

Rolling Bearings General

Catalogue

No. .GBC02/01E



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We reserve the right to make modifications in compliance with any technical developments.

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Foreword

The most up-to-date global research data, as well as the latest International Standards Organization (ISO) documents, were consulted in preparation of this improved edition of the MTK Bearings **General Rolling Bearings Catalogue**.

The catalogue includes the full range of the company's standard manufacturing program. Because of the wide range of products illustrated in the catalogue, the great majority of the needs of MTK customer can be accommodated. MTK bearings are manufactured in accordance with the ISO 9001 quality standards, with basic dynamic and static load ratings meeting ISO standards.

MTK is an international manufacturer with forty years' experience in production of rollings bearings. Over the years, we have continually increased the quality of our bearings so that today, our products are internationally recognized as being in the top rank of technical proficiency. We use the latest technologies to increase the life expectancy and performance of our bearings, which are made of high accuracy bearing steel with careful adherence to lubrication requirements.

All data included in this catalogue are based on current production. We reserve the right to make any changes that may be necessitated by future technological advances.

We strive for maximum customer satisfaction and we assure you that we will do everything possible to meet the needs of our customers.

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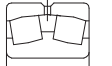
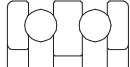
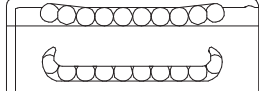
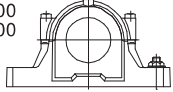
Designations beginning with letters

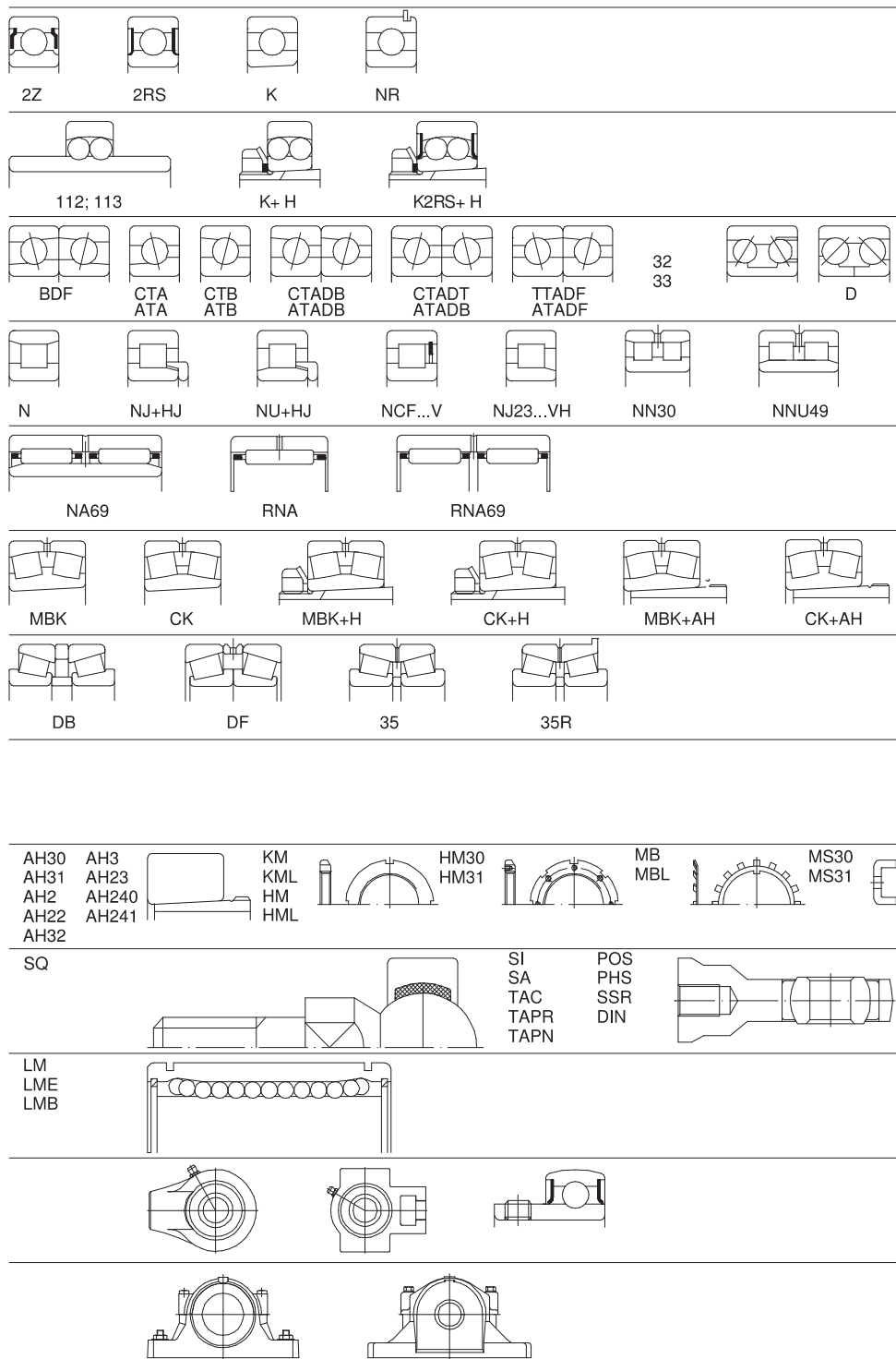
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Measuring units of the international system SI

Length

$$1 \text{ mm} = 0,039 \text{ in}$$

$$1 \text{ in} = 25,4 \text{ mm}$$

Weight

$$1 \text{ kg} = 2,205 \text{ lb}$$

$$1 \text{ lb} = 0,454 \text{ kg}$$

Force

$$1 \text{ kN} = 1\,000 \text{ N} = 225 \text{ lbf}$$

$$1 \text{ kgf} = 9,81 \text{ N}$$

$$1 \text{ lbf} = 4,45 \text{ N}$$

Moment

$$1 \text{ N mm} = 0,102 \text{ kgf mm}$$

$$1 \text{ kgf mm} = 9,81 \text{ N mm}$$

$$1 \text{ N m} = 8,85 \text{ in lbf}$$

$$1 \text{ in lbf} = 0,113 \text{ N mm}$$

Pressure per unit of area (surface)

$$1 \text{ N/mm}^2 = 1 \text{ MPa} = 145 \text{ psi}$$

$$1 \text{ psi} = 0,102 \text{ kgf/mm}^2$$

$$1 \text{ kgf/mm}^2 = 9,81 \text{ N/mm}^2$$

Power

$$1 \text{ W} = 1 \text{ J/s} = 1 \text{ N m/s} = 0,102 \text{ kgf m/s}$$

$$1 \text{ kW} = 1,36 \text{ CP} = 102 \text{ kgf m/s}$$

$$1 \text{ kgf m/s} = 9,81 \text{ N m/s} = 9,81 \text{ J/s}$$

Mechanical work

$$1 \text{ kgf m} = 9,81 \text{ W s} = 9,81 \text{ N m}$$

$$1 \text{ J (Joule)} = 1 \text{ N m} = 1 \text{ W s} = 0,102 \text{ kgf m}$$

Kinematic viscosity

$$1 \text{ mm}^2/\text{s} = 1 \text{ cSt (centiStokes)}$$

I. Rolling bearings

1. Selection of bearing type

Each type of bearing displays characteristic features which make it suitable for a certain application. Therefore, many bearing types and constructive versions have been developed so that they can satisfy various demands for rolling bearings. Taking into account the great number of factors to be considered when selecting a bearing type, no general rule can be given.

We give further the most important criteria to be considered when selecting the bearing type.

Selection of bearing type, considering the load magnitude and direction

Radial load

Deep groove ball bearings are the most suitable types of bearings for light and moderate pure radial loads. For heavy radial load and where large-diameter shafts are used, double row cylindrical roller bearings are the adequate choice. Needle roller bearings are recommended in case of limited space and heavy loads.

Axial load

For pure axial loads, single direction thrust ball bearings are used in case of loads acting in one direction. For loads acting in both directions, double direction thrust ball bearings are used. Angular contact thrust ball bearings and single or double row angular contact ball bearings are used in case of light or moderate pure axial loads at moderate speeds.

For light axial loads at high speeds, deep groove ball bearings are suitable. Under the axial load, a contact angle different from 0° is generated in these bearings and therefore they operate as angular contact ball bearings. In order to increase axial load carrying capacity, a larger clearance should be selected (C3, C4, etc.)

For moderate axial loads at high speeds, angular contact ball bearings in tandem arrangement are used so that they can take over loads acting in both directions. Four-point contact ball bearings, QJ type, are also used.

Combined load

In order to carry combined radial and axial loads acting simultaneously, bearings with a contact angle different from 0° are used. The greater the contact angle, the greater the axial load carrying capacity.

Self-aligning ball bearings, spherical roller bearings or cylindrical roller bearings, NJ, NUP, NJ + HJ types, can also accommodate combined loads of certain values. But there are some limit values of the ratio F_a/F_r , which are shown in bearing tables and cannot be exceeded. Cylindrical roller bearings can carry axial loads by means of the sliding friction on ribs. For this reason, the load is limited according to the indications on page 162.

Bearings which accommodate only one direction axial loads should always be mounted in pairs so that they can carry axial loads in both directions.

Selection of bearing type considering the alignment between shaft and housing

Angular misalignments occur generally when the shaft bends under the operating load or when bearings adjacent parts have form or position deviations.

In such cases, self-aligning ball bearings, cylindrical roller bearings or spherical roller thrust bearings should be used.

A certain bearing bent angle can compensate for errors of alignment and maximum angle values are shown for each type in the introductory texts of the table sections.

When misalignments should be compensated, radial and axial clearance are important. The larger the clearance, the greater the possibility of self-aligning.

If the misalignment exceeds the permissible values shown in the introductory texts of the bearing tables, the bearing rating life decreases. The greater the ratio F_r/C_{0r} , the shorter the rating life. If $0,1 < F_r/C_{0r} < 3$, the rating life decreases with about 25%.

Selection of bearing type considering the operating temperature

Bearings are generally used up to a temperature of maximum +120°C. In case of higher temperatures, bearings with special heat treatments should be used, in accordance with specifications on page 27.

Sealed bearings, 2RS type, should be used at operating temperatures up to +80°C. If this temperature is exceeded, the efficacy of lubricants is considerably reduced.

Selection of bearing internal clearance

In most cases, while operating, bearings should have a small radial clearance that can be defined as "the possible value of displacement in radial direction of one bearing ring in relation to the other without parts deformations"

While operating, bearing internal clearance is different from the one at delivery, since the latter is reduced when mounting bearings with a certain tight fit.

Under operating conditions, internal clearance change is also caused by different temperatures between the outer and inner ring. Bearings are generally delivered with a normal radial or axial clearance according to the values shown for each rolling bearing group.

The decrease in radial clearance due to the tight fit and operating temperature is considered to be between 60-80% of the tightening value, depending on bearing series and size.

After the clearance in bearings has been decreased, a large enough operational clearance should remain, so that the lubricant film shouldn't be destroyed.

Deep groove ball bearings should have an operational

clearance close to zero. There may be often a light preload, due to the point-contact between the rolling elements and raceways.

Small-sized cylindrical roller and needle roller bearings should have an operational clearance of 5-10 µm and larger-sized bearings a clearance of 10-30 µm.

Bearing producers can also manufacture - at request- bearings with radial and axial clearance smaller (C1 and C2) or larger (C3, C4 and C5) than normal, so that the most favorable operating conditions for bearings should be assured.

Cylindrical and needle roller bearings can be manufactured with interchangeable rings (no special designation) and with non interchangeable rings (suffix NA).

Bearings with non interchangeable parts have a smaller radial clearance than bearings with interchangeable parts. Changing rings from one bearing to another is not allowed.

In case of bearings with interchangeable parts, the rings may be changed and the values of radial clearance will not be altered.

Bearing types and technical characteristics

MTK bearing producers can manufacture bearings of various types and sizes so that they can meet the customers' requirements assuring a proper reliability for various applications.

Table 1.1 shows qualitative results of each group of bearings, considering the main technical characteristics.

Bearing type is selected depending on the technical characteristics required by a certain application.

A suggestive graphic symbol has been determined for each main technical characteristic. Thus, a proper bearing for each purpose can be easily chosen. According to the specifications in this catalogue, the proper type and size of bearing can be selected, together with all manufacturing and operating technical conditions.

Bearing types and their characteristics

Tabel 1.1

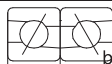
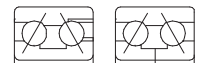
 - excellent  - good  - fair  - poor  - unsuitable  - single direction  - double direction <th>Purely radial load</th> <th>Purely axial load</th> <th>Combined load</th> <th>Moment load</th>	Purely radial load	Purely axial load	Combined load	Moment load
Deep groove ball bearings		  		
Self-aligning ball bearings		 		
Angular contact ball bearings -single row	 	  		
-high precision	 	  		
-double rows		  		
Cylindrical roller bearings, -NU; N	 	 		
-NJ, NU+HJ, NUP, NJ+HJ	   	  		
-NCF, NJ23VH	 	  		
-NNU, NN	 	 		
Needle roller bearings -NA	 	 		
Spherical roller bearings	 	  		
Tapered roller bearings -single row		  		
-double row, paired	 	  		
Thrust ball bearing -single direction -double direction	 	  		

Table 1.1

Tolerance class	Quiet running	High speed	High stiffness	Compensation of misalignment	Low friction	Shock resistance	Located bearing	Non-located bearing	Axial displacement possible in bearing
									
									
									
									
									
									
									
									
									
									
									
									
									
									

2. Selection of bearing size

The size of a bearing is selected considering the load in the used rolling bearing and also depends on the operational rating life and prescribed operating safety.

Basic load ratings

The basic dynamic load rating C_r is used to calculate bearing dimensions while rotating under load. It expresses the bearing admissible load which will give a basic rating life up to 1000 000 revolutions.

The basic dynamic load ratings of MTK bearings have been determined in accordance with international standard ISO 281. The values are given in bearing tables.

Considering the basic dynamic load rating, the service time until the fatigue of the material appears is calculated, determining this way the calculated rating life.

Basic static load rating C_{or} is considered in case of low speeds, low oscillating movements or in the stationary case.

The basic static load rating is defined in accordance with ISO 76, as the load acting upon the stationary bearing. It corresponds to a calculated contact stress in the center of the contact area between the most heavily loaded rolling element and the raceway, of:

- 4 600 MPa for self-aligning ball bearings,
- 4 200 MPa for all other ball bearings,
- 4 000 MPa for all roller bearings.

This stress produces a permanent deformation of the rolling element and raceway which is about 0,0001 of the rolling element diameter. The loads are pure radial for radial bearings and pure axial for thrust bearings.

Bearing life

The life of a rolling bearing is defined as the number of revolutions or the number of operating hours, which the bearing is capable to endure, before the first sign of fatigue occurs on one of its rings, on the raceway or the rolling elements.

If we want to consider only the fatigue on the bearing operating surfaces, the following conditions have to be observed:

1. The forces and speeds considered when calculating the bearing should correspond to the real operating conditions.

2. Proper lubrication should be assured during the entire operating period.

3. If the bearing carries a light load, its failure is generated by the wear.

4. Experience showed that the failure of many bearings was caused by other reasons than fatigue, such as: selection of an inadequate bearing type in a bearing joint, improper operation or lubrication, outer particles in bearing etc.

Basic rating life

The basic rating life of a single bearing or of a group of apparently identical bearings operating under identical conditions, is the life corresponding to a reliability of 90%.

The average life of a group of bearings is approximately five times longer than the basic rating life.

Basic rating life is marked with L_{10} (millions of revolutions) or L_{10h} (operating hours).

L_{10} can be calculated using the equation:

$$L_{10} = \left(\frac{C}{P} \right)^p, \text{ where:}$$

- | | |
|------------|--|
| L_{10} | - basic rating life, millions of revolutions, |
| C | - basic bearing load, kN, |
| P | - equivalent dynamic bearing load, kN, |
| p | - exponent of the life equation with the following values: |
| $p = 3$ | - for ball bearings |
| $p = 10/3$ | - for roller bearings |

The equivalent dynamic bearing load, respectively the radial and axial load, acting simultaneously can be calculated using the following equations (applicable to ball and roller radial bearings):

- | | |
|-----------------------------|------------------------|
| $P_r = F_r$, kN, | - for pure radial load |
| $P_r = X F_r + Y F_a$, kN, | - for combined load |

For thrust ball bearings, the following equations can be used:

- | | |
|-----------------------------|-----------------------|
| $P_a = F_a$, kN, | - for pure axial load |
| $P_a = X F_r + Y F_a$, kN, | - for combined load |

where:

F_r = the radial component of the load, kN

F_a = the axial component of the load, kN

In the texts preceding the bearing tables, for some groups of bearings there are given details for determining the equivalent load. Values of the coefficients X and Y can be found in tables.

For bearings operating at constant speed, the basic rating life expressed in operating hours can be calculated using the equation:

$$L_{10h} = \frac{1\,000\,000}{60\,n} (C/P)^p \text{ sau } L_{10h} = \frac{16\,666}{n} (C/P)^p$$

where:

n = rotational speed, r/min

Values of the basic rating life L_{10} (millions of revolutions) as a function of the ratio C/P can be found in the table 2.1.

Values of the basic rating life L_{10h} (operating hours) as a function of the ratio C/P and speed n can be found in table 2.2 for ball bearings and table 2.3 for roller bearings.

When determining the bearing size it is necessary to base the calculations on the rating life corresponding to the purpose of operation.

It usually depends on the machine type, service life and the requirements regarding operational safety.

Approximate values of the service life for various classes of machines and equipments for general purposes are given in table 2.4

The basic rating life L_{10h} of the bearings can be determined as a function of service life, using the life calculation chart on page 16.

The basic rating life of road and rail vehicle bearings, for wheel - axle bearings, is expressed as a function of the wheel diameter and covered distance (km), using the equation:

$$L_{10} = \frac{1\,000}{\pi\,D} L_{10s}, \text{ respectively: } L_{10s} = \frac{\pi\,D}{1\,000} L_{10}$$

where:

- L_{10} - basic rating life, millions of revolutions
- L_{10s} - service life distance, millions of kilometers
- D - wheel diameter, m

Approximate values for the service life distance (kilometers covered), in case of light loaded cars and rail vehicles are given in table 2.5.

**Load ratio C/P for various life values L_{10}
(millions of revolutions)**

Table 2.1

L_{10}	C/P Ball bearings	Roller bearings	L_{10}	C/P Ball bearings	Roller bearings
0,5	0,793	0,812	600	8,43	6,81
0,75	0,909	0,917	650	8,66	6,98
1	1	1	700	8,88	7,14
1,5	1,14	1,13	750	9,09	7,29
2	1,26	1,24	800	9,28	7,43
3	1,44	1,39	850	9,47	7,56
4	1,59	1,52	900	9,65	7,7
5	1,71	1,62	950	9,83	7,82
6	1,82	1,71	1 000	10	7,94
8	2	1,87	1 100	10,3	8,17
10	2,15	2	1 200	10,6	8,39
12	2,29	2,11	1 300	10,9	8,59
14	2,41	2,21	1 400	11,2	8,79
16	2,52	2,3	1 500	11,4	8,97
18	2,62	2,38	1 600	11,7	9,15
20	2,71	2,46	1 700	11,9	9,31
25	2,92	2,63	1 800	12,2	9,48
30	3,11	2,77	1 900	12,4	9,63
35	3,27	2,91	2 000	12,6	9,78
40	3,42	3,02	2 200	13	10,1
45	3,56	3,13	2 400	13,4	10,3
50	3,68	3,23	2 600	13,8	10,6
60	3,91	3,42	2 800	14,1	10,8
70	4,12	3,58	3 000	14,4	11
80	4,31	3,72	3 200	14,7	11,3
90	4,48	3,86	3 400	15	11,5
100	4,64	3,98	3 600	15,3	11,7
120	4,93	4,2	3 800	15,6	11,9
140	5,19	4,4	4 000	15,9	12
160	5,43	4,58	4 500	16,5	12,5
180	5,65	4,75	5 000	17,1	12,9
200	5,85	4,9	5 500	17,7	13,2
220	6,04	5,04	6 000	18,2	13,6
240	6,21	5,18	6 500	18,7	13,9
260	6,38	5,3	7 000	19,1	14,2
280	6,54	5,42	7 500	19,6	14,5
300	6,69	5,54	8 000	20	14,8
320	6,84	5,64	8 500	20,4	15,1
340	6,98	5,75	9 000	20,8	15,4
360	7,11	5,85	9 500	21,2	15,6
380	7,24	5,94	10 000	21,5	15,8
400	7,37	6,03	12 000	22,9	16,7
420	7,49	6,12	14 000	24,1	17,5
440	7,61	6,21	16 000	25,2	18,2
460	7,72	6,29	18 000	26,2	18,9
480	7,83	6,37	20 000	27,1	19,5
500	7,94	6,45	25 000	29,2	20,9
550	8,19	6,64	30 000	31,1	22

Ball bearings - load ratio C/P for various basic rating lives L_{10h} (operating hours) at various speeds n (r/min)

Table 2.2

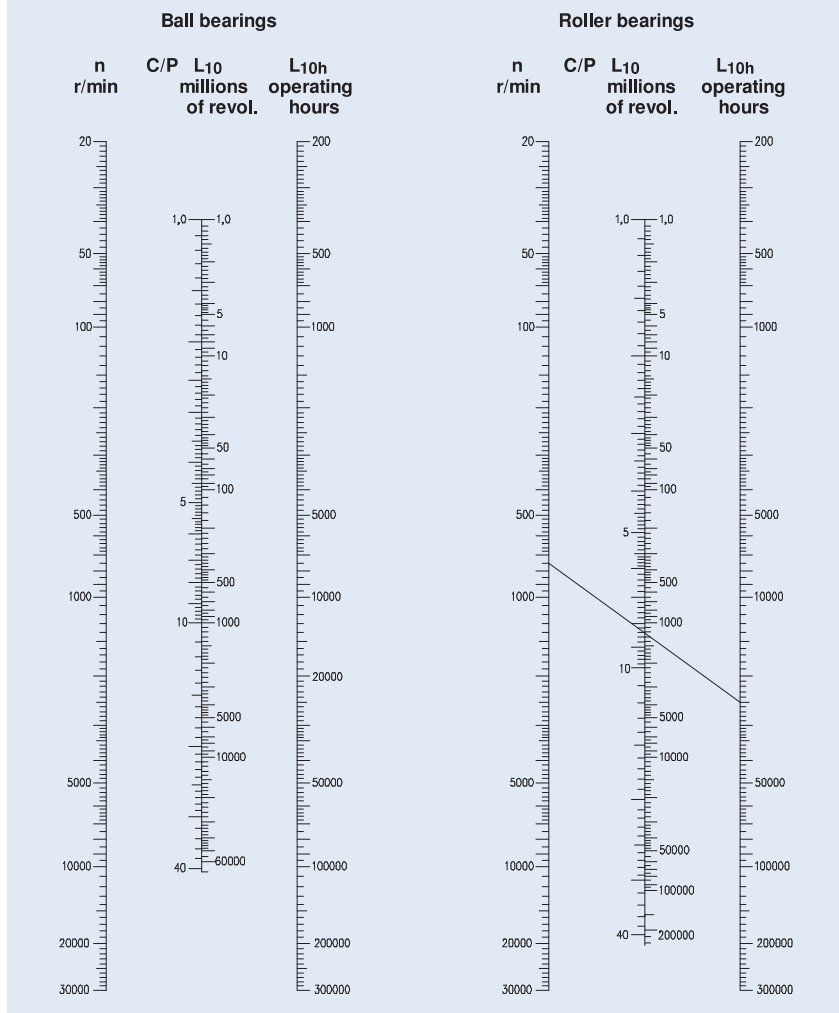
L _{10h}	C/P when n = 50	100	150	200	250	300	400	500	750	1 000	1 500
100	0,67	0,84	0,97	1,06	1,14	1,22	1,34	1,44	1,65	1,82	2,08
500	1,14	1,44	1,65	1,82	1,96	2,08	2,29	2,47	2,82	3,11	3,56
1 000	1,44	1,82	2,08	2,29	2,47	2,62	2,88	3,11	3,56	3,91	4,48
1 250	1,55	1,96	2,24	2,47	2,66	2,82	3,11	3,35	3,83	4,22	4,83
1 600	1,69	2,13	2,43	2,68	2,88	3,07	3,37	3,63	4,16	4,58	5,24
2 000	1,82	2,29	2,62	2,88	3,11	3,30	3,63	3,91	4,48	4,93	5,65
2 500	1,96	2,47	2,82	3,11	3,35	3,56	3,91	4,22	4,83	5,31	6,08
3 200	2,13	2,68	3,07	3,37	3,63	3,86	4,25	4,58	5,24	5,77	6,60
4 000	2,29	2,88	3,30	3,63	3,91	4,16	4,58	4,93	5,65	6,21	7,11
5 000	2,47	3,11	3,56	3,91	4,22	4,48	4,93	5,31	6,08	6,69	7,66
6 300	2,66	3,36	3,84	4,23	4,55	4,84	5,33	5,74	6,57	7,23	8,28
8 000	2,88	3,63	4,16	4,58	4,93	5,24	5,77	6,21	7,11	7,83	8,96
10 000	3,11	3,91	4,48	4,93	5,31	5,65	6,21	6,69	7,66	8,43	9,65
12 500	3,35	4,22	4,83	5,31	5,72	6,08	6,69	7,21	8,25	9,09	10,4
16 000	3,63	4,58	5,24	5,77	6,21	6,60	7,27	7,83	8,96	9,86	11,3
20 000	3,91	4,93	5,65	6,21	6,69	7,11	7,83	8,43	9,65	10,6	12,2
25 000	4,22	5,31	6,08	6,69	7,21	7,66	8,43	9,09	10,4	11,4	13,1
32 000	4,58	5,77	6,60	7,27	7,83	8,32	9,16	9,86	11,3	12,4	14,2
40 000	4,93	6,21	7,11	7,83	8,43	8,96	9,86	10,6	12,2	13,4	15,3
50 000	5,31	6,69	7,66	8,43	9,09	9,65	10,6	11,4	13,1	14,4	16,5
63 000	5,74	7,23	8,28	9,11	9,81	10,4	11,5	12,4	14,2	15,6	17,8
80 000	6,21	7,83	8,96	9,86	10,6	11,3	12,4	13,4	15,3	16,9	19,3
100 000	6,69	8,43	9,65	10,6	11,4	12,2	13,4	14,4	16,5	18,2	20,8
200 000	8,43	10,6	12,2	13,4	14,4	15,3	16,9	18,2	20,8	22,9	26,2
L _{10h}	C/P when n = 2 000	2 500	3 000	4 000	5 000	6 000	8 000	10 000	15 000	20 000	30 000
100	2,29	2,47	2,62	2,88	3,11	3,30	3,63	3,91	4,48	4,93	5,65
500	3,91	4,22	4,48	4,93	5,31	5,65	6,21	6,69	7,66	8,43	9,65
1 000	4,93	5,31	5,65	6,21	6,69	7,11	7,83	8,43	9,65	10,6	12,2
1 250	5,31	5,72	6,08	6,69	7,21	7,66	8,43	9,09	10,4	11,4	13,1
1 600	5,77	6,21	6,60	7,27	7,83	8,32	9,16	9,86	11,3	12,4	14,2
2 000	6,21	6,69	7,11	7,83	8,43	8,96	9,86	10,6	12,2	13,4	15,3
2 500	6,69	7,21	7,66	8,43	9,09	9,65	10,6	11,4	13,1	14,4	16,5
3 200	7,27	7,83	8,32	9,16	9,86	10,5	11,5	12,4	14,2	15,7	17,9
4 000	7,83	8,43	8,96	9,86	10,6	11,3	12,4	13,4	15,3	16,9	19,3
5 000	8,43	9,09	9,65	10,6	11,4	12,2	13,4	14,4	16,5	18,2	20,8
6 300	9,11	9,81	10,4	11,5	12,4	13,1	14,5	15,6	17,8	19,6	22,5
8 000	9,86	10,6	11,3	12,4	13,4	14,2	15,7	16,9	19,3	21,3	24,3
10 000	10,6	11,4	12,2	13,4	14,4	15,3	16,9	18,2	20,8	22,9	26,2
12 500	11,4	12,3	13,1	14,4	15,5	16,5	18,2	19,6	22,4	24,7	28,2
16 000	12,4	13,4	14,2	15,7	16,9	17,9	19,7	21,3	24,3	26,8	30,7
20 000	13,4	14,4	15,3	16,9	18,2	19,3	21,3	22,9	26,2	28,8	33,0
25 000	14,4	15,5	16,5	18,2	19,6	20,8	22,9	24,7	28,2	31,1	35,6
32 000	15,7	16,9	17,9	19,7	21,3	22,6	24,9	26,8	30,7	33,7	38,6
40 000	16,9	18,2	19,3	21,3	22,9	24,3	26,8	28,8	33,0	36,3	41,6
50 000	18,2	19,6	20,8	22,9	24,7	26,1	28,8	31,1	35,6	39,1	44,8
63 000	19,6	21,1	22,5	24,7	26,6	28,3	31,2	33,6	38,4	42,3	48,4
80 000	21,3	22,9	24,3	26,8	28,8	30,7	33,7	36,3	41,6	45,8	52,4
100 000	22,9	24,7	26,2	28,8	31,1	33,0	36,3	39,1	44,8	49,3	56,5
200 000	28,8	31,1	33,0	36,3	39,1	41,6	45,8	49,3	56,5	62,1	71,1

Roller bearings - load ratio C/P for various basic rating lives L_{10h} (operating hours) at various speeds n (r/min)

Table 2.3

L _{10h}	C/P when n = 50	100	150	200	250	300	400	500	750	1 000	1 500
100	0,70	0,86	0,97	1,06	1,13	1,19	1,30	1,39	1,57	1,71	1,93
500	1,13	1,39	1,57	1,71	1,83	1,93	2,11	2,25	2,54	2,77	3,13
1 000	1,39	1,71	1,93	2,11	2,25	2,38	2,59	2,77	3,13	3,42	3,86
1 250	1,49	1,83	2,07	2,25	2,41	2,54	2,77	2,97	3,35	3,65	4,12
1 600	1,60	1,97	2,23	2,43	2,59	2,74	2,99	3,19	3,61	3,93	4,44
2 000	1,71	2,11	2,38	2,59	2,77	2,93	3,19	3,42	3,86	4,20	4,75
2 500	1,83	2,25	2,54	2,77	2,97	3,13	3,42	3,65	4,12	4,50	5,08
3 200	1,97	2,43	2,74	2,99	3,19	3,37	3,68	3,93	4,44	4,84	5,47
4 000	2,11	2,59	2,93	3,19	3,42	3,61	3,93	4,20	4,75	5,18	5,85
5 000	2,25	2,77	3,13	3,42	3,65	3,86	4,20	4,50	5,08	5,54	6,25
6 300	2,42	2,97	3,36	3,66	3,91	4,13	4,51	4,82	5,44	5,93	6,70
8 000	2,59	3,19	3,61	3,93	4,20	4,44	4,84	5,18	5,85	6,37	7,20
10 000	2,77	3,42	3,86	4,20	4,50	4,75	5,18	5,54	6,25	6,81	7,70
12 500	2,97	3,65	4,12	4,50	4,81	5,08	5,54	5,92	6,68	7,29	8,23
16 000	3,19	3,93	4,44	4,84	5,18	5,47	5,96	6,37	7,20	7,85	8,86
20 000	3,42	4,20	4,75	5,18	5,54	5,85	6,37	6,81	7,70	8,39	9,48
25 000	3,65	4,50	5,08	5,54	5,92	6,25	6,81	7,29	8,23	8,97	10,1
32 000	3,93	4,84	5,47	5,96	6,37	6,73	7,34	7,85	8,86	9,66	10,9
40 000	4,20	5,18	5,85	6,37	6,81	7,20	7,85	8,39	9,48	10,3	11,7
50 000	4,50	5,54	6,25	6,81	7,29	7,70	8,39	8,97	10,1	11,0	12,5
63 000	4,82	5,93	6,70	7,30	7,81	8,25	8,99	9,61	10,9	11,8	13,4
80 000	5,18	6,37	7,20	7,85	8,39	8,86	9,66	10,3	11,7	12,7	14,4
100 000	5,54	6,81	7,70	8,39	8,97	9,48	10,3	11,0	12,5	13,6	15,4
200 000	6,81	8,39	9,48	10,3	11,0	11,7	12,7	13,6	15,4	16,7	18,9
L _{10h}	C/P when n = 2 000	2 500	3 000	4 000	5 000	6 000	8 000	10 000	15 000	20 000	30 000
100	2,11	2,25	2,38	2,59	2,77	2,93	3,19	3,42	3,86	4,20	4,75
500	3,42	3,65	3,86	4,20	4,50	4,75	5,18	5,54	6,25	6,81	7,70
1 000	4,20	4,50	4,75	5,18	5,54	5,85	6,37	6,81	7,70	8,39	9,48
1 250	4,50	4,81	5,08	5,54	5,92	6,25	6,81	7,29	8,23	8,97	10,1
1 600	4,84	5,18	5,47	5,96	6,37	6,73	7,34	7,85	8,86	9,66	10,9
2 000	5,18	5,54	5,85	6,37	6,81	7,20	7,85	8,39	9,48	10,3	11,7
2 500	5,54	5,92	6,25	6,81	7,29	7,70	8,39	8,97	10,1	11,0	12,5
3 200	5,96	6,37	6,73	7,34	7,85	8,29	9,03	9,66	10,9	11,9	13,4
4 000	6,37	6,81	7,20	7,85	8,39	8,86	9,66	10,3	11,7	12,7	14,4
5 000	6,81	7,29	7,70	8,39	8,97	9,48	10,3	11,0	12,5	13,6	15,4
6 300	7,30	7,81	8,25	8,99	9,61	10,2	11,1	11,8	13,4	14,6	16,5
8 000	7,85	8,39	8,86	9,66	10,3	10,9	11,9	12,7	14,4	15,7	17,7
10 000	8,39	8,97	9,48	10,3	11,0	11,7	12,7	13,6	15,4	16,7	18,9
12 500	8,97	9,59	10,1	11,0	11,8	12,5	13,6	14,5	16,4	17,9	20,2
16 000	9,66	10,3	10,9	11,9	12,7	13,4	14,6	15,7	17,7	19,3	21,8
20 000	10,3	11,0	11,7	12,7	13,6	14,4	15,7	16,7	18,9	20,6	23,3
25 000	11,0	11,8	12,5	13,6	14,5	15,4	16,7	17,9	20,2	22,0	24,9
32 000	11,9	12,7	13,4	14,6	15,7	16,5	18,0	19,3	21,8	23,7	26,8
40 000	12,7	13,6	14,4	15,7	16,7	17,7	19,3	20,6	23,3	25,4	28,7
50 000	13,6	14,5	15,4	16,7	17,9	18,9	20,6	22,0	24,9	27,1	30,6
63 000	14,6	15,6	16,5	17,9	19,2	20,3	22,1	23,6	26,7	29,1	32,8
80 000	15,7	16,7	17,7	19,3	20,6	21,8	23,7	25,4	28,7	31,2	35,3
100 000	16,7	17,9	18,9	20,6	22,0	23,3	25,4	27,1	30,6	33,4	37,7
200 000	20,6	22,0	23,3	25,4	27,1	28,7	31,2	33,4	37,7	41,1	46,4

Basic rating life calculation chart



Example:

1. It is required to determine the size of a deep groove ball bearing single row, considering the following conditions:

- Basic rating life $L_{10h} = 25\,000$ operating hours
- Rotational speed $n = 1\,000$ r/min
- Load in bearing $F_r = 5$ kN

The chart shows that $C/P = 11.6$; $C = 11.6$, $P = 11.6 \times 5 = 58$ kN. In the catalogue on page 95, you can select the bearing 6310 type with the following characteristics: $C_r = 61.8$ kN; $n = 7\,000$ r/min.

2. What is the basic rating life of the bearing NU 210E which is operating under a radial load of 7,7 kN at a rotational speed $n = 750$ r/min ?

See page 174 in the catalogue and you will find for the bearing, NU 210E type, the following values: $C_r = 63.7$ kN, $n = 8\,000$ r/min. From the chart, for a bearing operated at a rotational speed of 750 r/min and $C_r/P_r = 63.7/7.7 = 8.3$, a basic rating life $L_{10h} = 25\,000$ operating hours is determined.

Application	Recommended basic rating life L 10h (operating hours)
Household machines, technical apparatus for medical use, instruments, agricultural machines:	300...3 000
Machines used for short periods or intermittently: electric hand tools, cranes, lifting tackles in workshops, building machines:	3 000...8 000
Machines used intermittently or for short periods with high operational reliability: lifts, small cranes:	8 000...12 000
Machines for use 8 hours/day but not always at full capacity: machines for general purposes, electric motors for industrial use, rotary crushers, gear drives for general purposes:	10 000...25 000
Machines operating 8 hours/day at full capacity: machine tools, woodworking machines, large cranes, printing equipment, ventilators, separators, centrifuges:	20 000...30 000
Machines for continuous use 24 hours/day: Rolling mill gear units, medium sized electrical machinery, compressors, pumps, textile machines, mine hoists:	40 000...50 000
Hydraulic machines, rotary furnaces, capstans, propulsion machinery for sea vessels (propellers for sea vessels):	50 000...10 0000
Machines for continuous use 24 hours/day with high reliability: large electric machinery, mine pumps and mine ventilators, power station plants, machines for cellulose industry, pumping units:	100 000...

Values for basic rating life L10s

Table 2.5

Type of vehicle	L10s/10 ⁶ km
Wheel hub bearings for road vehicles	
- light loaded cars	0,3
- trucks, buses	0,6
Axlebox bearings for rail vehicles:	
goods wagons (according to UIC)	0,8
suburban vehicles, trams	1,5
long distance passenger carriages	3
motorailers	3-4
Diesel and electric locs	3-4

In case of bearings which do not rotate but oscillate from a central position through an angle, as shown in fig.1, basic rating life can be determined as follows:

$$L_{10osc} = \frac{180}{2\gamma} L_{10}$$

where:

L10osc - basic rating life, millions of cycles
 γ - oscillation amplitude (angle of maximum deviation from center position), degrees.

If the amplitude of oscillation is very small, it can be ignored for basic rating life determination.

Fluctuating dynamic load and speeds

In many cases, in operation speed and magnitude of load fluctuate. Therefore, a mean dynamic load is to be calculated.

Complete oscillation = 4γ from point 0 to point 4

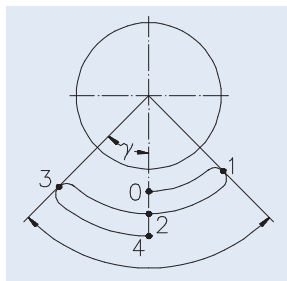


Fig. 1

The load acting on the bearing can vary as shown in fig. 2-a and 2-b.

In this case, the mean load can be determined using the equation:

$$F_m = \sqrt[p]{\frac{F_1^p n_1 + F_2^p n_2 + \dots + F_n^p n_n}{n}}$$

where:

F_m - constant mean load, kN
 $F_1, F_2, \dots, F_n$ - constant load during $n_1, n_2, \dots, n_n$ revolutions, kN
 n - total number of revolutions ($n = n_1 + n_2 + \dots + n_n$) during which loads $F_1, F_2, \dots$ act
 p - exponent -3 - for ball bearings, -10/3 - for roller bearings.

If the bearing speed is constant and the magnitude of the load is between the minimum value F_{min} and a maximum value F_{max} as shown in fig. 3 a and b, the mean load can be obtained from:

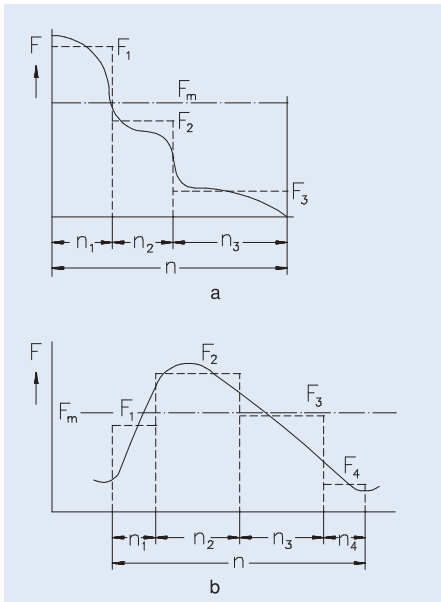


Fig. 2

$$F_m = \frac{F_{min} + 2F_{max}}{3}, \text{ kN}$$

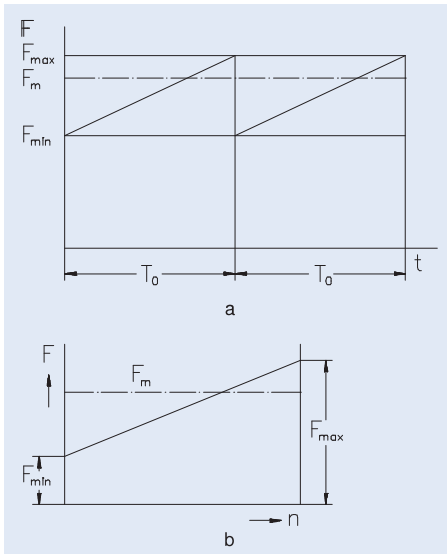


Fig. 3

If the external radial load consists of a load F_1 which is constant in magnitude and direction and a load F_2 which is variable in direction and constant in magnitude (F_1 and F_2 acting in the same plane) as shown in fig.4, the mean load can be determined using the equation:

$$F_m = f_m (F_1 + F_2), \text{ kN}$$

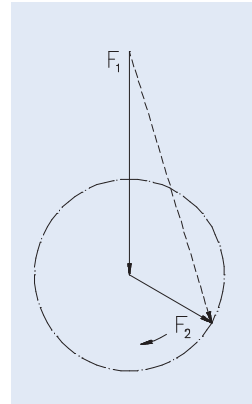


Fig. 4

Values for the factor f_m can be obtained from fig.5.

In case of sinusoidal movement as it is shown in fig. 6, the mean load can be obtained from:

$$F_m = \sqrt{\frac{p}{3\pi}} F_{max}, \text{ kN},$$

$F_m \approx 0,75 F_{max}, \text{ kN}$, for ball bearings

$F_m \approx 0,77 F_{max}, \text{ kN}$, for roller bearings

In case of oscillating movements with oscillating angle γ , as shown in fig. 7, equivalent mean load can be calculated with the equation:

$$F_m = \sqrt{\frac{p \cdot \gamma}{90^\circ}} F_r, \text{ kN}$$

If the fluctuating load acts in a pure radial direction for radial bearings and in a pure axial direction for thrust bearings, the equivalent dynamic bearing load will be: $P_r = F_m$.

For combined loads, with radial load F_r and axial load F_a constant in direction and magnitude, the equivalent dynamic load can be calculated using the equation

$$P_r = X F_r + Y F_a, \text{ kN}$$

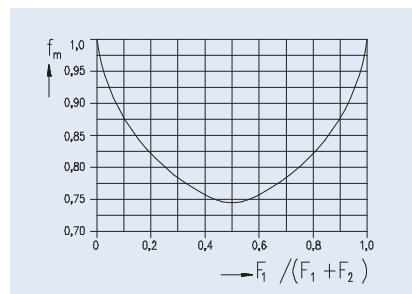


Fig. 5

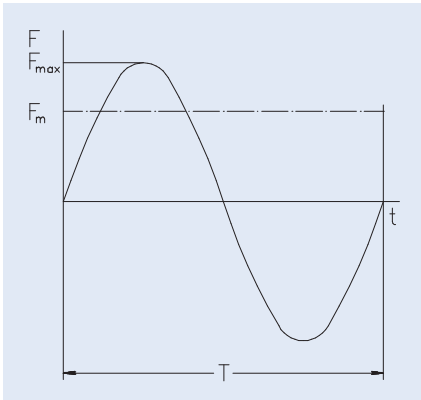


Fig. 6

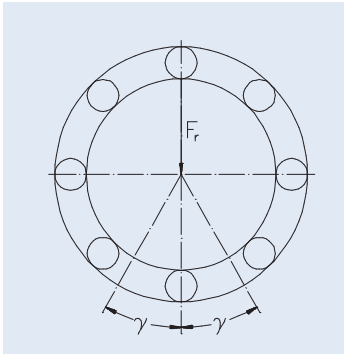


Fig. 7

In case of combined loads, with radial and axial loads changing in time, ratio F_r/F_a being constant, the equivalent dynamic load can be calculated by:

$$P_m = X F_{r m} + Y F_{a m}$$

where:

- P_m - equivalent mean dynamic load, kN,
- $F_{r m}$ - radial mean load, kN,
- $F_{a m}$ - axial mean load, kN,
- X, Y - factors of radial and axial load.

In case the direction and magnitude of the load change in time and speeds fluctuate in time, the equivalent mean dynamic load will be calculated using the equation:

$$P_m = \sqrt[p]{\frac{P_1^p n_1 + P_2^p n_2 + \dots + P_n^p n_n}{n}}$$

where:

- P_m - equivalent mean dynamic load, kN
- P_1 - equivalent dynamic load for n_1 revolutions, kN
- P_2 - equivalent dynamic load for n_2 revolutions, kN
- P_n - equivalent dynamic load for n_n revolutions, kN
- n_1 - number of revolutions for load P_1
- n_2 - number of revolutions for load P_2
- n_n - number of revolutions for load P_n
- n - number of revolutions ($n = n_1 + n_2 + \dots + n_n$)
- p - exponent: -3 - for ball bearings, -10/3 - for roller bearings

Basic dynamic load of a bearing group

In case of ball and roller bearings especially, a bearing group of the same type mounted close together is required, so that heavy radial loads can be carried.

In order to take over the load uniformly these bearings should be mounted in order to equal the diameter deviations to the radial clearances.

These deviations must be kept below 1/2 of the admitted tolerance class.

Basic dynamic load for a bearing group, as a function of the basic load of the single bearing, can be calculated using the equation:

$$C_{ri} = C_r i^n$$

where:

- C_{ri} - basic dynamic load of the bearing group, kN,
- C_r - basic dynamic load of the single bearing, selected from the tables,
- i - number of bearings of the same type, mounted close together,
- n - exponent depending on the bearing type:
 - 0,7 - for ball bearings
 - 7/9 - for roller bearings

Values of i^n are given in table 2.6.

Values for i^n

Table 2.6

i	$i^{0,7}$	$i^{7/9}$
2	1,62	1,71
2	2,16	2,35
4	2,64	2,94

The equivalent dynamic load for each group of bearings is calculated considering the specifications in the introductory text preceding the respective group.

Adjusted rating life

Basic rating life L_{10h} is often satisfactory for bearing performances. This life means a reliability of 90% for material and a modern and usual manufacturing technology, as well as for conventional operating conditions.

For a reliability over 90% (100-n)%, ISO recommends steels elaborated in better conditions, high level manufacturing technologies and specific operating conditions. In this case, adjusted rating life can be calculated as follows:

$$L_{na} = a_1 a_2 a_3 L_{10} \text{ or}$$

$$L_{na} = a_1 a_2 a_3 \left(\frac{C}{P} \right)^p$$

where:

- L_{na} - adjusted rating life, millions of revolutions
- a_1 - life adjustment factor considering reliability
- a_2 - life adjustment factor considering the material and manufacturing conditions
- a_3 - life adjustment factor considering the operating conditions.

In case of life adjustment factors a_1, a_2, a_3 greater than 1, when calculating adjusted rating life, prudence and familiarity with bearing manufacturing and operating conditions, including shaft bending and housing stiffness are recommended.

Life adjustment factor a_1 for reliability

The bearing failure, caused by fatigue, is subjected to certain statistic laws. Therefore, this fact is recommended to be considered when calculating the bearing life.

Values of the life adjustment factor a_1 for reliabilities over than 90% are given in table 2.7.

Values for factor a_1

Table 2.7

Reliability, %	L_{na}	a_1
90	L_{10a}	1
95	L_{5a}	0,62
96	L_{4a}	0,53
97	L_{3a}	0,44
98	L_{2a}	0,33
99	L_{1a}	0,21

Life adjustment factor a_2 for material

Life adjustment factor a_2 takes into account the properties of the material, heat treatment of the steel and manufacturing technologies. For MTK bearings, $a_2=1$ is recommended.

Life adjustment factor a_{23} for operating conditions

The longest life of a bearing can be reached in case of hydrodynamic lubrication, namely where there is no direct contact between rolling elements and raceway due to the lubricant film. In this field, many studies have been done by world leading bearing manufacturing companies. These studies showed that there is relationship between life adjustment factor a_2 for material and life adjustment factor a_3 for operating conditions. Preferably these factors should be unified, obtaining factor a_{23} . In this case, adjusted rating life would be:

$$L_{na} = a_1 a_{23} L_{10} \text{ or } L_{na} = a_1 a_{23} L_{10h}$$

The values of a_{23} coefficient depend on the lubricant used for bearing lubrication, namely on the ratio of the oil viscosity at +40°C, ν (initial value) to the viscosity required for adequate lubrication at the operating temperature ν_1 . The values are given in table 2.8.

Values for factor a_{23}

Table 2.8

$\frac{\nu}{\nu_1}$	0,1	0,2	0,5	1	1,5	2	3	4	5
a_{23}	0,45	0,55	0,75	1	1,3	1,6	2	2,5	2,5

The values of viscosity ν_1 , as a function of the mean bearing diameter and operating speed, are given in the diagram fig. 8.

Kinematic viscosity ν at the temperature of +40°C can be determined from the diagram fig. 9 in accordance with ISO, if the bearing operating temperature is known.

In case of grease lubrication, calculation should be done considering the basic oil viscosity and the value of the life adjustment factor a_{23} will be smaller than 1.

Example of oil kinematic viscosity calculation for bearing lubrication:

The bearing 6212 operates at a speed of 3500 r/min and a temperature of +70°C.

Mean diameter will be:

$$0,5 (d+D) = 0,5 (60 + 110) = 85 \text{ mm.}$$

From the diagram fig.9, at a temperature of +70°C, for a viscosity $\nu_1 = 8 \text{ mm}^2/\text{s}$, the viscosity at + 40°C is 20 mm^2/s (cSt).

In this case should be selected an oil in accordance with ISO VG22 with kinematic viscosity limits: $\nu_{\min} = 19,8 \text{ mm}^2/\text{s}$ (cSt) and $\nu_{\max} = 24,2 \text{ mm}^2/\text{s}$ (cSt)

In case of bearing operating at temperatures higher than +150°C, an adjustment factor f_t for temperature should be added to the life adjustment factor a_{23} . Adjusted rating life will be:

$$L_{na} = a_1 a_{23} f_t L_{10} \text{ or } L_{na} = a_1 a_{23} f_t L_{10h}$$

Values for the life adjustment factor f_t for temperature are given in table 2.9.

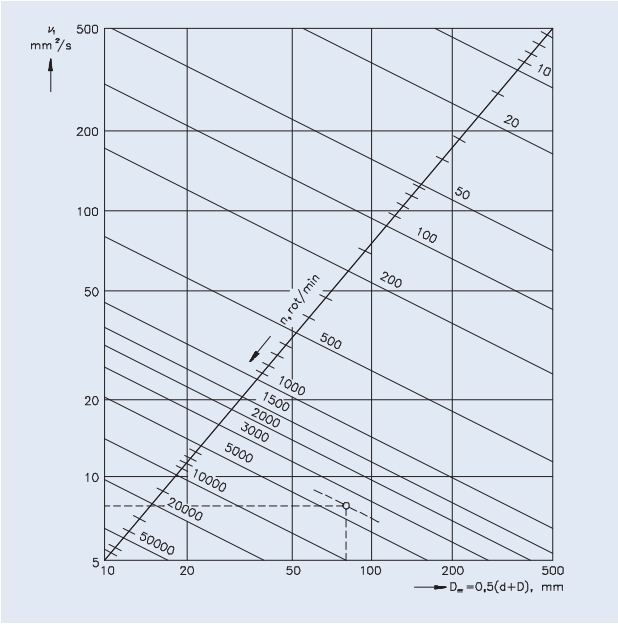


Fig. 8

Values for operating temperature factor f_t

Table 2.9

Operating temperature, t °C	150	200	250	300
f_t	1	0,73	0,42	0,22

Static load

When the bearing is stationary or rotates at slow movements or very low speeds (lower than 10 r/min), basic static load is not determined by the material fatigue but by permanent deformation caused at the rolling element/raceway contact.

It is also the case of rotating bearings, when they have to sustain heavy shock loads which act during a fraction of their revolution.

Generally, the value of the load may increase up to the value of the basic static load C_0 , without altering the bearing operating properties.

Equivalent static load

Combined static load (radial and axial load acting simultaneously on bearing) must be converted into an equivalent static bearing load. This is defined as the load (radial for radial bearings and axial for thrust bearings)

which if applied, would cause the same permanent deformation in the bearing as the real load operating upon it. Equivalent static load is obtained from the general equation:

$$P_0 = X_0 F_r + Y_0 F_a, \text{ kN},$$

where:

- P_0 - equivalent static bearing load, kN,
- F_r - radial component of the heaviest static load, kN,
- F_a - axial component of the heaviest static load, kN,
- X_0 - radial load factor of the bearing,
- Y_0 - axial load factor of the bearing.

Data needed to calculate equivalent static load can be found in text and in bearing tables.

Requisite basic static load rating

When determining bearing size on the basis of the static load, a static safety factor s_0 is used.

The requisite basic static load is calculated using the equation:

$$C_{r0} = s_0 P_{r0}, \text{ kN},$$

where:

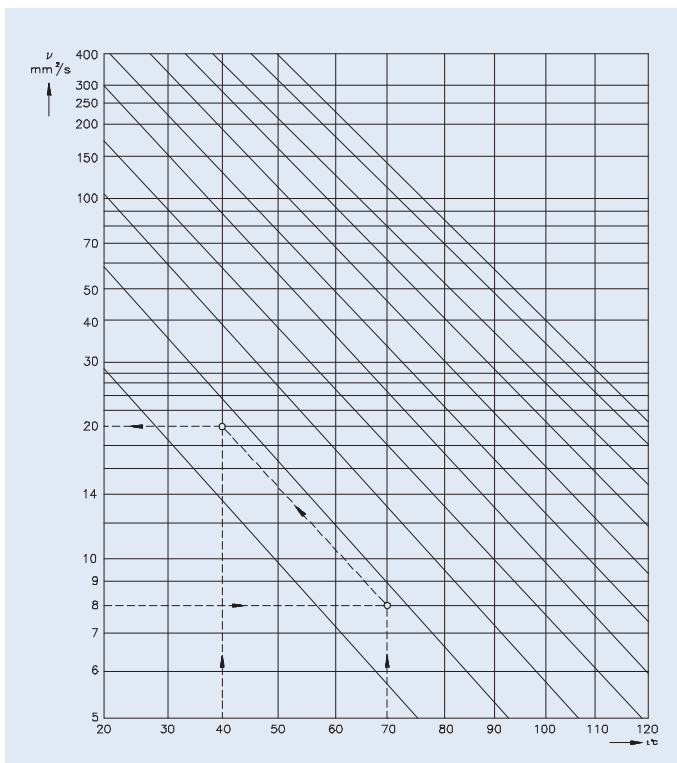


Fig. 9

C_{r0} - basic static load rating, kN,
 s_0 - static safety factor, table 2.11,
 P_{r0} - equivalent static load, kN.

At high temperatures, life of the material decreases and the static load carrying capacity of bearings is reduced.

For high temperatures, basic static load is calculated using the equation:

$$C_{r0} = f_{0t} s_0 P_{r0}, \text{ kN}$$

The values of factor f_{0t} depending on temperature is given in table 2.10

Values for temperature factor f_{0t}

Table 2.10

Operating temperature, °C	150	200	250	300
f_{0t}	1	0,95	0,85	0,75

Non-rotating bearings

In case of non-rotating bearings, the values of static safety factor s_0 , for certain applications are given in table 2.11. These values are also valid for bearings with oscillating movements.

Values for static safety factor s_0

Table 2.11

Application	s_0
Variable pitch propeller for aircraft	0,5
Gates for barrages, dams, sluices	
Opening bridges	1,5
Crane hooks for:	
- large cranes without additional loads	1,5
- small cranes with additional dynamic loads	1,6

Rotating bearings

In case of fluctuating or oscillating loads and especially when heavy shock loads are acting during a fraction of revolution, it is necessary to check if the bearing has the proper static load carrying capacity.

Heavy shock loads, higher than the basic static bearing load, produce permanent deformations not uniformly distributed on raceway, which influence negatively upon bearing running.

Generally, heavy shock loads cannot be exactly calculated and in certain cases they produce deformations of bearing housing and consequently an unfavorable load distribution in bearing.

When a bearing rotates under maximum load, raceway becomes uniformly deformed on all its outer surface without any imprint.

For various operating conditions, maximum load acting upon the bearing is calculated with static safety factor s_0 , depending on the vibrations and shock loads.

The values of static safety factor are given in table 2.12.

Values for static safety factor s_0

Table 2.12

Type of operation	Requirements regarding quiet running					
	Unimportant	Normal		High		
	Ball bearings	Roller bearings	Ball bearings	Roller bearings	Ball bearings	Roller bearings
Smooth, vibration-free Normal	0,5	1	1	1,5	2	3
	0,5	1	1	1,5	2	3,5
Heavy shock loads	>1,5	>2,5	>1,5	>3	>2	>4

For bearings with a known equivalent static load, static safety factor s_0 is necessary to be checked using the equation:

$$s_0 = \frac{C_{r0}}{P_{r0}}$$

If the value of s_0 is less than that recommended in table 2.12, then a bearing with a higher basic static load carrying capacity should be selected.

Basic static load for a group of bearings

Where more bearings of the same type are mounted close together to take over a static load, the load magnitude supported by these bearings will be calculated from:

$$C_{0ri} = C_{0r} i,$$

where:

- C_{0ri} - basic static load of the bearing group,
- C_{0r} - basic static load of the single bearing (from tables),
- i - number of bearings.

3. Bearing tolerances

Bearing tolerances have been internationally standardized in accordance with ISO 492, ISO 199, ISO 582, ISO 1132.

Bearings are generally manufactured to the tolerance class P0. At request, they can also be manufactured to the tolerance classes P6, P6X, P5, P4 and P2. These bearings are used for special applications, such as very accurate shaft guidance or very high speeds.

The values of the limit deviations for these tolerance classes are given for:

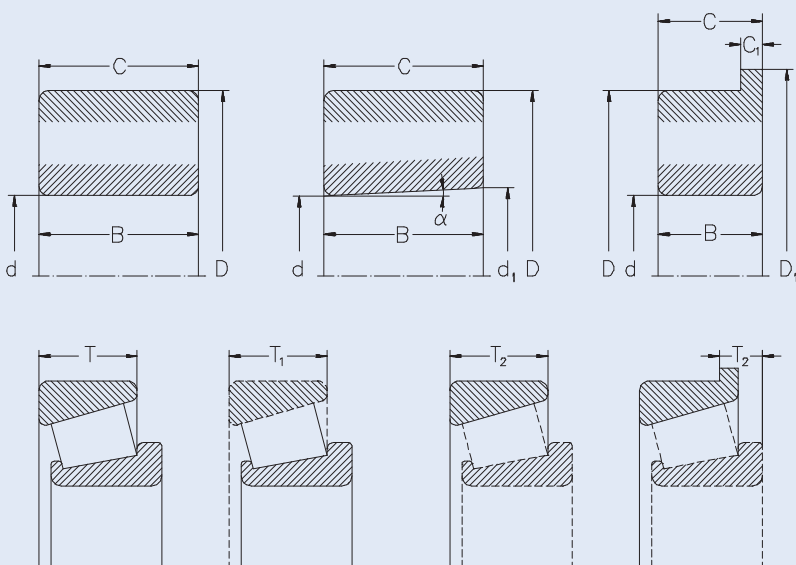
- the overall dimensions of:
 - deep groove ball bearings, angular contact ball bearings, self-aligning ball bearings, spherical roller bearings, cylindrical roller bearings, needle roller bearings, tapered roller bearings,
 - tapered roller bearings with metric(mm) and inch dimensions,
 - tapered bore bearings,
 - thrust ball bearings, angular contact thrust ball bearings, cylindrical roller thrust bearings, needle roller thrust bearings,
- mounting chamfer.

Symbols

d	- nominal bore diameter or shaft washer nominal bore diameter for thrust bearings
d_1	- nominal diameter at the theoretical large end of the tapered bore
d_2	- nominal bore diameter of the shaft washer for double direction thrust bearings
d_s	- deviation of single bore diameter
d_{psmax}	- maximum bore diameter, in a single radial plane
d_{psmin}	- minimum bore diameter, in a single radial plane
Δd_s	- deviation of a single bore diameter $\Delta d_s = d_s - d$
d_{mp}	- mean bore diameter, in a single radial plane $d_{mp} = (d_{psmax} + d_{psmin})/2$
Δd_{mp}	- deviation of the mean bore diameter in a single radial plane; or deviation of the mean diameter at the theoretical small end of the tapered bore, in case of tapered bore bearings; or deviation of the mean bore diameter of the shaft washer in a single radial plane for

	single direction thrust bearings $\Delta d_{mp} = d_{mp} - d$
d_{1mp}	- mean diameter at the large theoretical end of the tapered bore in a single plane.
Δd_{1mp}	- deviation of the mean diameter at the theoretical large end of the tapered bore $\Delta d_{1mp} = d_{1mp} - d$
Δd_{2mp}	- deviation of the mean bore diameter of the shaft washer for a double direction thrust bearing, in a single radial plane
V_{dp}	- bore diameter variation in a single radial plane; or bore diameter variation of the shaft washer in a single radial plane, for single direction thrust bearings $V_{dp} = d_{psmax} - d_{psmin}$
V_{d2p}	- bore diameter variation of the shaft washer for double direction thrust bearings, in a single radial plane
V_{dmp}	- mean bore diameter variation (valid only for cylindrical bore) $V_{dmp} = d_{mpmax} - d_{mpmin}$
∞	- nominal half-angle of the tapered bore
D	- nominal outside diameter or housing washer nominal diameter
D_1	- nominal outside diameter of the outer ring rib
D_s	- single outside diameter
D_{psmax}	- maximum outside diameter in a single radial plane
D_{psmin}	- minimum outside diameter in a single radial plane
ΔD_s	- deviation of the single outside diameter $\Delta D_s = D_s - D$
D_{mp}	- mean outside diameter, in a single plane $D_{mp} = (D_{psmax} + D_{psmin})/2$
ΔD_{mp}	- deviation of the mean outside diameter in a single radial plane; or deviation of the mean diameter of housing washer in a single radial plane, for thrust bearings $\Delta D_{mp} = D_{mp} - D$
V_{Dp}	- outside diameter variation in a single radial plane; or housing washer diameter variation in a single radial plane for double direction thrust bearings $V_{Dp} = D_{psmax} - D_{psmin}$
V_{Dmp}	- mean outside diameter variation
B	- nominal width of the inner ring
B_s	- single width of the inner ring
ΔB_s	- inner ring single width deviation $\Delta B_s = B_s - B$
V_{B_s}	- inner ring single width variation
C	- nominal width of the outer ring
C_s	- single width of the outer ring
ΔC_s	- deviation of outer ring single width $\Delta C_s = C_s - C$

VC_s	- single width variation of the outer ring $VC_s = C_{smax} - C_{smin}$	SD	- variation in inclination of outside cylindrical surface to outer ring side face
T	- nominal width of tapered roller bearings	Si_a	- side face runout of assembled inner ring with reference to raceway
T_s	- single width of tapered roller bearings	Se_a	- side face runout of assembled outer ring with reference to raceway
ΔT_s	- deviation of the single width of taper roller bearings $\Delta T_s = T_s - T$	Si	- thickness variation measured from middle of raceway to back seating face of shaft washer
T_1	- nominal width of the inner ring and tapered roller assembly	Se	- thickness variation measured from middle of raceway to back face of housing washer
T_{1s}	- single width of the inner ring and tapered roller assembly	ΔH_s	- deviation of mounting height of single direction thrust ball and roller bearings
ΔT_{1s}	- deviation of the single width of inner ring and tapered roller assembly $\Delta T_{1s} = T_{1s} - T_1$	ΔH_{1s}	- deviation of mounting height of thrust ball bearings with sphered housing washer
T_2	- nominal width of the outer ring assembly	ΔH_{2s}	- deviation of mounting height of double direction thrust ball and roller bearings
T_{2s}	- single width of the outer ring assembly	ΔH_{3s}	- deviation of mounting height of double direction thrust ball bearings with sphered housing washer
ΔT_{2s}	- deviation of the single width of outer ring assembly $\Delta T_{2s} = T_{2s} - T_2$		
K_{ia}	- radial runout of assembled bearing inner ring		
K_{ea}	- radial runout of assembled bearing outer ring		
S_d	- side face runout with reference to bore of the inner ring		



Radial bearings (excepting tapered roller bearings) Tolerance class P0

Inner ring												Table 3.1
Deviations μm												
d mm		Δdmp		V_{dp}			V_{dmp}	K_{ia}	ΔBs			V_{Bs}
				Diameter series					all	nor- mal	modi- fied ²⁾	
		7,8,9	0,1	2,3,4								
over	up to	high	low	max.	max.	max.	max.	max.	high	low	low	max.
0,6 ¹⁾	2,5	0	− 8	10	8	6	6	10	0	− 40	−	12
2,5	10	0	− 8	10	8	6	6	10	0	− 120	− 250	15
10	18	0	− 8	10	8	6	6	10	0	− 120	− 250	20
18	30	0	− 10	13	10	8	8	13	0	− 120	− 250	20
30	50	0	− 12	15	12	9	9	15	0	− 120	− 250	20
50	80	0	− 15	19	19	11	11	20	0	− 150	− 380	25
80	120	0	− 20	25	25	15	15	25	0	− 200	− 380	25
120	180	0	− 25	31	31	19	19	30	0	− 250	− 500	30
180	250	0	− 30	38	38	23	23	40	0	− 300	− 500	30
250	315	0	− 35	44	44	26	26	50	0	− 350	− 500	35
315	400	0	− 40	50	50	30	30	60	0	− 400	− 630	40

1) This value included.

2) It refers to isolated bearing ring for paired mounting or stack mounting.

Outer ring													Table 3.2
Deviations μm													
D mm	ΔDmp	$\text{V}_{\text{Dp}}^{3)}$		$\text{V}_{\text{Dp}}^{3)}$			$\text{V}_{\text{Dmp}}^{3)}$			K_{ea}	ΔCs		V_{Cs}
				Open bearings			Shielded bearings ²⁾						
		Diameter series		7,8,9	0,1	2,3,4	2,3,4						
over	up to	high	low	max.	max.	max.	max.	max.	max.	max.	high	low	max.
2,5 ¹⁾	6	0	− 8	10	8	6	10	6	15	Values are identical the to ΔB_S and $\text{V}_{\text{B}_\text{S}}$ for the inner ring of the same bearing.			
6	18	0	− 8	10	8	6	10	6	15				
18	30	0	− 9	12	9	7	12	7	15				
30	50	0	− 11	14	11	8	16	8	20				
50	80	0	− 13	16	13	10	20	10	25				
80	120	0	− 15	19	19	11	26	11	35				
120	150	0	− 18	23	23	14	30	14	40				
150	180	0	− 25	31	31	19	38	19	45				
180	250	0	− 30	38	38	23	−	23	50				
250	315	0	− 35	44	44	26	−	26	60				
315	400	0	− 40	50	50	30	−	30	70				
400	500	0	− 45	56	56	34	−	34	80				

1) This value included.
2) For bearings of diameter series 7,8,9,0 and 1 values are not indicated.
3) Values are valid before mounting the snap ring or shields or after their dismounting.

Tolerance class P6

Inner ring												Table 3.3
Deviations μm												
d mm	Δdmp	V_{dp}					V_{dmp}	K_{ia}	ΔBs		V_{Bs}	
		Diameter series			all	normal			modified ²⁾			
		7,8,9	0,1	2,3,4								
over	up to	high	low	max.	max.	max.	max.	max.	high	low	max.	max.
0,6 ¹⁾	2,5	0	− 7	9	7	5	5	5	0	− 40	−	12
2,5	10	0	− 7	9	7	5	5	6	0	− 120	− 250	15
10	18	0	− 7	9	7	5	5	7	0	− 120	− 250	20
18	30	0	− 8	10	8	6	6	8	0	− 120	− 250	20
30	50	0	− 10	13	10	8	8	10	0	− 120	− 250	20
50	80	0	− 12	15	15	9	9	10	0	− 150	− 380	25
80	120	0	− 15	19	19	11	11	13	0	− 200	− 380	25
120	180	0	− 18	23	23	14	14	18	0	− 250	− 500	30
180	250	0	− 22	28	28	17	17	20	0	− 300	− 500	30
250	315	0	− 25	31	31	19	19	25	0	− 350	− 500	35
315	400	0	− 30	38	38	23	23	30	0	− 400	− 630	40

1) This value included.

2) It refers to isolated bearing ring for paired mounting or stack mounting.

Outer ring													Table 3.4
Deviations μm													
D mm	ΔDmp		$V_{\text{Dp}}^{3)}$				$V_{\text{Dmp}}^{2)3)}K_{\text{ea}}$		ΔCs		V_{Cs}		
			Open bearings		Shielded bearings								
			Diameter series										
			7,8,9	0,1	2,3,4	0,1,2,3,4							
over	up to	high	low	max.	max.	max.	max.	max.	high	low	max.		
2,5 ¹⁾	6	0	− 7	9	7	5	9	5	8	Values are identical to ΔBs and V_{Bs} for the inner ring.			
6	18	0	− 7	9	7	5	9	5	8				
18	30	0	− 8	10	8	6	10	6	9				
30	50	0	− 9	11	9	7	13	7	10				
50	80	0	− 11	14	11	8	16	8	13				
80	120	0	− 13	16	16	10	20	10	18				
120	150	0	− 15	19	19	11	25	11	20				
150	180	0	− 18	23	23	14	30	14	23				
180	250	0	− 20	25	25	15	−	15	25				
250	315	0	− 25	31	31	19	−	19	30				
315	400	0	− 28	35	35	21	−	21	35				
400	500	0	− 33	41	41	25	−	25	40				

1) This value included.
2) For bearings of diameter series 7,8 and 9 values are not indicated.
3) Values are valid before mounting the snap ring or shields or after their dismounting.

Tolerance class P5

Deviations μm				Inner ring										Table 3.5	
d mm	Δdmp			V_{dp}		V_{dmp}	K_{ia}	S_{d}	$S_{\text{ia}}^{2)}$	ΔBs	V_{Bs}				
				Diameter series 7,8,9						all	norm.	modi- fied ³⁾			
over	up to	sup	low	max.	max.	max.	max.	max.	max.	high	low	low	max.		
0,6 ¹⁾	2,5	0	− 5	5	4	3	4	7	7	0	− 40	− 250	5		
2,5	10	0	− 5	5	4	3	4	7	7	0	− 40	− 250	5		
10	18	0	− 5	5	4	3	4	7	7	0	− 80	− 250	5		
18	30	0	− 6	6	5	3	4	8	8	0	− 120	− 250	5		
30	50	0	− 8	8	6	4	5	8	8	0	− 120	− 250	5		
50	80	0	− 9	9	7	5	5	8	8	0	− 150	− 250	6		
80	120	0	− 10	10	8	5	6	9	9	0	− 200	− 380	7		
120	180	0	− 13	13	10	7	8	10	10	0	− 250	− 380	8		
180	250	0	− 15	15	12	8	10	11	13	0	− 300	− 500	10		
250	315	0	− 18	18	14	9	13	13	15	0	− 350	− 500	13		
315	400	0	− 25	25	18	12	15	15	20	0	− 400	− 630	15		

2) Applies only to ball bearings.

2) Applies only to ball bearings.

3) It refers to single bearing ring for paired mounting or stack mounting.

Deviations μm				Outer ring							Table 3.6	
D mm		ΔDmp		$V_{\text{Dp}}^{2)}$		V_{Dmp}	K_{ea}	S_{D}	$S_{\text{ea}}^{3)}$	ΔCs		V_{Cs}
				Diameter series 7,8,9	0,1,2, 3,4					high	low	
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	max.
2,5 ¹⁾	6	0	−5	5	4	3	5	8	8	Identical to ΔBs for the inner ring		5
6	18	0	−5	5	4	3	5	8	8			5
18	30	0	−6	6	5	3	6	8	8			5
30	50	0	−7	7	5	4	7	8	8			5
50	80	0	−9	9	7	5	8	8	10			6
80	120	0	−10	10	8	5	10	9	11			8
120	150	0	−11	11	8	6	11	10	13			8
150	180	0	−13	13	10	7	13	10	14			8
180	250	0	−15	15	11	8	15	11	15			10
250	315	0	−18	18	14	9	18	13	18			11
315	400	0	−20	20	15	10	20	13	20			13
400	500	0	−23	23	17	12	23	15	23			15

2) Do not apply to shielded bearings.

3) Apply to ball bearings.

Tolerance class P4

Inner ring														Table 3.7
Deviations μm														
d mm	Δdmp,Δds2)			Vdp		Vdmp	Kia	Sd	Sia ³⁾	ΔBs			VBs	
				Diameter series						all	normal	modified ⁴⁾		
				7,8,9	0,1,2,3,4									
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	low	max.	
0,6 ¹⁾	2,5	0	−4	4	3	2	2,5	3	3	0	−40	−250	2,5	
2,5	10	0	−4	4	3	2	2,5	3	3	0	−40	−250	2,5	
10	18	0	−4	4	3	2	2,5	3	3	0	−80	−250	2,5	
18	30	0	−5	5	4	2,5	3	4	4	0	−120	−250	2,5	
30	50	0	−6	6	5	3	4	4	4	0	−120	−250	3	
50	80	0	−7	7	5	3,5	4	5	5	0	−150	−250	4	
80	120	0	−8	8	6	4	5	5	5	0	−200	−380	4	
120	180	0	−10	10	8	5	6	6	7	0	−250	−380	5	
180	250	0	−12	12	9	6	8	7	8	0	−300	−500	6	

1) This value included.

2) Apply only to bearings of diameter series 0,1,2,3,4.

3) Apply only to ball bearings.

4) It refers to single bearing ring for paired mounting or stack mounting.

Outer ring													Table 3.8
Deviations μm													
D mm	$\Delta D_{\text{mp}}, \Delta D_{\text{s}}^{2)}$			$V_{\text{Dp}}^{3)}$		V_{Dmp}	K_{ea}	S_{D}	$S_{\text{ea}}^{4)}$	ΔC_{s}	V_{Cs}		
				Diameter series									
				7,8,9	0,1,2,3,4								
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	max.	
2,5 ¹⁾	6	0	−4	4	3	2	3	4	5	Identical to ΔB_{s} for the inner ring		2,5	
6	18	0	−4	4	3	2	3	4	5			2,5	
18	30	0	−5	5	4	2,5	4	4	5			2,5	
30	50	0	−6	6	5	3	5	4	5			2,5	
50	80	0	−7	7	5	3,5	5	4	5			3	
80	120	0	−8	8	6	4	6	5	6			4	
120	150	0	−9	9	7	5	7	5	7			5	
150	180	0	−10	10	8	5	8	5	8			5	
180	250	0	−11	11	8	6	10	7	10			7	
250	315	0	−13	13	10	7	11	8	10			7	
315	400	0	−15	15	11	8	13	10	13			8	

1) This value included.

2) Apply to bearings of diameter series 0,1,2,3 and 4.

3) Do not apply to sealed and shielded bearings.

4) Apply only to ball bearings.

Tolerance class P2

Inner ring												Table 3.9
Deviations μm												
d		$\Delta\text{dmp}, \Delta\text{ds}$			V_{dp}	V_{dmp}	K_{ia}	S_{d}	$S_{\text{ia}}^{2)}$	ΔBs	V_{Bs}	
mm		high	low	max.	max.	max.	max.	max.	high	low	max.	
over	up to											
0,6 ¹⁾	2,5	0	-2,5	2,5	1,5	1,5	1,5	1,5	0	-40	1,5	
2,5	10	0	-2,5	2,5	1,5	1,5	1,5	1,5	0	-40	1,5	
10	18	0	-2,5	2,5	1,5	1,5	1,5	1,5	0	-80	1,5	
18	30	0	-2,5	2,5	1,5	2,5	1,5	2,5	0	-120	1,5	
30	50	0	-2,5	2,5	1,5	2,5	1,5	2,5	0	-120	1,5	
50	80	0	-4	4	2	2,5	1,5	2,5	0	-150	1,5	
80	120	0	-5	5	2,5	2,5	2,5	2,5	0	-200	2,5	
120	150	0	-7	7	3,5	2,5	2,5	2,5	0	-250	2,5	
150	180	0	-7	7	3,5	5	4	5	0	-300	4	
180	250	0	-8	8	4	5	5	5	0	-350	5	

1) This value included.
2) Apply only to ball bearings.

Outer ring												Table 3.10
Deviations μm												
D		$\Delta\text{Dmp}, \Delta\text{Ds}$			V_{Dp}	V_{Dmp}	K_{ea}	$S_{\text{D}}^{2)3)}$	$S_{\text{ea}}^{2)}$	ΔCs	V_{Cs}	
mm		high	low	max.	max.	max.	max.	max.	max.	high	low	max.
over	up to											
2,5 ¹⁾	6	0	-2,5	2,5	1,5	1,5	1,5	1,5		Identical to ΔBs for the inner- ring		1,5
6	18	0	-2,5	2,5	1,5	1,5	1,5	1,5				1,5
18	30	0	-4	4	2	2,5	1,5	2,5				1,5
30	50	0	-4	4	2	2,5	1,5	2,5				1,5
50	80	0	-4	4	2	4	1,5	4				1,5
80	120	0	-5	5	2,5	5	2,5	5				2,5
120	150	0	-5	5	2,5	5	2,5	5				2,5
150	180	0	-7	7	3,5	5	2,5	5				2,5
180	250	0	-8	8	4	7	4	7				4
250	315	0	-8	8	4	7	5	7				5
315	400	0	-10	10	5	8	7	8				7

1) This value included.
2) Do not apply to bearings with rib on the inner ring.
3) Apply only to ball bearings.

