circle diameter* ➤ *1180* | ▦

Normal clearance	Preload	Circumferential velocity
Oil lubrication	–	up to 8 m/s ($n \cdot D_M$ = 152 800)
Grease lubrication	–	up to 4 m/s ($n \cdot D_M$ = 76 400)
–	Oil lubrication	up to 4 m/s ($n \cdot D_M$ = 76 400)
–	Grease lubrication	up to 2 m/s ($n \cdot D_M$ = 38 200)

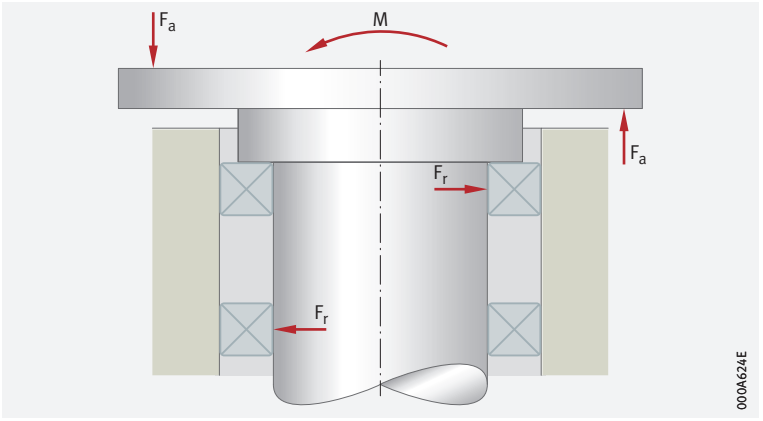
1.2 Load carrying capacity

✎ *Suitable for axial loads in both directions, radial loads and tilting moment loads*

Due to the X arrangement of the cylindrical rollers, the bearings can support axial forces in both directions, radial loads, tilting moment loads and any combination of loads by means of a single bearing position ➤ *1156* | ⧉ *4*. As a result, it is generally possible to reduce conventional bearing arrangements comprising two bearing positions (bearing arrangement with one radial and one axial bearing) to one bearing position ➤ *1156* | ⧉ *3* and ➤ *1156* | ⧉ *4*. This reduces the work required and the costs for the design of the adjacent construction (only one bearing position is processed) and considerably reduces the mounting of the bearings (there is no requirement for the matching of two bearings to each other).

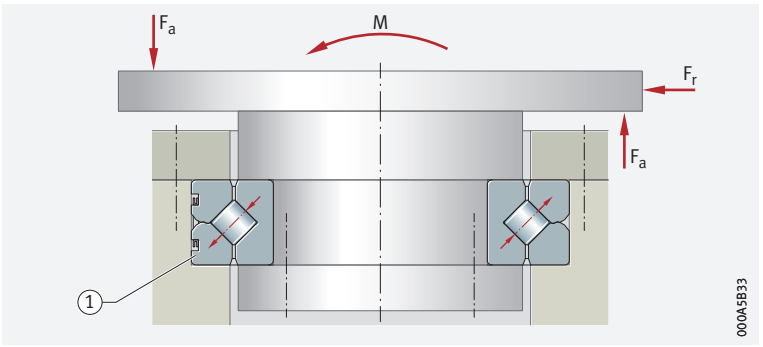
3
Conventional bearing arrangement with two bearing positions

F_r = *radial load*
F_a = *axial load*
M = *tilting moment load*



4
Optimised bearing arrangement with one crossed roller bearing

F_r = *radial load*
F_a = *axial load*
M = *tilting moment load*
① *Crossed roller bearing SX*



1.3 Angular adjustment facility

Crossed roller bearings SX cannot be used for the compensation of misalignments. These bearings are precision bearings for high precision applications. In order to ensure their correct function, it is essential that the specifications for design of the adjacent construction are observed ➤*1170|1.16*. Skewing of the bearing rings increases the running noise, places increased strain on the plastic spacers, has a negative effect on the running accuracy and a highly detrimental influence on the operating life of the bearings.

1.4 Lubrication

✎ *Grease or oil lubrication is possible*

The bearings are greased as standard but can alternatively be lubricated with oil. The decisive factors in determining the type of lubrication and the requisite lubricant quantity are:

- the size of the bearing
- the design of the bearing environment
- the lubricant feeds
- the operating conditions

If there is any uncertainty as to whether the lubricant or type of lubrication is suitable for a particular application, please consult Schaeffler or the lubricant manufacturer respectively.

Grease lubrication

✎ *Suitable greases*

If the bearing is to be lubricated with grease, a high quality lithium soap grease to DIN 51825–KP2N–20 is suitable, for example Arcanol LOAD150 or LOAD220.

Lubrication intervals

Influences on the lubrication interval

The lubrication intervals are essentially dependent on:

- the operating conditions
- the environmental influences such as contamination, water, etc.
- the type of bearings

Precise lubrication intervals can only be determined by means of tests under the specific application conditions. The observation period selected must be sufficiently long and the condition of the grease must be checked at regular intervals.

Grease operating life

If relubrication is not possible, the grease operating life becomes the decisive factor. Based on experience, the guide value for the grease operating life in the majority of applications is higher by a factor of 2 than the guide value for the lubrication interval. At operating temperatures above +70 °C, the lubrication interval and therefore the grease operating life are reduced. In order to ensure operational reliability, the grease operating life should not exceed 3 years.

Oil lubrication

Selection of the oil

A lubricant film which is capable of supporting loads must form in the contact zones between the rolling elements and the raceway. Depending on the operating speed, the oil at operating temperature must have at least the nominal viscosity ν_1. The guide value for ν_1 is dependent on the mean bearing diameter d_M and the speed.

Influence of temperature on viscosity

As the temperature increases, the viscosity of the oil decreases. When selecting the viscosity, the lower operating temperature must also be taken into consideration. With increasing viscosity, the flowability of the lubricant is reduced. As a result, the level of power losses will increase.

Suitable oils

For oil lubrication, suitable oils are type CLP to DIN 1517 or HLP to DIN 51524 of the viscosity classes ISO VG 10 to 100.

With oil lubrication, oil change intervals must be observed

At higher temperatures, aged oil and additives in the oil can impair the operating life of the plastic used for the spacers. Stipulated oil change intervals must therefore be observed.

1.5 Sealing

Provide seals in the adjacent construction

Crossed roller bearings SX are not sealed. As a result, sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing

Schaeffler seal profiles

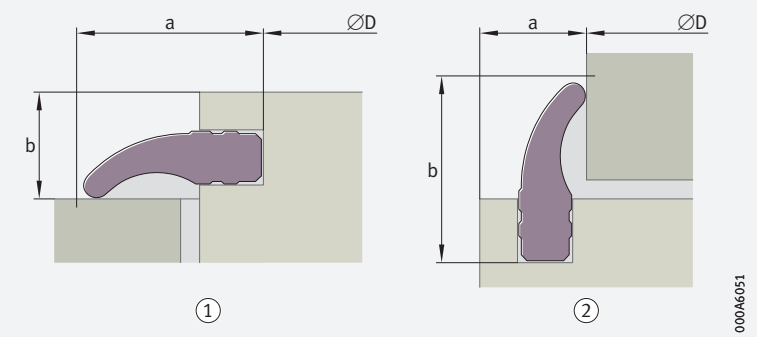
Material by the metre for radial and/or axial sealing of the bearing position

For sealing of the bearing position in the adjacent construction, Schaeffler supplies various seal profiles by the metre ➤ *1158* | 5. These profiles are intended for axial and/or radial sealing and – depending on the seal profile – fulfil a wide range of requirements (for example: under normal requirements for sealing, under heavy contamination, for low frictional torque, if only limited space is available, for sealing of fluids, at low speeds or under swivel operation). In addition to the seal profiles with a radial or axial sealing effect respectively, double direction profiles (with both axial and radial sealing effect) are also available. Mounting drawings can be requested for the individual seal profiles.

The seal profiles are not suitable for applications that require leakage-free operation; this applies not only to oil but also to grease lubrication. If leakage losses are unacceptable, measures such as rotary shaft seals can be used. The area around the bearing seal must be designed such that the seal profiles are not damaged during operation.

5
Seal profiles – example

① *Axial sealing*
② *Radial sealing*



Seal profile material

The standard material for the profiles is the synthetic elastomer NBR 70. This material has good resistance to oil and grease as well as good wear resistance. Operating temperature of seal profiles ➤*1158*|▦*2*.
For further information on the seal profiles, please contact Schaeffler.

1.6 Speeds

✎*Limiting speeds in the product tables*

Rolling bearings cannot rotate at unspecified high speeds, but are generally restricted by the operating temperature that is permissible in relation to the lubricant and the material of the bearing parts ➤*1158*|*1.8*.
The product tables give the kinematic limiting speeds n_G oil and n_G grease for the bearings.

The limiting speeds n_G oil and n_G grease are the kinematically permissible speeds for a bearing and apply to oil and grease lubrication respectively. Even under favourable mounting and operating conditions, these speeds must not be exceeded without prior consultation with Schaeffler.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** *https://medias.schaeffler.com*

1.8 Temperature range

✎*Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and cylindrical rollers
- the material of the plastic spacers
- the lubricant
- the seal material in the adjacent construction

Possible operating temperatures of the bearings ➤*1158*|▦*2*.

▦2
Permissible temperature ranges

Operating temperature	Crossed roller bearings	Schaeffler seal profiles
	–30 °C to +100 °C	–40 °C to +80 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

The rollers are guided by plastic spacers

In the crossed roller bearings SX, the rolling elements are separated from each other and guided not by typical rolling bearing cages but by plastic spacers ➤1155|2. The plastic selected and the design of the running surfaces for the cylindrical rollers give low-friction running of the bearings.

1.10 Internal clearance

The crossed roller bearings are available:

- with normal clearance (radial and axial clearance)
- with low clearance (radial clearance/preload)
- with preload VSP (preload min. and max.)

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of crossed roller bearings correspond to dimension series 18 in accordance with DIN 616.

Tolerances

The dimensional and running tolerances are based on DIN 620-2 and DIN 620-3 and are in the range P6 and P5.

1.12 Suffixes

Suffixes describe the design and features of a bearing in more detail.

3 Suffixes and corresponding descriptions

Suffix	Description of suffix	
RR	Corrosion-resistant design, with Corrotect coating	Special design, available by agreement
RL0	Low clearance	Standard
VSP	Preloaded	Special design, available by agreement
VSP+PRL50	Preloaded, axial and radial runout tolerance restricted by 50%	Special design, available by agreement

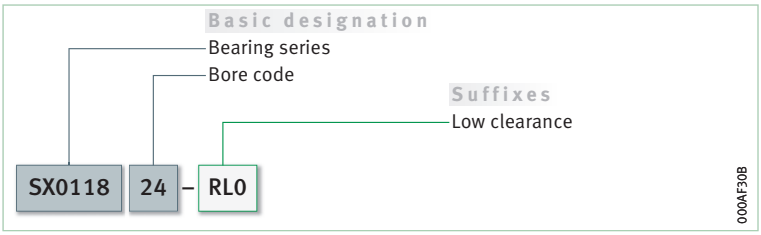
1.13 Structure of bearing designation

With ***medias*** interchange, equivalent Schaeffler bearing designations can be determined for bearing designations from other rolling bearing manufacturers *https://www.schaeffler.de/std/1B69*.

Example

The designation of bearings follows a set model ➤1159|6.

6 Crossed roller bearing SX, low clearance: designation structure



1.14 Dimensioning

Static load carrying capacity

For bearings under static loading, the static load carrying capacity applies

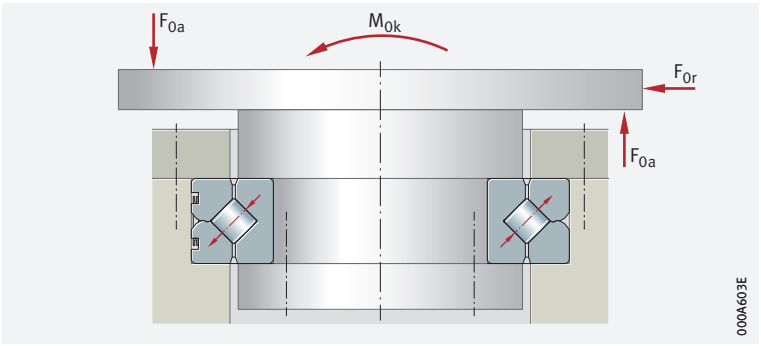
Crossed roller bearings that undergo rotary motion only infrequently, undergo slow swivel motion, rotate only slowly or are subjected to load while stationary are dimensioned on the basis of their static load carrying capacity. The size of a statically loaded bearing can therefore be checked in approximate terms using the basic static load ratings C_0 and the static limiting load diagrams.

Checking the static load carrying capacity

It can be checked in approximate terms if the correct load arrangement is present and all the requirements relating to clamping rings, location, mounting and lubrication are fulfilled ➤*1160*|*7*.

Where load arrangements are more complex or there are variations from the conditions, please contact us.

7 *Load arrangement*



F_{0a} = *axial static bearing load*
F_{0r} = *radial static bearing load*
M_{0k} = *static tilting moment load*

In order to check the static load carrying capacity, the following equivalent static operating values must be determined:

- the equivalent static bearing load F_{0q}
- the equivalent static tilting moment load M_{0q}

Checking is possible for applications with or without radial load.

Determining the equivalent static bearing load without radial load

In the presence of axial and tilting moment loads only ➤*1160*|*1* and ➤*1160*|*2*:

1 *Equivalent axial bearing load (static)*

$$F_{0q} \triangleq F_{0a} \cdot f_A \cdot f_S$$

2 *Equivalent tilting moment load (static)*

$$M_{0q} \triangleq M_{0k} \cdot f_A \cdot f_S$$

Legend

F_{0q}	kN	Equivalent axial bearing load (static)
F_{0a}	kN	Axial static bearing load
f_A	–	Application factor ➤*1162*|*4*
f_S	–	Factor for additional safety ➤*1162*
M_{0q}	kNm	Equivalent tilting moment load (static)
M_{0k}	kNm	Static tilting moment load.

The values for F_{0q} and M_{0q} are used to determine the load point in the static limiting load diagram for the raceway ➤*1180*.

In addition to the raceway, the dimensioning of the fixing screws must also be checked.

The static limiting load diagrams for the raceway and the fixing screws are indicated in the product tables.

The load point must lie under the raceway curve, otherwise the bearing is not adequately dimensioned.

Determining the equivalent static bearing load with radial load

Radial loads can only be taken into consideration if the radial load F_{0r} is smaller than the basic static radial load rating C_{0r} ➤*1180*|▦.

The equivalent static bearing load with radial load is determined as follows:

- Calculate the parameter for the load eccentricity ϵ according to ➤*1161*|*f* 3
- Determine the static radial load factor f_{0r}. In this case:
  - determine the ratio F_{0r}/F_{0a} in ➤*1161*|⧉ *8* or ➤*1162*|⧉ *9* respectively
  - based on the ratio F_{0r}/F_{0a} and ϵ, determine the static radial load factor f_{0r} from ➤*1161*|⧉ *8* or ➤*1162*|⧉ *9* respectively
- Determine the application factor f_A ➤*1162*|▦ *4* and, where necessary, the safety factor f_S
- Calculate the equivalent axial bearing load F_{0q} and the equivalent tilting moment load M_{0q} using the equations ➤*1161*|*f* 4 and ➤*1161*|*f* 5
- Using the values for F_{0q} and M_{0q}, determine the load point in the static limiting load diagram for the raceway ➤*1180*|▦

The load point must lie under the raceway curve, otherwise the bearing is not adequately dimensioned.

f 3 *Load eccentricity parameter*

$$\epsilon = \frac{2\,000 \cdot M_{0k}}{F_{0a} \cdot D_M}$$

f 4 *Equivalent bearing load (static)*

$$F_{0q} = F_{0a} \cdot f_A \cdot f_S \cdot f_{0r}$$

f 5 *Equivalent tilting moment load (static)*

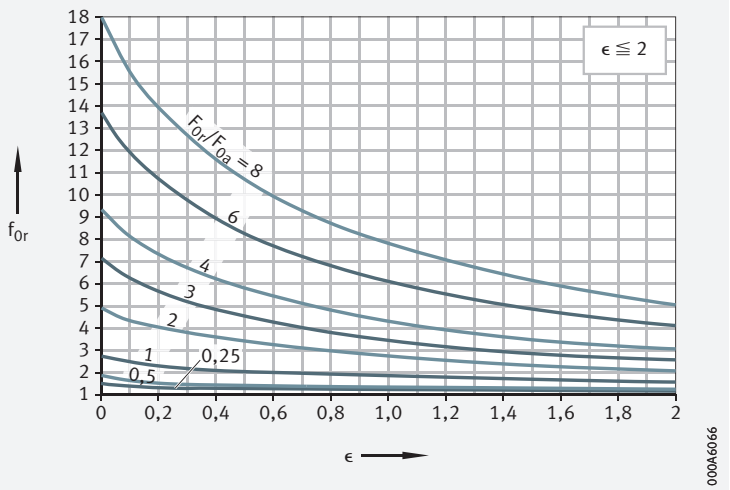
$$M_{0q} = M_{0k} \cdot f_A \cdot f_S \cdot f_{0r}$$

Legend

ϵ	–	Load eccentricity parameter
M_{0k}	kNm	Static tilting moment load
F_{0a}	kN	Axial static bearing load
D_M	mm	Rolling element pitch circle diameter ➤*1180*|▦
F_{0q}	kN	Equivalent bearing load (static)
f_A	–	Application factor ➤*1162*|▦ *4*
f_S	–	Factor for additional safety ➤*1162*
f_{0r}	–	Static radial load factor ➤*1161*|⧉ *8* or ➤*1162*|⧉ *9*
M_{0q}	kNm	Equivalent tilting moment load (static).