Tolerance class SP

Inner ring																Table 3.11		
Deviations μm																		
Cylindrical bore																		
Tapered bore																		
d		$\Delta\text{dmp}, \Delta\text{ds}$				Vdp				$\Delta\text{d1mp}, \Delta\text{dmp}$		ΔBs		VBs		Kia	Sd	Sia
mm		Δdmp	Δds	Vdp	Δds	Vdp	Δd1mp	Δdmp	ΔBs	VBs	Kia	Sd	Sia					
over	up to	low	high	max.	low	high	max.	low	high	low	high	max.	max.	max.	max.			
—	18	−5	0	3	—	—	—	—	—	−100	0	5	3	8	8			
18	30	−6	0	3	0	+10	3	0	+4	−100	0	5	3	8	8			
30	50	−8	0	4	0	+12	4	0	+4	−120	0	5	4	8	8			
50	80	−9	0	5	0	+15	5	0	+5	−150	0	6	4	8	8			
80	120	−10	0	5	0	+20	5	0	+6	−200	0	7	5	9	9			
120	180	−13	0	7	0	+25	7	0	+8	−250	0	8	6	10	10			
180	250	−15	0	8	0	+30	8	0	+10	−300	0	10	8	11	13			
250	315	−18	0	9	0	+35	9	0	+12	−350	0	13	10	13	15			
315	400	−23	0	12	0	+40	12	0	+13	−400	0	15	12	15	20			

Outer ring										Table 3.12
Deviations μm										
D mm		$\Delta\text{Dmp}, \Delta\text{Ds}$		V_{Dp}	K_{ea}	S_{D}	S_{ea}	ΔCs	V_{Cs}	
over	up to	low	high	max.	max.	max.	max.			
30	50	− 7	0	4	5	8	8	Identical to ΔBs and V_{Bs} for the inner ring		
50	80	− 9	0	5	5	8	10			
80	120	− 10	0	5	6	9	11			
120	150	− 11	0	6	7	10	13			
150	180	− 13	0	7	8	10	14			
180	250	− 15	0	8	10	11	15			
250	315	− 18	0	9	11	13	18			
315	400	− 20	0	10	13	13	20			
400	500	− 23	0	18	20	20	30			

Tolerance class UP

Deviations μm		Inner ring										Table 3.13				
		Cylindrical bore				Tapered bore										
		$\Delta\text{dmp}, \Delta\text{ds}$		V_{dp}	Δds		V_{dp}		$\Delta\text{d1mp} - \Delta\text{dmp}$		ΔBs					
over	up to	low	high	max.	low	high	max.	low	high	low	high	max.	max.	max.	max.	
–	18	–4	0	2	–	–	–	–	–	–25	0	1,5	1,5	2	3	
18	30	–5	0	3	0	+6	3	0	+2	–25	0	1,5	1,5	3	3	
30	50	–6	0	3	0	+8	3	0	+3	–30	0	2	2	3	3	
50	80	–7	0	4	0	+9	4	0	+3	–40	0	3	2	4	3	
80	120	–8	0	4	0	+10	4	0	+4	–50	0	3	3	4	4	
120	180	–10	0	5	0	+13	5	0	+5	–60	0	4	3	5	6	
180	250	–12	0	6	0	+15	6	0	+7	–75	0	5	4	6	7	
250	315	–18	0	9	0	+18	9	0	+8	–90	0	6	5	6	8	
315	400	–23	0	12	0	+23	12	0	+9	–100	0	8	6	8	9	

Deviations μm				Outer ring				Table 3.14	
D mm		ΔD_{mp}	ΔD_S	V_{Dp}	K_{ea}	S_D	S_{ea}	ΔC_s	$V C_s$
over	up to	low	high	max.	max.	max.	max.		
30	50	−5	0	3	3	2	4	Identical to ΔB_s and $V B_s$ for the innr ring	
50	80	−6	0	3	3	2	4		
80	120	−7	0	4	3	3	5		
120	150	−8	0	4	4	3	6		
150	180	−9	0	5	4	3	7		
180	250	−10	0	5	5	4	9		
250	315	−12	0	6	6	4	9		
315	400	−14	0	7	7	5	12		
400	500	−23	0	12	8	—	12		

5.2. Tapered roller bearings

Tolerance class P0 and P6X

Inner ring

Deviations μm Table 3.15

d mm		Δd_{mp}		V_{dp}		K_{ia}
over	up to	high	low	max.	max.	max.
10 ¹⁾	18	0	−12	12	9	15
18	30	0	−12	12	9	18
30	50	0	−12	12	9	20
50	80	0	−15	15	11	25
80	120	0	−20	20	15	30
120	180	0	−25	25	19	35
180	250	0	−30	30	23	50
250	315	0	−35	35	26	60
315	400	0	−40	40	30	70

1) This value included.

Outer ring

Deviations μm Table 3.16

D mm		ΔD_{mp}		V_{Dp}		K_{ea}
over	up to	high	low	max.	max.	max.
18 ¹⁾	30	0	−12	12	9	18
30	50	0	−14	14	11	20
50	80	0	−16	16	12	25
80	120	0	−18	18	14	35
120	150	0	−20	20	15	40
150	180	0	−25	25	19	45
180	250	0	−30	30	23	50
250	315	0	−35	35	26	60
315	400	0	−40	40	30	70
400	500	0	−45	45	34	80

1) This value included.

Note: Limit deviations of the diameter D_1 of the outer ring rib for bearings with ribs are in accordance with tolerance class h9.

Tolerance class P0

Inner and outer ring

Deviations μm Table 3.17

d mm		$\Delta B_s, \Delta C_s$		ΔT_s		ΔT_{1s}		ΔT_{2s}	
over	up to	high	low	high	low	high	low	high	low
10 ¹⁾	18	0	−120	+200	0	+100	0	+100	0
18	30	0	−120	+200	0	+100	0	+100	0
30	50	0	−120	+200	0	+100	0	+100	0
50	80	0	−150	+200	0	+100	0	+100	0
80	120	0	−200	+200	−200	+100	−100	+100	−100
120	180	0	−250	+350	−250	+150	−150	+200	−100
180	250	0	−300	+350	−250	+150	−150	+200	−100
250	315	0	−350	+350	−250	+150	−150	+200	−100
315	400	0	−400	+400	−400	+200	−200	+200	−200

1) This value included.

Tolerance class P6X

Inner and outer ring

Diameter limit deviations and radial runout of the inner and outer ring for this tolerance class are the same as those of tolerance class P0.

Deviations μm

Table 5.18

d mm		ΔB_s		ΔC_s		ΔT_s		$\Delta T1_s$		$\Delta T2_s$	
over	up to	high	low	high	low	high	low	high	low	high	low
10 ¹⁾	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	250	0	-50	0	-100	+150	0	+50	0	+100	0
250	315	0	-50	0	-100	+200	0	+100	0	+100	0
315	400	0	-50	0	-100	+200	0	+100	0	+100	0

1) This value included.

Tolerance class P5

Inner ring

Deviations μm

Table 3.19

d mm		Δd_{mp}		V_{dp}	V_{dmp}	K_{ia}	S_d	ΔB_s		ΔT_s	
over	up to	high	low	max.	max.	max.	max.	high	low	high	low
10 ¹⁾	18	0	-7	5	5	5	7	0	-200	+200	-200
18	30	0	-8	6	5	5	8	0	-200	+200	-200
30	50	0	-10	8	5	6	8	0	-240	+200	-200
50	80	0	-12	9	6	7	8	0	-300	+200	-200
80	120	0	-15	11	8	8	9	0	-400	+200	-200
120	180	0	-18	14	9	11	10	0	-500	+350	-250
180	250	0	-22	17	11	13	11	0	-600	+350	-250

1) This value included.

Outer ring

Deviations μm

Table 3.20

D mm		ΔD_{mp}		V_{Dp}	V_{Dmp}	K_{ea}	S_D	ΔC_s	
over	up to	high	low	max.	max.	max.	max.	high	low
18 ¹⁾	30	0	-8	6	5	6	8	Identical to ΔB_s for the inner ring	
30	50	0	-9	7	5	7	8		
50	80	0	-11	8	6	8	8		
80	120	0	-13	10	7	10	9		
120	150	0	-15	11	8	11	10		
150	180	0	-18	14	9	13	10		
180	250	0	-20	15	10	15	11		
250	315	0	-25	19	13	18	13		
315	400	0	-28	22	14	20	13		

1) This value included.

Note Limit deviations of diameter D_1 of the outer ring for bearings with ribs are in accordance with tolerance class h9.

Tolerance class P4

Deviations μm		Inner ring										Table 3.21	
d		$\Delta\text{dmp}, \Delta\text{ds}$			V_{dp}	V_{dmp}	K_{ia}	S_{d}	S_{ia}	ΔB_{s}		ΔT_{s}	
mm		high	low	max.	max.	max.	max.	max.	high	low	high	low	
over	up to												
10 ¹⁾	18	0	−5	4	4	3	3	3	0	−200	+200	−200	
18	30	0	−6	5	4	3	4	4	0	−200	+200	−200	
30	50	0	−8	6	5	4	4	4	0	−240	+200	−200	
50	80	0	−9	7	5	4	5	4	0	−300	+200	−200	
80	120	0	−10	8	5	5	5	5	0	−400	+200	−200	
120	180	0	−13	10	7	6	6	7	0	−500	+350	−250	
180	250	0	−15	11	8	8	7	8	0	−600	+350	−250	

1) This value included.

Deviations μm		Outer ring									Table 3.22
D mm		$\Delta\text{Dmp}, \Delta\text{Ds}$		V_{Dp}	V_{Dmp}	K_{ea}	S_{D}	S_{ea}	ΔCs		
over	up to	high	low	max.	max.	max.	max.	max.	high	low	
18	30	0	− 6	5	4	4	4	5	Identical to ΔBs for the inner ring		
30	50	0	− 7	5	5	5	4	5			
50	80	0	− 9	7	5	5	4	5			
80	120	0	− 10	8	5	6	5	6			
120	150	0	− 11	8	6	7	5	7			
150	180	0	− 13	10	7	8	5	8			
180	250	0	− 15	11	8	10	7	10			
250	315	0	− 18	14	9	11	8	10			
315	400	0	− 20	15	10	13	10	13			

1) This value included.

Note Limit deviations of diameter D_1 of the outer ring for bearings with ribs are in accordance with tolerance class h9.

Tapered roller bearings, inch-metric sizes (AFBMA)

Inner ring— Δ_{dmp}											
Deviations μm											
Table 3.23											
Tolerance classes											
d mm											
4 2 3 0 00											
over	up to	high	low	high	low	high	low	high	low	high	low
—	76,2	+ 13	0	+ 13	0	+ 13	0	+ 13	0	+ 8	0
76,2	266,7	+ 25	0	+ 25	0	+ 13	0	+ 13	0	+ 8	0
266,7	304,8	+ 25	0	+ 25	0	+ 13	0	+ 13	0	—	—

Outer ring— Δ_{Dmp}											
Deviations μm											
Table 3.24											
Tolerance classes											
D mm											
4 2 3 0 00											
over	up to	high	low	high	low	high	low	high	low	high	low
—	266,7	+ 25	0	+ 25	0	+ 13	0	+ 13	0	+ 8	0
266,7	304,8	+ 25	0	+ 25	0	+ 13	0	+ 13	0	—	—
304,8	609,6	+ 51	0	+ 51	0	+ 25	0	—	—	—	—

Assembled bearing— K_{ia}, K_{ea}											
Deviations μm											
Table 5.25											
Tolerance classes											
D mm											
4 2 3 0 00											
over	up to	max.	max.	max.	max.	max.					
—	266,7	51	38	8	4	2					
266,7	304,8	51	38	8	4	—					
304,8	609,6	51	38	18	—	—					

Assembled bearing $-\Delta_{Ts}$

Table 3.26

Deviations μm

d mm		Tolerance classes									
		4		2		3		0		00	
over	up to	high	low	high	low	high	low	high	low	high	low
–	101,6	+ 203	–	+ 203	0	+ 203	– 203	+ 203	– 203	+ 203	– 203
101,6	266,7	+ 356	– 254	+ 203	0	+ 203	– 203	+ 203	– 203	+ 203	– 203
266,7	304,8	+ 356	– 254	+ 203	0	+ 203	– 203	+ 203	– 203	–	–

Inner roller ring - standard outer ring assembly $-\Delta_{T1s}$

Table 3.27

Deviations μm

d mm		Tolerance classes									
		4		2		3		0		00	
over	up to	high	low	high	low	high	low	high	low	high	low
–	101,6	+ 102	0	+ 102	0	+ 102	– 102	+ 102	– 102	+ 102	– 102
101,6	304,8	+152	– 152	+ 102	0	+ 102	– 102	+ 102	– 102	+ 102	– 102

Outer ring with gauge inner ring assembly $-\Delta_{T2s}$

Table 3.28

Deviations μm

d mm		Tolerance classes									
		4		2		3		0		00	
over	up to	high	low	high	low	high	low	high	low	high	low
–	101,6	+102	0	+102	0	+102	–102	+102	–102	+102	–102
101,6	304,8	+203	–102	+102	0	+102	–102	+102	–102	+102	–102

Tapered bore bearings

Taper 1:12

Table 3.29

Deviations μm

d mm		Normal tolerance class P6 ¹⁾			$\Delta d_{1mp} - \Delta d_{mp}$		Tolerance class P5			$\Delta d_{1mp} - \Delta d_{mp}$	
		Δd_{mp}	V_{dp}				Δd_{mp}	V_{dp}			
over	up to	high	low	max.	high	low	high	low	max.	high	low
18	30	+21	0	13	+21	0	+13	0	13	+13	0
30	50	+25	0	15	+25	0	+16	0	15	+16	0
50	80	+30	0	19	+30	0	+19	0	19	+19	0
80	120	+35	0	25	+35	0	+22	0	22	+22	0
120	180	+40	0	31	+40	0	+25	0	25	+25	0
180	250	+46	0	38	+46	0	+29	0	29	+29	0
250	315	+52	0	44	+52	0	+32	0	32	+32	0
315	400	+57	0	50	+57	0	+36	0	36	+36	0

1) Applies in all single radial planes of the bore.

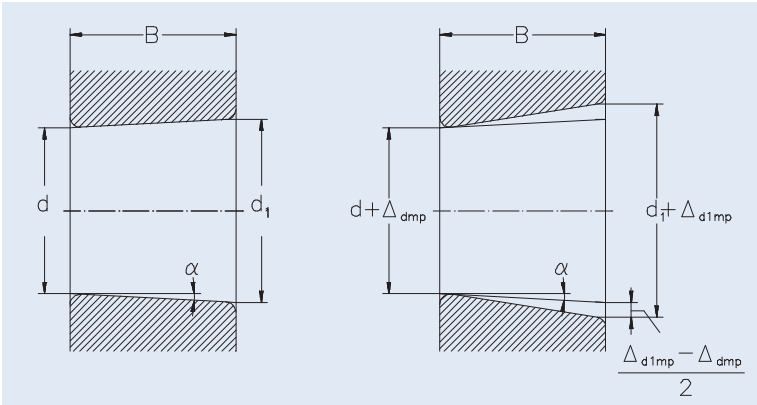
Taper 1:30

Table 3.30

Deviations μm

d mm		Normal tolerance class P6 ¹⁾			$\Delta d_{1mp} - \Delta d_{mp}$	
		Δd_{mp}	V_{dp}			
over	up to	high	low	max.	high	low
80	120	+20	0	25	+40	0
120	180	+25	0	31	+50	0
180	250	+30	0	38	+55	0
250	315	+35	0	44	+60	0
315	400	+40	0	50	+65	0

1) Applies in all singular planes.



Tapered bore
Half angle of taper, α

Nominal diameter, d_1 at the
theoretical large end of bore

$$d_1 = d + \frac{1}{12}B \text{ (taper 1:12)}$$

$$d_1 = d + \frac{1}{30}B \text{ (taper 1:30)}$$

$$\alpha = 2^\circ 23' 9,4'' \text{ (taper 1:12)}$$

$$\alpha = 0^\circ 57' 17,4'' \text{ (taper 1:30)}$$

Thrust ball bearings Shaft washer

Table 3.31

Deviations μm

$d \sim i \ d_2$ mm		P0; P6; P5 Δd_{mp} Δd_{2mp}		V_{dp} V_{d2p}	P4; P2 Δd_{mp} Δd_{2mp}		V_{dp} V_{d2p}
over	up to	high	low	max.	high	low	max.
–	18	0	– 8	6	0	– 7	5
18	30	0	– 10	8	0	– 8	6
30	50	0	– 12	9	0	– 10	8
50	80	0	– 15	11	0	– 12	9
80	120	0	– 20	15	0	– 15	11
120	180	0	– 25	19	0	– 18	14
180	250	0	– 30	23	0	– 22	17
250	315	0	– 35	26	0	– 25	19
315	400	0	– 40	30	0	– 30	23

Housing washer

Table 3.32

Deviations μm

D mm		P0; P6; P5 ΔD_{mp}		V_{Dp}	P4; P2 ΔD_{mp}		V_{Dp}
over	up to	high	low	max.	high	low	max.
10 ¹⁾	18	0	– 11	8	0	– 7	5
18	30	0	– 13	10	0	– 8	6
30	50	0	– 16	12	0	– 9	7
50	80	0	– 19	14	0	– 11	8
80	120	0	– 22	17	0	– 13	10
120	180	0	– 25	19	0	– 15	11
180	250	0	– 30	23	0	– 20	15
250	315	0	– 35	26	0	– 25	19
315	400	0	– 40	30	0	– 28	21
400	500	0	– 45	34	0	– 33	25

1) This value included.

Variation of shaft washer and housing washer thickness

Table 3.33

Deviations μm

d^* mm		S_i P0	P6	P5	P4	P2	S_e P0;P6;P5;P4;P2
over	up to	max.	max.	max.	max.	max.	max.
–	18	10	5	3	2	1	Identical to S_i for the shaft washer
18	30	10	5	3	2	1,2	
30	50	10	6	3	2	1,5	
50	80	10	7	4	3	2	
80	120	15	8	4	3	2	
120	180	15	9	5	4	3	
180	250	20	10	5	4	3	
250	315	25	13	7	5	4	
315	400	30	15	7	5	4	

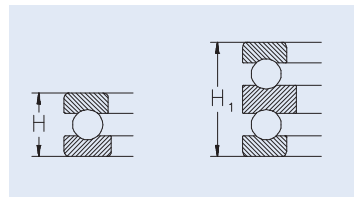
* The values of S_i and S_e admitted for double direction thrust bearings are equal to the corresponding values of the single direction thrust bearings and are functions of the bore diameter d , of the single direction bearings.

Assembled thrust ball bearings **Bearing height**

Deviations μm

Table 3.34

d mm	ΔH_s		ΔH_{1s}	
	over	up to	high	low
–	30		+ 20	– 250
30	50		+ 20	– 250
50	80		+ 20	– 300
80	120		+ 25	– 300
120	180		+ 25	– 400
180	250		+ 30	– 400
250	315		+ 40	– 400
315	400		+ 40	– 500



Mounting chamfer dimension tolerances

Symbols:

r_1, r_3 – chamfer dimension in radial direction,

r_2, r_4 – chamfer dimension in axial direction,

$r_s \text{ min}$ – general symbol for minimum limit of r_1, r_2, r_3, r_4 ,

$r_{1s \text{ max}}, r_{3s \text{ max}}$ – maximum dimension in radial direction,

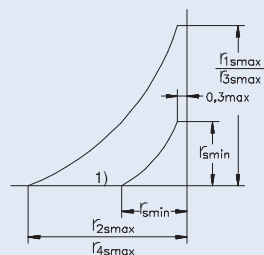
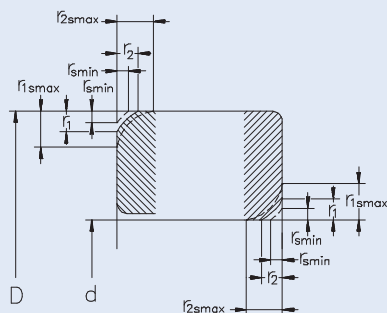
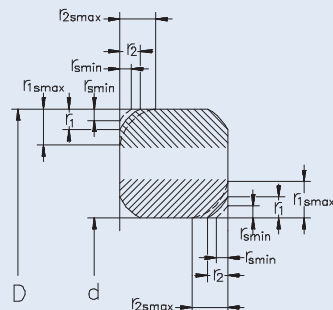
$r_{2s \text{ max}}, r_{4s \text{ max}}$ – maximum dimension in axial direction.

Mounting chamfer dimension limits for radial and thrust bearings

Values in mm

Table 3.37

$r_s \text{ min}$	d	Radial bearings		Thrust bearings	
		r_{1s}, r_{3s}	r_{2s}, r_{4s}	r_{1s}, r_{2s}	
	over	up to	max.	max.	max.
0,1	–	–	0,2	0,4	0,2
0,15	–	–	0,3	0,6	0,3
0,2	–	–	0,5	0,8	0,5
0,3	–	40	0,6	1	0,8
	40	–	0,8	1	0,8
0,6	–	40	1	2	1,5
	40	–	1,3	2	1,5
1	–	50	1,5	3	2,2
	50	–	1,9	3	2,2
1,1	–	120	2	3,5	2,7
	120	–	2,5	4	2,7
1,5	–	120	2,3	4	3,5
	120	–	3	5	3,5
2	–	80	3	4,5	4
	220	–	3,8	6	4
	80	220	3,5	5	4
2,1	–	100	3,8	6	4,5
	–	280	4	6,5	4,5
	280	–	4,5	7	4,5
2,5	100	280	4,5	6	–
	280	–	5	7	–
3	–	280	5	8	5,5
	280	–	5,5	8	5,5
4	–	–	6,5	9	6,5
5	–	–	8	10	8
6	–	–	10	13	10
7,5	–	–	12,5	17	12,5



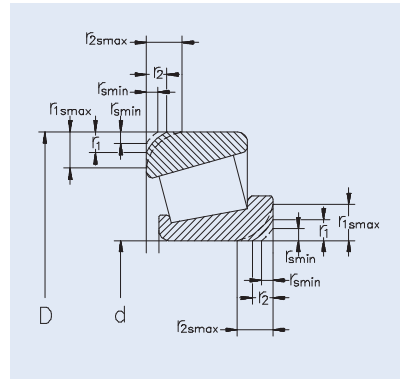
1) Only for $d < 30 \text{ mm}$

Mounting chamfer dimension limits for tapered roller bearings

Values in mm

Table 3.38

r_s min.	d, D		r_{1s}, r_{3s}	r_{2s}, r_{4s}
	high	low	max.	max.
0,3	—	40	0,7	1,4
	40	—	0,9	1,6
0,6	—	40	1,1	1,7
	40	—	1,3	2
1	—	50	1,6	2,5
	50	—	1,9	3
1,5	—	120	2,3	3
	120	250	2,8	3,5
	250	—	3,5	4
2	—	120	2,8	4
	120	250	3,5	4,5
	250	—	4	5
	250	—	4,5	6
2,5	—	120	3,5	5
	120	250	4	5,5
3	—	120	4	5,5
	120	250	4,5	6,5
	250	400	5	7
	400	—	5,5	7,5
4	—	120	5	7
	120	250	5,5	7,5
	250	400	6	8
	400	—	6,5	8,5
5	—	180	6,5	8
	180	—	7,5	9
6	—	180	7,5	10
	180	—	9	11



Mounting chamfer dimension limits for tapered roller bearings (inch-metric sizes)

Values in mm

Table 3.39

Minimum values	Inner ring		Maximum values	Outer ring		Maximum
	values	Nominal bore diameter		Nominal outer diameter	values	
r_s min	d		r_{1s} max.	D	r_{3s} max.	r_{4s} max.
	over	up to		over	up to	
See bearing tables	—	50,8	r_s min+ 0,4	—	101,6	r_s min+ 1,1
	50,8	101,6	r_s min+ 0,5	101,6	168,3	r_s min+ 1,2
	101,6	254	r_s min+ 0,6	168,3	355,6	r_s min+ 1,4
1	254	—	r_s min+ 1,8	266,7	—	r_s min+ 1,7
1,5	254	—		355,6	—	
2,5	254	—		355,6	1,9	3
3	254	—		355,6	3,5	4
3,3	254	—		355,6	4,5	6
3,5	254	—		355,6	5,5	7,5
6,4	254	—		355,6	6,5	9
8,5	254	—		355,6	6,5	9
	254	—		355,6	12,5	17
	254	—		355,6	15	19

4. Bearing application

Locating bearings and non-locating bearings

Radial and axial loads in bearing units can be transmitted by locating and non-locating bearings.

A locating bearing is generally used for medium- and large-sized shafts that can reach high temperatures during operation. It has to support radially the shaft assembly and to locate it axially in both directions.

A non-locating bearing supports the shaft assembly only radially. It also allows axial displacement in relation to the housing to take place so that additional axial loading is avoided.

Axial displacement can take place either in the housing bore seating or in the bearing itself.

In case the shaft is supported by more than two bearings, only one of them will be a locating bearing and it will be the one with the lightest radial load.

In case of small-sized shafts, two non-locating bearings with limited displacement can be used. Each of them can accommodate axial loads in a single direction, having thus mutual location.

Fig. 4.1 shows a few of the most representative applications of locating and non-locating bearings, as follows:

a) The locating bearing is a single row deep groove ball bearing and the non-locating one is a cylindrical roller bearing with both rings tightly fitted on the shaft and into the housing, respectively.

b) Both bearings are supported by spherical roller bearings. The locating bearing is tightly fitted both on the shaft and into the housing. The non-locating bearing has the outer ring mounted with clearance into the housing and thus allows axial displacement in both directions.

c) The locating bearing consists of a cylindrical roller bearing, NUP type and the non-locating bearing consists of a cylindrical roller bearing, NU type.

d) The locating bearing consists of a cylindrical roller bearing, NUP type. The non-locating bearing consists of a cylindrical roller bearing, NU type.

e) The locating bearing consists of a cylindrical roller bearing, NU type which takes over radial loads and of a four-point contact ball bearing (unloaded on the outside). The non-locating bearing consists of a cylindrical roller bearing, NU type.

f) The locating bearing consists of a needle roller bearing, NA type which takes over radial loads and of a single row deep groove ball bearing (unloaded on the

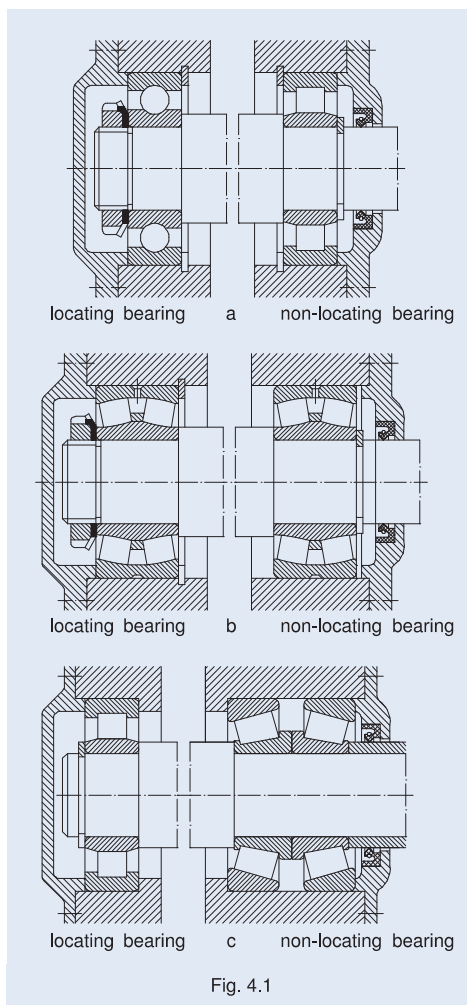


Fig. 4.1

outside) which takes over axial loads in both directions. The nonlocating bearing consists of a needle roller bearing, NA type.

g) The shafts bearings can also be X-type arrangement of two tapered roller bearings which can be considered mutual located bearing.

Recommendation for bearing fit selection

Three main criteria have to be considered when selecting the bearing fit:

1. Firm location and uniform support of rings
2. Ease of mounting and dismounting
3. Axial displacement of non-locating bearing

The most common location is assured by a tight fit.

A high tightening is recommended for roller bearings and large-sized bearings in comparison to ball bearings of the same size.

In case of a tight fit, the inner ring is supported by the entire shaft contact surface, thus bearing is used at full load carrying capacity.

The tolerance classes given in tables 4.1 and 4.3 are available for bearing fits which do not exceed +120°C during operation.

As a general rule, the selection of the tolerance class "H" is recommended for bearings of separable design and tolerance class "J" for bearings of non-separable design.

When selecting a fit, the load of the rotating ring has to consider, namely:

-If the inner ring rotates and the load is stationary, the outer ring should be mounted with clearance fit.

-If the inner ring rotates and the load is a rotating one, the outer ring should be mounted with tight fit.

-If the inner ring rotates and the direction of load is not determined, both rings should be mounted with tight fit.

In table 4.1, there are given recommendations to select the tolerance class for shaft as function of: bearing type, loading and shaft diameter. In table 4.3, one can find recommendations to select the tolerance class for housing.

Figure 4.2 shows schematically the tolerance classes for shaft and housing and their influence over fit type i.e. clearance, transition or tight fit for housing and transition fit or tight fit for shaft, respectively.

In tables 4.2 and 4.4, the deviations of the shaft diameter (4.2) and of the housing diameter (4.4) are given, considering the following:

- upper and lower limits
- theoretical minimum and maximum values of tightening (+) or clearance (-) in the fit
- the minimum and maximum values of the probable tightening or clearance in the fit (99% of fits are between these limits).

The tolerances of bore diameter d_{mp} and outside diameter D_{mp} are valid for all metric sized bearings, except tapered roller bearings with $d < 30$ mm and $D < 150$ mm and thrust ball bearings with $D \leq 150$ mm, (see table 3.15 and 3.16 on page 33 and table 3.31 and 3.32 on page 39).

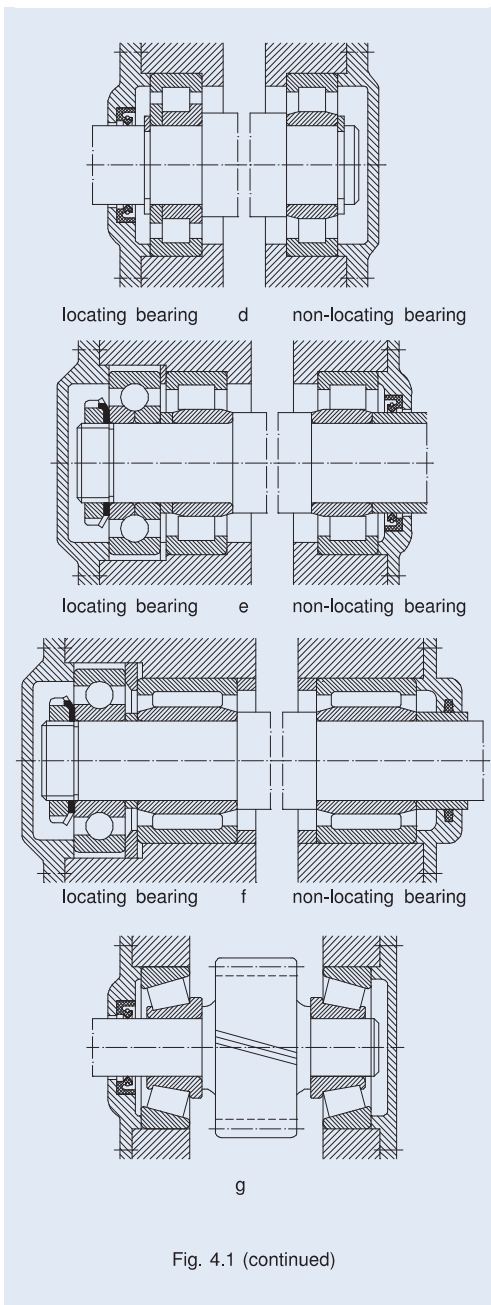


Fig. 4.1 (continued)

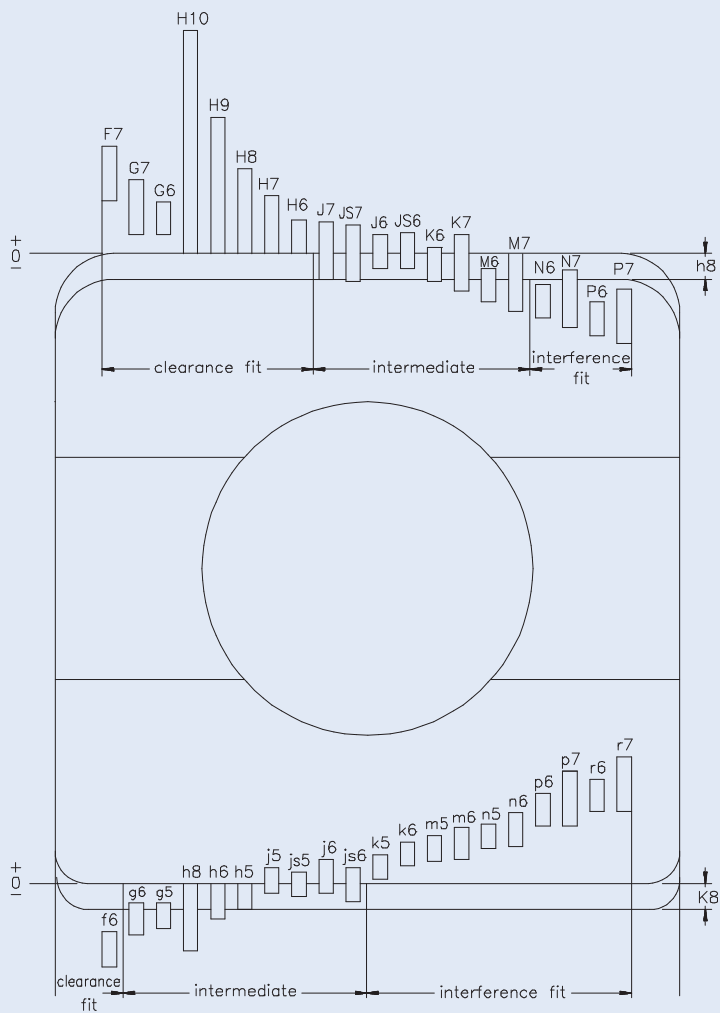


Fig.4.2

Bearingsapplication

Tolerance classes for shafts

Table 4.1

Operating conditions	Examples	Shaft diameter (mm)			Tolerance class symbol
		Ball bearings	Cylindrical, needle and tapered roller bearings	Spherical roller bearings	
Radial bearings with cylindrical bore					
Stationary inner ring load					
Easy axial displacement of inner ring on shaft desirable	Wheels on non-rotating shafts (free wheels)	All diameters			g6(f6)
Axial displacement of inner ring on shaft not necessary	Tension pulleys, sheaves				h6
Rotating inner ring load					
Light and variable loads (P<0,06C)	Conveyers lightly loaded mechanisms, bearings	18...100 >100...140	≤ 40 >40...100	— —	j6 k6
Normal and heavy loads (P>0,06C)	General mechanical engineering, electric motors, turbines, pups, gearboxes, woodworking machines	≤ 18 >18...100 >100...140 >140...200 >200...280 — — —	— ≤ 40 >40...100 >100...140 >140...200 >200...400 — — —	— ≤ 40 >40...65 >65...100 >100...140 >140...280 >280...500 >500	j5 k5(k6) m5(m6) m6 n6 p6 r6 r7
Heavy loads and shock loads, arduous working conditions (P>0,12C)	Heavy duty railway vehicles axle bearings, traction motors, rolling mills	— — —	>50...140 >140...200 >200	>50...100 >100...200 >200	n6 p6 r6
High running accuracy, light loads (P<0,06C)	Machine tools	≤ 18 >18...100 >100...200 —	— ≤ 40 >40...140 >140...200	— — — —	h5 j5 k5 m5
Axial loads					
	All kind of bearing application	≤ 250 >250	≤ 250 >250	<250 >250	j6 js6

Bearingsapplication

Tolerance classes for shafts

Table 4.1 (continued)

Operating conditions	Examples	Shaft diameter (mm)	Tolerance class symbol
Tapered bore bearings with withdrawal or adapter sleeve			
	Axle shaft for railway vehicles	All diameters	h9
	General mechanical engineering		h10
Thrust bearings			
Axial loads			
Thrust ball bearings		All sizes	h6
Cylindrical and needle roller thrust bearings		All sizes	h6(h8)
Cylindrical, needle roller and cage thrust assembly		All sizes	h8
Combined loads on spherical roller thrust bearings			
Stationary load on shaft washer		≤ 250	j6
		>250	js6
Rotating load on shaft washer or indeterminate load direction		≤ 200	k6
		>200...400	n8
		>400	m6

Bearings application

Shaft fits

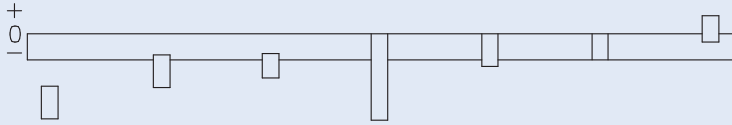


Table 4.2

Shaft Diameter		Bearing Bore diameter tolerance Δ_{dmp}		Deviations of shaft diameter, resultant fits Tolerances														
d				f6	g6			g5		h8		h6		h5		j5		
nominal					a) Deviations (shaft diameter)													
over	up to	low	high		b) Tightening/Theoretical clearance													
					c) Tightening/Probable clearance													
mm		μm																
1	3	-8	0	a) -6 b) +2 c) 0	-12 -12 -10	-2 +6 +4	-8 -8 -6	-2 +6 +5	-6 -6 -5	0 +8 +6	-14 -14 -12	0 +8 +6	-6 -6 -4	0 +8 +7	-4 -4 -3	+2 +10 +9	-2 -0 -1	
3	6	-8	0		-10 -2 -4	-18 -18 -16	-4 +4 +2	-12 -12 -10	-4 +3 +4	-9 -9 -8	0 +8 +5	-18 -18 -15	0 +8 +6	-8 -8 -6	0 +8 +7	-5 -5 -4	+3 +11 +10	-2 -1 -2
6	10	-8	0		-13 -5 -7	-22 -22 -20	-5 +3 +1	-14 -14 -12	-5 +3 +1	-11 -11 -9	0 +8 +5	-22 -22 -19	0 +8 +6	-9 -9 -7	0 +8 +6	-6 -6 -4	+4 +12 +10	-2 -2 0
10	18	-8	0		-16 -8 -10	-27 -27 -25	-6 +2 0	-17 -17 -15	-6 +2 0	-14 -14 -12	0 +8 +5	-27 -27 -24	0 +8 +6	-11 -11 -9	0 +8 +6	-8 -8 -6	+5 +13 +11	-3 -3 -1
18	30	-10	0		-20 -10 -13	-33 -33 -30	-7 +3 0	-20 -20 -17	-7 +3 +1	-16 -16 -14	0 +10 +6	-33 -33 -29	0 +10 +7	-13 -13 -10	0 +10 +8	-9 -9 -7	+5 +15 +13	-4 -2 -2
30	50	-12	0		-25 -13 -17	-41 -41 -37	-9 +3 -1	-25 -25 -21	-9 +3 0	-20 -20 -17	0 +12 +7	-39 -39 -34	0 +12 +8	-16 -16 -12	0 +12 +9	-11 -11 -8	+6 +18 +15	-5 -5 -2
50	80	-15	0		-30 -15 -19	-49 -49 -45	-10 +5 +1	-29 -29 -25	-10 +5 +1	-23 -23 -19	0 +15 +9	-46 -46 -40	0 +15 +11	-19 -19 -15	0 +15 +11	-13 -13 -9	+6 +21 +17	-7 -7 -3
80	120	-20	0		-36 -16 -22	-58 -58 -52	-12 +8 +2	-34 -34 -28	-12 +8 +3	-27 -27 -22	0 +20 +12	-54 -54 -46	0 +20 +14	-22 -22 -16	0 +20 +15	-15 -15 -10	+6 +26 +21	-9 -9 -4
120	180	-25	0		-43 -18 -25	-68 -68 -61	-14 +11 +4	-39 -39 -32	-14 +11 +5	-32 -32 -26	0 +25 +15	-63 -63 -53	0 +25 +18	-25 -25 -18	0 +25 +19	-18 -18 -12	+7 +32 +26	-11 -11 -5
180	250	-30	0		-50 -20 -28	-79 -79 -71	-15 +15 +7	-44 -44 -36	-15 +15 +9	-35 -35 -29	0 +30 +18	-72 -72 -60	0 +30 +22	-29 -29 -21	0 +30 +24	-20 -20 -14	+7 +37 +31	-13 -13 -7
250	315	-35	0		-56 -21 -30	-88 -88 -79	-17 +18 +9	-49 -49 -40	-17 +18 +10	-40 -40 -32	0 +35 +22	-81 -81 -68	0 +35 +26	-32 -32 -23	0 +35 +27	-23 -23 -15	+7 +42 +34	-16 -16 -8
315	400	-40	0		-62 -22 -33	-98 -98 -87	-18 +22 +11	-54 -54 -43	-18 +22 +14	-43 -43 -35	0 +40 +25	-89 -89 -74	0 +40 +29	-36 -36 -25	0 +40 +32	-25 -25 -17	+7 +47 +39	-18 -18 -10

Bearings application

Shaft fits

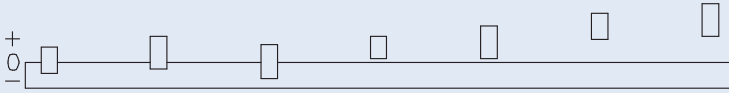


Table 4.2 (continued)

Shaft Diameter		Bearing Bore diameter tolerance Δ_{dmp}		Deviations of shaft diameter, resultant fits Tolerances														
d				js5		j6		js6		k5		k6		m5		m6		
nominal				a)Deviations (shaft diameter) b)Tightening/Theoretical clearance c)Tightening/Probable clearance														
over	up to	low	high															
mm		μm																
1	3	- 8	0	a) +2 b) +10 c) +9	-2 -2 -1	+4 +12 +10	-2 -2 0	+3 +11 +9	-3 -3 -1	+4 +12 +11	0 0 +1	+6 +14 +12	0 0 +2	+6 +14 +13	+2 +2 +3	+8 +16 +14	+2 +2 +4	
3	6	- 8	0		+2,5 +10,5 +9	-2,5 -2,5 -1	+6 +14 +12	-2 -2 0	+4 +12 +10	-4 -4 -2	+6 +14 +13	+1 +1 +2	+9 +17 +15	+1 +1 +3	+9 +17 +16	+4 +4 +5	+12 +20 +18	+4 +4 +6
6	10	- 8	0		+3 +11 +9	-3 -3 -1	+7 +15 +13	-2 -2 0	+4,5 +12,5 +11	-4,5 -4,5 -3	+7 +15 +13	+1 +1 +3	+10 +18 +16	+1 +1 +3	+12 +20 +18	+6 +6 +8	+15 +23 +21	+6 +6 +9
10	18	- 8	0		+4 +12 +10	-4 -4 -2	+8 +16 +14	-3 -3 -1	+5,5 +13,5 +11	-5,5 -5,5 -3	+9 +17 +15	+1 +1 +3	+12 +20 +18	+1 +1 +3	+15 +23 +21	+7 +7 +9	+18 +26 +24	+7 +7 +9
18	30	- 10	0		+4,5 +14,5 +12	-4,5 -4,5 -2	+9 +19 +16	-4 -4 -1	+6,5 +16,5 +14	-6,5 -6,5 -4	+11 +21 +19	+2 +2 +4	+15 +25 +22	+2 +2 +5	+17 +27 +25	+8 +8 +10	+21 +31 +28	+8 +8 +11
30	50	- 12	0		+5,5 +17,5 +15	-5,5 -5,5 -3	+11 +23 +19	-5 -5 -1	+8 +20 +16	-8 -8 -4	+13 +25 +22	+2 +2 +5	+18 +30 +26	+2 +2 +6	+20 +32 +29	+9 +9 +12	+25 +37 +33	+9 +9 +13
50	80	- 15	0		+6,5 +21,5 +18	-6,5 -6,5 -3	+12 +27 +23	-7 -7 -3	+9,5 +24,5 +20	-9,5 -9,5 -5	+15 +30 +26	+2 +2 +6	+21 +36 +32	+2 +2 +6	+24 +39 +35	+11 +11 +15	+30 +45 +41	+11 +11 +15
80	120	- 20	0		+7,5 +27,5 +23	-7,5 -7,5 -3	+13 +33 +27	-9 -9 -3	+11 +31 +25	-11 -11 -5	+18 +38 +33	+3 +3 +8	+25 +45 +39	+3 +3 +9	+28 +48 +43	+13 +13 +18	+35 +55 +49	+13 +13 +19
120	180	- 25	0		+9 +34 +28	-9 -9 -3	+14 +39 +32	-11 -11 -4	+12,5 +37,5 +31	-12,5 -12,5 -6	+21 +46 +40	+3 +3 +9	+28 +53 +46	+3 +3 +10	+33 +58 +52	+15 +15 +21	+40 +65 +58	+15 +15 +22
180	250	- 30	0		+10 +40 +34	-10 -10 -4	+16 +46 +38	-13 -13 -5	+14,5 +44,5 +36	-14,5 -14,5 -6	+24 +54 +48	+4 +4 +10	+33 +63 +55	+4 +4 +12	+37 +67 +61	+17 +17 +23	+46 +76 +68	+17 +17 +25
250	315	- 35	0		+11,5 +46,5 +39	-11,5 -11,5 -4	+16 +51 +42	-16 -16 -7	+16 +51 +42	-16 -16 -7	+27 +62 +54	+4 +4 +12	+36 +71 +62	+4 +4 +13	+43 +78 +70	+20 +20 +28	+52 +87 +78	+20 +20 +29
315	400	- 40	0		+12,5 +52,5 +44	-12,5 -12,5 -4	+18 +58 +47	-18 -18 -7	+18 +58 +47	-18 -18 -7	+29 +69 +61	+4 +4 +12	+40 +80 +69	+4 +4 +15	+46 +86 +78	+21 +21 +29	+57 +97 +86	+21 +21 +32

Bearings application

Shaft fits

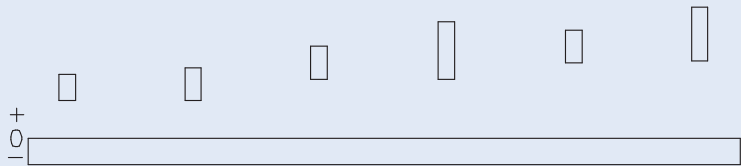


Table 4.2 (continued)

Shaft Diameter		Bearing Bore diameter tolerance Δdmp		Deviations of shaft diameter, resultant fits Tolerances											
d				n5	n6		p6		p7		r6		r7		
nominal				a)Deviations (shaft diameter) b)Tightening/Theoretical clearance c)Tightening/Probable clearance											
over	up to	low	high												
mm		μm													
1	3	− 8	0	a) + 8 b) + 16 c) + 15	+ 4 + 4 + 5	+ 10 + 18 + 16	+ 4 + 4 + 6	+ 12 + 20 + 18	+ 6 + 6 + 8	+ 16 + 24 + 22	+ 6 + 6 + 8	+ 16 + 24 + 22	+ 10 + 10 + 12	+ 20 + 28 + 26	+ 10 + 10 + 12
3	6	− 8	0	+ 13 + 21 + 20	+ 8 + 8 + 9	+ 16 + 24 + 22	+ 8 + 8 + 10	+ 20 + 28 + 26	+ 12 + 12 + 14	+ 24 + 32 + 30	+ 12 + 12 + 14	+ 23 + 31 + 29	+ 15 + 15 + 17	+ 27 + 35 + 33	+ 15 + 15 + 17
6	10	− 8	0	+ 16 + 24 + 22	+ 10 + 10 + 12	+ 19 + 27 + 25	+ 10 + 10 + 12	+ 24 + 32 + 30	+ 15 + 15 + 17	+ 30 + 38 + 35	+ 15 + 15 + 18	+ 28 + 36 + 34	+ 19 + 19 + 21	+ 34 + 42 + 39	+ 19 + 19 + 22
10	18	− 8	0	+ 20 + 28 + 26	+ 12 + 12 + 14	+ 23 + 31 + 29	+ 12 + 12 + 14	+ 29 + 37 + 35	+ 18 + 18 + 20	+ 36 + 44 + 41	+ 18 + 18 + 21	+ 34 + 42 + 40	+ 23 + 23 + 25	+ 41 + 49 + 46	+ 23 + 23 + 26
18	30	− 10	0	+ 24 + 34 + 32	+ 15 + 15 + 17	+ 28 + 38 + 35	+ 15 + 15 + 18	+ 35 + 45 + 42	+ 22 + 22 + 25	+ 43 + 53 + 50	+ 22 + 22 + 25	+ 41 + 51 + 48	+ 28 + 28 + 31	+ 49 + 59 + 56	+ 28 + 28 + 31
30	50	− 12	0	+ 28 + 40 + 37	+ 17 + 17 + 20	+ 33 + 45 + 41	+ 17 + 17 + 21	+ 42 + 54 + 50	+ 26 + 26 + 30	+ 51 + 63 + 59	+ 26 + 26 + 30	+ 50 + 62 + 58	+ 34 + 34 + 38	+ 59 + 71 + 67	+ 34 + 34 + 38
50	65	− 15	0	+ 33 + 48 + 44	+ 20 + 20 + 24	+ 39 + 54 + 50	+ 20 + 20 + 24	+ 51 + 66 + 62	+ 32 + 32 + 36	+ 62 + 77 + 72	+ 32 + 32 + 37	+ 60 + 75 + 71	+ 41 + 41 + 45	+ 71 + 86 + 81	+ 41 + 41 + 46
65	80	− 15	0	+ 33 + 48 + 44	+ 20 + 20 + 24	+ 39 + 54 + 50	+ 20 + 20 + 24	+ 51 + 66 + 62	+ 32 + 32 + 36	+ 62 + 77 + 72	+ 32 + 32 + 37	+ 62 + 75 + 73	+ 43 + 43 + 47	+ 73 + 88 + 83	+ 43 + 43 + 48
80	100	− 20	0	+ 38 + 58 + 53	+ 23 + 23 + 28	+ 45 + 65 + 59	+ 23 + 23 + 29	+ 59 + 79 + 73	+ 37 + 37 + 43	+ 72 + 92 + 85	+ 37 + 37 + 44	+ 73 + 93 + 87	+ 51 + 51 + 57	+ 86 + 106 + 99	+ 51 + 51 + 58
100	120	− 20	0	+ 38 + 58 + 53	+ 23 + 23 + 28	+ 45 + 65 + 59	+ 23 + 23 + 29	+ 59 + 79 + 73	+ 37 + 37 + 43	+ 72 + 92 + 85	+ 37 + 37 + 44	+ 76 + 96 + 90	+ 54 + 54 + 60	+ 89 + 109 + 102	+ 54 + 54 + 61
120	140	− 25	0	+ 45 + 70 + 64	+ 27 + 27 + 33	+ 52 + 77 + 70	+ 27 + 27 + 34	+ 68 + 93 + 86	+ 43 + 43 + 50	+ 83 + 108 + 100	+ 43 + 43 + 51	+ 88 + 113 + 106	+ 63 + 63 + 70	+ 103 + 128 + 120	+ 63 + 63 + 71
140	160	− 25	0	+ 45 + 70 + 64	+ 27 + 27 + 33	+ 52 + 77 + 70	+ 27 + 27 + 34	+ 68 + 93 + 86	+ 43 + 43 + 50	+ 83 + 108 + 100	+ 43 + 43 + 51	+ 90 + 115 + 108	+ 65 + 65 + 72	+ 105 + 130 + 122	+ 65 + 65 + 73
160	180	− 25	0	+ 45 + 70 + 64	+ 27 + 27 + 33	+ 52 + 77 + 70	+ 27 + 27 + 34	+ 68 + 93 + 86	+ 43 + 43 + 50	+ 83 + 108 + 100	+ 43 + 43 + 51	+ 93 + 118 + 111	+ 68 + 68 + 75	+ 108 + 133 + 125	+ 68 + 68 + 76

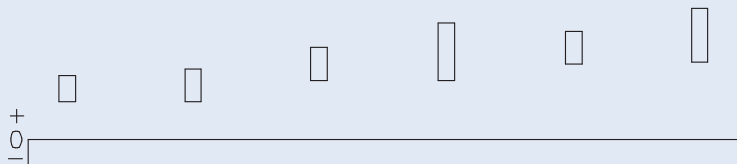


Table 4.2 (continued)

Shaft Diameter		Bearing Bore diameter tolerance Δdmp		Deviations of shaft diameter, resultant fits Tolerances													
d						n5		n6		p6		p7		r6		r7	
nominal				a)	Deviations (shaft diameter)												
over	up to	low	high	b)	Tightening/Theoretical clearance												
				c)	Tightening/Probable clearance												
mm		μm															
180	200	- 30	0	a) + 51 b) + 81 c) + 75	+ 31 + 31 + 37	+ 60 + 90 + 82	+ 31 + 31 + 39	+ 79 + 109 + 101	+ 50 + 50 + 58	+ 96 + 126 + 116	+ 50 + 50 + 60	+ 106 + 136 + 128	+ 77 + 77 + 85	+ 123 + 153 + 143	+ 77 + 77 + 87		
200	225	- 30	0	+ 51 + 81 + 75	+ 31 + 31 + 37	+ 60 + 90 + 82	+ 31 + 31 + 39	+ 79 + 109 + 101	+ 50 + 50 + 58	+ 96 + 126 + 116	+ 50 + 50 + 60	+ 109 + 139 + 131	+ 80 + 80 + 88	+ 126 + 156 + 146	+ 80 + 80 + 90		
225	250	- 30	0	+ 51 + 81 + 75	+ 31 + 31 + 37	+ 60 + 90 + 82	+ 31 + 31 + 39	+ 79 + 109 + 101	+ 50 + 50 + 58	+ 96 + 126 + 116	+ 50 + 50 + 60	+ 113 + 143 + 135	+ 84 + 84 + 92	+ 130 + 160 + 150	+ 84 + 84 + 94		
250	280	- 35	0	+ 57 + 92 + 84	+ 34 + 34 + 42	+ 66 + 101 + 92	+ 34 + 34 + 43	+ 88 + 123 + 114	+ 56 + 56 + 65	+ 108 + 143 + 131	+ 56 + 56 + 68	+ 126 + 161 + 152	+ 94 + 94 + 103	+ 146 + 181 + 169	+ 94 + 94 + 106		
280	315	- 35	0	+ 57 + 92 + 84	+ 34 + 34 + 42	+ 66 + 101 + 92	+ 34 + 34 + 43	+ 88 + 123 + 114	+ 56 + 56 + 65	+ 108 + 143 + 131	+ 56 + 56 + 68	+ 130 + 165 + 156	+ 98 + 98 + 107	+ 150 + 185 + 173	+ 98 + 98 + 110		
315	355	- 40	0	+ 62 + 102 + 94	+ 37 + 37 + 45	+ 73 + 113 + 102	+ 37 + 37 + 48	+ 98 + 138 + 127	+ 62 + 62 + 73	+ 119 + 159 + 146	+ 62 + 62 + 75	+ 144 + 184 + 173	+ 108 + 108 + 119	+ 165 + 205 + 192	+ 108 + 108 + 121		
355	400	- 40	0	+ 62 + 102 + 94	+ 37 + 37 + 45	+ 73 + 113 + 102	+ 37 + 37 + 48	+ 98 + 138 + 127	+ 62 + 62 + 73	+ 119 + 159 + 146	+ 62 + 62 + 75	+ 150 + 190 + 179	+ 114 + 114 + 125	+ 171 + 211 + 198	+ 114 + 114 + 127		

Bearings application

Tolerance classes for housing bores

Radial bearings

Solid housing

Table 4.3

Operating conditions	Examples	Tolerance class symbol	Outer ring displacement
Rotating outer ring load			
Heavy loads on bearings in thin-walled housings, heavy shock lads (P>0,12C)	Roller bearing wheel hubs, connecting rod bearing	P7	Outer ring cannot be displaced
Normal and heavy loads (P>0,06C)	Ball bearing wheel hubs, connecting rod bearings, crane traveling wheels	N7	
Light and variable loads (P≤ 0,06C)	Conveyer rollers, rope sheaves, belt tension pulleys	M7	
Direction of load indeterminate			
Heavy shock loads	Traction motors	M7	Outer ring cannot be displaced
Normal and heavy loads (P > 0,06 C). Outer ring displacement is not necessary	Electric motors, pumps crankshaft main bearings	K7	

Split or solid housings

Table 4.3 (continued)

Operating conditions	Examples	Tolerance class symbol	Outer ring displacement
Direction of load indeterminate			
Light and normal loads. Desirable outer ring displacement (P≤ 0,12C)	Medium-sized electric motors, pumps, crankshaft main bearings	J7	The outer ring can be displaced
Stationary outer ring load			
Loads of all kinds	General mechanical engineering, railway axleboxes	H7	The outer ring can be easily displaced
Light and normal loads with simple conditions (P≤ 0,12C)		H8	
Heat conduction through shaft	Drying cylinders, large electrical machines with spherical roller bearings	G7	

Split housings

Table 4.3 (continued)

Operating conditions	Examples	Tolerance class symbol	Outer ring displacement	
High accuracy rotation, quiet running				
High shiftness at variable loads	Main shafts for machine-tools with roller bearings	D≤ 125 D>125	M6 N6	The outer ring cannot be displaced
Light loads, indeterminate load direction	Shaft operating surface for grinding machines with ball bearings, free bearing for high speed superchargers	K6		The outer ring cannot be displaced
Desirable outer ring displacement	Shaft operating surface for grinding machines with ball bearings, free bearing for high speed superchargers	J6		The outer ring can be displaced
Quiet running	Small-sized electrical machines	H6		The outer ring can be easily displaced

Tolerance classes for housing bores Thrust bearings

Table 4.3 (continued)

Operating conditions	Tolerance class symbol	Remarks
Axial load		
Thrust ball bearings Cylindrical and needle roller thrust bearings	H8 H7(H9)	For less accurate bearing arrangements, radial clearance in housing can be up to 0,001 D
Combined loads on spherical roller thrust bearings		
Local load on housing washer Peripheral load on housing washer	H7(H9) M7	
Axial or combined load on spherical roller thrust bearings		
Bearing radial location is ensured by another bearing	—	Housing washer fitted with clearance up to 0,001 D

Bearings application

Housing fits

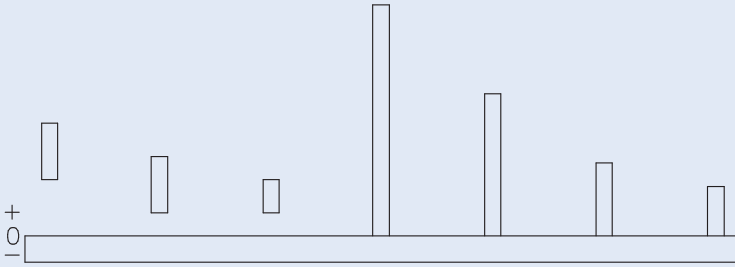


Table 4.4

Housing Diameter		Bearing Outside diameter tolerance ΔD_{mp}		Deviations of housing bore diameter, resultant fits Tolerances											
D				F7	G7	G6	H10	H9	H8	H7					
nominal				a)Deviations (housing bore diameter)											
over up to	low	high		b)Tightening/Theoretical clearance											
				c)Tightening/Probable clearance											
mm	μm														
6	10	0	-8	a) +13	+28	+5	+20	+5	+14	0	+58	0	+36	0	+22
				b) -13	-36	-5	-28	-5	-22	0	-66	0	-44	0	-30
				c) -16	-33	-8	-25	-7	-20	-3	-63	-3	-41	-3	-27
10	18	0	-8	+16	+34	+6	+24	+6	+17	0	+70	0	+43	0	+27
				-16	-42	-6	-32	-6	-25	0	-78	0	-51	0	-35
				-19	-39	-9	-29	-8	-23	-3	-75	-3	-48	-3	-32
18	30	0	-9	+20	+41	+7	+28	+7	+20	0	+84	0	+52	0	+33
				-20	-50	-7	-37	-7	-29	0	-93	0	-61	0	-42
				-23	-47	-10	-34	-10	-26	-4	-89	-4	-57	-3	-39
30	50	0	-11	+25	+50	-9	+34	+9	+25	0	+100	0	+62	0	+39
				-25	-61	-9	-45	-9	-36	0	-111	0	-73	0	-50
				-29	-57	-13	-41	-12	-33	-5	-106	-5	-68	-4	-46
50	80	0	-13	+30	+60	+10	+40	+10	+29	0	+120	0	+74	0	+46
				-30	-73	-10	-53	-10	-42	0	-133	0	-87	0	-59
				-35	-68	-15	-48	-14	-38	-6	-127	-5	-82	-5	-54
80	120	0	-15	+36	+71	+12	+47	+12	+34	0	+140	0	+87	0	+54
				-36	-86	-12	-62	-12	-49	0	-155	0	-102	0	-69
				-41	-81	-17	-57	-17	-44	-7	-148	-6	-96	-6	-63
120	150	0	-18	+43	+83	+14	+54	+14	+39	0	+160	0	+100	0	+63
				-43	-101	-14	-72	-14	-57	0	-178	0	-118	0	-81
				-50	-94	-21	-65	-20	-51	-8	-170	-8	-110	-7	-74
150	180	0	-25	+43	+83	+14	+54	+14	+39	0	+160	0	+100	0	+63
				-43	-108	-14	-79	-14	-64	0	-185	0	-125	0	-88
				-51	-100	-22	-71	-21	-57	-11	-174	-10	-115	-10	-78
180	250	0	-30	+50	+96	+15	+61	+15	+44	0	+185	0	+115	0	+72
				-50	-126	-15	-91	-15	-74	0	-215	0	-145	0	-102
				-60	-116	-25	-81	-23	-66	-13	-202	-13	-132	-12	-90
250	315	0	-35	+56	+108	-17	+69	+17	+49	0	+210	0	+130	0	+81
				-56	-143	-17	-104	-17	-84	0	-245	0	-165	0	-116
				-68	-131	-29	-92	-26	-75	-16	-229	-15	-150	-13	-103
315	400	0	-40	+62	+119	+18	+75	+18	+54	0	+230	0	+140	0	+89
				-62	-159	-18	-115	-18	-94	0	-270	0	-180	0	-129
				-75	-146	-31	-102	-29	-83	-18	-252	-17	-163	-15	-114
400	500	0	-45	+68	+131	+20	+83	+20	+60	0	+250	0	+155	0	+97
				-68	-176	-20	-128	-20	-105	0	-295	0	-200	0	-142
				-83	-161	-35	-113	-32	-93	-20	-275	-19	-181	-17	-125

Bearings application

Housing fits

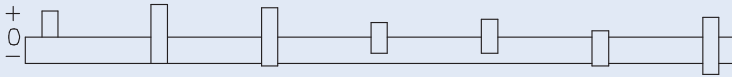


Table 4.4 (continued)

Housing Diameter	Bearing Outside diameter tolerance ΔD_{mp}			Deviations of housing bore diameter, resultant fits Tolerances														
D				H6	J7		JS7		J6		JS6		K6		K7			
nominal				a)Deviations (housing bore diameter)														
over				b)Tightening/Theoretical clearance														
up to	low	high	c)Tightening/Probable clearance															
mm		μm																
6	10	0	-8	a) 0 b) 0 c) -2	0 -17 -15	+9 +7 +4	-7 +7 +4	+8 -16 -13	-7,5 +7,5 +5	+7,5 -15,5 -13	-4 +4 +2	+5 -13 -11	-4,5 +4,5 +3	+4,5 -12,5 -11	-7 +7 +5	+2 -10 -8	-10 +10 +7	+5 -13 -10
10	18	0	-8	0 0 -2	+11 -19 -17	-8 +8 +5	+10 -18 -15	-9 +9 +6	+9 -17 -14	-5 +5 +3	+6 -14 -12	-5,5 +5,5 +3	+5,5 -13,5 -11	-9 +9 +7	+2 -10 -8	-12 +12 +9	+6 -14 -11	
18	30	0	-9	0 0 -3	+13 -22 -19	-9 +9 +6	+12 -21 -18	-10,5 +10,5 +7	+10,5 -19,5 -16	-5 +5 +2	+8 -17 -14	-6,5 +6,5 +4	+6,5 -15,5 -13	-11 +11 +8	+2 -11 -8	-15 +15 +12	+6 -15 -12	
30	50	0	-11	0 0 -3	+16 -27 -24	-11 +11 +7	+14 -25 -21	-12,5 +12,5 +9	+12,5 -23,5 -20	-6 +6 +3	+10 -21 -18	-8 +8 +5	-8 -19 -16	-13 +13 +10	+3 -14 -11	-18 +18 +14	+7 -18 -14	
50	80	0	-13	0 0 -4	+19 -32 -28	-12 +12 +7	+18 -31 -26	-15 +15 +10	+15 -28 -23	-6 +6 +2	+13 -26 -22	-9,5 +9,5 +6	+9,5 -22,5 -19	-15 +15 +11	+4 -17 -13	-21 +21 +16	+9 -22 -17	
80	120	0	-15	0 0 -5	+22 -37 -32	-13 +13 +8	+22 -37 -32	-17,5 +17,5 +12	+17,5 -32,5 -27	-6 +6 +1	+16 -31 -26	-11 +11 +6	-11 -26 -21	-18 +18 +13	+4 -19 -14	-25 +25 +20	+10 -25 -20	
120	150	0	-18	0 0 -6	+25 -43 -37	-14 +14 +7	+26 -44 -37	-20 +20 +13	+20 -38 -31	-7 +7 +1	+18 -36 -30	-12,5 +12,5 +7	+12,5 -30,5 -25	-21 +21 +15	+4 -22 -16	-28 +28 +21	+12 -30 -23	
150	180	0	-25	0 0 -7	+25 -50 -43	-14 +14 +6	+26 -43 -43	-20 +20 +12	+20 -45 -37	-7 +7 0	+18 -43 -36	-12,5 +12,5 +6	+12,5 -37,5 -31	-21 +21 +14	+4 -29 -22	-28 +28 +20	+12 -37 -29	
180	250	0	-30	0 0 -8	+29 -59 -51	-16 +16 +6	+30 -60 -50	-23 +23 +13	+23 -53 -43	-7 +7 -1	+22 -52 -44	-14,5 +14,5 +6	+14,5 -44,5 -36	-24 +24 +16	+5 -35 -27	-33 +33 +23	+13 -43 -33	
250	315	0	-35	0 0 -9	+32 -67 -58	-16 +16 +4	+36 -71 -59	-26 +26 +14	+26 -61 -49	-7 +7 -2	+25 -60 -51	-16 +16 +7	+16 -27 -42	-27 +27 +18	+5 -40 -31	-36 +36 +24	+16 -51 -39	
315	400	0	-40	0 0 -11	+36 -76 -65	-18 +18 +5	+39 -79 -66	-28,5 +28,5 +15	+28,5 -68,5 -55	-7 +7 -4	+29 -69 -58	-18 +18 +7	+18 -58 -47	-29 +29 +18	+7 -47 -36	-40 +40 +27	+17 -57 -44	
400	500	0	-45	0 0 -12	+40 -85 -73	-20 +20 +5	+43 -88 -73	-31,5 +31,5 +17	+31,5 -76,5 -62	-7 +7 -5	+33 -78 -66	-20 +20 +8	+20 -65 -53	-32 +32 +20	+8 -53 -41	-45 +45 +30	+18 -63 -48	

Bearings application

Housing fits

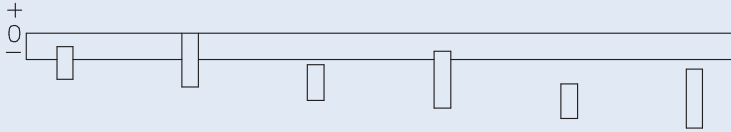


Table 4.4 (continued)

Housing Diameter		Bearing Outside diameter tolerance ΔD_{mp}		Deviations of housing bore diameter, resultant fits Tolerances											
D				M6	M7	N6	N7	P6	P7						
nominal				a)Deviations (housing bore diameter) b)Tightening/Theoretical clearance c)Tightening/Probable clearance											
over	up to	low	high												
mm		μm													
6	10	0	- 8	a) - 12 b) + 12 c) + 10	- 3 - 5 - 3	- 15 + 15 + 12	0 - 8 - 5	- 16 + 16 + 14	- 7 - 1 + 1	- 19 + 19 + 16	- 4 - 4 - 1	- 21 + 21 + 19	- 12 + 4 + 6	- 24 + 24 + 21	- 9 + 1 + 4
10	18	0	- 8	- 15 + 15 + 13	- 4 - 4 - 2	- 18 + 18 + 15	0 - 8 - 5	- 20 + 20 + 18	- 9 + 1 + 3	- 23 + 23 + 20	- 5 - 3 0	- 26 + 26 + 24	- 15 + 7 + 9	- 29 + 29 + 26	- 11 + 3 + 6
18	30	0	- 9	- 17 + 17 + 14	- 4 - 5 - 2	- 21 + 21 + 18	0 - 9 - 6	- 24 + 24 + 21	- 11 + 2 + 5	- 28 + 28 + 25	- 7 - 2 + 1	- 31 + 31 + 28	- 18 + 9 + 12	- 35 + 35 + 32	- 14 + 5 + 8
30	50	0	- 11	- 20 + 20 + 17	- 4 - 7 - 4	- 25 + 25 + 21	0 - 11 - 7	- 28 + 28 + 25	- 12 + 1 + 4	- 33 + 33 + 29	- 8 - 3 + 1	- 37 + 37 + 34	- 21 + 10 + 13	- 42 + 42 + 38	- 17 + 6 + 10
50	80	0	- 13	- 24 + 24 + 20	- 5 - 8 - 4	- 30 + 30 + 25	0 - 13 - 8	- 33 + 33 + 29	- 14 + 1 + 5	- 39 + 39 + 34	- 9 - 4 + 1	- 45 + 45 + 41	- 26 + 13 + 17	- 51 + 51 + 46	- 21 + 8 + 13
80	120	0	- 15	- 28 + 28 + 23	- 6 - 9 - 4	- 35 + 35 + 30	0 - 15 - 10	- 38 + 38 + 33	- 16 + 1 + 6	- 45 + 45 + 40	- 10 - 5 0	- 52 + 52 + 47	- 30 + 15 + 20	- 59 + 59 + 54	- 24 + 9 + 14
120	150	0	- 18	- 33 + 33 + 27	- 8 - 10 - 4	- 40 + 40 + 33	0 - 18 - 11	- 45 + 45 + 39	- 20 + 2 + 8	- 52 + 52 + 45	- 12 - 6 + 1	- 61 + 61 + 55	- 36 + 18 + 24	- 68 + 68 + 61	- 28 + 10 + 17
150	180	0	- 25	- 33 + 33 + 26	- 8 - 17 - 10	- 40 + 40 + 32	0 - 25 - 17	- 45 + 45 + 38	- 20 - 5 + 2	- 52 + 52 + 44	- 12 - 13 - 5	- 61 + 61 + 54	- 36 + 11 + 18	- 68 + 68 + 60	- 28 + 3 + 11
180	250	0	- 30	- 37 + 37 + 29	- 8 - 22 - 14	- 46 + 46 + 36	0 - 30 - 20	- 51 + 51 + 43	- 22 - 8 0	- 60 + 60 + 50	- 14 - 16 - 6	- 70 + 70 + 62	- 41 + 11 + 19	- 79 + 79 + 69	- 33 + 3 + 13
250	315	0	- 35	- 41 + 41 + 32	- 9 - 26 - 17	- 52 + 52 + 40	0 - 35 - 23	- 57 + 57 + 48	- 25 - 10 - 1	- 66 + 66 + 54	- 14 - 21 - 9	- 79 + 79 + 70	- 47 + 12 + 21	- 88 + 88 + 76	- 36 + 1 + 13
315	400	0	- 40	- 46 + 46 + 35	- 10 - 30 - 19	- 57 + 57 + 44	0 - 40 - 27	- 62 + 62 + 51	- 26 - 14 - 3	- 73 + 73 + 60	- 16 - 24 - 11	- 87 + 87 + 76	- 51 + 11 + 22	- 98 + 98 + 85	- 41 + 1 + 14
400	500	0	- 45	- 50 + 50 + 38	- 10 - 35 - 23	- 63 + 63 + 48	0 - 45 - 30	- 67 + 67 + 55	- 27 - 18 - 6	- 80 + 80 + 65	- 17 - 28 - 13	- 95 + 95 + 83	- 55 + 10 + 22	- 108 + 108 + 93	- 45 0 + 15

Deviations of form and position

Permissible deviations of form and position for shaft and housing where bearings are to be mounted are given in fig. 4.3 and table 4.5.

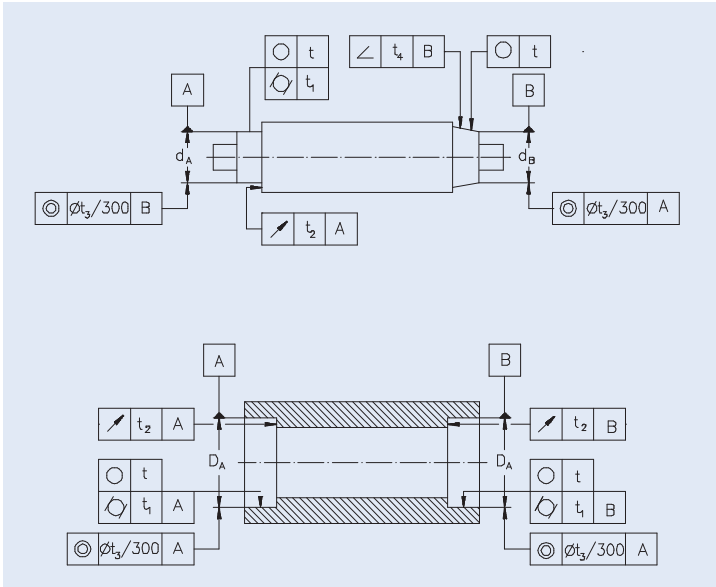


Fig.4.3.

Permissible deviations depending on the tolerance class								Table 4.5
Tolerance name	Fit	Symbol of deviation		Permissible deviations depending on the tolerance class				
				P0 P6X	P6	P5	P4(SP)	P2(UP)
Tolerance of dimension	shaft	—	—	IT6(IT5)	IT5	IT4	IT4	IT3
	housing			IT7(IT6)	IT6	IT5	IT4	IT4
Tolerance of roundness and cylindricity	shaft		t,t1	$\frac{IT4}{2} \left(\frac{IT3}{2} \right)$	$\frac{IT3}{2} \left(\frac{IT2}{2} \right)$	$\frac{IT2}{2}$	$\frac{IT1}{2}$	$\frac{IT0}{2}$
	housing		t,t1	$\frac{IT5}{2} \left(\frac{IT4}{2} \right)$	$\frac{IT4}{2} \left(\frac{IT2}{2} \right)$	$\frac{IT3}{2}$	$\frac{IT2}{2}$	$\frac{IT1}{2}$
Tolerance of face runout	shaft		t2	IT4(IT3)	IT3(IT2)	IT2	IT1	IT0
	housing			IT5(IT4)	IT4(IT3)	IT3	IT2	IT1
Tolerance of concentricity	shaft		t3	IT5	IT4	IT4	IT3	IT3
	housing			IT6	IT5	IT5	IT4	IT3
Tolerance of angularity	shaft		t4	$\frac{IT7}{2}$	$\frac{IT6}{2}$	$\frac{IT4}{2}$	$\frac{IT3}{2}$	$\frac{IT2}{2}$

In case of bearings on which adapter or withdrawal sleeves are to be mounted, the shaft tolerances for deviations of form and position should be to IT 5/2 tolerance class for shafts with diameter tolerance h9 and IT7/2 for

shaft tolerance h10.
Surface roughness of bearing seating is given in table 4.6.

Shaft and housing mounting surfaces roughness					Table 4.6
Bearing tolerance class	Shaft		Housing		
	Diameter d, mm		Diameter D, mm		
	≤ 80	80...500	≤ 80	80...500	
Roughness Ra, μm					
P0, P6X and P6	0,8 (N6)	1,6 (N7)	0,8 (N6)	1,6 (N7)	
P5, SP and P4	0,4 (N5)	0,8 (N6)	0,8 (N6)	1,6 (N7)	
P2 and UP	0,2 (N4)	0,4 (N5)	0,4 (N5)	0,8 (N6)	

If bearings are mounted with adapter or withdrawal sleeves, shaft surface roughness should be of max. Ra = 1,6 μm.

The values of fundamental tolerances - ISO (tolerance classes IT0...IT12) are given in table 4.7.

Tolerance ISO (IT)														Table 4.7	
Nominal dimension, mm	over 1	3	6	10	18	30	50	80	120	180	250	315	400	500	630
up to	3	6	10	18	30	50	80	120	180	250	315	400	500	630	
Tolerances in micrometers (0,001 mm)															
IT0	0,5	0,6	0,6	0,8	1	1	1,2	1,5	2	3	4	5	6		
IT1	0,8	1	1	1,2	1,5	1,5	2	2,5	3,5	4,5	6	7	8		
IT2	1,2	1,5	1,5	2	2,5	2,5	3	4	5	7	8	9	10		
IT3	2	2,5	2,5	3	4	4	5	6	8	10	12	13	15		
IT4	3	4	4	5	6	7	8	10	12	14	16	18	20		
IT5	4	5	6	8	9	11	13	15	18	20	23	25	27	29	
IT6	6	8	9	11	13	16	19	22	25	29	32	36	40	44	
IT7	10	12	15	18	21	25	30	35	40	46	52	57	63	70	
IT8	14	18	22	27	33	39	46	54	63	72	81	89	97	110	
IT9	25	30	36	43	52	62	74	87	100	115	130	140	155	175	
IT10	40	48	58	70	84	100	120	140	160	185	210	230	250	280	
IT11	60	75	90	110	130	160	190	220	250	290	320	360	400	440	
IT12	100	120	150	180	210	250	300	350	400	460	520	570	630	700	

Bearing axial location

Axial location of bearings is necessary for a proper guiding of bearing in an assembly under operation.

An tight fit is inadequate for the axial location of bearing. In case of locating bearings, axial location for both rings is generally needed. Some important solutions of bearing axial location, on shaft or into the housing are shown in Fig.4.4.

In case of bearings with light axial loads, bearings can be located using a lock nut and a lock washer (a), an end plate fastened by a screw at the shaft end (b) and, for bearings carrying light axial loads, by lock rings mounted in shaft and housing grooves (c).

Bearings with NR design, with groove and snap ring on the outer ring, can be easily located by the lock ring (d). Tapered roller bearings can be located by supporting the inner ring on the shaft shoulder and the outer ring with a threaded ring and a safety plate fastened by a screw (e).

Tapered bore bearings can be mounted and axially located by adapter or withdrawal sleeves (f, g, h).

The axial load carrying capacity of the bearings mounted with adapter or withdrawal sleeves is governed by the friction between shaft and sleeve (g).

To locate radial bearings, where axial adjustment of the shaft is required, setting washers (i) or spacer rings (j) are used between the outer rings, the width of the spacer ring being experimentally determined, during mounting.

Bearing sealing

Seals are used in most of bearing arrangements and they must ensure the conditions of a proper operation.

For such a purpose, they have to prevent solid contaminants (dust, hard particles, water, aggressive substances etc.) from penetrating into the bearing and at the same time to retain the lubricant in the bearing.

Seals for rolling bearings can be classified considering some important criteria such as: design, operation, type of lubricant etc.

Considering their design and operation, seals can be: stationary seals between the stationary bearing elements (housing and cover), rotary seals, between the rotating bearing elements and they also can be rubbing seals or non-rubbing seals, which are used in special applications (surroundings conditions and loading stress).

Rotary non-rubbing seals are often used due to their simple design. They are particularly used at high speeds or temperatures, both for grease and oil, and have practically no friction and do not wear.

In case of bearing grease lubrication, bearing operating temperature must be lower with 20°C than the dropping point of the grease (melting temperature).

The main constructive types of rotary non-rubbing seals have narrow gaps, labyrinths and their combinations are shown in fig. 4.5 a-c.

Gap seals represent the simplest constructive solution for a rotary non-rubbing seal which have to retain grease in the bearing housing. The efficacy of sealing depends on the gap length (L) and the clearance between shaft and housing. It can be improved by providing one or more circular grooves on the shaft or in the housing, which are to be filled with grease (b). In case of oil lubrication, the grooves on the shaft must be helical (c) and their direction must be the same with the direction of the shaft rotary movement.