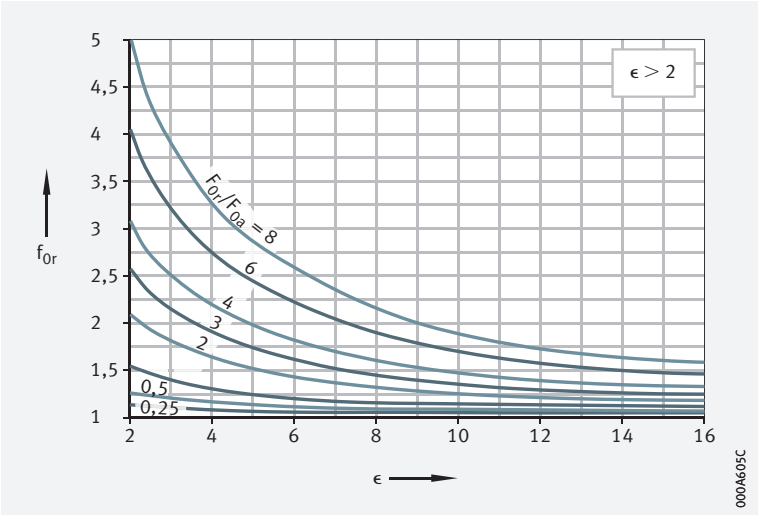
⧉ 8 *Static radial load factor*

f_{0r} = *static radial load factor*
ϵ = *load eccentricity parameter; $\epsilon \leqq 2$*
F_{0a} = *axial static bearing load*
F_{0r} = *radial static bearing load*



9
Static radial load factor

f_{0r} = *static radial load factor*
ϵ = *load eccentricity parameter;* $\epsilon > 2$
F_{0a} = *axial static bearing load*
F_{0r} = *radial static bearing load*



Application factors

The application factors f_A are empirical values obtained in practice ➤*1162*| ▦ *4*. They take account of the most important requirements, such as the type and severity of operation, rigidity and running accuracy. If the precise requirements of an application are known, the values may be altered accordingly.

Application factors < 1 must not be used.

A large proportion of applications can be statically calculated using the factor 1, for example in the case of bearings for gearboxes and rotary tables.

In addition to static calculation, the rating life should also always be checked ➤*1164*.

4
Application factors f_A

Application	Operating and requirement criteria	Application factor f_A
Robots	Rigidity	1,25
Antennae	Accuracy	1,5
Machine tools	Accuracy	1,5
Metrology	Smooth running	2
Medical equipment	Smooth running	1,5

Safety factors

The factor for additional safety f_S is 1.

It is not normally necessary to factor in any additional safety in calculation.

In special cases, such as approval specifications, internal specifications, requirements stipulated by inspection bodies etc., the appropriate safety factors must be applied.

Calculation example

The static load carrying capacity of the crossed roller bearing SX011860 is to be checked.

✎ *Given*	Static bearing load (axial)	F_{0a} = 70 kN
	Static bearing load (radial)	F_{0r} = 17,5 kN
	Static tilting moment load	M_{0k} = 22,5 kNm
	Rolling element pitch circle diameter	D_M = 340 mm
	Application factor	f_A = 1,25
	Safety factor	f_S = 1
✎ *Required*	Static load carrying capacity of the bearing	

Solution

*f*6 *Load eccentricity parameter*

$$\epsilon = \frac{2\,000 \cdot M_{0k}}{F_{0a} \cdot D_M}$$

$$\epsilon = \frac{2000 \cdot 22{,}5}{70 \cdot 340} = 1{,}89$$

$$\frac{F_{0r}}{F_{0a}} = \frac{17{,}5}{70} = 0{,}25$$

$$f_{0r} = 1{,}2$$

Legend

ϵ	–	Load eccentricity parameter
M_{0k}	kNm	Static tilting moment load
F_{0a}	kN	Static bearing load (axial)
D_M	mm	Rolling element pitch circle diameter
F_{0r}	kN	Static bearing load (radial)
f_{0r}	–	Static radial load factor ➤*1161*|*8* or ➤*1162*|*9*.

*f*7 *Equivalent bearing load (static)*

$$F_{0q} = F_{0a} \cdot f_A \cdot f_S \cdot f_{0r}$$

$$F_{0q} = 70 \cdot 1{,}25 \cdot 1 \cdot 1{,}2 = 105\,\text{kN}$$

Legend

F_{0q}	kN	Equivalent bearing load (static)
F_{0a}	kN	Static bearing load (axial)
f_A	–	Application factor
f_S	–	Factor for additional safety.

*f*8 *Equivalent tilting moment load (static)*

$$M_{0q} = M_{0k} \cdot f_A \cdot f_S \cdot f_{0r}$$

$$M_{0q} = 22{,}5 \cdot 1{,}25 \cdot 1 \cdot 1{,}2 = 33{,}75\,\text{kNm}$$

Legend

M_{0q}	kNm	Equivalent tilting moment load (static)
M_{0k}	kNm	Static tilting moment load
f_A	–	Application factor
f_S	–	Factor for additional safety.

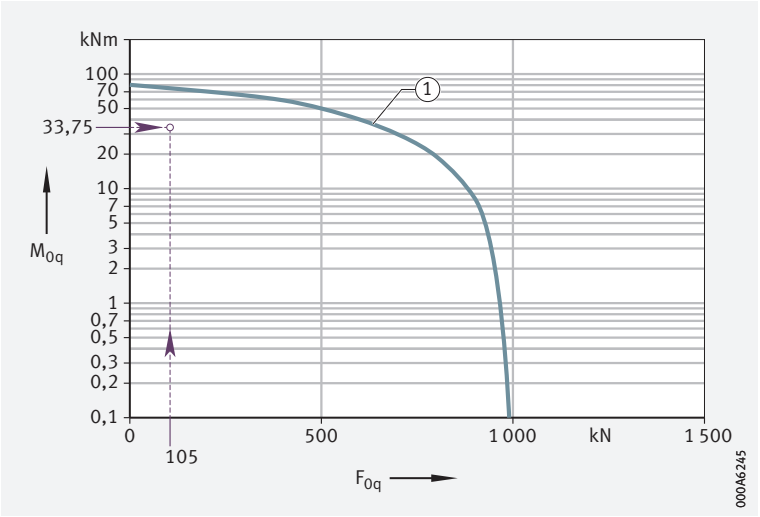
Determining the load point in the static limiting load diagram – checking the static load carrying capacity

Using the values for F_{0q} and M_{0q}, the load point in the static limiting load diagrams for the raceway and fixing screws is determined ➤*1164*\|*10* and ➤*1164*\|*11*.

The load point is below the raceway and screw curves. The bearing is adequately dimensioned and thus suitable for the application.

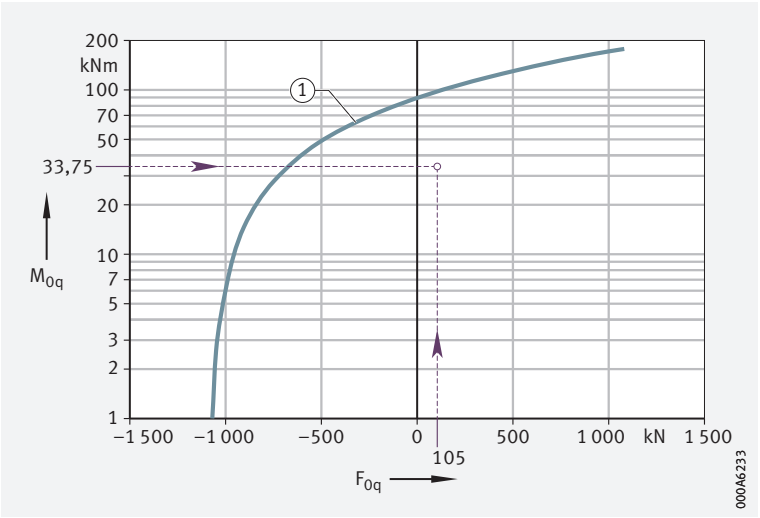
10
Static limiting load diagram for raceway – compressive load

M_{0q} = *equivalent tilting moment load*
F_{0q} = *equivalent bearing load*
① *Raceway curve*



11
Static limiting load diagram for fixing screws – compressive load

M_{0q} = *equivalent tilting moment load*
F_{0q} = *equivalent bearing load*
① *Screw curve*



Dynamic load carrying capacity

✎ For bearings under dynamic loading, the dynamic load carrying capacity applies

Dynamically loaded crossed roller bearings, i. e. bearings that undergo predominantly rotary motion, are dimensioned in accordance with their dynamic load carrying capacity. The size of a dynamically loaded bearing can therefore be checked in approximate terms using the basic dynamic load ratings C and the basic rating life L or L_h.

Determining the basic rating life

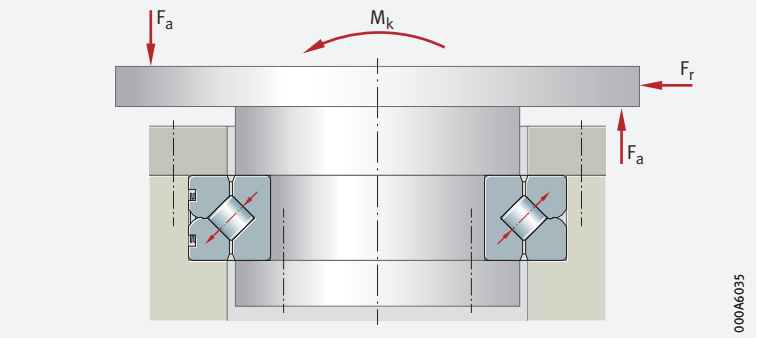
The life formulae for L and L_h are only valid:

- with a load arrangement according to ➤ *1165* | *12*
- if all the requirements are fulfilled in relation to location (the bearing rings must be rigid or firmly connected to the adjacent construction), mounting, lubrication and sealing
- if the load and speed can be regarded as constant during operation. If the load and speed are not constant, equivalent operating values can be determined that will result in the same fatigue conditions as the actual loads
- if the load ratio is $F_r/F_a \leqq 8$

For more complex load arrangements, if a ratio $F_r/F_a > 8$ is present or there are variations from the specified conditions, please contact us.

12
Load arrangement

F_a = *axial dynamic bearing load*
F_r = *radial dynamic bearing load*
M_k = *dynamic tilting moment load*



Determining the basic rating life for bearings subjected to combined loads

For bearings subjected to combined loads, in other words bearings with axial, radial and tilting moment loads, the rating life L or L_h is determined as follows:

- Determine the ratio of the radial dynamic bearing load F_r to the axial dynamic bearing load F_a (F_r/F_a)
- Calculate the load eccentricity parameter ϵ ➤*1165* | *9*
- Using the values for ϵ and the ratio F_r/F_a, determine the dynamic load factor k_F ➤*1166* | *13*
- Calculate the equivalent dynamic axial bearing load $P_a = k_F \cdot F_a$ ➤*1165* | *10*
- Enter the equivalent dynamic axial bearing load P_a and the basic dynamic axial load rating C_a in the rating life equations L or L_h respectively and calculate the rating life ➤*1165* | *11* and ➤*1165* | *12*

  If swivel operation is present, enter the operating speed n determined in the rating life equation L_h ➤*1165* | *13*

9
Load eccentricity parameter

$$\epsilon = \frac{2\,000 \cdot M_k}{F_a \cdot D_M}$$

10
Equivalent dynamic axial bearing load

$$P_a = k_F \cdot F_a$$

11
Basic rating life in millions of revolutions

$$L_{10} = \left(\frac{C_a}{P_a}\right)^p$$

12
Basic rating life in operating hours

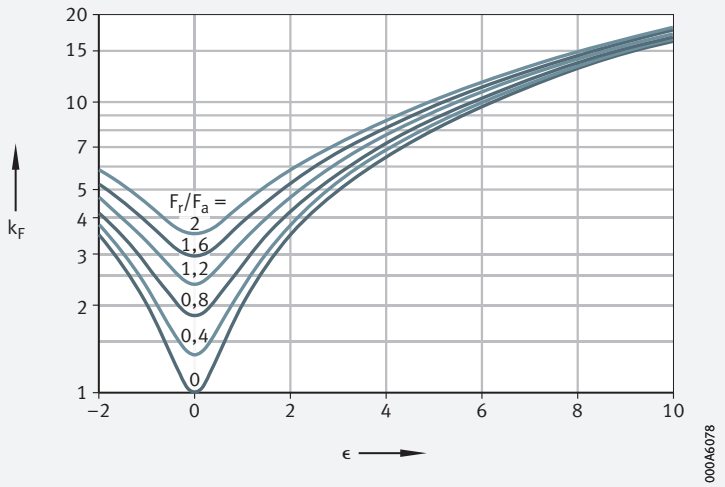
$$L_{10h} = \frac{16666}{n} \cdot \left(\frac{C_a}{P_a}\right)^p$$

13
Operating speed

$$n = n_{osc} \cdot \frac{\gamma}{90°}$$

13
Dynamic load factor

k_F = *dynamic load factor*
ϵ = *load eccentricity parameter*
F_a = *axial dynamic bearing load*
F_r = *radial dynamic bearing load*



Determining the basic rating life for bearings subjected to radial loads only

For slewing rings subjected to radial loads only, the following values are entered in the rating life formulae L and L_h:

- $P_r = F_r$
- the basic dynamic radial load rating C_r

f 14
Basic rating life in millions of revolutions

$$L_{10} = \left(\frac{C_r}{P_r}\right)^p$$

f 15
Basic rating life in operating hours

$$L_{10h} = \frac{16666}{n} \cdot \left(\frac{C_r}{P_r}\right)^p$$

Legend

ϵ	–	Load eccentricity parameter
M_k	kNm	Dynamic tilting moment load
F_a	kN	Axial dynamic bearing load
D_M	mm	Rolling element pitch circle diameter ➤ *1180* | ▦
P_a	kN	Equivalent dynamic axial bearing load. For bearings subjected to radial load only, enter P_r
k_F	–	Dynamic load factor ➤ *1166* | ⧉ *13*
L_{10}	10^6	Basic rating life in millions of revolutions
C_a, C_r	kN	Basic axial or radial dynamic load rating ➤ *1180* | ▦. For bearings subjected to radial load only, enter C_r
p	–	Life exponent for crossed roller bearings: p = $^{10}/_3$
L_{10h}	h	Basic rating life in operating hours
n	min^{-1}	Operating speed
n_{osc}	min^{-1}	Frequency of oscillating motion
γ	°	Half of swivel angle
P_r	kN	Equivalent dynamic radial bearing load
F_r	kN	Radial dynamic bearing load.

Calculation example

For the crossed roller bearing SX011820, the basic rating life L in millions of revolutions is to be checked.

✎ *Given*	Crossed roller bearing	SX011820
	Rolling element pitch circle diameter ➤*1180*	D_M = 112 mm
	Basic dynamic load rating (axial) ➤*1180*	C_a = 28 kN
	Life exponent for crossed roller bearings	p = $^{10}/_{3}$
	Dynamic bearing load (axial)	F_a = 20 kN
	Dynamic bearing load (radial)	F_r = 4 kN
	Dynamic tilting moment load	M_k = 1 kNm
✎ *Required*	Basic rating life L_{10} in millions of revolutions	

Solution

f **16** *Load eccentricity parameter*

$$\epsilon = \frac{2\,000 \cdot M_k}{F_a \cdot D_M}$$

$$\epsilon = \frac{2\,000 \cdot 1}{20 \cdot 112} = 0{,}89$$

$$\frac{F_r}{F_a} = \frac{4}{20} = 0{,}2$$

$$k_F = 2{,}1$$

Legend

ϵ	–	Load eccentricity parameter
M_k	kNm	Dynamic tilting moment load
F_a	kN	Axial dynamic bearing load
D_M	mm	Rolling element pitch circle diameter ➤*1180*
F_r	kN	Radial dynamic bearing load
k_F	–	Dynamic load factor ➤*1166* 🗨 *13.*

f **17** *Equivalent bearing load (static)*

$$P_a = k_F \cdot F_a$$

$$P_a = 2{,}1 \cdot 20\ \text{kN} = 42\ \text{kN}$$

Legend

P_a	kN	Equivalent dynamic axial bearing load. For bearings subjected to radial load only, enter P_r
k_F	–	Dynamic load factor ➤*1166* 🗨 *13*
F_a	kN	Axial dynamic bearing load.

f **18** *Basic rating life in million revolutions*

$$L_{10} = \left(\frac{C_a}{P_a}\right)^p$$

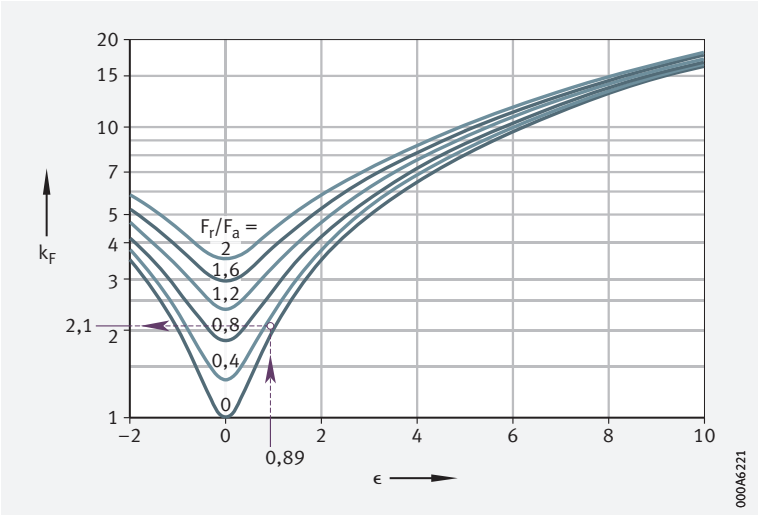
$$L_{10} = \left(\frac{28}{42}\right)^{\frac{10}{3}} = 0{,}26 \cdot 10^6 \text{ revolutions}$$

Legend

L_{10}	10^6	Basic rating life in millions of revolutions For bearings subjected to radial load only, enter P_r
C_a, C_r	kN	Basic axial or radial dynamic load rating ➤*1180*
P_a	kN	Equivalent dynamic axial bearing load. For bearings subjected to radial load only, enter P_r
p	–	Life exponent for crossed roller bearings: p = $^{10}/_{3}$.

14
Dynamic load factor k_F for crossed roller bearings

k_F = *dynamic load factor*
ϵ = *load eccentricity parameter*
F_a = *axial dynamic bearing load*
F_r = *radial dynamic bearing load*



Determining the load carrying capacity of the fixing screws

In addition to the raceway, the load carrying capacity of the fixing screws must also be checked. This is based on the information in ➤*1160*.

The load carrying capacity of the fixing screws can be checked if the following conditions are fulfilled:

- the criteria according to ➤*1160*
  - the screws are tightened as specified using a torque wrench
    screw tightening factor $\alpha_A = 1,6$
    tightening torques ➤*1173*|▦ *8* to ➤*1174*|▦ *9*
- the permissible contact pressure is not exceeded
- screws of the recommended size, quantity and grade are used

Indicator of load carrying capacity

The load carrying capacity of the screws is described by:

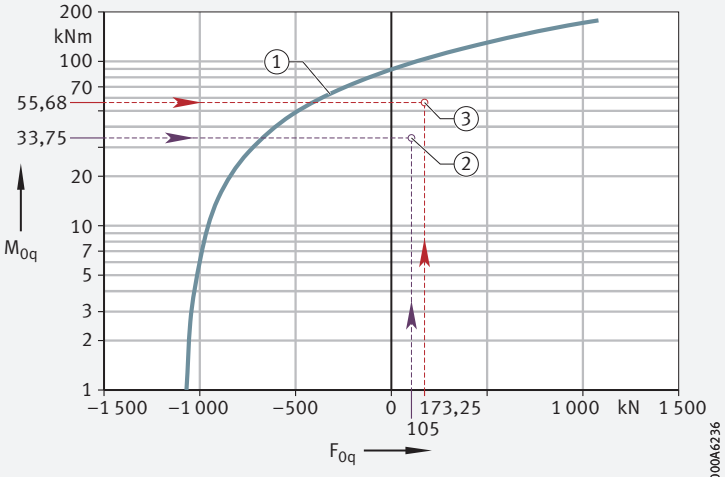
- the curves in the static limiting load diagrams for fixing screws in the product tables
- the maximum permissible radial load $F_{r\,per}$ (friction locking)

The screw curves are shown in the static limiting load diagrams for fixing screws. The curves are based on screws of grade 10.9, tightened to 90% of their proof stress, including the torsion content.