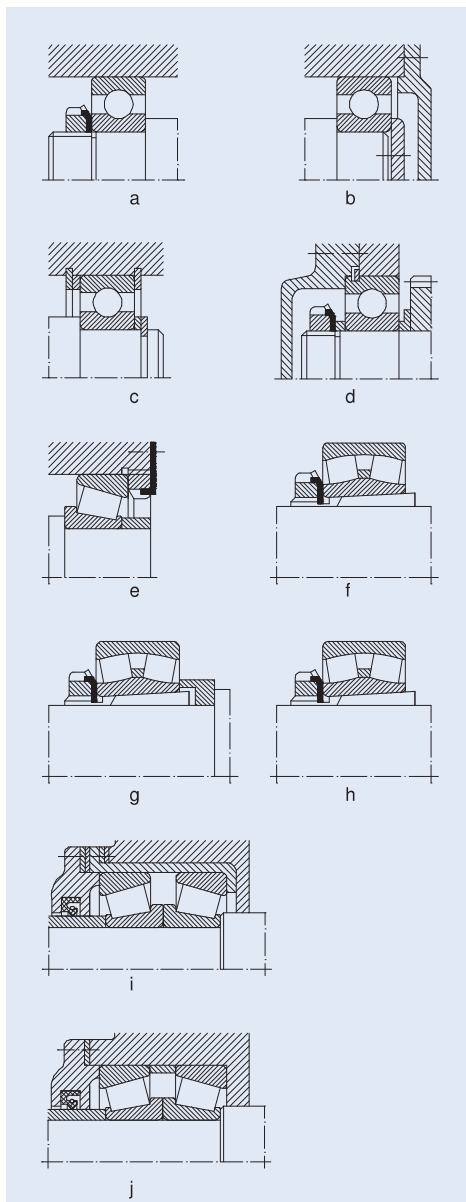


Fig. 4.4

Experiments proved that most favorable clearance is obtained between the limits of the fit A11/h10, geometrical deviations should be IT6 and gap surface roughness $R_a = 12,6 \mu\text{m}$.

Labyrinth seals are used at high peripheral speeds, in impure surroundings. They are shown in fig. 4.6 a-d.

The labyrinths are spaces where periodically water-insoluble grease (e.g. Lithium or Calcium base grease) is to be supplied.

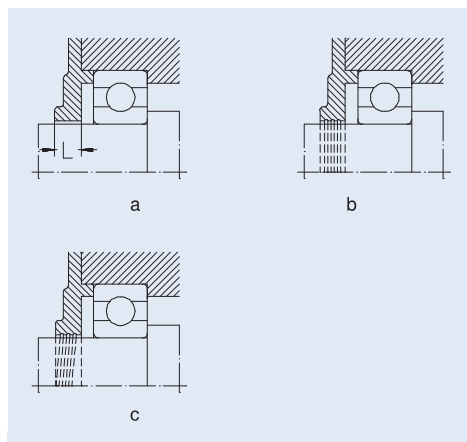


Fig. 4.5

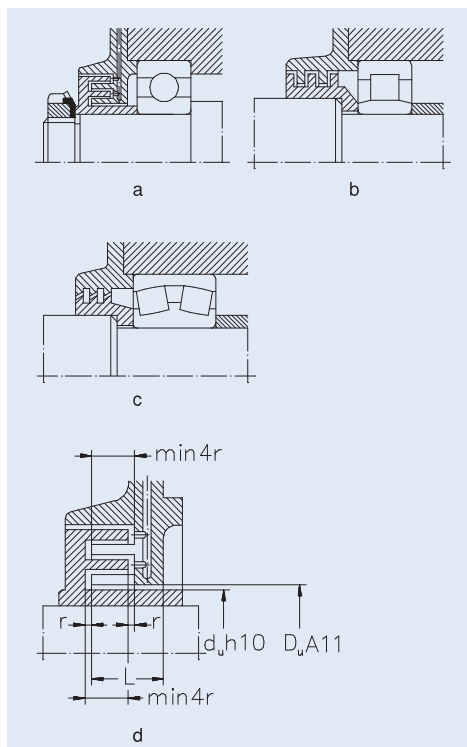


Fig. 4.6

The tongues of the labyrinth seals can be radially (a), axially (b) arranged or they can have inclined passages. Details of an axial labyrinth design are given in fig. 4.6 d and values of axial clearance r and length L are given in table 4.8.

Values for dimensions r and L

Table 4.8

d over	up to	Axial clearance r	Length L
mm			
—	50	1,5	13,5...27
50	120	2	18...36
120	180	2,5	22,5...45

Sealing efficacy increases where both radial and axial labyrinths are used and the number of gaps is increased. Other types of seals are shown in fig. 4.7 a-c.

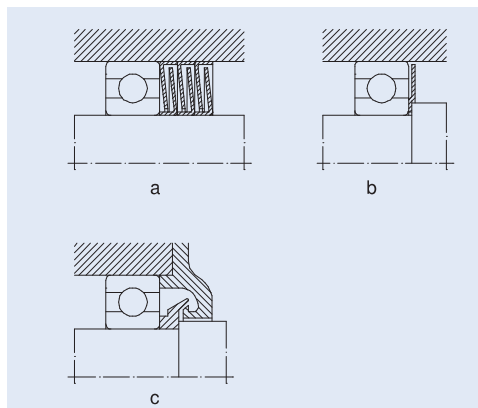


Fig. 4.7

in case of rotary rubbing seals there is a direct contact between a seal elastic element and the rotating element. They are shown in fig. 4.8.

When selecting the proper rotary rubbing seal, the following factors have to be considered: material and its elasticity (felt, rubber, plastics, leather, graphite, asbestos etc.); resistance at various temperatures, maximum peripheral speed on sealing surface; sealing direction etc. These systems have sealing properties higher than those corresponding to non-rubbing seals. In case of grease lubrication at peripheral speeds higher than 4 m/s and temperatures over $+100^{\circ}\text{C}$, felt ring seals (a) are frequently used because of their simple design and cheapness.

Before mounting, felt rings are impregnated during an hour with a mixture of mineral oil (66%) and paraffin (34%), at a temperature of $+70...+80^{\circ}\text{C}$ so that sealing properties are improved as the friction is reduced.

At higher temperatures and peripheral speeds over 12 m/s, surface roughness is $R_a = 1,6\text{ }\mu\text{m}$ and the space between the ends of the seal should be filled with grease. Two felt rings can be used for sealing.

Rubbing seals with a spring incorporated are preferably to be used in case of oil lubricated bearings which are operated under peripheral speeds of 5-10 m/s, temperatures between -40°C and $+20^{\circ}\text{C}$. Their efficacy depends on the material and operating surroundings.

In most cases, rubbing seals with a spring incorporated are made of synthetic rubber and have a metallic hardening fixture.

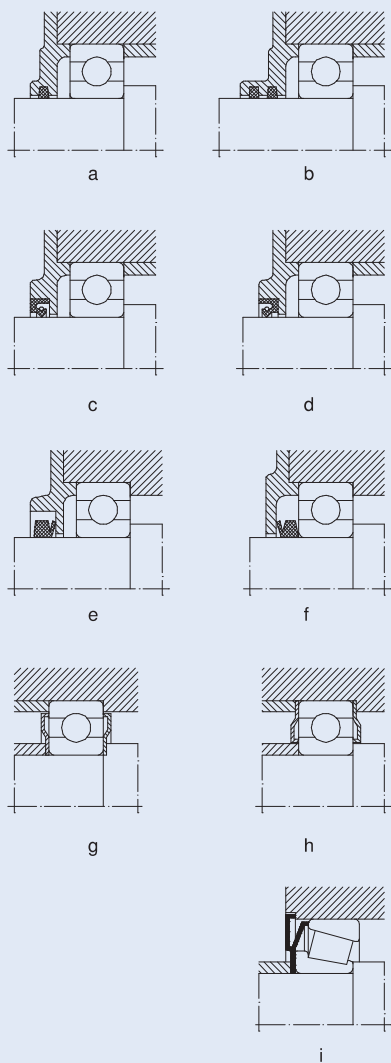


Fig. 4.8

Inclined sealing surfaces are recommended to be ground at $R_a = 0,8\mu\text{m}$ and hardened at 45 HRC, when operating at peripheral speeds over 8 m/s. Lubricant outflow can be stopped by mounting the rubbing seal with incorporated spring with the edge inwards (c) or outwards (d) if sealing has to prevent dust or other impurities from penetrating into the bearing.

Double sealing with these rubbing seals can also be used.

V-ring seal is used to prevent dust or contaminants from penetrating into the bearing with best results both in case of grease or oil lubrication. The elastic rubber lip of the V-ring seal is notched on the plane sealing surface,

drawing the fluids in centrifugal motion. V-ring seals are used at temperatures of $-40^\circ\text{C} \dots +100^\circ\text{C}$, roughness of sealing surface being $R_a = 1,5 - 3 \mu\text{m}$. Generally, at peripheral speeds up to 15 m/s, the V-ring seal operates as a rubbing seal (seal lip reaches sealing surface), and at peripheral speeds over 15 m/s the seal lip will lift from the sealing surface, operating as a centrifugal sealing.

V-ring seals can also be used in case of angular misalignments of the shaft ($2' \dots 3'$), as they are made of high quality, elastic rubber, easy to be mounted.

The efficacy of sealing depends on the fact that the ring body acts as a flinger for dirt and fluids. Therefore, with grease lubrication the seal is generally arranged outside the housing and with oil lubrication it is placed inside the housing.

Pressed sheet washers provide simple, inexpensive and space- saving sealing especially for grease lubricated deep groove ball bearings. The washers are clamped against either the outer ring or the inner ring and exert a resilient pressure axially against the rubbing ring. In case of usual applications, the types of seals mentioned above or their combinations shown in fig. 4.9 are used, some of them becoming standard seals for rolling bearings (e.g. labyrinths, felt rings, V-rings etc.). Thus, better sealing can be obtained if felt ring (a) or V-ring (b) rubbing seals are combined with radial or axial labyrinth non-rubbing seals.

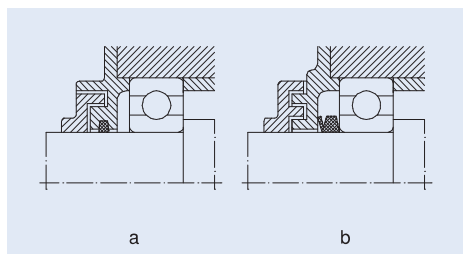


Fig. 4.9

Special seals are used in case of unusual surroundings and loading conditions (e.g. rolling mills, helm of ocean-vessels, main shaft of grinding machines etc.).

Sealed bearings of the type 2RS (2RSR) (a) or shielded bearings of the type 2Z (2ZR) (b) shown in fig. 4.10 a.b. provide simple and inexpensive sealing, with upper operating results. These rolling bearings are delivered ready greased , provision for relubrication and maintenance are not needed. They are used in case of bearings with small free space where other seals cannot be used.

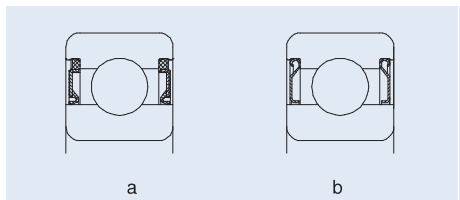


Fig. 4.10

5. Bearing lubrication

Safe operating and long rating life of bearings depend on the lubricant type and quality and on the lubrication method. Bearing lubrication is used for certain purposes, such as:

- to reduce friction between rolling elements and raceway, rolling elements and cage, cage and guiding ribs of rings during operation;
- to ensure anticorrosive protection of bearings;
- to reduce noise in bearing within certain limits;
- to distribute heat uniformly in contact areas and to remove it outside through lubricant circulation.

Lubricants for bearing lubrication should satisfy the following conditions:

- they should have physical and chemical stability;
- foreign mechanical substances (abrasive, metallic substances etc.) are not admitted in lubricant;
- they should have a minimal coefficient of friction;
- to be non-corrosive;
- good unctuosity (lubricating capacity).

There are two categories of lubricants used for bearing lubrication:

- fluid lubricants (oils);
- plastic lubricants (greases).

Table 5.1 shows comparison between fluid and plastic lubricants.

Although fluid lubricants have better characteristics than plastic lubricants, they cannot be used in all cases because of sealing difficulties.

Comparative values for lubricants

Table 5.1

Characteristics	Lubricant Fluid	Plastic
speed	any value	low and medium
friction	low (reduced)	high
unctuosity	excellent	good
service life	long	short
cooling effect	high	low
replacement	easy	difficult

Selection of lubricants

When selecting lubricants, much care is needed and all operating conditions and lubricant properties should be considered.

No lubrication system can be considered universal.

The most important criteria when selecting a lubricant have to be as follows:

- size of bearing
- speed
- load
- bearing operating temperature

These characteristics act upon lubricant viscosity as follows:

- the higher the bearing size, value of load and temperature, the higher the viscosity
- bearing speed acts by product $D_m n$, as shown in table 5.2.

Corelation between $D_m n$ and lubricant type

Table 5.2

$D_m n$ over	up to	Lubricant type
—	150×10^3	Mineral oil and grease with medium or high viscosity
150×10^3	300×10^3	Mineral oil with medium viscosity and grease
300×10^3	500×10^3	Mineral oil with low viscosity and grease
500×10^3	$1\ 200 \times 10^3$	Mineral oil with low viscosity and lubricating equipment

Grease lubrication

Grease can be used to lubricate rolling bearings only when product $D_m n \leq 500 \times 10^3$ and it offers the following advantages:

- it is more easily retained in the bearing;

- it assures anti-corrosive protection to bearing as it is water-resistant;

- low expenses for sealing.

The grease quantity to be supplied shouldn't be excessive, otherwise rotation is braked, friction increases and also operating temperature without extending the bearing rating life.

The quantity of grease that is to be inserted in bearing seating should be as follows, considering the free space inside the housing:

- 1/2...3/4 of the free space in the housing, in case of normal speeds;

- 1/3 of the free space in the housing, in case of high speeds and speed limit;

- the whole housing space should be free, in case of low speeds and product $D_m n < 10 \times 10^3$.

The quantity of grease can be calculated as a function of bearing bore diameter using the equation:

$$G = K d^{2.5}, g.$$

where:

K = 1/900 - for ball bearings

K = 1/350 - for roller bearings

d = bore diameter, mm

Relubrication intervals in most cases can be experimentally determined and depend on:

- bearing type

- bearing size

- operating temperature

- grease properties

Grease service life and relubricating interval can be calculated from:

$$T_{ur} = k_0 \left(\frac{14 \times 10^6}{n \sqrt{d}} - 4d \right) f_1 f_2,$$

where:

T_{ur} = service life or relubricating interval, in operating hours

k_0 = coefficient depending on the bearing type, table 5.3

n = speed, r/min

d = bore diameter, mm

f_1 = temperature factor, table 5.4

f_2 = factor depending on the operating conditions, table 5.5

Values for coefficient k_0

Table 5.3

Bearing type	Value of k_0	Grease
	Relubrication interval	service life
Angular contact ball bearings		
Tapered roller bearings		
Thrust ball bearings	1	2
Cylindrical roller bearings		15
Needle roller bearings		
Deep groove ball bearings	10	20...40

Values for factor f_1

Table 5.4

Temperature	70°C	85°C	100°C
Factor f_1	1	0,5	0,25

Values for factor f_2

Table 5.5

Operating conditions	Light	Moderate	Hard	Very hard
Factor f_2	1	0,7...0,9	0,4...0,7	0,1...0,4

Low values are valid for deep groove ball bearings with shields, 2Z type, or with seals, 2RS type, series 60, 62 and 63.

Bearing relubrication interval can be also determined using the chart - fig. 5.1, as a function of bearing type, bore diameter and speed.

Example:

A bearing 6208-2RSR is operated under reduced load (it is not considered for calculation), at a speed $n = 1500$ r/min, at a temperature of +60deg C, light operating conditions. What is the grease service life and relubrication interval?

Grease service life will be:

$$T_u = k_0 \left(\frac{14 \times 10^6}{n \sqrt{d}} - 4d \right) f_1 f_2 = 32\,893 \text{ hours},$$

$k_0 = 25$ from table 5.3

d = 40 mm

$f_1 = 1$, from table 5.4

$f_2 = 1$, from table 5.5

Relubrication interval:

$$T_r = k_0 \left(\frac{14 \times 10^6}{n \sqrt{d}} - 4d \right) f_1 f_2 = 13\,157 \text{ hours},$$

$k_0 = 10$, from table 5.3

$f_1, f_2 = 1$, from tables 5.4, 5.5.

Values for coefficient K

Table 5.6

Relubrication interval	K
weekly	0,0015...0,0020
monthly	0,0020...0,0030
yearly	0,0030...0,0045
after 2...3 years	0,0045...0,0055

From the diagram fig. 5.1, the value of the relubrication interval will be of 13 500 operating hours.

The grease quantity to be supplied can be determined using the equation:

$$G = K D B, g.$$

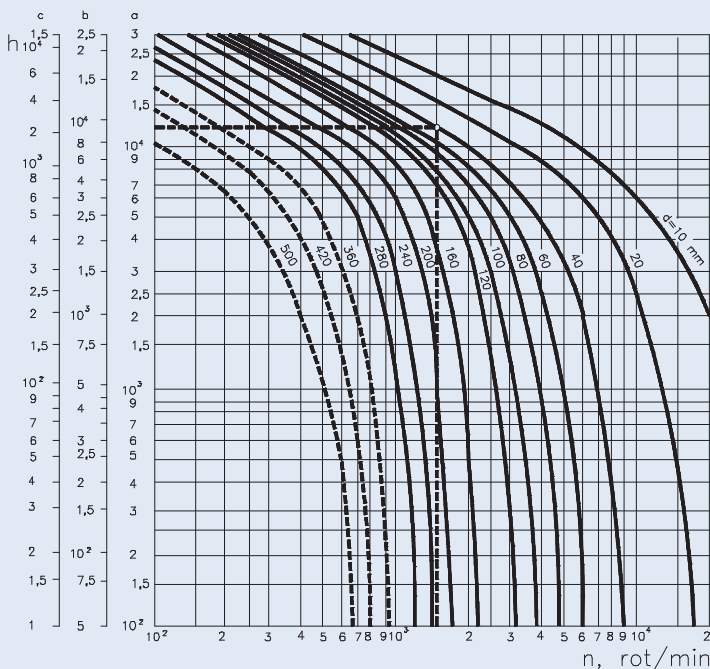
where:

G = grease quantity, g

K = coefficient depending on the relubrication interval, table 5.6

D = bearing outside diameter, mm

B = total bearing width for radial bearings, mm and total bearing height for thrust bearings, mm



Scale a; deep groove ball bearings

Scale b; cylindrical roller bearings

Scale c; spherical roller bearings, thrust ball bearings, roller thrust bearings, cylindrical roller bearings without cage.

Fig. 5.1

The chart in fig. 5.1 applies to operating temperatures which do not exceed $+70^{\circ}\text{C}$. For operating temperatures over $+70^{\circ}\text{C}$, see table 5.4.

Grease service life can be defined as the period of time when it preserves physical and mechanical characteristics in time and oxidizing due to temperature and vaporization of base oil doesn't occur.

A more accurate calculation of grease service life, considering grease quality and bearing operating conditions (load, size, speed, temperature etc.) can be done using the equation:

$$L = 10^{a - (m_1 + m_2 + m_3)}$$

where:

L = service life, operating hours

a = exponent depending on the grease quality ($a = 5,8...6,1$)

$m_1...m_3$ = exponents which take into account the following factors:

$$m_1 = 4,4 \times 10^{-6} D_m n,$$

$$m_2 = 2,5(P/C - 0,05),$$

$$m_3 = (0,021 - 1,80 \times 10^{-6} D_m n)t,$$

D_m = bearing mean diameter, mm,

n = bearing speeds, r/min,

P = equivalent radial load, kN,

C = basic dynamic load, kN,

t = bearing operating temperature, $^{\circ}\text{C}$

When calculating the values of t , $D_m n$ and P/C , the following have to be considered:

- when bearing operating temperature is lower than $+50^{\circ}\text{C}$, then $t = +50^{\circ}\text{C}$
- when speed factor $D_m n < 125\,000$, then $D_m n = 125\,000$
- when ratio $P/C < 0,05$, then $P/C = 0,05$

Grease service life, as a function of operating temperature can be approximately determined using the diagram fig. 5.2.

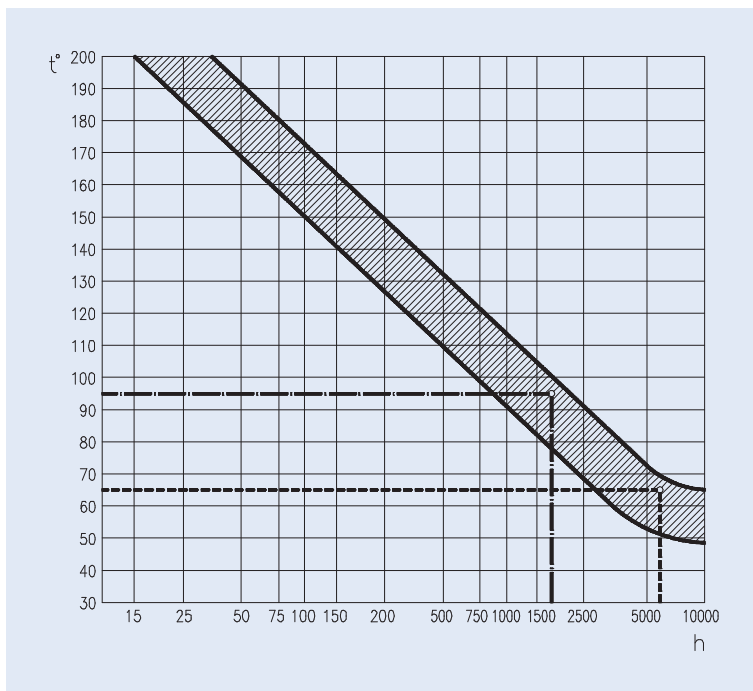


Fig.5.2

Example 1

A bearing 6210 operates under a load $P_r = 5$ kN, speed $n = 3000$ r/min at an operating temperature $t = 50^\circ\text{C}$. What is the service life of the grease used for bearing lubrication?

$$\begin{aligned}
 C_r &= 35,1 \text{ kN, tables on page 132, bearing 6210} \\
 L &= 10^{a-(m_1+m_2+m_3)} = 10^{6,1-2,273} = 6\,214 \text{ hours} \\
 a &= 6,1, \text{ for Mobil grease,} \\
 D_m n &= 65 \times 3\,000 = 195 \times 10^3 \\
 P_r/C_r &= 5/35,1 = 0,143 \\
 m_1 &= 4,4 \times 10^{-6} D_m n = 0,858 \\
 m_2 &= 2,5 (P_r/C_r - 0,05) = 0,23 \\
 m_3 &= (0,021 - 1,80 \times 10^{-8} D_m n)^{65} = 1,119 \\
 m_1 + m_2 + m_3 &= 2,273
 \end{aligned}$$

Table 5.7 shows technical characteristics of usual grease, which are recommended for lubrication of sealed and shielded bearings, 2RS and 2Z types and also for rolling bearings in various assemblies and machines.

Example 2

For the same bearing and operating conditions as in Example 1, it is required to find the service life of the same grease at a temperature of $t = 95^\circ\text{C}$.

$$\begin{aligned}
 m_3 &= 1,66 \\
 m_1 + m_2 + m_3 &= 2,794
 \end{aligned}$$

$$L = 10^{6,1-2,794} = 10^{3,306} = 1\,774 \text{ operating hours}$$

From the diagram fig. 5.2, we can find approximately the same value, respectively 6 000 operating hours at $+65^\circ\text{C}$ and 1700 operating hours at $+95^\circ\text{C}$.

Technical characteristics for usual greases for bearing lubrication

Table 5.7

Grease main components		Dropping point °C	Temperature range (continuous running)	Application	Grease type, producer
Base oil	Thickener				
Mineral oil	Lithium soap	170°C-190°C	-30°C...+130°C	Ball, roller and needle roller bearings: - small and medium sized, - moderate speeds, - temperatures up to 70°C	- Mobilux 2-3, Mobil Austria, - Castrol Spherol SRB2, Castrol Germany - Shell Alvania R 2-3, Shell England - Aguila Nr30, Brugarolas Spain
Mineral oil + additive for excessive pressure (EP)	Lithium soap	185°C-190°C	-30°C...+150°C	Ball and roller bearings, - moderate speeds, - heavy loads, shock loads, - continuous running temperature +130°C, - initial lubrication and relubrication at periods of 6-9 months	- Mobilux EP 2-3, Mobil Austria - Shell Alvania EP 2-3, Shell England - Beacon EP 2, Esso Germany
Synthetic oil (diesteric)	Lithium soap	180°C-230°C	-30°C...+130°C	Bearings for electrical motors, generators, electronic equipment, - small sizes, - light loads, - high speeds $Dm \times n \leq 1000 \times 10^3$	- Beacon 325, Esso Germany
Synthetic oil (diesteric)	Lithium soap	190°C-230°C	-50°C...+120°C	Bearings for electrical motors, generators, electronic equipment, - small sizes, - light loads, - high speeds $Dm \times n \leq 1000 \times 10^3$	- Izoflex LDS 18 Special A, Klüber Lubrication Germany
Mineral oil	Complex calcium soap	100°C-180°C	-30°C...+130°C	Bearings for general applications, - heavy loads, moderate speeds, - continuous running temperature 100°C	- Beacon 2-3, Esso Germany - Beacon EP1, Esso Germany
Synthetic oil	Without soap, synthetic thickener	indeterminate	-30°C...+250°C	Bearings for general applications, - large sizes, - low speeds $Dm \times n < 200 \times 10^3$, - high temperature	- Barlerta 1S, Klüber Lubrication Germany
Synthetic oil + additive for excessive pressure (EP)	without soap, synthetic thickener	265°C	-54°C...+177°C	Spherical roller thrust bearings, roller thrust bearings etc., bearings operating with high friction, - moderate and high speeds, - low and high temperatures	- Mobilgrease 28, Mobil Austria
Synthetic oil	without soap, inorganic thickener	260°C	-50°C...+177°C	Bearing for general applications, - light loads, - high speeds, - low and high temperatures	- Armingras BT-2, Brugarolas Spain
			-30°C...+140°C	Cylindrical roller bearings, - moderate and high speeds $Dm \times n \leq 300 \times 10^3$	- Staburags NBU12, Klüber Lubrication Germany
			0°C...+260°C	Roller bearings operating at high temperatures	- Mobiltemp 1-2, Mobil Austria

Oil lubrication

Oil lubrication can be used in any operating condition, but this kind of lubrication is compulsory when the value of the product $D_m n$ from table 5.2 is exceeded for grease, namely $D_m n > 500 \times 10^3$ and when high temperatures occur in bearing. Then, oil has to lubricate and to remove heat from bearing.

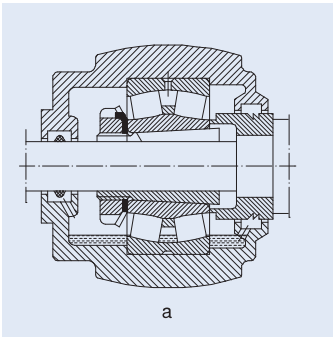
Oils used for bearing lubrication can be:

- mineral oils, used up to a temperature of $+150^{\circ}\text{C}$
 - synthetic oils, used up to a temperature of $+220^{\circ}\text{C}$
- For a proper lubrication of bearings, low quantities of lubricants to reach the rolling elements are needed.
- The lubricating systems must provide oil quantity necessary to prevent oil draining from bearing and heat removal in case of high speeds.
- Most usual oil lubricating systems depending on factor $D_m n$ are given in table 5.8.

Oil lubricating systems

Table 5.8

Lubricating system	Operating conditions	Factor $D_m n$	Oil viscosity at 40°C (m^2/s)	Example in fig.
Oil bath	Bath is filled up to the lowest rolling element for horizontal shaft and 70-80% of bath width for vertical shaft	$< 250 \times 10^3$	$(17.....300) \times 10^{-6}$	5.3 a), b)
Oil bath with external circulation	Central tank, oil circulates under a pressure of 1,5 MPa. High speeds.	$< 600 \times 10^3$	$(45...175) \times 10^{-6}$	5.4
Oil injection	Oil is injected into the operating area under a pressure of 0.1..0.5 MPa, with flow capacity of 0.5..10 l/min depending on temperature. Heavy loads and high speeds.	$< 900 \times 10^3$	$(13,5..80) \times 10^{-6}$	5.5
Oil spot	Oil in air current under a pressure of (0.05..0.5)MPa, flow capacity of (0.5..4) m^3/hour , (0.5..4)m/hour for small and medium-sized bearings, heavy loads and high speeds.	$< 1200 \times 10^3$	$(10...45) \times 10^{-6}$	5.6



a

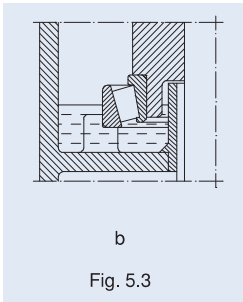


Fig. 5.3

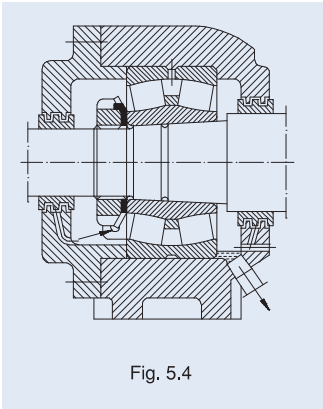


Fig. 5.4

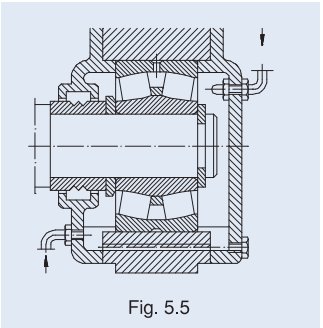


Fig. 5.5

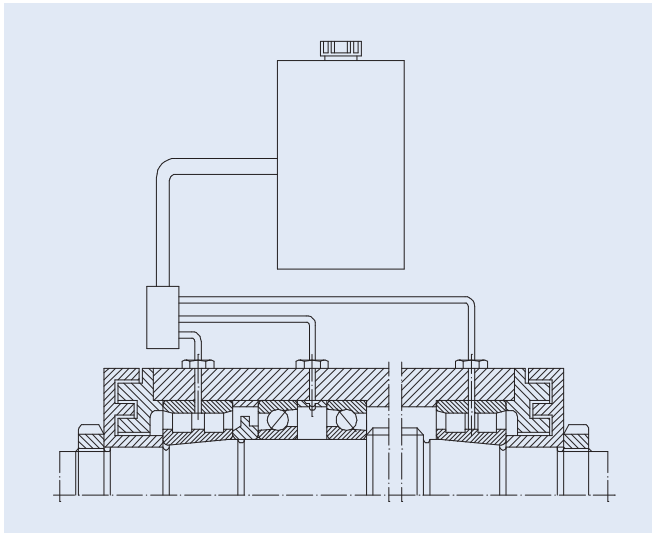


Fig. 5.6

Approximate values of oil kinematic viscosity at +40°C depending on the operating temperature are given in table 5.9.

Table 5.10 shows oils which are recommended by ISO for bearing lubrication. Values of kinematic viscosity at +40°C, mm²/s are also given.

Corelation between viscosity and temperature
Table 5.9

Temperature t °C		Viscosity at 40° C, cSt
over	up to	
–	50	12...60
50	80	37...75,5
80	120	> 75,5
120	150	227

Diagram fig. 5.7 shows kinematic viscosity classes at 40°C in accordance with ISO, its variation depending on the operating temperature (t °C) in relation to speed and bearing mean diameter (D_m).

Example

A bearing 6204 is to operate under a speed $n = 2\,000$ r/min at a temperature $t = +65^\circ\text{C}$. $D_m = 0.5(d + D) = 35,5$ mm.

The viscosity of the oil for bearing lubrication is required.

From the diagram, for $D_m = 35,5$ mm, we can find viscosity at +65°C, $\nu_1 = 13$ cSt and viscosity at +40°C, $\nu = 32$ cSt.

Recommended oils by ISO standards
Table 5.10

Class ISO		Kinematic viscosity at +40° C, mm ² /s (cSt)		
		mean	low	high
ISO VG	2	2,2	1,98	2,42
ISO VG	3	3,2	2,88	3,52
ISO VG	5	4,6	4,14	5,06
ISO VG	7	6,8	6,12	7,48
ISO VG	10	10	9	11
ISO VG	15	15	13,5	16,5
ISO VG	22	22	19,8	24,2
ISO VG	32	32	28,8	35,2
ISO VG	46	46	41,4	50,6
ISO VG	68	68	61,2	74,8
ISO VG	100	100	90	110
ISO VG	150	150	135	165
ISO VG	220	220	198	242
ISO VG	320	320	288	352
ISO VG	460	460	414	506
ISO VG	680	680	612	748
ISO VG	1 000	1 000	900	1 100
ISO VG	1 500	1 500	1 350	1 650



6. Bearing designation

The purpose of designation is that of identification of bearings, so that bearings with the same designation to be interchangeable both dimensionally and operationally, no matter who the producers may be. Designations of URB rolling bearings are in accordance with those used by world-known bearing companies: SKF,

FAG, INA, KOYO etc.
The complete designation of a bearing consists of a basic design and may include one or more supplementary designations (prefixes and suffixes), as shown in chart fig.6.1.

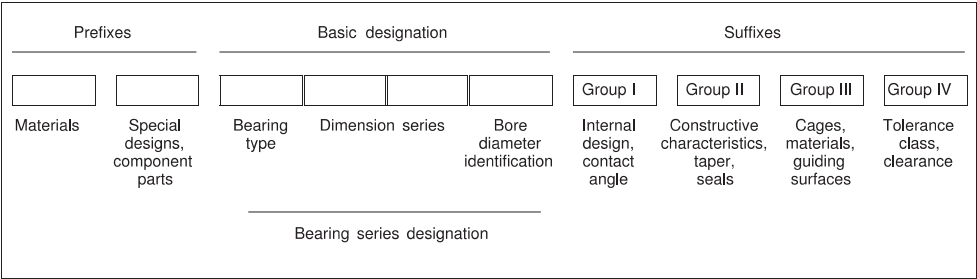


Fig. 6.1

The basic designation consists of an identification of the type of bearing (figure or letter), the series designation, in accordance with ISO and the bore diameter identification.

The designations of the bearing type and dimension series, for main standardized bearing types, are given in table 6.1.

Bore diameter identification consists of one, two or more figures as follows:

- bore diameter from 1 to 9 mm
 - bore diameter from 10 to 495 mm
- one figure, representing the bore diameter (e.g. 623, 608);
 - two figures, as follows: 00 for 10 mm, 01 for 12 mm, 02 for 15 mm, 03 for 17 mm, 04 and up to 99 for bore diameter from 20 to 495 mm. (bore diameter = bore diameter identification x 5, e.g. 6230, d = 150 mm);

- bore diameter of 500 mm and over
- is stated directly separated by a slash, the same applies to the values which are not perfect multiples of 5, or if they include a decimal point (e.g. 610/560, 62/32, 62/1,5).

Tapered roller bearings with inch dimensions listed in this catalogue make an exception from this rule.

Prefixes

Prefixes are letter-identifications which indicate the material, other than steel for bearings or component parts of bearing. The prefix for material is separated by a horizontal line from the rest of designation.

Designation of the type and dimension series for the standardized bearings

Table 6.1
Example

Bearing design	Bearing type identification	Series designation	Example
	6	18 10 03 19 02 23 00 22 04	61952 6208
	1	10 03 02 23 22	1205 11210
	7	10 02 03	7030C 7210B
	0	32 33	3207 3316D
	NU	10 02 22 03	NU208
	NJ	23 04	NJ2206
	N		N310 N5161M
	NUP		NUP209
	NNU	49	NNU4920
	NN	30	NN3015
	NA	48 49	NA4905 NA121815 NA 85/26
	NA	69	NA6912
	2	30 41 13 40 22 23 31 32	22216 25130
	3	29 22 23 20 03 02 13	32010 32208 34115
	35	0	35130
	5	11 13 12 14	51115 51212
	5	22 23 24	52205 52308

Prefixes for materials

H	- heat-resisting steel (e.g. H - NUP 210)
M	- copper alloy (e.g. M - 6008)
S	- plastics, glass, ceramics etc. (e.g. S - 6204)
SS	- stainless steel (e.g. SS - 6202)
T	- case - hardening steel (e.g. T - 35352)

Prefixes for special designs or parts of bearings

K	- cage with rolling elements of dismountable bearing (e.g. KNU205)
L	- free ring of dismountable bearing (e.g. LNU205) (interchangeable ring, e.g. L30205)
R	- dismountable bearing without free ring) (e.g. RNU205; RN205)
E	- shaft washer of thrust ball bearing (e.g. E51210)
W	- housing washer of thrust ball bearing (e.g. W51216)

Suffixes

Suffixes are used to identify various constructive modifications of the bearing in comparison to normal design. They are classified in four different groups, as follows:

Group I	- Modifications of internal design, design with increased basic load (e.g. A, C, E etc.), contact angle (e.g. A, B, C) and others.
Group II	- Modifications of external design, tapered bore, groove on outer ring etc. (e.g. 30205A, 1210K, 6210NR, 6310-2RS)
Group III	- Modifications of cage design, material, guiding surfaces etc. (e.g. 6205TN, NU310MA).
Group IV	- Modifications of normal design regarding tolerance classes, bearing radial or axial clearance, stability of dimensions at high temperatures, bearing matching etc. (e.g. 6206P5, 6310P53, NU210SO, 7010CDB).

These suffixes for bearing designation are listed considering the groups they belong to, at the beginning of each bearing group.

7. Mounting and dismounting

Proper operation of rolling bearings is also determined by a proper selection of the solution of mounting and dismounting, considering the type and size of bearing, fit, adequate tools for these operations, performance etc.

As being precision components, rolling bearings should be handled carefully when storing or mounting. Thus, the following conditions should be observed:

- storing in their original package, on special shelves, in dry room, temperature of $+18^{\circ}\text{C} \dots +20^{\circ}\text{C}$, maximum moisture degree of 60%
- handling bearings, while storing and mounting, should be carefully done so that original package to be protected and not to be deteriorated.
- bearings should be unpacked only when they are to be mounted.

They shouldn't be washed if original package hasn't been destroyed.

- as the adjoint parts of bearings are accurate, without burrs, chips or hits, special care should be taken

Mounting of bearings with cylindrical bore

Bearings with cylindrical bore which are to have tight fit on shaft or in housing respectively, will be mounted by mechanical, thermic or hydraulic means.

The pressing force should be transmitted only by the ring which is pressed on the shaft or into the housing bore. Transmission by rolling bearings should be avoided as they can get deformed and premature damage can occur.

Special sleeves with one or two ribs, fig.7.1, a and b are used when mounting small and medium-sized bearings, which are to be mounted with transition fit. In case of self-aligning ball bearings or spherical roller thrust bearings, a plate is mounted for a proper location of the outer ring, as shown in fig. 7.2.

Mechanical or hydraulic presses are used as shown in fig. 7.3, in case of serial production so that force can be continuously and gradually applied.

For the mounting of bearings with clearance fit into the housing or on the shaft, the ring with transition or tight fit should be mounted first, after which the shaft-bearing assembly will be mounted into the housing as shown in fig. 7.4, a and b.

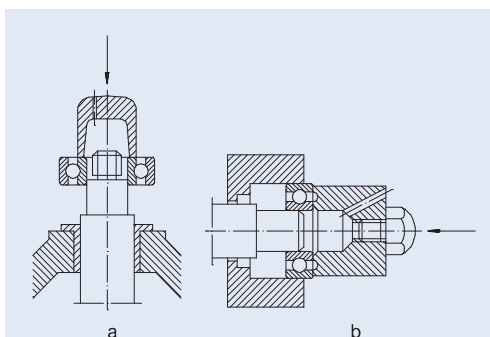


Fig. 7.1

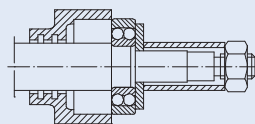


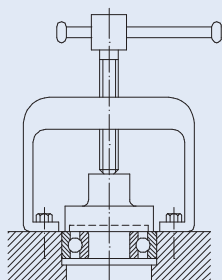
Fig. 7.2

In case of dismantlable bearings, rings can be mounted separately - fig. 7.5, even if a tight fit is required for both rings.

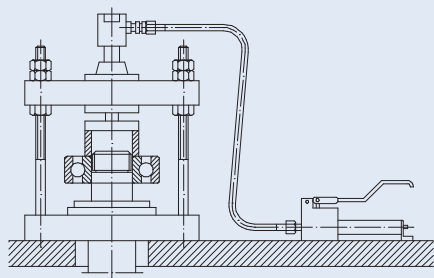
The mounting of medium ($d > 50 \text{ mm}$) and large-sized bearings with tight fit, requires much greater pressing forces. That's why in this case heating of bearings up to $+80^{\circ}\text{C} \dots +110^{\circ}\text{C}$ should be used instead of pressing, excepting shielded bearings, 2Z (2ZR) type and sealed bearings, 2RS (2RSR) type.

For the bearings heating, oil bath, electric range, heating device with thermic ring or induction heating device etc. can be used as shown in fig.7.6, a-d.

The device with thermic ring - fig.7.6 c consists of a split aluminium ring with three grips and cuts which make it be elastic.

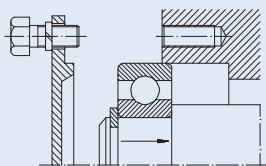


a

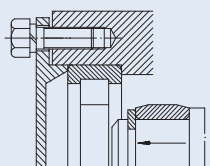


b

Fig. 7.3



a



b

Fig. 7.4

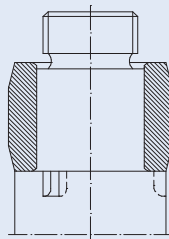


Fig. 7.5

Thermic ring bore diameter is equal to inner ring raceway diameter of dismountable bearings.

The ring outside diameter can be calculated using the equation:

$$D_{ex} = \sqrt{4 d_1^2 - 3d^2}, \text{ mm},$$

where:

D_{ex} = outside diameter of the thermic ring,

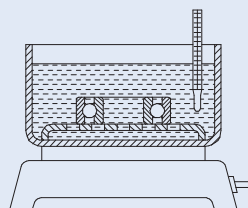
d_1 = diameter of the inner ring raceway, mm

d = bearing bore diameter, mm

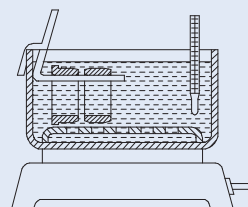
The weight of the thermic ring is approximately equal to the weight of the bearing inner ring.

In case of large-sized cylindrical roller bearings, heating is done with induction devices. These devices consist of a coil inductor, thermal relays for temperature adjustment and timers. 380 V voltage and 50 - 60 Hz frequency inductors are used for bearings with bore diameter up to 200 mm. For larger-sized bearings, 20... 40 V voltage and 50 - 60 Hz inductors are used.

This device is schematically shown in fig. 7.6.d.



a



b

Fig. 7.5

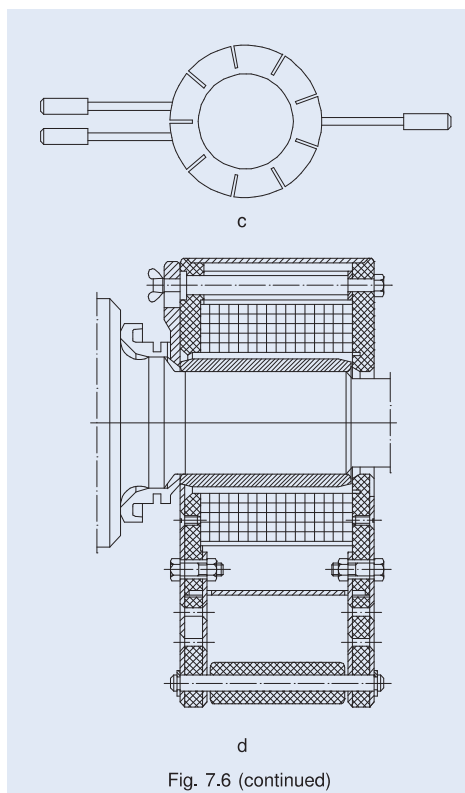


Fig. 7.6 (continued)

Mounting of bearings with tapered bore

Tapered bore bearings can be mounted directly on the shaft, on adapter sleeve or withdrawal sleeve. These bearings should always be mounted only with a tight fit. The tight fit can be done by an axial displacement of the bearing inner ring which is mounted directly on the

tapered spindle of the shaft or by an axial displacement of the adapter or withdrawal sleeve.

The values of reduction in radial clearance are given in tables 7.1 and 7.2, as function of axial displacement on shaft of self-aligning ball bearings and spherical roller thrust bearings. After mounting the initial radial clearance is to be considered.

After mounting, radial clearance of radial and self-aligning ball bearings are in accordance with table 7.1.

The values of tightening are estimated by the values of the radial clearance reduction or of axial displacement. Axial displacement of the mounted bearing is measured by means of a limit gauge, as shown in fig. 7.7, a and b. The thickness of the limit gauge can be calculated from:

$$m = S - a$$

where:

m = thickness of the limit gauge, mm

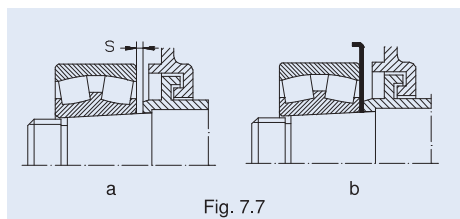


Fig. 7.7

S = distance initially measured, mm

a = axial displacement, from table 7.1, mm

Example

A bearing 22252, $d = 260$ mm, taper 1:12, distance $s=10$ mm, distance "a" from table 7.1 = 1,90 mm, $m = 10 - 1,9 = 8,10$ mm

Small-sized bearings with tapered bore which are to be mounted directly on the shaft or with adapter or withdrawal sleeves can be axially displaced by means of a nut as shown in fig. 7.8, a, or by means of a special sleeve as in fig. 7.8 b,c.

Medium-sized bearings can be axially displaced by means of a special nut as shown in fig. 7.9 and some screws. Then, the nut is to be dismantled and replaced with a nut for axial fastening.

Special hydraulic presses - fig. 7.10 or special hydraulic nuts - fig. 7.11 are used to mount medium and large-sized bearings.

Values for self-aligning ball bearings radial clearance, after mounting

Table 7.1

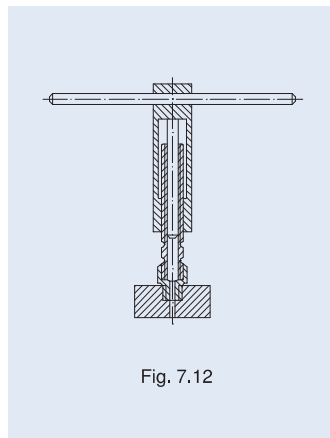
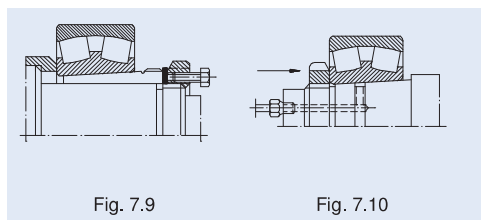
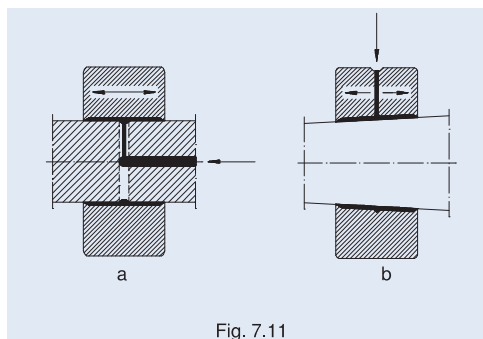
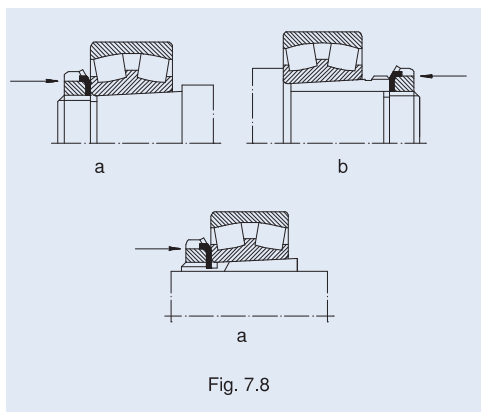
Bore diameter d		Reduction of radial clearance		Axial displacement "a", taper 1:12				Minimum radial clearance after mounting, in case of clearance group	
over	up to	low	high	low	high	low	high	normal	C3
—	20	0,003	0,010	0,22	0,23	0,24	0,25	0,01	0,02
20	30	0,005	0,010	0,22	0,23	0,23	0,24	0,01	0,02
30	40	0,009	0,015	0,30	0,30	0,32	0,32	0,01	0,02
40	50	0,010	0,016	0,31	0,34	0,35	0,37	0,015	0,025
50	65	0,012	0,018	0,39	0,41	0,40	0,42	0,015	0,03
65	80	0,015	0,025	0,43	0,47	0,45	0,50	0,02	0,04
80	100	0,022	0,030	0,54	0,60	0,56	0,62	0,02	0,04
100	120	0,025	0,035	0,58	0,70	0,60	0,75	0,025	0,055

Values for spherical roller bearings radial clearance, after mounting

Values in mm

Table 7,2

Bore diameter d		Reduction of radial clearance		Axial displacement a, taper 1:12				Axial displacement "a", taper 1:30				Minimum radial clearance after mounting, in case of clearance group		
				on tapered shaft		on tapered sleeve		on tapered shaft		on tapered sleeve				
over	up to	low	high	low	high	low	high	low	high	low	high	Normal	C3	C4
30	40	0,02	0,025	0,35	0,4	0,35	0,45	—	—	—	—	0,015	0,025	0,04
40	50	0,025	0,03	0,4	0,45	0,45	0,5	—	—	—	—	0,02	0,03	0,05
50	65	0,03	0,04	0,45	0,6	0,5	0,7	—	—	—	—	0,025	0,035	0,055
65	80	0,04	0,05	0,6	0,75	0,7	0,85	—	—	—	—	0,025	0,04	0,07
80	100	0,045	0,06	0,7	0,9	0,75	1	1,7	2,2	1,8	2,4	0,035	0,05	0,08
100	120	0,05	0,07	0,7	1,1	0,8	1,2	1,9	2,7	2	2,8	0,05	0,065	0,1
120	140	0,065	0,09	1,1	1,4	1,2	1,5	2,7	3,5	2,8	3,6	0,055	0,08	0,11
140	160	0,075	0,1	1,2	1,6	1,3	1,7	3	4	3,1	4,2	0,055	0,09	0,13
160	180	0,08	0,11	1,3	1,7	1,4	1,9	3,2	4,2	3,3	4,6	0,06	0,1	0,15
180	200	0,09	0,13	1,4	2	1,5	2,2	3,5	4,5	3,6	5	0,07	0,1	0,16
200	225	0,1	0,14	1,6	2,2	1,7	2,4	4	5,5	4,2	5,7	0,08	0,12	0,18
225	250	0,11	0,15	1,7	2,4	1,8	2,6	4,2	6	4,6	6,2	0,09	0,13	0,2
250	280	0,12	0,17	1,9	2,6	2	2,9	4,7	6,7	4,8	6,9	0,1	0,14	0,22
280	315	0,13	0,19	2	3	2,2	3,2	5	7,5	5,2	7,7	0,11	0,15	0,24
315	355	0,15	0,21	2,4	3,4	2,6	3,6	6	8,2	6,2	8,4	0,12	0,17	0,26
355	400	0,17	0,23	2,6	3,6	2,9	3,9	6,5	9	6,8	9,2	0,13	0,19	0,29



To reduce the bearing displacing force in case of large -sized bearings, pressurized oil is to be introduced between the tapered surfaces of the shaft spindle, bearing and b, by means of an oil pump - fig.7.10 or oil injector - fig. 7.12. One or more grooves should be provided as shown in fig. 7.13, a and b so that oil can be distributed between the mounting surfaces.

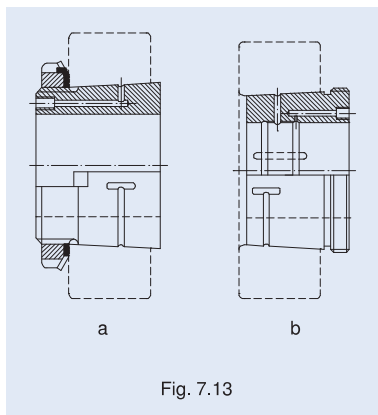


Fig. 7.13

Bearing dismounting

When bearings with tapered bore are to be dismounted from the shaft or housing, the succession of operations is inversely done than in case of mounting.

Thus, the assembly mounted with clearance fit or small tightening is to be dismounted first and then the parts mounted with greater tightening, as shown in fig. 7.14 and fig. 7.15.

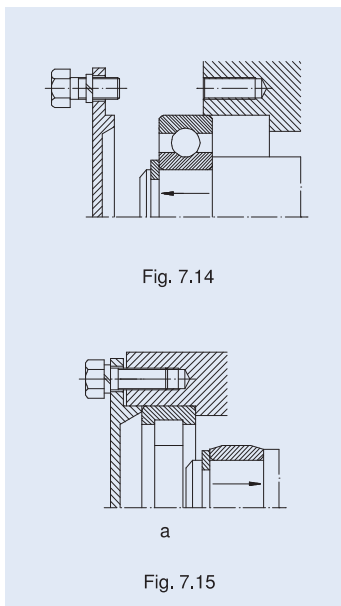


Fig. 7.14

Fig. 7.15

To use mechanical or hydraulic instruments, when dismounting bearings, a special design of the shaft and housing is required, as shown in fig. 7.16, a-c: withdrawal grooves (a) and (b), threaded bores (c), grooves for oil distribution, fig. 7.13.

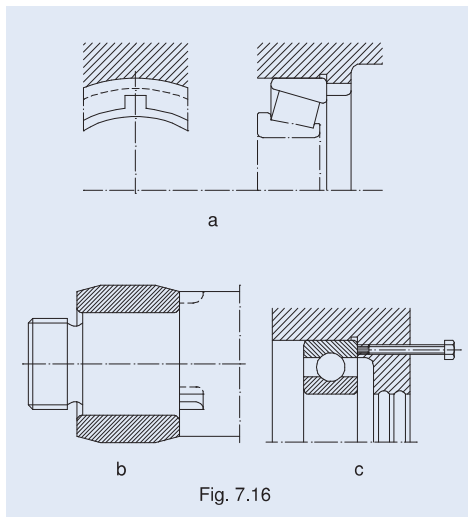


Fig. 7.16

Medium and small-sized bearings which are mounted with an tight fit are dismounted from the shaft by means of a soft steel or copper mandrel or by means of mechanical or hydraulic presses - fig.7.17, a-c.

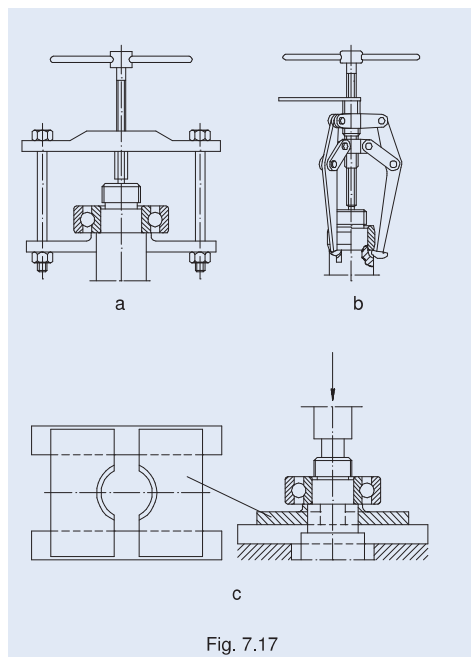


Fig. 7.17

To reduce the frictional force when dismounting large-sized bearings which were mounted on shaft with tight fit, pressurized oil should be introduced, as in case of mounting - fig.7.11.

To dismount bearings with tapered bore which were mounted directly on the shaft or bearings which were

mounted with withdrawal or adapter sleeves, the nut axially fastened should be first stripped. Then, dismantling is to be done by light hammering on the inner ring by means of a soft steel or copper mandrel, as shown in fig. 7.18, a and b.

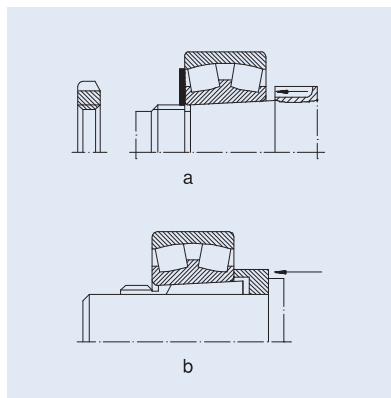


Fig. 7.18

In case of bearings mounted with withdrawal sleeves, a nut is to be screwed up on the threaded part provided for this purpose, as shown in fig. 7.19, a and b.

In case of large-sized bearings, hydraulic devices are used as in case of mounting.

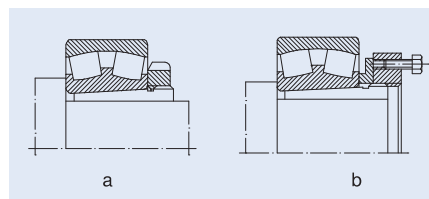


Fig. 7.19

Some solutions for dismantling bearings with tapered bore mounted directly on the shaft spindle, with adapter or withdrawal sleeve are given in fig. 7.20, a and b.

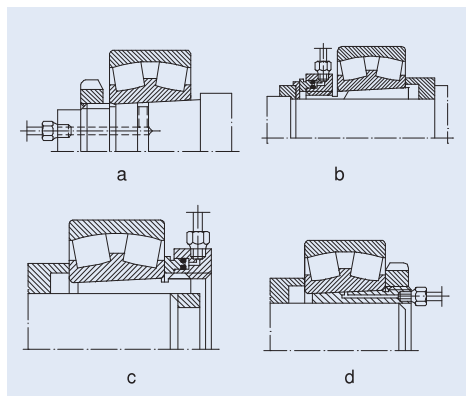


Fig. 11.20



Deep groove ball bearings



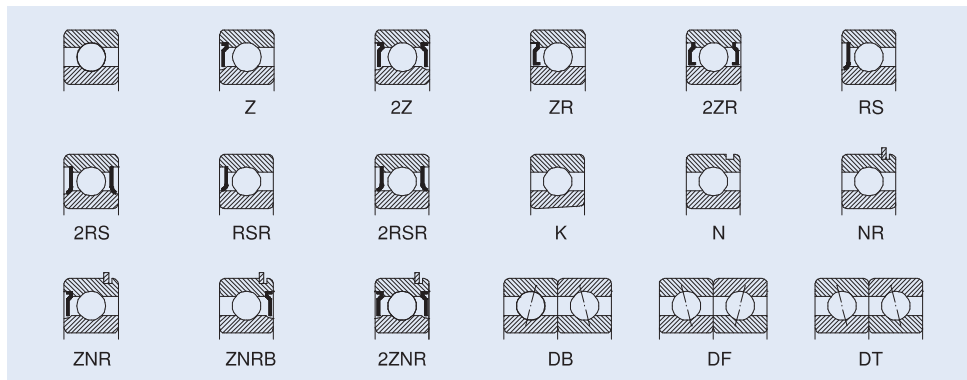
Deep groove ball bearings

Deep groove ball bearings are manufactured in a varied range, both of standard design and various constructive versions.

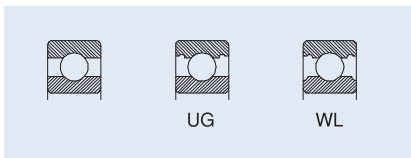
Deep groove ball bearings can take double direction radial

and axial loads and also allow good operation at high speeds.

For these reasons, they can be widely used. Therefore, single row deep groove ball bearings are manufactured in many constructive versions as shown below.



Besides deep groove ball bearings of basic design, bearings with UG design, with grooves on the outer ring and WL design, with grooves on both rings are also used for the purpose of mounting seals or shields on bearings, 2ZR, 2RSR or 2RS type, as shown in the bellow figure.



Suffixes

- A** - bearing with extended outer ring
- B** - bearing with extended inner ring
- C2** - radial clearance smaller than normal
- C3** - radial clearance larger than normal

- FA** - machined cage of steel or cast iron guided in the outer ring
- F2** - constructive modifications
- K** - bearing with tapered bore
- M** - machined cage of brass guided on the rolling elements
- MA** - machined cage of brass guided in the outer ring
- MB** - machined cage of brass guided on the inner ring
- N** - circular groove for snap ring on the outer ring
- NR** - circular groove on the outer ring and snap ring
- P0** - normal tolerance class (it is not marked)
- P6** - tolerance class more accurate than normal
- P63** - tolerance class P6 and radial clearance C3
- P5** - tolerance class more accurate than P6
- P4** - tolerance class more accurate than P5
- R** - rib on the outer ring
- RS** - bearing with seal on one side, with friction on the inner ring recess
- RSA** - bearing with special seal
- 2RS** - bearing with 2 seals, friction on the inner ring recess

- RSR** - bearing with seal on one side, friction on the rib of the inner ring
- 2RSR** - bearing with 2 seals, friction on the rib of the inner ring
- S0** - bearing which can operate up to a temperature of +150°C
- S1** - bearing which can operate up to a temperature of +200°C
- SP** - snap ring, diameter series 0, 2, 3, 4
- SR** - snap ring, dimension series 18 and 19
- T30** - bearing which can operate up to a temperature of +300°C, radial clearance 0,20...0,25 mm; phosphate-treated surfaces
- TN** - polyamide cage
- V** - bearing without cage
- Z** - bearing with shield and recess on the inner ring
- 2Z** - bearing with 2 shields and recess on the inner ring
- ZNRB** - bearing with shield and snap ring on the same side
- ZR** - bearing with shield, without recess on the inner ring
- 2ZR** - bearing with 2 shields, without recess on the inner ring

Sealed and shielded deep groove ball bearings

MTK manufactures two versions of sealed and shielded bearings, namely:

- bearings RS and Z type, with recess on the inner ring for sealing or shielding.

- bearings RSR and ZR type, when shielding and sealing respectively are done directly on the outside surface of the inner ring.

In case of bearings with non-rubbing shields, there is a small interstice between the shield and the rib of the inner ring; in case of bearings with seals, the gasoline and oil resistant elastic rubber lip rubs on the groove on the inner ring side or directly on the outside surface.

Bearings sealed and shielded on both sides manufactured in series are delivered filled with lithium base grease and are used at temperatures between -30°C and +110°C, in accordance with the specifications in chapter 5. Bearings can also be greased with special greases, relubrication not being necessary. Washing or heating are not allowed before bearing mounting in the assembly.

Bearings with shields have been designed first of all for cases when the inner ring rotates.

When the outer ring rotates, the lubricant can flow out of the bearing at a certain speed. In such cases, we recommend you to consult our experts.

Deep groove ball bearings with snap ring groove

Deep groove ball bearings, with snap ring groove on the outer ring can be located in the housing with snap rings.

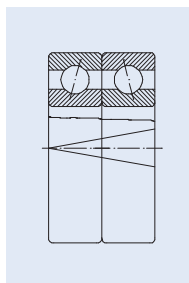
Because of their simple and space saving mounting, these bearings simplify the assembly design. The groove for the snap ring and the snap rings are in accordance with ISO 464 and tables 7 and 8 respectively.

Paired deep groove ball bearings

If the basic load of a single bearing is inadequate or the shaft has to be axially located in both directions with a certain clearance, paired deep groove ball bearings are recommended to be used.

These bearings can be delivered matched in pairs in three versions, as follows: DT (tandem arrangement), DB (back-to-back arrangement) or DF (face-to-face arrangement). They can be delivered with axial clearance or preload. The values of clearance or preload are given in table 2.

The producer marks "V" on the bearing outside surface as shown in the next figure, so that paired bearings to be correctly mounted.



The speed limit of these bearings can be calculated multiplying the speed of the basic bearing by 0,8.

Paired bearings are packed and delivered in the same box.

Stainless steel deep groove ball bearings

Deep groove ball bearings can be made and constructive version of stainless steel.

Dimensions

The overall dimensions of deep groove ball bearings are in accordance with the stipulations of ISO 15.

Misalignments

Deep groove ball bearings have limited abilities to compensate for bearing errors of alignment. The permissible misalignment between the outer ring and the inner ring, which will not produce inadmissible high additional loads in the bearing, depends on the bearing size, operational radial clearance, inner bearing design and also on the magnitude of loads and moments acting upon the bearing.

Because of the complex relationship of these influence factors, definite and universally valid values of permissible misalignment cannot be determined.

Considering the above mentioned factors, under normal operation conditions the permissible misalignments

are between 2 and 10 minutes of arc, depending on the bearing series and load.

It should be considered that misalignments of bearing rings in operation produce a considerably higher noise .

Tolerances

Deep groove ball bearings are generally manufactured to the normal tolerance class P0.

At request, they can also be manufactured to the tolerance classes P6, P5 or P4.

The values of tolerances are given in chapter 3 on page 24.

Radial and axial clearance

Deep groove ball bearings are generally manufactured with normal radial clearance. At request, they can also be manufactured with radial clearance different from the normal one, according to ISO 5753. The values of radial clearance are given in table 1.

Paired bearings can be manufactured with axial clearance (suffix A) or preloaded (suffix L). Values for axial clearance and preload are given in table 2.

If a certain axial clearance is prescribed, this has to be measured and marked on the bearing by "A", followed by clearance actual value.

Radial clearance of deep groove ball bearings

Table 1

Bore diameter		Clearance group symbol for bearings with cylindrical bore									
		C2		Normal		C3		C4		C5	
d		Clearance group symbol for bearings with tapered bore									
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		μm									
2,5	10	0	7	2	13	8	23	14	29	20	37
10	18	0	9	3	18	11	25	18	33	25	45
18	24	0	10	5	20	13	28	20	36	28	48
24	30	1	11	5	20	13	28	23	41	30	53
30	40	1	11	6	20	15	33	28	46	40	64
40	50	1	11	6	23	18	36	30	51	45	73
50	65	1	15	8	28	23	43	38	61	55	90
65	80	1	15	10	30	25	51	46	71	65	105
80	100	1	18	12	36	30	58	53	84	75	120
100	120	2	20	15	41	36	66	61	97	90	140
120	140	2	23	18	48	41	81	71	114	105	160
140	160	2	23	18	53	46	91	81	130	120	180
160	180	2	25	20	61	53	102	91	147	135	200
180	200	2	30	25	71	63	117	107	163	150	230
200	225	2	35	25	85	75	140	125	195	175	265
225	250	2	40	30	95	85	160	145	225	205	300
250	280	2	45	35	105	90	170	155	245	225	340
280	315	2	55	40	115	100	190	175	270	245	370
315	355	3	60	45	125	110	210	195	300	275	410
355	400	3	70	55	145	130	240	225	340	315	460

Axial clearance and mounting preload of paired bearings series 60, 62, 63

Table 2

Bore diameter d		Axial clearance (suffix A)		Preload (suffix L)		
over	up to	min.	max.	Bearing series		
				60	62	63
mm		μm		N		
—	10	15	35	30	30	—
10	18	20	40	50	50	100
18	30	25	45	100	100	100
30	50	35	55	100	100	200
50	80	40	70	200	200	350
80	120	50	80	300	400	600
120	180	60	100	500	700	900
180	250	70	110	800	1000	1200

Cages

Deep groove ball bearings are generally fitted with cages of pressed steel sheet.

Cages of glass fibre reinforced polyamide 6.6 are also suitable if the operating temperature doesn't exceed + 120°C. They have reduced weight, low coefficient of friction and are noiseless in operation. Large-sized bearings are fitted with machined brass cages.

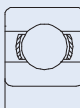
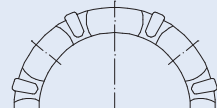
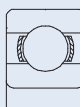
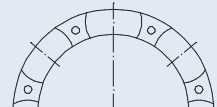
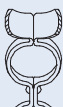
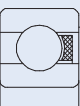
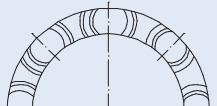
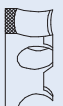
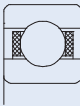
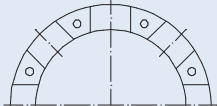
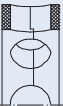
Cage design and some technical data are given in table 3.

Bearing minimum radial load

A minimum load must be applied on a deep groove ball bearing so that they can operate correctly, especially in case of operating under heavy loads.

Cage design and technical data

Table 3

Cage	Design bearing	cage	Application	Max. value Dm n			
				oil	grease		
Pressed sheet cage with fins				- General application - Bearings with d < 10 mm - Low frictional moment - Low inertia - Moderate speeds.	550× 10 ³	450× 10 ³	
Pressed cage of riveted sheet					- General application - Bearings with d > 10 mm - Low frictional moment - Low inertia - Moderate speeds.	1000× 10 ³	550× 10 ³
Polyamide cage					- General application - Low frictional moment - High speeds	1 400× 10 ³	1 100× 10 ³
Brass machined cage					- General application - Bearings: 61836-618/1400, 61936-619/950, 16036-16072, 6030-60/630, 6230-6248, 6320-6330.	1 000× 10 ³	800× 10 ³

The forces of inertia which occur in bearing as well as the friction in lubricant influence negatively the operating conditions and can cause detrimental sliding movements between balls and raceways.

Minimum radial load depends on the bearing size, speed and lubricant viscosity at operating temperature. It can be roughly calculated from the equation:

$$F_{r \min} = 0,01 C_r, \quad (C_r = \text{basic dynamic radial load}).$$

Equivalent dynamic radial load

Deep groove ball bearings can take also radial and axial combined loads.

For deep groove ball bearings, single or paired in tandem arrangement DT, equivalent dynamic radial load can be calculated using the equation:

$$P_r = F_r, \text{ kN}, \quad \text{when } F_a/F_r \leq e$$

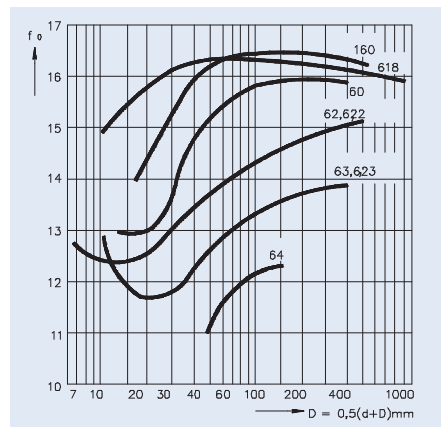
$$P_r = X F_r + Y F_a, \text{ kN}, \quad \text{when } F_a/F_r > e$$

The greater the axial load, the greater the contact angle of these bearings.

Factors e , X and Y depend on the ratio $f_0 F_a/C_0$. Factor f_0 can be determined using the diagram in the below figure, as a function of dimension series and mean diameter $(d+D)/2$. F_a

is the axial load and C_0 is the static basic load of the bearing.

The values of factors e , X , Y which depend on the bearing clearance can be determined from table 4, corresponding to the values of the ratio $f_0 F_a/C_0$. The values in table 4 apply to bearings mounted with normal fit, i.e. shafts manufactured to tolerance class j5 or k5 and housing in J6, respectively.



Calculation factors e, X and Y for deep groove ball bearings, single mounted or matched in tandem.
Table 4

$f_0 F_a / C_{0r}$	Normal radial clearance			Radial clearance C3			Radial clearance C4		
	e	X	Y	e	X	Y	e	X	Y
0,2	0,19	0,56	2,25	0,32	0,46	1,77	0,38	0,44	1,44
0,4	0,22	0,56	1,95	0,34	0,46	1,63	0,42	0,44	1,36
0,8	0,26	0,56	1,68	0,38	0,46	1,44	0,45	0,44	1,25
1,6	0,31	0,56	1,40	0,43	0,46	1,27	0,48	0,44	1,16
3	0,37	0,56	1,20	0,48	0,46	1,14	0,52	0,44	1,08
6	0,44	0,56	1,02	0,54	0,46	1	0,56	0,44	1

For bearings matched in DB or DT arrangement, equivalent dynamic radial load can be calculated using the equation:

$P_r = F_r + Y_1 F_a$, kN, when $F_a / F_r \leq e$,
 $P_r = 0,75 F_r + Y_2 F_a$, kN, when $F_a / F_r > e$.

The values of factors e, Y₁ and Y₂, as functions of ratio F_a / C_{0r} are given in table 5.

Equivalent static radial load

For deep groove ball bearings, single or matched in tandem (DT), equivalent static radial load can be calculated using the equations:

$P_0 = F_r$, kN, when $F_a / F_r \leq 0,8$
 $P_0 = 0,6 F_r + 0,5 F_a$, kN, when $F_a / F_r > 0,8$

For bearings matched in DB or DF arrangement, it can be calculated from:

$P_0 = F_r + 1,7 F_a$, kN

Calculation factors e,Y₁,Y₂ for DB and DF arrangements
Table 5

F_a / C_{0r}	e	Y ₁	Y ₂
0,03	0,32	2	2,8
0,10	0,4	1,55	2,2
0,25	0,47	3	1,65

Axial load

If deep groove ball bearings are purely axial loaded, the axial load should not exceed 0,5 C_{0r}. In case of small-sized bearings and bearings of light series (diameter series 8, 9, 0 and 1), the axial load should not exceed 0,25 C_{0r}.

Heavy axial loads cause a significant decrease of bearing rating life. In such cases, we recommend you to consult our experts.

Abutment dimensions

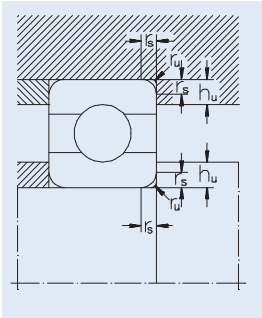
For a proper location of bearing rings on the shaft shoulder and housing shoulder, respectively, maximum shaft (housing) connection radius $r_{u \max}$ should be less than minimum bearing mounting chamfer $r_{s \min}$.

The shoulder should have the proper height corresponding to maximum bearing mounting chamfer.

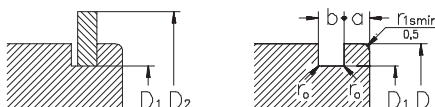
The values of the connection radius (r_u) and support shoulder height (h_u) as functions of mounting chamfers are given in table 6.