If screws of grade 8.8 or 12.9 are used, the equivalent static loads F_{0q} and M_{0q}, ➤*1160*, must be converted using the following factors:

- grade 8.8 ($F_{0q} \cdot 1,65$, $M_{0q} \cdot 1,65$)
- grade 12.9 ($F_{0q} \cdot 0,8$, $M_{0q} \cdot 0,8$)

Static limiting load diagram for fixing screws – example



15 *Static limiting load diagram for fixing screws – example for crossed roller bearing SX011860*

M_{0q} = *equivalent tilting moment load (static)*

F_{0q} = *equivalent axial bearing load (static)*

① *Screw curve*

② *Load point for screws of normal grade (10.9)*

③ *Load point for screws of grade 8.8*

Checking the static load carrying capacity of the screws

The static load carrying capacity of the screw is limited by its proof stress.

For applications with and without radial load

The equivalent static bearing loads F_{0q} and M_{0q} must be determined.

Using the values F_{0q} and M_{0q}, the load point is then determined in the static limiting load diagram for fixing screws, see diagrams in product tables ➤*1182*|▦.

The load point must be below the appropriate screw curve.

Radial load and static load carrying capacity of the screws

If radial loads occur in uncentred bearing rings, the screw connections must prevent displacement of the bearing rings on the adjacent construction.

In order to check this:

- multiply the radial bearing load by an application factor f_A ➤*1162*|▦*4*
- compare the values determined with the maximum permissible radial load $F_{r\,per}$

The maximum radial load $F_{r\,per}$ on the fixing screws is dependent on their friction locking and not on the radial load carrying capacity of the bearing.

If the radial load on the bearing is higher than the friction locking of the fixing screws or very high radial loads are present ($F_r/F_a > 4$), please contact us.

Checking the dynamic load carrying capacity of the screws

The dynamic load carrying capacity of the screws corresponds to the fatigue strength of the screw.

Dynamic load carrying capacity

Based on the dynamic loads present, the equivalent loads F_{0q} and M_{0q} are determined.

Instead of the application factor f_A, the operating load must always be increased by the following factor:

- grade 8.8 (factor 1,8),
  grade 10.9 (factor 1,6),
  grade 12.9 (factor 1,5)

The load carrying capacity must then be checked in the static limiting load diagram for the fixing screws ➤*1180*|▦.

The load point must be below the appropriate screw curve.

1.15 Minimum load

In order to prevent damage due to slippage, a minimum load is required

In order that no slippage occurs between the contact partners, the crossed roller bearings must be constantly subjected to a sufficiently high load. In most cases, however, the load is already sufficiently high due to the weight of the supported parts and the external forces.

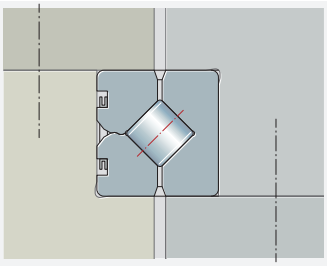
1.16 Design of bearing arrangements

The design of the adjacent construction has a considerable influence on the function of the bearings

Crossed roller bearings SX can support high loads. Due to the X arrangement of the cylindrical rollers, these bearings can support axial forces in both directions, radial loads, tilting moment loads and any combinations of loads. In order that these advantages can be utilised comprehensively, the adjacent construction must be designed so that it is appropriately rigid. The bearing rings must always be rigidly and uniformly supported over the circumference and width of the rings ➤*1170*|*16*.

The adjacent construction must be designed only in accordance with the information in this section. Any deviations from the specifications, material strength and adjacent components will considerably reduce the load carrying capacity and operating life of the bearings.

16
Uniform support of the bearing rings by the adjacent construction



Shaft and housing tolerances

For normal applications, the tolerance class K7 Ⓔ for the housing and h7 Ⓔ for the shaft are sufficient ➤*1170*|*5* and ➤*1171*|*6*.

In precision applications, the bearing seat in the housing should be designed to tolerance class K6 Ⓔ and on the shaft to h6 Ⓔ ➤*1170*|*5* and ➤*1171*|*6*.

5
Mounting tolerances for the shaft

Nominal dimension d_i mm		Tolerance classes			
>	≦	h6		h7	
		Upper deviation µm	Lower deviation µm	Upper deviation µm	Lower deviation µm
65	80	0	–19	0	–30
80	100	0	–22	0	–35
100	120	0	–22	0	–35
120	140	0	–25	0	–40
140	160	0	–25	0	–40
160	180	0	–25	0	–40

continued ▼

5 *Mounting tolerances for the shaft*

Nominal dimension d_i mm		Tolerance classes			
>	≦	h6		h7	
		Upper deviation µm	Lower deviation µm	Upper deviation µm	Lower deviation µm
180	200	0	−29	0	−46
200	225	0	−29	0	−46
225	250	0	−29	0	−46
250	280	0	−32	0	−52
280	315	0	−32	0	−52
315	355	0	−36	0	−57
355	400	0	−36	0	−57
400	450	0	−40	0	−63
450	500	0	−40	0	−63

continued ▲

6 *Mounting tolerances for the housing bore*

Nominal dimension D_a mm		Tolerance classes			
>	≦	K6		K7	
		Upper deviation µm	Lower deviation µm	Upper deviation µm	Lower deviation µm
80	100	+4	−18	+10	−25
100	120	+4	−18	+10	−25
120	140	+4	−21	+12	−28
140	160	+4	−21	+12	−28
160	180	+4	−21	+12	−28
180	200	+5	−24	+13	−33
200	225	+5	−24	+13	−33
225	250	+5	−24	+13	−33
250	280	+5	−27	+16	−36
280	315	+5	−27	+16	−36
315	355	+7	−29	+17	−40
355	400	+7	−29	+17	−40
400	450	+8	−32	+18	−45
450	500	+8	−32	+18	−45
500	560	0	−44	0	−70
560	630	0	−44	0	−70

Location using clamping rings

For the location of crossed roller bearings SX, clamping rings have proved effective ➤ *1173* | *17*.

The bearing rings must always be rigidly and uniformly supported over the circumference and width of the rings.

The thickness of the clamping rings and mounting flanges must not be less than the minimum thickness s.

Counterbores to DIN 74, type J, for screws to DIN 6912 are permissible. For deeper counterbores, the thickness of the clamping ring s must be increased by the additional counterbore depth.

Mounting dimensions ➤ *1172* | *7* and ➤ *1173* | *17*. Minimum strength of clamping rings ➤ *1172*.

Bearing seat depth

In order that the clamping rings retain the bearing securely, the bearing seat depth t must be in accordance with the specification ➤*1172*| ▦ *7* and ➤*1173*| ⧉ *17*.

The depth of the bearing seat influences the bearing clearance and the rotational resistance.

Bearings with preload (suffix VSP) have a considerably higher rotational resistance.

If particular requirements for rotational resistance apply, the depth t must be produced to match the relevant height of the bearing ring. It has proved effective to tolerance the depth t to deviations that are the same as or further restricted compared to the dimension h in the product tables. For safety, internal tests should in any case be carried out.

Minimum strength of clamping rings

For screws of grade 10.9, the minimum strength under the screw heads or nuts must be 500 N/mm^2. Seating washers are not necessary for these screws.

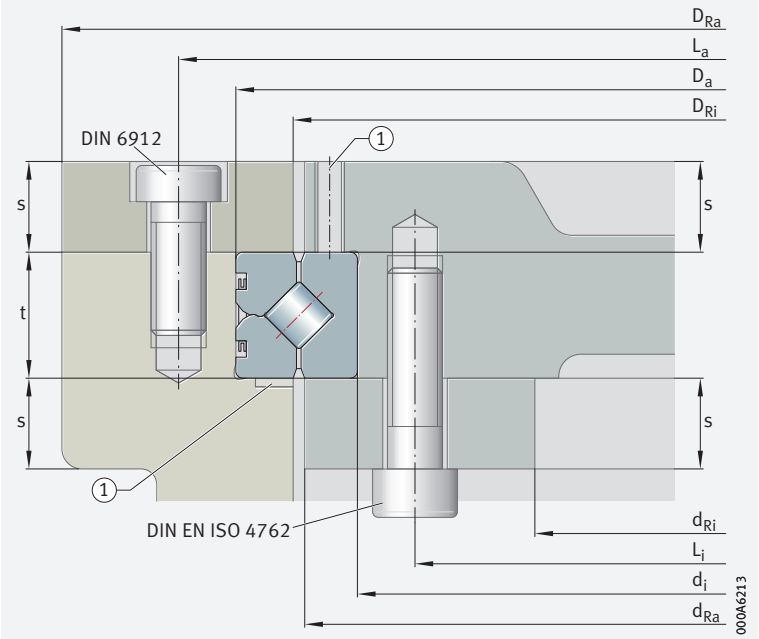
For fixing screws of grade 12.9, the minimum strength must not be less than 850 N/mm^2, otherwise quenched and tempered seating washers under the screw heads or quenched and tempered nuts must be used.

▦ *7*
Mounting dimensions

Designation	Mounting dimensions in mm									
	d_i h7 (h6)	D_a K7 (K6)	t	s min.	d_{Ra}	d_{Ri}	D_{Ri}	D_{Ra}	L_i max.	L_a min.
SX011814	70	90	10 –0,005 –0,015	8	78	42	82	118	60	100
SX011818	90	115	13 –0,005 –0,020	10	100	61	104	144	80	125
SX011820	100	125	13 –0,005 –0,020	10	110	71	114	154	90	135
SX011824	120	150	16 –0,005 –0,025	12	132	84	138	186	108	162
SX011828	140	175	18 –0,005 –0,030	14	154	94	160	221	124	191
SX011832	160	200	20 –0,02 –0,05	15	177	111	183	249	144	216
SX011836	180	225	22 –0,02 –0,05	17	199	121	205	284	160	245
SX011840	200	250	24 –0,02 –0,06	18	221	139	229	311	180	270
SX011848	240	300	28 –0,02 –0,06	21	269	166	274	374	216	324
SX011860	300	380	38 –0,04 –0,10	29	335	201	345	479	268	412
SX011868	340	420	38 –0,04 –0,10	29	375	241	385	519	308	452
SX011880	400	500	46 –0,04 –0,10	35	445	275	455	625	360	540
SX0118/500	500	620	56 –0,04 –0,10	42	554	350	566	700	452	668

17
Clamping rings, bearing seat depth, mounting dimensions

① *Slots, threaded extraction hole or similar for dismounting purposes*



Fixing screws

For the location of the bearing rings or clamping rings, screws of grade 10.9 are suitable ➤*1173*|▦*8*.

Any deviations from the recommended size, grade and quantity of screws will considerably reduce the load carrying capacity and operating life of the bearings.

For screws of grade 12.9, the minimum strength of the clamping rings must be achieved or quenched and tempered seating washers must be used.

8
Fixing screws

Crossed roller bearings	Fixing screws Grade 10.9		Tightening torque
	Dimension	Quantity	M_A Nm
SX011814	M5	18	7
SX011818	M5	24	7
SX011820	M5	24	7
SX011824	M6	24	11,7
SX011828	M8	24	27,8
SX011832	M8	24	27,8
SX011836	M10	24	55,6
SX011840	M10	24	55,6
SX011848	M12	24	98,4
SX011860	M16	24	247
SX011868	M16	24	247
SX011880	M20	24	481
SX0118/500	M24	24	831

Securing of screws

Normally, the screws are adequately secured by the correct preload ➤*1174*|▦*9* and ➤*1174*|▦*10*. If regular shock loads or vibrations occur, however, additional securing of the screws may be necessary.

Not every method of securing screws is suitable for crossed roller bearings. Never use spring washers or split washers.

General information on securing of screws is given in DIN 25201-4:2004. If these are to be used, please consult the relevant companies.

▦**9**
Tightening torques M_A for the torque-controlled tightening of socket headless screws

Fixing screw	Clamping cross-section A_S mm²	Core cross-section A_{d3} mm²	Tightening torque M_A [1] in Nm for grade		
			8.8	10.9	12.9
M4	8,78	7,75	2,25	3,31	3,87
M5	14,2	12,7	4,61	6,77	7,92
M6	20,1	17,9	7,8	11,5	13,4
M8	36,6	32,8	19,1	28	32,8
M10	58	52,3	38	55,8	65,3
M12	84,3	76,2	66,5	97,7	114
M14	115	105	107	156	183
M16	157	144	168	246	288
M18	192	175	229	336	394
M20	245	225	327	481	562
M22	303	282	450	661	773
M24	353	324	565	830	972

1) *M_A in accordance with guideline VDI 2230 (February 2003) for $\mu_K = 0,08$ and $\mu_G = 0,12$.*

▦**10**
Assembly preload forces F_M for the torque-controlled tightening of socket headless screws

Fixing screw	Clamping cross-section A_S mm²	Core cross-section A_{d3} mm²	Mounting preload force F_M [1] in kN for grade		
			8.8	10.9	12.9
M4	8,78	7,75	4,05	5,95	6,96
M5	14,2	12,7	6,63	9,74	11,4
M6	20,1	17,9	9,36	13,7	16,1
M8	36,6	32,8	17,2	25,2	29,5
M10	58	52,3	27,3	40,2	47
M12	84,3	76,2	39,9	58,5	68,5
M14	115	105	54,7	80,4	94,1
M16	157	144	75,3	111	129
M18	192	175	91,6	134	157
M20	245	225	118	173	202
M22	303	282	147	216	253
M24	353	324	169	249	291

1) *F_M in accordance with guideline VDI 2230 (February 2003) for $\mu_G = 0,12$.*

1.17 Mounting and dismounting

Mounting of crossed roller bearings

The bores and edges of the adjacent components must be free from burrs. The support surfaces for the bearing rings must be clean.

The seating and locating surfaces for the bearing rings on the adjacent construction must be lightly oiled or greased.

Lightly oil the thread of the fixing screws in order to prevent varying friction factors (do not oil or grease screws that will be secured by means of adhesive).

Ensure that all adjacent components and lubrication ducts are free from cleaning agents, solvents and washing emulsions. The bearing seat surfaces can rust or the raceway system can become contaminated.

Mounting forces must only be applied to the bearing ring to be mounted; forces must never be directed through the rolling elements or seals. Avoid direct blows on the bearing rings in all cases.

Locate the bearing rings consecutively and without application of any external load.

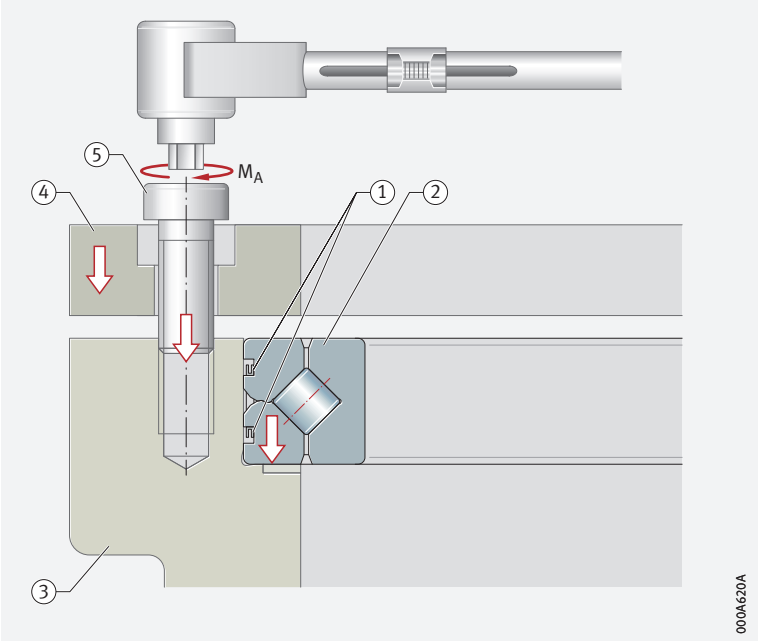
The outer ring is split and is held together by three retaining rings ① ➤*1175*|*18*. Never apply tensile loads to the retaining rings.

Locating the outer bearing ring

Mounting of the ring ➤*1175*|*18*:

- Insert or press the bearing ② into the external adjacent construction ③ with the outer ring first
- Position the external clamping ring ④
- Insert the fixing screws ⑤ in the clamping ring and tighten in steps up to the specified tightening torque M_A
  - tighten the screws in a crosswise sequence in order to prevent unacceptable fluctuations in the screw tensioning forces
  - tightening torques M_A for fixing screws ➤*1174*|*9*

18
Locating the outer bearing ring

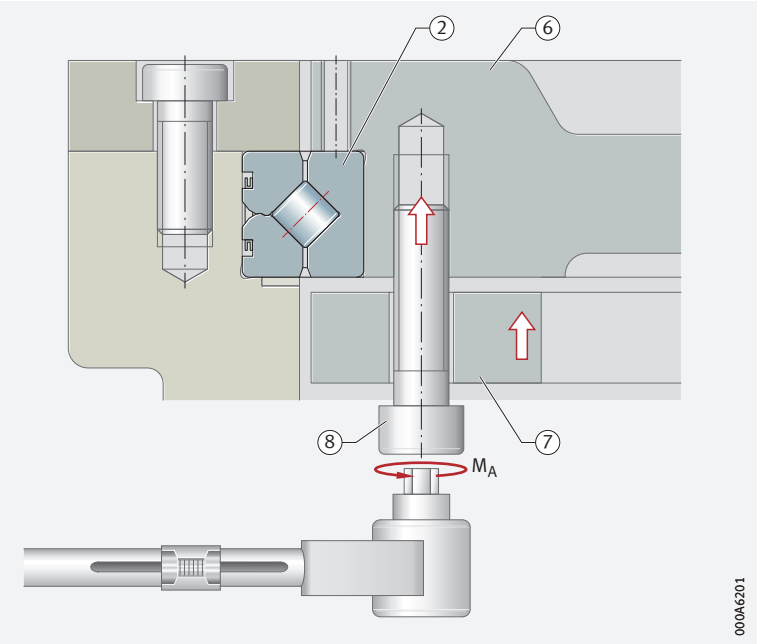


Locating the inner bearing ring

Mounting of the ring ➤*1176*| *19*:

- Insert the bearing ② into the internal adjacent construction ⑥
- Position the internal clamping ring ⑦
- Insert the fixing screws ⑧ in the clamping ring and tighten in steps up to the specified tightening torque M_A
  – tighten the screws in a crosswise sequence in order to prevent unacceptable fluctuations in the screw tensioning forces

19
Locating the inner bearing ring



Checking the function

Once mounting is complete, the operation of the mounted crossed roller bearing must be checked. If the bearing runs irregularly or roughly, or the temperature in the bearing shows an unusual increase, the bearing must be dismounted, checked and mounted again in accordance with the mounting guidelines described.