Abutment dimensions
Table 6

r_s min.	r_u max.	h_u min.	Bearing series	
			618,619, 160	161,60, 62,63
			64	
mm				
0,15	0,15	0,4	0,7	—
0,2	0,20	0,7	0,9	—
0,3	0,30	1	1,2	—
0,6	0,60	1,6	2,1	—
1	1	2,3	2,8	—
1,1	1	3	3,5	4,5
1,5	1,5	3,5	4,5	5,5
2	2	4,4	5,5	6,5
2,1	2,1	5,1	6	7
3	2,5	6,2	7	8
4	3	7,3	8,5	10
5	4	9	10	12
6	5	11,5	13	15
7,5	6	14	—	—



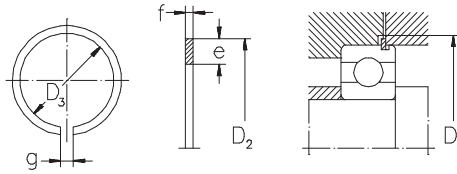
Snap ring groove and snap ring dimensions and tolerances



Snap ring groove

Outer diameter D	D ₁		a		Dimensions series		b		r ₀	
	nom.	toler.	nom.	toler.	nom.	toler.	nom.	toler.	nom.	toler.
mm										
22	20,8	-0,3	-	-	1,05	-0,15	0,8	+0,25	0,2	-0,1
24	22,8	-0,3	-	-	1,05	-0,15	0,8	+0,25	0,2	-0,1
28	26,7	-0,3	-	-	1,3	-0,15	0,95	+0,25	0,25	-0,12
30	28,7	-0,3	-	-	1,3	-0,15	0,95	+0,25	0,25	-0,12
32	30,7	-0,3	1,3	-0,15	-	-	0,95	+0,25	0,25	-0,12
34	32,7	-0,3	1,3	-0,15	-	-	0,95	+0,25	0,25	-0,12
37	35,7	-0,3	1,3	-0,15	1,7	-0,15	0,95	+0,25	0,25	-0,12
39	37,7	-0,3	-	-	1,7	-0,15	0,95	+0,25	0,25	-0,12
40	38,7	-0,3	1,3	-0,15	-	-	0,95	+0,25	0,25	-0,12
42	40,7	-0,3	1,3	-0,15	1,7	-0,15	0,95	+0,25	0,25	-0,12
44	42,7	-0,3	1,3	-0,15	-	-	0,95	+0,25	0,25	-0,12
45	43,7	-0,3	-	-	1,7	-0,15	0,95	+0,25	0,25	-0,12
47	45,7	-0,3	1,3	-0,15	1,7	-0,15	0,95	+0,25	0,25	-0,12
52	50,7	-0,3	1,3	-0,15	1,7	-0,15	0,95	+0,25	0,25	-0,12
55	53,7	-0,3	-	-	1,7	-0,15	0,95	+0,25	0,25	-0,12
58	56,7	-0,3	1,3	-0,15	-	-	0,95	+0,25	0,25	-0,12
62	60,7	-0,4	-	-	1,7	-0,15	0,95	+0,25	0,25	-0,12
65	63,7	-0,4	1,3	-0,15	-	-	0,95	+0,25	0,25	-0,12
68	66,7	-0,4	-	-	1,7	-0,15	0,95	+0,25	0,25	-0,12
72	70,7	-0,4	1,7	-0,15	1,7	-0,15	0,95	+0,25	0,25	-0,12
78	76,2	-0,4	1,7	-0,15	-	-	1,3	+0,3	0,4	-0,2
80	77,9	-0,4	-	-	2,1	-0,2	1,3	+0,3	0,4	-0,2
85	82,9	-0,4	1,7	-0,15	2,1	-0,2	1,3	+0,3	0,4	-0,2
90	87,9	-0,4	1,7	-0,15	2,1	-0,2	1,3	+0,3	0,4	-0,2
95	92,9	-0,4	1,7	-0,15	-	-	1,3	+0,3	0,4	-0,2
100	97,9	-0,4	1,7	-0,15	2,5	-0,2	1,3	+0,3	0,4	-0,2
105	102,6	-0,5	-	-	2,5	-0,2	1,3	+0,3	0,4	-0,2
110	107,6	-0,5	2,1	-0,2	2,5	-0,2	1,3	+0,3	0,4	-0,2
115	112,6	-0,5	2,1	-0,2	-	-	1,3	+0,3	0,4	-0,2
120	117,6	-0,5	2,1	-0,2	3,3	-0,2	1,3	+0,3	0,4	-0,2
125	122,6	-0,5	2,1	-0,2	3,3	-0,2	1,3	+0,3	0,4	-0,2
130	127,6	-0,5	2,1	-0,2	3,3	-0,2	1,3	+0,3	0,4	-0,2
140	137,6	-0,5	2,5	-0,2	3,3	-0,2	1,9	+0,3	0,6	-0,2
145	142,6	-0,5	-	-	3,3	-0,2	1,9	+0,3	0,6	-0,3
150	147,6	-0,5	2,5	-0,2	3,3	-0,2	1,9	+0,3	0,6	-0,3
165	161,8	-0,5	3,3	-0,2	3,7	-0,2	1,9	+0,3	0,6	-0,3
175	171,8	-0,5	3,3	-0,2	-	-	1,9	+0,3	0,6	-0,3
180	176,8	-0,5	-	-	3,7	-0,2	1,9	+0,3	0,6	-0,3
190	186,8	-0,5	3,3	-0,2	3,7	-0,2	1,9	+0,3	0,6	-0,3
200	196,8	-0,5	3,3	-0,2	-	-	1,9	+0,3	0,6	-0,3

The outer ring chamfer on the side of snap ring groove should allow a housing connection radius of:
0,3 mm for dimension series 18, up to D = 78 mm included and for dimension series 19, up to D = 47 mm included;
0,5 mm for dimension series 18, for D > 78 mm and for dimension series 19, for D > 47 mm



Snap ring

Table 7

Outer diameter	D ₂ ¹⁾	D ₃ ²⁾		D ₄	e	f	g	r	Weight	Snap ring designation
D	max.	nom.	toler.	min.	nom.	nom.	nom.	min.		
mm									g	–
22	24,8	20,5	– 0,3	25	2	0,7	2	0,2	0,812	SR22
24	26,8	22,5	– 0,3	28	2	0,7	2	0,2	0,886	SR24
28	30,8	26,4	– 0,3	32	2,05	0,85	3	0,2	1,269	SR28
30	32,8	28,3	– 0,3	34	2,05	0,85	3	0,2	1,39	SR30
32	34,8	30,3	– 0,3	36	2,05	0,85	3	0,2	1,483	SR32
34	36,8	32,3	– 0,3	38	2,05	0,85	3	0,2	1,577	SR34
37	39,8	35,3	– 0,3	41	2,05	0,85	3	0,2	1,718	SR37
39	41,8	37,3	– 0,3	43	2,05	0,85	3	0,2	1,811	SR39
40	42,8	38,3	– 0,3	44	2,05	0,85	3	0,2	1,858	SR40
42	44,8	40,3	– 0,4	46	2,05	0,85	3	0,2	1,952	SR42
44	46,8	42,3	– 0,4	48	2,05	0,85	4	0,2	2,032	SR44
45	47,8	43,3	– 0,4	49	2,05	0,85	4	0,2	2,079	SR45
47	49,8	45,3	– 0,4	51	2,05	0,85	4	0,2	2,173	SR47
52	54,8	50,3	– 0,4	56	2,05	0,85	4	0,2	2,407	SR52
55	57,8	53,3	– 0,4	59	2,05	0,85	4	0,2	2,547	SR55
58	60,8	56,3	– 0,6	62	2,05	0,85	4	0,2	2,688	SR58
62	64,8	60,2	– 0,6	66	2,05	0,85	4	0,2	2,938	SR62
65	67,8	63,2	– 0,6	69	2,05	0,85	4	0,2	3,081	SR65
68	70,8	66,2	– 0,6	72	2,05	0,85	5	0,2	3,212	SR68
72	74,8	70,2	– 0,6	76	2,05	0,85	5	0,2	3,403	SR72
78	82,7	75,7	– 0,6	84	3,25	1,12	5	0,4	7,462	SR78
80	84,4	77,4	– 0,6	86	3,25	1,12	5	0,4	7,625	SR80
85	89,4	82,4	– 0,6	91	3,25	1,12	5	0,4	8,105	SR85
90	94,4	87,4	– 0,6	96	3,25	1,12	5	0,4	8,585	SR90
95	99,4	92,4	– 0,6	101	3,25	1,12	5	0,4	9,065	SR95
100	104,4	97,4	– 0,6	106	3,25	1,12	5	0,4	9,545	SR100
105	110,7	101,9	– 0,8	112	4,04	1,12	5	0,4	12,653	SR105
110	115,7	106,9	– 0,8	117	4,04	1,12	5	0,4	13,257	SR110
115	120,7	111,9	– 0,8	122	4,04	1,12	5	0,4	13,861	SR115
120	125,7	116,9	– 0,8	127	4,04	1,12	7	0,4	14,393	SR120
125	130,7	121,8	– 0,8	132	4,04	1,12	7	0,4	15,164	SR125
130	135,7	126,8	– 0,8	137	4,04	1,12	7	0,4	15,774	SR130
140	145,7	136,8	– 1	147	4,04	1,7	7	0,4	25,796	SR140
145	150,7	141,8	– 1	152	4,04	1,7	7	0,6	26,722	SR145
150	155,7	146,8	– 1,2	157	4,04	1,7	7	0,6	27,648	SR150
165	171,5	161	– 1,2	173	4,85	1,7	7	0,6	35,89	SR165
175	181,5	171	– 1,2	183	4,85	1,7	10	0,6	37,883	SR175
180	186,5	176	– 1,2	187	4,85	1,7	10	0,6	38,976	SR180
190	196,5	186	– 1,4	198	4,85	1,7	10	0,6	41,162	SR190
200	206,5	196	– 1,4	208	4,85	1,7	10	0,6	43,348	SR200

1) D₂ dimension refers to the mounted snap ring

2) D₃ represents dimension before mounting

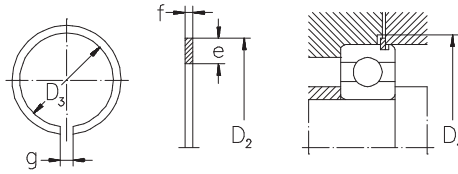
Snap ring groove and snap ring dimensions and tolerances



Snap ring groove

Outer diameter D	D1		a		Dimensions series		b		r0	
	nom.	toler.	60 nom.	toler.	62, 63, 64 nom.	toler.	nom.	toler.	nom.	toler.
mm										
30	28,17	-0,25				-0,3				
32	30,15	-0,25	2	-0,15	1,35	+0,3	0,4	-0,2		
35	33,17	-0,25	2	-0,15	1,35	+0,3	0,4	-0,2		
40	38,10	-0,25				-0,2				
42	39,75	-0,25	2	-0,15	1,35	+0,3	0,4	-0,2		
47	44,60	-0,25	2	-0,15	0,35	+0,3	0,4	-0,2		
52	49,73	-0,25	2	-0,15	1,35	+0,3	0,4	-0,2		
55	52,60	-0,25	2			-0,2				
62	59,61	-0,5	2,08	-0,2	3,28	-0,2	1,90	+0,3	0,6	-0,3
68	64,82	-0,5	2,49	-0,2	3,28	-0,2	1,90	+0,3	0,6	-0,3
72	68,81	-0,5			3,28	-0,2	1,90	+0,3	0,6	-0,3
75	71,83	-0,5	2,49	-0,2	3,28	-0,2	1,90	+0,3	0,6	-0,3
80	76,81	-0,5	2,49	-0,2	3,28	-0,2	1,90	+0,3	0,6	-0,3
85	81,81	-0,5			3,28	-0,2	1,90	+0,3	0,6	-0,3
90	86,79	-0,5	2,87	-0,2	3,28	-0,2	2,70	+0,3	0,6	-0,3
95	91,82	-0,5			2,87	-0,2	2,70	+0,3	0,6	-0,3
100	96,80	-0,5	2,87	-0,2	3,28	-0,2	2,70	+0,3	0,6	-0,3
110	106,81	-0,5	2,87	-0,2	3,28	-0,2	2,70	+0,3	0,6	-0,3
115	111,81	-0,5	2,87	-0,2			2,70	+0,3	0,6	-0,3
120	115,21	-0,5			4,06	-0,2	3,10	+0,3	0,6	-0,3
125	120,22	-0,5	2,87	-0,2	4,06	-0,2	3,10	+0,3	0,6	-0,3
130	125,22	-0,5	2,87	-0,2	4,06	-0,2	3,10	+0,3	0,6	-0,3
140	135,23	-0,5	3,71	-0,25	4,90	-0,25	3,10	+0,3	0,6	-0,3
145	140,23	-0,5	3,71	-0,25			3,10	+0,3	0,6	-0,3
150	145,24	-0,5	3,71	-0,25	4,90	-0,25	3,10	+0,3	0,6	-0,3
160	155,22	-0,5	3,71	-0,25	4,90	-0,25	3,10	+0,3	0,6	-0,3
170	163,65	-0,5	3,71	-0,25	5,69	-0,25	3,50	+0,3	0,6	-0,3
180	173,66	-0,5	3,71	-0,25	5,69	-0,25	3,50	+0,3	0,6	-0,3
200	193,65	-0,5	5,69	-0,25	5,69	-0,25	3,50	+0,3	0,6	-0,3

The outer ring chamfer on the side of snap ring groove should allow a housing connection radius of:
0,3 mm for dimension series 18, up to D = 78 mm included and for dimension series 19, up to D = 47 mm included;
0,5 mm for dimension series 18, for D > 78 mm and for dimension series 19, for D > 47 mm



Snap ring

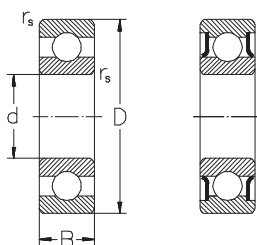
Table 8

Outer diameter	D ₂ ¹⁾	D ₃ ²⁾		D ₄	e	f	g	r	Weight	Snap ring designation
D	max.	nom.	toler.	min.	nom.	nom.	nom.	min.		
mm									g	–
30	34,7	27,9	– 0,4	36	3,25	1,12	3	0,4	2,78	SP30
32	36,7	29,9	– 0,4	38	3,25	1,12	3	0,4	2,98	SP32
35	39,7	32,9	– 0,4	41	3,25	1,12	3	0,4	3,22	SP35
40	44,6	37,8	– 0,4	46	3,25	1,12	3	0,4	3,60	SP40
42	46,3	39,5	– 0,5	47	3,25	1,12	3	0,4	3,75	SP42
47	52,7	44,3	– 0,5	54	4,04	1,12	4	0,4	5,30	SP47
52	57,9	49,4	– 0,5	59	4,04	1,12	4	0,4	5,92	SP52
55	60,7	52,3	– 0,5	62	4,04	1,12	4	0,4	6,17	SP55
62	67,7	59,0	– 0,6	69	4,04	1,70	4	0,6	10,5	SP62
68	74,6	64,2	– 0,6	76	4,85	1,70	5	0,6	12,6	SP68
72	78,6	68,2	– 0,6	80	4,85	1,70	5	0,6	14,7	SP72
75	81,6	71,2	– 0,6	83	4,85	1,70	5	0,6	15,3	SP75
80	86,6	76,2	– 0,6	88	4,85	1,70	5	0,6	16,3	SP80
85	91,6	81,2	– 0,6	93	4,85	1,70	5	0,6	17,5	SP85
90	96,5	86,2	– 0,6	98	4,85	2,46	5	0,6	26,6	SP90
95	101,6	91,2	– 0,6	103	4,85	2,46	5	0,6	28,2	SP95
100	106,5	96,2	– 0,8	108	4,85	2,46	5	0,6	29,2	SP100
110	116,6	106,2	– 0,8	118	4,85	2,46	5	0,6	32,8	SP110
115	121,6	111,2	– 0,8	123	4,85	2,46	5	0,6	34,4	SP115
120	129,7	114,6	– 0,8	131	7,21	2,82	7	0,6	60,6	SP120
125	134,7	119,6	– 0,8	136	7,21	2,82	7	0,6	63,0	SP125
130	139,7	124,6	– 0,8	141	7,21	2,82	7	0,6	65,6	SP130
140	149,7	134,6	– 1,2	151	7,21	2,82	7	0,6	70,6	SP140
145	154,7	139,6	– 1,2	156	7,21	2,82	7	0,6	73,0	SP145
150	159,7	144,5	– 1,2	161	7,21	2,82	7	0,6	77,2	SP150
160	169,7	154,5	– 1,2	172	7,21	2,82	7	0,6	81,0	SP160
170	182,9	162,9	– 1,2	185	9,60	3,10	10	0,6	122	SP170
180	192,9	172,8	– 1,2	195	9,60	3,10	10	0,6	128	SP180
200	212,9	192,8	– 1,4	215	9,60	3,10	10	0,6	148	SP200

1) D₂ dimension refers to the mounted snap ring

2) D₃ represents dimension before mounting

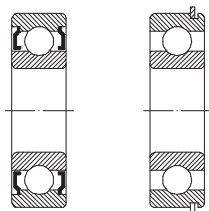
Deep groove ball bearings



2RSR

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
3	10	4	0,1	0,64	0,23	40 000	48 000	623		0,002
	10	4	0,1	0,64	0,23	40 000		623 2ZR		0,002
4	13	5	0,2	1,3	0,49	38 000	45 000	624		0,003
	13	5	0,2	1,3	0,49	38 000		624 2ZR		0,003
	16	5	0,3	1,2	0,5	34 000	40 000	634		0,005
	16	5	0,3	1,2	0,5	34 000		634 2ZR		0,005
	16	5	0,3	1,2	0,5	34 000				
5	11	3	0,1	0,64	0,26	55 000	65 000	618/5		0,001
	16	5	0,3	1,9	0,69	34 000	40 000	625		0,005
	16	5	0,3	1,9	0,69	34 000		625 2ZR		0,005
	16	5	0,3	1,9	0,69	22 000		625 2RSR		0,005
	19	6	0,3	1,7	0,72	32 000	38 000	635		0,009
	19	6	0,3	1,7	0,72	32 000		635 2ZR		0,009
6	13	3,5	0,1	1	0,44	50 000	59 000	618/6		0,002
	15	5	0,2	1,45	0,6	47 000	56 000	619/6		0,004
	19	6	0,3	2,2	0,89	32 000	38 000	626		0,008
	19	6	0,3	2,2	0,89	32 000		626 2ZR		0,008
	19	6	0,3	2,2	0,89	22 000		626 2RSR		0,008
7	14	3,5	0,1	0,96	0,4	47 000	56 000	618/7		0,002
	17	5	0,3	2,1	0,8	44 000	51 000	619/7Y		0,005
	19	6	0,3	2,25	0,89	32 000	38 000	607		0,008
	19	6	0,3	2,25	0,89	32 000		607 2ZR		0,008
	19	6	0,3	2,25	0,89	22 000		607 2RSR		0,008
	22	7	0,3	3,3	1,35	30 000	36 000	627		0,012
	22	7	0,3	3,3	1,35	30 000		627 2ZR		0,012
	22	7	0,3	3,3	1,35	20 000		627 2RSR		0,012
8	16	4	0,2	1,35	0,57	44 000	51 000	618/8		0,003
	19	6	0,3	1,6	0,74	40 000	47 000	619/8		0,007
	22	7	0,3	3,3	1,35	30 000	36 000	608		0,015
	22	7	0,3	3,3	1,35	30 000		608 2ZR		0,015
	22	7	0,3	3,3	1,35	20 000		608 2RSR		0,015
9	17	4	0,2	1,45	0,64	40 000	47 000	618/9		0,003
	20	6	0,3	2,65	1,1	37 000	43 000	619/9		0,007
	24	7	0,3	3,35	1,4	30 000	36 000	609		0,018
	24	7	0,3	3,35	1,4	30 000		609 2ZR		0,018
	24	7	0,3	3,35	1,4	20 000		609 2RSR		0,018
	26	8	0,3	4,55	1,95	28 000	34 000	629		0,020
	26	8	0,3	4,55	1,95	26 000		629 2ZR		0,020
	26	8	0,3	4,55	1,95	18 000		629 2RSR		0,020

Deep groove ball bearings

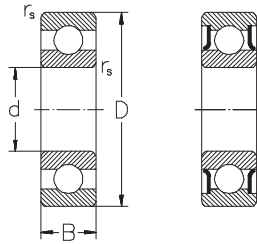


2ZR

NR

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		—		kg
10	19	5	0,3	1,7	0,83	37 000	43 000	61800		0,005
	22	6	0,3	1,95	0,75	34 000	41 000	61900 TN		0,010
	26	8	0,3	4,55	1,95	28 000	34 000	6000 TN		0,020
	26	8	0,3	4,55	1,95	28 000		6000 2ZR		0,020
	26	8	0,3	4,55	1,95	17 000		6000 2RSR		0,020
	28	8	0,3	4,55	1,95	28 000	34 000	16100		0,023
	30	9	0,6	5,1	2,4	32 000	38 000	6200TN		0,032
	30	9	0,6	5,1	2,4	26 000		6200 2ZR		0,032
	30	9	0,6	5,1	2,4	17 000		6200 2RSR		0,032
	35	11	0,6	8,1	3,45	20 000	26 000	6300		0,057
	35	11	0,6	8,1	3,45	20 000		6300 2ZR		0,057
	35	11	0,6	8,1	3,45	14 000		6300 2RSR		0,057
	21	5	0,3	1,8	0,95	33 000	39 000	61801		0,006
	21	5	0,3	1,45	0,67	33 000	39 000	61801 NR	SR21	0,006
12	24	6	0,3	2,9	1,45	31 000	36 000	61901		0,011
	24	6	0,3	2,9	1,45	31 000	36 000	61901 NR	SR24	0,011
	28	8	0,3	5,1	2,4	26 000	32 000	6001		0,022
	28	8	0,3	5,1	2,4	26 000	32 000	6001 TN		0,022
	28	8	0,3	5,1	2,4	26 000		6001 2ZR		0,022
	28	8	0,3	5,1	2,4	17 000		6001 2RSR		0,022
	30	8	0,3	5,1	2,4	26 000	32 000	16101		0,026
	32	10	0,6	6,8	3,05	22 000	28 000	6201		0,037
	32	10	0,6	6,8	3,05	22 000	28 000	6201TN		0,037
	32	10	0,6	6,8	3,05	22 000		6201 2ZR		0,037
	32	10	0,6	6,8	3,05	15 000		6201 2RSR		0,037
	32	14	0,6	6,8	3,05	22 000		62201 2RSR		0,049
	37	12	1	9,65	4,15	19 000	24 000	6301		0,065
	37	12	1	9,65	4,15	19 000		6301 2ZR		0,065
	37	12	1	9,65	4,15	12 000		6301 2RSR		0,065
15	24	5	0,3	2	1,25	28 000	33 000	61802		0,007
	24	5	0,3	2	1,25	28 000	33 000	61802 NR	SR24	0,007
	28	7	0,3	4	2,05	26 000	30 000	61902		0,017
	28	7	0,3	4	2,05	26 000	30 000	61902 NR	SR28	0,017
	30	8	0,3	4	2,05	22 000	28 000	16002		0,037
	32	9	0,3	5,6	2,85	22 000	28 000	6002		0,031
	32	9	0,3	5,6	2,85	22 000		6002 2ZR		0,031
	32	9	0,3	5,6	2,85	14 000		6002 2RSR		0,031
	35	11	0,6	7,65	3,75	19 000	24 000	6202		0,046
	35	11	0,6	7,65	3,75	19 000		6202 2ZR		0,046

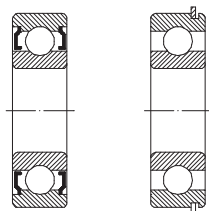
Deep groove ball bearings



2RSR

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
15	35	11	0,6	7,65	3,75	19 000	24 000	6202 TN		0,046
	35	11	0,6	7,65	3,75	13 000		6202 2RSR		0,046
	35	14	0,6	7,65	3,75	19 000		62202 2RSR		0,053
	42	13	1	11,4	5,45	17 000	20 000	6302		0,092
	42	13	1	11,4	5,45	17 000		6302 2ZR		0,092
	42	13	1	11,4	5,45	11 000		6302 2RSR		0,092
	42	17	1	11,4	5,45	17 000		62302 2RSR		0,099
	26	5	0,3	2,2	1,4	26 000	32 000	61803		0,009
	30	7	0,3	4,35	2,3	26 000	32 000	61903		0,018
	35	8	0,3	6	3,25	20 000	26 000	16003		0,040
17	35	10	0,3	6	3,25	20 000	26 000	6003		0,042
	35	10	0,3	6	3,25	20 000		6003 2ZR		0,042
	35	10	0,3	6	3,25	12 000		6003 2RSR		0,042
	40	12	0,6	9,55	4,8	17 000	20 000	6203		0,070
	40	12	0,6	9,55	4,8	17 000	20 000	6203 TN		0,070
	40	12	0,6	9,55	4,8	17 000		6203 2ZR		0,070
	40	12	0,6	9,55	4,8	11 000		6203 2RSR		0,070
	40	12	0,6	9,55	4,8	17 000	20 000	6203 NR	SP40	0,070
	40	16	1	9,55	4,8	17 000	20 000	62203 2RSR		0,082
	47	14	1	13,4	6,55	16 000	19 000	6303		0,120
	47	14	1	13,4	6,55	16 000		6303 2ZR		0,120
	47	14	1	13,4	6,55	11 000		6303 2RSR		0,120
	47	19	1	13,4	6,55	16 000		62303 2RSR		0,145
	62	17	1,1	22,5	11	12 000	15 000	6403		0,285
	62	17	1,1	22,5	11	12 000	15 000	6403 NR	SP62	0,285
	32	7	0,3	3,45	2,25	20 000	26 000	61804		0,020
	32	7	0,3	3,45	2,25	21 000	25 000	61804 NR	SR32	0,020
	37	9	0,3	6,55	3,65	19 000	23 000	61904		0,036
	37	9	0,3	6,55	3,65	19 000	23 000	61904 NR	SR37	0,036
	42	8	0,3	7,95	4,5	17 000	20 000	16004		0,050
20	42	12	0,6	9,4	5,05	17 000	20 000	6004		0,070
	42	12	0,6	9,4	5,05	17 000		6004 2ZR		0,070
	42	12	0,6	9,4	5,05	11 000		6004 2RSR		0,070
	47	14	1	12,8	6,65	15 000	18 000	6204		0,118
	47	14	1	12,8	6,65	15 000	18 000	6204 TN		0,118
	47	14	1	12,8	6,65	15 000		6204 2ZR		0,118
	47	14	1	12,8	6,65	10 000		6204 2RSR		0,118
	47	14	1	12,8	6,65	15 000	18 000	6204 NR	SP47	0,118
	47	18	1	12,8	6,65	15 000		62204 2RSR		0,131

Deep groove ball bearings

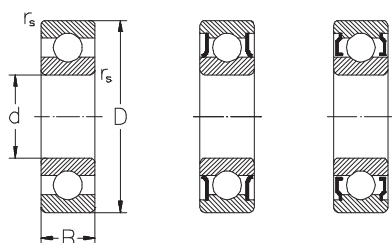


2ZR

NR

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		—		kg
20	52	15	1,1	15,9	7,9	13 000	16 000	6304	SP52	0,158
	52	15	1,1	15,9	7,9	13 000	16 000	6304 TN		0,158
	52	15	1,1	15,9	7,9	13 000	16 000	6304 MAP5		0,158
	52	15	1,1	15,9	7,9	13 000		6304 2ZR		0,158
	52	15	1,1	15,9	7,9	8 000		6304 2RSR		0,158
	52	15	1,1	15,9	7,9	13 000	16 000	6304 NR		0,158
	52	21	1,1	15,9	7,9	13 000		62304 2RSR		0,197
	72	19	1,1	31	15,2	10 000	13 000	6404		0,420
	50	14	1	12,9	6,8	15 000	17 000	62/22		0,118
	50	14	1	12,9	6,8	15 000		62/22 2ZR		0,118
22	50	14	1	12,9	6,8	15 000		62/22 2RSR	SP52	0,118
	56	16	1,1	18,5	9,5	13 000	15 000	63/22		0,201
	56	16	1,1	18,5	9,5	13 000		63/22 2ZR		0,201
	56	16	1,1	18,5	9,5	13 000		63/22 2RSR		0,201
	37	7	0,3	4,35	2,6	18 000	25 000	61805		0,022
	42	9	0,3	6,65	4,1	16 000	19 000	61905		0,041
	47	8	0,3	8,4	5,1	15 000	18 000	16005		0,058
	47	12	0,6	10,1	5,85	15 000	18 000	6005 TN		0,086
	47	12	0,6	10,1	5,85	15 000		6005 2ZR		0,086
	47	12	0,6	10,1	5,85	9 500		6005 2RSR		0,086
25	52	15	1	14	7,85	12 000	15 000	6205	SP52	0,142
	52	15	1	14	7,85	12 000		6205 2ZR		0,142
	52	15	1	14	7,85	8 000		6205 2RSR		0,142
	52	15	1	14	7,85	12 000	15 000	6205 NR		0,142
	52	18	1	14	7,85	12 000		62205 2RSR		0,148
	62	17	1,1	20,6	11,3	11 000	14 000	6305		0,250
	62	17	1,1	20,6	11,3	11 000	14 000	6305 MAP5		0,250
	62	17	1,1	20,6	11,3	11 000		6305 2ZR		0,250
	62	17	1,1	20,6	11,3	7 500		6305 2RSR		0,250
	62	17	1,1	20,6	11,3	11 000	14 000	6305 NR		0,250
28	62	24	1,1	20,6	11,3	11 000		62305 2RSR	SP62	0,317
	80	21	1,5	37	18,8	9 000	11 000	6405		0,575
	80	21	1,5	37	18,8	9 000	11 000	6405 NR	SP80	0,575
	58	16	1	10,7	6,65	14 000	16 000	62/28		0,173
	58	16	1	10,7	6,65	14 000		62/28 2ZR		0,173
	58	16	1	10,7	6,65	14 000		62/28 2RSR		0,173
	68	18	1,1	19,5	11,5	10 000	12 000	63/28		0,328
	68	18	1,1	19,5	11,5	10 000		63/28 2ZR		0,328

Deep groove ball bearings

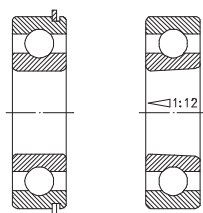


2RSR

2ZR

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
28	68	18	1,1	19,5	11,5	10 000		63/28 2RSR		0,328
30	42	7	0,3	4,4	2,9	15 000	18 000	61806	SR42	0,027
	42	7	0,3	4,4	2,9	15 000	18 000	61806 NR		0,027
	47	9	0,3	7,8	4,7	14 000	17 000	61906	SR47	0,045
	47	9	0,3	7,8	4,7	14 000	17 000	61906 NR		0,045
	55	9	3	11,2	7,35	12 000	15 000	16006		0,087
	55	13	1	13,2	8,25	12 000	15 000	6006TN		0,129
	55	13	1	13,2	8,25	12 000		6006 2ZR	SP55	0,129
	55	13	1	13,2	8,25	7 000		6006 2RSR		0,129
	55	13	1	13,2	8,25	12 000	15 000	6006 NR		0,129
	62	16	1	19,5	11,3	10 000	13 000	6206		0,210
	62	16	1	19,5	11,3	10 000		6206 2ZR		0,210
	62	16	1	19,5	11,3	7 500		6206 2RSR	SP62	0,210
	62	16	1	19,5	11,3	10 000	10 000	6206 NR		0,210
	62	20	1	19,5	11,3	10 000		62206 2RSR		0,236
	72	19	1,1	29,9	15,8	9 000	11 000	6306		0,371
	72	19	1,1	29,9	15,8	9 000	11 000	6306 MAP5		0,371
	72	19	1,1	29,9	15,8	9 000		6306 2ZR	SP72	0,371
	72	19	1,1	29,9	15,8	6 000		6306 2RSR		0,371
	72	19	1,1	29,9	15,8	9 000	11 000	6306 NR		0,371
	72	27	1,1	26,6	14,9	9 000		62306 2RSR		0,473
	90	23	1,5	47,3	24,5	8 500	10 000	6406		0,785
	90	23	1,5	47,3	24,5	8 500	10 000	6406 NR	SP90	0,785
32	65	17	1	23	13	10 000	12 000	62/32		0,228
	65	17	1	23	13	10 000		62/32 2ZR		0,228
	65	17	1	23	13	10 000		62/32 2RSR		0,228
	75	20	1,1	30	16	9 000	11 000	63/32		0,437
	75	20	1,1	30	16	9 000		63/32 2ZR		0,437
35	75	20	1,1	30	16	9 000		63/32 2RSR		0,437
	47	7	0,3	4	3,25	13 000	16 000	61807		0,031
	55	10	0,6	9,5	6,2	12 000	14 000	61907		0,073
	62	9	0,3	12,2	8,85	10 000	13 000	16007		0,111
	62	14	1	15,9	10,3	10 000	13 000	6007		0,164
	62	14	1	15,9	10,3	10 000		6007 2ZR		0,164
	62	14	1	15,9	10,3	7 000		6007 2RSR	SP62	0,164
	62	14	1	15,9	10,3	10 000	13 000	6007 NR		0,164
	72	17	1,1	25,7	15,4	9 000	11 000	6207 K		0,315
	72	17	1,1	25,7	15,4	9 000	11 000	6207 TN		0,315

Deep groove ball bearings

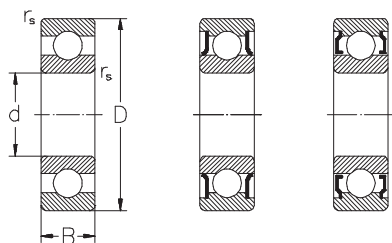


NR

K

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
35	72	17	1,1	25,7	15,4	9 000	11 000	6207 MAP6		0,315
	72	17	1,1	25,7	15,4	9 000	11 000	6207 P6		0,315
	72	17	1,1	25,7	15,4	9 000	11 000	6207 P5		0,315
	72	17	1,1	25,7	15,4	9 000		6207 2ZR		0,315
	72	17	1,1	25,7	15,4	6 000		6207 2RSR		0,315
	72	17	1,1	25,7	15,4	9 000	11 000	6207 NR	SP72	0,315
	72	17	1,1	25,7	15,4	9 000	11 000	6207 NRP6	SP72	0,315
	72	17	1,1	25,7	15,4	9 000	11 000	6207 MA		0,315
	72	23	1,1	25,7	15,4	9 000		62207 2RSR		0,375
	80	21	1,5	33,5	18,3	8 500	10 000	6307		0,450
	80	21	1,5	33,5	18,3	8 500	10 000	6307 K		0,450
	80	21	1,5	33,5	18,3	8 500	10 000	6307 P6		0,450
	80	21	1,5	33,5	18,3	8 500	10 000	6307 P5		0,450
	80	21	1,5	33,5	18,3	8 500		6307 2ZR		0,450
	80	21	1,5	33,5	18,3	8 500		6307 2ZRP5		0,450
	80	21	1,5	33,5	18,3	5 600		6307 2RSR		0,450
	80	21	1,5	33,5	18,3	5 600		6307 2RSRP6		0,450
	80	21	1,5	33,5	18,3	5 600		6307 2RSRP5		0,450
	80	21	1,5	33,5	18,3	8 500	10 000	6307 NR	SP80	0,450
	80	31	1,5	33,5	18,3	8 500		62307 2RSR		0,658
	100	25	1,5	55,5	29,4	7 000	8 500	6407		0,954
	100	25	1,5	55,5	29,4	7 000	8 500	6407 NR	SP100	0,954
40	52	7	0,3	4,5	4,05	11 000	14 000	61808 P5		0,034
	52	7	0,3	4,5	4,05	12 000	14 000	61808 NR	SR52	0,034
	62	12	0,6	14,5	10,2	11 000	13 000	61908		0,110
	62	12	0,6	14,5	10,2	11 000	13 000	61908 NR	SR62	0,110
	68	9	0,3	13,3	9,8	9 500	12 000	16008		0,130
	68	15	1	16,8	11,6	9 500	12 000	6008		0,210
	68	15	1	16,8	11,6	9 500		6008 2ZR		0,210
	68	15	1	16,8	11,6	6 000		6008 2RSR		0,210
	68	15	1	16,8	11,6	9 500	12 000	6008 NR	SP68	0,210
	80	18	1,1	32	17,8	8 500	10 000	6208		0,402
	80	18	1,1	32	17,8	8 500	10 000	6208 K		0,402
	80	18	1,1	32	17,8	8 500	10 000	6208 P6		0,402
	80	18	1,1	32	17,8	8 500	10 000	6208 P5		0,402
	80	18	1,1	32	17,8	8 500		6208 2ZR		0,402
	80	18	1,1	32	17,8	8 500		6208 2ZRP5		0,402
	80	18	1,1	32	17,8	5 600		6208 2RSR		0,402
	80	18	1,1	32	17,8	5 600		6208 2RSRP5		0,402

Deep groove ball bearings

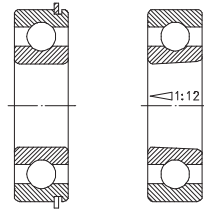


2RSR

2ZR

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
40	80	18	1,1	32	17,8	8 500	10 000	6208 NR	SP80	0,402
	80	18	1,1	32	17,8	8 500	10 000	6208 MB		0,402
	80	18	1,1	32	17,8	8 500	10 000	6208 NMA		0,402
	80	23	1,1	32	19,8	8 500		62208 2RSR		0,460
	90	23	1,5	40,7	24	7 500	9 000	6308		0,635
	90	23	1,5	40,7	24	7 500	9 000	6308 K		0,635
	90	23	1,5	40,7	24	7 500	9 000	6308 TN		0,635
	90	23	1,5	40,7	24	7 500	9 000	6308 P6		0,635
	90	23	1,5	40,7	24	7 500	9 000	6308 P5		0,635
	90	23	1,5	40,7	24	7 500		6308 2ZR		0,635
	90	23	1,5	40,7	24	7 500		6308 2ZRP5		0,635
	90	23	1,5	40,7	24	5 000		6308 2RSR		0,635
	90	23	1,5	40,7	24	7 500	9 000	6308 NMA		0,635
	90	23	1,5	40,7	24	7 500	9 000	6308 NR	SP90	0,635
	90	33	1,5	40,7	24	7 500		62308 2RSR		0,874
	110	27	2	64	35	6 700	7 500	6408	SP110	1,23
	110	27	2	64	35	6 700	8 000	6408 NR		1,23
45	58	7	0,3	6,4	5,6	9 500	12 000	61809		0,043
	68	12	0,6	14	9,8	9 700	11 000	61909		0,120
	75	10	0,6	15,5	12,3	9 000	11 000	16009		0,170
	75	16	1	21	15	9 000	11 000	6009		0,261
	75	16	1	21	15	9 000	11 000	6009 P5		0,261
	75	16	1	21	15	9 000	11 000	6009 P4		0,261
	75	16	1	21	15	9 000		6009 2ZR		0,261
	75	16	1	21	15	9 000		6009 2ZRP4		0,261
	75	16	1	21	15	5 600		6009 2RSR		0,261
	75	16	1	21	15	9 000	11 000	6009 NR	SP75	0,261
	85	19	1,1	32,7	20,2	7 500	9 000	6209		0,414
	85	19	1,1	32,7	20,2	7 500	9 000	6209 K		0,414
	85	19	1,1	32,7	20,2	7 500	9 000	6209 P6		0,414
	85	19	1,1	32,7	20,2	7 500	9 000	6209 P5		0,414
	85	19	1,1	32,7	20,2	8 000		6209 2ZR		0,414
	85	19	1,1	32,7	20,2	8 000		6209 2ZRP5		0,414
	85	19	1,1	32,7	20,2	5 300		6209 2RSR		0,414
	85	19	1,1	32,7	20,2	5 300		6209 2RSRP6		0,414
	85	19	1,1	32,7	20,2	5 300		6209 2RSRP5		0,414
	85	19	1,1	32,7	20,2	8 000	9 500	6209 NR	SP85	0,414
	85	23	1,1	32,7	20,2	8 000		62209 2RSR		0,481
	100	25	1,5	52,8	31,7	6 700	8 000	6309		0,838

Deep groove ball bearings

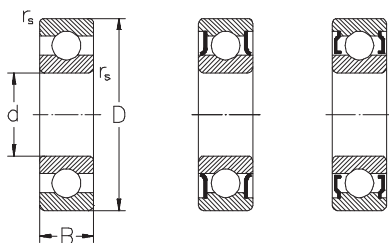


NR

K

Dimensions				Basic radial load		Speed limit		Designation bearing	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	snap ring	
mm				kN		min ⁻¹		–	kg
45	100	25	1,5	52,8	31,7	6 700	8 000	6309 K	0,838
	100	25	1,5	52,8	31,7	6 700	8 000	6309 MB	0,838
	100	25	1,5	52,8	31,7	6 700	8 000	6309 MAP6	0,838
	100	25	1,5	52,8	31,7	6 700	8 000	6309 P6	0,838
	100	25	1,5	52,8	31,7	6 700	8 000	6309 P5	0,838
	100	25	1,5	52,8	31,7	6 700		6309 2ZR	0,838
	100	25	1,5	52,8	31,7	6 700		6309 2ZRP5	0,838
	100	25	1,5	52,8	31,7	4 500		6309 2RSR	0,838
	100	25	1,5	52,8	31,7	4 500		6309 2RSRP6	0,838
	100	25	1,5	52,8	31,7	4 500		6309 2RSRP5	0,838
	100	25	1,5	52,8	31,7	6 700	8 000	6309 NR	0,838
	100	36	1,5	52,8	31,7	6 700		62309 2RSR	1,18
	120	29	2	76,8	44,9	5 600	6 700	6409	1,54
	120	29	2	76,8	44,9	5 600	6 700	6409 NR	1,54
								SP100	
								SP120	
50	65	7	0,3	6,8	6,3	9 500	12 000	61810	0,057
	65	7	0,3	6,8	6,3	9 700	11 000	61810 NR	0,057
	72	12	0,6	14,5	10,4	9 000	11 000	61910	0,130
	72	12	0,6	14,5	10,4	9 000	11 000	61910 NR	0,130
	80	10	0,6	16,3	13,1	8 500	10 000	16010	0,188
	80	16	1	21,8	16,5	8 500	10 000	6010 K	0,260
	80	16	1	21,8	16,5	8 500		6010 2ZR	0,260
	80	16	1	21,8	16,5	5 300		6010 2RSR	0,260
	90	20	1,1	35,1	23,1	7 000	8 500	6210	0,460
	90	20	1,1	35,1	23,1	7 000	8 500	6210 K	0,460
	90	20	1,1	35,1	23,1	7 000	8 500	6210 M	0,460
	90	20	1,1	35,1	23,1	7 000	8 500	6210 MAP6	0,460
	90	20	1,1	35,1	23,1	7 000	8 500	6210 P6	0,460
	90	20	1,1	35,1	23,1	7 000	8 500	6210 P5	0,460
	90	20	1,1	35,1	23,1	7 000		6210 2ZR	0,460
	90	20	1,1	35,1	23,1	7 000		6210 2ZRP5	0,460
	90	20	1,1	35,1	23,1	4 500		6210 2RSR	0,460
	90	20	1,1	35,1	23,1	4 500		6210 2RSRP6	0,460
	90	20	1,1	35,1	23,1	4 500		6210 2RSRP5	0,460
	90	20	1,1	35,1	23,1	7 000	8 500	6210 NR	0,460
	90	23	1,1	35,1	23,1	7 000		62210 2RSR	0,514
	110	27	2	61,8	37,9	6 000	7 000	6310	1,06
	110	27	2	61,8	37,9	6 000	7 000	6310 K	1,06
	110	27	2	61,8	37,9	6 000	7 000	6310 MAP6	1,06
	110	27	2	61,8	37,9	6 000		6310 2ZR	1,06

Deep groove ball bearings

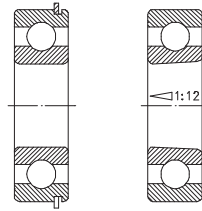


2RSR

2ZR

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
50	110	27	2	61,8	37,9	4 000		6310 2RSR	SP110	1,06
	110	27	2	61,8	37,9	6 000	7 000	6310 NR		1,06
	110	40	2	61,8	37,9	6 000		62310 2RSR		1,65
	130	31	2,1	87,1	52	5 000	6 000	6410	SP130	1,89
	130	31	2,1	87,1	52	5 000	6 000	6410 NR		1,89
55	72	9	0,3	9	8,5	8 500	10 000	61811		0,083
	90	11	0,6	19,3	16,3	7 500	9 000	16011		0,26
	90	18	1,1	28,3	21,2	7 500	9 000	6011 MB		0,39
	90	18	1,1	28,3	21,2	7 500		6011 2ZR	SP90	0,39
	90	18	1,1	28,3	21,2	4 500		6011 2RSR		0,39
	90	18	1,1	28,3	21,2	7 500	9 000	6011 NR		0,39
	100	21	1,5	43,4	29,3	6 300	7 500	6211		0,611
	100	21	1,5	43,4	29,3	6 300	7 500	6211 K	SP100	0,611
	100	21	1,5	43,4	29,3	6 300	7 500	6211 MA		0,611
	100	21	1,5	43,4	29,3	6 300		6211 2ZR		0,611
	100	21	1,5	43,4	29,3	4 000		6211 2RSR		0,611
	100	21	1,5	43,4	29,3	6 300	7 500	6211 NR		0,611
	120	29	2	71,5	44,6	5 300	6 300	6311		1,38
	120	29	2	71,5	44,6	5 300	6 300	6311 K		1,38
	120	29	2	71,5	44,6	5 300	6 300	6311 MA		1,38
	120	29	2	71,5	44,6	5 300		6311 2ZR		1,38
	120	29	2	71,5	44,6	3 600		6311 2RSR	SP120	1,38
	120	29	2	71,5	44,6	5 300	6 300	6311 NR		1,38
	140	33	2,1	100	62	4 800	5 600	6411		2,30
	140	33	2,1	100	62	4 800	5 600	6411 NR	SP140	2,30
60	78	10	0,3	8,7	6,7	8 000	9 500	61812		0,120
	95	11	0,6	20	17,6	7 000	8 500	16012		0,280
	95	18	1,1	29,4	23,2	6 700	8 000	6012		0,420
	95	18	1,1	29,4	23,2	6 700		6012 2ZR	SP95	0,420
	95	18	1,1	29,4	23,2	4 300		6012 2RSR		0,420
	95	18	1,1	29,4	23,2	7 000	8 500	6012 NR		0,420
	110	22	1,5	52,4	36	6 000	7 000	6212		0,780
	110	22	1,5	52,4	36	6 000	7 000	6212 K	SP110	0,780
	110	22	1,5	52,4	36	6 000	7 000	6212 MA		0,780
	110	22	1,5	52,4	36	6 000		6212 2ZR		0,780
	110	22	1,5	52,4	36	4 000		6212 2RSR		0,780
	110	22	1,5	52,4	36	6 000	7 000	6212 NR		0,780
	130	31	2,1	81,8	51,9	5 000	6 000	6312		1,72
	130	31	2,1	81,8	51,9	5 000	6 000	6312 K		1,72
	130	31	2,1	81,8	51,9	5 000		6312 2ZR		1,72

Deep groove ball bearings

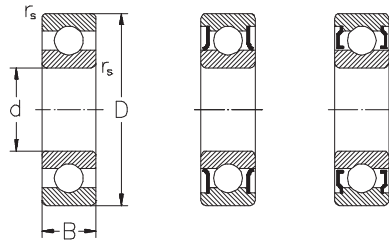


NR

K

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
60	130	31	2,1	81,8	51,9	3 400		6312 2RSR	SP130	1,72
	130	31	2,1	81,8	51,9	5 000	6 000	6312 NR		1,72
	150	35	2,1	110	70,8	4 300		6412	SP150	2,76
	150	35	2,1	110	70,8	4 300	5 000	6412 NR		2,76
62	110	22	1,5	47,5	28	6 000	7 000	62/62		0,600
65	85	10	0,6	12,2	12	7 000	8 500	61813	SP100	0,130
	100	11	0,6	22,9	19,6	6 300	7 500	16013		0,300
	100	18	1,1	30,5	25,2	6 300	7 500	6013 K		0,440
	100	18	1,1	30,5	25,2	6 300		6013 2ZR		0,440
	100	18	1,1	30,5	25,2	4 000		6013 2RSR		0,440
	100	18	1,1	30,5	25,2	6 300	7 500	6013 NR		0,440
	120	23	1,5	57,2	40	5 300	6 300	6213		0,995
	120	23	1,5	57,2	40	5 300	6 300	6213 M		0,995
	120	23	1,5	57,2	40	5 300	6 300	6213 MA		0,995
	120	23	1,5	57,2	40	5 300		6213 2ZR		0,995
	120	23	1,5	57,2	40	3 600		6213 2RSR	SP120	0,995
	120	23	1,5	57,2	40	5 300	6 300	6213 NR		0,995
	140	33	2,1	92,7	59,7	4 800	5 600	6313		2,10
	140	33	2,1	92,7	59,7	4 800	5 600	6313 MA		2,10
	140	33	2,1	92,7	59,7	4 800	5 600	6313 MB		2,10
	140	33	2,1	92,7	59,7	4 800		6313 2ZR	SP140	2,10
	140	33	2,1	92,7	59,7	3 000		6313 2RSR		2,10
	140	33	2,1	92,7	59,7	4 800	5 600	6313 NR		2,10
	160	37	2,1	118	79	4 000	4 800	6413		3,300
	160	37	2,1	118	79	4 000	4 800	6413 NR	SP160	3,300
70	90	10	0,6	12,5	10	6 700	8 000	61814	SP110	0,160
	110	13	0,6	27,9	25	6 000	7 000	16014		0,433
	110	20	1,1	38,1	30,9	6 000	7 000	6014		0,600
	110	20	1,1	38,1	30,9	6 000	7 000	6014 MAP5		0,600
	110	20	1,1	38,1	30,9	6 000		6014 2ZR		0,600
	110	20	1,1	38,1	30,9	3 600		6014 2RSR		0,600
	110	20	1,1	38,1	30,9	6 000	7 000	6014 NR		0,600
	125	24	1,5	62,2	44,1	5 000	6 000	6214		1,07
	125	24	1,5	62,2	44,1	5 000	6 000	6214 MA		1,07
	125	24	1,5	62,2	44	5 000		6214 2ZR		1,07
	125	24	1,5	62,2	44	3 400		6214 2RSR	SP125	1,07
	125	24	1,5	62,2	44	5 000	6 000	6214 NR		1,07
	150	35	2,1	104	68,1	4 500	5 300	6314		2,50
	150	35	2,1	104	68,1	4 500	5 300	6314 K		2,50

Deep groove ball bearings

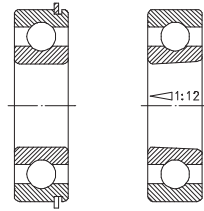


2RSR

2ZR

Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	rs min.	dyn. Cr	stat. Cor	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
70	150	35	2,1	104	68,1	4 500	5 300	6314 MAP6	SP150	2,50
	150	35	2,1	104	68,1	4 500		6314 2ZR		2,50
	150	35	2,1	104	68,1	2 800		6314 2RSR		2,50
	150	35	2,1	104	68,1	4 500	5 300	6314 NR		2,50
	180	42	3	144	104	3 800	4 500	6414		4,85
75	95	10	0,6	12,8	12,1	6 300	7 500	61815 P5		0,160
	95	10	0,6	12,8	12,1	4 000		61815 2RSR		0,160
	115	13	0,6	28,5	26,8	5 600	6 700	16015		0,460
	115	20	1,1	39,7	33,5	5 600	6 700	6015 M		0,640
	115	20	1,1	39,7	33,5	5 600	6 700	6015 MAP5		0,640
	115	20	1,1	39,7	33,5	5 600		6015 2ZR	SP115	0,640
	115	20	1,1	39,7	33,5	3 400		6015 2RSR		0,640
	115	20	1,1	39,7	33,5	5 600	6 700	6015 NR		0,640
	130	25	1,5	67,4	49,3	4 800	5 600	6215		1,18
	130	25	1,5	67,4	49,3	4 800	5 600	6215 K		1,18
	130	25	1,5	67,4	49,3	4 800		6215 2ZR	SP130	1,18
	130	25	1,5	67,4	49,3	3 200		6215 2RSR		1,18
	130	25	1,5	67,4	49,3	4 800	5 600	6215 NR		1,18
	160	37	2,1	113	77	4 000	4 800	6315		3,03
	160	37	2,1	113	77	4 000	4 800	6315 MP6		3,03
	160	37	2,1	113	77	4 000		6315 2ZR	SP160	3,03
	160	37	2,1	113	77	2 800		6315 2RSR		3,03
	160	37	2,1	113	77	4 000	5 000	6315 NR		3,03
	190	45	3	154	115	3 600	4 300	6415		6,50
80	100	10	0,6	12,9	13,7	6 000	7 000	61816		0,160
	110	16	1	25,1	20,5	5 600	6 700	61916		0,380
	125	14	0,6	31,9	29,7	5 300	6 300	16016		0,600
	125	22	1,1	47,6	39,8	5 300	6 300	6016 MA		0,850
	125	22	1,1	47,6	39,8	5 300		6016 2ZR		0,850
	125	22	1,1	47,6	39,8	3 600		6016 2RSR	SP125	0,850
	125	22	1,1	47,6	39,8	5 300	6 300	6016 NR		0,850
	140	26	2	72,7	53	4 500	5 300	6216		1,40
	140	26	2	72,7	53	4 500	5 300	6216 K		1,40
	140	26	2	72,7	53	4 500	5 300	6216 MA		1,40
	140	26	2	72,7	53	4 500		6216 2ZR	SP140	1,40
	140	26	2	72,7	53	3 000		6216 2RSR		1,40
	140	26	2	72,7	53	4 500	5 300	6216 NR		1,40
	170	39	2,1	123	86,5	3 800	4 500	6316 K		3,60
	170	39	2,1	123	86,5	3 800	4 500	6316 M		3,60

Deep groove ball bearings

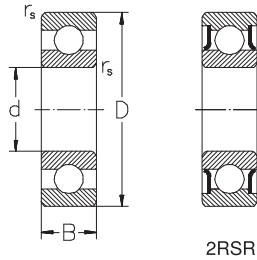


NR

K

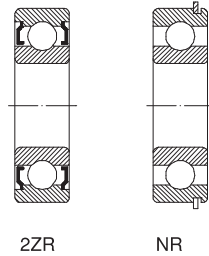
Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
80	170	39	2,1	123	86,5	3 800		6316 2ZR	SP170	3,60
	170	39	2,1	123	86,5	3 800	4 500	6316 NR		3,60
	200	48	3	164	125	3 400	4 000	6416		7,50
85	110	13	1	19,3	20	5 300	6 300	61817		0,290
	130	14	1	33,8	33,5	5 000	6 000	16017		0,630
	130	22	1,1	49,5	43,1	5 000	6 000	6017		0,890
	130	22	1,1	49,5	43,1	5 000		6017 2ZR		0,890
	130	22	1,1	49,5	43,1	3 400		6017 2RSR		0,890
	130	22	1,1	49,5	43,1	5 000	6 000	6017 NR	SP130	0,890
	150	28	2	84	61,9	4 300	5 000	6217		1,80
	150	28	2	84	61,9	4 300	5 000	6217 K		1,80
	150	28	2	84	61,9	4 300	5 000	6217 MP6		1,80
	150	28	2	84	61,9	4 300		6217 2ZR		1,80
	150	28	2	84	61,9	2 800		6217 2RSR	SP150	1,80
	150	28	2	84	61,9	4 300	5 000	6217 NR		1,80
	180	41	3	133	96,6	3 600	4 300	6317		4,20
	180	41	3	133	96,6	3 600	4 300	6317 K		4,20
	180	41	3	133	96,6	3 600	4 300	6317 MA		4,20
	180	41	3	133	96,6	3 600	4 300	6317 MB	SP180	4,20
	180	41	3	133	96,6	3 600		6317 2ZR		4,20
	180	41	3	133	96,6	3 600	4 300	6317 NR		4,20
	210	52	4	173	136	3 200	3 800	6417		9,00
	115	13	1	19,6	20,4	5 300	6 300	61818		0,300
	140	16	1	41,9	40,4	4 500	5 300	16018		0,850
	140	24	1,5	58,2	49,7	4 500	5 300	6018 MA		1,16
	140	24	1,5	58,2	49,7	4 500		6018 MP6		1,16
	140	24	1,5	58,2	49,7	4 500		6018 2ZR		1,16
	140	24	1,5	58,2	49,7	3 000		6018 2RSR	SP140	1,16
	140	24	1,5	58,2	49,7	4 500	5 600	6018 NR		1,16
	160	30	2	96	71,5	3 800	4 500	6218		2,16
	160	30	2	96	71,5	3 800	4 500	6218 K		2,16
	160	30	2	96	71,5	3 800	4 500	6218 MA		2,16
	160	30	2	96	71,5	3 800	4 500	6218 MP6	SP160	2,16
	160	30	2	96	71,5	3 800		6218 2ZR		2,16
	160	30	2	96	71,5	3 800	4 500	6218 NR		2,16
	190	43	3	143	107	3 400	4 000	6318		4,90
	190	43	3	143	107	3 400	4 000	6318 K		4,90
	190	43	3	143	107	3 400	4 000	6318 M		4,90
	190	43	3	143	107	3 400		6318 2ZR		4,90

Deep groove ball bearings



Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
90	190	43	3	143	107	3 400	4 000	6318 NR	SP190	4,90
	225	54	4	190	160	3 000	3 600	6418		11,5
	145	16	1	42,3	41,5	4 300	5 000	16019		0,890
	145	24	1,5	60,5	53,6	4 300	5 000	6019		1,20
95	145	24	1,5	60,5	53,6	4 300		6019 2ZR	SP145	1,20
	145	24	1,5	60,5	53,6	2 800		6019 2RSR		1,20
	145	24	1,5	60,5	53,6	4 300	5 000	6019 NR		1,20
	170	32	2,1	109	81,9	3 600	4 300	6219 MBP6		2,60
	170	32	2,1	109	81,9	3 600	4 300	6219 NR	SP170	2,60
	200	45	3	153	118	3 200	3 800	6319		5,60
	200	45	3	153	118	3 200	3 800	6319 MAP6		5,60
100	125	13	1	19,6	21,2	4 800	5 600	61820 MAP5		0,320
	150	16	1	45	44	4 300	5 000	16020		0,910
	150	24	1,5	60,5	54	4 300	5 000	6020 MAP6		1,25
	150	24	1,5	60,5	54	4 300		6020 2ZR		1,25
	150	24	1,5	60,5	54	2 800		6020 2RSR	SP150	1,25
	150	24	1,5	60,5	54	4 300	5 000	6020 NR		1,25
	180	34	2,1	124	93	3 400	4 000	6220		3,10
	180	34	2,1	124	93	3 400	4 000	6220 MA		3,15
	180	34	2,1	124	93	3 400	4 000	6220 MP6	SP180	3,15
	180	34	2,1	124	93	3 400	4 000	6220 NR		3,15
	215	47	3	173	140	3 000		6320 2ZR		7,00
	215	47	3	173	140	3 000	3 600	6320 MAP6		7,00
105	130	13	1	20,8	19,6	4 500	5 300	61821 MAP5		0,350
	160	18	1	52	51	4 000	4 800	16021		1,20
	160	26	2	72,3	65,8	3 800	4 500	6021 M		1,60
	190	36	2,1	133	104	3 200	3 800	6221		3,70
	190	36	2,1	133	104	3 200	3 800	6221 MA		3,70
110	225	49	3	184	153	2 800	3 400	6321 MA		8,00
	140	16	1	28,1	29	4 300	5 000	61822		0,600
	170	19	1	57,5	56,7	3 800	4 500	16022		1,46
	170	28	2	82	73	3 600	4 300	6022		1,95
	200	38	2,1	143	118	3 000	3 600	6222		4,35
	200	38	2,1	143	118	3 000	3 600	6222 M		4,35
	200	38	2,1	143	118	3 000	3 600	6222 NR		4,35
	240	50	3	203	178	2 600	3 200	6322		9,58
	240	50	3	203	178	2 600	3 200	6322 MA		9,58

Deep groove ball bearings

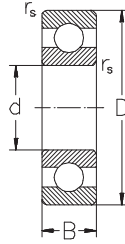


2ZR

NR

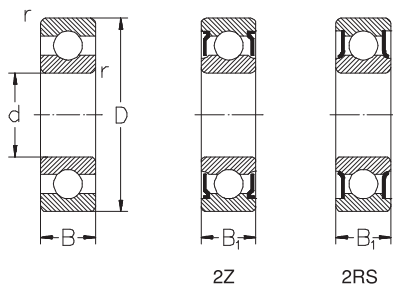
Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil	bearing		
mm				kN		min ⁻¹		–		kg
120	150	16	1	29,1	32,5	3 800	4 500	61824	SP215	0,650
	180	19	1	63,2	63,3	3 400	4 000	16024		1,70
	180	28	2	85	79,3	3 400	4 000	6024 MP6		2,09
	215	40	2,1	155	131	2 800	3 400	6224		5,15
	215	40	2,1	155	131	2 800	3 400	6224 MB		5,15
	215	40	2,1	155	131	2 800	3 400	6224 MAP6		5,15
	215	40	2,1	155	131	2 800	3 400	6224 2ZR		5,15
	215	40	2,1	155	131	2 800	3 400	6224 NR		5,15
	260	55	3	212	190	2 400	3 000	6324 MA		13,6
130	165	18	1,1	38	43	3 600	4 300	61826 MAP5		0,930
	200	22	1,1	79	81	3 200	3 800	16026		2,50
	200	33	2	106	101	3 000	3 600	6026		3,25
	230	40	3	167	146	2 600	3 200	6226		6,00
	230	40	3	167	146	2 600	3 200	6226 M		6,00
	280	58	4	229	214	2 200	2 800	6326 MA		17,0
140	175	18	1,1	39	46	3 400	4 000	61828 MAP5		1,00
	210	22	1,1	80,5	86	2 800	3 400	16028		2,70
	210	33	2	110	109	2 800	3 400	6028 MP6		3,35
	250	42	3	176	164	2 400	3 000	6228		7,50
	250	42	3	176	164	2 400	3 000	6228 MA		7,50
150	300	62	4	253	246	2 000	2 600	6328 MA		21,0
	190	20	1,1	48,8	61	3 000	3 600	61830		1,40
	225	24	1,1	92,3	98	2 600	3 200	16030		3,40
	225	35	2,1	125	126	2 600	3 200	6030 MA		4,75
	270	45	3	176	170	2 000	2 600	6230 MA		9,60
160	320	65	4	275	284	1 900	2 400	6330 MA		25,0
	200	20	1,1	52	62	2 800	3 400	61832		1,49
	240	25	1,5	99,4	107	2 400	3 000	16032		3,60
	240	38	2,1	140	143	2 400	3 000	6032 MA		5,85
	290	48	3	185	186	1 900	2 400	6232 MA		15,0
170	215	22	1,1	61,8	73,5	2 600	3 200	61834 P6		2,00
	260	28	1,5	118	127	2 200	2 800	16034		5,70
	260	42	2,1	168	172	2 200	2 800	6034 MA		7,80
	310	52	4	212	224	1 900	2 400	6234 MA		17,5
180	225	22	1,1	62,3	78,5	2 400	3 000	61836 P5		2,00
	250	33	2	128	137	2 200	2 800	61936 MA		4,90
	280	31	2	140	146	2 000	2 600	16036 MA		7,00
	280	46	2,1	186	194	2 000	2 600	6036		10,5
	320	52	4	227	242	1 800	2 200	6236		18,5

Deep groove ball bearings



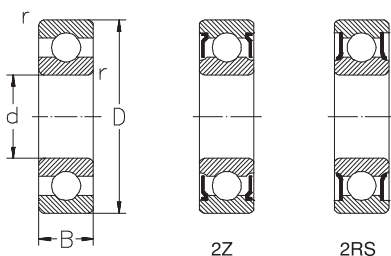
Dimensions				Basic radial load		Speed limit		Designation	snap ring	Weight
d	D	B	r_s min.	dyn. C_r	stat. C_{0r}	grease	oil	bearing		
mm				kN		min^{-1}		–		kg
190	240	24	1,5	74,1	92	2 200	2 800	61838		2,60
	290	31	2	148	162	2 000	2 600	16038		7,90
	290	46	2,1	194	210	2 000	2 600	6038 MA		11,0
	290	46	2,1	194	210	2 000	2 600	6038 MB		11,0
	290	46	2,1	194	210	2 000	2 600	6038 MBP6		11,0
	290	46	2,1	194	210	2 000	2 600	6038 MBP5		11,0
	340	55	4	255	278	1 700	2 000	6238 MA		23,0
	340	55	4	255	278	1 700	2 000	6238 MB		23,0
	250	24	1,5	78	93	2 200	2 800	61840 MB		2,70
	280	38	2,1	151	160	2 200	2 800	61940 MB		7,25
200	310	34	2	168	187	1 900	2 400	16040 MBP6		9,00
	310	34	2	168	187	1 900	2 400	16040 MBP5		9,00
	310	51	2,1	208	226	1 900	2 400	6040 MA		13,5
	310	51	2,1	208	226	1 900	2 400	6040 MB		13,5
	310	51	2,1	208	226	1 900	2 400	6040 MBP52		13,5
	360	58	4	280	314	1 700	2 000	6240 M		28,0
	360	58	4	280	314	1 700	2 000	6240 MB		27,0
	250	24	1,5	78	93	2 200	2 800	61840 MB		2,70
	280	38	2,1	151	160	2 200	2 800	61940 MB		7,25
	310	34	2	168	187	1 900	2 400	16040 MBP6		9,00

Stainless steel deep groove ball bearings



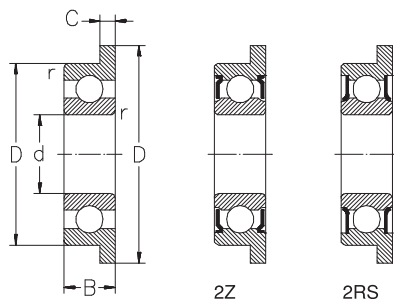
Dimensions					Basic radial load		Designation		
d	D	B	B ₁	r min.	dyn. C _r	stat. C _{0r}	opened	shielded	sealed
mm					kN		—		
3	8	3	4	0,15	560	179	S619/3	S619/3 ZZ	
	10	4	4	0,15	630	218	S623	S623 ZZ	
	13	5	5	0,2	1300	485	S633	S633 ZZ	
4	9	2,5	4	0,1	640	225	S618/4	S618/4 ZZ	
	11	4	4	0,15	960	345	S619/4	S619/4 ZZ	
	12	4	4	0,2	960	345	S604	S604 ZZ	
	13	5	5	0,2	1300	485	S624	S624 ZZ	
	16	5	5	0,3	1730	670	S634	S634 ZZ	
5	11	3	5	0,15	715	281	S618/5	S618/5 ZZ	
	13	4	4	0,2	1080	430	S619/5	S619/5 ZZ	
	14	5	5	0,2	1330	505	S605	S605 ZZ	
	16	5	5	0,3	1730	670	S625	S625 ZZ	S625 2RS
	19	6	6	0,3	2340	885	S635	S635 ZZ	S635 2RS
6	13	3,5	5	0,15	1080	440	S618/6	S618/6 ZZ	S618/6 2RS
	15	5	5	0,2	1730	670	S619/6	S619/6 ZZ	S619/6 2RS
	17	6	6	0,3	2260	835	S606	S606 ZZ	S606 2RS
	19	6	6	0,3	2340	885	S626	S626 ZZ	S626 2RS
	22	7	7	0,3	3300	1370	S636	S636 ZZ	S636 2RS
7	14	3,5	5	0,15	1170	510	S618/7	S618/7 ZZ	S618/7 2RS
	17	5	5	0,3	1610	710	S619/7	S619/7 ZZ	S619/7 2R
	19	6	6	0,3	2340	885	S607	S607 ZZ	S607 2RS
	22	7	7	0,3	3300	1370	S627	S627 ZZ	S627 2RS
	26	9	9	0,3	4050	1620	S637	S637 ZZ	S637 2RS
8	16	4	5	0,2	1260	590	S618/8	S618/8ZZ	S618/8 2RS
	19	6	6	0,3	2240	910	S619/8	S619/8ZZ	S619/8 2RS
	22	7	7	0,3	3300	1370	S608	S608ZZ	S608 2RS
	24	8	8	0,3	3350	1430	S628	S628ZZ	S628 2RS
	28	9	9	0,3	4550	1970	S638	S638ZZ	S638 2RS
9	17	4	5	0,2	1330	665	S618/9	S618/9ZZ	S618/9 2RS
	20	6	6	0,3	1720	840	S619/9	S619/9ZZ	S619/9 2RS
	24	7	7	0,3	3350	1430	S609	S609ZZ	S609 2RS
	26	8	8	0,3	4550	1970	S629	S629 ZZ	S629 2RS
	30	10	10	0,6	5100	2390	S639	S639 ZZ	S639 2RS

Stainless steel deep groove ball bearings



Dimensions				Basic radial load dyn. C _r	Designation	opened	shielded	sealed
d	D	B	r min.		stat. C _{0r}			
mm					kN		—	
10	19	5	0,3	1720	840	S61800	S61800 ZZ	S61800 2RS
	22	6	0,3	2700	1270	S61900	S61900 ZZ	S61900 2RS
	26	8	0,3	4550	1980	S6000	S6000 ZZ	S600 2RS
	30	9	0,6	5100	2380	S6200	S6200 ZZ	S6200 2RS
	35	11	0,6	8100	3480	S6300	S6300 ZZ	S6300 2RS
12	21	5	0,3	1920	1040	S61801	S61801 ZZ	S61801 2RS
	24	6	0,3	2890	1460	S61901	S61901 ZZ	S61901 2RS
	28	8	0,3	5100	2380	S6001	S6001 ZZ	S6001 2RS
	32	10	0,6	6820	3050	S6201	S6201 ZZ	S6201 2RS
	37	12	1	9720	5080	S6301	S6301 ZZ	S6301 2RS
15	24	5	0,3	2070	1260	S61802	S61802 ZZ	S61802 2RS
	28	7	0,3	4350	2260	S61902	S61902 ZZ	S61902 2RS
	32	9	0,3	5580	2850	S6002	S6002 ZZ	S6002 2RS
	35	11	0,6	7650	3720	S6202	S6202 ZZ	S6202 2RS
	42	13	1	11500	5420	S6302	S6302 ZZ	S6302 2RS
17	26	5	0,3	2630	1570	S61803	S61803 ZZ	S61803 2RS
	30	7	0,3	4600	2550	S61903	S61903 ZZ	S61903 2RS
	35	10	0,3	6000	3250	S6003	S6003 ZZ	S6003 2RS
	40	12	0,6	9580	4780	S6203	S6203 ZZ	S6203 2RS
	47	14	1	13500	6580	S6303	S6303 ZZ	S6303 2RS
20	32	7	0,3	4000	2470	S61804	S61804 ZZ	S61804 2RS
	37	9	0,3	6400	3700	S61904	S61904 ZZ	S61904 2RS
	42	12	0,6	9380	5020	S6004	S6004 ZZ	S6004 2RS
	47	14	1	12800	6650	S6204	S6204 ZZ	S6204 2RS
	52	15	1,1	15800	7880	S6304	S6304 ZZ	S6304 2RS
22	44	12	0,6	9400	5050	S60/22	S60/22 ZZ	S60/22 2RS
	50	14	1	12900	6800	S62/22	S62/22 ZZ	S62/22 2RS
	56	16	1,1	18400	9250	S63/22	S63/22ZZ	S63/22 2RS
25	37	7	0,3	4300	2950	S61805	S61805 ZZ	S61805 2RS
	42	9	0,3	7050	4550	S61905	S61905 ZZ	S61905 2RS
	47	12	0,6	10000	5850	S6005	S6005 ZZ	S6005 2RS
	52	15	1	14000	7880	S6205	S6205 ZZ	S6205 2RS
	62	17	1,1	22200	11500	S6305	S6305 ZZ	S6305 2RS

Stainless steel deep groove ball bearings



Dimensions						Basic radial load		Designation		
d	D	D ₁	B	C ₁	r min.	dyn. C _r	stat. C _{0r}	opened	shielded	sealed
mm						kN	—			
3	8	9,5	4	0,9	0,15	560	179	SF619/3	SF619/3 ZZ	
	10	11,5	4	1	0,15	630	218	SF623	SF623 ZZ	
	13	15	5	1	0,2	1300	485	SF633	SF633 ZZ	
4	11	12,5	4	1	0,15	960	345	SF619/4	SF619/4 ZZ	
	12	13,5	4	1	0,2	960	345	SF604	SF604 ZZ	
	13	15	5	1	0,2	1300	485	SF624	SF624 ZZ	
	16	18	5	1	0,3	1730	670	SF634	SF634 ZZ	
5	13	15	4	1	0,2	1080	430	SF619/5	SF 619/5 ZZ	
	14	16	5	1	0,2	1330	505	SF605	SF605 ZZ	
	16	18	5	1	0,3	1730	670	SF625	SF625 ZZ	SF625 2RS
	19	22	6	1,5	0,3	2340	885	SF635	SF635 ZZ	SF 635 2RS
6	15	17	5	1,2	0,2	1730	670	SF619/6	SF619/6 ZZ	SF619/6 2RS
	17	19	6	1,2	0,3	2260	835	SF606	SF606 ZZ	SF606 2RS
	19	22	6	1,5	0,3	2340	885	SF626	SF626 ZZ	SF626 2RS
	22	25	7	1,5	0,3	3300	1370	SF636	SF636 ZZ	SF636 2RS
7	17	19	5	1,2	0,3	1610	710	SF619/7	SF619/7 ZZ	SF619/7 2RS
	19	22	6	1,5	0,3	2340	885	SF607	SF607 ZZ	SF607 2RS
	22	25	7	1,5	0,3	3300	1370	SF627	SF627 ZZ	SF627 2RS
	26	29	9	2	0,3	4050	1620	SF637	SF637 ZZ	SF637 2RS
8	19	22	6	1,5	0,3	2240	910	SF619/8	SF619/8 ZZ	SF619/8 2RS
	22	25	7	1,5	0,3	3300	1370	SF608	SF608 ZZ	SF608 2RS
	24	26	8	2	0,3	3350	1430	SF628	SF628 ZZ	SF628 2RS
	28	30,25	9	2,25	0,3	4550	1970	SF638	SF638 ZZ	SF638 2RS
9	20	23	6	1,5	0,3	1720	840	SF619/9	SF619/9 ZZ	SF619/9 2RS
	24	27	7	1,5	0,3	3350	1430	SF609	SF609 ZZ	SF609 2RS
	26	28	8	2	0,3	4550	1970	SF629	SF629 ZZ	SF629 2RS
	30	32,5	10	2,5	0,6	5100	2390	SF639	SF639 ZZ	SF639 2RS
10	22	25	6	1,5	0,3	2700	1270	SF61900	SF61900 ZZ	SF61900 2RS
	26	28	8	2	0,3	4550	1980	SF6000	SF6000 ZZ	SF6000 2RS
	30	32,25	9	2,25	0,6	5100	2380	SF6200	SF6200 ZZ	SF6200 2RS
	35	37,75	11	2,75	0,6	8100	3480	SF6300	SF6300 ZZ	SF6300 2RS



Self-aligning ball bearings

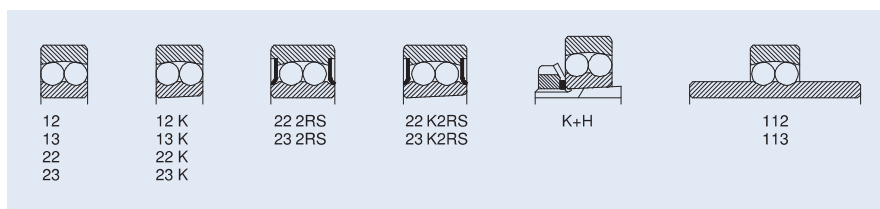


Self-aligning ball bearings

Self-aligning ball bearings have a common sphered raceway in the outer ring. This feature allows angular misalignment of the shaft relative to the housing. Therefore self-aligning ball bearings are particularly used in case of bearings where misalignment can occur from

errors in mounting or from shaft bending.

Double row self-aligning ball bearings are manufactured both with cylindrical bore and tapered bore (taper 1:12). Self-aligning bearings with tapered bore can be delivered, at request, with adapter sleeves.



Suffixes

C2	- radial clearance smaller than normal
C3	- radial clearance larger than normal
H	- adapter sleeve
K	- tapered bore bearings
M	- machined brass cage, ball guided
MB	- machined brass cage, guided on the inner ring
P6	- tolerance class more accurate than normal
P63	- tolerance class P6 with radial clearance C3
2RS	- bearing with two seals
TN	- polyamide cage

Sealed bearings are greased for the entire operating period, relubrication not being necessary. Sealed bearings washing or heating before mounting in assembly is not allowed.

Self-aligning ball bearings with extended inner ring

Self-aligning ball bearings with extended inner ring of series 112 and 113 are used in applications where high accuracy is not necessary and generally, they can be mounted directly on rolled shafts. The bore manufactured to tolerance class J7 allows fast mounting and dismounting. The inner ring has a groove for bearing axial location which can be done by means of a screw or pin.

Sealed self-aligning ball bearings

Self-aligning ball bearings are also available in a sealed version with seals at both sides. The seals are made of gasoline, oil and wear-resistant synthetic rubber. Sealed bearings are delivered filled with a certain grease quantity. Sealed bearing operating temperatures are between -30°C and +80°C. Grease service life is much reduced if bearing operates at a temperature higher than + 80°C (see Chapter 5).

Dimensions

Overall dimensions of self-aligning ball bearings are in accordance with ISO 15.

Misalignment

Self-aligning ball bearings allow within certain limits an angular misalignment of the outer ring in relation to the inner ring, without detrimental effects in bearing unit.

Approximate values for permissible misalignment, under normal operating conditions are given in table 1.

Permissible misalignment

Table 1

Bearing series		Permissible misalignment
degrees		
108,126,127,129,135		3
12,112		2,5
13,113		3
22		2,5
22-2 RS		1,5
23		3
23-2 RS		1,5

Tolerances and radial clearance

Bearings of serial production are manufactured to normal tolerance class and with normal radial clearance. Tapered bore bearings of serial production are also manufactured with radial clearance C3.

Self-aligning ball bearings with extended inner ring are manufactured with radial clearance C2 and normal clearance.

At request, these bearings can also be manufactured to other tolerance classes and with smaller or larger radial clearance.

The bore of self-aligning ball bearings with extended inner ring is manufactured to tolerance class J7.

Bearing tolerances are given on page 24 and the values of radial clearance are given in tables 2 and 3.

Radial clearance of self-aligning ball bearings
With cylindrical bore

Table 2

Bore diameter d		Designation of clearance group									
		C2 Bearing radial clearance		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm	µm										
2,5	6	1	8	5	15	10	20	15	25	21	33
6	10	2	9	6	17	12	25	19	33	27	42
10	14	2	10	6	19	13	26	21	35	30	48
14	18	3	12	8	21	15	28	23	37	32	50
18	24	4	14	10	23	17	30	25	39	34	52
24	30	5	16	11	24	19	35	29	46	40	58
30	40	6	18	13	29	23	40	34	53	46	66
40	50	6	19	14	31	25	44	37	57	50	71
50	65	7	21	16	36	30	50	45	69	62	88
65	80	8	24	18	40	35	60	54	83	76	108
80	100	9	27	22	48	42	70	64	96	89	124
100	120	10	31	25	56	50	83	75	114	105	145
120	140	10	38	30	68	60	100	90	135	125	175
140	160	15	44	35	80	70	120	110	161	150	210

With tapered bore

Table 3

Bore diameter d		Designation of clearance group									
		C2 Bearing radial clearance		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm	µm										
18	24	7	17	13	26	20	33	28	42	37	55
24	30	9	20	15	28	23	39	33	50	44	62
30	40	12	24	19	35	29	46	40	59	52	72
40	50	14	27	22	39	33	52	45	65	58	79
50	65	18	32	27	47	41	61	56	80	73	99
65	80	23	39	35	57	50	75	69	98	91	123
80	100	29	47	42	68	62	90	84	116	109	144
100	120	35	56	50	81	75	108	100	139	130	170
120	140	40	68	60	98	90	130	120	165	155	205
140	160	45	74	65	110	100	150	140	191	180	240

Equivalent dynamic radial load

$P_r = F_r + Y_1 F_a, \text{ kN,}$ when $F_a/F_r \leq e,$
 $P_r = 0,65 F_r + Y_2 F_a, \text{ kN}$ when $F_a/F_r > e$

The values of factors e , Y_1 and Y_2 which depend on bearings are given in bearing tables.

Equivalent static radial load

$P_{0r} = F_r + Y_0 F_a, \text{ kN}$

The values of the factor Y_0 which depends on bearing are given in bearing tables.

Axial load on bearings with adapter sleeves

If self-aligning ball bearings are mounted with adapter sleeves on smooth shafts, without side location, their axial carrying capacity depends on the friction between the sleeve bore and shaft.

Permissible axial load can be precisely enough determined using the equation:

$F_{a \text{ max}} = 3 B d,$
where:
 $F_{a \text{ max}}$ - maximum permissible axial load, N
 B - bearing width, mm
 d - bearing bore diameter, mm

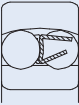
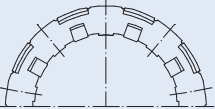
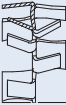
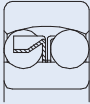
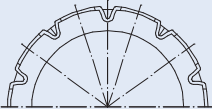
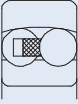
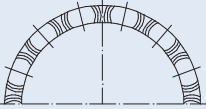
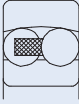
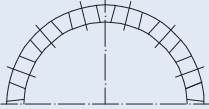
Cages

Self-aligning ball bearings are generally fitted with pressed cages of sheet. At special request, when bearings operate under fluctuating loads, at high speeds and where large sizes are required, machined brass cages are recommended to be used. Glass fibre reinforced polyamide 6.6 cages are also suitable if the operating temperatures do not exceed +120°C. They have low weight, a low coefficient of friction and are noiseless while running.

Cage design and technical data are given in table 4.

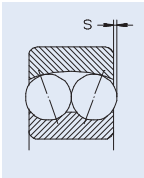
Cage design and technical data

Table 4

Cage	Design bearing	cage	Application	Max. value $D_m n$	
				oil	grease
Pressed sheet cage			 - General application - Moderate speeds - Sealed bearings series 12, 13, 22, 23	600×10^3	450×10^3
Pressed sheet cage			 - General application - Moderate speeds - Bearings series 22, 23	600×10^3	450×10^3
Polyamide cage TN			 - High speeds - Bearings series 12, 13, 22, 23	1000×10^3	800×10^3
Machined brass cage M			 - High speeds - Bearings: 1220-1222, 1317-1322, 2217-2222, 2317-2320.	900×10^3	700×10^3

Special characteristics

In case of some dimensions of self-aligning ball bearings series 12 and 13, the balls protrude somewhat from the bearing, as shown in the adjacent design and table. This should be considered both by designer and user.



Values of dimension S

Table 5

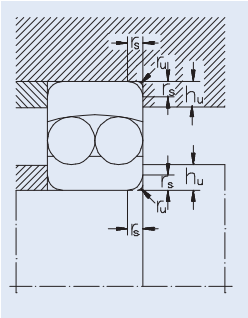
Bearing	S
	mm
1224	1,3
1226	0,7
1318	1,0
1319	1,5
1320	2,5
1321	2,6
1322	2,6

Abutment dimensions

For a proper location of bearing rings on the shaft shoulder and housing shoulder respectively, maximum connection radius $r_{U \max}$ of shaft (housing) should be less than minimum mounting chamfer $r_{S \min}$ of bearing.

Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

In case of self-aligning ball bearings with tapered bore which are mounted directly on a tapered shaft or with an adapter sleeve, proper tightening and minimum radial clearance of 10 - 20 μm should be assured for normal clearance and of 20 - 55 μm for clearance C3, depending on bearing size and series. The values of the connection radius and support shoulder height are given in table 6 and mounting dimensions for bearings mounted with adapter sleeves are given in table 7.



Abutment dimensions

Table 6

r_s min.	r_u max.	$h_{\min}$ min. Bearing series 12, 13, 112, 22, 23, 113
mm		
0,3	0,2	1,2
0,6	0,6	2,1
1	1	2,8
1,1	1	3,5
1,5	1,5	4,5
2	2	5,5
2,1	2,1	6

Self-aligning ball bearings with adapter sleeves

Abutment dimensions

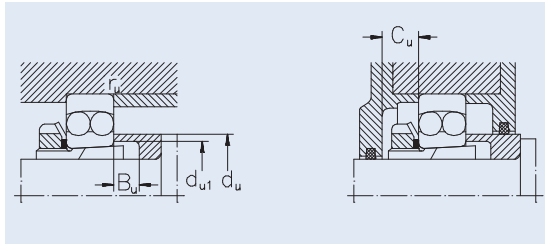
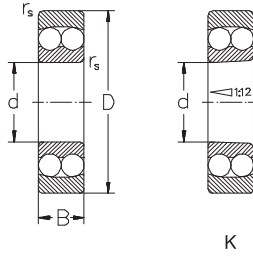


Table 7

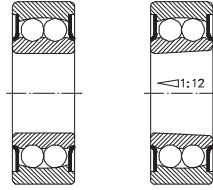
Bore symbol	Shaft diameter	Bearing series												All series C _u min
		12K			22K			13K			23K			
		d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	
mm														
04	17	23	27	5	23	27	5	23	30	8	24	28	5	
05	20	28	32	6	28	32	5	28	35	6	30	34	5	15
06	25	33	38	6	33	38	5	33	42	6	35	40	5	15
07	30	38	45	5	39	44	5	39	49	7	40	45	5	17
08	35	43	52	5	44	50	5	44	55	5	45	51	5	17
09	40	48	57	5	50	56	7	50	61	5	50	57	5	17
10	45	53	62	5	55	61	9	50	61	5	56	63	5	19
11	50	60	69	6	60	68	10	60	74	6	61	69	6	19
12	55	64	75	6	65	73	9	65	83	6	66	74	6	20
13	60	70	83	6	70	79	8	70	89	6	72	82	6	21
14	60	75	86	6	75	85	11	75	94	6	77	88	6	21
15	65	80	92	6	80	90	12	80	100	6	82	94	6	23
16	70	85	99	6	85	96	12	85	107	6	88	100	6	25
17	75	90	105	7	91	102	12	91	114	7	94	106	7	27
18	80	95	110	7	96	108	10	96	120	7	100	112	7	28
19	85	100	117	7	102	114	9	102	126	7	105	117	7	29
20	90	106	124	7	108	120	8	108	132	7	110	125	7	30
21	95	111	131	7										31
22	100	116	138	7										32

Self-aligning ball bearings



Dimensions				Basic radial load.Factors				stat.		Speed limit		Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	C _{0r}	Y ₀	grease	oil		kg
mm				kN	—			kN	—	min ⁻¹		—	
5	19	6	0,3	2,55	0,33	1,9	3	0,48	2	30 000	36 000	135	0,010
6	19	6	0,3	2,5	0,33	1,9	3	0,48	2	30 000	36 000	126	0,010
7	22	7	0,3	2,65	0,33	1,9	3	0,56	2	30 000	36 000	127	0,010
8	22	7	0,3	2,65	0,33	1,9	3	0,56	2	30 000	36 000	108	0,010
9	26	8	0,6	3,8	0,33	1,9	3	0,8	2	26 000	32 000	129	0,020
10	30	9	0,6	5,5	0,33	1,9	3	1,2	2	24 000	30 000	1200	0,030
	30	14	0,6	7,2	0,54	1,2	1,8	1,6	1,2	22 000	28 000	2200	0,040
	35	11	0,6	7,2	0,34	1,9	2,9	1,6	1,9	20 000	26 000	1300	0,620
12	32	10	0,6	5,6	0,37	1,7	2,6	1,25	1,8	22 000	28 000	1201	0,040
	32	14	0,6	7,6	0,53	1,2	1,8	1,75	1,2	20 000	26 000	2201	0,050
	37	12	1	9,4	0,35	1,8	2,8	2,15	1,9	18 000	22 000	1301	0,060
	37	17	1	9,4	0,54	1,2	1,8	2,3	1,2	17 000	20 000	2301	0,090
15	35	11	0,6	7,5	0,36	1,8	2,7	1,75	1,9	19 000	24 000	1202	0,040
	35	14	0,6	7,7	0,5	1,3	2	1,85	1,3	18 000	22 000	2202	0,060
	42	13	1	9,55	0,35	1,8	2,8	2,3	1,9	17 000	20 000	1302	0,090
	42	17	1	12,1	0,5	1,3	2	2,9	1,3	15 000	18 000	2302	0,110
17	40	12	0,6	7,9	0,32	1,9	3	2,05	2	18 000	22 000	1203	0,070
	40	16	0,6	9,8	0,5	1,3	2	2,4	1,3	17 000	20 000	2203	0,080
	47	14	1	12,5	0,34	1,8	2,9	3,15	2	14 000	17 000	1303	0,130
	47	19	1	14,5	0,49	1,3	2	3,6	1,3	13 000	16 000	2303	0,160
20	47	14	1	9,9	0,28	2,2	3,5	2,65	2,4	15 000	18 000	1204	0,120
	47	14	1	9,9	0,28	2,2	3,5	2,65	2,4	15 000	18 000	1204K	0,120
	47	18	1	12,6	0,28	2,2	3,5	3,3	2,4	14 000	17 000	2204	0,140
	47	18	1	12,6	0,28	2,2	3,5	3,3	2,4	14 000	17 000	2204K	0,140
	52	15	1,1	12,4	0,3	2,1	3,3	3,35	2,2	12 000	15 000	1304	0,160
	52	15	1,1	12,4	0,3	2,1	3,3	3,35	2,2	12 000	15 000	1304K	0,160
	52	21	1,1	18,2	0,52	1,2	1,9	4,7	1,3	11 000	14 000	2304	0,210
	52	21	1,1	18,2	0,52	1,2	1,9	4,7	1,3	11 000	14 000	2304K	0,210
25	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13 000	16 000	1205	0,140
	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13 000	16 000	1205K	0,140
	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13 000	16 000	1205M	0,140
	52	18	1	12,5	0,43	1,5	2,3	3,45	1,6	11 000	14 000	2205	0,160
	52	18	1	12,5	0,43	1,5	2,3	3,45	1,6	11 000	14 000	2205K	0,160
	52	18	1	12,2	0,29	2,2	3,4	3,3	2,3	7 000		2205 2RS	0,160
	52	18	1	12,2	0,29	2,2	3,4	3,3	2,3	7 000		2205 K2RS	0,160
	62	17	1,1	17,8	0,28	2,2	3,5	4,9	2,4	9 500	12 000	1305	0,260
	62	17	1,1	17,8	0,28	2,2	3,5	4,9	2,4	9 500	12 000	1305 K	0,260
	62	24	1,1	24,5	0,44	1,4	2,2	6,55	1,5	9 500	12 000	2305	0,340
	62	24	1,1	24,5	0,44	1,4	2,2	6,55	1,5	9 500	12 000	2305 K	0,340

Self-aligning ball bearings

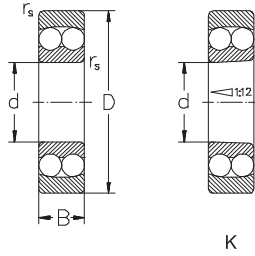


2RS

K2RS

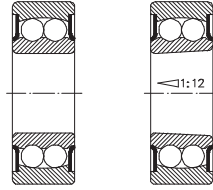
Dimensions				Basic radial load.Factors				stat.		Speed limit		Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	C _{0r}	Y ₀	grease	oil		
mm				kN	—			kN	—	min ⁻¹		—	kg
25	62	24	1,1	17,8	0,28	2,2	3,5	4,9	2,4	6 300		2305 2RS	0,330
	62	24	1,1	17,8	0,28	2,2	3,5	4,9	2,4	6 300		2305 2RS	0,330
30	62	16	1	15,7	0,25	2,5	3,9	4,7	2,7	10 000	13 000	1206	0,220
	62	16	1	15,7	0,25	2,5	3,9	4,7	2,7	10 000	13 000	1206 K	0,220
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9 500	12 000	2206	0,260
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9 500	12 000	2206 K	0,260
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9 500	12 000	2206 M	0,260
	62	20	1	15,7	0,25	2,5	3,9	4,7	2,7	5 300		2206 2RS	0,260
	62	20	1	15,7	0,25	2,5	3,9	4,7	2,7	5 300		2206 K2RS	0,260
	72	19	1,1	21,4	0,24	2,6	4,1	6,35	2,8	9 000	11 000	1306	0,380
	72	19	1,1	21,4	0,24	2,6	4,1	6,35	2,8	9 000	11 000	1306 K	0,380
	72	27	1,1	31,4	0,4	1,6	2,5	8,7	1,7	8 500	10 000	2306	0,500
	72	27	1,1	31,4	0,4	1,6	2,5	8,7	1,7	8 500	10 000	2306 K	0,500
	72	27	1,1	21,4	0,24	2,6	4,1	6,35	2,8	5 600		2306 2RS	0,500
35	72	17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9 000	11 000	1207	0,320
	72	17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9 000	11 000	1207 K	0,320
	72	17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9 000	11 000	1207 M	0,320
	72	23	1,1	21,7	0,37	1,7	2,6	6,7	1,8	8 500	10 000	2207	0,400
	72	23	1,1	21,7	0,37	1,7	2,6	6,7	1,8	8 500	10 000	2207 K	0,400
	72	23	1,1	15,8	0,23	2,8	4,2	5,15	2,9	5 600		2207 2RS	0,400
	72	23	1,1	15,8	0,23	2,8	4,2	5,15	2,9	5 600		2207 K2RS	0,400
	80	21	1,5	25,1	0,25	2,5	3,9	7,95	2,7	7 500	9 000	1307	0,510
	80	21	1,5	25,1	0,25	2,5	3,9	7,95	2,7	7 500	9 000	1307 K	0,510
	80	31	1,5	39,7	0,43	1,5	2,3	12,9	1,6	7 000	8 500	2307	0,670
	80	31	1,5	39,7	0,43	1,5	2,3	12,9	1,6	7 000	8 500	2307 K	0,670
	80	31	1,5	25,1	0,25	2,5	3,9	7,95	2,7	4 500		2307 2RS	0,670
40	80	18	1,1	19,2	0,22	2,9	4,5	6,5	3	8 500	10 000	1208	0,410
	80	18	1,1	19,2	0,22	2,9	4,5	6,5	3	8 500	10 000	1208 K	0,410
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7 500	9 000	2208	0,500
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7 500	9 000	2208 K	0,500
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7 500	9 000	2208 M	0,500
	80	23	1,1	19,2	0,22	2,9	4,5	6,5	3	4 800		2208 2RS	0,500
	80	23	1,1	19,2	0,22	2,9	4,5	6,5	3	4 800		2208 K2RS	0,500
	90	23	1,5	29,5	0,24	2,6	4,1	9,75	2,8	6 700	8 000	1308	0,710
	90	23	1,5	29,5	0,24	2,6	4,1	9,75	2,8	6 700	8 000	1308 K	0,710
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6 300	7 500	2308	0,920
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6 300	7 500	2308 K	0,920
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6 300	7 500	2308 M	0,920
45	85	19	1,1	21,8	0,21	3	4,7	7,4	3,2	7 500	9 000	1209	0,460
	85	19	1,1	21,8	0,21	3	4,7	7,4	3,2	7 500	9 000	1209 K	0,460
	85	23	1,1	23,3	0,31	2	3,1	8,15	2,1	7 000	8 500	2209	0,540
	85	23	1,1	23,3	0,31	2	3,1	8,15	2,1	7 000	8 500	2209 K	0,540

Self-aligning ball bearings



Dimensions				Basic radial load.Factors				Speed limit				Designation Weight	
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	—			kN	—	min ⁻¹		—	kg
45	85	23	1,1	21,8	0,21	3	4,7	7,4	3,2	4 500		2209 2RS	0,540
	85	23	1,1	21,8	0,21	3	4,7	7,4	3,2	4 500		2209 K2RS	0,540
	100	25	1,5	37,7	0,24	2,6	4,1	12,9	2,8	6 300	7 500	1309	0,950
	100	25	1,5	37,7	0,24	2,6	4,1	12,9	2,8	6 300	7 500	1309 K	0,950
	100	36	1,5	54,1	0,31	2	3,1	16,5	2,1	5 600	6 700	2309	1,23
	100	36	1,5	54,1	0,31	2	3,1	16,5	2,1	5 600	6 700	2309 K	1,23
	100	36	1,5	37,7	0,24	2,6	4,1	12,9	2,8	3 600		2309 2RS	1,23
	90	20	1,1	22,9	0,21	3	4,7	8,1	3,2	7 000	8 500	1210	0,520
	90	20	1,1	22,9	0,21	3	4,7	8,16	3,2	7 000	8 500	1210 K	0,520
	90	23	1,1	23,3	0,29	2,2	3,4	8,5	2,3	6 300	7 500	2210	0,590
	90	23	1,1	23,3	0,29	2,2	3,4	8,5	2,3	6 300	7 500	2210 K	0,590
	90	23	1,1	22,9	0,21	3	4,6	8,1	3,2	4 000		2210 2RS	0,590
50	90	23	1,1	22,9	0,21	3	4,6	8,1	3,2	4 000		2210 K2RS	0,590
	110	27	2	43,4	0,24	2,6	4,1	14,2	2,8	5 600	6 700	1310	1,21
	110	27	2	43,4	0,24	2,6	4,1	14,2	2,8	5 600	6 700	1310 K	1,21
	110	40	2	64,4	0,42	1,5	2,3	20	1,6	5 300	6 300	2310	1,23
	110	40	2	64,4	0,42	1,5	2,3	20	1,6	5 300	6 300	2310 K	1,23
	110	40	2	43,4	0,24	2,6	4,1	14,2	2,8	3 400		2310 2RS	1,64
	100	21	1,5	26,6	0,2	3,2	4,9	10,1	3,3	6 300	7 500	1211	0,700
	100	21	1,5	26,6	0,2	3,2	4,1	10,1	3,3	6 300	7 500	1211 K	0,700
	100	25	1,5	26,5	0,27	2,3	3,6	9,9	2,5	6 000	7 000	2211	0,810
	100	25	1,5	26,5	0,27	2,3	3,6	9,9	2,5	6 000	7 000	2211 K	0,810
	120	29	2	51,3	0,23	2,3	4,2	18,1	2,9	5 000	6 000	1311	1,58
	120	29	2	51,3	0,23	2,3	4,2	18,1	2,9	5 000	6 000	1311 K	1,58
55	120	43	2	75,3	0,41	1,5	2,4	23,8	1,6	4 800	5 600	2311	2,10
	120	43	2	75,3	0,41	1,5	2,4	23,8	1,6	4 800	5 600	2311 K	2,10
	110	22	1,5	30,2	0,19	3,4	5,2	11,6	3,5	5 600	6 700	1212	0,900
	110	22	1,5	30,2	0,19	3,4	5,2	11,6	3,5	5 600	6 700	1212 K	0,900
	110	28	1,5	33,8	0,28	2,2	3,5	12,6	2,4	5 300	6 300	2212	1,10
	110	28	1,5	33,8	0,28	2,2	3,5	12,6	2,4	5 300	6 300	2212 K	1,10
	130	31	2,1	57,1	0,23	2,8	4,2	20,8	2,9	4 500	5 300	1312	1,96
	130	31	2,1	57,1	0,23	2,8	4,2	20,8	2,9	4 500	5 300	1312 K	1,96
	130	46	2,1	87,1	0,41	1,5	2,4	28	1,6	4 300	5 000	2312	2,60
	130	46	2,1	87,1	0,41	1,5	2,4	28	1,6	4 300	5 000	2312 K	2,60
	120	23	1,5	31	0,17	3,7	5,7	12,4	3,9	5 300	6 300	1213	1,15
	120	23	1,5	31	0,17	3,7	5,7	12,4	3,9	5 300	6 300	1213 K	1,15
60	120	31	1,5	43,6	0,28	2,2	3,5	16,4	2,4	5 000	6 000	2213	1,45
	120	31	1,5	43,6	0,28	2,2	3,5	16,4	2,4	5 000	6 000	2213 K	1,45
	140	33	2,1	62	0,23	2,8	4,2	22,9	2,8	4 300	5 000	1313	2,45
	140	33	2,1	62	0,23	2,8	4,2	22,9	2,8	4 300	5 000	1313 K	2,45
	140	48	2,1	95,6	0,38	1,7	2,6	32,5	1,7	4 000	4 800	2313	3,25
	140	48	2,1	95,6	0,38	1,7	2,6	32,5	1,7	4 000	4 800	2313 K	3,25

Self-aligning ball bearings

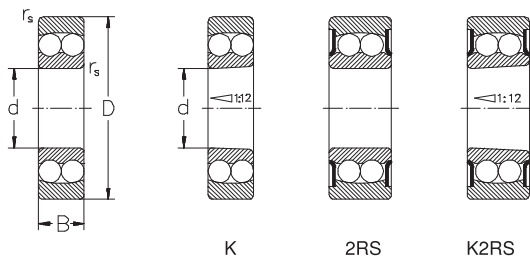


2RS

K2RS

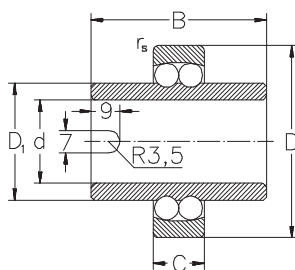
Dimensions				Basic radial load.Factors				Speed limit				Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	–			kN	–	min ^{–1}		–	kg
70	125	24	1,5	34,6	0,18	3,5	5,4	13,7	3,7	5 000	6 000	1214	1,25
	125	24	1,5	34,6	0,18	3,5	5,4	13,7	3,7	5 000	6 000	1214 K	1,25
	125	31	1,5	44,2	0,27	2,3	3,6	17,1	2,5	4 800	5 600	2214	1,50
	125	31	1,5	44,2	0,27	2,3	3,6	17,1	2,5	4 800	5 600	2214 K	1,50
	150	35	2,1	74,1	0,22	2,9	4,5	27,7	3	4 000	4 800	1314	3,00
	150	35	2,1	74,1	0,22	2,9	4,5	27,7	3	4 000	4 800	1314 K	3,00
	150	51	2,1	111	0,35	1,8	2,8	31,7	1,9	3 600	4 300	2314	3,90
	150	51	2,1	111	0,35	1,8	2,8	31,7	1,9	3 600	4 300	2314 K	3,90
	130	25	1,5	38,9	0,18	3,5	5,4	15,6	3,7	4 800	5 600	1215	1,35
	130	25	1,5	38,9	0,18	3,5	5,4	15,6	3,7	4 800	5 600	1215 K	1,35
75	130	31	1,5	44	0,25	2,5	3,9	17,8	2,7	4 500	5 300	2215	1,60
	130	31	1,5	44	0,25	2,5	3,9	17,8	2,7	4 500	5 300	2215 K	1,60
	160	37	2,1	79,2	0,22	2,9	4,5	30	3	3 600	4 300	1315	3,55
	160	37	2,1	79,2	0,22	2,9	4,5	30	3	3 600	4 300	1315 K	3,55
	160	55	2,1	123	0,38	1,7	2,6	42,8	1,7	3 400	4 000	2315	4,70
	160	55	2,1	123	0,38	1,7	2,6	42,8	1,7	3 400	4 000	2315 K	4,70
	160	55	2,1	123	0,38	1,7	2,6	42,8	1,7	3 400	4 000	2315 KM	4,70
	140	26	2	39,8	0,16	3,9	6,1	17	4,1	4 300	5 000	1216	1,65
	140	26	2	39,8	0,16	3,9	6,1	17	4,1	4 300	5 000	1216 K	1,65
	140	33	2	48,8	0,26	2,4	3,7	19,9	2,5	4 000	4 800	2216	2,00
80	140	33	2	48,8	0,26	2,4	3,7	19,9	2,5	4 000	4 800	2216 K	2,00
	170	39	2,1	88,4	0,22	2,9	4,5	33	3	3 400	4 000	1316	4,20
	170	39	2,1	88,4	0,22	2,9	4,5	33	3	3 400	4 000	1316 K	4,20
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3 200	3 800	2316	6,10
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3 200	3 800	2316 K	6,10
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3 200	3 800	2316 M	6,10
	150	28	2	48,2	0,17	3,7	5,7	20,8	3,9	4 000	4 800	1217	2,05
	150	28	2	48,2	0,17	3,7	5,7	20,8	3,9	4 000	4 800	1217 K	2,05
	150	36	2	58,5	0,25	2,5	3,9	23,8	2,7	3 800	4 800	2217	2,50
	150	36	2	58,5	0,25	2,5	3,9	23,8	2,7	3 800	4 500	2217 K	2,50
85	180	41	3	97,5	0,22	2,9	4,5	37,9	3	3 200	4 800	1317	5,00
	180	41	3	97,5	0,22	2,9	4,5	37,9	3	3 200	4 800	1317 K	5,00
	180	60	3	140	0,37	1,7	2,6	51,5	1,8	3 000	3 600	2317	7,05
	180	60	3	140	0,37	1,7	2,6	51,5	1,8	3 000	3 600	2317 K	7,05
	160	30	2	57	0,17	3,7	5,7	23,1	3,9	3 800	4 500	1218	2,50
	160	30	2	57	0,17	3,7	5,7	23,1	3,9	3 800	4 500	1218 K	2,50
	160	40	2	70,2	0,27	2,3	3,6	27,2	2,5	3 600	4 300	2218	3,40
	160	40	2	70,2	0,27	2,3	3,6	27,2	2,5	3 600	4 300	2218 K	3,40
	190	43	3	117	0,22	2,9	4,5	44,5	3	3 000	3 600	1318	5,80
	190	43	3	117	0,22	2,9	4,5	44,5	3	3 000	3 600	1318 K	5,80
90	190	64	3	153	0,38	1,7	2,6	57,7	1,7	2 800	3 400	2318	8,45
	190	64	3	153	0,38	1,7	2,6	57,7	1,7	2 800	3 400	2318 K	8,45

Self-aligning ball bearings



Dimensions				Basic radial load.Factors					Speed limit			Designation Weight	
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	—			kN	—	min ⁻¹		—	kg
95	170	32	2,1	63,7	0,17	3,7	5,7	24,3	3,9	3 400	4 000	1219	3,10
	170	32	2,1	63,7	0,17	3,7	5,7	24,3	3,9	3 400	4 000	1219 K	3,10
	200	45	3	133	0,23	2,8	4,2	50,8	2,9	2 800	3 400	1319	6,70
	200	45	3	133	0,23	2,8	4,2	50,8	2,9	2 800	3 400	1319 K	6,70
100	180	34	2,1	68,9	0,17	3,7	5,7	29,7	3,9	3 200	3 800	1220	3,70
	180	34	2,1	68,9	0,17	3,7	5,7	29,7	3,9	3 200	3 800	1220 K	3,70
	180	46	2,1	97,5	0,24	2,6	4,1	34	2,8	3 200	3 800	2220	5,00
	180	46	2,1	97,5	0,24	2,6	4,1	34	2,8	3 200	3 800	2220 K	5,00
	215	47	3	143	0,24	2,6	4,1	57,3	2,8	2 600	3 200	1320	8,30
	215	47	3	143	0,24	2,6	4,1	57,3	2,8	2 600	3 200	1320 K	8,30
	215	73	3	193	0,34	1,9	2,9	73,4	2	2 400	3 000	2320	12,2
	215	73	3	193	0,34	1,9	2,9	73,4	2	2 400	3 000	2320 K	12,5
110	200	38	2,1	88	0,17	3,7	5,7	35,2	3,9	2 800	3 400	1222	5,15
	200	38	2,1	88	0,17	3,7	5,7	35,2	3,9	2 800	3 400	1222 K	5,15
	200	53	2,1	124	0,26	2,4	3,7	48,9	2,5	2 800	3 400	2222	7,10
	200	53	2,1	124	0,26	2,4	3,7	48,9	2,5	2 800	3 400	2222 K	7,10
	240	50	3	163	0,22	2,9	4,5	67,5	3	2 400	3 000	1322	12,0
	240	50	3	163	0,22	2,9	4,5	67,5	3	2 400	3 000	1322 K	12,0
	240	50	3	163	0,22	2,9	4,5	67,5	3	2 400	3 000	1322 K	12,0

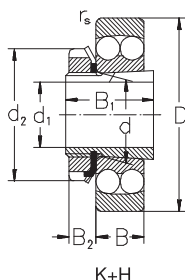
Self-aligning ball bearings with extended inner ring



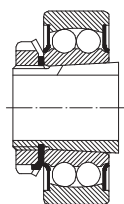
Dimensions				Basic radial load. Factors								Speed limit		Designation	
d ¹⁾	D	C	B	D ₁	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm						kN	—			kN	—	min ⁻¹		—	kg
20	47	14	40	29,2	1	9,9	0,28	2,2	3,5	2,65	2,4	7 100	9 000	11204	0,180
	52	15	44	31,5	1,1	12,4	0,3	2,1	3,3	3,35	2,2	8 000	6 300	11304	0,270
25	52	15	44	33,3	1	12,2	0,29	2,2	3,4	3,3	2,3	6 300	8 000	11205	0,220
	62	17	48	38	1,1	17,8	0,28	2,2	3,5	4,9	2,4	5 000	6 300	11305	0,410
30	62	16	48	40,1	1	15,7	0,25	2,5	3,9	4,7	2,7	5 000	6 300	11206	0,350
	72	19	52	45	1,1	21,4	0,24	2,6	4,1	6,35	2,8	4 000	5 000	11306	0,610
35	72	17	52	47,7	1,1	15,8	0,23	2,8	4,2	5,15	2,9	4 000	5 000	11207	0,540
	80	21	56	51,7	1,5	25,1	0,25	2,5	3,9	7,95	2,7	3 600	4 500	11307	0,810
40	80	18	56	54	1,1	19,2	0,22	2,9	4,5	6,5	3	3 600	4 500	11208	0,720
	90	23	58	57,7	1,5	29,5	0,24	2,6	4,1	9,75	2,8	3 200	4 000	11308	1,08
45	85	19	58	57,7	1,1	21,8	0,21	3	4,7	7,4	3,2	3 600	4 500	11209	0,770
	100	25	60	63,9	1,5	37,7	0,24	2,6	4,1	12,8	2,8	2 800	3 600	11309	1,38
50	90	20	58	62,7	1,1	22,9	0,21	3	4,7	8,1	3,2	3 200	4 000	11210	0,850
	110	27	62	70,3	2	43,4	0,24	2,6	4,1	14,1	2,8	2 500	3 200	11310	1,72
55	100	21	60	69,5	1,5	26,6	0,2	3,2	4,9	10,0	3,3	2 800	3 600	11211	1,13
60	110	22	62	78	1,5	30,2	0,19	3,4	5,2	11,6	3,5	2 500	3200	11212	1,50

1) Tolerance J7

Self-aligning ball bearings with adapter sleeve



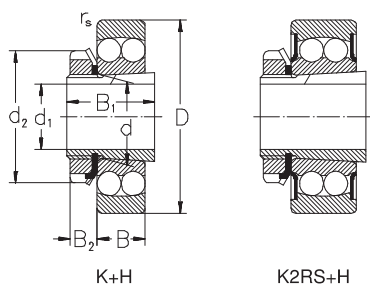
Dimensions				rs min.	d2	B1	B2	Designation bearing	adapter sleeve	Weight
d1	d	D	B							
mm								—		kg
17	20	47	14	1	32	24	7	1204 K	H204	0,167
	20	47	18	1	32	28	7	2204 K	H304	0,201
	20	52	15	1,1	32	28	7	1304 K	H304	0,221
	20	52	21	1,1	32	31	7	2304 K	H2304	0,281
20	25	52	15	1	38	26	8	1205 K	H205	0,219
	25	52	18	1	38	29	8	2205 K	H305	0,233
	25	52	18	1	38	29	8	2205 K2RS	H305	0,236
	25	62	17	1,1	38	29	8	1305 K	H305	0,227
	25	62	24	1,1	38	35	8	2305 K	H2305	0,414
25	30	62	16	1	45	27	8	1206 K	H206	0,33
	30	62	20	1	45	31	8	2206 K	H306	0,363
	30	62	20	1	45	31	8	2206 K2RS	H306	0,363
	30	72	19	1,1	45	31	8	1306 K	H306	0,49
	30	72	27	1,1	45	38	8	2306 K	H2306	0,615
30	35	72	17	1,1	52	29	9	1207 K	H207	0,422
	35	72	23	1,1	52	35	9	2207 K	H307	0,538
	35	72	23	1,1	52	35	9	2207 K2RS	H307	0,538
	35	80	21	1,5	52	35	9	1307 K	H307	0,644
	35	80	31	1,5	52	43	9	2307 K	H2307	0,822
35	40	80	18	1,1	58	31	10	1208 K	H208	0,585
	40	80	23	1,1	58	36	10	2208 K	H308	0,683
	40	80	23	1,1	58	36	10	2208 K2RS	H308	0,683
	40	90	23	1,5	58	36	10	1308 K	H308	0,893
	40	90	33	1,5	58	46	10	2308 K	H2308	1,13
40	45	85	19	1,1	65	33	11	1209 K	H209	0,686
	45	85	23	1,1	65	39	11	2209 K	H309	0,781
	45	85	23	1,1	65	39	11	2209 K2RS	H309	0,781
	45	100	25	1,5	65	39	11	1309 K	H309	1,19
	45	100	36	1,5	65	50	11	2309 K	H2309	1,48
45	50	90	20	1,1	70	35	12	1210 K	H210	0,789
	50	90	23	1,1	70	42	12	2210 K	H310	0,88
	50	90	23	1,1	70	42	12	2210 K2RS	H310	0,88
	50	110	27	2	70	42	12	1310 K	H310	1,49
	50	110	40	2	70	55	12	2310 K	H2310	1,96
50	55	100	21	1,5	75	37	12	1211 K	H211	1
	55	100	25	1,5	75	45	12	2211 K	H311	1,2
	55	120	29	2	75	45	12	1311 K	H311	1,91
	55	120	43	2	75	59	12	2311 K	H2311	2,47
55	60	110	22	1,5	80	38	13	1212 K	H212	1,03
	60	110	28	1,5	80	47	13	2212 K	H312	1,55
	60	130	31	2,1	80	47	13	1312 K	H312	2,32
	60	130	46	2,1	80	62	13	2312 K	H2312	3,01
60	65	120	23	1,5	85	40	14	1213 K	H213	1,53



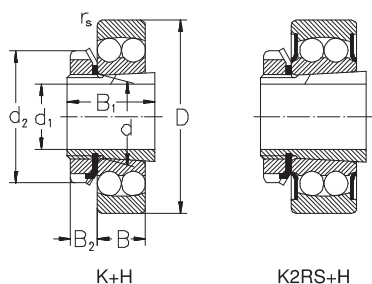
K2RS+H

Basic radial load. Factors				Speed limit			
dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil
kN	—			kN	—	min ⁻¹	
9,9	0,28	2,2	3,5	2,65	2,4	15 000	18 000
12,6	0,28	2,2	3,5	3,3	2,4	14 000	17 000
12,4	0,3	2,1	3,3	3,35	2,2	12 000	15 000
18,2	0,52	1,2	1,9	4,7	1,3	11 000	14 000
12,2	0,29	2,2	3,4	3,3	2,3	13 000	16 000
12,5	0,43	1,5	2,3	3,45	1,6	11 000	14 000
12,2	0,29	2,2	3,4	3,3	2,3	7 000	
17,8	0,28	2,2	3,5	4,9	2,4	9 500	12 000
24,5	0,44	1,4	2,2	6,55	1,5	9 500	12 000
15,7	0,25	2,5	3,9	4,7	2,7	10 000	13 000
15,3	0,4	1,6	2,5	4,6	1,7	9 500	12 000
15,7	0,25	2,5	3,9	4,7	2,7	5 300	
21,4	0,24	2,6	4,1	6,35	2,8	9 000	11 000
31,4	0,4	1,6	2,5	8,7	1,7	8 500	10 000
15,8	0,23	2,8	4,2	5,15	2,9	9 000	11 000
21,7	0,37	1,7	2,6	6,7	1,8	8 500	10 000
15,8	0,23	2,8	4,2	5,15	2,9	5 600	
25,1	0,25	2,5	3,9	7,95	2,7	7 500	9 000
39,7	0,43	1,5	2,3	12,9	1,6	7 000	8 500
19,2	0,22	2,9	4,5	6,5	3	8 500	10 000
22,4	0,33	1,9	3	7,4	2	7 500	9 000
19,2	0,22	2,9	4,5	6,5	3	4 800	
29,5	0,24	2,6	4,1	9,75	2,8	6 700	8 000
44,9	0,39	1,6	2,5	15,1	1,7	6 300	7 500
21,8	0,21	3	4,7	7,4	3,2	7 500	9 000
23,3	0,31	2	3,1	8,15	2,1	7 000	8 500
21,8	0,21	3	4,7	7,4	3,2	4 500	
37,7	0,24	2,6	4,1	12,9	2,8	6 300	7 500
54,1	0,31	2	3,1	16,5	2,1	5 600	6 700
22,9	0,21	3	4,7	8,16	3,2	7 000	8 500
23,3	0,29	2,2	3,4	8,5	2,3	6 300	7 500
22,9	0,21	3	4,6	8,1	3,2	4 000	
43,4	0,24	2,6	4,1	14,2	2,8	5 600	6 700
64,4	0,42	1,5	2,3	20	1,6	5 300	6 300
26,6	0,2	3,2	4,1	10,1	3,3	6 300	7 500
26,5	0,27	2,3	3,6	9,9	2,5	6 000	7 000
51,3	0,23	2,8	4,2	18,1	2,9	5 000	6 000
75,3	0,41	1,5	2,4	23,8	1,6	4 800	5 600
30,2	0,19	3,4	5,2	11,6	3,5	5 600	6 700
33,8	0,28	2,2	3,5	12,6	2,4	5 300	6 300
57,1	0,23	2,8	4,2	20,8	2,9	4 500	5 300
87,1	0,41	1,5	2,4	28	1,6	4 300	5 000
31	0,17	3,7	5,7	12,4	3,9	5 300	6 300

Self-aligning ball bearings with adapter sleeve



Dimensions								Designation		Weight
d1	d	D	B	rs min.	d2	B1	B2	bearing	adapter sleeve	
mm								—		kg
60	65	120	31	1,5	85	50	14	2213 K	H313	2,00
	65	140	33	2,1	85	50	14	1313 K	H313	2,87
	65	140	48	2,1	85	65	14	2313 K	H2313	3,71
65	75	130	25	1,5	98	43	15	1215 K	H215	2,05
	75	130	31	1,5	98	55	15	2215 K	H315	2,52
	75	160	37	2,1	98	55	15	1315 K	H315	4,34
65	75	160	55	2,1	98	73	15	2315 K	H2315	5,66
70	80	140	26	2	105	46	17	1216 K	H216	2,52
	80	140	33	2	105	59	17	2216 K	H316	3,18
	80	170	39	2,1	105	59	17	1316 K	H316	5,33
	80	170	58	2,1	105	78	17	2316 K	H2316	7,24
75	85	150	28	2	110	50	18	1217 K	H217	3,06
	85	150	36	2	110	63	18	2217 K	H317	3,85
	85	180	41	3	110	63	18	1317 K	H317	6,27
	85	180	60	3	110	82	18	2317 K	H2317	8,34
80	90	160	30	2	120	52	18	1218 K	H218	3,67
	90	160	40	2	120	65	18	2218 K	H318	4,74
	90	190	43	3	120	65	18	1318 K	H318	7,36
	90	190	64	3	120	86	18	2318 K	H2318	9,94
85	95	170	32	2,1	125	55	19	1219 K	H219	4,42
	95	200	45	3	125	68	19	1319 K	H319	8,30
90	100	180	34	2,1	130	58	20	1220 K	H220	5,13
	100	180	46	2,1	130	71	20	2220 K	H320	6,63
	100	215	47	3	130	71	20	1320 K	H320	9,96
	100	215	73	3	130	97	20	2320 K	H2320	14,3
100	110	200	38	2,1	145	63	21	1222 K	H222	7,00
	110	200	53	2,1	145	77	21	2222 K	H322	9,15
	110	240	50	3	145	77	21	1322 K	H322	13,9



Basic radial load. Factors					Speed limit		
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil
kN	—			kN	—	min^{-1}	
43,6	0,28	2,2	3,5	16,4	2,4	5 000	6 000
62	0,23	2,8	4,2	22,9	2,8	4 300	5 000
95,6	0,38	1,7	2,6	32,5	1,7	4 000	4 800
38,9	0,18	3,5	5,4	15,6	3,7	4 800	5 600
44	0,25	2,5	3,9	17,8	2,7	4 500	5 300
79,2	0,22	2,9	4,5	30	3	3 600	4 300
123	0,38	1,7	2,6	42,8	1,7	4 300	4 000
39,8	0,16	3,9	6,1	17	4,1	4 300	5 000
48,8	0,26	2,4	3,7	19,9	2,5	4 000	4 800
88,4	0,22	2,9	4,5	33	3	3 400	4 000
136	0,34	1,9	2,9	48,5	2	3 200	3 800
48,8	0,17	3,7	5,7	20,8	3,9	4 000	4 800
58,5	0,25	2,5	3,9	23,8	2,7	3 800	4 500
97,5	0,22	2,9	4,5	37,9	3	3 200	3 800
140	0,37	1,7	2,6	51,5	1,8	3 000	3 600
57	0,17	3,7	5,7	23,1	3,9	3 800	4 500
70,2	0,27	2,3	3,6	27,2	2,5	3 600	4 300
117	0,22	2,9	4,5	44,5	3	3 000	3 600
153	0,38	1,7	2,6	57,7	1,7	2 800	3 400
63,7	0,17	3,7	5,7	24,3	3,9	3 400	4 000
133	0,23	2,8	4,2	50,8	2,9	2 800	3 400
68,9	0,17	3,7	5,7	29,7	3,9	3 200	3 800
97,5	0,24	2,6	4,1	34	2,8	2 200	3 800
143	0,24	2,6	4,1	57,3	2,8	2 600	3 200
193	0,34	1,9	2,9	73,4	2	2 400	3 000
88	0,17	3,7	5,7	35,2	3,9	2 800	3 400
124	0,26	2,4	3,7	48,9	2,5	2 800	3 400
163	0,22	2,9	4,5	67,5	3	2 400	3 000



Angular contact ball bearings, single row



Angular contact ball bearings, single row

Single row angular contact ball bearings are manufactured in various constructive versions, with various contact angles, depending on the application. Bearings series 72B and 73B for general applications have a contact angle $\alpha = 40^\circ$. Bearings series 718, 719, 70 and 72 generally used

for tool-holders, have phenol resins (textolite) cages or machined brass cages. Those with bore diameters up to $d = 100$ mm are manufactured to tolerance classes P5, P4 and P2 and have a contact angle of 15° (C) and 25° (A) respectively.



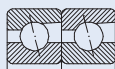
Series 72B, 73B
Contact angle $\alpha = 40^\circ$



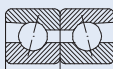
Series 70A, 72A
Contact angle $\alpha = 25^\circ$



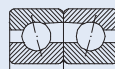
Series 70C, 72C
Contact angle $\alpha = 15^\circ$



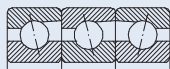
DT arrangement
(Tandem)



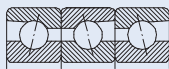
DB arrangement
(Back-to-back)



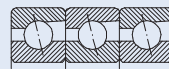
DF arrangement
(Face-to-face)



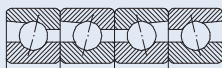
TFT arrangement



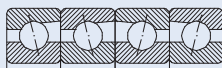
TBT arrangement



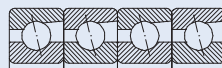
TT arrangement



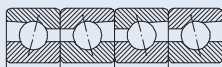
QBC arrangement



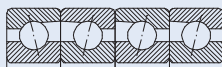
QFC arrangement



QT arrangement



QBT arrangement



QFT arrangement

Suffixes

A	- bearing with extended outer ring
B	- bearing with contact angle $\alpha = 25^\circ$
B	- bearing with extended outer ring
B	- bearing with contact angle $\alpha = 40^\circ$
BB	- bearing with $\alpha = 40^\circ$ and extended inner ring
C	- bearing with contact angle $\alpha = 15^\circ$
CA	- bearing with radial clearance smaller than normal
CB	- bearing with normal radial clearance
CC	- radial bearing with axial clearance larger than normal
D	- two bearings set
D	- bearing with two-pieces inner ring
DB	- two bearings set in back-to-back arrangement, (O)
DF	- two bearings set in face-to-face arrangement, (X)
DT	- two bearings set in tandem arrangement
E	- bearing with contact angle $\alpha = 20^\circ$
FA	- bearing with machined cage of steel or cast iron, guided in the outer ring
FB	- bearing with machined cage of steel or cast iron guided on the inner ring
GA	- light preload, bearings series 72B, 73B
GB	- moderate preload, bearings series 72B, 73B
GC	- heavy preload, bearings series 72B, 73B
L	- light preload, bearings series 70C, 70A, 72A
M	- moderate preload, bearings series 70C, 70A, 72A
M	- machined brass cage, ball guided
MA	- machined brass cage, guided in the outer ring
MB	- machined brass cage, guided on the inner ring
O	- bearing set without axial clearance
P0	- normal tolerance class
P6	- tolerance class more accurate than normal
P5	- tolerance class more accurate than P6
P4	- tolerance class more accurate than P5
P2	- tolerance class more accurate than P4
Q	- four bearings set
QBC	- tandem pairs in O arrangement
QBT	- tandem pairs plus O arrangement
QFC	- tandem pairs in X arrangement
QFT	- tandem pairs plus X arrangement
QT	- tandem pairs
S	- heavy preload, bearings series 70C, 70A, 72A
S0	- bearings operating up to a temperature of $+150^\circ\text{C}$
S1	- bearings operating up to a temperature of $+200^\circ\text{C}$
T	- three bearings set
T	- bearing set total width (T168, T200)
TBT	- three bearings set in O arrangement, plus T
TFT	- three bearings set in X arrangement, plus T
TT	- three bearings set in tandem arrangement
TN	- polyamide cage
V	- full complement bearing
U	- bearings of universal design, with deviations of d and D, from table 1 on page 175 and K_i , K_o in P2 class
UA	- bearings with small axial clearance at DB and DF arrangements
UL	- bearings with light preload at DB and DF arrangements
UO	- bearings without small axial clearance at DB and DF arrangements
UP	- tolerance class with deviations of d and D in P4 class and of K_i and K_o in P2 class.

Single row angular contact ball bearings can take only one direction axial loads. When being radially loaded, in bearing occurs an axially acting load which has to be compensated.

For this reason, a bearing or paired bearings are mounted on each shaft end.

Single row angular contact ball bearings with B suffix have a contact angle $\alpha = 40^\circ$ and are suitable in case of heavy loads.

These bearings are not dismountable and their use at relatively high speeds is allowed.

Pair mounting of bearings as shown in figures on page 119 is used when the load carrying capacity of a single bearing is inadequate (tandem arrangement), respectively when axial loads have to be taken in both directions (DB or DF arrangements).

In case of DT tandem arrangement, the contact lines are in parallel. Radial and axial loads are uniformly distributed on both bearings. The bearing pair can take axial loads in only one direction. Therefore, a third bearing should take axial loads in the opposite direction.

In case of DB arrangement, the contact lines diverge towards the bearing axis and form letter "O". Axial loads are taken in both directions, but only by one single bearing for each direction.

DB arrangement is considered to be a relatively stiff arrangement and can also take tilting moments.

The contact lines of DF arrangement converge towards the bearing axis and form letter "X". Axial loads are taken in the same way as in case of DB arrangement, but the arrangement is not so stiff and it is less suitable for taking tilting moments.

Universal design

Single row angular contact ball bearings of universal design are suitable for DB, DF and DT arrangements.

Bearings of universal design are manufactured to more accurate tolerance classes and can be matched if the mounting conditions UA, UO and UL are observed.

The values of clearance or preload are obtained when the shaft is manufactured to tolerance class j5 and the housing bore to tolerance class J6.

Dimensions

Main dimensions of bearings given in tables are in accordance with ISO 15.

Misalignment

In case of single row angular contact ball bearings the conditions regarding the permissible error of alignment of the outer ring relative to the inner ring are as complex as for single row deep groove ball bearings.

When the bearings are paired in DB arrangement, angular misalignments of the outer ring in relation to the inner ring can only be accommodated between the balls and raceways by force, leading to a reduction in bearing life.

Tolerances

Single row angular contact ball bearings of series 72B and 73B, with a contact angle $\alpha = 40^\circ$ (B) are generally manufactured to the normal tolerance class.

At request, they also can be manufactured to normal

tolerance classes P6 and P5.

Single row angular contact ball bearings of high accuracy, series 70C, 72C, 70A and 72A, with a contact angle $\alpha = 15^\circ$ (C) and $\alpha = 25^\circ$ are manufactured to tolerance classes SP, P4, UP and P2.

The deviations of bore diameter, outside diameter and width of high accuracy single row angular contact ball

bearings of universal design (UL) are given in table 1.

In case of single row angular contact ball bearings manufactured and delivered in sets of 2, 3 or 4 bearings, outside and bore diameter should be chosen considering the mean tolerance values, which are given on the package.

Deviations of main dimensions of high accuracy single row angular contact bearings									
Deviations in μm									
Bore d		$\Delta\text{dmp}, \Delta\text{Dmp}$						ΔBS	
(mm)		P4		UP		P2			
over	up to	low	high	low	high	low	high	low	high
—	18	— 3	— 1	— 3	— 1	— 2	0	— 250	0
18	30	— 3,5	— 1,5	— 3	— 1	— 2	0	— 250	0
30	50	— 4	— 1,5	— 3	— 1	— 2	0	— 250	0
50	80	— 5	— 2	— 3,5	— 1,5	— 3	— 1	— 250	0
80	120	— 5,5	— 2			— 3,5	— 1,5	— 380	0

Table 1

Contact angle

In case of single row angular contact ball bearings, the efforts between rings and rolling elements (contact points of rolling elements/ outer or inner ring) are transmitted at an angle α ($< 90^\circ$) to a plane perpendicular to the bearing axis.

The value of this angle depends on the magnitude of the raceway radius, rolling element diameter and radial clearance in bearing, when the curvature centres of the raceways in the outer or on the inner ring are in the same plane.

The contact angle α can be calculated and verified in accordance with the specifications on page 118.

Axial clearance - preload

Axial clearance or preload can be obtained only when single row angular contact ball bearing is mounted in the assembly and depends on the location of the second bearing which assures the shaft axial guiding.

Single row angular contact ball bearings series 72B and 73B, paired mounted in DB and DF arrangements are manufactured with normal axial clearance CB, smaller than normal, CA, larger than normal, CC, or with light preload, GA, moderate preload GB, or heavy preload, GC, according to the values given in table 2.

Axial clearance or preload of single row angular contact ball bearings series 72B and 73B, pair mounted in DB or DF arrangements																	
Bore d		Axial clearance CA		CB		CC		Preload GA		GB		GC					
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm	μm																
—	10	4	12	14	22	22	30	—	—	—	—	—	—	—	—	—	—
10	18	5	13	15	23	24	32	+4	— 4	80	— 2	— 10	30	330	— 8	— 16	230
18	30	7	15	18	26	32	40	+4	— 4	120	— 2	— 10	40	480	— 8	— 16	340
30	50	9	17	22	30	40	48	+4	— 4	160	— 2	— 10	60	630	— 8	— 16	450
50	80	11	23	26	38	48	60	+6	— 6	380	— 3	— 15	140	1500	— 12	— 24	1080
80	120	14	26	32	44	55	67	+6	— 6	410	— 3	— 15	150	1600	— 12	— 24	1150
120	180	17	29	35	47	62	74	+6	— 6	540	— 3	— 15	200	2150	— 12	— 24	1500
180	250	21	37	45	61	74	90	+8	— 8	940	— 4	— 20	330	3700	— 16	— 32	2650
250	315	26	42	52	68	90	106	+8	— 8	1080	— 4	— 20	380	4250	— 16	— 32	3000

Table 2

High accuracy single row angular contact ball bearings series 70C, 70A and 72A, with a contact angle $\alpha = 15^\circ$ (C) and $\alpha = 25^\circ$ (A), which are generally used for grinding stone holders, paired mounted in DB and DF arrange-

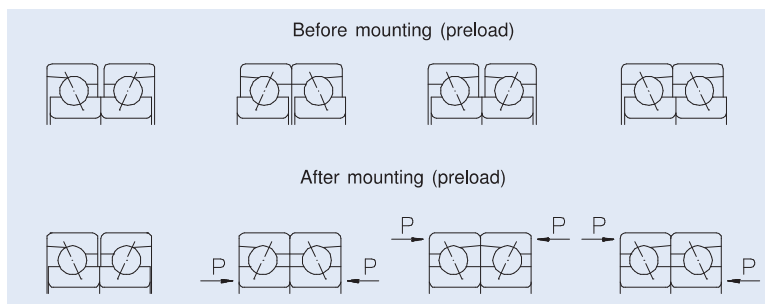
ment, are manufactured with an initial preload. It can be: light (L), moderate (M), heavy (S). The values of these preloads are given in table 3.

Values of axial preload of bearings of series 70C, 70A and 72A, in DB and DF arrangements

Table 3

Bore	Axial preload Series 70C			Series 72C				Series 70A				Series 72A	
d	Symbol	L	M	S	L	M	S	L	M	S	L	M	S
mm	—	N											
10	00	15	30	60	20	40	80	25	50	100	35	70	140
12	01	15	30	60	20	40	80	25	50	100	35	70	140
15	02	20	40	80	30	60	120	30	60	120	45	90	180
17	03	25	50	100	35	70	140	40	80	160	60	120	240
20	04	35	70	140	45	90	180	50	100	200	70	140	280
25	05	35	70	140	50	100	200	60	120	240	80	160	320
30	06	50	100	200	90	180	360	90	180	360	150	300	600
35	07	60	120	240	120	240	480	90	180	360	190	380	760
40	08	60	120	240	150	300	600	100	200	400	240	480	960
45	09	110	220	440	160	320	640	170	340	680	260	520	1040
50	10	110	220	440	170	340	680	180	360	720	260	520	1040
55	11	150	300	600	210	420	840	230	460	920	330	660	1320
60	12	150	300	600	250	500	1000	240	480	960	400	800	1600
65	13	160	320	640	290	580	1160	240	480	960	450	900	1800
70	14	200	400	800	300	600	1200	300	600	1200	480	960	1920
75	15	200	400	800	310	620	1240	310	620	1240	500	1000	2000
80	16	240	480	960	370	740	1480	390	780	1560	580	1160	2320
85	17	250	500	1000	370	740	1480	400	800	1600	600	1200	2400
90	18	300	600	1200	480	960	1920	460	920	1840	750	1500	3000
95	19	310	620	1240	520	1040	2080	480	960	1920	850	1700	3400
100	20	310	620	1240	590	1180	2360	500	1000	2000	950	1900	3800
105	21	360	720	1440	650	1300	2600	560	1120	2240	1000	2000	4000
110	22	420	840	1680	670	1340	2680	650	1300	2600	1050	2100	4200
120	24	430	860	1720	750	1500	3000	690	1380	2760	1200	2400	4800
130	26	560	1120	2240	800	1600	3200	900	1800	3600	1250	2500	5000
140	28	570	1140	2280	—	—	—	900	1800	3600	—	—	—
150	30	650	1300	2600	—	—	—	1000	2000	4000	—	—	—
160	32	730	1460	2920	—	—	—	1150	2300	4600	—	—	—
170	34	800	1600	3200	—	—	—	1250	2500	5000	—	—	—
180	36	900	1800	3600	—	—	—	1450	2900	5800	—	—	—
190	38	950	1900	3800	—	—	—	1450	2900	5800	—	—	—

Designs of single row angular contact ball bearings with clearance or initial preload are given in the figures below.



Cages

Single row angular contact ball bearings series 72B and 73B are generally fitted with pressed sheet cages.

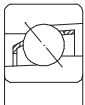
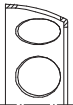
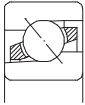
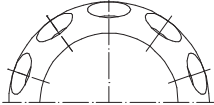
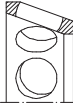
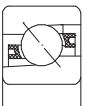
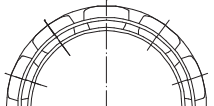
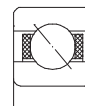
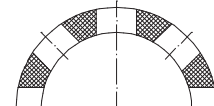
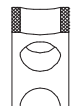
High precision single row angular contact ball bearings series 70C, 72C, 70A and 72A are fitted with textolite cages (textile fibre reinforced phenol resins).

At special request (high speeds, large sizes), bearings series 70C, 72C, 70A and 72A are fitted with machined brass cages. Cages of glass fibre reinforced polyamide 6.6 are also used with good results if operating temperature doesn't exceed +120°C.

Cages design and some technical data are given in table 4

Cages design and some technical data

Table 4

Cage	Design bearing cage	Application	Max. value	
			$D_m n$ oil	grease
Pressed sheet cage	  	- General application - Moderate speeds - Bearings series 72B, 73B	600×10^3	450×10^3
Machined brass cage M,MA,MB	  	- General application - High speeds - Bearings: 7231B-7238B 7310B-7338B	1100×10^3	800×10^3
Polyamide cage TN	  	- General application - Low friction moment - High speeds	1100×10^3	900×10^3
Textolite cage T,TA,TB	  	- High accuracy bearings series: 70C, 72C, 70A, 72A - High speeds - Low vibration level	1200×10^3	900×10^3

Equivalent dynamic radial load

For single row angular contact ball bearings series 72B and 73B, single and in tandem arrangement the following equations are used:

$$P_r = F_r, \text{ kN, when } F_a/F_r \leq 1,14,$$
$$P_r = 0,35 F_r + 0,57 F_a, \text{ kN, when } F_a/F_r > 1,14$$

For bearings in DB or DF arrangement

$$P_r = F_r + 0,65 F_a, \text{ kN, when } F_a/F_r \leq 1,14$$
$$P_r = 0,57 F_r + 0,93 F_a, \text{ kN, when } F_a/F_r > 1,14$$

In case of paired bearings, F_r and F_a are the loads acting upon the bearings pair.

As the load is transmitted from one raceway to the other under a certain angle to the bearing axis, the actual load will cause an axial load. This has to be considered when calculating the equivalent dynamic load, in case of two single bearings or tandem arrangements. The equations needed for calculation are given in table 5, for various arrangements and loading versions.

These equations are available for bearings mounted without clearance and without preload (clearance equal to zero).

For single row angular contact ball bearings series 70C and 72C with a contact angle $\alpha = 15^\circ$ (C), single or in DT arrangement, the following equations are available:

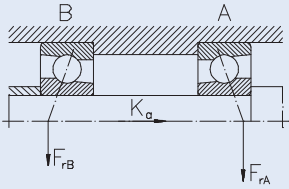
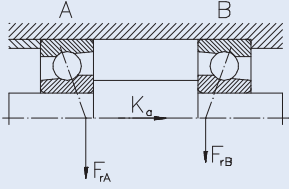
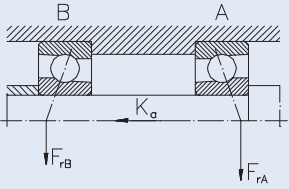
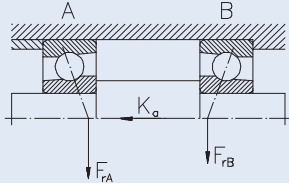
$$P_r = F_r, \text{ kN, for } F_a/F_r \leq e$$
$$P_r = 0,44 F_r + Y F_a, \text{ kN, for } F_a/F_r > e$$

The values of factor Y depend on the values of the ratio f_0 i F_a/C_0r and are given in table 6. Factor f_0 can be found in diagram in page 179 as a function of dimensions series and bearing mean diameter. "i" represents the number of bearings or bearing pairs in a bearing joint.

For bearings in DB and DF arrangements, the following equations are available:

$$P_r = F_r + Y_1 F_a, \text{ kN, for } F_a/F_r \leq e$$
$$P_r = 0,72 F_r + Y_2 F_a, \text{ kN, for } F_a/F_r > e$$

The values of factors Y_1 and Y_2 depend on the ratio $f_0 i F_a/C_0r$ and are given in table 6 (f_0 from diagram below).

	Loading version	Axial load
Back-to-back arrangement DB  Face-to-face arrangement DF 	1a) $F_{rA} \geq F_{rB}$ $K_a \geq 0$	$F_{aA} = 1,14 F_{rA}$ $F_{aB} = F_{aA} + K_a$
	1b) $F_{rA} < F_{rB}$ $K_a \geq 1,14 (F_{rB} - F_{rA})$	$F_{aA} = 1,14 F_{rA}$ $F_{aB} = F_{aA} + K_a$
	1c) $F_{rA} < F_{rB}$ $K_a < 1,14 (F_{rB} - F_{rA})$	$F_{aA} = F_{aB} - K_a$ $F_{aB} = 1,14 F_{rB}$
Back-to-back arrangement DB  Face-to-face arrangement DF 	2a) $F_{rA} \leq F_{rB}$ $K_a \geq 0$	$F_{aA} = F_{aB} + K_a$ $F_{aB} = 1,14 F_{rB}$
	2b) $F_{rA} > F_{rB}$ $K_a \geq 1,14 (F_{rA} - F_{rB})$	$F_{aA} = F_{aB} + K_a$ $F_{aB} = 1,14 F_{rB}$
	2c) $F_{rA} > F_{rB}$ $K_a < 1,14 (F_{rA} - F_{rB})$	$F_{aA} = 1,14 F_{rA}$ $F_{aB} = F_{aA} - K_a$

For single row angular contact ball bearings series 70A and 72A, with a contact angle $\alpha = 25^\circ$, single or in DT arrangement, the following equations are available:

$$P_r = F_r, \text{ kN, for } F_a/F_r \leq 0,68$$

$$P_r = 0,41 F_r + 0,87 F_a, \text{ kN, for } F_a/F_r > 0,68$$

For bearings in DB and DF arrangement, the following equations are available:

$$P_r = F_r + Y_1 F_a, \text{ kN, for } F_a/F_r \leq e$$

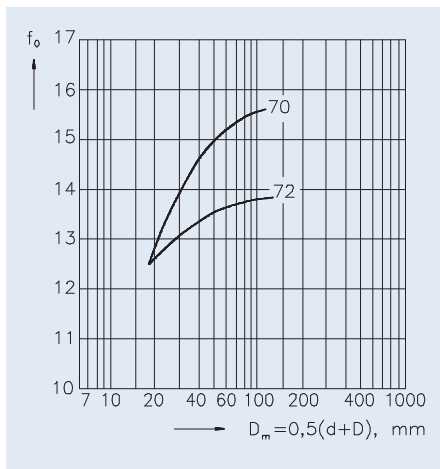
$$P_r = 0,72 F_r + Y_2 F_a, \text{ kN, for } F_a/F_r > e$$

Values for Y_1 and Y_2 are given in table 6.

Values of factors e , Y , Y_1 and Y_2

Table 6

$f_0 \mid \frac{F_a}{C_{0r}}$	e	Single and DT Y	Arrangement DB or DF Y_1	Y_2
0,2	0,38	1,46	1,64	2,37
0,4	0,41	1,36	1,52	2,21
0,8	0,44	1,28	1,44	2,11
1,6	0,48	1,16	1,31	1,90
3	0,52	1,08	1,21	1,78
6	0,56	1	1,12	1,66



Equivalent static load

For single row angular contact ball bearings series 72B and 73B with a contact angle $\alpha = 40^\circ$, single and in DT arrangement, the following equation is available:

$$P_{0r} = 0,6 F_r + 0,26 F_a, \text{ kN}$$

If $P_{0r} < F_r$, then we consider $P_0 = F_r$

For bearings in DB and DT arrangement, the following equation is available:

$$P_{0r} = F_r + 0,52 F_a, \text{ kN}$$

For single row angular contact ball bearings series 70C and 72C, with a contact angle $\alpha = 15^\circ$, single and in DT arrangement, the following equation is available:

$$P_{0r} = 0,5 F_r + 0,46 F_a, \text{ kN}$$

For bearings in DB and DE arrangement, the following equation is available:

$$P_{0r} = 0,5 F_r + 0,92 F_a, \text{ kN}$$

For single row angular contact ball bearings series 70A and 72A with a contact angle $\alpha = 25^\circ$, single and in DT arrangement, the following equation is available:

$$P_{0r} = 0,5 F_r + 0,38 F_a, \text{ kN}$$

For bearings in DB and DE arrangement, the following equation is available:

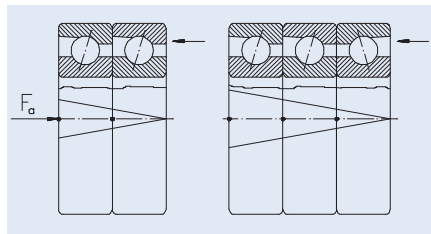
$$P_{0r} = F_r + 0,76 F_a, \text{ kN}$$

Two "V" scratches are marked on the outside surface where the runout is maximum, i.e. where the outer ring thickness is maximum, so that the bearings of a set can be mounted in the manufacturing order. The place of maximum runout is marked on the chamfer between the inner ring bore and side face. Thus, the possible fit

ovalnesses on the shaft can be compensated.

Every set is delivered as an unit, separately packed. In each unit, bearings are singly packed.

If distance rings are necessary to be mounted between bearings, they have not to be adjusted when being mounted. There is only one condition to be observed: the inner distance ring width should be equal to that of the outer ring, the side faces being parallel to each other. This can be easily done if both distance rings are simultaneously ground on a grinding and lapping machine. If bearings are mounted with distance rings, the mounting is also done observing the "V" marked as mentioned above. The cone vertex should be on the ring side opposite to that one on which the load acts (see next figure).



Basic dynamic load of paired bearings

Basic dynamic load given in bearing tables is valid for each single bearing. Basic dynamic load of a paired bearings set can be determined according to the specifications on page 26.

Basic static load of paired bearings

Basic static load of paired bearings can be similarly determined, multiplying the values of C_{0r} in the tables by 2, 3 and 4 respectively.

Bearing speed limit

Single row angular contact ball bearings are used at high speeds.

High precision bearings allow operation at higher speeds than those in the catalogue, depending on the oil lubrication system (oil bath, dropping lubrication, oil spot, with oil cooling).

The values of speeds for bearings series 72B and 73B, normal tolerance class, without preload are given in this catalogue.

In case of preloaded bearings, for single mounted bearing and bearings in DB, DF or DT arrangements, speeds should be multiplied by the coefficients in table 7.

For bearings series 70C, 72C, 70A and 72A, speeds are given for the tolerance class P4 and light preload.

In case of bearings with other values of preloads or arrangements of 3 or 4 bearing sets, the speeds of the bearing of basic design should be multiplied by the

Speed limit reduction factor

Table 7

Arrangement	Bearing preload			
	UA,UO	L	M	S
Single	1,0	1,0	0,90	0,80
Tandem, DT	0,90	0,90	0,80	0,65
Back-to-back, DB	0,80	0,80	0,70	0,55
Face-to-face, DF	0,80	0,75	0,60	0,40
Three bearings set	0,75	0,70	0,55	0,35
Four bearings set	0,70	0,65	0,45	0,25

values of the coefficients in table 7.

Abutment dimensions

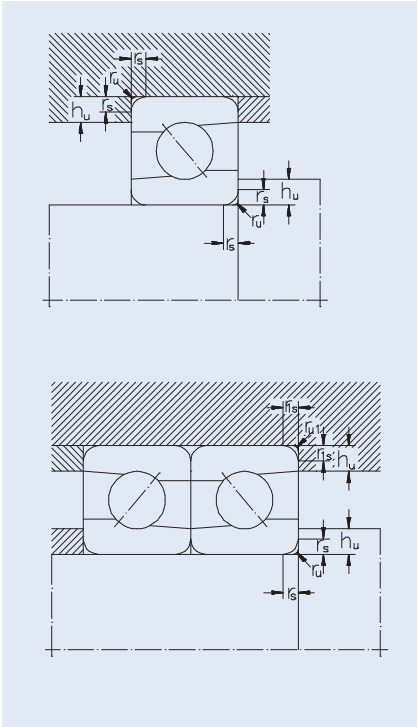
For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum connection radius $r_{u\max}$ should be less than bearing minimum mounting chamfer $r_{1\min}$. $r_{2\min}$.
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.
The values of the connection radii and support shoulder

Abutment dimensions

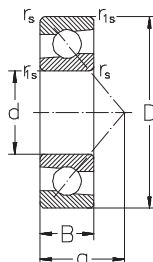
Table 8

r_s, r_{1s} min.	r_u, r_{u1} max.	h_u, h_{u1} min.	
			Bearing series
			718, 728 72
			719, 729 73
			70
mm			
0,3	0,3	1	1,2
0,6	0,6	1,6	2,1
1	1	2,3	2,6
1,1	1	3	3,5
1,5	1,5	3,5	4,5
2	2	4,4	5,5
2,1	2,1	5,1	6
3	2,5	6,2	7
4	3	7,3	8,5

height are given in table 8.

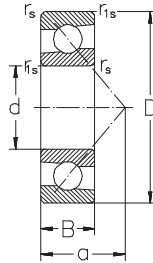


Angular contact ball bearings, single row



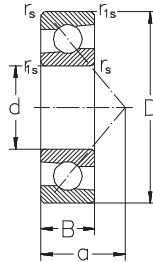
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm	mm	mm				kN		min ⁻¹		–	kg
10	30	9	0,6	0,3	13	4,95	2,5	19 000	28 000	7200B	0,031
12	32	10	0,6	0,3	14	7,4	3,75	17 000	24 000	7201B	0,045
15	35	11	0,6	0,3	16	7,45	3,9	16 000	22 000	7202B	0,048
	35	11	0,6	0,3	16	7,45	3,9	16 000	22 000	7202BP6	0,048
	35	11	0,6	0,3	16	7,45	3,9	16 000	22 000	7202BP5	0,048
	42	13	1	0,6	19	12,9	6,5	14 000	19 000	7302B	0,090
17	40	12	0,6	0,6	18	11	6,1	14 000	19 000	7203B	0,070
	40	12	0,6	0,6	18	11	6,1	14 000	19 000	7203BP6	0,070
	40	12	0,6	0,6	18	11	6,1	14 000	19 000	7203BP5	0,070
	47	14	1	0,6	21	14,8	8,1	12 000	17 000	7303B	0,120
20	47	14	1	0,6	21	14,1	8,4	11 000	16 000	7204B	0,110
	47	14	1	0,6	21	14,1	8,4	11 000	16 000	7204BP6	0,110
	47	14	1	0,6	21	14,1	8,4	11 000	16 000	7204BP5	0,110
	52	15	1,1	0,6	23	17,3	9,7	10 000	15 000	7304B	0,150
25	52	15	1,1	0,6	23	17,3	9,7	10 000	15 000	7304BP6	0,150
	52	15	1	0,6	24	15,5	10,1	9 500	14 000	7205B	0,130
	52	15	1	0,6	24	15,5	10,1	9 500	14 000	7205BP6	0,130
	52	15	1	0,6	24	15,5	10,1	9 500	14 000	7205BP5	0,130
25	62	17	1,1	0,6	27	24,4	14,6	8 500	12 000	7305B	0,250
	62	17	1,1	0,6	27	24,4	14,6	8 500	12 000	7305BP6	0,250
	62	17	1,1	0,6	27	24,4	14,6	8 500	12 000	7305BP5	0,250
	62	17	1,1	0,6	27	24,4	14,6	8 500	12 000	7305AMA	0,250
30	62	16	1	0,6	27	20,5	13,6	8 500	12 000	7206B	0,210
	62	16	1	0,6	27	20,5	13,6	8 500	12 000	7206BP6	0,210
	62	16	1	0,6	27	20,5	13,6	8 500	12 000	7206BP5	0,210
	62	16	1	0,6	27	20,5	13,6	8 500	12 000	7206ATAP2	0,210
30	72	19	1,1	0,6	31	29,3	19	7 500	10 000	7306B	0,370
	72	19	1,1	0,6	31	29,3	19	7 500	10 000	7306BP6	0,370
	72	19	1,1	0,6	31	29,3	19	7 500	10 000	7306BP5	0,370
	72	19	1,1	0,6	31	29,3	19	7 500	10 000	7306AMA	0,370
35	72	17	1,1	0,6	31	28,5	19,8	7 500	10 000	7207B	0,300
	72	17	1,1	0,6	31	28,5	19,8	7 500	10 000	7207BP5	0,300
	80	21	1,5	1	35	36,7	24,3	7 000	9 500	7307B	0,510
	80	21	1,5	1	35	36,7	24,3	7 000	9 500	7307BP5	0,510
40	80	18	1,1	0,6	34	32,1	23	6 700	9 000	7208B	0,390
	80	18	1,1	0,6	34	32,1	23	6 700	9 000	7208BP6	0,390
	80	18	1,1	0,6	34	32,1	23	6 700	9 000	7208BP5	0,390
	90	23	1,5	1	39	44,8	30,3	6 300	8 500	7308B	0,670
40	90	23	1,5	1	39	44,8	30,3	6 300	8 500	7308BP6	0,670
	90	23	1,5	1	39	44,8	30,3	6 300	8 500	7308BP5	0,670
	90	23	1,5	1	39	44,8	30,3	6 300	8 500	7308BP5	0,670
45	85	19	1,1	0,6	37	36,1	26,2	6 300	8 500	7209B	0,440

Angular contact ball bearings, single row



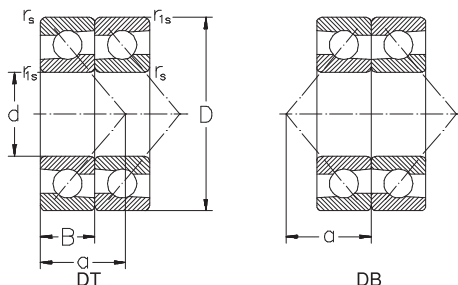
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm	mm	mm				kN		min ⁻¹		—	kg
45	85	19	1,1	0,6	37	36,1	26,2	6 300	8 500	7209BP5	0,440
	100	25	1,5	1	43	58,3	40,1	5 600	7 500	7309B	0,900
	100	25	1,5	1	43	58,3	40,1	5 600	7 500	7309BP6	0,900
	100	25	1,5	1	43	58,3	40,1	5 600	7 500	7309BP5	0,900
50	90	20	1,1	0,6	39	37,4	28,6	5 600	7 500	7210B	0,490
	90	20	1,1	0,6	39	37,4	28,6	5 600	7 500	7210BP6	0,490
	90	20	1,1	0,6	39	37,4	28,6	5 600	7 500	7210BP5	0,490
	110	27	2	1	47	68,2	47,9	5 000	6 700	7310B	1,15
	110	27	2	1	47	68,2	47,9	5 000	6 700	7310BP6	1,15
	110	27	2	1	47	68,2	47,9	5 000	6 700	7310BP5	1,15
55	100	21	1,5	1	43	46,2	36,2	5 300	7 000	7211B	0,650
	120	29	2	1	52	78,8	56,4	4 500	6 000	7311B	1,45
60	110	22	1,5	1	47	56,3	44,7	4 800	6 300	7212B	0,840
	110	22	1,5	1	47	56,3	44,7	4 800	6 300	7212BP5	0,840
	130	31	2,1	1,1	56	90	65,5	4 300	5 600	7312B	1,85
	130	31	2,1	1,1	56	90	65,5	4 300	5 600	7312BP5	1,85
65	120	23	1,5	1	50	63,6	52,5	4 300	5 600	7213B	1,05
	120	23	1,5	1	50	63,6	52,5	4 300	5 600	7213BP6	1,05
	120	23	1,5	1	50	63,6	52,5	4 300	5 600	7213BP5	1,05
	140	33	2,1	1,1	60	101	75,3	4 000	5 300	7313B	2,25
70	125	24	1,5	1	53	69,1	57,8	4 300	5 600	7214B	1,15
	125	24	1,5	1	53	69,1	57,8	4 300	5 600	7214BP6	1,15
	150	35	2,1	1,1	64	114	86	3 800	5 000	7314B	2,75
	150	35	2,1	1,1	64	114	86	3 800	5 000	7314BP6	2,75
	150	35	2,1	1,1	64	114	86	3 800	5 000	7314BP5	2,75
	150	35	2,1	1,1	64	114	86	3 800	5 000	7314BTN	2,75
75	130	25	1,5	1	56	74,8	63,2	4 000	5 300	7215B	1,30
	130	25	1,5	1	56	74,8	63,2	4 000	5 300	7215BP6	1,30
	130	25	1,5	1	56	74,8	63,2	4 000	5 300	7215BP5	1,30
	160	37	2,1	1,1	68	125	97,5	3 400	4 500	7315B	3,30
	160	37	2,1	1,1	68	125	97,3	3 400	4 500	7315BMAP6	3,30
	160	37	2,1	1,1	68	125	97,5	3 400	4 500	7315AMA	3,30
80	140	26	2	1	59	80,5	69,3	3 800	5 000	7216B	1,55
	170	39	2,1	1,1	72	135	109	3 200	4 300	7316B	3,90
	170	39	2,1	1,1	72	135	109	3 200	4 300	7316BP6	3,903
	170	39	2,1	1,1	72	135	109	3 200	4 300	7316BMAP6	3,903
85	150	28	2	1	64	93,1	81,1	3 400	4 500	7217B	1,953
	180	41	3	1,1	76	145	122	3 000	4 000	7317B	4,603
	180	41	3	1,1	76	145	122	3 000	4 000	7317BP6	4,603
	180	41	3	1,1	76	145	122	3 000	4 000	7317BMP6	4,603

Angular contact ball bearings, single row



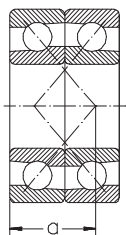
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		–	kg
90	160	30	2	1	67	107	93,8	3 200	4 300	7218B	2,403
	160	30	2	1	67	107	93,8	3 200	4 300	7218BMB	2,403
	190	43	3	1,1	80	156	135	2 800	3 800	7318B	5,403
95	170	32	2,1	1,1	71	116	101	3 000	4 000	7219B	2,903
	200	45	3	1,1	84	168	150	2 600	3 600	7319B	6,253
100	180	34	2,1	1,1	76	129	116	2 800	3 800	7220B	3,453
	180	34	2,1	1,1	76	129	116	2 800	3 800	7220BP6	3,453
	180	34	2,1	1,1	76	129	116	2 800	3 800	7220BMA	3,453
	180	34	2,1	1,1	76	129	116	2 800	3 800	7220BMAP6	3,453
	180	34	2,1	1,1	76	129	116	2 800	3 800	7220BMAP4	3,453
	180	34	2,1	1,1	76	129	116	2 800	3 800	7220BMB	3,453
	215	47	3	1,1	90	190	178	2 400	3 400	7320B	7,753
	215	47	3	1,1	90	190	178	2 400	3 400	7320BP6	7,753
	215	47	3	1,1	90	190	178	2 400	3 400	7320BM	7,753
	215	47	3	1,1	90	190	178	2 400	3 400	7320BM	7,753
110	200	38	2,1	1,1	84	153	145	2 400	3 400	7222B	4,803
	200	38	2,1	1,1	84	153	145	2 400	3 400	7222BMB	4,803
	240	50	3,1	1,1	99	248	229	2 000	3 000	7322B	10,53
	240	50	3	1,1	99	248	229	2 000	3 000	7322BP5	10,53
	240	50	3	1,1	99	248	229	2 000	3 000	7322BM	10,53
140	250	42	3	1,1	103	191	210	1 700	2 400	7228B	8,803
	300	62	4	1,5	123	290	334	1 700	2 400	7328B	21,63
	300	62	4	1,5	123	290	334	1 700	2 400	7328BMBP5	21,63
150	190	24	1,1	0,6	35	60,5	79,2	2 200	3 000	72830CMA	3,363
	270	45	3	1,1	111	195	222	2 000	2800	7230BM	11,63
	320	65	4	1,5	131	317	380	1 600	2 000	7330BM	26,53
	320	65	4	1,5	131	317	380	1 600	2 000	7330BMP5	26,53
160	220	28	2	1	58	110	134	2 200	3 000	71932AMAP5	3,263
180	250	33	2	2	33	131	162	2 000	2 800	71936AM	5,36
200	250	30	1,5	0,6	45	102	141	3 000	5 600	72840CMAp4	3,43

Angular contact ball bearings, single row, for paired and stack mounted

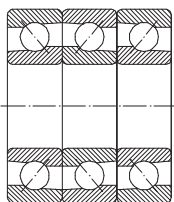


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{fs} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
15	35	11	0,6	0,3	16	12	7,8	14 000	20 000	7202BDT	0,096
	35	11	0,6	0,3	16	12	7,8	13 000	18 000	7202BDB	0,096
	35	11	0,6	0,3	16	12	7,8	14 000	20 000	7202BP6DT	0,096
	35	11	0,6	0,3	16	12	7,8	13 000	18 000	7202BP5DB	0,096
17	40	12	0,6	0,6	18	17,8	12,2	13 000	17 000	7203BDT	0,140
	40	12	0,6	0,6	18	17,8	12,2	11 000	15 000	7203BDB	0,140
	40	12	0,6	0,6	18	17,8	12,2	11 000	15 000	7203BDF	0,140
	40	12	0,6	0,6	18	17,8	12,2	11 000	15 000	7203BP6DB	0,140
20	40	12	0,6	0,6	18	17,8	12,2	11 000	15 000	7203BP5DB	0,140
	47	14	1	0,6	21	24	16,2	11 000	15 000	7303BDT	0,240
	47	14	1	0,6	21	22,8	16,8	10 000	14 000	7204BDT	0,220
	47	14	1	0,6	21	22,8	16,8	10 000	14 000	7204BDB	0,220
25	47	14	1	0,6	21	22,8	16,8	9 000	13 000	7204BDF	0,220
	47	14	1	0,6	21	22,8	16,8	9 000	13 000	7204BP6DB	0,220
	47	14	1	0,6	21	22,8	16,8	9 000	13 000	7204BP5DB	0,220
	52	15	1,1	0,6	23	28	19,4	9 000	14 000	7304BDT	0,303
30	52	15	1,1	0,6	23	28	19,4	8 000	12 000	7304BDB	0,303
	52	15	1,1	0,6	23	28	19,4	8 000	12 000	7304BDF	0,303
	52	15	1	0,6	24	25,1	20,2	9 000	13 000	7205BDT	0,260
	52	15	1	0,6	24	25,1	20,2	7 500	11 000	7205BDB	0,260
35	52	15	1	0,6	24	25,1	20,2	7 500	11 000	7205BDF	0,260
	52	15	1	0,6	24	25,1	20,2	7 500	11 000	7205BP6DB	0,260
	52	15	1	0,6	24	25,1	20,2	9 000	13 000	7205BP5DT	0,260
	52	15	1	0,6	24	25,1	20,2	9 000	13 000	7205BP5DB	0,260
40	52	15	1	0,6	24	25,1	20,2	7 500	11 000	7205BP5TFT	0,260
	52	15	1	0,6	24	33,5	30,3	7 000	10 000	7305BDT	0,390
	62	17	1,1	0,6	27	39,5	29,2	7 500	11 000	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
45	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305AMADF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
50	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
55	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
60	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
65	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
70	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
75	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
80	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
85	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
90	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
95	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
100	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
105	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
110	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
115	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
120	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
125	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
130	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
135	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDB	0,500
140	62	17	1,1	0,6	27	39,5	29,2	6 700	9 500	7305BDF	0,500
	62	17	1,1	0,6	27	39,5					

Angular contact ball bearings, single row, for paired and stack mounted



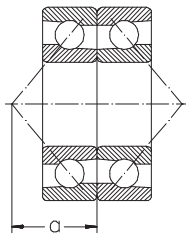
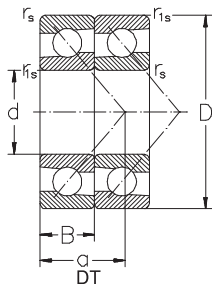
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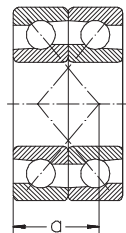
TFT

Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r1 _s min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
30	72	19	1,1	0,6	31	47,5	38	6 700	9 000	7306BP5DT	0,740
	72	19	1,1	0,6	31	47,5	38	6 700	9 000	7306AMADT	0,740
	72	19	1,1	0,6	31	47,5	38	6 000	8 000	7306AMADF	0,740
35	72	17	1,1	0,6	31	46,2	39,6	6 700	9 000	7207BDT	0,600
	72	17	1,1	0,6	31	46,2	39,6	6 000	8 000	7207BDB	0,600
	72	17	1,1	0,6	31	46,2	39,6	6 000	8 000	7207BDF	0,600
	72	17	1,1	0,6	31	46,2	39,6	6 700	9 000	7207BP5DT	0,600
	72	17	1,1	0,6	31	46,2	39,6	6 000	8 000	7207BP5DB	0,600
	72	17	1,1	0,6	31	61,6	59,4	5 300	7 000	7207BP5TBT	0,900
	72	17	1,1	0,6	31	75,2	79,2	5 300	7 000	7207BP5QFC	1,203
	80	21	1,5	1	35	59,5	48,6	6 300	8 500	7307BDT	1,023
	80	21	1,5	1	35	59,5	48,6	5 600	7 500	7307BDB	1,023
	80	21	1,5	1	35	59,5	48,6	5 600	7 500	7307BDF	1,023
	80	21	1,5	1	35	59,5	48,6	5 600	7 500	7307BP6DB	1,023
	80	18	1,1	0,6	34	52	46	6 000	8 000	7208BDT	0,780
40	80	18	1,1	0,6	34	52	46	6 030	8 100	7208BDB	0,780
	80	18	1,1	0,6	34	52	46	5 300	7 000	7208BDF	0,780
	80	18	1,1	0,6	34	52	46	6 000	8 000	7208BP5DT	0,780
	80	18	1,1	0,6	34	52	46	5 300	7 000	7208BP5DB	0,780
	90	23	1,5	1	39	72,6	60,6	5 600	7 500	7308BDT	1,343
	90	23	1,5	1	39	72,6	60,6	5 000	6 700	7308BDB	1,343
	90	23	1,5	1	39	72,6	60,6	5 000	6 700	7308BDF	1,343
	90	23	1,5	1	39	96,8	91,8	4 500	6 000	7308BTFT	0,670
	90	23	1,5	1	39	118	121	4 500	6 000	7308BQFC	2,683
	90	23	1,5	1	39	72,6	60,6	5 000	6 700	7308BP6DF	1,343
	90	23	1,5	1	39	72,6	60,6	5 000	6 700	7308BP5DB	1,343
	90	23	1,5	1	39	96,8	91,8	4 500	6 000	7308BP5TFT	2,013
45	90	23	1,5	1	39	118	121	4 500	6 000	7308BP5QFC	2,683
	85	19	1,1	0,6	37	58,5	52,4	5 600	7 500	7209BDT	0,880
	85	19	1,1	0,6	37	58,5	52,4	5 000	6 700	7209BDB	0,880
	85	19	1,1	0,6	37	58,5	52,4	5 000	6 700	7209BDF	0,880
	85	19	1,1	0,6	37	58,5	52,4	5 000	6 700	7209BP5DB	0,880
	100	25	1,5	1	43	94,4	80,2	5 000	6 700	7309BDT	1,803
	100	25	1,5	1	43	94,4	80,2	4 500	6 000	7309BDB	1,803
	100	25	1,5	1	43	94,4	80,2	4 480	6 000	7309BDF	1,803
	100	25	1,5	1	43	94,4	80,2	4 500	6 000	7309BP6DB	1,803
	100	25	1,5	1	43	94,4	80,2	4 500	6 000	7309BP6DF	1,803
	90	20	1,1	0,6	39	60,6	57,2	5 000	6 700	7210BDT	0,980
	90	20	1,1	0,6	39	60,6	57,2	4 500	6 000	7210BDF	0,980
50	90	20	1,1	0,6	39	60,6	57,2	5 000	6 700	7210BP5DT	0,980
	90	20	1,1	0,6	39	60,6	57,2	4 500	6 000	7210BP5DB	0,980
	110	27	2	1	47	111	95,8	4 500	6 000	7310BDT	2,303

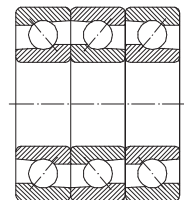
Angular contact ball bearings, single row, for paired and stack mounted



DB



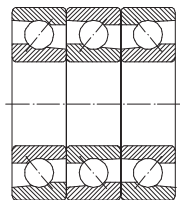
DF



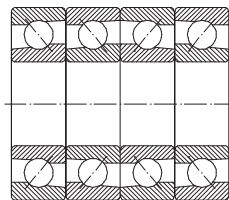
TFT

Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
50	110	27	2	1	47	111	95,8	4 000	5 300	7310BDB	2,303
	110	27	2	1	47	111	95,8	4 000	5 300	7310BDF	2,303
	110	27	2	1	47	205	144	3 600	4 800	7310BP5TFT	3,453
	110	27	2	1	47	273	192	3 600	4 800	7310BP5QFC	4,603
55	100	21	1,5	1	43	74,8	72,4	4 800	6 300	7211BDT	1,303
	100	21	1,5	1	43	74,8	72,4	4 300	5 600	7211BDB	1,303
	100	21	1,5	1	43	74,8	72,4	4 300	5 600	7211BDF	1,303
	120	29	2	1	51	128	113	4 000	5 300	7311BDT	2,903
	120	29	2	1	51	128	113	3 600	4 800	7311BDB	2,903
	120	29	2	1	52	128	113	3 600	4 800	7311BDF	2,903
	110	22	1,5	1	47	91,2	89,4	4 300	5 600	7212BDT	1,683
	110	22	1,5	1	47	91,2	89,4	3 800	5 000	7212BDB	1,683
60	110	22	1,5	1	47	91,2	89,4	3 800	5 000	7212BDF	1,683
	110	22	1,5	1	47	91,2	89,4	3 800	5 000	7212BP5DB	1,683
	130	31	2,1	1,1	55	146	131	3800	5 000	7312BDT	3,703
	130	31	2,1	1,1	55	146	131	3 400	4 500	7312BDB	3,703
	130	31	2,1	1,1	55	146	131	3 400	4 500	7312BDF	3,703
	130	31	2,1	1,1	55	146	131	3 400	4 500	7312BP5DB	3,703
	120	23	1,5	1	50	103	105	3 800	5 000	7213BDT	2,103
	120	23	1,5	1,1	50	103	105	3 800	5 000	7213BDB	2,103
65	120	23	1,5	1,1	50	103	105	3 800	5 000	7213BDF	2,103
	120	23	1,5	1	50	103	105	3 400	4 500	7213BP6DB	2,103
	120	23	1,5	1	50	103	105	3 400	4 500	7213BP6DF	2,103
	140	33	2,1	1,1	60	164	151	3 600	4 800	7313BDT	4,503
	140	33	2,1	1,1	60	164	151	3 200	4 300	7313BDB	4,503
	140	33	2,1	1,1	60	164	151	3 200	4 300	7313BDF	4,503
	125	24	1,5	1	53	112	116	3 800	5 000	7214BDT	2,303
	125	24	1,5	1	53	112	116	3 400	4 500	7214BDB	2,303
70	125	24	1,5	1	53	112	116	3 400	4 500	7214BDF	2,303
	150	35	2,1	1,1	64	185	172	3 400	4 500	7314BDT	5,503
	150	35	2,1	1,1	64	185	172	3 000	4 000	7314BDB	5,503
	150	35	2,1	1,1	64	185	172	3 000	4 000	7314BDF	5,503
	150	35	2,1	1,1	64	185	172	3 400	4 500	7314BP6DT	5,503
	150	35	2,1	1,1	64	185	172	3 400	4 500	7314BP5DT	5,503
	150	35	2,1	1,1	64	185	172	3 000	4 000	7314BP5DB	5,503
	130	25	1,5	1	56	121	126	3 600	4 300	7215BDT	2,603
75	130	25	1,5	1	56	121	126	3 200	4 300	7215BDB	2,603
	130	25	1,5	1	56	121	126	3 200	4 300	7215BDF	2,603
	130	25	1,5	1	56	121	126	3 200	4 300	7215BP6DB	2,603
	130	25	1,5	1	56	121	126	3 200	4 300	7215BMAP6DB	2,603
	160	37	2,1	1,1	68	203	195	3 200	4 000	7315BDT	6,603
	160	37	2,1	1,1	68	203	195	2 800	3 600	7315BDB	6,603

Angular contact ball bearings, single row, for paired and stack mounted



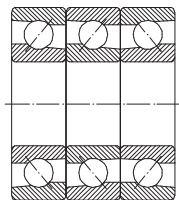
TBT



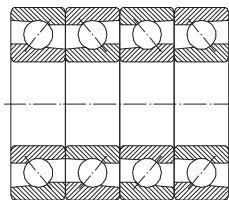
QFC

Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
75	160	37	2,1	1,1	68	203	195	2 800	3 600	7315BDF	6,603
	160	37	2,1	1,1	68	203	195	2 800	3 600	7315AMADF	6,603
80	110	16	1	1	21	55,1	69,2	4 000	5 300	71916CTAP4DT	0,736
	140	26	2	1	59	130	139	3 200	4 300	7216BDT	3,103
	140	26	2	1	59	130	139	2 800	3 800	7216BDB	3,103
	140	26	2	1	59	130	139	2 800	3 800	7216BDF	3,103
	170	39	2,1	1,1	72	219	218	2 800	3 800	7316BDT	7,803
	170	39	2,1	1,1	72	219	218	2 600	3 400	7316BDB	7,803
	170	39	2,1	1,1	72	219	218	2 600	3 400	7316BDF	7,803
	170	39	2,1	1,1	72	292	327	2 200	3 000	7316BTBT	11,73
	170	39	2,1	1,1	72	219	218	2 800	3 800	7316BP6DT	7,803
	170	39	2,1	1,1	72	292	327	2 200	3 000	7316BMAP6TBT	11,73
	150	28	2	1	64	151	162	3 000	4 000	7217BDT	3,903
	150	28	2	1	64	151	162	2 800	3 600	7217BDB	3,903
	150	28	2	1	64	151	162	2 800	3 600	7217BDF	3,903
	180	41	3	1,1	76	235	244	2 800	3 600	7317BDT	9,203
85	180	41	3	1,1	76	235	244	2 400	3 200	7317BDB	9,203
	180	41	3	1,1	76	235	244	2 400	3 200	7317BDF	9,203
	160	30	2	1	67	173	188	2 800	3 800	7218BDT	4,803
	160	30	2	1	67	173	188	2 600	3 400	7218BDB	4,803
	160	30	2	1	67	173	188	2 600	3 400	7218BDF	4,803
	190	43	3	1,1	80	253	270	2 600	3 400	7318BDT	10,83
	190	43	3	1,1	80	253	270	2 200	3 000	7318BDB	10,83
	190	43	3	1,1	80	253	270	2 200	3 000	7318BDF	10,83
	190	43	3	1,1	80	337	405	2 000	2 600	7318BTBT	16,23
	170	32	2,1	1,1	72	188	202	2 800	3 600	7219BDT	5,803
	170	32	2,1	1,1	72	188	202	2 400	3 200	7219BDB	5,803
	170	32	2,1	1,1	72	188	202	2 400	3 200	7219BDF	5,803
	200	45	3	1,1	84	272	300	2 400	3 200	7319BDT	12,53
	200	45	3	1,1	84	272	300	2 000	2 800	7319BDB	12,53
90	200	45	3	1,1	84	272	300	2 000	2 800	7319BDF	12,53
	180	34	2,1	1,1	76	208	232	2 600	3 400	7220BDT	6,903
	180	34	2,1	1,1	76	208	232	2 200	3 000	7220BDB	6,903
	180	34	2,1	1,1	76	208	232	2 200	3 000	7220BDF	6,903
	180	34	2,1	1,1	76	208	232	2 200	3 000	7220BMAP6DB	6,903
	180	34	2,1	1,1	76	208	232	2 200	3 000	7220BMAP6DT	6,903
	180	34	2,1	1,1	76	208	232	2 200	3 000	7220BMAP4DT	6,903
	215	47	3	1,1	90	308	356	2 200	3 000	7320BDT	15,53
	215	47	3	1,1	90	308	356	1 900	2 800	7320BDB	15,53
	215	47	3	1,1	90	308	356	1 900	2 800	7320BDF	15,53
	215	47	3	1,1	90	308	356	2 200	3 000	7320BP6DT	15,53
	215	47	3	1,1	90	308	356	2 200	3 000	7320BP6DT	15,53
	215	47	3	1,1	90	308	356	2 200	3 000	7320BP6DT	15,53
	215	47	3	1,1	90	308	356	2 200	3 000	7320BP6DT	15,53

Angular contact ball bearings, single row, for paired and stack mounted



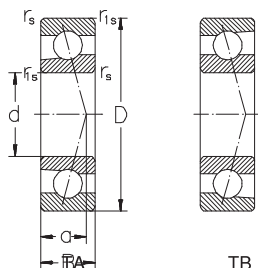
TBT



QFC

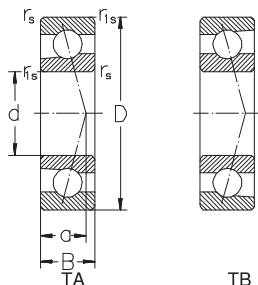
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		–	kg
100	215	47	3	1,1	90	308	356	2 200	3 000	7320BMDT	15,53
110	200	38	2,1	1,1	84	248	290	2 200	3 000	7222BDT	9,603
	200	38	2,1	1,1	84	248	290	1 900	2 800	7222BDB	9,603
	240	50	3	1,1	99	365	458	1 800	2 800	7322BDT	21,03
	240	50	3	1,1	99	365	458	1 600	2 400	7322BDB	21,03
	240	50	3	1,1	99	536	687	1 400	2 200	7322BTBT	31,53
	240	50	3	1,1	99	365	458	1 800	2 800	7322BP5DT	21,03
	240	50	3	1,1	99	365	458	1 600	2 400	7322BMDF	21,03
140	250	42	3	1,1	103	172	189	1 400	1 900	7228BDT	17,63
	300	62	4	1,5	123	470	668	1 400	2 200	7328BDT	43,23
	300	62	4	1,5	123	470	668	1 200	1 900	7328BDB	43,23
	300	62	4	1,5	123	470	668	1 400	2 200	7328BMBP5DT	43,23
150	270	45	3	1,1	111	156	444	2 400	3 800	7230BDB	23,23
	270	45	3	1,1	111	156	444	2 400	3 800	7230BMDB	23,23
	320	65	4	1,5	131	254	760	1 400	1 800	7330BMDF	53,03
	320	65	4	1,5	131	254	760	1 400	1 800	7330BMP5DT	53,03
160	220	28	2	1	58	176	268	1 600	2 400	71932AMAP5DB	6,523
180	250	33	2	2	33	210	324	1 500	2 200	71936AMDB	10,83
200	250	30	1,5	0,6	45	165	282	1 400	2 000	72840CMAP4DB	6,863
	250	30	1,5	0,6	45	220	423	1 300	1 800	72840CMAP4TBT	10,23

High precision angular contact ball bearings, single row



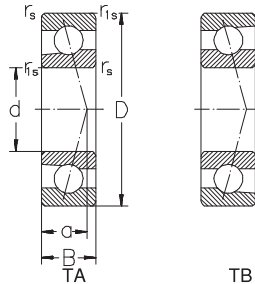
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	rs min.	r1s min.	a	C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
10	26	8	0,3	0,1	6	5,3	2,45	56 000	90 000	7000CTAP4	0,020
	26	8	0,3	0,1	6	5,3	2,45	56 000	90 000	7000CTAP2	0,020
	30	9	0,6	0,3	7	5,8	2,95	50 000	80 000	7200CTAP4	0,029
	30	9	0,6	0,3	7	5,8	2,95	50 000	80 000	7200CTAP2	0,029
12	28	8	0,3	0,1	7	5,4	2,6	50 000	80 000	7001CTAP4	0,023
	28	8	0,3	0,1	7	5,4	2,6	50 000	80 000	7001CTAP2	0,023
	32	10	0,6	0,3	10	7,5	3,4	45 000	70 000	7201ATAP4	0,030
	32	10	0,6	0,3	10	7,5	3,4	45 000	70 000	7201ATAP2	0,030
15	32	9	0,3	0,1	8	6,3	3,4	43 000	67 000	7002CTAP4	0,030
	32	9	0,3	0,1	8	6,3	3,4	43 000	67 000	7002CTAP2	0,030
	35	11	0,6	0,3	9	8,9	4,5	40 000	63 000	7202CTAP4	0,042
	35	11	0,6	0,3	9	8,9	4,5	40 000	63 000	7202CTAP2	0,042
	35	11	0,6	0,3	12	8,7	4,4	36 000	56 000	7202ATAP4	0,042
	35	11	0,6	0,3	12	8,7	4,4	36 000	56 000	7202ATAP2	0,042
	35	11	0,6	0,3	12	8,7	4,4	36 000	56 000	7202ATAP2	0,042
17	35	10	0,3	0,1	9	7,2	4,2	38 000	60 000	7003CTAP4	0,039
	35	10	0,3	0,1	9	7,2	4,2	38 000	60 000	7003CTAP2	0,039
	40	12	0,6	0,3	10	10,9	5,8	36 000	56 000	7203CTAP4	0,060
	40	12	0,6	0,3	10	10,9	5,8	36 000	56 000	7203CTAP2	0,060
	40	12	0,6	0,3	13	9	5,1	30 000	48 000	7203ATAP4	0,060
	40	12	0,6	0,3	13	9	5,1	30 000	48 000	7203ATAP2	0,060
	40	12	0,6	0,3	13	9	5,1	30 000	48 000	7203ATAP2	0,060
20	42	12	0,6	0,3	10	10,5	6,1	32 000	50 000	7004CTAP4	0,070
	42	12	0,6	0,3	10	10,5	6,1	32 000	50 000	7004CTAP2	0,070
	42	12	0,6	0,3	10	10,5	6,1	32 000	50 000	7004CTBP4	0,070
	42	12	0,6	0,3	10	10,5	6,1	32 000	50 000	7004CTBP2	0,070
	42	12	0,6	0,3	13	10	5,8	28 000	45 000	7004ATAP4	0,070
	42	12	0,6	0,3	13	10	5,8	28 000	45 000	7004ATAP2	0,070
	47	14	1	0,6	12	15,6	9	30 000	48 000	7204CTAP4	0,100
	47	14	1	0,6	12	15,6	9	30 000	48 000	7204CTAP2	0,100
	47	14	1	0,6	12	15,6	9	30 000	48 000	7204CTBP4	0,100
	47	14	1	0,6	12	15,6	9	30 000	48 000	7204CTBP2	0,100
	47	14	1	0,6	15	14,9	8,6	26 000	43 000	7204ATAP4	0,100
	47	14	1	0,6	15	14,9	8,6	26 000	43 000	7204ATAP2	0,100
	47	14	1	0,6	15	14,9	8,6	26 000	43 000	7204ATAP2	0,100
	47	14	1	0,6	15	14,9	8,6	26 000	43 000	7204ATAP2	0,100
	47	14	1	0,6	15	14,9	8,6	26 000	43 000	7204ATAP2	0,100
25	47	12	0,6	0,3	11	11,7	7,4	28 000	45 000	7005CTAP4	0,080
	47	12	0,6	0,3	11	11,7	7,4	28 000	45 000	7005CTAP2	0,080
	47	12	0,6	0,3	11	11,7	7,4	28 000	45 000	7005CTBP4	0,080
	47	12	0,6	0,3	11	11,7	7,4	28 000	45 000	7005CTBP2	0,080
	47	12	0,6	0,3	15	10,4	6,95	24 000	40 000	7005ATAP4	0,080
	47	12	0,6	0,3	15	10,4	6,95	24 000	40 000	7005ATAP2	0,080
	52	15	1	0,6	13	16,6	10,3	26 000	43 000	7205CTAP4	0,120
	52	15	1	0,6	13	16,6	10,3	26 000	43 000	7205CTAP2	0,120
	52	15	1	0,6	13	16,6	10,3	26 000	43 000	7205CTBP4	0,120
	52	15	1	0,6	13	16,6	10,3	26 000	43 000	7205CTBP2	0,120
	52	15	1	0,6	13	16,6	10,3	26 000	43 000	7205CTBP2	0,120

High precision angular contact ball bearings, single row



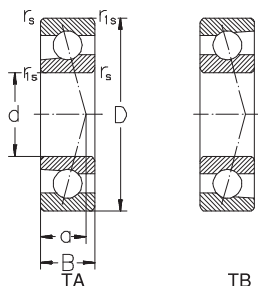
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
25	52	15	1	0,6	17	13,7	8,8	22 000	38 000	7205ATAP4	0,120
	52	15	1	0,6	17	13,7	8,8	22 000	38 000	7205ATAP2	0,120
30	55	13	1	0,3	12	15,1	10,3	24 000	40 000	7006CTAP4	0,120
	55	13	1	0,3	12	15,1	10,3	24 000	40 000	7006CTAP2	0,120
	55	13	1	0,3	12	15,1	10,3	24 000	40 000	7006CTBP4	0,120
	55	13	1	0,3	12	15,1	10,3	24 000	40 000	7006CTBP2	0,120
	55	13	1	0,3	17	13,4	9,5	20 000	36 000	7006ATAP4	0,120
	55	13	1	0,3	17	13,4	9,5	20 000	36 000	7006ATAP2	0,120
	62	16	1	0,6	14	23	14,8	22 000	38 000	7206CTAP4	0,190
	62	16	1	0,6	14	23	14,8	22 000	38 000	7206CTAP2	0,190
	62	16	1	0,6	14	23	14,8	22 000	38 000	7206CTBP4	0,190
	62	16	1	0,6	14	23	14,8	22 000	38 000	7206CTBP2	0,190
	62	16	1	0,6	19	22	14,1	19 000	34 000	7206ATAP4	0,190
	62	16	1	0,6	19	22	14,1	19 000	34 000	7206ATAP2	0,190
	62	14	1	0,3	14	19,2	13,7	20 000	36 000	7007CTAP4	0,160
	62	14	1	0,3	14	19,2	13,7	20 000	36 000	7007CTAP2	0,160
	62	14	1	0,3	14	19,2	13,7	20 000	36 000	7007CTBP4	0,160
	62	14	1	0,3	19	18,2	13,1	18 000	32 000	7007CTBP2	0,160
35	62	14	1	0,3	19	18,2	13,1	18 000	32 000	7007ATAP4	0,160
	62	14	1	0,3	19	18,2	13,1	18 000	32 000	7007ATAP2	0,160
	72	17	1,1	0,6	16	30,4	20,2	19 000	34 000	7207CTAP4	0,270
	72	17	1,1	0,6	16	30,4	20,2	19 000	34 000	7207CTAP2	0,270
	72	17	1,1	0,6	16	30,4	20,2	19 000	34 000	7207CTBP4	0,270
	72	17	1,1	0,6	16	30,4	20,2	19 000	34 000	7207CTBP2	0,270
	72	17	1,1	0,6	21	24,5	17	16 000	28 000	7207ATAP4	0,270
	72	17	1,1	0,6	21	24,5	17	16 000	28 000	7207ATAP2	6,270
	68	15	1	0,3	15	20,6	15,9	19 000	34 000	7008CTAP4	0,190
	68	15	1	0,3	15	20,6	15,9	19 000	34 000	7008CTAP2	0,190
	68	15	1	0,3	20	19,5	15	16 000	28 000	7008ATAP4	0,190
	68	15	1	0,3	20	19,5	15	16 000	28 000	7008ATAP2	0,190
	68	15	1	0,3	20	19,5	15	16 000	28 000	7008ATBP4	0,190
	80	18	1,1	0,6	17	36,3	25,2	17 000	30 000	7208CTAP4	0,350
	80	18	1,1	0,6	17	36,3	25,2	17 000	30 000	7208CTAP2	0,350
	80	18	1,1	0,6	17	36,3	25,2	17 000	30 000	7208CTBP4	0,350
40	80	18	1,1	0,6	17	36,3	25,2	17 000	30 000	7208CTBP2	0,350
	80	18	1,1	0,6	23	35,2	24,4	15 000	26 000	7208ATAP4	0,350
	80	18	1,1	0,6	23	35,2	24,4	15 000	26 000	7208ATAP2	0,350
	80	18	1,1	0,6	23	35,2	24,4	15 000	26 000	7208ATBP4	0,350
	75	16	1	0,3	16	24,4	19,3	16 000	28 000	7009CTAP4	0,250
	75	16	1	0,3	16	24,4	19,3	15 000	28 000	7009CTAP2	0,250
	75	16	1	0,3	22	22	17,3	15 000	26 000	7009ATAP4	0,250

High precision angular contact ball bearings, single row



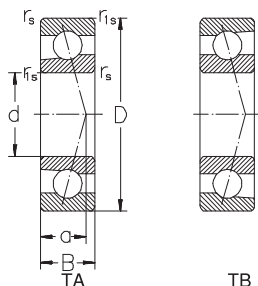
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		–	kg
45	75	16	1	0,3	22	22	17,3	15 000	26 000	7009ATAP2	0,250
	85	19	1,1	0,6	18	40	29	15 000	26 000	7209CTAP4	0,400
	85	19	1,1	0,6	18	40	29	15 000	26 000	7209CTAP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13 000	22 000	7209ATAP4	0,400
	85	19	1,1	0,6	25	36,8	27,5	13 000	22 000	7209ATAP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13 000	22 000	7209ATBP4	0,400
	85	19	1,1	0,6	25	36,8	27,5	13 000	22 000	7209ATBP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13 000	22 000	7209ATBP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13 000	22 000	7209ATBP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13 000	22 000	7209ATBP2	0,400
50	80	16	1	0,3	17	25,1	20,7	15 000	26 000	7010CTAP4	0,260
	80	16	1	0,3	17	25,1	20,7	15 000	26 000	7010CTAP2	0,260
	80	16	1	0,3	23	23,2	20	13 000	22 000	7010ATAP4	0,260
	80	16	1	0,3	23	23,2	20	13 000	22 000	7010ATAP2	0,260
	90	20	1,1	0,6	20	42,8	31,7	14 000	24 000	7210CTAP4	0,450
	90	20	1,1	0,6	20	42,8	31,7	14 000	24 000	7210CTAP2	0,450
	90	20	1,1	0,6	27	42	31	12 000	20 000	7210ATAP4	0,450
	90	20	1,1	0,6	27	42	31	12 000	20 000	7210ATAP2	0,450
	90	20	1,1	0,6	27	42	31	12 000	20 000	7210ATBP4	0,450
	90	20	1,1	0,6	27	42	31	12 000	20 000	7210ATBP2	0,450
55	90	18	1,1	0,6	19	34,1	28,6	13 000	22 000	7011CTAP4	0,390
	90	18	1,1	0,6	19	34,1	28,6	13 000	22 000	7011CTAP2	0,390
	90	18	1,1	0,6	19	34,1	28,6	13 000	22 000	7011CTBP4	0,390
	90	18	1,1	0,6	26	32,3	27,1	12 000	20 000	7011ATAP4	0,390
	90	18	1,1	0,6	26	32,3	27,1	12 000	20 000	7011ATAP2	0,390
	100	21	1,5	1	21	53	40	12 000	20 000	7211CTAP4	0,600
	100	21	1,5	1	21	53	40	12 000	20 000	7211CTAP2	0,600
	100	21	1,5	1	29	50,6	38,3	11 000	19 000	7211ATAP4	0,600
	100	21	1,5	1	29	50,6	38,3	11 000	19 000	7211ATBP2	0,600
	100	21	1,5	1	29	50,6	38,3	11 000	19 000	7211ATBP4	0,600
60	100	21	1,5	1	29	50,6	38,3	11 000	19 000	7211ATBP2	0,600
	95	18	1,1	0,6	20	35	30,5	12 000	20 000	7012CTAP4	0,420
	95	18	1,1	0,6	20	35	30,5	12 000	20 000	7012CTAP2	0,420
	95	18	1,1	0,6	20	35	30,5	12 000	20 000	7012CTBP2	0,420
	95	18	1,1	0,6	27	33,2	29,1	11 000	19 000	7012ATAP4	0,420
	95	18	1,1	0,6	27	33,2	29,1	11 000	19 000	7012ATAP2	0,420
	110	22	1,5	1	23	64,2	49	11 000	19 000	7212CTAP4	0,770
	110	22	1,5	1	23	64	49	11 000	19 000	7212CTAP2	0,770
	110	22	1,5	1	31	61	47,5	9 500	17 000	7212ATAP4	0,770
	110	22	1,5	1	31	61	47,5	9 500	17 000	7212ATAP2	0,770
65	110	22	1,5	1	31	61	47,5	9 500	17 000	7212ATBP4	0,770
	110	22	1,5	1	31	61	47,5	9 500	17 000	7212ATBP2	0,770
	100	18	1,1	0,6	20	36	32,5	12 000	20 000	7013CTAP4	0,460
	100	18	1,1	0,6	20	36	32,5	12 000	20 000	7013CTAP2	0,460
	100	18	1,1	0,6	28	34	31	10 000	18 000	7013AMBPA	0,460

High precision angular contact ball bearings, single row



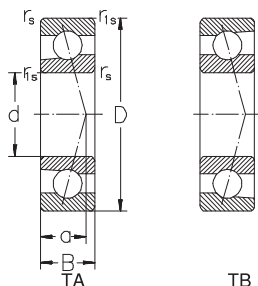
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
65	100	18	1,1	0,6	28	34	31	10 000	18 000	7013ATAP4	0,460
	100	18	1,1	0,6	28	34	31	10 000	18 000	7013ATAP2	0,460
	100	18	1,1	0,6	28	34	31	10 000	18 000	7013ATBP4	0,460
	120	23	1,5	1	24	72	57	10 000	18 000	7213CTAP4	0,970
	120	23	1,5	1	24	72	57	10 000	18 000	7213CTAP2	0,970
	120	23	1,5	1	33	69,5	54	9 000	16 000	7213ATAP4	0,970
	120	23	1,5	1	33	69,5	54	9 000	16 000	7213ATAP2	0,970
	120	23	1,5	1	33	69,5	54	9 000	16 000	7213ATBP4	0,970
	120	23	1,5	1	33	69,5	54	9 000	16 000	7213ATBP2	0,970
	110	20	1,1	0,6	22	45,3	40,8	10 000	18 000	7014CTAP4	0,640
	110	20	1,1	0,6	22	45,3	40,8	10 000	18 000	7014CTAP2	0,640
	110	20	1,1	0,6	22	45,3	40,8	10 000	18 000	7014CTBP4	0,640
70	110	20	1,1	0,6	31	43	34	9 000	16 000	7014ATAP4	0,640
	110	20	1,1	0,6	31	43	34	9 000	16 000	7014ATAP2	0,640
	125	24	1,5	1	25	76	60,2	9 500	17 000	7214CTAP4	1,053
	125	24	1,5	1	25	76	60,2	9 500	17 000	7214CTAP2	1,053
	125	24	1,5	1	35	78	57	8 500	15 000	7214ATAP4	1,053
	125	24	1,5	1	35	78	57	8 500	15 000	7214ATAP2	1,053
	125	24	1,5	1	35	78	57	8 500	15 000	7214ATBP4	1,053
	125	24	1,5	1	35	78	57	8 500	15 000	7214ATBP2	1,053
	115	20	1,1	0,6	23	46,5	43,5	10 000	18 000	7015CTAP4	0,680
	115	20	1,1	0,6	23	46,5	43,5	10 000	18 000	7015CTAP2	0,680
	115	20	1,1	0,6	32	44	41,2	8 500	15 000	7015ATAP4	0,680
	115	20	1,1	0,6	32	44	41,2	8 500	15 000	7015ATAP2	0,680
75	115	20	1,1	0,6	32	44	41,2	8 500	15 000	7015ATBP2	0,680
	130	25	1,5	1	26	80	65,5	9 000	16 000	7215CTAP4	1,153
	130	25	1,5	1	26	80	65,5	9 000	16 000	7215CTAP2	1,153
	130	25	1,5	1	37	73	60,5	8 000	14 000	7215ATAP4	1,153
	130	25	1,5	1	37	73	60,5	8 000	14 000	7215ATAP2	1,153
	130	25	1,5	1	37	73	60,5	8 000	14 000	7215ATBP4	1,153
	130	25	1,5	1	37	73	60,5	8 000	14 000	7215ATBP2	1,153
	125	22	1,1	0,6	25	58,6	55	9 000	16 000	7016CTAP4	0,890
	125	22	1,1	0,6	25	58,7	55,2	9 000	16 000	7016CTAP2	0,890
	125	22	1,1	0,6	35	56	63	8 000	14 000	7016AMAP4	0,890
	125	22	1,1	0,6	35	56,2	63	8 000	14 000	7016ATAP4	0,890
	125	22	1,1	0,6	35	56	63	8 000	14 000	7016ATAP2	0,890
80	140	26	2	1	28	92,6	78	7 500	13 000	7216CTAP4	1,403
	140	26	2	1	28	93,2	78	8 000	14 000	7216CTAP2	1,403
	140	26	2	1	39	86	73,5	7 000	12 000	7216ATAP4	1,403
	140	26	2	1	39	86	73,5	7 000	12 000	7216ATAP2	1,403
	140	26	2	1	39	86	73,5	7 000	12 000	7216ATBP4	1,403
	140	26	2	1	39	86	73,5	7 000	12 000	7216ATBP2	1,403
	140	26	2	1	39	86	73,5	7 000	12 000	7216ATBP2	1,403
	140	26	2	1	39	86	73,5	7 000	12 000	7216ATBP2	1,403

High precision angular contact ball bearings, single row



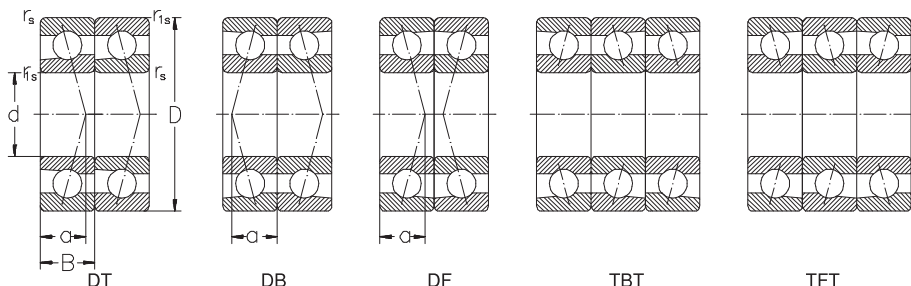
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
85	130	22	1,1	0,6	26	60,2	58,6	8 500	15 000	7017CTAP4	0,930
	130	22	1,1	0,6	26	60,2	58,6	8 500	15 000	7017CTAP2	0,930
	130	22	1,1	0,6	36	57	56	7 500	13 000	7017ATAP4	0,930
	130	22	1,1	0,6	36	57	56	7 500	13 000	7017ATAP2	0,930
	150	28	2	1	30	104	90	7 500	13 000	7217CTAP4	1,753
	150	28	2	1	30	104	90	7 500	13 000	7217CTAP2	1,753
	150	28	2	1	42	98	76,5	6 700	11 000	7217ATAP4	1,753
	150	28	2	1	42	98	76,5	6 700	11 000	7217ATAP2	1,753
	150	28	2	1	42	98	76,5	6 700	11 000	7217ATBP4	1,753
	150	28	2	1	42	98	76,5	6 700	11 000	7217ATBP2	1,753
	140	24	1,5	0,6	28	71,6	69	7 000	12 000	7018CTAP4	1,203
	140	24	1,5	0,6	28	71,7	69,1	7 500	13 000	7018CTAP2	1,203
	140	24	1,5	0,6	28	71,7	69,1	7 500	13 000	7018CTBP4	1,203
	140	24	1,5	0,6	39	68	65,5	6 700	11 000	7018ATAP4	1,203
	140	24	1,5	0,6	39	68	65,5	6 700	11 000	7018ATAP2	1,203
90	160	30	2	1	32	123	105	7 000	12 000	7218CTAP4	2,153
	160	30	2	1	32	123	105	7 000	12 000	7218CTAP2	2,153
	160	30	2	1	44	117	100	6 000	9 500	7218AMAP4	2,153
	160	30	2	1	44	117	100	6 000	9 500	7218ATAP4	2,153
	160	30	2	1	44	117	100	6 000	9 500	7218ATAP2	2,153
	160	30	2	1	44	117	100	6 000	9 500	7218ATBP4	2,153
	160	30	2	1	44	189	100	6 000	9 500	7218ATBP2	2,153
	145	24	1,5	0,6	28	73,4	73,4	8 000	14 000	7019CTAP4	1,253
	145	24	1,5	0,6	28	73,4	73,4	8 000	14 000	7019CTAP2	1,253
	145	24	1,5	0,6	40	68	66	6 300	10 000	7019ATAP4	1,253
	145	24	1,5	0,6	40	68	66	6 300	10 000	7019ATAP2	1,253
	170	32	2,1	1,1	34	130	115	6 300	10 000	7219CTAP4	2,653
	170	32	2,1	1,1	34	130	115	6 300	10 000	7219CTAP2	2,653
	170	32	2,1	1,1	47	126	110	5 600	9 000	7219ATAP4	2,653
	170	32	2,1	1,1	47	126	110	5 600	9 000	7219ATAP2	2,653
100	150	24	1,5	0,6	29	75,3	77,2	7 000	12 000	7020CTAP4	1,303
	150	24	1,5	0,6	29	75,3	77,2	7 000	12 000	7020CTAP2	1,303
	150	24	1,5	0,6	41	71,1	73	6 000	9 500	7020AMP4	1,303
	150	24	1,5	0,6	41	71	73	6 000	9 500	7020ATAP2	1,303
	150	24	1,5	0,6	41	71	73	6 000	9 500	7020ATAP4	1,303
	180	34	2,1	1,1	36	148	127	6 000	9 500	7220CTAP4	3,203
	180	34	2,1	1,1	36	150	127	6 000	9 500	7220CTAP2	3,153
	180	34	2,1	1,1	50	142	121	5300	8 500	7220AMAP4	3,153
	180	34	2,1	1,1	50	142	121	5300	8 500	7220ATAP4	3,153
	180	34	2,1	1,1	50	142	121	5300	8 500	7220ATAP2	3,153
	180	34	2,1	1,1	50	142	121	5300	8 500	7220ATBP4	3,153
	180	34	2,1	1,1	50	142	121	5300	8 500	7220ATBP2	3,153
	180	34	2,1	1,1	50	142	121	5300	8 500	7220ATBP4	3,153
	180	34	2,1	1,1	50	142	121	5300	8 500	7220ATBP2	3,153

High precision angular contact ball bearings, single row

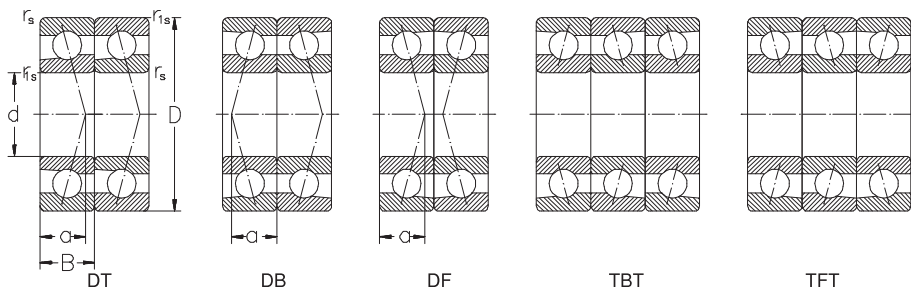


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r_s min.	$r1s$ min.	a	dyn. C_r	stat. C_{0r}	grease	oil		
mm						kN		min^{-1}		—	kg
100	180	34	2,1	1,1	50	142	121	5 300	8 000	7220ATBP2	3,153
105	160	26	2	1	31	87	89	5 600	8 500	7021CTAP4	1,663
110	170	28	2	1	47	104	104	5 300	8 000	7022ATAP4	3,203
120	180	28	2	2	34	109	111	5 000	7 500	7024CTBP4	2,083
	180	28	2	2	49	104	105	5 000	7 500	7024AMAP4	2,293
	180	28	2	2	49	104	105	5 000	7 500	7024ATAP4	2,293
130	200	33	2	1	39	145	99	6 300	8 500	7026CMAP4	3,193
	200	33	2	1	39	145	149	5 600	7 500	7026CTAP4	3,193
150	225	35	2,1	1,1	61	159	173	4 500	6 000	7030CMAP4	4,323
	225	35	2,1	1,1	61	159	173	4 500	6 000	7030CTAP4	4,323
	225	35	2,1	1,1	61	159	173	5 000	6 700	7030AMAP4	4,323

High precision angular contact ball bearings, single row, for paired and stack mounted

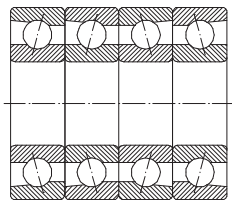


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r_s min.	r_{1s} min.	a	dyn. C_r	stat. C_{0r}	grease	oil		
mm						kN		min^{-1}		—	kg
10	26	8	0,3	0,1	6	8,6	4,9	48 000	80 000	7000CTAP4DT	0,040
	26	8	0,3	0,1	6	8,6	4,9	43 000	70 000	7000CTAP4DB	0,040
	26	8	0,3	0,1	6	8,6	4,9	43 000	70 000	7000CTAP4DF	0,040
	30	9	0,6	0,3	7	9,4	5,9	43 000	70 000	7200CTAP4DT	0,058
	30	9	0,6	0,3	7	9,4	5,9	38 000	63 000	7200CTAP4DB	0,058
	30	9	0,6	0,3	7	9,4	5,9	38 000	63 000	7200CTAP4DF	0,058
	28	8	0,3	0,1	7	8,75	5,2	43 000	70 000	7001CTAP4DT	0,046
	28	8	0,3	0,1	7	8,75	5,2	38 000	63 000	7001CTAP4DB	0,046
	28	8	0,3	0,1	7	8,75	5,2	38 000	63 000	7001CTAP4DF	0,046
	32	10	0,6	0,3	10	12,2	6,8	38 000	63 000	7201ATAP4DT	0,060
12	32	10	0,6	0,3	10	12,2	6,8	34 000	56 000	7201ATAP4DB	0,060
	32	10	0,6	0,3	10	12,2	6,8	34 000	56 000	7201ATAP4DF	0,060
	32	9	0,3	0,1	8	10,2	6,8	36 000	60 000	7002CTAP4DT	0,060
	32	9	0,3	0,1	8	10,2	6,8	32 000	53 000	7002CTAP4DB	0,060
	32	9	0,3	0,1	8	10,2	6,8	32 000	53 000	7002CTAP4DF	0,060
	32	9	0,3	0,1	8	16,6	13,6	28 000	48 000	7002CTAP4QBC	0,120
	32	9	0,3	0,1	8	10,2	6,8	36 000	60 000	7002CTAP2DT	0,060
	32	9	0,3	0,1	8	10,2	6,8	36 000	60 000	7002CTBP4DT	0,060
	35	11	0,6	0,3	9	14,4	9	34 000	56 000	7202CTAP4DT	0,084
	35	11	0,6	0,3	9	14,4	9	30 000	50 000	7202CTAP4DB	0,084
15	35	11	0,6	0,3	9	14,4	9	30 000	50 000	7202CTAP4DF	0,084
	35	11	0,6	0,3	12	14,1	8,8	30 000	50 000	7202ATAP4DT	0,048
	35	11	0,6	0,3	12	14,1	8,8	28 000	45 000	7202ATAP4DB	0,048
	35	11	0,6	0,3	12	14,1	8,8	28 000	45 000	7202ATAP4DF	0,048
	35	11	0,6	0,3	12	14,1	8,8	28 000	45 000	7202ATAP2DB	0,084
	35	10	0,3	0,1	9	11,7	8,4	32 000	53 000	7003CTAP4DT	0,078
	35	10	0,3	0,1	9	11,7	8,4	28 000	48 000	7003CTAP4DB	0,078
	35	10	0,3	0,1	9	11,7	8,4	28 000	48 000	7003CTAP4DF	0,078
	35	10	0,3	0,1	9	15,6	16,8	28 000	45 000	7003CTAP4TBT	0,117
	35	10	0,3	0,1	9	11,7	8,4	28 000	48 000	7003CTAP2DB	0,078
17	40	12	0,6	0,3	10	17,7	11,6	30 000	50 000	7203CTAP4DT	0,120
	40	12	0,6	0,3	10	17,7	11,6	28 000	45 000	7203CTAP4DB	0,120
	40	12	0,6	0,3	10	17,7	11,6	28 000	45 000	7203CTAP4DF	0,120
	40	12	0,6	0,3	13	14,6	10,2	26 000	43 000	7203ATAP4DT	0,120
	40	12	0,6	0,3	13	14,6	10,2	22 000	38 000	7203ATAP4DB	0,120
	40	12	0,6	0,3	13	14,6	10,2	22 000	38 000	7203ATAP4DF	0,120
	42	12	0,6	0,3	10	17	12,2	28 000	45 000	7004CTAP4DT	0,140
	42	12	0,6	0,3	10	17	12,2	24 000	40 000	7004CTAP4DB	0,140
	42	12	0,6	0,3	10	17	12,2	24 000	40 000	7004CTAP4DF	0,140
	42	12	0,6	0,3	10	27,7	24,4	22 000	36 000	7004CTAP4QBC	0,280
20	42	12	0,6	0,3	10	17	12,2	24 000	40 000	7004CTAP2DB	0,140



Dimensions						Basic radial		Speed limit		Designation	Weight	
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil			
mm						kN		min ⁻¹		—	kg	
20	42	12	0,6	0,3	10	17	12,2	24 000	40 000	7004CTBP4DB	0,140	
	42	12	0,6	0,3	10	17	12,2	28 000	45 000	7004CTBP2DT	0,140	
	42	12	0,6	0,3	13	16,2	11,6	24 000	40 000	7004ATAP4DT	0,140	
	42	12	0,6	0,3	13	16,2	11,6	22 000	36 000	7004ATAP4DB	0,140	
	42	12	0,6	0,3	13	16,2	11,6	22 000	36 000	7004ATAP4DF	0,140	
	47	14	1	0,6	12	25,3	18	26 000	43 000	7204CTAP4DT	0,200	
	47	14	1	0,6	12	25,3	18	22 000	38 000	7204CTAP4DB	0,200	
	47	14	1	0,6	12	25,3	18	22 000	38 000	7204CTAP4DF	0,200	
	47	14	1	0,6	12	25,3	18	26 000	43 000	7204CTBP4DT	0,200	
	47	14	1	0,6	12	25,3	18	22 000	38 000	7204CTBP4DB	0,200	
	47	14	1	0,6	12	25,3	18	22 000	38 000	7204CTBP4DF	0,200	
	47	14	1	0,6	15	24,2	17,2	22 000	38 000	7204ATAP4DT	0,200	
	47	14	1	0,6	15	24,2	17,2	20 000	34 000	7204ATAP4DB	0,200	
	47	14	1	0,6	15	24,2	17,2	20 000	34 000	7204ATAP4DF	0,200	
	47	14	1	0,6	12	25,3	18	22 000	38 000	7204CTBP4DF	0,200	
	47	14	1	0,6	12	25,3	18	22 000	38 000	7204CTBP2DF	0,200	
	47	14	1	0,6	15	24,2	17,2	22 000	38 000	7204ATAP4DT	0,200	
	47	14	1	0,6	15	24,2	17,2	20 000	34 000	7204ATAP4DB	0,200	
	47	14	1	0,6	15	24,2	17,2	20 000	34 000	7204ATAP4DF	0,200	
	25	47	12	0,6	0,3	11	17	14,8	24 000	40 000	7005CTAP4DT	0,160
		47	12	0,6	0,3	11	19	14,8	22 000	36 000	7005CTAP4DB	0,160
		47	12	0,6	0,3	11	19	14,8	22 000	36 000	7005CTAP4DF	0,160
		47	12	0,6	0,3	11	19	14,8	24 000	40 000	7005CTAP2DT	0,160
		47	12	0,6	0,3	11	19	14,8	22 000	36 000	7005CTAP2DB	0,160
		47	12	0,6	0,3	11	19	14,8	24 000	40 000	7005CTAP2TBT	0,240
		47	12	0,6	0,3	11	19	14,8	24 000	40 000	7005CTBP2DT	0,160
		47	12	0,6	0,3	11	19	14,8	22 000	36 000	7005CTBP2DB	0,160
		47	12	0,6	0,3	15	16,9	13,9	22 000	36 000	7005ATAP4DT	0,160
47		12	0,6	0,3	15	16,9	13,9	19 000	32 000	7005ATAP4DB	0,160	
47		12	0,6	0,3	15	16,9	13,9	19 000	32 000	7005ATAP4DF	0,160	
52		15	1	0,6	13	26,9	20,6	22 000	38 000	7205CTAP4DT	0,240	
52		15	1	0,6	13	26,9	20,6	20 000	34 000	7205CTAP4DB	0,240	
52		15	1	0,6	13	26,9	20,6	20 000	34 000	7205CTAP4DF	0,240	
52		15	1	0,6	13	43,8	41,2	18 000	30 000	7205CTAP4QBC	0,120	
52		15	1	0,6	13	26,9	20,6	22 000	38 000	7205CTAP2DT	0,240	
52		15	1	0,6	13	26,9	20,6	20 000	34 000	7205CTAP2DB	0,240	
52		15	1	0,6	13	26,9	20,6	22 000	38 000	7205CTBP4DT	0,240	
52		15	1	0,6	13	26,9	20,6	20 000	34 000	7205CTBP4DB	0,240	
52		15	1	0,6	13	26,9	20,6	20 000	34 000	7205CTBP4DF	0,240	
25		52	15	1	0,6	13	43,8	41,2	18 000	30 000	7205CTBP4QBC	0,480
		52	15	1	0,6	17	22,2	17,6	20 000	34 000	7205ATAP4DT	0,240
		52	15	1	0,6	17	22,2	17,6	18 000	30 000	7205ATAP4DB	0,240
		52	15	1	0,6	17	22,2	17,6	18 000	30 000	7205ATAP4DF	0,240
		52	15	1	0,6	17	29,6	26,4	17 000	28 000	7205ATAP4TFT	0,360
		52	15	1	0,6	17	29,6	26,4	17 000	28 000	7205ATAP4TFT	0,360
30		55	13	1	0,3	12	24,5	20,6	22 000	36 000	7006CTAP4DT	0,240
		55	13	1	0,3	12	24,5	20,6	19 000	32 000	7006CTAP4DB	0,240
	55	13	1	0,3	12	24,5	20,6	19 000	32 000	7006CTAP4DF	0,240	
	55	13	1	0,3	12	32,6	30,9	18 000	30 000	7006CTAP4TBT	0,360	

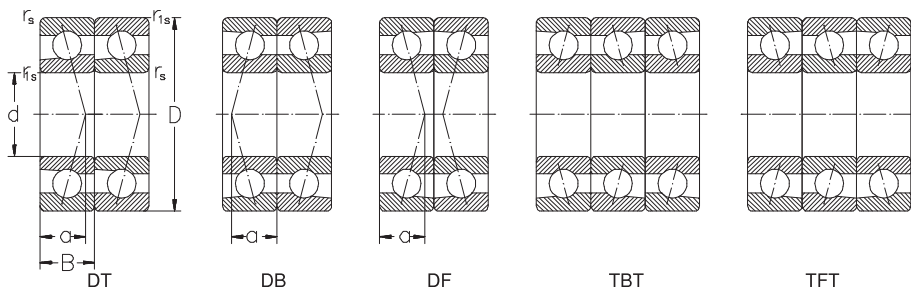
High precision angular contact ball bearings, single row, for paired and stack mounted



QBC

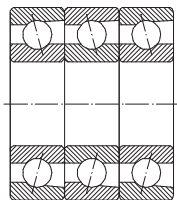
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
30	55	13	1	0,3	12	24,5	20,6	19 000	32 000	7006CTAP2DB	0,240
	55	13	1	0,3	12	24,5	20,6	22 000	36 000	7006CTBP2DT	0,240
	55	13	1	0,3	17	21,7	19	19 000	32 000	7006ATAP4DT	0,240
	55	13	1	0,3	17	21,7	19	17 000	28 000	7006ATAP4DB	0,240
	55	13	1	0,3	17	21,7	19	17 000	28 000	7006ATAP4DF	0,240
	62	16	1	0,6	14	37,3	29,6	20 000	34 000	7206CTAP4DT	0,380
	62	16	1	0,6	14	37,3	29,6	18 000	30 000	7206CTBP2DT	0,380
	62	16	1	0,6	14	37,3	29,6	18 000	30 000	7206CTAP4DF	0,380
	62	16	1	0,6	14	49,7	44,4	17 000	28 000	7206CTAP4TT	0,570
	62	16	1	0,6	14	49,7	44,4	17 000	28 000	7206CTAP4TBT	0,570
	62	16	1	0,6	14	60,7	59,2	16 000	26 000	7206CTAP4QFC	0,760
	62	16	1	0,6	14	37,3	29,6	20 000	34 000	7206CTAP2DT	0,380
	62	16	1	0,6	14	37,3	29,6	18 000	30 000	7206CTAP2DB	0,380
	62	16	1	0,6	14	37,3	29,6	20 000	34 000	7206CTBP4DT	0,380
	62	16	1	0,6	14	37,3	29,6	18 000	30 000	7206CTBP4DB	0,380
	62	16	1	0,6	14	37,3	29,6	18 000	30 000	7206CTBP4DF	0,380
	62	16	1	0,6	14	49,7	44,4	17 000	28 000	7206CTBP4TT	0,570
	62	16	1	0,6	14	60,7	59,2	16 000	26 000	7206CTBP4QFC	0,760
	62	16	1	0,6	19	35,7	28,2	18 000	30 000	7206ATAP4DT	0,380
	62	16	1	0,6	19	35,7	28,2	17 000	28 000	7206ATAP4DB	0,380
	62	16	1	0,6	19	35,7	28,2	17 000	28 000	7206ATAP4DF	0,380
35	62	14	1	0,3	14	31,1	27,4	19 000	32 000	7007CTAP4DT	0,320
	62	14	1	0,3	14	31,1	27,4	17 000	28 000	7007CTAP4DB	0,320
	62	14	1	0,3	14	31,1	27,4	17 000	28 000	7007CTAP4DF	0,320
	62	14	1	0,3	14	31,1	27,4	17 000	28 000	7007CTAP2DB	0,320
	62	14	1	0,3	14	31,1	27,4	17 000	28 000	7007CTBP4DB	0,320
	62	14	1	0,3	14	31,1	27,4	19 000	32 000	7007CTBP2DT	0,320
	62	14	1	0,3	19	29,5	26,2	17 000	28 000	7007ATAP4DT	0,320
	62	14	1	0,3	19	29,5	26,2	16 000	26 000	7007ATAP4DB	0,320
	62	14	1	0,3	19	29,5	26,2	16 000	26 000	7007ATAP4DF	0,320
	72	17	1,1	0,6	16	49,3	40,4	18 000	30 000	7207CTAP4DT	0,540
	72	17	1,1	0,6	16	49,3	40,4	17 000	28 000	7207CTAP4DB	0,540
	72	17	1,1	0,6	16	49,3	40,4	17 000	28 000	7207CTAP4DF	0,540
	72	17	1,1	0,6	16	65,7	60,6	16 000	26 000	7207CTAP4TFT	0,810
	72	17	1,1	0,6	16	80,3	80,8	14 000	24 000	7207CTAP4QFC	1,083
	72	17	1,1	0,6	16	49,3	40,4	18 000	30 000	7207CTBP4DT	0,540
	72	17	1,1	0,6	16	49,3	40,4	17 000	28 000	7207CTBP4DB	0,540
	72	17	1,1	0,6	16	49,3	40,4	17 000	28 000	7207CTBP4DF	0,540
	72	17	1,1	0,6	21	39,7	34	16 000	26 000	7207ATAP4DT	0,540
	72	17	1,1	0,6	21	39,7	34	13 000	22 000	7207ATAP4DB	0,540
	72	17	1,1	0,6	21	39,7	34	13 000	22 000	7207ATAP4DF	0,540
40	68	15	1	0,3	15	33,4	31,8	18 000	30 000	7008CTAP4DT	0,380
	68	15	1	0,3	15	33,4	31,8	17 000	28 000	7008CTAP4DB	0,380

High precision angular contact ball bearings, single row, for paired and stack mounted

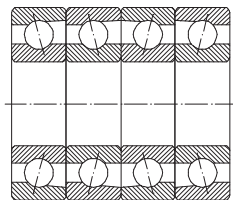


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{fs} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
40	68	15	1	0,3	15	33,4	31,8	17 000	28 000	7008CTAP4DF	0,380
	68	15	1	0,3	15	33,4	31,8	18 000	30 000	7008CTAP2DT	0,380
	68	15	1	0,3	15	33,4	31,8	17 000	28 000	7008CTAP2DB	0,380
	68	15	1	0,3	15	33,4	31,8	18 000	30 000	7008CTBP4DT	0,380
	68	15	1	0,3	15	33,4	31,8	17 000	28 000	7008CTBP4DB	0,380
	68	15	1	0,3	20	31,6	30	16 000	26 000	7008ATAP4DT	0,380
	68	15	1	0,3	20	31,6	30	13 000	22 000	7008ATAP4DB	0,380
	68	15	1	0,3	20	31,6	30	13 000	22 000	7008ATAP4DF	0,380
	68	15	1	0,3	20	31,6	30	13 000	22 000	7008ATBP4DB	0,380
	68	15	1	0,3	15	44,5	47,7	13 000	22 000	7008ATBP4TBT	0,570
	80	18	1,1	0,6	17	58,8	50,4	17 000	28 000	7208CTAP4DT	0,700
	80	18	1,1	0,6	17	58,8	50,4	14 000	24 000	7208CTAP4DB	0,700
	80	18	1,1	0,6	17	58,8	50,4	14 000	24 000	7208CTAP4DF	0,700
	80	18	1,1	0,6	17	58,8	50,4	17 000	28 000	7208CTBP4DT	0,700
	80	18	1,1	0,6	17	58,8	50,4	14 000	24 000	7208CTBP4DB	0,700
	80	18	1,1	0,6	17	58,8	50,4	14 000	24 000	7208CTBP4DF	0,700
	80	18	1,1	0,6	17	78,4	75,6	13 000	22 000	7208CTBP4TT	1,053
	80	18	1,1	0,6	17	95,8	101	13 000	22 000	7208CTBP4QT	1,403
	80	18	1,1	0,6	17	95,8	101	13 000	22 000	7208CTBP4QFC	1,403
	80	18	1,1	0,6	23	57	48,8	14 000	24 000	7208ATAP4DT	0,700
	80	18	1,1	0,6	23	57	48,8	12 000	20 000	7208ATAP4DB	0,700
	80	18	1,1	0,6	23	57	48,8	12 000	20 000	7208ATAP4DF	0,700
	80	18	1,1	0,6	23	57	48,8	14 000	24 000	7208ATBP4DB	0,700
	80	18	1,1	0,6	23	57	48,8	12 000	20 000	7208ATBP4DT	0,700
	80	18	1,1	0,6	17	95,8	101	11 000	18 000	7208ATBP4QT	1,403
	75	16	1	0,3	16	39,5	38,6	16 000	26 000	7009CTAP4DT	0,500
	75	16	1	0,3	16	39,5	38,6	13 000	22 000	7009CTAP4DB	0,500
	75	16	1	0,3	16	39,5	38,6	13 000	22 000	7009CTAP4DF	0,500
	75	16	1	0,3	16	52,7	57,9	13 000	22 000	7009CTAP4TBT	0,750
	75	16	1	0,3	16	64,5	77,2	12 000	20 000	7009CTAP4QBC	1,003
	75	16	1	0,3	16	39,5	38,6	16 000	26 000	7009CTAP2DT	0,500
	75	16	1	0,3	16	39,5	38,6	13 000	22 000	7009CTAP2DB	0,500
	75	16	1	0,3	22	35,7	34,6	14 000	24 000	7009ATAP4DT	0,500
	75	16	1	0,3	22	35,7	34,6	12 000	20 000	7009ATAP4DB	0,500
	75	16	1	0,3	22	35,7	34,6	12 000	20 000	7009ATAP4DF	0,500
	85	19	1,1	0,6	18	64,8	58	14 000	24 000	7209CTAP4DT	0,800
	85	19	1,1	0,6	18	64,8	58	12 000	20 000	7209CTAP4DB	0,800
	85	19	1,1	0,6	18	64,8	58	12 000	20 000	7209CTAP4DF	0,800
	85	19	1,1	0,6	18	64,8	58	14 000	24 000	7209CTAP2DT	0,800
	85	19	1,1	0,6	25	59,6	55	12 000	20 000	7209ATAP4DT	0,800
	85	19	1,1	0,6	25	59,6	55	11 000	18 000	7209ATAP4DB	0,800
	85	19	1,1	0,6	25	59,6	55	11 000	18 000	7209ATAP4DF	0,800
	85	19	1,1	0,6	18	64,8	58	11 000	18 000	7209CTAP2DB	0,800
	85	19	1,1	0,6	25	59,6	55	12 000	20 000	7209ATBP4DT	0,800

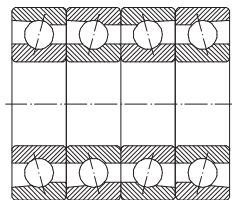
High precision angular contact ball bearings, single row, for paired and stack mounted



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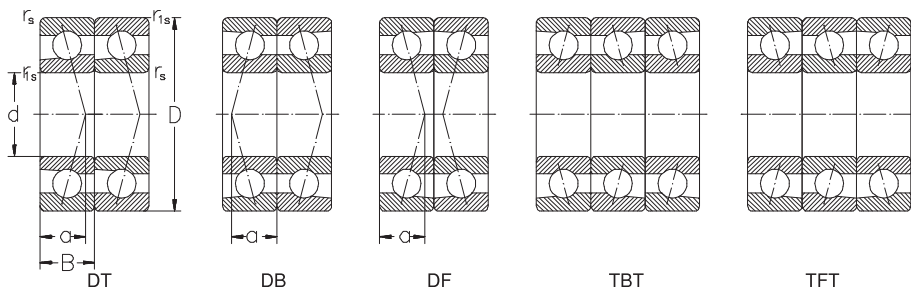
QFC



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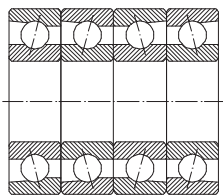
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		–	kg
45	85	19	1,1	0,6	25	59,6	55	11 000	18 000	7209ATBP4DB	0,800
	85	19	1,1	0,6	25	59,6	55	11 000	18 000	7209ATBP4DF	0,800
50	80	16	1	0,3	17	40,7	41,4	14 000	24 000	7010CTAP4DT	0,520
	80	16	1	0,3	17	40,7	41,4	12 000	20 000	7010CTAP4DB	0,520
	80	16	1	0,3	17	40,7	41,4	12 000	20 000	7010CTAP4DF	0,520
	80	16	1	0,3	17	66,3	82,8	11 000	18 000	7010CTAP4QBC	1,043
	80	16	1	0,3	17	40,7	41,4	14 000	24 000	7010CTAP2DT	0,520
	80	16	1	0,3	17	40,7	41,4	12 000	20 000	7010CTAP2DB	0,520
	80	16	1	0,3	23	37,6	40	12 000	20 000	7010ATAP4DT	0,520
	80	16	1	0,3	23	37,6	40	11 000	18 000	7010ATAP4DB	0,520
	80	16	1	0,3	23	37,6	40	11 000	18 000	7010ATAP4DF	0,520
	90	20	1,1	0,6	20	69,4	63,4	13 000	22 000	7210CTAP4DT	0,900
	90	20	1,1	0,6	20	69,4	63,4	11 000	19 000	7210CTAP4DB	0,900
	90	20	1,1	0,6	20	69,4	63,4	11 000	19 000	7210CTAP4DF	0,900
	90	20	1,1	0,6	27	68	62	11 000	18 000	7210ATAP4DT	0,900
	90	20	1,1	0,6	27	68	62	9 500	16 000	7210ATAP4DB	0,900
	90	20	1,1	0,6	27	68	62	9 500	16 000	7210ATAP4DF	0,900
	90	20	1,1	0,6	27	68	62	11 000	18 000	7210ATBP4DT	0,900
	90	20	1,1	0,6	27	68	62	9 500	16 000	7210ATBP4DB	0,900
	90	20	1,1	0,6	27	68	62	9 500	16 000	7210ATBP4DF	0,900
	90	20	1,1	0,6	27	68	62	11 000	18 000	7210ATBP2DT	0,900
55	90	18	1,1	0,6	19	55,3	57,2	12 000	20 000	7011CTAP4DT	0,780
	90	18	1,1	0,6	19	55,3	57,2	11 000	18 000	7011CTAP4DB	0,780
	90	18	1,1	0,6	19	55,3	57,2	11 000	18 000	7011CTAP4DF	0,780
	90	18	1,1	0,6	19	73,7	85,2	10 000	17 000	7011CTAP4TT	1,173
	90	18	1,1	0,6	19	73,7	85,2	10 000	17 000	7011CTAP4TBT	1,173
	90	18	1,1	0,6	26	52,3	54,2	11 000	18 000	7011ATAP4DT	0,780
	90	18	1,1	0,6	26	52,3	54,2	9 500	16 000	7011ATAP4DB	0,780
	90	18	1,1	0,6	26	52,3	54,2	9 500	16 000	7011ATAP4DF	0,780
	100	21	1,5	1	21	85,9	80	11 000	18 000	7211CTAP4DT	1,203
	100	21	1,5	1	21	85,9	80	9 500	16 000	7211CTAP4DB	1,203
	100	21	1,5	1	21	85,9	80	9 500	16 000	7211CTAP4DF	1,203
	100	21	1,5	1	29	82	76,6	10 000	17 000	7211ATAP4DT	1,203
	100	21	1,5	1	29	82	76,6	9 000	15 000	7211ATAP4DB	1,203
	100	21	1,5	1	29	82	76,6	9 000	15 000	7211ATAP4DF	1,203
	100	21	1,5	1	29	82	76,6	9 000	15 000	7211ATBP2DB	1,203
	100	21	1,5	1	29	82	76,6	10 000	17 000	7211ATBP4DT	1,203
	100	21	1,5	1	29	82	76,6	9 000	15 000	7211ATBP4DB	1,203
	100	21	1,5	1	29	82	76,6	9 000	15 000	7211ATBP4DF	1,203
60	95	18	1,1	0,6	20	56,7	61	11 000	18 000	7012CTAP4DT	0,840
	95	18	1,1	0,6	20	56,7	61	9 500	16 000	7012CTAP4DB	0,840
	95	18	1,1	0,6	20	56,7	61	9 500	16 000	7012CTAP4DF	0,840
	95	18	1,1	0,6	20	75,6	91,5	9 000	15 000	7012CTAP4TBT	1,263

High precision angular contact ball bearings, single row, for paired and stack mounted

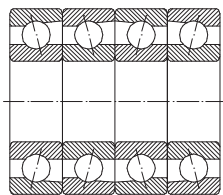


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{fs} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		–	kg
60	95	18	1,1	0,6	20	92,4	122	8 500	14 000	7012CTAP4QBC	1,683
	95	18	1,1	0,6	20	56,7	61	9 500	16 000	7012CTBP2DB	0,840
	95	18	1,1	0,6	27	53,8	58,2	10 000	17 000	7012ATAP4DT	0,840
	95	18	1,1	0,6	27	53,8	58,2	9 000	15 000	7012ATAP4DB	0,840
	95	18	1,1	0,6	27	53,8	58,2	9 000	15 000	7012ATAP4DF	0,840
	95	18	1,1	0,6	27	53,8	58,2	9 000	15 000	7012ATAP4DT	0,840
	110	22	1,5	1	23	53,8	58,2	9 000	15 000	7012ATAP2DF	0,840
	110	22	1,5	1	23	104	98	10 000	17 000	7212CTBP2DB	1,543
	110	22	1,5	1	23	104	98	9 000	15 000	7212CTAP4DB	1,543
	110	22	1,5	1	23	104	98	9 000	15 000	7212CTAP4DF	1,543
	110	22	1,5	1	23	138	147	8 500	14 000	7212CTAP4TBT	2,313
	110	22	1,5	1	23	104	98	9 000	15 000	7212CTAP2DB	1,543
	110	22	1,5	1	31	98,8	95	9 000	15 000	7212ATAP4DT	1,543
	110	22	1,5	1	31	98,8	95	8 500	14 000	7212ATAP4DB	1,543
	110	22	1,5	1	31	98,8	95	8 500	14 000	7212ATAP4DF	1,543
	110	22	1,5	1	31	98,8	95	9 000	15 000	7212ATBP4DT	1,543
	110	22	1,5	1	31	98,8	95	8 500	14 000	7212ATBP4DB	1,543
	110	22	1,5	1	31	98,8	95	8 500	14 000	7212ATBP4DF	1,543
	100	18	1,1	0,6	20	58,3	65	11 000	18 000	7013CTAP4DT	0,920
	100	18	1,1	0,6	20	58,3	65	9 500	16 000	7013CTAP4DB	0,920
	100	18	1,1	0,6	20	58,3	65	9 500	16 000	7013CTAP4DF	0,920
65	100	18	1,1	0,6	20	77,8	97,5	9 000	15 000	7013CTAP4TBT	1,383
	100	18	1,1	0,6	20	95	130	8 500	14 000	7013CTAP4QBC	1,843
	100	18	1,1	0,6	20	77,8	97,5	9 000	15 000	7013CTAP2TBT	1,383
	100	18	1,1	0,6	28	55	62	9 500	16 000	7013AMB4DT	0,920
	100	18	1,1	0,6	28	55	62	8 500	14 000	7013ATAP4DB	0,920
	100	18	1,1	0,6	28	55	62	8 500	14 000	7013ATAP4DF	0,920
	120	23	1,5	1	24	117	114	9 500	20 000	7213CTAP4DT	1,943
	120	23	1,5	1	24	117	114	8 500	14 000	7213CTAP4DB	1,943
	120	23	1,5	1	24	117	114	8 500	14 000	7213CTAP4DF	1,943
	120	23	1,5	1	24	117	114	9 500	16 000	7213CTAP2DT	1,943
	120	23	1,5	1	33	113	108	8 500	14 000	7213ATAP4DT	1,943
	120	23	1,5	1	33	113	108	8 000	13 000	7213ATAP4DB	1,943
	120	23	1,5	1	33	113	108	8 000	13 000	7213ATAP4DF	1,943
	120	23	1,5	1	33	113	108	8 500	14 000	7213ATBP4DT	1,943
	120	23	1,5	1	33	113	108	8 000	13 000	7213ATBP4DB	1,943
	120	23	1,5	1	33	113	108	8 000	13 000	7213ATBP4DF	1,943
	110	20	1,1	0,6	22	73,4	81,6	9 500	16 000	7014CTAP4DT	1,283
	110	20	1,1	0,6	22	73,4	81,6	8 500	14 000	7014CTAP4DB	1,283
	110	20	1,1	0,6	22	73,4	81,6	8 500	14 000	7014CTAP4DF	1,283
	110	20	1,1	0,6	31	93	102	8 500	14 000	7014CTAP4TBT	1,923
	110	20	1,1	0,6	31	69,7	68	8 500	14 000	7014AMB4DT	1,283
70	110	20	1,1	0,6	31	114	136	6 700	11 000	7014AMB4QBC	2,563
	110	20	1,1	0,6	31	69,7	68	8 500	14 000	7014ATAP4DT	1,283

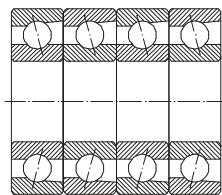
High precision angular contact ball bearings, single row, for paired and stack mounted



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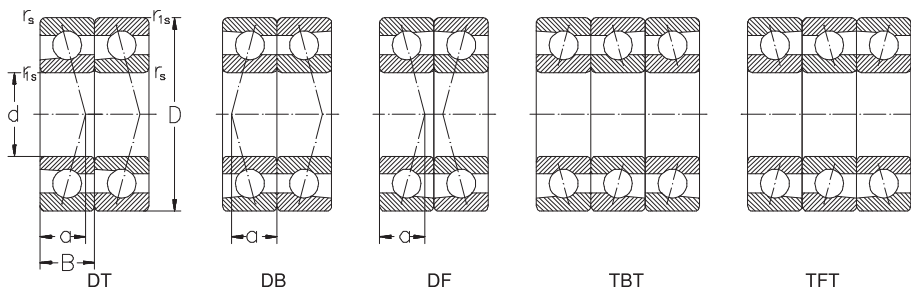
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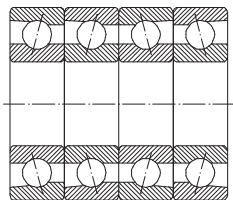
Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		–	kg
75	110	20	1,1	0,6	31	69,7	68	8 000	12 000	7014ATAP4DB	1,283
	110	20	1,1	0,6	31	69,7	68	8 000	13 000	7014ATAP4DF	1,283
	110	20	1,1	0,6	31	93	102	7 000	13 000	7014ATAP2TBT	1,923
	125	24	1,5	1	25	123	120	9 000	15 000	7214CTAP4DT	2,103
	125	24	1,5	1	25	123	120	8 500	14 000	7214CTAP4DB	2,103
	125	24	1,5	1	25	123	120	8 500	14 000	7214CTAP4DF	2,103
	125	24	1,5	1	25	123	120	8 500	14 000	7214CTAP2DB	2,103
	125	24	1,5	1	35	126	114	8 500	14 000	7214ATAP4DT	2,103
	125	24	1,5	1	35	126	114	7 000	12 000	7214ATAP4DB	2,103
	125	24	1,5	1	35	126	114	7 000	12 000	7214ATAP4DF	2,103
	125	24	1,5	1	35	126	114	8 500	14 000	7214ATBP4DT	2,103
	125	24	1,5	1	35	126	114	7 000	12 000	7214ATBP4DB	2,103
	125	24	1,5	1	35	126	114	7 000	12 000	7214ATBP4DF	2,103
	115	20	1,1	0,6	23	75,4	87	9 500	16 000	7015CTAP4DT	1,363
	115	20	1,1	0,6	23	75,4	87	8 500	14 000	7015CTAP4DB	1,363
	115	20	1,1	0,6	23	75,4	87	8 500	14 000	7015CTAP4DF	1,363
	115	20	1,1	0,6	32	71,3	82,4	7 000	12 000	7015AMAP4DB	1,363
	115	20	1,1	0,6	23	100	131	6 700	11 000	7015AMAP4TBT	2,043
	115	20	1,1	0,6	32	116	165	6 700	11 000	7015AMAP4QBC	2,723
	115	20	1,1	0,6	32	71,3	82,4	8 500	14 000	7015ATAP4DT	1,363
	115	20	1,1	0,6	32	71,3	82,4	7 000	11 000	7015ATAP4DB	1,363
	115	20	1,1	0,6	32	71,3	82,4	7 000	11 000	7015ATAP4DF	1,363
	115	20	1,1	0,6	32	71,3	82,4	7 000	12 000	7015ATBP2DB	1,363
	130	25	1,5	1	26	130	131	8 500	14 000	7215CTAP4DT	2,303
	130	25	1,5	1	26	130	131	8 000	13 000	7215CTAP4DB	2,303
	130	25	1,5	1	26	130	131	8 000	13 000	7215CTAP4DF	2,303
	130	25	1,5	1	37	118	121	8 000	13 000	7215ATAP4DT	2,303
	130	25	1,5	1	37	118	121	6 700	11 000	7215ATAP4DB	2,303
	130	25	1,5	1	37	118	121	6 700	11 000	7215ATAP4DF	2,303
	130	25	1,5	1	37	118	121	8 000	13 000	7215ATBP4DT	2,303
	130	25	1,5	1	37	118	121	6 700	11 000	7215ATBP4DB	2,303
	130	25	1,5	1	37	118	121	6 700	11 000	7215ATBP4DF	2,303
80	125	22	1,1	0,6	25	95	110	8 500	14 000	7016CTAP4DT	1,783
	125	22	1,1	0,6	25	95	110	8 000	13 000	7016CTAP4DB	1,783
	125	22	1,1	0,6	25	95	110	8 000	13 000	7016CTAP4DF	1,783
	125	22	1,1	0,6	35	91	126	8 000	13 000	7016AMAP4DT	1,783
	125	22	1,1	0,6	35	91	126	6 700	11 000	7016AMAP4DB	1,783
	125	22	1,1	0,6	25	155	221	6 000	10 000	7016AMAP4QBC	3,563
	125	22	1,1	0,6	35	91	126	8 000	13 000	7016ATAP4DT	1,783
	125	22	1,1	0,6	35	91	126	6 700	11 000	7016ATAP4DB	1,783
	125	22	1,1	0,6	35	91	126	6 700	11 000	7016ATAP4DF	1,783
	140	26	2	1	28	151	156	7 000	12 000	7216CTAP4DT	2,803
	140	26	2	1	28	151	156	6 000	10 000	7216CTAP4DB	2,803
	140	26	2	1	28	151	156	6 000	10 000	7216CTAP4DB	2,803

High precision angular contact ball bearings, single row, for paired and stack mounted

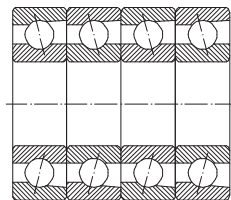


Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
80	140	26	2	1	28	151	156	6 000	10 000	7216CTAP4DF	2,803
	140	26	2	1	28	201	234	6 000	10 000	7216CTAP4TBT	4,203
	140	26	2	1	28	151	156	7 000	12 000	7216CTAP2DT	2,803
	140	26	2	1	28	151	156	6 000	10 000	7216CTAP2DB	2,803
	140	26	2	1	28	151	156	6 000	10 000	7216CTAP2DF	2,803
	140	26	2	1	28	246	312	5 300	9 000	7216CTAP2QBC	5,603
	140	26	2	1	39	139	147	6 700	11 000	7216ATAP4DT	2,803
	140	26	2	1	39	139	147	5 600	9 500	7216ATAP4DB	2,803
	140	26	2	1	39	139	147	5 600	9 500	7216ATAP4DF	2,803
	140	26	2	1	39	139	147	6 700	11 000	7216ATBP4DT	2,803
	140	26	2	1	39	139	147	5 600	9 500	7216ATBP4DB	2,803
	140	26	2	1	39	139	147	5 600	9 500	7216ATBP4DF	2,803
	130	22	1,1	0,6	26	97,5	117	8 500	14 000	7017CTAP4DT	1,863
	130	22	1,1	0,6	26	97,5	117	7 000	12 000	7017CTAP4DB	1,863
	130	22	1,1	0,6	26	97,5	117	7 000	12 000	7017CTAP4DF	1,863
	130	22	1,1	0,6	36	92	112	7 000	12 000	7017ATAP4DT	1,863
	130	22	1,1	0,6	36	92	112	6 000	10 000	7017ATAP4DB	1,863
	130	22	1,1	0,6	36	92	112	6 000	10 000	7017ATAP4DF	1,863
85	150	28	2	1	30	168	180	7 000	12 000	7217CTAP4DT	3,503
	150	28	2	1	30	168	180	6 000	10 000	7217CTAP4DB	3,503
	150	28	2	1	30	168	180	6 000	10 000	7217CTAP4DF	3,503
	150	28	2	1	42	159	153	6 000	10 000	7217ATAP4DT	3,503
	150	28	2	1	42	159	153	5 300	9 000	7217ATAP4DB	3,503
	150	28	2	1	42	159	153	5 300	9 000	7217ATAP4DF	3,503
	150	28	2	1	42	159	153	6 000	10 000	7217ATBP4DT	3,503
	150	28	2	1	42	159	153	5 300	9 000	7217ATBP4DB	3,503
	150	28	2	1	42	159	153	5 300	9 000	7217ATBP4DF	3,503
	140	24	1,5	0,6	28	116	138	7 000	12 000	7018CMBP4DT	2,403
	140	24	1,5	0,6	28	116	138	7 000	12 000	7018CTAP4DT	2,403
	140	24	1,5	0,6	28	116	138	6 000	10 000	7018CTAP4DB	2,403
	140	24	1,5	0,6	28	116	138	6 000	10 000	7018CTAP4DF	2,403
	140	24	1,5	0,6	28	155	207	5 300	10 000	7018CTAP2TBT	3,603
	140	24	1,5	0,6	39	110	131	6 000	10 000	7018AMPB4DT	2,403
	140	24	1,5	0,6	39	147	262	5 000	8 500	7018AMPB4TBT	3,603
	140	24	1,5	0,6	39	180	262	4 500	7 500	7018AMPB4QT	4,803
	140	24	1,5	0,6	39	110	131	6 000	10 000	7018ATAP4DT	2,403
	140	24	1,5	0,6	39	110	131	5 300	9 000	7018ATAP4DB	2,403
90	140	24	1,5	0,6	39	110	131	5 300	9 000	7018ATAP4DF	2,403
	160	30	2	1	32	199	210	6 700	11 000	7218CTAP4DT	4,303
	160	30	2	1	32	199	210	5 600	9 500	7218CTAP4DB	4,303
	160	30	2	1	32	199	210	5 600	9 500	7218CTAP4DF	4,303
	160	30	2	1	44	189	200	5 000	8 500	7218AMAP4DT	4,303
	160	30	2	1	44	189	200	4 500	7 500	7218AMAP4DB	4,303

High precision angular contact ball bearings, single row, for paired and stack mounted



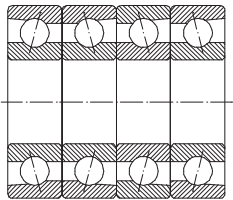
QBT



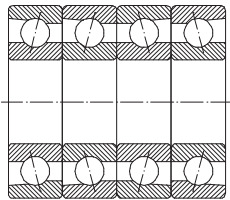
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Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
90	160	30	2	1	44	189	200	4 500	7 500	7218AMAP4DF	4,303
	160	30	2	1	44	189	200	5 000	8 500	7218ATAP4DT	4,303
	160	30	2	1	44	189	200	4 500	7 500	7218ATAP4DB	4,303
	160	30	2	1	44	189	200	4 500	7 500	7218ATAP4DF	4,303
	160	30	2	1	44	189	200	5 000	8 500	7218ATBP4DT	4,303
	160	30	2	1	44	189	200	4 500	7 500	7218ATBP4DB	4,303
	160	30	2	1	44	189	200	4 500	7 500	7218ATBP4DF	4,303
	160	30	2	1	44	189	200	4 500	7 500	7218ATBP4DT	4,303
	160	30	2	1	44	189	200	4 500	7 500	7218ATBP4DB	4,303
	160	30	2	1	44	189	200	4 500	7 500	7218ATBP4DF	4,303
95	145	24	1,5	0,6	28	119	147	8 000	13 000	7019CTAP4DT	2,503
	145	24	1,5	0,6	28	119	147	6 700	11 000	7019CTAP4DB	2,503
	145	24	1,5	0,6	28	119	147	6 700	11 000	7019CTAP4DF	2,503
	145	24	1,5	0,6	40	110	132	5 300	9 000	7019ATAP4DT	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DB	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DF	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DT	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DB	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DF	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DT	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DB	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DF	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DT	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DB	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DF	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DT	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DB	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DF	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DT	2,503
	145	24	1,5	0,6	40	110	132	4 800	8 000	7019ATAP4DB	2,503
100	150	24	1,5	0,6	29	122	154	6 700	11 000	7020CTAP4DT	2,603
	150	24	1,5	0,6	29	122	154	5 600	9 500	7020CTAP4DB	2,603
	150	24	1,5	0,6	29	122	154	5 600	9 500	7020CTAP4DF	2,603
	150	24	1,5	0,6	41	115	146	5 000	8 500	7020AMPB4DT	2,603
	150	24	1,5	0,6	29	163	231	4 300	7 000	7020AMPB4TBT	3,903
	150	24	1,5	0,6	41	188	292	4 000	6 700	7020AMPB4QBT	5,203
	150	24	1,5	0,6	41	115	146	4 500	7 500	7020AMPB2DB	2,603
	150	24	1,5	0,6	41	115	146	5 000	8 500	7020ATAP4DT	2,603
	150	24	1,5	0,6	41	115	146	4 500	7 500	7020ATAP4DB	2,603
	150	24	1,5	0,6	41	115	146	4 500	7 500	7020ATAP4DF	2,603
	180	34	2,1	1,1	36	243	254	5 000	8 500	7220CTAP4DT	6,303
	180	34	2,1	1,1	36	243	254	4 500	7 500	7220CTAP4DB	6,303
	180	34	2,1	1,1	36	243	254	4 500	7 500	7220CTAP4DF	6,303
	180	34	2,1	1,1	36	398	508	4 000	6 700	7220CTAP4QBC	12,63
	180	34	2,1	1,1	50	230	243	4 500	7 500	7220AMAP4DT	6,303
	180	34	2,1	1,1	50	230	243	4 000	6 700	7220AMAP4DB	6,303
	180	34	2,1	1,1	50	230	243	4 500	7 500	7220ATAP4DT	6,303
	180	34	2,1	1,1	50	230	243	4 000	6 700	7220ATAP4DB	6,303
	180	34	2,1	1,1	50	230	243	4 000	6 700	7220ATAP4DF	6,303
	180	34	2,1	1,1	50	230	243	4 500	7 500	7220ATBP4DT	6,303

High precision angular contact ball bearings, single row, for paired and stack mounted



QBT



QBC

Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		–	kg
100	180	34	2,1	1,1	50	230	243	4 000	6 700	7220ATBP4DB	6,303
	180	34	2,1	1,1	50	230	243	4 000	6 700	7220ATBP4DF	6,303
105	160	26	2	1	31	143	178	4 500	7 500	7021CTAP4DB	3,323
110	170	28	2	1	47	169	208	3 800	6 300	7022ATAP4DB	6,403
120	180	28	2	2	49	169	210	3 600	6 000	7024AMAP4DB	2,293
130	200	33	2	1	39	313	298	3 800	6 300	7026CMAP4TBT	9,573
	200	33	2	1	39	235	298	4 000	6 700	7026CTAP4DB	6,383
150	225	35	2,1	1,1	61	258	346	2 800	4 500	7030AMAP4DB	8,643

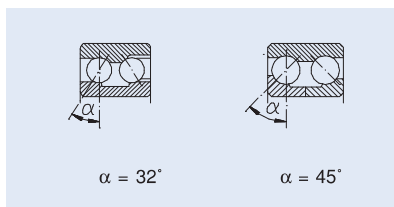
Angular contact ball bearings, double row

Double row angular contact ball bearings are, functionally, similar to two single row angular contact ball bearings in DB arrangement and they have to take axial loads acting in both directions and tilting moments.