Checking the running accuracy

✎ Possible causes of deviations in values

The running accuracy must be checked by means of a dial gauge. The corresponding values are taken from the mounting drawing or the product tables. Deviations from the values may be the result of:

- inaccuracies in the adjacent construction
- braced bearings due to incorrectly tightened clamping rings, fixing screws or locknuts

Checking the rotational resistance

✎ Factors influencing the rotational resistance

The rotational resistance is essentially determined by:

- the rolling resistance of the rolling elements
- the internal clearance or bearing preload
- the friction of the spacers
- the friction of the seals
- the grease
- a deformed or defective adjacent construction
- errors during mounting

Preload, rotational resistance, bearing temperature

Due to the preload in the rolling element system, the rotational resistance is higher than in a bearing with clearance. At higher speeds, a high preload can lead to generation of significant heat in the bearing.
In such applications, tests must be carried out if necessary with bearings preloaded to various values.

Checking the bearing temperature

Possible causes of high temperatures

After commissioning, the temperature in the bearing can increase; in the case of grease lubrication, this may continue until the grease is evenly distributed in the bearing. A further increase or unusually high temperatures may be caused by one of the following:

- The bearing is lubricated using an unsuitable grease
- There is too much lubricant in the bearing
- The bearing load is too high
- The bearing is mounted unevenly
- The adjacent construction deviates from the specifications

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings *https://www.schaeffler.de/std/1D53*.
It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

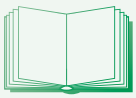
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1.19 Further information

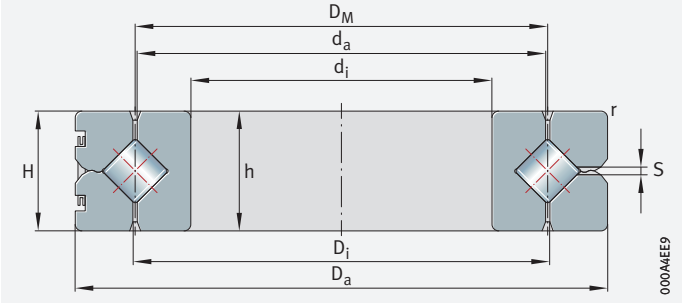


In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*185*
- Design of bearing arrangements ➤*141*
- Mounting and dismounting ➤*194*



Crossed roller bearings



SX

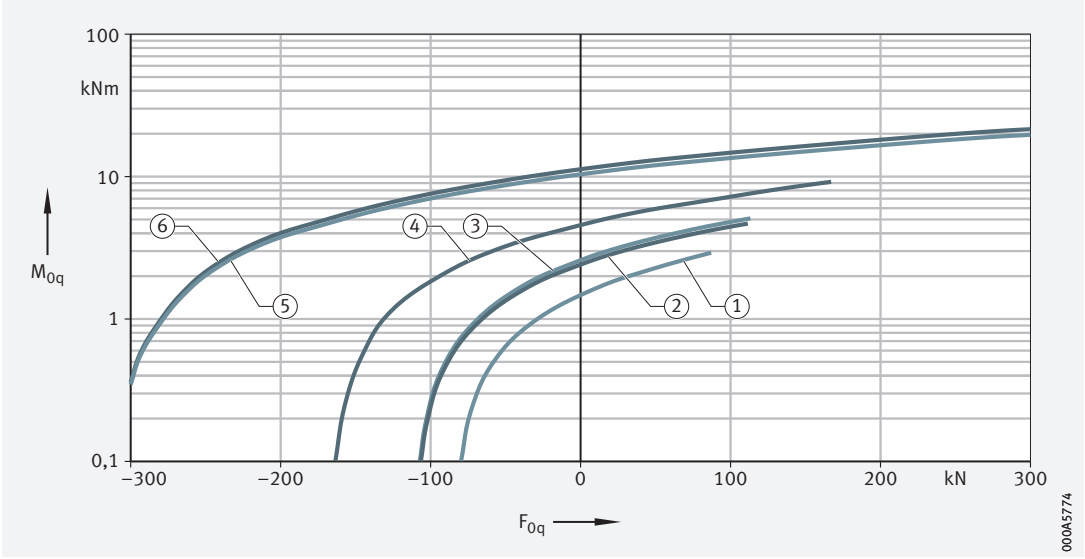
d_i = 70 – 160 mm

Main dimensions			Basic load ratings				Limiting speeds				Mass	Designation	Dimensions identical to deep groove ball bearing 618
d_i	D_a	H[1]	axial		radial[2]		with standard clearance		with preload		m	➤*1159|1.12* ➤*1159|1.13*	
			dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	n_G oil	n_G grease	n_G oil	n_G grease			
K6	h6		kN	kN	kN	kN	min^{-1}	min^{-1}	min^{-1}	min^{-1}	≈ kg		
70 +0,004 −0,015	90 0 −0,022	10 +0,06 −0,06	16,6	52	11,8	25,5	1 910	955	955	475	0,3	**SX011814**	61814
90 +0,004 −0,018	115 0 −0,022	13 +0,06 −0,06	26,5	87	18,9	43	1 500	750	750	375	0,4	**SX011818**	61818
100 +0,004 −0,018	125 0 −0,025	13 +0,06 −0,06	28	97	20	47,5	1 360	680	680	340	0,5	**SX011820**	61820
120 +0,004 −0,018	150 0 −0,025	16 +0,06 −0,06	39,5	140	28	69	1 130	565	565	280	0,8	**SX011824**	61824
140 +0,004 −0,021	175 0 −0,025	18 +0,06 −0,06	64	223	45,5	109	975	485	485	240	1,1	**SX011828**	61828
160 +0,004 −0,021	200 0 −0,029	20 +0,10 −0,10	69	255	49	126	850	425	425	210	1,7	**SX011832**	61832

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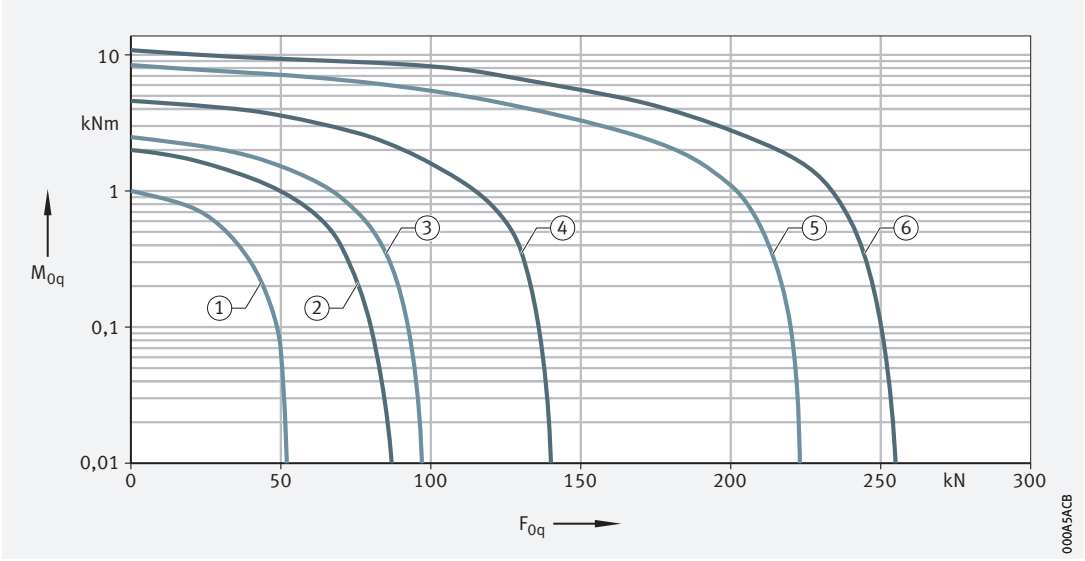
[1] H = section height of bearing, h = height of individual ring.

[2] Basic load ratings, radial: for radial loads only.