Double row angular contact ball bearings are narrower than a pair of single row angular contact ball bearings.

Double row angular contact ball bearings can be manufactured in two versions:

- with non-separable inner ring, series 32 and 33, with a contact angle $\alpha = 32^\circ$;
- with separable inner ring, series 33D, with a contact angle $\alpha = 45^\circ$.



Double row angular contact ball bearings, series 32 and 33 have filling slots on one side. If these bearings have to take axial loads mainly in one direction, they are to be mounted so that axial loads acting upon the shaft should be directed to the filling slots.

Double row angular contact ball bearings series 33D are suitable to accommodate heavy axial loads in both directions.

Dimensions

Main bearing dimensions given in tables are in accordance with ISO/R15.

Misalignment

Angular misalignment of the outer ring, relative to the inner ring, is accommodated by force between the balls and raceway. This leads to a shortening of bearing life.

Tolerances

Double row angular contact ball bearings are generally manufactured to the normal tolerance class.

Bearing tolerances are given on page 24.

Axial clearance

Double row angular contact ball bearings series 32 and 33, with a contact angle $\alpha = 32^\circ$ are generally manufactured with normal axial clearance. They can also be manufactured with smaller or larger axial clearances.

Double row angular contact ball bearings series 33D, with a contact angle $\alpha = 45^\circ$ are generally mounted on the shaft with greater tightening than those of series 33. For this reason, the axial clearance is larger.

The values of axial clearance of the double row angular contact ball bearings are given in table 1.

Cages

Double row angular contact ball bearings series 32, 33 are fitted with machined brass cages.

Glass fibre reinforced polyamide 6.6 cages are also used with good results.

Large-sized bearings are fitted with pressed sheet cages.

Cage design and some technical data are given in table 2.

Equivalent dynamic radial load

For double row angular contact ball bearings series 32 and 33 with a contact angle $\alpha = 32^\circ$, the following equations are available:

$$\begin{aligned} P_r &= F_r + 0,73 F_a, \text{ kN,} & \text{for } F_a/F_r \leq 0,86 \\ P_r &= 0,62 F_r + 1,17 F_a, \text{ kN,} & \text{for } F_a/F_r > 0,86 \end{aligned}$$

For double row angular contact ball bearings series 33D with a contact angle $\alpha = 45^\circ$, the following equations are used:

Axial clearance of the double row angular contact ball bearings

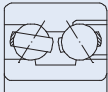
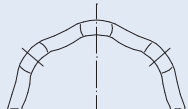
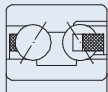
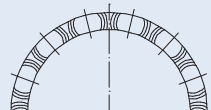
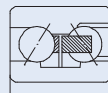
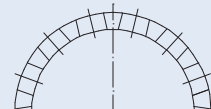
Table 1

Outer diameter d over		Series 32 and 33 C2 min.		Normal min.		C3 min.		Series 33D Normal min.		C3 min.	
up to		max.		max.		max.		max.		max.	
mm		μm									
–	10	1	11	5	21	12	28	11	28	20	37
10	18	1	12	6	23	13	31	13	31	23	41
18	24	2	14	7	25	16	34	14	32	24	42
24	30	2	15	8	27	18	37	16	35	27	46
30	40	2	16	9	29	21	40	18	38	30	50
40	50	2	18	11	33	23	44	22	44	36	58
50	65	3	22	13	36	26	48	25	48	40	63
65	80	3	24	15	40	30	54	29	54	48	71
80	100	3	26	18	46	35	63	35	63	55	83
100	110	4	30	22	53	42	73	42	73	65	96

Radial clearance = 0,6 axial clearance

Cage design and some technical data

Table 2

Cage	Design Bearing	Cage	Application	Max. value	
				D _{mn} oil	grease
Pressed sheet cage			- General application - Bearing series 32, 33	450×10 ³	350×10 ³
Polyamide cage TN			- General application - Bearing series 32, 33	1000×10 ³	800×10 ³
Machined brass cage M			- General application - Bearings dimensions 3319-3322, 3305D- 3318D	800×10 ³	600×10 ³

$$P_r = F_r + 0,47 F_a, \text{ kN, for } F_a/F_r \leq 1,33,$$

$$P_r = 0,54 F_r + 0,81 F_a, \text{ kN, for } F_a/F_r > 1,33$$

For double row angular contact ball bearings with a contact angle $\alpha = 40^\circ$, the following equations are used:

$$P_r = F_r + 0,55 F_a, \text{ kN, for } F_a/F_r \leq 1,14,$$

$$P_r = 0,57 F_r + 0,93 F_a, \text{ kN, for } F_a/F_r > 1,14.$$

$$P_{0r} = F_r + 0,63 F_a, \text{ kN}$$

For double row angular contact ball bearings series 33D with a contact angle $\alpha = 45^\circ$:

$$P_{0r} = F_r + 0,46 F_a, \text{ kN}$$

For double row angular contact ball bearings with a contact angle $\alpha = 40^\circ$:

$$P_{0r} = F_r + 0,52 F_a, \text{ kN}$$

Equivalent static radial load

For double row angular contact ball bearings series 32 and 33 with a contact angle $\alpha = 32^\circ$:

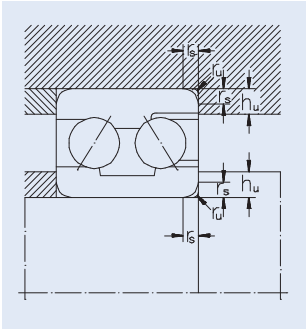
Abutment dimensions

For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum radius $r_{u\ max}$ should be less than bearing minimum mounting chamfer $r_{s\ min}$

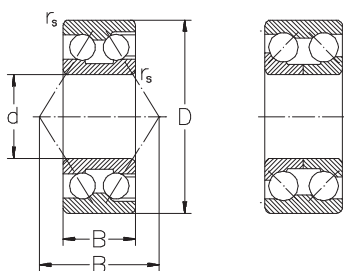
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

The values of the connection radii and support shoulder height are given in table 3.

Abutment dimensions		
Table 3		
r_s min.	r_u max.	h_u min. Bearing series 32; 33; 33D
mm		
0,6	0,6	2,1
1	1	2,8
1,1	1,1	3,5
1,5	1,5	4,5
2	2	5,5
2,1	2,1	6
3	2,5	7



Angular contact ball bearings, double row

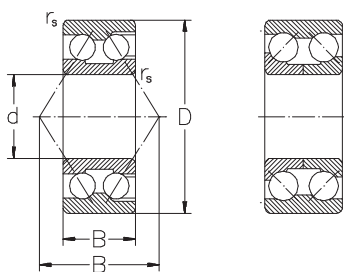


32; 33

33D

Dimensions					Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm					kN		min ⁻¹		—	kg
10	30	14,3	0,6	19	7,8	3,9	16 000	22 000	3200	0,050
12	32	15,9	0,6	22	10,6	5,1	15 000	20 000	3201	0,060
15	35	15,9	0,6	23	11,8	6,1	13 000	18 000	3202	0,070
	42	19	1	27	16,3	8,7	10 000	15 000	3302	0,130
17	40	17,5	0,6	27	14,6	7,8	10 000	15 000	3203	0,100
	47	22,2	1	31	20,8	10,6	9 500	14 000	3303	0,190
20	47	20,6	1	31	19,6	10,8	9 000	13 000	3204	0,170
	52	22,2	1,1	34	23,2	12,9	8 500	12 000	3304	0,230
	52	22,2	1,1	46	24	11	8 500	12 000	3304D	0,230
25	52	20,6	1	35	21,2	12,7	8 000	11 000	3205	0,190
	62	25,4	1,1	40	29,2	17,3	7 500	10 000	3305	0,370
	62	25,4	1,1	57	30	19	7 500	10 000	3305D	0,380
30	62	23,8	1	41	28,1	18,3	7 000	9 500	3206	0,310
	72	30,2	1,1	47	38	24,5	6 300	8 500	3306	0,580
	72	30,2	1,1	67	41,5	30	6 300	8 500	3306D	0,600
35	72	27	1,1	47	39	25	6 000	8 000	3207	0,480
	80	34,9	1,5	54	51	30	5 600	7 500	3307	0,780
	80	34,9	1,5	76	58	38	5 600	7 500	3307D	0,780
40	80	30,2	1,1	52	48	31,5	5 600	7 500	3208	0,650
	90	36,5	1,5	58	62	39	5 000	6 700	3308	1,05
	90	36,5	1,5	84	70	45	5 000	6 700	3308D	1,15
45	85	30,2	1,1	56	49	32,5	5 000	6 700	3209	0,700
	100	39,7	1,5	64	71	57	4 500	6 000	3309	1,41
	100	39,7	1,5	93	78	51	4 500	6 000	3309D	1,61
50	90	30,2	1,1	59	51	36	4 800	6 300	3210	0,740
	110	44,4	2	73	85	75	4 000	5 300	3310	1,90
	110	44,4	2	102	90	72	4 000	5 300	3310D	2,05
55	100	33,3	1,5	64	54	55	4 300	5 600	3211	1,05
	120	49,2	2	80	98	88	3 600	4 800	3311	2,48
	120	49,2	2	114	104	81,5	3600	4800	3311D	2,68
60	110	36,5	1,5	71	69,5	72	3 800	5 000	3212	1,36
	130	54	2,1	86	114	112	3 400	4 500	3312	3,17
	130	54	2,1	123	116	104	3 400	4 500	3312D	3,42
65	120	38,1	1,5	76	73,5	83	3 600	4 800	3213	1,76
	140	58,7	2,1	94	129	130	3 200	4 300	3313	4,01
	140	58,7	2,1	132	135	117	3 200	4 300	3313D	4,31

Angular contact ball bearings, double row



32; 33

33D

Dimensions					Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm					kN		min ⁻¹		—	kg
70	125	39,7	1,5	81	81,5	91,5	3 200	4 300	3214	1,93
	150	63,5	2,1	101	143	146	2 800	3 800	3314	5,04
70	150	63,5	2,1	142	159	130	2 800	3 800	3314D	5,40
75	130	41,3	1,5	84	85	98	3 200	4 300	3215	2,08
	160	68,3	2,1	107	163	166	2 600	3 600	3315	6,16
	160	68,3	2,1	140	179	150	2 600	3 600	3315D	6,66
80	140	44,4	2	91	95	110	2 800	3 800	3216	2,64
	170	68,3	2,1	112	176	186	2 400	3 400	3316	6,93
	170	68,3	2,1	149	192	170	2 400	3 400	3316D	7,53
85	150	49,2	2	97	112	132	2 600	3 600	3217	3,39
	180	73	3	119	190	200	2 200	3 200	3317	8,30
	180	73	3	155	208	193	2 200	3 200	3317D	9,00
90	160	52,4	2	104	125	146	2 400	3 400	3218	4,14
	190	73	3	125	216	240	2 000	3 000	3318	9,23
	190	73	3	166	228	216	2 000	3 000	3318D	10,0
95	170	55,6	2,1	111	140	163	2 200	3 200	3219	5,00
	200	77,8	3	133	220	245	1 900	2 800	3319	11,4
100	180	60,3	2,1	118	160	196	2 000	3 000	3220	6,10
	215	82,6	3	139	240	280	1 800	2 600	3320	14,2
110	200	69,8	2,1	132	190	228	1 900	2 800	3222	8,79
	240	92,1	3	153	280	400	1 800	2 600	3322	19,0



Cylindrical roller bearings



Cylindrical roller bearings

Cylindrical roller bearings are manufactured in a various range of constructive types and sizes, particularly single row cylindrical roller bearings but also two or more row cylindrical roller bearings, with cages or roller by roller, as shown in the designs below.

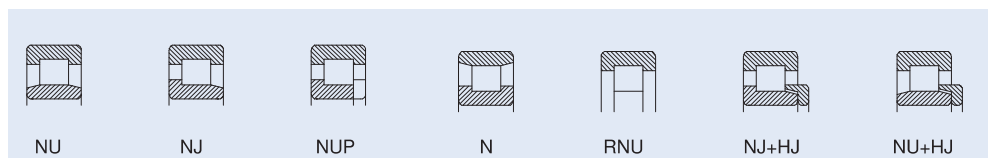
In case of cylindrical roller bearings, the rollers are laterally guided by the fixed ribs of one ring.

In case of bearings with cages, the ring with ribs and the rollers retained in the cage can be drawn out from the other ring, which means that these bearings are dismountable.

Therefore, bearings from joints can be much easier mounted and dismounted, especially where interference fits are needed for both rings due to the loading conditions.

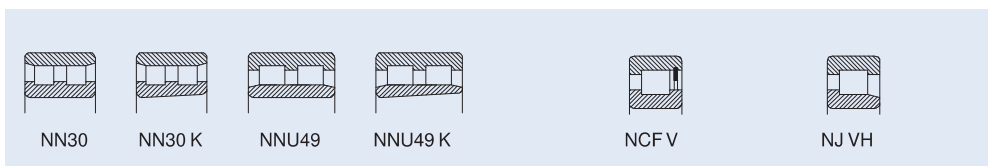
Bearings are provided with unloaded rollers at both generatrix ends. Therefore, the linear contact between rollers and rings alters advantageously, i.e. peripheral stresses are avoided.

- single row



- double row

-without cage (full complement)



Suffixes

- | | | | |
|-------------|---|------------|--|
| AR | - Grinding addition on the inner ring raceway | D | - Two-pieces inner ring |
| B | - Cylindrical roller bearings with extended inner ring | E | - Cylindrical roller bearings, E - design (increased basic static and dynamic loads) |
| C2 | - Radial clearance smaller than normal, bearings with interchangeable elements | F | - Machined steel or special cast iron cage |
| C2NA | - Radial clearance smaller than normal, bearings with noninterchangeable elements | F2 | - Constructive modifications |
| C3 | - Radial clearance larger than normal, bearings with interchangeable elements | K | - Tapered bore bearing |
| C3NA | - Radial clearance larger than normal, bearings with non-interchangeable elements | M | - Machined brass cage guided on the rolling elements |
| | | MA | - Machined brass cage guided in the outer ring |
| | | MB | - Machined brass cage guided on the inner ring |
| | | MPA | - Machined brass cage (one-piece) |
| | | N | - Circular groove in the outer ring for snap ring |
| | | NA | - Radial clearance, non-interchangeable elements |

NR	- Circular groove in the outer ring and snap ring
P	- Two-pieces outer ring
P5	- Tolerance class more accurate than normal (P5)
P51	- Tolerance class P5 and radial clearance C1
P53	- Tolerance class P5 and radial clearance C3
P4	- Tolerance class more accurate than P5
P41	- Tolerance class P4 and radial clearance C1
R...	- Non-standardized radial clearance (e.g. R45...85)
TN	- Polyamide cage
V	- Roller bearing without cage (full complement)
VH	- Self-retaining roller bearing without cage
W3	- Lubrication holes in the outer ring
W4	- Lubrication holes in the outer and inner ring
W5	- Lubrication groove and holes in both rings
W6	- Lubrication groove and holes in the outer ring and lubrication holes in the inner ring
W7	- Locating holes
W8	- Lubrication groove on the outer ring side surfaces
W9	- Lubrication grooves on the inner ring side surfaces
W20	- Lubrication holes in the outer ring
W33	- Lubrication groove and holes on the outer ring
W44	- Lubrication groove and holes on the inner ring
W339	- W9 + W33
ZS	- NA radial clearance; changing the bearing elements, the clearance can be obtained from the interchangeable elements.

Single or more rows cylindrical roller bearings

Single row cylindrical roller bearings are manufactured by MTK in various constructive versions, depending on the position of the ribs on rings. The four basic designs (NU, NJ, N and NUP) are given in the bearing tables.

Bearings of NU design have two fixed ribs on the outer ring and one smooth inner ring. Bearings of N design have two fixed ribs on the inner ring and one smooth outer ring. These designs allow an axial displacement in certain limits, of the shaft in relation to the housing. Therefore, these rolling bearings are used in non-locating bearing units.

Bearings of NJ design have two fixed ribs on the outer ring and a fixed rib on the inner ring which can guide the shaft in a single direction (axially).

Bearings of NUP design have also two fixed ribs on the outer ring and, on the inner ring, a fixed rib and a support washer. This way they can be used as locating bearings, guiding the shaft axially in both directions.

For a shaft guiding in a single direction, it also can be used a bearing of NU design which is combined with a support washer. Thus, the constructive version NUJ is obtained.

Support washers on both sides of a bearing of NU design are not allowed as they lead to an axial blocking of the rollers.

Cylindrical roller bearings can carry heavy radial loads and can operate at high speeds.

Double or more rows cylindrical roller bearings have small sections, high load carrying capacity and stiffness. These bearings provide high stiffness and maximum load carrying capacity and are particularly used for tool holders of the machine-tools and rolling mills.

Double row cylindrical roller bearings series NNU49 and NN30 are generally manufactured to tolerance clas-

ses P5 and SP, used for machine tools.

Large-sized bearings series NNU49 are also manufactured to the normal tolerance class.

Cylindrical roller bearings with snap ring groove

Single row cylindrical roller bearings are also manufactured with snap ring grooves on the outer rings. This design simplifies the bearing joint as the bearings are located into the housing by means of the snap rings. The snap ring groove and snap rings are in accordance with ISO 464, and tables 7 and 8 on page 84 and 87.

Cylindrical roller bearings without cage (full complement)

These bearings incorporate the maximum number of rollers and have a small section in relation to their width.

This provides a high load carrying capacity and allows space-saving designs to be achieved.

Cylindrical roller bearings without cage cannot be used at speeds as high as those with cages. These bearings are manufactured with single or more row rollers and suffix V is added to the bearing designation. The most utilized bearings are those of series NCF29 V, NCF30 V and NJ23VH and they are given in this catalogue on page 194.

Dimensions

The main dimensions of standardized bearings given in tables are in accordance with ISO 15.

Misalignment

The modified contact between rollers and raceway allows not only peripheral stresses to be avoided but also, in case of single row roller bearings, permits an angular misalignment of the outer ring with respect to the inner ring, depending on the bearing series and load according to the table 1.

Permissible misalignment		
Bearing series	Table 1	
	Permissible misalignment $P \leq 0,1C_r$	$P > 0,1C_r$
NU10,NU2,NU3,NU4, NU2E,NU3E	max. 3'	max. 7'
NU22,NU23,NU22E, NU23E	max. 2'	max. 4'
N,NJ,NUP design, all series	max. 2'	max. 4'

Tolerances and radial clearance

Single row cylindrical roller bearings are usually manufactured to normal tolerance class with normal radial clearance.

They can also be manufactured to more accurate tolerance classes and with larger (C3NA and C4NA) or smaller (C1NA and C2NA) radial clearances.

Tolerances of cylindrical roller bearings are given on pages 24.

Radial clearances according to international standard ISO 5753 are given in tables 2 and 3 for cylindrical bore bearings both with interchangeable rings and with non-interchangeable rings (NA).

Radial clearance for single and double row cylindrical roller bearings and needle roller bearings

With interchangeable elements
With cylindrical bore¹⁾

Table 2

Bore diameter d		Clearance group symbol C2		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		µm									
24	24	0	25	20	45	35	60	50	75	65	90
30	30	0	25	20	45	35	60	50	75	70	95
30	40	5	30	25	50	45	70	60	85	80	105
40	50	5	35	30	60	50	80	70	100	95	125
50	65	10	40	40	70	60	90	80	110	110	140
65	80	10	45	40	75	65	100	90	125	130	165
80	100	15	50	50	85	75	110	105	140	155	190
100	120	15	55	50	90	85	125	125	165	180	220
120	140	15	60	60	105	100	145	145	190	200	245
140	160	20	70	70	120	115	165	165	215	225	275
160	180	25	75	75	125	120	170	170	220	250	300
180	200	35	90	90	145	140	195	195	250	275	330
200	225	45	105	105	165	160	220	220	280	305	365
225	250	45	110	110	175	170	235	235	300	330	395
250	280	55	125	125	195	190	260	260	330	370	440
280	315	55	130	130	205	200	275	275	350	410	485
315	355	65	145	145	225	225	305	305	385	455	535
355	400	100	190	190	280	280	370	370	460	510	600
400	450	110	210	210	310	310	410	410	510	565	665
450	500	110	220	220	330	330	440	440	550	625	735
500	560	120	240	240	360	360	480	480	600	660	780
560	630	140	260	260	380	380	500	500	620	675	795
630	710	145	285	285	425	425	565	565	705	705	845
710	800	150	310	310	470	470	630	630	790	790	950
800	900	180	350	350	520	520	690	690	860	860	1 030
900	1 000	200	390	390	580	580	770	770	960	960	1 150
1 000	1 120	220	430	430	640	640	850	850	1 060	1 060	1 270
1 120	1 250	230	470	470	710	710	950	950	1 190	1 190	1 430
1 250	1 400	270	530	530	790	790	1 050	1 050	1 310	1 310	1 570
1 400	1 600	330	610	610	890	890	1 170	1 170	1 450	1 450	1 730

1) Radial clearance for bearings with tapered bore is staggered with one group to the right, for example radial clearance C3 for cylindrical bore bearings match Normal radial clearance for tapered bore bearings.

Cages

Small and medium-sized single row cylindrical roller bearings are generally fitted with pressed sheet cages. Large-sized bearings are fitted with machined brass cages of normal design, i.e. cages of separable design

guided on rolling elements M, on the outside surface MA or inner surface MB.

In case of heavy loads and high speeds, cages are made in one piece.

Radial clearance for single and double row cylindrical roller bearings and needle roller bearings

With non-interchangeable elements
With cylindrical bore¹⁾

Table 3

Bore diameter d		Clearance group symbol											
		C1NA		C2NA		NA		C3NA		C4NA		C5NA	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		µm											
2,5	6	0	7	8	15	15	15	30	40	40	50		
6	10	0	7	10	20	20	30	35	45	45	55		
10	14	0	10	10	20	20	30	35	45	45	55		
14	24	5	15	10	20	20	30	35	45	45	55	65	75
24	20	5	15	10	25	25	35	40	50	50	60	70	80
30	40	5	15	12	25	25	40	45	55	55	70	80	95
40	50	5	18	15	30	30	45	50	65	65	80	95	110
50	65	5	20	15	35	35	50	55	75	75	90	110	130
65	80	10	25	20	40	40	60	70	90	90	110	130	150
80	100	10	30	25	45	45	70	80	105	105	125	155	180
100	120	10	30	25	50	50	80	95	120	120	145	180	205
140	140	10	35	30	60	60	90	105	135	135	160	200	230
140	160	10	35	35	65	65	100	115	150	150	180	225	260
160	180	10	40	35	75	75	110	125	165	165	200	250	285
180	200	15	45	40	80	80	120	140	180	180	220	275	315
200	225	15	50	45	90	90	135	155	200	200	240	305	350
225	250	15	50	50	100	100	150	170	215	215	265	330	380
250	280	20	55	55	110	110	165	185	240	240	295	370	420
280	315	20	60	60	120	120	180	205	265	265	325	410	470
315	355	20	65	65	135	135	200	225	295	295	360	455	520
355	400	25	75	75	150	150	225	255	330	330	405	510	585
400	450	25	85	85	170	170	255	285	370	370	455	565	650
450	500	25	95	95	190	190	285	315	410	410	505	625	720
500	560	25	100	105	210	210	315	350	455	455	560	720	815
560	630	30	110	115	230	230	345	390	505	505	620	800	910
630	710	30	130	130	260	260	390	435	565	565	695	900	1 030
710	800	35	140	145	290	290	435	485	630	630	775	1 000	1 140
800	900	35	160	160	320	320	480	540	700	700	860	1 130	1 290
900	1 000	35	180	180	360	360	540	600	780	780	960	1 270	1 440
1 000	1 120	50	200	200	400	400	600	660	860	860	1 060	1 380	1 560
1 120	1 250	60	220	220	440	440	660	730	950	950	1 170	1 520	1 720
1 250	1 400	60	240	240	480	480	720	810	1 050	1 050	1 290	1 680	1 900
1 400	1 600	70	270	270	540	540	810	910	1 190	1 190	1 460	1 900	2 150

1) Radial clearance for bearings with tapered bore is staggered with one group to the right, for example radial clearance C3NA for cylindrical bore bearings match radial clearance NA for tapered bore bearings.

Glass fibre reinforced polyamide 6.6 cages, are successfully used for small and medium-sized bearings, if the operating temperature doesn't exceed + 120°C. These cages have low weight, low coefficient of friction and are noiseless while running.

Cage design and some technical data are given in table 4.

Minimum load

Cylindrical roller bearings must be subjected to a given minimum load, so that a proper operation of these bearings can be guaranteed.

This is necessary especially as the bearings are operated at high speeds and the centrifugal forces

produce additional friction in bearing due to the sliding between rollers and raceway.

The values of the minimum load can be enough accurately calculated using the equation:

F_{rm} = 0,02 C_r, kN

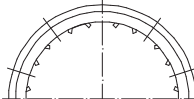
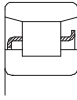
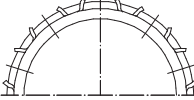
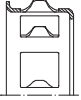
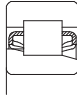
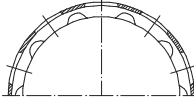
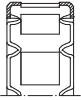
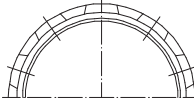
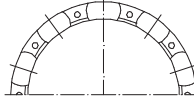
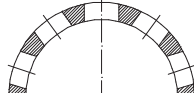
Equivalent dynamic radial load

For cylindrical roller bearings purely radially loaded which don't locate shafts axially, equivalent dynamic load is:

P_r = F_r, kN

Cages design and some technical data

Table 4

Cage	Design bearing	cage	Application	Max.value D _{mn} oil	grease	
Pressed sheet cage with fins				- General application - Low inertia - Provides proper bearing lubrication - Moderate speeds - Bearings NU,NJ,NUP	550×10^3	400×10^3
Pressed sheet cage with fins					550×10^3	400×10^3
Pressed sheet cage					550×10^3	400×10^3
Polyamide cage TN					1400×10^3	1100×10^3
Machined brass cage M, MA, MB					1200×10^3	900×10^3
One piece machined brass cage MPA					1400×10^3	1100×10^3

If cylindrical roller bearings have ribs on the outer and inner rings and locate shafts axially in one or both directions, equivalent dynamic load can be calculated using the equations:

$$P_r = F_r, \text{ kN}, \quad \text{when } F_a/F_r \leq e$$

$$P_r = 0,92 F_r + Y F_a, \text{ kN}, \quad \text{when } F_a/F_r > e$$

where:

e – calculation factor with values:

- 0,2 for series 10,2,3 and 4
- 0,3 for series 22,23

Y – factor for axial load

- 0,6 for series 10,2,3 and 4
- 0,4 for series 22,23

Cylindrical roller bearings axially loaded run satisfactorily only if they are simultaneously radially loaded. Ratio F_a/F_r should not exceed 0,5 for bearings of E design and 0,4 for the other bearings.

Equivalent static radial load

For cylindrical roller bearings purely radially loaded, equivalent static load is:

$$P_{0r} = F_r, \text{ kN}$$

Dynamic axial load

Bearings with ribs on the outer ring can accommodate axial loads in addition to radial loads. The axial load carrying capacity of cylindrical roller bearings do not depend essentially on the steel fatigue strength, but on the resistance of the sliding surfaces at the roller end and rib contact and therefore on lubrication, operating temperature and bearing thermal conductivity.

Considering the above mentioned, axial load carrying capacity of a cylindrical roller bearing can be enough accurately calculated using the following equation:

$$F_{a \max} = \frac{k_1 C_{0r} 10^4}{n(d + D)} - k_2 F_r,$$

where:

- $F_{a \max}$ - maximum permissible axial load, kN
- C_{0r} - radial static load, kN
- F_r - radial load component, kN
- n - operating speed, r/min
- d - bearing bore diameter, mm
- D - bearing outside diameter, mm
- k_1 - auxiliary factor, see table 5
- k_2 - auxiliary factor, see table 5

The above equation is based on conditions which are considered typical for normal bearing operation:

- a difference of 60°C between the bearing operating temperature and the ambient temperature
- a specific heat loss from the bearing of 0,5 mW/mm² °C
- a viscosity ratio $k = 2$.

The viscosity ratio k is the ratio of the actual viscosity at the operating temperature to the requisite viscosity for a proper lubrication at that temperature. Further details can be found in subchapter "Adjusted rating life", life adjustment factor a_3 - on page 20.

In case of grease lubrication, the base oil viscosity of the grease should be used. These effects can be reduced

at low speeds by using oils with EP additives.

The values of permissible axial load $F_{a \max}$ obtained from the equation above mentioned are valid for a continuously acting constant axial load. If axial loads act only for short periods, the values may be multiplied by 2 or for shock loads by 3.

The constantly acting axial load $F_{a \max}$ (N) should never exceed the numerical value of $1,2 D^2$ (D = bearing outside diameter, mm) and occasional shock loads should never be greater than the numerical value of $3 D^2$.

In case of heavy axial loads ($F_a > D^2$), the ribs of the outer and inner ring respectively are recommended to be supported by the bearing adjoint parts. Bearings of NUP and NJ+HJ designs which take axial loads in both directions are to be placed so that main axial loads should be taken by the fixed ribs, if bearing design allows.

Heat treatment

Cylindrical roller bearings with outside diameter $D > 240$ mm of all series given in the catalogue are to be subjected to a heat treatment of stress relieving which allows bearings to be operated up to a temperature of +150°C.

- The hardness of rings should not be less 59 HRC.
- Small-sized bearings operate normally up to +120°C.

Abutment dimensions

For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum radius $r_{u \max}$ should be less than bearing minimum mounting chamfer $r_{s \min}$.

Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

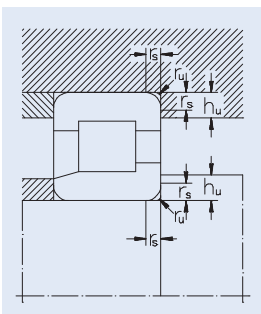
The values of the connection radii and support shoulder height are given in table 6.

Abutment dimensions for single row cylindrical roller bearings are given in table 7. The values for double row cylindrical roller bearings are given in table 8.

Factors k_1 and k_2

Table 5

Factor	Lubrication	
	oil	grease
Bearings construction E		
k_1	1,5	1
k_2	0,15	0,1
Other bearings		
k_1	0,5	0,3
k_2	0,05	0,03



Abutment dimensions

Table 6

r_s, r_{1s} min	r_u max	h_u min		
		Bearing series		
		10, 18, 19, 28, 29,	2, 2E, 3, 3E, 22,	4
		30, 48, 49, 60	22E, 23, 23E	
mm				
0,3	0,3	1	1,2	
0,6	0,6	1,6	2,1	
1	1	2,3	2,8	
1,1	1	3	3,5	4,5
1,5	1,5	3,5	4,5	5,5
2	2	4,4	5,5	6,5
2,1	2,1	5,1	6	7
3	2,5	6,2	7	8
4	3	7,3	8,5	10
5	4	9	10	12

Cylindrical roller bearings, single row

Abutment dimensions

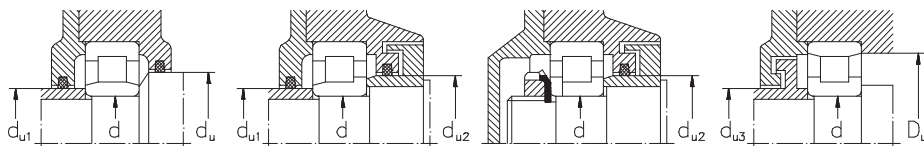


Table 7

Bore	Dimensions series																			
	10	19				2, 2E 22, 22E				3, 3E 23, 23E				4						
symbol	d	d _u min.	d _{u1} max.	d _u min.	d _{u1} max.	d _{u2} min.	d _{u3} min.	D _u max.	d _u min.	d _{u1} max.	d _{u2} min.	d _{u3} min.	D _u max.	d _u min.	d _{u1} max.	d _{u2} min.	d _{u3} min.	D _u max.		
—	mm																			
04	03	17			25	21	27	32	35	27	24	30	37	40						
05	20	27	25		29	26	32	39	42	30	27	33	43	46						
06	25	32	30		34	31	37	44	47	37	33	40	51	55	40	38	45	61	64	
07	30	38	35		40	37	44	53	56	44	40	48	60	64	47	44	52	71	74	
08	35	44	41		46	43	50	61	65	48	45	53	67	72	55	52	61	81	84	
09	40	49	46		52	49	56	69	72	55	51	60	76	82	60	57	67	90	93	
10	45	54	52		57	54	61	74	77	60	57	66	85	90	66	63	74	99	102	
11	50	59	57		62	58	67	79	83	67	63	73	94	99	73	69	81	109	112	
12	55	66	63		68	65	73	87	91	72	69	80	103	108	79	76	87	115	119	
13	60	71	68		75	71	80	96	101	79	75	86	112	117	85	82	94	125	128	
14	65	76	73		81	77	87	104	110	85	81	93	120	126	91	88	100	133	137	
15	70	82	78		86	82	92	109	115	92	87	100	128	135	102	99	112	150	153	
16	75	87	83		90	87	96	115	120	97	93	106	138	145	107	103	118	158	162	
17	80	94	90		97	94	104	124	129	105	99	114	145	153	112	109	124	168	172	
18	85	99	95		104	99	110	132	138	110	106	119	154	162	115	111	128	175	179	
19	90	106	101		109	105	116	141	147	117	111	127	163	172	125	122	139	189	194	
20	95	111	106		116	111	123	150	156	124	119	134	172	180	136	132	149	199	204	
21	100	116	111		122	117	130	158	165	132	125	143	184	194	141	137	156	208	213	
22	105	122	118		129	124	137	166	171	137	132	149	198	202	147	143	162	217	223	
23	110	128	124		135	130	144	177	183	145	140	158	204	214	157	153	173	232	238	
24	120	138	134		146	141	156	190	198	156	151	171	223	233	172	168	190	256	264	
25	130	151	146		158	151	168	202	211	169	164	184	240	250	187	183	208	281	289	
26	140	161	156		171	166	182	219	228	182	176	198	256	268	200	195	222	298	306	
27	150	173	167		184	179	196	236	245	195	190	213	273	287	216	210	237	313	321	
28	160	184	178		197	192	210	252	262	211	200	228	288	304						
29	170	197	190		211	204	223	269	284	223	216	241	305	322						
30	180	209	203		221	214	233	279	294	235	227	255	323	339						
31	190	219	213		234	227	247	296	311	248	240	268	340	357						
32	200	233	226		247	240	261	313	328	263	254	283	355	375						
33	220	254	248		273	266	289	347	364	288	276	310	391	411						
34	240	275	268		298	293	316	382	400	314	300	338	425	447						
35	260	300	292		323	318	343	416	437	340	325	365	459	478						
36	280	320	313		344	333	364	436	457	366	353	394	493	512						
37	300	344	337		368	358	391	472	491											
38	320	365	356		394	384	420	506	525											
39	340	390	381		424	404	448	536	562											
40	360	410	401																	
41	380	430	420																	
42	400	455	446																	

Cylindrical roller bearings, double row and bearings without inner ring, RNU type

Abutment dimensions

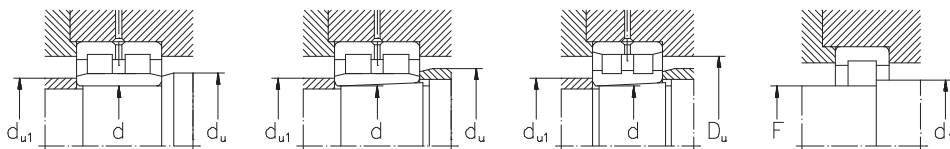
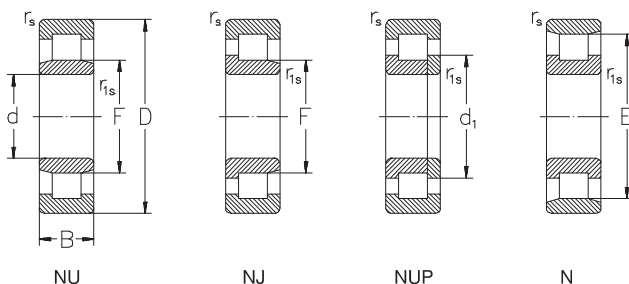


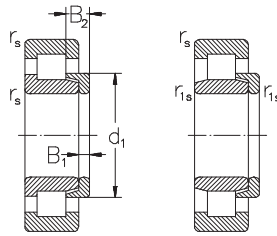
Table 8

Bore		Dimensions series				Symbol		Dimensions	
symbol	diameter	NNU49 NNU49 K d_u max.	d_{u1} min.	NN30 K d_{u1} max.	D_u min.	bore	bearing	F	d1
—	mm					—		mm	
06	30			35	49	05	RNU205E	31,5	34,9
07	35			40	56	06	RNU206E	37,5	41,3
08	40			45	62	07	RNU1007	42	57,9
09	45			50	69	07	RNU207E	44	48,1
10	50			55	74	08	RNU1008	47	63,7
11	55			61,5	82	08	RNU5208	40,025	50,3
12	60			66,5	87	09	RNU1009	52,5	70,4
13	65			71,5	92	10	RNU1010	57,5	75,4
14	70			76,5	102	10	RNU210E	59,5	63,9
15	75			81,5	107	11	RNU5311	66,92	83,8
16	80			86,5	115	12	RNU1012	69,5	89,8
17	85			91,5	120	13	RNU5513	80,48	100,5
18	90			98	129	16	RNU5116	95,36	120,8
19	95			103	134	19	RNU5119	113,6	145,4
20	100	112	115	108	139	24	RNU5124	145,23	183,4
21	105	117	120	114	148				
22	110	122	125	119	157				
24	120	133	137	129	167				
26	130	145	148	139	184				
28	140	155	158	149	194				
30	150	167	171	161	208				
32	160	177	181	171	222				
34	170	187	191	181	239				
36	180	200	205	191	258				
38	190	210	215	201	268				
40	200	223	228	211	285				
44	220	243	248	233	313				
48	240	263	268	253	334				
52	260	289	295	276	368				
56	280	309	315	296	388				
60	300	335	342	316	422				
64	320	355	362	336	442				
68	340	375	383	360	477				
72	360	395	405	380	497				
76	380	421	431	400	514				
80	400	441	451	422	552				

Cylindrical roller bearings, single row



Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
17	40	12	0,6	0,3	11,2	9	17 000	20 000	NU203
	40	16	0,6	0,3	17,5	15	16 000	19 000	NU2203
	40	16	0,6	0,3	17,5	15	16 000	19 000	NUP2203
	47	14	1	0,6	16,4	13	13 000	16 000	NU303
20	47	14	1	0,6	15,2	12,5	15 000	18 000	NU204
	47	14	1	0,6	15,2	12,5	15 000	18 000	NJ204
	47	18	1	0,6	20,7	18,5	13 000	16 000	NU2204
	47	18	1	0,6	20,7	18,5	13 000	16 000	NJ2204
	52	15	1,1	0,6	21,1	17,1	12 000	15 000	NU304
	52	15	1,1	0,6	21,1	17,1	12 000	15 000	NJ304
	52	21	1,1	0,6	42	38,8	11 000	14 000	NU2304 E
	52	21	1,1	0,6	42	38,8	11 000	14 000	NJ2304 E
	52	18	1	0,6	34,6	34,3	11 000	14 000	NU2205 E
	52	18	1	0,6	34,6	34,3	11 000	14 000	NJ2205 E
25	47	12	0,6	0,3	13,4	20,5	15 000	18 000	NU1005
	52	15	1	0,6	28,5	26,7	12 000	15 000	NU205 E
	52	15	1	0,6	28,5	26,7	12 000	15 000	NJ205 E
	52	15	1	0,6	28,5	26,7	12 000	15 000	NUP205 E
	52	18	1	0,6	34,6	34,3	11 000	14 000	NU2205 E
	52	18	1	0,6	34,6	34,3	11 000	14 000	NU2205 EMA
	52	18	1	0,6	34,6	34,3	11 000	14 000	NJ2205 E
	52	18	1	0,6	34,6	34,3	11 000	14 000	NJ2205 EM
	52	18	1	0,6	34,6	34,3	11 000	14 000	NUP2205 E
	52	18	1	0,6	34,6	34,3	11 000	14 000	NUP2205 EMA
	62	17	1,1	1,1	41,2	37	9 500	12 000	NU305 E
	62	17	1,1	1,1	41,2	37	10 000	13 000	NU305 EMA
	62	17	1,1	1,1	41,2	37	10 000	13 000	NJ305 E
	62	17	1,1	1,1	41,2	37	10 000	13 000	NUP305 E
	62	17	1,1	1,1	41,2	37	9 500	12 000	N305 E
	62	17	1,1	1,1	41,2	37	10 000	13 000	N305 EM
	62	24	1,1	1,1	56,7	55,7	9 500	12 000	NJ2305 E
	62	24	1,1	1,1	56,7	55,7	9 500	12 000	NUP2305 E
	80	21	1,1	1,1	48	41,5	8 500	11 000	NU405
30	55	13	1	0,5	17,9	16,7	12 000	15 000	NU1006
	62	16	1	0,6	39,7	37,9	10 000	13 000	NU206 E
	62	16	1	0,6	39,7	37,9	10 000	13 000	NU206 EMA
	62	16	1	0,6	39,7	37,9	10 000	13 000	NU206 ENR
	62	16	1	0,6	39,7	37,9	10 000	13 000	NJ206 E
	62	16	1	0,6	39,7	37,9	10 000	13 000	NJ206 EMA
	62	16	1	0,6	39,7	37,9	10 000	13 000	NJ206 ENR
	62	16	1	0,6	39,7	37,9	10 000	13 000	NUP206 E
	62	16	1	0,6	39,7	37,9	10 000	13 000	N206 E
	62	20	1	0,6	48,9	49,9	9 000	11 000	NU2206 E
	62	20	1	0,6	48,9	49,9	9 000	11 000	NU2206 EMA
	62	20	1	0,6	48,9	49,9	9 000	11 000	NU2206 ENR

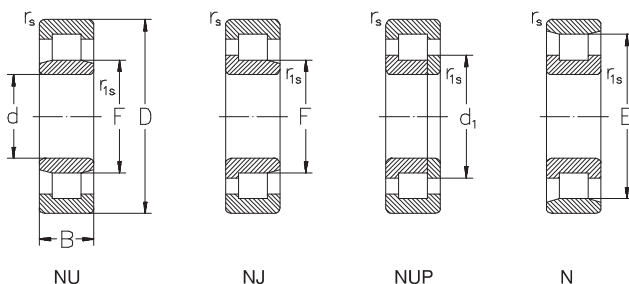


NJ+HJ

NU+HJ

Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
mm		kg	d1	B1	B2	—	kg
17	22,9	0,067					
	22,9	0,089					
	25,1	0,120					
20	27	0,110	30	3	6,75	HJ204	0,012
	27	0,110	30	3	6,75	HJ204	0,012
	27	0,140	30	3	7,5	HJ2204	0,012
	27	0,140	30	3	7,5	HJ2204	0,012
	28,5	0,140	31,8	4	7,5	HJ304	0,017
	28,5	0,140	31,8	4	7,5	HJ304	0,017
	27,5	0,220	31,4	4	7,5	HJ2304 E	0,027
	27,5	0,220	31,4	4	7,5	HJ2304 E	0,027
	27,5	0,220	31,4	4	7,5	HJ2304 E	0,027
25	30,5	0,084	32,7	3	6,25	HJ1005	0,010
	31,5	0,140	34,8	3	6	HJ205 E	0,014
	31,5	0,140	34,8	3	6	HJ205 E	0,014
	31,5	0,140	34,8	3	6	HJ205 E	0,014
	31,5	0,170	34,8	3	6,5	HJ2205 E	0,014
	31,5	0,170	34,8	3	6,5	HJ2205 E	0,014
	31,5	0,170	34,8	3	6,5	HJ2205 E	0,014
	31,5	0,170	34,8	3	6,5	HJ2205 E	0,014
	31,5	0,170	34,8	3	6,5	HJ2205 E	0,014
	31,5	0,170	34,8	3	6,5	HJ2205 E	0,014
	34	0,240	38,2	4	7	HJ305 E	0,025
	34	0,240	38,2	4	7	HJ305 E	0,025
	34	0,240	38,2	4	7	HJ305 E	0,025
	34	0,240	38,2	4	7	HJ305 E	0,025
	54	0,240	38,2	4	7	HJ305 E	0,025
	54	0,240	38,2	4	7	HJ305 E	0,025
	34	0,340	38,2	4	8	HJ2305 E	0,026
	38,8	0,629	43,6	6	10,5	HJ405	0,057
30	36,5	0,120	38,9	3	6,5	HJ1006	0,025
	37,5	0,200	41,4	4	7	HJ206 E	0,025
	37,5	0,200	41,4	4	7	HJ206 E	0,025
	37,5	0,200	41,4	4	7	HJ206 E	0,025
	37,5	0,210	41,4	4	7	HJ206 E	0,025
	37,5	0,210	41,4	4	7	HJ206 E	0,025
	37,5	0,200	41,4	4	7	HJ206 E	0,025
	37,5	0,220	41,4	4	7	HJ206 E	0,025
	55,5	0,200	41,4	4	7,5	HJ2206 E	0,025
	37,5	0,260	41,4	4	7,5	HJ2206 E	0,025
	37,5	0,260	41,4	4	7,5	HJ2206 E	0,025
	37,5	0,260	41,4	4	7,5	HJ2206 E	0,025
	37,5	0,260	41,4	4	7,5	HJ2206 E	0,025
	37,5	0,260	41,4	4	7,5	HJ2206 E	0,025
	37,5	0,260	41,4	4	7,5	HJ2206 E	0,025

Cylindrical roller bearings, single row



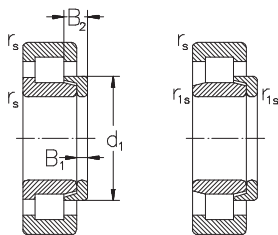
NU

NJ

NUP

N

Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
30	72	19	1,1	1,1	50,5	47	8 500	10 000	NU306 E
	72	19	1,1	1,1	50,5	47	8 500	10 000	NU306 EMA
	72	19	1,1	1,1	50,5	47	8 500	10 000	NJ306 E
	72	19	1,1	1,1	50,5	47	8 500	10 000	NUP306 E
	72	19	1,1	1,1	50,5	47	8 500	10 000	N306 E
	72	27	1,1	1,1	71,9	74	8 500	10 000	NU2306 E
	72	27	1,1	1,1	71,9	74	8 500	10 000	NJ2306 E
	72	27	1,1	1,1	71,9	74	8 500	10 000	NJ2306 EMA
	90	23	1,5	1,5	65	57,8	7 500	9 000	NU406
	35	62	14	1	0,5	21,6	21,8	10 000	13 000
72	17	1,1	0,6	49,9	49,7	9 000	11 000	NJ207 E	
72	23	1,1	0,6	64,9	69,8	8 000	9 500	NU2207 EV	
80	21	1,5	1,1	63,8	61,6	8 500	10 000	NJ307 E	
80	21	1,5	1,1	63,8	61,6	8 500	10 000	NU307 EMA	
80	21	1,5	1,1	63,8	61,6	8 500	10 000	NJ307 E	
80	21	1,5	1,1	63,8	61,6	8 500	10 000	NJ307 ENR	
80	21	1,5	1,1	63,8	61,6	8 500	10 000	NUP307 E	
80	21	1,5	1,1	63,8	61,6	8 500	10 000	NUP307 ENR	
80	21	1,5	1,1	63,8	61,6	8 500	10 000	N307 E	
80	21	1,5	1,1	63,8	61,6	8 500	10 000	N307 EM	
80	31	1,5	1,1	85,5	89,9	7 500	9 000	NU2307 E	
80	31	1,5	1,1	85,5	89,9	7 500	9 000	NJ2307 E	
80	31	1,5	1,1	85,5	89,9	7 500	9 000	NUP2307 E	
100	25	1,5	1,5	75,7	69,4	6 700	8 000	NU407	
100	25	1,5	1,5	75,7	69,4	6 700	8 000	NU407 MA	
40	68	15	1	0,6	24	25,7	9 500	12 000	NU1008 M
	80	18	1,1	1,1	52,6	51,6	8 000	9 500	NU208 E
	80	18	1,1	1,1	52,6	51,6	8 000	9 500	NU208 EMA
	80	18	1,1	1,1	52,6	51,6	8 000	9 500	NJ208 E
	80	18	1,1	1,1	52,6	51,6	8 000	9 500	NUP208 EMA
	80	18	1,1	1,1	52,6	51,6	8 000	9 500	NUP208 ENR
	80	18	1,1	1,1	52,6	51,6	8 000	9 500	N208 E
	80	23	1,1	1,1	70,3	74,8	7 500	9 000	NU2208 E
	80	23	1,1	1,1	70,3	74,8	7 500	9 000	NJ2208 E
	80	23	1,1	1,1	70,3	74,8	7 500	9 000	NJ2208 EM
	80	23	1,1	1,1	70,3	74,8	7 500	9 000	NUP2208 E
	80	23	1,1	1,1	70,3	74,8	7 500	9 000	NUP2208 EMA
	90	23	1,5	1,5	79,9	77,5	7 000	8 500	NU308 E
	90	23	1,5	1,5	79,9	77,5	7 000	8 500	NJ308 EMA
	90	23	1,5	1,5	79,9	77,5	7 000	8 500	NJ308 E
	90	23	1,5	1,5	79,9	77,5	7 000	8 500	NJ308 EM
	90	23	1,5	1,5	79,9	77,5	7 000	8 500	NJ308 EMA
	90	23	1,5	1,5	79,9	77,5	7 000	8 500	N308 E

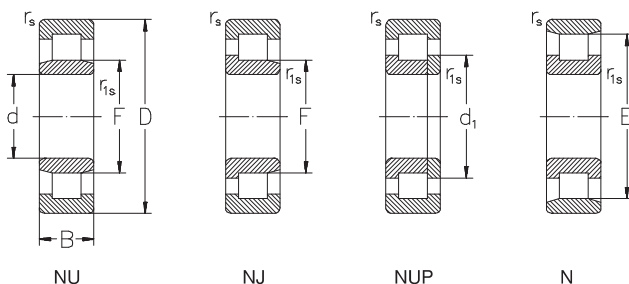


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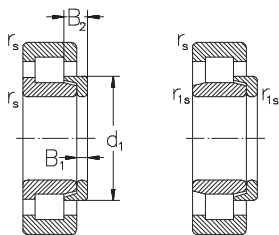
NU+HJ

Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions		B ₂		
mm		kg	d ₁	B ₁		—	kg
30	40,5	0,350	45,1	5	9,5	HJ306 E	0,042
	40,5	0,350	45,1	5	9,5	HJ306 E	0,042
	40,5	0,370	45,1	5	9,5	HJ306 E	0,042
		0,380	45,1				
	62,5	0,350					
	40,5	0,500	45,1	5	8,5	HJ2306 E	0,043
	40,5	0,520	45,1	5	8,5	HJ2306 E	0,043
	40,5	0,520	45,1	5	8,5	HJ2306 E	0,043
	45	0,750	50,5	7	11,5	HJ406	0,080
35	42	0,180	44,6	4	7,75	HJ1007	0,022
	43,8	0,300	47,6	4	7	HJ207 E	0,030
	43,8	0,402	47,6	4	8,5	HJ2207 E	0,038
	46,2	0,470	51,1	6	9,5	HJ307 E	0,060
	46,2	0,470	51,1	6	9,5	HJ307 E	0,060
	46,2	0,490	51,1	6	9,5	HJ307 E	0,060
	46,2	0,490	51,1	6	9,5	HJ307 E	0,060
		0,500	51,1				
		0,500	51,1				
	70,2	0,470					
	70,2	0,470					
	46,2	0,696	51,1	6	11	HJ2307 E	0,062
	46,2	0,727	51,1	6	11	HJ2307 E	0,062
		0,696	51,1				
	53	1,02	59	8	13	HJ407	0,120
	53	1,02	59	8	13	HJ407	0,120
40	47	0,223	54,1	4	8	HJ1008	0,027
	49,5	0,366	54,1	5	8,5	HJ208 E	0,049
	49,5	0,366	54,1	5	8,5	HJ208 E	0,049
	49,5	0,376	54,1	5	8,5	HJ208 E	0,049
		0,391	54,1				
		0,391	54,1				
		0,366					
	71,5	0,490	54,1	5	9	HJ2208 E	0,049
	49,5	0,500	54,1	5	9	HJ2208 E	0,050
	49,5	0,500	54,1	5	9	HJ2208 E	0,050
		0,490	54,1				
		0,490	54,1				
	52	0,650	57,7	7	11	HJ308 E	0,088
	52	0,650	57,7	7	11	HJ308 E	0,088
	52	0,680	57,7	7	11	HJ308 E	0,088
	52	0,680	57,7	7	11	HJ308 E	0,088
	52	0,690	57,7	7	11	HJ308 E	0,088
	80	0,650					

Cylindrical roller bearings, single row



Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
40	90	33	1,5	1,5	111	118	6 700	8 000	NU2308 E
	90	33	1,5	1,5	111	118	6 700	8 000	NJ2308 E
	90	33	1,5	1,5	111	118	6 700	8 000	NUP2308 E
	110	27	2	2	93,8	86,8	6 000	7 000	NU408
	110	27	2	2	93,8	86,8	6 000	7 000	NJ408
	110	27	2	2	93,8	86,8	6 000	7 000	NUP408
45	75	16	1	0,6	31,4	34,8	9 000	11 000	NU1009 M
	85	19	1,1	1,1	61,7	64,6	7 500	9 000	NU209 E
	85	19	1,1	1,1	61,7	64,6	7 500	9 000	N209 E
	85	23	1,1	1,1	73,9	81,6	7 500	9 000	NJ2209 E
	100	25	1,5	1,5	96,9	97,7	6 000	7 000	NU309 E
	100	25	1,5	1,5	96,9	97,7	6 000	7 000	NU309 EMA
	100	25	1,5	1,5	96,9	97,7	6 000	7 000	NU309 ENR
	100	25	1,5	1,5	96,9	97,7	6 000	7 000	NJ309 E
	100	25	1,5	1,5	96,9	97,7	6 000	7 000	NJ309 ENR
	100	25	1,5	1,5	96,9	97,7	6 000	7 000	N309 E
	100	25	1,5	1,5	96,9	97,7	6 000	7 000	N309 EM
	100	25	1,5	1,5	96,9	97,7	6 000	7 000	N309 ENR
	100	36	1,5	1,5	130	142	6 000	7 000	NUP2309 E
	120	29	2	2	104	97,8	5 600	6 700	NUP409
	80	16	1	0,6	32,1	36,1	8 500	10 000	NU1010 M
	90	20	1,1	1,1	63,7	68,3	6 700	8 000	NU210 E
	90	20	1,1	1,1	63,7	68,3	6 700	8 000	NJ210 E
	90	20	1,1	1,1	63,7	68,3	6 700	8 000	NUP210 E
	110	27	2	2	110	112	6 000	7 000	NU310 E
50									
	110	27	2	2	110	112	6 000	7 000	NU310 EMA
	110	27	2	2	110	112	6 000	7 000	NJ310 E
	110	27	2	2	110	112	6 000	7 000	NJ310 ENR
	110	27	2	2	110	112	6 000	7 000	NUP310 E
	110	27	2	2	110	112	6 000	7 000	N310 E
	110	27	2	2	110	112	6 000	7 000	N310 EM
	130	31	2,1	2,1	139	136	4 800	5 600	NU410 MA
	130	31	2,1	2,1	139	136	4 800	5 600	N410 M
55	100	21	1,5	1,1	82,6	93,4	6 300	7 500	NU211 E
	100	21	1,5	1,1	82,6	93,4	6 300	7 500	NJ211 E
	100	21	1	1,1	82,6	93,4	6 300	7 500	NUP211 E
	100	25	1,1	2	98,9	118	6 300	7 500	NJ2211 E
	120	29	2	2	134	138	5 000	6 000	NU311 E
	120	29	2	2	134	138	5 000	6 000	NU311 ENR
	120	29	2	2	134	138	5 000	6 000	NJ311 E
	120	29	2	2	134	138	5 000	6 000	NUP311 E
	120	29	2	2	134	138	5 000	6 000	NUP311 EMA

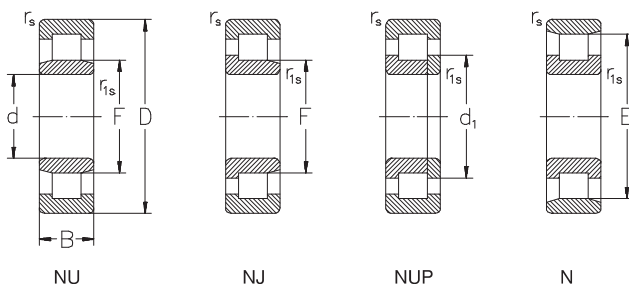


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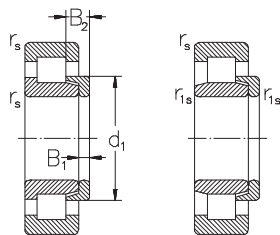
NU+HJ

Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
mm		kg	d1	B1	B2	—	kg
40	52	0,956	57,7	7	12,5	HJ2308 E	0,091
	52	0,986	57,7	7	12,5	HJ2308 E	0,091
	58	1,30	64,8	8	13	HJ408	0,140
	58	1,30	64,8	8	13	HJ408	0,140
		1,300	64,8				
45	52,5	0,289	55,5	4	8,25	HJ1009	0,032
	54,5	0,427	59,1	5	8,5	HJ209 E	0,055
	76,5	0,427					
	54,5	0,530	59,1	5	9	HJ2209 E	0,055
	58,5	0,870	64,5	7	11,5	HJ309 E	0,110
	58,5	0,870	64,5	7	11,5	HJ309 E	0,110
	58,5	0,870	64,5	7	11,5	HJ309 E	0,110
	58,5	0,890	64,5	7	11,5	HJ309 E	0,110
	58,5	0,890	64,5	7	11,5	HJ309 E	0,110
	88,5	0,870					
	88,5	0,870					
	88,5	0,870					
		1,250	64,5				
		1,640	71,8				
50	57,5	0,310	60,5	4	8,25	HJ1010	0,035
	59,5	0,479	64,1	5	9	HJ210 E	0,061
	59,5	0,499	64,1	5	9	HJ210 E	0,061
		0,514	64,1				
	65	1,15	71,4	8	13	HJ310 E	0,151
	65	1,15	71,4	8	13	HJ310 E	0,151
	65	1,18	71,4	8	13	HJ310 E	0,151
	65	1,18	71,4	8	13	HJ310 E	0,151
		1,21	71,4				
	97	1,15					
	97	1,15					
	70,8	2,01	78,8	9	14,5	HJ410	0,230
	110,8	2,01					
55	66	0,640	70,9	6	9,5	HJ211 E	0,087
	66	0,660	70,9	6	9,5	HJ211 E	0,087
		0,680	70,9				
	66	0,780	70,9	6	10	HJ2211 E	0,088
	70,5	1,44	77,6	9	14	HJ311 E	0,195
	70,5	1,44	77,6	9	14	HJ311 E	0,195
	70,5	1,44	77,6	9	14	HJ311 E	0,195
		1,52	77,6				

Cylindrical roller bearings, single row



Dimensions					Basic radial load dyn. C _r	stat. C _{0r}	Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.			grease	oil	
mm					kN		min ⁻¹		—
55	120	29	2	2	134	138	5 000	6 000	NUP311 ENR
	140	33	2,1	2,1	139	138	4 300	5 000	NU411
	140	33	2,1	2,1	139	138	4 300	5 000	NJ411
	140	33	2,1	2,1	139	138	4 300	5 000	NUP411
60	95	18	1,1	1	35,8	43,2	6 700	8 000	NU1012 M
	110	22	1,5	1,5	93,4	101	5 600	6 700	NU212 E
	110	22	1,5	1,5	93,4	101	5 600	6 700	NJ212 E
	110	22	1,5	1,5	93,4	101	5 600	6 700	NUP212 E
	110	28	1,5	1,5	128	153	5 000	6 000	NJ2212 E
	130	31	2,1	2,1	148	155	4 500	5 300	NU312 E
	130	31	2,1	2,1	148	155	4 500	5 300	NU312 EM
	130	31	2,1	2,1	148	155	4 500	5 300	NU312 EMA
	130	31	2,1	2,1	148	155	4 500	5 300	NJ312 E
	130	31	2,1	2,1	148	155	4 500	5 300	NJ312 EM
	130	31	2,1	2,1	148	155	4 500	5 300	NUP312 E
	130	31	2,1	2,1	148	155	4 500	5 300	N312 E
	130	46	2,1	2,1	222	262	4 300	5 000	NU2312 E
	130	46	2,1	2,1	222	262	4 300	5 000	NJ2312 E
	130	46	2,1	2,1	222	262	4 300	5 000	NUP2312 E
	150	35	2,1	2,1	178	184	4 000	4 800	NU412
	150	35	2,1	2,1	178	184	4 000	4 800	NUP412 MA
65	120	23	1,5	1,5	107	118	5 300	6 300	NU213 E
	120	23	1,5	1,5	107	118	5 300	6 300	NJ213 E
	120	23	1,5	1,5	107	118	5 300	6 300	NUP213 E
	120	31	1,5	1,5	117	146	4 800	5 600	NU2213
	120	31	1,5	1,5	117	146	4 800	5 600	NJ2213
	140	33	2,1	2,1	179	190	4 300	5 000	NU313 E
	140	33	2,1	2,1	179	190	4 300	5 000	NU313 EM
	140	33	2,1	2,1	179	190	4 300	5 000	NU313 EMA
	140	33	2,1	2,1	179	190	4 300	5 000	NJ313 E
	140	33	2,1	2,1	179	190	4 300	5 000	NUP313 E
	140	33	2,1	2,1	179	190	4 300	5 000	NUP313 EM
	140	33	2,1	2,1	179	190	4 300	5 000	N313 E
	140	48	2,1	2,1	179	190	4 000	4 800	NU2313 E
	110	20	1,1	1	57,8	69,6	6 000	7 000	NU1014
	125	24	1,5	1,5	118	136	5 000	6 000	NU214 E
	125	24	1,5	1,5	118	136	5 000	6 000	NU214 EMA
70	125	24	1,5	1,5	118	136	5 000	6 000	NJ214 E
	125	24	1,5	1,5	118	136	5 000	6 000	NJ214 EMA
	125	24	1,5	1,5	118	136	5 000	6 000	NJ214 ENR
	125	24	1,5	1,5	118	136	5 000	6 000	NUP214 E
	125	24	1,5	1,5	118	136	5 000	6 000	N214 E
	125	31	1,5	1,5	143	174	4 800	5 600	NU2214 E
	125	24	1,5	1,5	118	136	5 000	6 000	NJ214 ENR
	125	24	1,5	1,5	118	136	5 000	6 000	NUP214 E

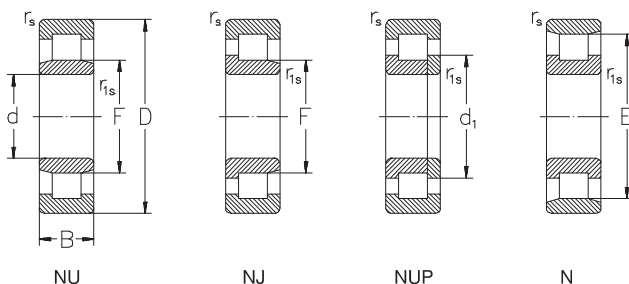


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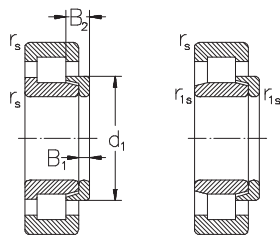
NU+HJ

Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions		B ₂		
mm		kg	d ₁	B ₁		—	kg
55		1,52	77,6				
	77,2	2,51	85,2	10	16,5	HJ411	0,290
	77,2	2,51	85,2	10	16,5	HJ411	0,290
		2,51	85,2				
60	69,5	0,480	72,7	5	10	HJ1012	0,063
	72	0,820	77,7	6	10	HJ212 E	0,108
	72	0,840	77,7	6	10	HJ212 E	0,108
		0,870	77,7				
	72	1,10	77,7	6	10	HJ2212 E	0,108
	77	1,83	84,5	9	14,5	HJ312 E	0,231
	77	1,83	84,5	9	14,5	HJ312 E	0,231
	77	1,83	84,5	9	14,5	HJ312 E	0,231
	77	1,88	84,5	9	14,5	HJ312 E	0,231
	77	1,88	84,5	9	14,5	HJ312 E	0,231
		1,93	84,5				
	115	1,83					
	77	2,69	84,5	9	16	HJ2312 E	0,237
	77	2,77	84,5	9	16	HJ2312 E	0,237
		2,86	84,5				
	83	3,02	91,8	10	16,5	HJ412	0,340
		3,02	91,8				
65	78,5	1,05	84,5	6	10	HJ213 E	0,129
	78,5	1,07	84,5	6	10	HJ213 E	0,129
		1,10	84,5				
	79,6	1,45	84,8	6	11,5	HJ2213	0,134
	79,6	1,45	84,8	6	11,5	HJ2213	0,134
	82,5	2,24	90,6	10	15,5	HJ313 E	0,288
	82,5	2,24	90,6	10	15,5	HJ313 E	0,288
	82,5	2,24	90,6	10	15,5	HJ313 E	0,288
	82,5	2,30	90,6	10	15,5	HJ313 E	0,288
	82,5	2,37	90,6				
		2,37	90,6				
	124,5	2,24					
	82,5	3,35	90,6	10	18	HJ2313 E	0,298
70	80	0,732					
	83,5	1,15	89,5	7	11	HJ214 E	0,157
	83,5	1,15	89,5	7	11	HJ214 E	0,157
	83,5	1,18	89,5	7	11	HJ214 E	0,157
	83,5	1,18	89,5	7	11	HJ214 E	0,157
	83,5	1,18	89,5	7	11	HJ214 E	0,157
		1,22	89,5				
	133,5	1,15					
	83,5	1,52	89,5	7	11,5	HJ2214 E	0,158

Cylindrical roller bearings, single row



Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
70	125	31	1,5	1,5	143	174	4 800	5 600	NJ2214 E
	125	31	1,5	1,5	143	174	4 800	5 600	NUP2214 E
	150	35	2,1	2,1	203	220	4 000	4 800	NU314 E
	150	35	2,1	2,1	203	220	4 000	4 800	NU314 EMA
	150	35	2,1	2,1	203	220	4 000	4 800	NJ314 E
	150	35	2,1	2,1	203	220	4 000	4 800	NJ314 EMA
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 E
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 EMA
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
	150	35	2,1	2,1	203	220	4 000	4 800	NUP314 ENR
75	130	25	1,5	1,5	129	155	4 800	5 600	NU215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NU215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NU215 EMA
	130	25	1,5	1,5	129	155	4 800	5 600	NJ215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NJ215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NJ215 ENR
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
	130	25	1,5	1,5	129	155	4 800	5 600	NUP215 E
80	140	26	2	2	139	166	4 300	5 000	NU216 E
	140	26	2	2	139	166	4 300	5 000	NU216 EM
	140	26	2	2	139	166	4 300	5 000	NJ216 E
	140	26	2	2	139	166	4 300	5 000	NUP216 E
	140	26	2	2	139	166	4 300	5 000	NUP216 E
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR
	140	26	2	2	139	166	4 300	5 000	NUP216 ENR

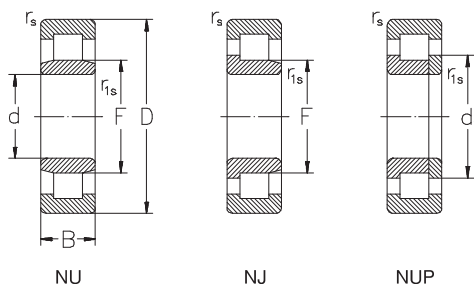


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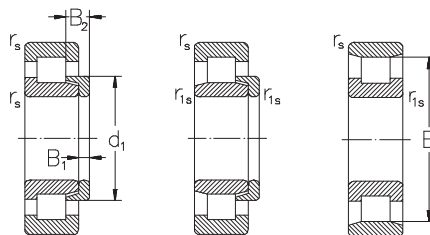
NU+HJ

Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
d	E,F		d ₁	B ₁	B ₂		
mm		kg	mm			—	kg
70	83,5	1,55	89,5	7	11,5	HJ2214 E	0,158
		1,57	89,5				
	89	2,73	97,5	10	15,5	HJ314 E	0,331
	89	2,73	97,5	10	15,5	HJ314 E	0,331
	89	2,80	97,5	10	15,5	HJ314 E	0,331
	89	2,80	97,5	10	15,5	HJ314 E	0,331
	89	2,80	97,5	10	15,5	HJ314 E	0,331
		2,88	97,5				
		2,88	97,5				
		2,88	97,5				
	89	3,95	97,5	10	18,5	HJ2314 E	0,345
	89	3,95	97,5	10	18,5	HJ2314 E	0,345
		3,95	97,5				
	100	5,26	110,5	12	20	HJ414	0,605
	100	5,26	110,5	12	20	HJ414	0,605
	100	5,28	110,5	12	20	HJ414	0,605
	100	5,28	110,5	12	20	HJ414	0,605
75	88,5	1,24	94,5	7	11	HJ215 E	0,166
	88,5	1,24	94,5	7	11	HJ215 E	0,166
	88,5	1,27	94,5	7	11	HJ215 E	0,166
	88,5	1,27	94,5	7	11	HJ215 E	0,166
		1,31	94,5				
	118,5	1,24					
	88,5	1,55	94,5	7	12,5	HJ2215	0,170
	88,5	1,55	94,5	7	12,5	HJ2215	0,170
		1,55	94,5				
	95	3,24	104,2	11	16,5	HJ315 E	0,411
	95	3,24	104,2	11	16,5	HJ315 E	0,411
	95	3,24	104,2	11	16,5	HJ315 E	0,411
	95	3,32	104,2	11	16,5	HJ315 E	0,410
	143	3,15					
	143	3,24					
	95	4,95	104,2	11	19,5	HJ2315 E	0,429
	104,5	6,44	116	13	21,5	HJ415	0,710
104,5	6,44	116	13	21,5	HJ415	0,710	
	6,44	116					
80	95,3	1,51	101,6	8	12,5	HJ216 E	0,222
	95,3	1,51	101,6	8	12,5	HJ216 E	0,222
	95,3	1,55	101,6	8	13,5	HJ216 E	0,222
		1,60	101,6				
		1,60	101,6				
	127,3	1,51					
	127,3	1,51					