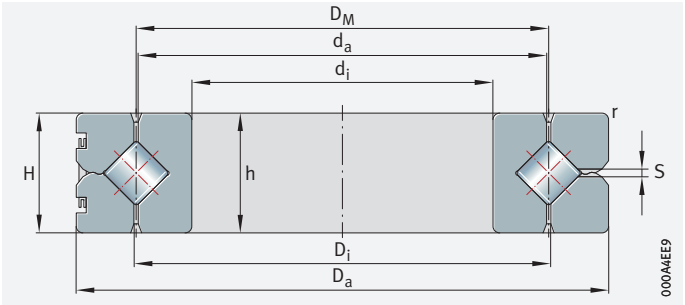
Static limiting load diagrams for fixing screws – compressive load

Dimensions							Running accuracy		Normal clearance				Low clearance RL0		Preload VSP		
d_i	D_M	$h^{1)}$	d_a	D_i	r	S	radial	axial	Radial clearance		Axial tilting clearance		Radial clearance	Preload			Position: see diagram
					min.				min.	max.	min.	max.	max.	max.	min.	max.	
70	80	10 0 −0,01	79,5	80,5	0,6	1,2	0,01	0,01	0,003	0,015	0,006	0,03	0,003	0,006	0,003	0,015	①
90	102	13 0 −0,01	101,5	102,5	1	1,2	0,01	0,01	0,003	0,015	0,006	0,03	0,003	0,006	0,003	0,015	②
100	112	13 0 −0,01	111,5	112,5	1	1,2	0,01	0,01	0,005	0,02	0,01	0,04	0,004	0,008	0,005	0,02	③
120	135	16 0 −0,01	134,4	135,6	1	1,5	0,01	0,01	0,005	0,02	0,01	0,04	0,004	0,008	0,005	0,02	④
140	157	18 0 −0,01	156,3	157,7	1,1	1,5	0,015	0,01	0,005	0,02	0,01	0,04	0,004	0,008	0,005	0,02	⑤
160	180	20 0 −0,025	179,2	180,8	1,1	1,5	0,015	0,01	0,005	0,02	0,01	0,04	0,004	0,008	0,005	0,02	⑥



Static limiting load diagrams for raceway – compressive load

Crossed roller bearings



SX

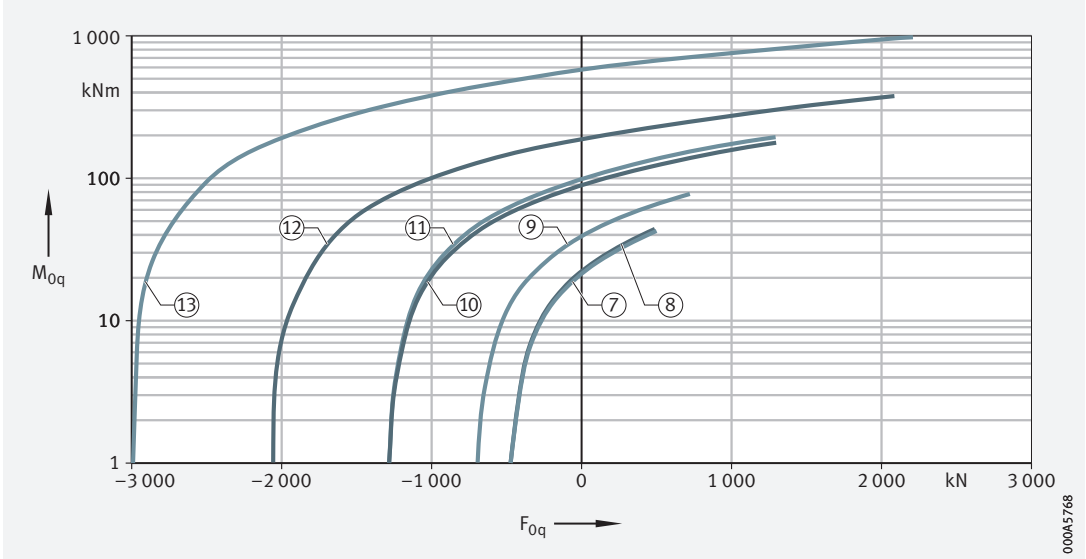
d_i = 180 – 500 mm

Main dimensions			Basic load ratings				Limiting speeds				Mass	Designation	Dimensions identical to deep groove ball bearing 618
d_i	D_a	H[1]	axial		radial[2]		with standard clearance		with preload		m	➤*1159|1.12* ➤*1159|1.13*	
			dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	n_G oil	n_G grease	n_G oil	n_G grease			
K6	h6		kN	kN	kN	kN	min^{-1}	min^{-1}	min^{-1}	min^{-1}	≈ kg		
180 +0,004 −0,021	225 0 −0,029	22 +0,10 −0,10	98	360	70	177	755	375	375	185	2,3	**SX011836**	61836
200 +0,004 −0,024	250 0 −0,029	24 +0,10 −0,10	104	400	74	197	680	340	340	170	3,1	**SX011840**	61840
240 +0,005 −0,024	300 0 −0,032	28 +0,10 −0,10	149	600	106	295	565	280	280	140	5,3	**SX011848**	61848
300 +0,005 −0,027	380 0 −0,036	38 +0,14 −0,14	245	990	174	485	450	225	225	110	12	**SX011860**	61860
340 +0,007 −0,029	420 0 −0,04	38 +0,14 −0,14	265	1 130	187	550	400	200	200	100	13,5	**SX011868**	61868
400 +0,007 −0,029	500 0 −0,04	46 +0,15 −0,15	385	1 660	275	810	340	170	170	85	24	**SX011880**	61880
500 +0,008 −0,032	620 0 −0,044	56 +0,16 −0,16	560	2 550	395	1 250	275	135	135	65	44	**SX0118/500**	618/500

medias *https://www.schaeffler.de/std/1F9A*

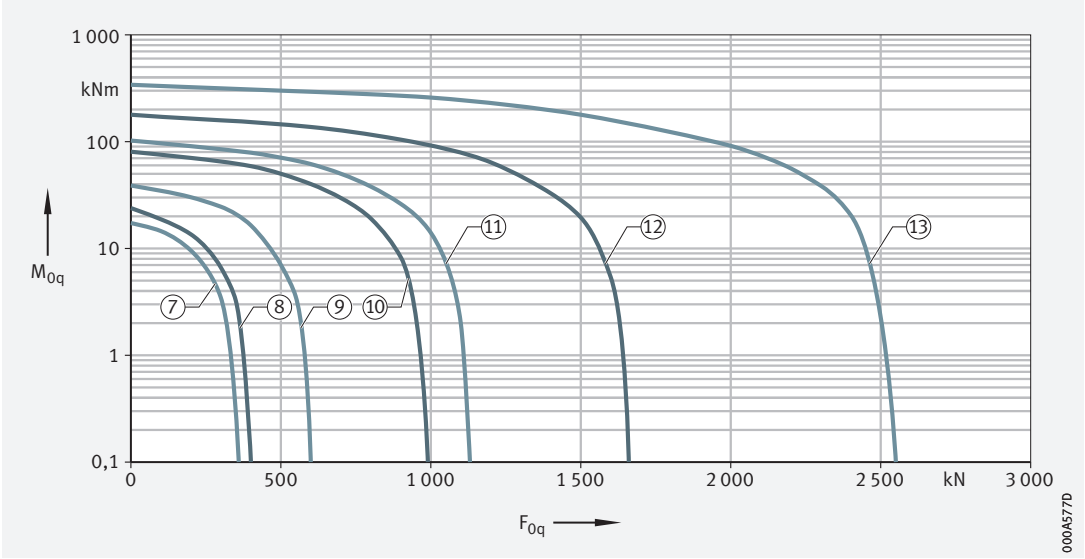
[1] H = section height of bearing, h = height of individual ring.

[2] Basic load ratings, radial: for radial loads only.



Static limiting load diagrams for fixing screws – compressive load

Dimensions							Running accuracy		Normal clearance				Low clearance RL0		Preload VSP		
d_i	D_M	$h^{1)}$	d_a	D_i	r	S	radial	axial	Radial clearance		Axial tilting clearance		Radial clearance	Preload			Position: see diagram
					min.				min.	max.	min.	max.	max.	max.	min.	max.	
180	202	22 0 −0,025	201,2	202,8	1,1	2	0,015	0,01	0,005	0,025	0,01	0,05	0,005	0,01	0,005	0,025	⑦
200	225	24 0 −0,025	224,2	225,8	1,5	2	0,015	0,01	0,005	0,025	0,01	0,05	0,005	0,01	0,005	0,025	⑧
240	270	28 0 −0,025	269,2	270,8	2	2	0,02	0,01	0,01	0,03	0,02	0,06	0,005	0,01	0,005	0,025	⑨
300	340	38 0 −0,05	339,2	340,8	2,1	2,5	0,02	0,01	0,01	0,04	0,02	0,08	0,005	0,01	0,005	0,025	⑩
340	380	38 0 −0,05	379,2	380,8	2,1	2,5	0,025	0,01	0,01	0,04	0,02	0,08	0,005	0,01	0,005	0,025	⑪
400	450	46 0 −0,05	449	451	2,1	2,5	0,03	0,01	0,01	0,05	0,02	0,1	0,005	0,01	0,005	0,025	⑫
500	560	56 0 −0,05	558,8	561,2	3	2,5	0,04	0,01	0,015	0,06	0,03	0,12	0,006	0,012	0,005	0,03	⑬



Static limiting load diagrams for raceway – compressive load

محرک چرخش

تأمین‌کننده تخصصی بلبرینگ و رولبرینگ

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وب‌سایت	moharekcharkhesh.com
تلفن	021 3399 8121 · 021 3399 8100
همراه	0912 464 6470
ایمیل	MoharekCharkhesh@proton.me
آدرس	تهران، خیابان امیرکبیر، کوچه ناظم‌الاطبا شمالی، پاساژ تهران، طبقه سوم، پلاک ۱۴۲
ساعت کاری	شنبه تا پنج‌شنبه، ۹:۰۰ تا ۱۸:۰۰

SCAN TO VISIT

تماس با کارشناس فروش

مشاهده محصولات در سایت

برای استعلام قیمت، اعلام موجودی و ثبت سفارش تکی و عمده بلبرینگ FAG با کارشناسان محرک چرخش تماس بگیرید.

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