Cylindrical roller bearings, single row



Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
80	140	33	2	2	179	231	4 300	5 000	NJ2216 E
	170	39	2,1	2,1	253	277	3 600	4 300	NJ316 E
	170	58	2,1	2,1	353	426	3 600	4 300	NJ2316 E
	170	58	2,1	2,1	274	332	3 600	4 300	N2316
	200	48	3	3	316	339	3 000	3 600	NU416 MA
85	150	28	2	2	164	194	4 300	5 000	NJ217 E
	150	28	2	2	121	141	4 300	5 000	N217 M
	150	36	2	2	215	274	3 600	4 300	NJ2217 E
	150	36	2	2	215	274	3 600	4 300	NJ2217 EMA
	180	41	3	3	210	226	3 400	4 000	NU317
	180	41	3	3	210	226	3 400	4 000	NU317 MA
	180	41	3	3	288	325	3 400	4 000	NJ317 E
	180	41	3	3	210	226	3 400	4 000	N317
	180	41	3	3	210	226	3 400	4 000	N317 MA
	180	60	3	3	297	353	3 400	4 000	NU2317 E
	180	60	3	3	368	446	3 400	4 000	NJ2317 E
	180	60	3	3	297	353	3 400	4 000	NUP2317
	210	52	4	4	357	384	2 800	3 400	NU417 M
	140	24	1,5	1,1	83,8	107	4 500	5 300	NU1018 MA
	160	30	2	2	180	215	3 800	4 500	NU218 E
	160	30	2	2	180	215	3 800	4 500	NU218 EMA
	160	30	2	2	180	215	3 800	4 500	NJ218 E
	160	30	2	2	180	215	3 800	4 500	NUP218 E
90	160	30	2	2	180	215	3 800	4 500	N218 E
	160	30	2	2	180	215	3 800	4 500	N218 EM
	160	40	2	2	214	277	3 200	3 800	NU2218
	160	40	2	2	214	277	3 200	3 800	NJ2218
	160	40	2	2	214	277	3 200	3 800	NUP2218
	190	43	3	3	322	349	3 200	3 800	NU318 E
	190	43	3	3	322	349	3 200	3 800	NU318 EM
	190	43	3	3	322	349	3 200	3 800	NU318 EMA
	190	43	3	3	237	261	3 200	3 800	NJ318
	190	43	3	3	237	261	3 200	3 800	NJ318 MA
	190	43	3	3	322	349	3 200	3 800	N318 E
	190	43	3	3	322	349	3 200	3 800	N318 EM
	190	43	3	3	237	261	3 200	3 800	N318 M
	190	64	3	3	342	420	3 000	3 600	NU2318 M
	190	64	3	3	342	420	3 000	3 600	NU2318 MA
	190	64	3	3	342	420	3 000	3 600	NJ2318
	190	64	3	3	342	420	3 000	3 600	NJ2318 M
	225	54	4	4	393	427	2 200	2 800	NUP2318 MA
	225	54	4	4	393	427	2 200	2 800	NU418
	225	54	4	4	393	427	2 200	2 800	NJ418



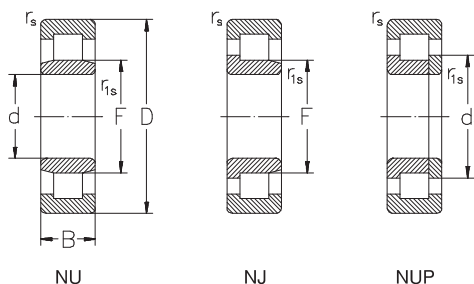
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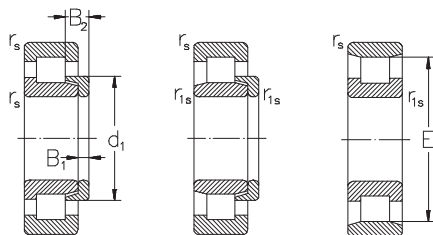
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Dimensions		Weight	Angle ring			Designation	Weight	
d	E,F		Dimensions					
d	E,F		d ₁	B ₁	B ₂			
mm		kg	mm			—	kg	
80	95,3	2,00	101,6	8	12,5	HJ216 E	0,222	
	103	4,02	110,6	11	19,5	HJ316	0,470	
	101	5,89	110,6	11	20	HJ2316 E	0,480	
	151	5,89						
	110	7,28	122	13	22	HJ416	0,780	
85	100,5	1,95	107,6	8	12,5	HJ217 E	0,250	
	133,8	1,90						
	100,5	2,55	107,6	8	13	HJ2217 E	0,255	
	100,5	2,55	107,6	8	13	HJ2217 E	0,255	
	108	4,52	117,5	12	20,5	HJ317	0,560	
	108	4,52	117,5	12	20,5	HJ317	0,560	
	108	4,64	117	12	18,5	HJ317 E	0,560	
	156	4,41						
	156	4,52						
	108	6,88	118	12	22	HJ2317 E	0,596	
	108	6,88	118	12	22	HJ2317 E	0,596	
	113	8,50	126	14	24	HJ417	0,880	
	90	103	1,34	107,8	6	12	HJ1018	0,161
		107	2,28	114,4	9	14	HJ218 E	0,320
		107	2,28	114,4	9	14	HJ218 E	0,320
107		2,34	114,4	9	14	HJ218 E	0,320	
		2,41	114,4					
145		2,28						
145		2,28						
107		3,18	114,2	9	15	HJ2218	0,325	
107		3,18	114,2	9	15	HJ2218	0,325	
		3,18	114,2					
113,5		5,38	124,2	12	18,5	HJ318 E	0,630	
113,5		5,38	124,2	12	18,5	HJ318 E	0,630	
113,5		5,38	124,2	12	18,5	HJ318 E	0,630	
115		5,51	125	12	21	HJ318	0,630	
115		5,51	125	12	21	HJ318	0,630	
169,5		5,38						
169,5		5,38						
165		5,38						
115		7,90	125	12	26	HJ2318	0,780	
115	7,90	125	12	26	HJ2318	0,780		
115	8,15	125	12	26	HJ2318	0,780		
115	8,15	125	12	26	HJ2318	0,780		
	8,25	125						
123,5	11,7	137	14	24	HJ418	1,05		
123,5	11,7	137	14	24	HJ418	1,05		

Cylindrical roller bearings, single row



Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
90	225	54	4	4	393	427	2 200	2 800	NUP418
95	170	32	2,1	2,1	166	195	3 800	4 500	NU219
	170	32	2,1	2,1	210	249	3 800	4 500	NJ219
	170	32	2,1	2,1	166	195	3 800	4 500	NUP219
	170	43	2,1	2,1	241	317	3 200	3 800	NU2219 M
	170	43	2,1	2,1	241	317	3 200	3 800	NU2219 MA
	170	43	2,1	2,1	241	317	3 200	3 800	NUP2219 M
	200	45	3	3	255	284	3 000	3 600	NU319
	200	45	3	3	331	381	3 000	3 600	NJ319 E
	200	67	3	3	255	284	3 000	3 600	NUP319
	200	67	3	3	390	491	2 800	3 400	NJ2319
	200	67	3	3	390	491	2 800	3 400	NJ2319 M
	150	24	1,5	1,1	89,6	120	4 300	5 000	NU1020
	150	24	1,5	1,1	89,6	120	4 300	5 000	NU1020 MA
	180	34	2,1	2,1	181	215	3 400	4 000	NU220
100	180	34	2,1	2,1	181	215	3 400	4 000	NU220 M
	180	34	2,1	2,1	181	215	3 400	4 000	NU220 MA
	180	34	2,1	2,1	181	215	3 400	4 000	NJ220
	180	34	2,1	2,1	181	215	3 400	4 000	NUP220
	180	34	2,1	2,1	181	215	3 400	4 000	NUP220 MA
	180	34	2,1	2,1	181	215	3 400	4 000	N220 M
	180	34	2,1	2,1	181	215	3 400	4 000	N220 MA
	180	34	2,1	2,1	181	215	3 400	4 000	N220 MB
	180	46	2,1	2,1	270	360	3 000	3 600	NU2220
	180	46	2,1	2,1	270	360	3 000	3 600	NU2220 M
	180	46	2,1	2,1	270	360	3 000	3 600	NU2220 MA
	180	46	2,1	2,1	319	418	3 000	3 600	NJ2220 E
	180	46	2,1	2,1	270	360	3 000	3 600	NUP2220
	180	46	2,1	2,1	270	360	3 000	3 600	NUP2220 M
	180	46	2,1	2,1	270	360	3 000	3 600	NUP2220 MA
	180	46	2,1	2,1	270	360	3 000	3 600	N2220
	215	47	3	3	295	332	3 000	3 600	NU320
	215	47	3	3	295	332	3 000	3 600	NU320 M
	215	47	3	3	295	332	3 000	3 600	NU320 MA
	215	47	3	3	381	427	3 000	3 600	NJ320 E
	215	47	3	3	295	332	3 000	3 600	NJ320 M
	215	47	3	3	295	332	3 000	3 600	N320 M
	215	47	3	3	295	332	3 000	3 600	N320 MA
	215	58	4	4	440	488	2 200	2 800	NU420
	215	58	4	4	440	488	2 200	2 800	NU420 MA
	215	73	3	3	457	584	2 600	3 200	NU2320 M
	215	73	3	3	457	584	2 600	3 200	NU2320 MA



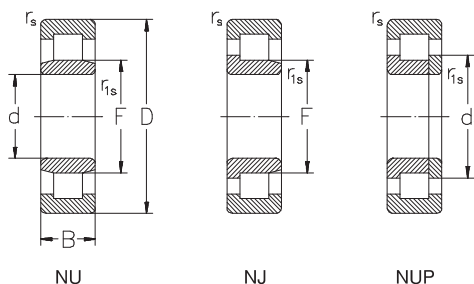
NJ+HJ

NU+HJ

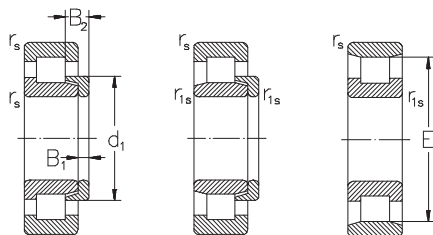
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Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
d	E,F		d ₁	B ₁	B ₂		
mm		kg	mm			—	kg
90		11,7	137				
95	112,5	2,83	120,7	9	14	HJ219	0,357
	112,5	2,83	120,7	9	14	HJ219	0,357
		2,83	120,7				
	113,5	3,93	121	9	16,5	HJ2219	0,382
	113,5	3,93	121	9	16,5	HJ2219	0,382
		3,93	121				
	121,5	6,28	132	13	20,5	HJ319	0,784
	121,5	6,28	132	13	20,5	HJ319	0,784
		6,28	132				
	121,5	3,93	132	13	26,5	HJ2319	0,890
		3,93	132				
	121,5	3,93	132	13	26,5	HJ2319	0,890
100	113	1,46	117,8	6	12	HJ1020	0,175
	113	1,46	117,8	6	12	HJ1020	0,175
	119	3,38	128	10	17	HJ220	0,444
	119	3,38	128	10	17	HJ220	0,444
	119	3,38	128	10	17	HJ220	0,444
		3,47	128	10	17	HJ220	0,444
		3,56	128				
		3,56	128				
	163	3,32					
	163	3,38					
		3,32					
	119	4,77	128	10	18	HJ2220	0,480
	119	4,67	128	10	18	HJ2220	0,480
	119	4,67	128	10	18	HJ2220	0,480
	119	4,77	127	10	16	HJ2220 E	0,448
		4,77	127,3				
		4,85	127,3				
		4,85	127,3				
	163	4,77					
	129,5	7,70	140,5	13	22,5	HJ320	0,895
	7,70	140,5					
129,5	7,70	140,5	13	22,5	HJ320	0,895	
129,5	7,70	140,5	13	22,5	HJ320	0,895	
127,5	7,90	139,6	13	20,5	HJ320 E	0,895	
129,5	7,70	140,5	13	22,5	HJ320	0,895	
185,5	7,70	140,5					
	7,70	140,5					
185,5	7,70	140,5					
139	14,0	153,5	16	27	HJ420	1,50	
139	14,0	153,5	16	27	HJ420	1,50	
129,5	11,9	140,5	13	27,5	HJ2320	1,14	
129,5	11,9	140,5	13	27,5	HJ2320	1,14	

Cylindrical roller bearings, single row



Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
100	215	73	3	3	568	714	2 600	3 200	NJ2320 E
	215	73	3	3	568	714	2 600	3 200	NJ2320 EM
	215	73	3	3	457	584	2 600	3 200	NUP2320 MA
105	190	36	2,1	2,1	210	256	3 200	3 800	NU221
	190	36	2,1	2,1	210	256	3 200	3 800	N221
	225	49	3	3	418	469	2 400	3 000	NU321 E
	225	49	3	3	418	469	2 400	3 000	NJ321 E
	225	49	3	3	418	469	2 400	3 000	NUP321 E
	225	49	3	3	418	469	2 400	3 000	N321 E
	260	60	4	4	488	545	2 200	2 800	NU421
	260	60	4	4	488	545	2 200	2 800	NJ421
	260	60	4	4	488	545	2 200	2 800	NUP421
	260	60	4	4	488	545	2 200	2 800	NU222 M
	260	60	4	4	488	545	2 200	2 800	N222
	260	60	4	4	488	545	2 200	2 800	N222 M
110	170	28	2	1,1	127	167	3 600	4 500	NU1022 M
	200	38	2,1	2,1	238	287	3 000	3 600	NU222
	200	38	2,1	2,1	238	287	3 000	3 600	NU222 M
	200	38	2,1	2,1	238	287	3 000	3 600	NU222 MA
	200	38	2,1	2,2	293	365	3 000	3 600	NJ222 E
	200	38	2,1	2,1	238	287	3 000	3 600	NUP222 M
	200	38	2,1	2,1	238	287	3 000	3 600	N222
	200	38	2,1	2,1	238	287	3 000	3 600	N222 M
	200	38	2,1	2,1	238	287	3 000	3 600	N222 MA
	200	38	2,1	2,1	238	287	3 000	3 600	N2222 M
	200	53	2,1	2,1	350	471	2 600	3 200	NU2222 MA
	200	53	2,1	2,1	350	471	2 600	3 200	NJ2222 MA
	200	53	2,1	2,1	350	471	2 600	3 200	NUP2222 MA
	240	50	3	3	443	513	2 400	3 000	NU322 E
	240	50	3	3	382	437	2 400	3 000	NU322 MA
	240	50	3	3	382	437	2 400	3 000	N322 M
	240	50	3	3	382	437	2 400	3 000	N322 MA
	240	80	3	3	667	868	2 200	2 800	NU2322 EM
	240	80	3	3	667	868	2 200	2 800	NU2322 EMA
	240	80	3	3	667	868	2 200	2 800	NJ2322 E
	240	80	3	3	667	868	2 200	2 800	NJ2322 EMA
	240	80	3	3	667	868	2 200	2 800	N2224 M
	240	80	3	3	667	868	2 200	2 800	N2224 MA
	240	80	3	3	667	868	2 200	2 800	N2224 E
	240	80	3	3	667	868	2 200	2 800	N2224 MA
120	180	28	2	1,1	139	192	3 400	4 000	N1024 M
	215	40	2,1	2,1	258	316	2 800	3 400	NU224 M
	215	40	2,1	2,1	258	316	2 800	3 400	NU224 MA
	215	40	2,1	2,1	331	415	2 800	3 400	NJ224 E
	215	40	2,1	2,1	258	316	2 800	3 400	NJ224 M
	215	40	2,1	2,1	258	316	2 800	3 400	NJ224 MA
	215	40	2,1	2,1	258	316	2 800	3 400	N224 M
	215	40	2,1	2,1	258	316	2 800	3 400	N224 MA
	215	40	2,1	2,1	258	316	2 800	3 400	N224 E
	215	40	2,1	2,1	258	316	2 800	3 400	N224 MA
	215	58	2,1	2,1	382	523	2 400	3 000	NU224 MA
	215	58	2,1	2,1	382	523	2 400	3 000	NUP224 M



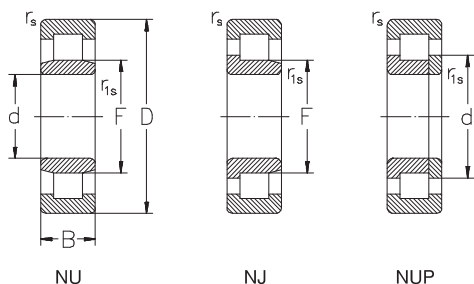
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NU+HJ

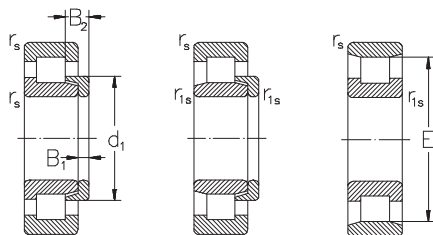
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Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
d	E,F		d ₁	B ₁	B ₂		
mm		kg	mm			—	kg
100	127,5	11,9	139,6	13	23,5	HJ2320 E	0,920
	127,5	11,9	139,6	13	23,5	HJ2320 E	0,920
		11,9	139,6				
105	126,8	4,00	135				
	168,8	4,00					
	135	9,09	147	13	22,5	HJ321 E	0,970
	135	9,09	147	13	22,5	HJ321 E	0,970
		9,09	147				
110	195	9,09					
	144,5	17,4	159,5	16	27	HJ421	1,65
	144,5	17,4	159,5	16	27	HJ421	1,65
		17,4	159,5				
110	125	2,31	131	7	13,5	HJ1022	0,267
	132,5	4,65	141,5	11	18,5	HJ222	0,615
	132,5	4,65	141,5	11	18,5	HJ222	0,615
	132,5	4,65	141,5	11	18,5	HJ222	0,615
	132,5	4,77	141	11	17	HJ222 E	0,615
		4,84	141,5				
	180,5	4,65					
	180,5	4,65					
	180,5	4,65					
	132,5	6,93	141,5	11	20,5	HJ2222	0,645
	132,5	6,93	141,5	11	20,5	HJ2222	0,645
	132,5	7,08	141,5	11	20,5	HJ2222	0,645
		7,14	141,5				
	143	10,4	155	14	22	HJ322 E	1,17
	143	10,4	155,5	14	23	HJ322	1,17
	211	10,4					
	211	10,4	155,5				
	143	18,8	155,9	14	28	HJ2322 E	1,37
	143	18,8	155,9	14	28	HJ2322 E	1,37
	143	19,0	155,9	14	28	HJ2322 E	1,37
143	19,0	155,9	14	28	HJ2322 E	1,37	
120	165	2,47					
	143,5	5,65	153	11	19	HJ224	0,715
	143,5	5,65	153	11	19	HJ224	0,715
	143,5	5,80	153	11	17	HJ224 E	0,715
	143,5	5,80	153	11	19	HJ224	0,715
	143,5	5,80	153	11	19	HJ224	0,715
		5,93	153				
	199,5	5,65					
	199,5	5,65					
143,5	8,56	153	11	22	HJ2224	0,750	

Cylindrical roller bearings, single row



Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
120	260	55	3	3	549	644	2 200	2 800	NU324 EM
	260	55	3	3	549	644	2 200	2 800	NJ324 E
	260	55	3	3	549	644	2 200	2 800	NJ324 EM
	260	55	3	3	441	498	2 200	2 800	NUP324 M
	260	55	3	3	441	498	2 200	2 800	NUP324 MA
	260	55	3	3	549	644	2 200	2 800	N324 EM
	260	55	3	3	441	498	2 200	2 800	N324 M
	260	55	3	3	441	498	2 200	2 800	N324 MA
	260	86	3	3	702	907	2 000	2 600	NU2324 MA
	260	86	3	3	702	907	2 000	2 600	NJ2324
	260	86	3	3	702	907	2 000	2 600	NJ2324 MA
	260	86	3	3	702	907	2 000	2 600	NUP2324 MA
	310	72	5	5	677	776	1 800	2 200	NU424 MA
	310	72	5	5	677	776	1 800	2 200	NJ424 MA
	200	33	2	1,1	163	221	3 000	3 600	NU1026 M
	200	33	2	1,1	163	221	3 000	3 600	NU1026 MA
	230	40	3	3	268	339	2 400	3 000	NU226 M
	230	40	3	3	268	339	2 400	3 000	NU226 MA
	230	40	3	3	268	339	2 400	3 000	NJ226 M
	230	40	3	3	359	446	2 400	3 000	NJ226 E
	230	40	3	3	268	339	2 400	3 000	NJ226 MA
	230	40	3	3	268	339	2 400	3 000	NUP226 M
	230	40	3	3	268	339	2 400	3 000	NUP226 MA
	230	40	3	3	268	339	2 400	3 000	N226 M
	230	40	3	3	268	339	2 400	3 000	N226 MA
	230	64	3	3	526	730	2 200	2 800	NU2226
130	280	58	4	4	607	722	2 000	2 600	NU326 EM
	280	58	4	4	520	607	2 000	2 600	NJ326 M
	280	58	4	4	520	607	2 000	2 600	NJ326
	280	58	4	4	520	607	2 000	2 600	NJ326 MA
	280	58	4	4	520	607	2 000	2 600	NUP326 M
	280	58	4	4	607	722	2 000	2 600	N326 EM
	280	93	4	4	912	1 219	1 900	2 400	NU2326
	280	93	4	4	912	1 219	1 900	2 400	NJ2326
	210	33	2	1,1	172	243	2 800	3 200	NU1028 M
	250	42	3	3	372	479	2 200	2 800	NU228 EM
	250	42	3	3	307	391	2 200	2 800	NJ228
	250	42	3	3	307	391	2 200	2 800	NJ228 M
	250	42	3	3	307	391	2 200	2 800	NJ228 MA
	250	42	3	3	307	391	2 200	2 800	NUP228 M
	250	42	3	3	307	391	2 200	2 800	NUP228 MA
	250	42	3	3	372	479	2 200	2 800	N228 EM
	250	68	3	3	479	708	2 000	2 600	NU2228 E
	250	68	3	3	479	708	2 000	2 600	NJ2228 E



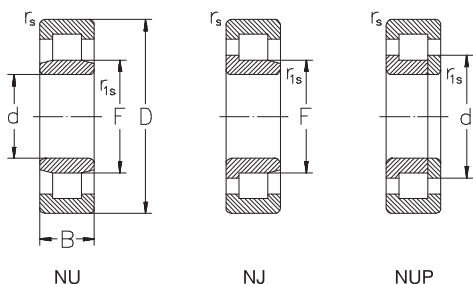
NJ+HJ

NU+HJ

N

Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
d	E,F		d ₁	B ₁	B ₂		
mm		kg	mm			—	kg
120	154	13,1	168,6	14	22,5	HJ324 E	1,41
	154	13,4	168,6	14	22,5	HJ324 E	1,41
	154	13,4	168,6	14	22,5	HJ324 E	1,41
		13,7	168,5				
		13,7	168,5				
	230	13,1					
	226	13,1					
	226	13,1					
	154	23,1	168,5	14	28	HJ2324	1,65
	154	23,2	168,5	14	28	HJ2324	1,65
	154	23,2	168,5	14	28	HJ2324	1,65
		23,2	168,5				
	154	28,0	168,5	17	30,5	HJ424	2,60
	154	28,0	168,5	17	30,5	HJ424	2,60
130	148	3,77	154,8	8	16	HJ1026	0,412
	148	3,77	154,8	8	16	HJ1026	0,412
	156	6,49	165,5	11	19	HJ226	0,840
	156	6,49	165,5	11	19	HJ226	0,840
	156	6,64	165,5	11	19	HJ226	0,840
		6,64	165,5				
	156	6,64	164	11	17	HJ226 E	0,840
	156	6,64	165,5	11	19	HJ226	0,840
		6,79	165,5				
		6,79	165,5				
	209,5	6,49					
	209,5	6,49					
	156	11,2	165,5	11	22	HJ2226	0,980
	167	16,4	182,3	14	23	HJ326 E	1,65
	167	16,8	182	14	24	HJ326	1,62
	167	16,8	182	14	24	HJ326	1,62
	167	16,8	182	14	24	HJ326	1,62
		16,9	182				
	247	16,4					
	167	29,1	182	14	29,5	HJ2326	1,92
	167	29,9	182	14	29,5	HJ2326	1,92
140	158	4,10	179,5	11	19	HJ228	1,00
	169	8,27	180	11	18	HJ228 E	0,990
	169	8,35	179,5	11	19	HJ228	1,00
	169	8,35	179,5	11	19	HJ228	1,00
	169	8,35	179,5	11	19	HJ228	1,00
		8,55	179,5				
		8,55	179,5				
	225	8,27					
	169	15,2	180	11	23	HJ2228 E	1,07
	169	15,2	180	11	23	HJ2228 E	1,07

Cylindrical roller bearings, single row

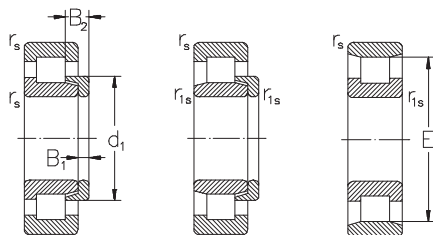


NU

NJ

NUP

Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
140	250	68	3	3	479	708	2 000	2 600	NUP2228 E
	250	68	3	3	479	708	2 000	2 600	N2228 E
	300	62	4	4	607	732	1 900	2 400	NU328 M
	300	62	4	4	607	732	1 900	2 400	NU328 MA
	300	62	4	4	703	861	1 900	2 400	NJ328 E
	300	62	4	4	607	732	1 900	2 400	NJ328 M
	300	62	4	4	607	732	1 900	2 400	NJ328 MA
	300	62	4	4	607	732	1 900	2 400	NUP328 M
	300	62	4	4	607	732	1 900	2 400	N328 M
	300	62	4	4	607	732	1 900	2 400	N328 MA
	300	102	4	4	913	1 236	1 800	2 200	NU2328 M
	300	102	4	4	1 130	1 589	1 800	2 200	NJ2328 E
	300	102	4	4	913	1 236	1 800	2 200	NUP2328 M
150	225	35	2,1	1,5	190	271	2 600	3 200	NU1030 M
	270	45	3	3	370	484	2 000	2 600	NU230 M
	270	45	3	3	370	484	2 000	2 600	NU230 MA
	270	45	3	3	370	484	2 000	2 600	NJ230 M
	270	45	3	3	370	484	2 000	2 600	NJ230 MA
	270	45	3	3	370	484	2 000	2 600	NUP230 M
	270	45	3	3	370	484	2 000	2 600	N230 M
	270	45	3	3	370	484	2 000	2 600	N230 MA
	270	73	3	3	565	836	1 900	2 400	NU2230 M
	270	73	3	3	565	836	1 900	2 400	NU2230 MA
	270	73	3	3	631	922	1 900	2 400	NJ2230 E
	270	73	3	3	565	836	1 900	2 400	NUP2230 MA
	320	65	4	4	667	813	1 700	2 000	NU330 MA
	320	65	4	4	667	813	1 700	2 000	NJ330 MA
	320	65	4	4	667	813	1 700	2 000	NUP330 M
	320	65	4	4	667	813	1 700	2 000	NUP330 MA
	320	65	4	4	667	813	1 700	2 000	N330 MA
	320	108	4	4	1 022	1 409	1 700	2 000	NU2330 M
	320	108	4	4	1 022	1 409	1 700	2 000	NU2330 MA
160	240	38	2,1	1,5	230	328	2 400	3 000	NU1032 MA
	290	48	3	3	440	591	1 900	2 400	NU232 MA
	290	48	3	3	440	591	1 900	2 400	NJ232 M
	290	48	3	3	440	591	1 900	2 400	NJ232 MA
	290	48	3	3	440	591	1 900	2 400	N232 MA
	290	80	3	3	767	1 109	1 700	2 000	NJ2232 E
	340	68	4	4	702	883	1 500	1 800	NU332 M
	340	68	4	4	702	883	1 500	1 800	N332 M
170	260	42	2,1	2,1	277	400	2 200	2 800	NU1034 M
	310	52	4	4	618	828	1 800	2 200	NU234 EM
	310	52	4	4	499	677	1 800	2 200	NJ234 M



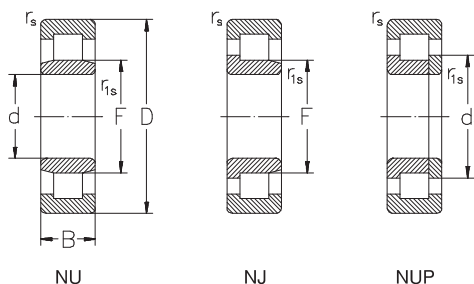
NJ+HJ

NU+HJ

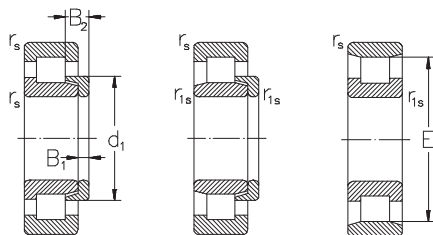
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Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
d	E,F		d ₁	B ₁	B ₂		
mm		kg	mm			—	kg
140		15,2	180				
	225	15,2					
	180	20,1	196	15	26	HJ328	1,93
	180	20,1	196	15	26	HJ328	1,93
	180	20,2	195	15	25	HJ328 E	1,93
	180	20,2	196	15	26	HJ328	1,93
	180	20,2	196	15	26	HJ328	1,93
		20,7	196				
	260	20,1					
	260	20,1					
	180	36,8	196	15	33,5	HJ2328	2,33
	180	37,2	195,6	15	31	HJ2328 E	2,33
		37,2	196				
150	169,5	4,83	176,7	9,5	18	HJ1030	0,580
	182	10,3	193	12	20,5	HJ230	1,21
	182	10,3	193	12	20,5	HJ230	1,21
	182	10,6	193	12	20,5	HJ230	1,21
	182	10,6	193	12	20,5	HJ230	1,21
		10,9	193				
	238	10,3					
	238	10,3					
	182	18,7	193	12	26,5	HJ2230	1,44
	182	18,7	193	12	26,5	HJ2230	1,44
	182	19,2	193	12	24,5	HJ2230 E	1,44
		19,7	193				
	193	26,6	210	15	26,5	HJ2230	1,44
	193	27,0	210	15	26,5	HJ330	2,37
		27,4	210			HJ330	2,37
		27,4	210				
	277	26,6					
	193	44,7	210	15	34	HJ2330	2,87
	193	44,7	210	15	34	HJ2330	2,87
160	180	5,93	188	10	19	HJ1032	0,65
	195	14,2	207	12	21	HJ232	1,48
	195	14,5	207	12	21	HJ232	1,48
	195	14,5	207	12	21	HJ232	1,48
	255	14,2	207	12	21	HJ232	1,48
	193	24,5	206,1	12	28	HJ2232 E	1,78
	208	32,0	225	15	28	HJ332	2,75
	292	32,0					
170	193	7,90	201,8	11	21	HJ1034	0,930
	207	17,6	220,8	12	20	HJ234 E	1,70
	208	18,2	220,5	12	22	HJ234	1,70

Cylindrical roller bearings, single row



Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
170	310	52	4	4	499	677	1 800	2 200	NJ234 MA
	310	52	4	4	618	828	1 800	2 200	N234 EM
	310	86	4	4	748	1 141	1 700	2 000	NU2234
	310	86	4	4	914	1 316	1 700	2 000	NJ2234 E
	310	86	4	4	748	1 141	1 700	2 000	NUP2234
	310	86	4	4	748	1 141	1 700	2 000	N2234
	360	72	4	4	928	1 149	1 600	1 900	NU334 E
	360	72	4	4	801	1 018	1 600	1 900	NUP334
	360	72	4	4	928	1 149	1 600	1 900	N334 E
	360	120	4	4	1 226	1 758	1 400	1 700	NU2334 M
	360	120	4	4	1 226	1 758	1 400	1 700	NJ2334 M
	280	46	2,1	2,1	337	479	2 000	2 600	NU1036
	280	46	2,1	2,1	337	479	2 000	2 600	NU1036 M
	320	52	4	4	516	717	1 800	2 200	NU236 MA
	320	52	4	4	516	717	1 800	2 200	NJ236 M
	320	52	4	4	516	717	1 800	2 200	NUP236 MA
	320	52	4	4	516	717	1 800	2 200	N236 MA
	320	86	4	4	775	1 208	1 600	1 900	NU2236 M
	320	86	4	4	955	1 408	1 600	1 900	NJ2236 E
	380	75	4	4	903	1 155	1 500	1 800	NU336 M
	380	75	4	4	903	1 155	1 500	1 800	NJ336 M
190	380	75	4	4	903	1 155	1 500	1 800	NUP336 M
	380	75	4	4	903	1 155	1 500	1 800	N336 M
	380	126	4	4	1 381	1 995	1 300	1 600	N2336 EM
	290	46	2,1	2,1	357	525	1 900	2 200	NU1038
	340	55	4	4	567	790	1 700	2 000	NU238 M
	340	55	4	4	567	790	1 700	2 000	NU238 MA
	340	55	4	4	567	790	1 700	2 000	NJ238 M
	340	55	4	4	567	790	1 700	2 000	N238 MA
	340	55	4	4	567	790	1 700	2 000	NUP238 MA
	340	55	4	4	567	790	1 700	2 000	N238 M
	340	55	4	4	567	790	1 700	2 000	N238 MA
	340	92	4	4	854	1 338	1 500	1 800	NU2238 M
	400	78	5	5	1 036	1 329	1 400	1 700	NU338
	400	132	5	5	1 789	2 628	1 300	1 600	NU2338 EM
	310	51	2,1	2,1	395	590	2 000	2 600	NU1040 M
	310	51	2,1	2,1	395	590	2 000	2 600	NU1040 MP6
	310	51	2,1	2,1	385	572	2 000	2 600	NU1040 MA
	360	58	4	4	690	904	1 600	1 900	NU240 M
	360	58	4	4	634	892	1 600	1 900	N240 MA
200	360	58	4	4	634	892	1 600	1 900	NJ240 MA
	360	58	4	4	634	892	1 600	1 900	NUP240 MA



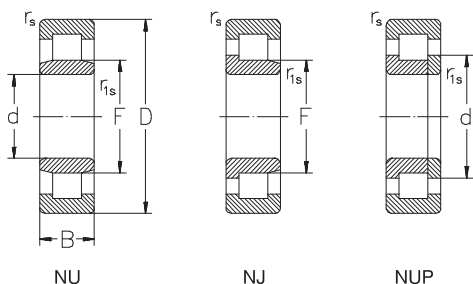
NJ+HJ

NU+HJ

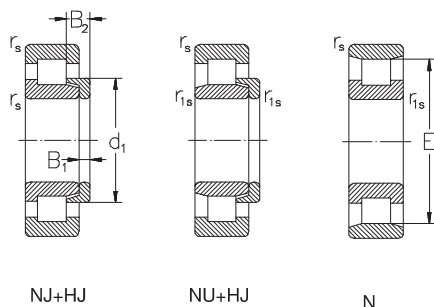
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Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
d	E,F		d ₁	B ₁	B ₂		
mm		kg	mm			—	kg
170	208	18,2	220,5	12	22	HJ234	1,70
	272	17,6					
	205	29,8	219,5	12	29	HJ2234	1,79
	205	29,8	219	12	24	HJ2234 E	1,79
		29,8	219,6				
	281	29,8					
	220	38,0	238	16	28	HJ334 E	3,18
		38,0	238				
	318	38,0					
	220	62,7	238	16	38,5	HJ2334	3,85
180	220	63,3	238	16	38,5	HJ2334	3,85
	205	10,9	214,1	12	22,5	HJ1036	1,25
	205	10,5	215	12	22,5	HJ1036	1,25
	218	18,7	230,5	12	22	HJ236	1,80
	218	19,1	230,5	12	22	HJ236	1,80
		20,3	230,5				
	282	18,7					
	218	30,4	230,5	12	29	HJ2236	2,40
	215	31,0	229,5	12	24	HJ2236 E	2,40
	232	43,4	252	17	30,5	HJ336	3,85
232	43,4	252	17	30,5	HJ336	3,85	
190		43,4	252				
	328	43,4					
	328	73,4					
	215	11,4	225	12	22,5	HJ1038	1,37
	231	22,5	244,5	13	23,5	HJ238	2,20
	231	22,5	244,5	13	23,5	HJ238	2,20
	231	23,1	244,5	13	23,5	HJ238	2,20
	231	23,1	244,5	13	23,5	HJ238	2,20
		24,2	244,5				
	299	22,5					
299	22,5						
231	37,5	243	13	31,5	HJ2238	2,80	
245	50,5						
200	245	85,5	265	18	41,5	HJ2338 E	4,85
	229	14,0	239,4	13	25,5	HJ1040	1,69
	229	14,0	239,4	13	25,5	HJ1040	1,69
	229	14,1	239,4	13	25,5	HJ1040	1,69
	244	26,5	258	14	25	HJ240	2,60
	244	26,5	258	14	25	HJ240	2,60
		27,3	258	14	25	HJ240	2,60
		27,7	258				
	244	27,3	258	14	25	HJ240	2,60
		27,7	258				

Cylindrical roller bearings, single row

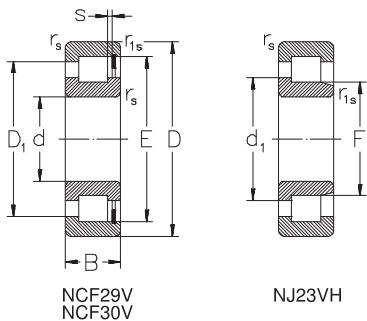


Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
200	360	58	4	4	634	892	1 600	1 900	N240 M
	360	58	4	4	634	892	1 600	1 900	N240 MA
	360	98	4	4	1 174	1 774	1 400	1 700	NU2240 E
	360	98	4	4	1 220	1 860	1 400	1 700	NU2240 EM
	360	98	4	4	1 220	1 860	1 400	1 700	NJ2240 EM
	420	80	5	5	1 250	1 648	1 300	1 600	NU340 EM
	420	80	5	5	974	1 273	1 300	1 600	NJ340
	420	80	5	5	1 250	1 648	1 300	1 600	NJ340 EM
	420	80	5	5	1 250	1 678	1 300	1 600	N340 EM
	420	138	5	5	1 740	2 685	1 200	1 500	NU2340 M
	340	56	3	3	650	1 047	1 300	1 600	NU1044 M
	340	56	3	3	495	737	1 800	2 200	NU1044 MA
	400	65	4	4	785	1 170	1 400	1 700	NU244 M
	400	65	4	4	778	1 113	1 400	1 700	NU244 MA
220	400	65	4	4	778	1 113	1 400	1 700	NJ244 MA
	400	65	4	4	778	1 113	1 400	1 700	NUP244 MA
	400	65	4	4	778	1 113	1 400	1 700	N244 M
	400	65	4	4	778	1 113	1 400	1 700	N244 MA
	400	108	4	4	1 370	2 310	1 400	1 700	NU2244 M
	460	88	5	5	1 480	1 989	1 400	1 700	NU344 M
	460	88	5	5	1 480	1 989	1 400	1 700	NJ344 M
	460	88	5	5	1 460	1 989	1 400	1 700	N344 M
	460	145	5	5	2 425	3 750	1 400	1 700	NU2344 M
	460	145	5	5	2 425	3 750	1 400	1 700	NJ2344 M
	460	145	5	5	2 425	3 750	1 400	1 700	NUP2344 M
	360	56	3	3	695	1 168	1 400	1 700	NU1048 M
	360	56	3	3	695	1 168	1 400	1 700	NUP1048 M
	360	56	3	3	695	1 168	1 400	1 700	N240 M
	360	56	3	3	695	1 168	1 400	1 700	N240 MA

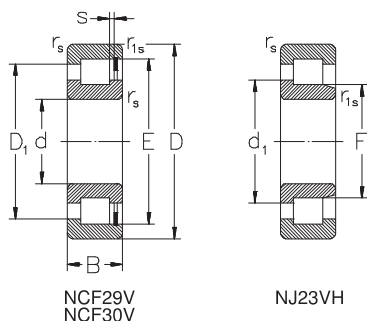


Dimensions		Weight	Angle ring			Designation	Weight
d	E,F		Dimensions				
d	E,F		d ₁	B ₁	B ₂		
mm		kg	mm			—	kg
200	316	26,5					
	316	26,5					
	244	47,5	256,9	14	28	HJ2240 E	3,25
	241	45,5	256,9	14	28	HJ2240 E	3,25
	241	47,5	256,9	14	28	HJ2240 E	3,25
	260	56,0					
	260	57,0	280	18	33	HJ340	5,60
	260	57,0					
	360	56,2					
	260	97,0	280	18	44,5	HJ2340	5,65
220	250	18,5	262	14	27	HJ1044	2,16
	250	18,5	262	14	27	HJ1044	2,16
	270	38,5	286	15	27,5	HJ244	3,55
	270	36,9	286	15	27,5	HJ244	3,55
	270	38,0	286	15	27,5	HJ244	3,55
		40,2	286				
		38,5					
	350	36,9					
	270	61,5	285,5	15	36,5	HJ2244	3,55
	280	72,5	307	20	36	HJ344	7,05
	280	73,0	307	20	36	HJ344	7,05
	396	73,0					
	280	125	301	20	40	HJ2344	7,10
	280	126	301	20	40	HJ2344	7,10
	127						
240	270	20,0 21,0	282 282	14	27	HJ1048	2,32

Cylindrical roller bearings, single row, full complement

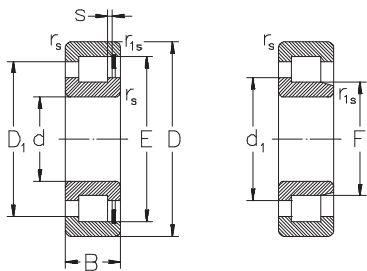


Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r_s min.	r_{1s} min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm					kN		min^{-1}		—
35	62	20	1	0,4	48	56	2 800	5 300	NCF3007V NJ2307VH
	80	31	1,5		108	112	2 200	4 300	
40	68	21	1	0,4	57	69,5	2 400	4 500	NCF3008V NJ2308VH
	90	33	1,5		146	156	1 900	3 800	
45	75	23	1	0,4	61	76,5	2 200	4 300	NCF3009V NJ2309VH
	100	36	1,5		156	173	1 800	3 600	
50	80	23	1	0,4	76,5	96,5	2 000	4 000	NCF3010V NJ2310VH
	110	40	2		196	216	1 600	3 200	
55	90	26	1,1	0,6	104	140	1 700	3 400	NCF3012V NJ2311VH
	120	43	2		232	255	1 400	2 800	
60	95	26	1,1	0,6	106	146	1 600	3 200	NCF3012V NJ2312VH
	130	46	2,1		245	280	1 300	2 600	
65	100	26	1,1	0,6	112	160	1 500	3 000	NCF3013V NJ2313VH
	140	48	2,1		300	355	1 200	2 400	
70	110	30	1,1	0,6	129	173	1 400	2 800	NCF3014V NJ2314VH
	150	51	2,1		335	390	1 100	2 200	
75	115	30	1,1	0,6	137	190	1 300	2 600	NCF3015V NJ2315VH
	160	55	2,1		390	465	1 000	2 000	
80	110	19	1	0,6	81,5	132	1 300	2 600	NCF2916V NCF3016V NJ2316VH
	125	34	1,1	0,6	163	232	1 200	2 400	
	170	58	2,1		455	550	950	1 900	
85	120	22	1,1	0,6	104	170	1 200	2 400	NCF2917V NCF3017V NJ2317VH
	130	34	1,1	0,6	166	240	1 100	2 200	
	180	60	3		480	600	900	1 800	
90	125	22	1,1	0,6	106	173	1 200	2 400	NCF2918V NCF3018V NJ2318VH
	140	37	1,5	1,0	200	280	1 100	2 200	
	190	64	3		520	655	900	1 800	
100	140	24	1,1	0,6	132	224	1 000	2 000	NCF2920V NCF3020V NJ2320VH
	150	37	1,5	1,0	212	310	1 000	2 000	
	215	73	3		655	830	800	1 600	
110	150	24	1,1	0,6	137	245	950	1 900	NCF2922V NCF3022V NJ2322VH
	170	45	2	1,0	275	400	900	1 800	
	240	80	3		830	1 060	700	1 400	
120	165	27	1,1	0,6	173	300	850	1 700	NCF2924V NCF3024V NJ2324VH NCF2926V
	180	46	2	1,0	290	430	800	1 600	
	260	86	3		950	1 220	630	1 200	
130	180	30	1,5	1,0	204	360	800	1 600	

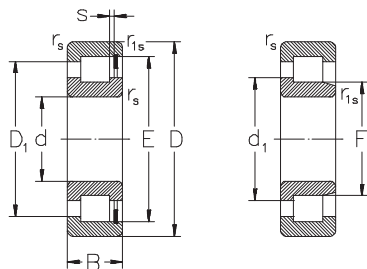


Dimensions						Weight
d	E	F	H	J	s	
mm						kg
35	55,52	40,52	52,6	43,6	2	0,235
	72,73	44,73	66,3	50,3		0,729
40	61,74	45,74	58,6	49	2	0,284
	83,1	51,1	76	57,5		1,00
45	66,85	50,85	63,7	54,1	2	0,374
	88,13	56,13	81,8	62,5		1,34
50	72,33	54,33	68,8	58	2	0,403
	98,7	60,7	90,3	68,3		1,80
55	83,54	63,54	79,5	67,5	2	0,606
	109,1	67,1	100,3	75,1		2,24
60	86,74	66,74	82,8	70,8	2	0,653
	115,68	73,68	106,8	81,6		2,83
65	93,1	73,1	87,1	77,1	2	0,701
	126,71	80,71	117	98,4		3,48
70	100,28	76,28	95,6	81,2	3	0,968
	132,22	84,22	121	93		4,32
75	107,9	83,9	103,6	89	3	1,01
	143,25	91,25	132,5	100,8		5,18
80	102,5	86,5	98,5	90,5	0,5	0,526
	116,99	90,99	111,8	96,2		1,40
	154,23	98,23	142,7	108,5		6,28
85	112,45	94,95	108	99	0,75	0,767
	121,44	95,44	115,9	100,3		1,47
	163,02	107,02	151,5	117,4		7,27
90	115,35	97,35	110,8	101,8	0,75	0,808
	130,11	100,11	124,2	106,2		1,89
	165,25	105,25	153,3	116,1		8,75
100	128,1	108,1	123,1	113,1	0,75	1,15
	139,65	109,65	133,7	115,8		2,06
	187,3	119,3	173,7	131,5		13,0
110	137,7	117,7	132,7	122,7	0,75	1,24
	156,13	120,13	149,1	127,5		3,34
	171,35	133,35	194,2	147		17,8
120	153,8	129,8	147,8	135,8	1,25	1,70
	167,58	120,13	160,5	138,9		3,63
	231,4	147,4	214	162,5		22,3

Cylindrical roller bearings, single row, full complement

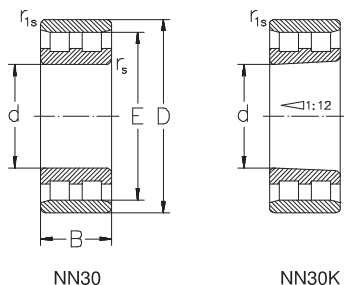


Dimensions					Basic radial load		Speed limit		Designation
d	D	B	r _s min.	r _{1s} min.	dyn. C _r	stat. C _{0r}	grease	oil	
mm					kN		min ⁻¹		—
140	200	52	2	1,0	415	620	750	1 500	NCF3026V
	280	93	4		1 100	1 430	560	1 000	NJ2326VH
150	190	30	1,5	1,0	212	380	750	1 500	NCF2928V
	210	53	2	1,0	440	680	670	1 300	NCF3028V
	300	102	4		1 250	1 630	530	950	NJ2328VH
160	210	36	2	1,1	290	500	670	1 300	NCF2930V
	225	56	2,1	1,1	455	710	630	1 200	NCF3030V
	320	108	4		1 500	2 000	500	900	NJ2330VH
170	220	36	2	1,0	300	540	630	1 200	NCF2932V
	240	60	2,1	1,1	520	800	600	1 100	NCF3032V
	340	114	4		1 630	2 200	450	800	NJ2332VH
180	230	36	2	1,1	310	570	600	1 100	NCF2934V
	260	67	2,1	1,1	670	1 060	560	1 000	NCF3034V
	360	120	4		1 760	2 400	450	800	NJ2334VH
190	250	42	2	1,1	390	695	560	1 000	NCF2936V
	280	74	2,1	1,1	780	1 250	500	900	NCF3036V
	380	126	4		1 900	2 700	400	700	NJ2336VH
200	260	42	2	1,1	405	735	530	950	NCF2938V
	290	75	2,1	1,1	800	1 290	480	850	NCF3038V
	400	132	5		2 080	2 900	400	700	NJ2338VH
200	280	48	2,1	1,1	490	915	480	850	NCF2940V
	310	82	2,1	1,1	915	1 530	450	800	NCF3040V
	420	138	5		2 320	3 250	380	670	NJ2340VH



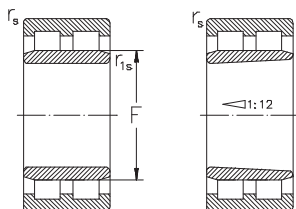
Dimensions						Weight
d	E	F	H	J	s	
mm						kg
130	166,5	140,5	160	147	1,25	2,29
	183,81	139,81	175	148,6	5,5	5,41
	247,95	157,95	229,9	174,1		27,9
140	175	149	168,5	155,5	1,25	2,45
	197,82	153,82	189,1	162,7	5,5	5,77
	264,46	168,46	245,3	184,7		34,9
150	194,9	162,9	186,9	170,9	2,25	3,81
	206,82	160,82	197,6	170	7	7,02
	286,5	182,5	265,7	201,2		41,6
160	205	173	197	181	2,25	4,02
	224,8	174,8	214,8	184,8	7	8,43
	308,55	196,55	286	216,7		48,8
170	215,5	183,5	207,5	191,5	2,25	4,23
	242,87	186,87	231,7	198	7	11,7
	319,56	203,56	296,4	224,5		59,2
180	231,5	193,5	222	203	3,25	6,21
	260,22	200,22	248,4	212,4	7	15,5
	337,74	221,74	314,6	242,6		69,6
190	243,5	205,5	234	215	3,25	6,48
	269,76	209,76	257,8	221,8	9	16,3
	352,62	224,6	327	247,6		80,0
200	262,4	220,4	251,9	230,9	3,4	9,08
	287,75	223,75	275,1	236,7	9	21,0
	374,66	238,65	347,5	263,2		91,6

Cylindrical roller bearings, double row



Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	E,F	n _s	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
30	55	19	1	48,5	4,5	29	38	11 000	14 000	NN3006 KMP41	0,192
	55	19	1	48,5	4,5	29	38	11 000	14 000	NN3006 KMP51	0,192
35	62	20	1	55	4,5	36,5	47	10 000	12 000	NN3007 KMP41	0,246
	62	20	1	55	4,5	36,5	47	10 000	12 000	NN3007 KMP51	0,246
40	68	21	1	61	4,5	42,5	58	9 000	11 000	NN3008 KMP41	0,298
	68	21	1	61	4,5	42,5	58	9 000	11 000	NN3008 KMP51	0,298
45	75	23	1	67,5	4,5	48,5	70	8 000	9 500	NN3009 KMP41	0,382
	75	23	1	67,5	4,5	48,5	70	8 000	9 500	NN3009 KMP51	0,382
50	80	23	1	72,5	4,5	51,5	80	7 500	9 000	NN3010 KMP41	0,415
	80	23	1	72,5	4,5	51,5	80	7 500	9 000	NN3010 KMP51	0,415
55	90	26	1,1	81	4,5	69	100	6 700	8 000	NN3011 KMP41	0,618
	90	26	1,1	81	4,5	69	100	6 700	8 000	NN3011 KMP51	0,618
	90	26	1,1	81	4,5	69	100	6 700	8 000	NN3011 KTNP41	0,618
	90	26	1,1	81	4,5	69	100	6 700	8 000	NN3011 KTNP51	0,618
60	95	26	1,1	86,1	4,5	72	110	6 300	7 500	NN3012 KMP41	0,664
	95	26	1,1	86,1	4,5	72	110	6 300	7 500	NN3012 KMP51	0,664
	95	26	1,1	86,1	4,5	72	110	6 300	7 500	NN3012 KTNP41	0,664
	95	26	1,1	86,1	4,5	72	110	6 300	7 500	NN3012 KTNP51	0,664
65	100	26	1,1	91	4,5	74	118	6 000	7 000	NN3013 KMP41	0,705
	100	26	1,1	91	4,5	74	118	6 000	7 000	NN3013 KMP51	0,705
	100	26	1,1	91	4,5	74	118	6 000	7 000	NN3013 KTNP41	0,705
	100	26	1,1	91	4,5	74	118	6 000	7 000	NN3013 KTNP51	0,705
70	110	30	1,1	100	6,5	96	151	5 300	6 300	NN3014 KMP41	1,02
	110	30	1,1	100	6,5	96	151	5 300	6 300	NN3014 KMP51	1,02
	110	30	1,1	100	6,5	96	151	5 300	6 300	NN3014 KTNP41	1,02
	110	30	1,1	100	6,5	96	151	5 300	6 300	NN3014 KTNP51	1,02
75	115	30	1,1	105	6,5	96	153	5 000	6 000	NN3015 KMP41	1,08
	115	30	1,1	105	6,5	96	153	5 000	6 000	NN3015 KMP51	1,08
	115	30	1,1	105	6,5	96	153	5 000	6 000	NN3015 KTNP41	1,08
	115	30	1,1	105	6,5	96	153	5 000	6 000	NN3015 KTNP51	1,08
80	125	34	1,1	113	6,5	118	184	4 800	5 600	NN3016 KMP41	1,50
	125	34	1,1	113	6,5	118	184	4 800	5 600	NN3016 KMP51	1,50
	125	34	1,1	113	6,5	118	184	4 800	5 600	NN3016 KTNP41	1,50
	125	34	1,1	113	6,5	118	184	4 800	5 600	NN3016 KTNP51	1,50
85	130	34	1,1	118	6,5	122	200	4 500	5 300	NN3017 KMP41	1,58
	130	34	1,1	118	6,5	122	200	4 500	5 300	NN3017 KMP51	1,58
	130	34	1,1	118	6,5	122	200	4 500	5 300	NN3017 KTNP41	1,58
	130	34	1,1	118	6,5	122	200	4 500	5 300	NN3017 KTNP51	1,58

Cylindrical roller bearings, double row

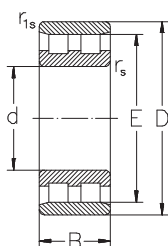


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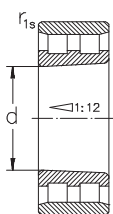
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Dimensions						Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.	E,F	n _s	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		—	kg
90	140	37	1,5	127	6,5	141	224	4 300	5 000	NN3018 MP51	2,01
	140	37	1,5	127	6,5	141	224	4 300	5 000	NN3018 TNP51	2,01
	140	37	1,5	127	6,5	141	224	4 300	5 000	NN3018 KMP41	2,01
	140	37	1,5	127	6,5	141	224	4 300	5 000	NN3018 KMP51	2,01
	140	37	1,5	127	6,5	141	224	4 300	5 000	NN3018 KTNP41	2,01
	140	37	1,5	127	6,5	141	224	4 300	5 000	NN3018 KTNP51	2,01
	140	37	1,5	127	6,5	141	224	4 300	5 000	NN3018 KTNP51	2,01
95	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 MP51	2,10
	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 TNP51	2,10
	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 KMP41	2,10
	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 KMP51	2,10
	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 KMP52	2,10
	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 KTNP41	2,10
	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 KTNP51	2,10
100	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 KTNP52	2,10
	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 KTNP52	2,10
	145	37	1,5	132	6,5	146	236	4 000	4 800	NN3019 KTNP52	2,10
	140	40	1,1	113	6,5	125	244	4 000	4 800	NNU4920 MP51	1,87
	140	40	2	113	125	244	244	4 000	4 800	NNU4920 KP51NA	1,80
	140	40	1,1	113	6,5	125	244	4 000	4 800	NNU4920 KMP51	1,79
	150	37	1,5	137	6,5	152	264	3 800	4 500	NN3020 MP51	2,21
105	150	37	1,5	137	6,5	152	264	3 800	4 500	NN3020 TNP51	2,21
	150	37	1,5	137	6,5	152	264	3 800	4 500	NN3020 KMP41	2,21
	150	37	1,5	137	6,5	152	264	3 800	4 500	NN3020 KMP51	2,21
	150	37	1,5	137	6,5	152	264	3 800	4 500	NN3020 KTNP41	2,21
	150	37	1,5	137	6,5	152	264	3 800	4 500	NN3020 KTNP51	2,21
	145	40	1,1	118	6,5	118	231	3 800	4 500	NN3021 MP51	1,90
	145	40	1,1	118	6,5	118	231	3 800	4 500	NN3021 KP51NA	2,00
110	145	40	1,1	118	6,5	118	231	3 800	4 500	NN3021 KMP51	1,82
	160	41	2	146	6,5	192	310	3 600	4 300	NN3021 KMP41	2,81
	160	41	2	146	6,5	192	310	3 600	4 300	NN3021 KMP51	2,81
	160	41	2	146	6,5	192	310	3 600	4 300	NN3021 KTNP41	2,81
	160	41	2	146	6,5	192	310	3 600	4 300	NN3021 KTNP51	2,81
	150	40	1,1	123	6,5	129	264	3 800	4 500	NNU4922 KMP51	1,91
	170	45	2	155	6,5	226	365	3 400	4 000	NN3022 MP41	3,56
120	170	45	2	155	6,5	226	365	3 400	4 000	NN3022 TNP41	3,56
	170	45	2	155	6,5	226	365	3 400	4 000	NN3022 KMP41	3,56
	170	45	2	155	6,5	226	365	3 400	4 000	NN3022 KMP51	3,56
	170	45	2	155	6,5	226	365	3 400	4 000	NN3022 KTNP41	3,56
	170	45	2	155	6,5	226	365	3 400	4 000	NN3022 KTNP51	3,56
	165	45	2	134,5	6,5	170	328	3 400	4 000	NNU4924 KP51NA	2,67
	165	45	1,1	134,5	6,5	170	328	3 400	4 000	NNU4924 KMP51	2,66
120	180	46	2	165	6,5	235	405	3 200	3 800	NN3024 MP41	3,87

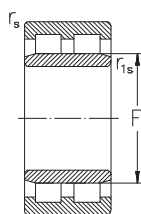
Cylindrical roller bearings, double row



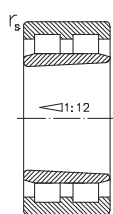
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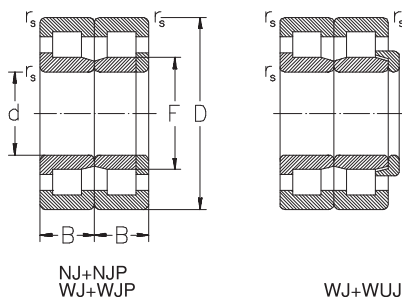
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NNU49K

Dimensions					Basic radial load		Speed limit		Designation	Weight	
d	D	B	r _s min.	E,F	n _s	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN	min ⁻¹		—	kg	
120	180	46	2	165	6,5	235	405	3 200	3 800	NN3024 TNP41	3,87
	180	46	2	165	6,5	235	405	3 200	3 800	NN3024 KMP41	3,87
	180	46	2	165	6,5	235	405	3 200	3 800	NN3024 KMP51	3,87
	180	46	2	165	6,5	235	405	3 200	3 800	NN3024 KTNP41	3,87
	180	46	2	165	6,5	235	405	3 200	3 800	NN3024 KTNP51	3,87
130	180	50	1,5	146	6,5	193	371	3 200	3 800	NNU4926 MP51	3,60
	180	50	1,5	146	6,5	193	371	3 200	3 800	NNU4926 KMP51	3,56
	180	50	1,5	146	6,5	193	371	3 200	3 800	NNU4926 KMP51NA	3,53
	200	52	2	182	9,5	294	510	3 000	3 600	NN3026 MP41	5,76
	200	52	2	182	9,5	294	510	3 000	3 600	NN3026 TNP41	5,76
	200	52	2	182	9,5	294	510	3 000	3 600	NN3026 KMP41	5,76
	200	52	2	182	9,5	294	510	3 000	3 600	NN3026 KMP51	5,76
	200	52	2	182	9,5	294	510	3 000	3 600	NN3026 KTNP41	5,76
	200	52	2	182	9,5	294	510	3 000	3 600	NN3026 KTNP51	5,76
	200	52	2	182	9,5	294	510	3 000	3 600	NN3026 KTNP51	5,76
140	190	50	1,5	156	6,5	189	395	3 000	3 600	NNU4928 KMP51	3,79
	190	50	1,5	156	6,5	189	395	3 000	3 600	NNU4928 KMP51NA	4,05
	210	53	2	192	6,5	305	520	2 800	3 400	NN3028 MP51	6,21
	210	53	2	192	9,5	305	520	2 800	3 400	NN3028 KMP51	6,21
150	210	60	2	168,5	6,5	326	645	2 600	3 200	NNU4930 KP51NA	6,46
	210	60	2	168,5	6,5	326	645	2 600	3 200	NNU4930 KMP51	5,95
	225	56	2,1	206	9,5	339	600	2 600	3 000	NN3030 KMP51	7,50
	225	65	2,1	206	9,5	339	600	2 600	3 000	NN3030 MP51	7,50
160	220	60	2	178,5		323	648	2 600	3 000	NNU4932 KMP51NA	6,38
170	230	60	2	188,5	6,5	339	720	2 400	3 000	NNU4934 KMP51	6,61
	260	67	2,1	236	9,5	458	810	2 200	2 600	NN3034 KMP51	12,4
180	250	69	2	202	9,5	380	830	2 200	2 600	NNU4936 KMP51	9,58
	250	69	2	202	9,5	409	873	2 200	2 600	NNU4936 KMP51NA	10,1
	280	74	2,1	255	12,2	576	1 080	2 000	2 600	NN3036 KMP51	16,3
190	260	69	2	212	9,5	412	910	2 200	2 600	NNU4938 KMP51	9,95
	290	75	2,1	265	12,2	610	1 150	2 000	2 400	NN3038 KMP51	17,1

Cylindrical roller bearings for railway axle-boxes



Dimensions					Basic radial load		Speed limit	Designation	Weight
d	D	B	r _s	F	dyn. C _r	stat. C _{0r}	grease		
mm					kN		min ⁻¹	—	kg
85	170	60	3	105	338	431	2 800	NJ+ NJP85/170 MAP63	14,5
110	215	73	3	135,5	452	594	2 600	WJ+ WJP110/215 M	25,0
	215	73	3	135,5	452	594	2 600	WJ+ WUJ110/215 M	26,0
120	240	80	3	150	885	1 530	2 400	WJ+ WJP120/240 M	34,7
	240	80	3	150	885	1 530	2 400	WJ+ WUJ120/240 M	34,7
130	240	80	3	157	900	1 632	2 200	WJ+ WJP130/240 M	35,6
	250	80	3	160	980	1 750	2 200	WJ+ WJP130/250 F	37,5
	250	80	3	160	618	868	2 200	WJ+ WJP130/250 M	37,7
	250	80	3	158	601	800	2 200	WJ+ WJP130/250 MPA	37,8
	260	86	3	164	697	944	2 000	WJ+ WJP130/260 M	44,4
140	300	102	4	180	1 460	1 768	1 800	WJ+ WJP140/300 M	71,6
	300	102	4	180	1 460	1 768	1 800	WJ+ WUJ140/300 M	71,6
160	320	102	4	200	953	1 338	1 500	WJ+ WJP160/320 FC4	81,6

1) Inner ring chamfer r_s = 8 mm



Needle roller bearings



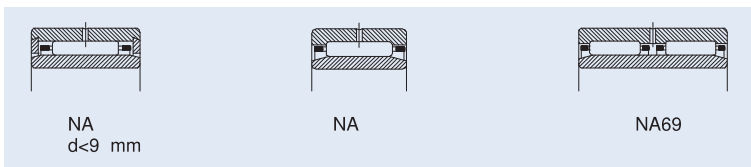
Needle roller bearings

Needle roller bearings can be considered a version of cylindrical roller bearings. As these small-sized bearings can take over heavy dynamic loads, they provide high

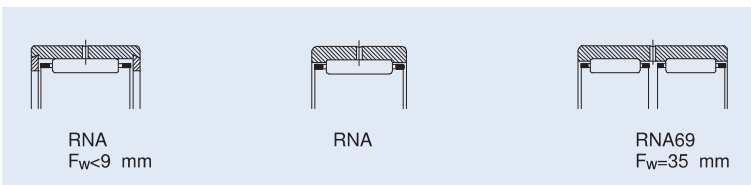
stiffness in bearing units.

Needle roller bearings are manufactured in the following constructive versions:

Needle roller bearings with inner ring



Needle roller bearings without inner ring (full complement)



Suffixes

- A** - dimensions rounded to whole numbers
- B** - extended inner ring
- C2** - radial clearance smaller than normal
- C3** - radial clearance larger than normal
- C4** - radial clearance larger than C3
- F2** - constructive modifications
- L** - light alloy machined cage
- NA** - radial clearance, non-interchangeable bearing elements
- NR** - groove on the inner ring and snap ring
- P6** - tolerance class more accurate than normal
- P5** - tolerance class more accurate than P6
- P52** - tolerance class P5, radial clearance C2
- S0** - bearing which can be used up to a temperature of + 150°C

- TN** - polyamide cage
- V** - bearing without cage (full complement)
- W2** - needle roller bearing with lubrication holes and grooves in the outer ring

In case of limited space needle roller bearings without inner rings (RNA type) can be used instead of needle roller bearings with inner rings. The shaft must be hardened and ground.

The shaft raceway must have a hardness of 58...65 HRC and a minimum roughness $R_a = 0,2 \mu\text{m}$ for normal bearings. In case of less pretentious bearings, $R_a = 0,3 \mu\text{m}$ is allowed.

Minimum thickness of the case-hardened layer can be

determined as a function of the rolling element diameter, using the equation:

$t_{min} = (0,07...0,12) D_w, \text{ mm}$

where:

D_w = rolling element diameter, mm

Greater values are valid in case of materials with core low strength and heavy loads.

In case of heat treatment steels (e.g. 41MoCr11) which have been surface hardened and tempered, layer thickness can be calculated using the equation:

$t_{min} = (0,1...0,15)D_w, \text{ mm}$

where:

D_w = rolling element diameter, mm

Layer thickness after grinding must be of minimum 0,3 mm.

If the hardness of the surface layer is less than 58 HRC, bearing cannot accommodate the initial basic dynamic load C_r and basic static load C_{0r} , respectively. In this case, basic dynamic load will be decreased by factor f_H and basic static load by factor f_{0H} , according to the equations:

$C_{r\text{ ef}} = f_H C_r, \text{ kN}$

$C_{0r\text{ ef}} = f_{0H} C_{0r}, \text{ kN}$

Factors f_H and f_{0H} are given in table 1.

Values of factors f_H and f_{0H}

Table 1

HRC	60	58	55	50	45	40	35	30
f_H	1,0	0,95	0,80	0,60	0,40	0,30	0,25	0,18
f_{0H}	1,0	1,0	0,95	0,80	0,70	0,55	0,40	0,30

Dimensions

The dimensions of needle roller bearings are standardized only for dimension series NA48, NA49, NA69, in accordance with ISO 1206.

Tolerances

Needle roller bearings with one-piece rings are generally manufactured to the normal tolerance class (P0). At request, they can be manufactured to other tolerance classes (P6 and P5).

The values of tolerances are given in chapter 3 on page 24.

Radial clearance

Needle roller bearings with one-piece rings are generally manufactured with normal radial clearances and the values of clearance are the same with those of the cylindrical roller bearings, according to ISO 5753 and are given on page 159, table 2. At request, these bearings are manufactured with other clearances (C2, C3 or C4).

If needle roller bearings are to be matched in pairs, radial clearance should be the same for both bearings so that loads should be uniformly distributed.

Cages

Needle roller bearings with one-piece rings are generally fitted with pressed sheet cages. At special request, when bearings are to be operated at high speeds and/or under heavy loads, machined steel cages are recommended to be used. Glass fibre reinforced polyamide 6.6 cages are also successfully used up to an operating temperature of + 120°C.

Cage design and some technical data are given in table 2.

Fits

Needle roller bearings are generally mounted with interference fits so that rings should not get deformed due to their low section. In case of large-sized bearings, heavy loads and shock loads, bearings are more tightly mounted. When determining the fit, the difference of temperature between the inner ring and the outer ring, respectively, should be considered. The manufacturing tolerance of the shaft should be in the tolerance class 6 (IT6) and of the housing in the tolerance class 7 (IT7). In case of bearings manufactured to more accurate tolerance classes, the manufacturing tolerance of the shaft should be in the tolerance class 5 (IT5) and of the housing in the tolerance class 6 (IT6). These classes are also compulsory for the raceway on shaft. Deviations of form and position should be in accordance with the stipulations on page 57.

The shaft tolerances are given in table 3. They depend on the radial clearance necessary for needle roller bearings without inner rings which are mounted into the housing, the housing bore being manufactured to the tolerance class K6.

Bearing minimum radial load

Needle roller bearings must be subjected to a given minimum load especially when being operated at high speeds, so that a proper operation of these bearings can be guaranteed.

The inertia forces which occur in bearing and the friction in the lubricant have a detrimental influence on the rolling conditions in bearing and may cause damaging sliding movements between needle rollers and raceways.

Minimum radial load can be approximately calculated using the equation:

$F_{r\text{ min}} = 0,02 C_r$

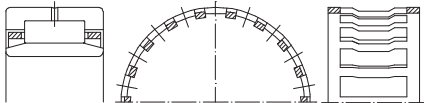
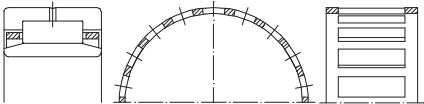
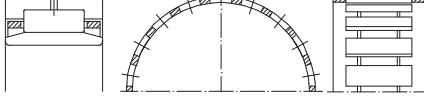
where:

$F_{r\text{ min}}$ = minimum radial load, kN

C_r = basic dynamic load, kN

Cage design and some technical data

Table 2

Cage	Design bearing cage	Application	Max. value $D_m n$	
			oil	grease
Pressed sheet cage		- General application - Moderate speeds	450×10^3	230×10^3
Polyamide cage TN		- General application - Moderate and high speeds - Bearings with $d \leq 80$ mm	850×10^3	500×10^3
Machined steel cage		- General application - Moderate speeds	450×10^3	250×10^3

Shaft tolerances for direct bearing unit

Table 3

Shaft diameter d (mm)	Radial clearance		
	Smaller than normal	Normal	Larger than normal
≤ 80	k5	h5	g6
> 80	k5	h5	f6

The values of the connection radius (r_u) and support

Dynamic and static equivalent load

Needle roller bearings can accommodate only radial loads which can be calculated using the equations:

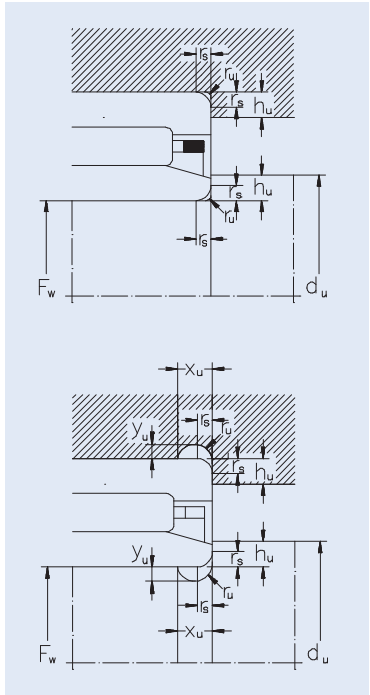
$$P_r = F_r, \text{ kN}$$

$$P_{0r} = F_{0r}, \text{ kN}$$

Abutment dimensions

For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum radius $r_{u \text{ max}}$ should be less than bearing minimum mounting chamfer $r_{s \text{ min}}$.

Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.



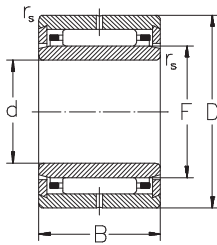
shoulder height (h_u), depending on the mounting chamfer, are given in table 4.

The diameter d_u should not exceed the values given in table 5, so that the shaft can be mounted and remounted. The dimension F_w is given in bearing tables.

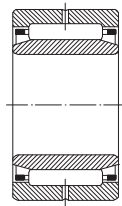
Abutment dimensions					
Table 4					
rs min.	ru max.	Yu	ru1	Xu	hu min.
mm					
0,15	0,15				0,6
0,3	0,3				1
0,6	0,6				2
1	1	0,2	1,3	2	2,5
1,1	1	0,3	2	3	3,25
1,5	1,5	0,4	2	3,2	4
2	2	0,5	2,5	4	5
2,1	2,1	0,5	3	4,7	5,5
3	2,5	0,5	3,5	5,3	6
4	3	0,6	4	5,5	7

Shoulder diameter		
Table 5		
F _w over	up to	d _u max.
mm		
—	20	F _w —0,3
20	55	F _w —0,5
55	100	F _w —0,7
100	250	F _w —1
255	—	F _w —1,5

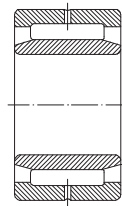
Needle roller bearings



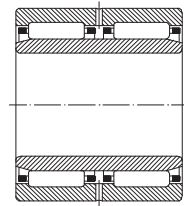
NA
d < 9 mm



NA



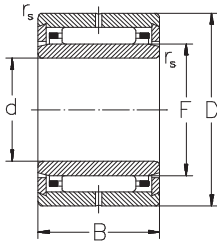
NA V



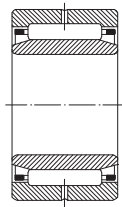
NA69

Dimensions					Basic radial load		Speed limit	oil	Designation	Weight
d	D	B	r _s min.	F _w	dyn. C _r	stat. C _{0r}	grease			
mm					kN		min ⁻¹		—	kg
5	15	12	0,3	8	3,7	3,95	19 000	32 000	NA051512 NA051516	0,013 0,016
	15	16	0,3	8	4,95	5,65	19 000	32 000		
6	16	12	0,3	9	4,3	4,8	18 000	30 000	NA061612 NA061616	0,014 0,018
	16	16	0,3	9	5,6	6,9	18 000	30 000		
7	17	12	0,3	10	4,5	5,35	17 000	28 000	NA071712 NA071716	0,015 0,020
	17	16	0,3	10	5,8	6,5	17 000	28 000		
9	19	12	0,3	12	4,65	5,8	16 000	26 000	NA091912 NA091916	0,018 0,023
	19	16	0,3	12	6,15	8,1	16 000	26 000		
10	22	13	0,3	14	8,25	9,1	15 000	24 000	NA4900 NA102216 NA102220	0,024 0,031 0,038
	22	16	0,3	14	9,8	11,3	15 000	24 000		
	22	20	0,3	14	11,8	15,4	15 000	24 000		
12	24	13	0,3	16	9,1	10,6	15 000	24 000	NA4901 NA6901	0,027 0,048
	24	22	0,3	16	14,8	20,2	15 000	24 000		
15	28	13	0,3	20	10,4	13,2	13 000	20 000	NA4902 NA6902	0,035 0,065
	28	23	0,3	20	16,8	24,5	13 000	20 000		
17	30	13	0,3	22	10,7	13,9	11 000	18 000	NA4903 NA6903	0,039 0,074
	30	23	0,3	22	18,2	27,8	11 000	18 000		
20	37	17	0,3	25	20,6	24,4	9 500	16 000	NA4904 NA6904	0,077 0,143
	37	30	0,3	25	33	47,6	9 500	16 000		
25	42	17	0,3	30	22,2	28,3	8 000	13 000	NA4905 NA4905V NA6905	0,096 0,100 0,170
	42	17	0,3	30	30	42,8	3 000	6 000		
	42	30	0,3	30	40,1	60,1	8 000	13 000		
30	45	20	0,3	35	24,2	38,5	7 000	11 000	NA304520 NA4906 NA6906	0,117 0,107 0,202
	47	17	0,3	35	23,7	32,1	7 000	11 000		
	47	30	0,3	35	43,1	69,3	7 000	11 000		
35	55	20	0,6	42	29,8	45,5	6 300	9 500	NA4907 NA6907	0,174 0,330
	55	36	0,6	42	52,7	95	6 300	9 500		
40	55	30	0,3	45	40,2	86,9	6 000	9 000	NA405530 NA4908 NA4908V NA6908 NA406522	0,221 0,239 0,266 0,450 0,290
	62	22	0,6	48	38,7	60,9	5 600	8 500		
	62	22	0,6	48	55	97,1	2 000	4 000		
	62	40	0,6	48	63,8	116	5 600	8 500		
	65	22	1	50	40,7	66,9	5 600	8 500		
45	62	25	0,6	50	36,3	76	5 300	8 000	NA456225 NA456235 NA4909 NA6909	0,235 0,330 0,285 0,515
	62	35	0,6	50	49,4	114	5 300	8 000		
	68	22	0,6	52	46,4	73,9	5 000	7 500		
	68	40	0,6	52	64,5	123	5 000	7 500		
50	68	25	0,6	55	38,5	82,2	5 000	7 500	NA506825 TN NA4910 NA6910	0,268 0,280 0,545
	72	22	0,6	58	45	73,5	4 800	7 000		
	72	40	0,6	58	67,3	136	4 800	7 000		

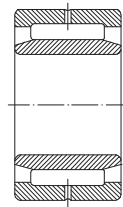
Needle roller bearings



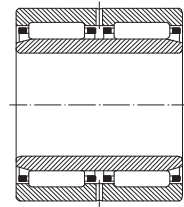
NA
d < 9 mm



NA



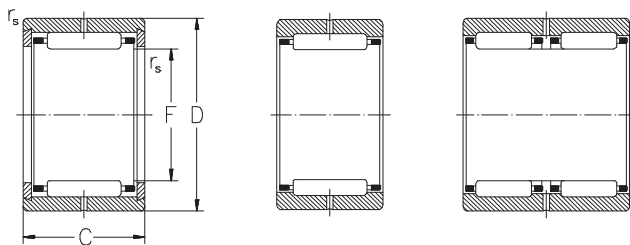
NA V



NA69

Dimensions				F _w	Basic radial load		Speed limit		Designation	Weight
d	D	B	r _s min.		dyn. C _r	stat. C _{0r}	grease	oil		
mm					kN		min ⁻¹		—	kg
55	72	25	0,6	60	40,2	87	4 500	6 700	NA557225 TN NA557235 NA4911	0,283
	72	35	0,6	60	55,7	130	4 500	6 700		0,380
	80	25	1	63	59,3	101	4 500	6 700		0,423
55	80	25	1	63	80,3	151	1 500	3 000	NA4911V NA6911	0,448
	80	45	1	63	83,8	173	4 500	6 700		0,795
60	85	25	1	68	62	109	4 000	6 000	NA4912 NA4912V NA6912	0,454
	85	25	1	68	83,4	163	1 400	2 800		0,480
	85	45	1	68	89,1	175	4 000	6 000		0,836
65	90	25	1	72	58,3	110	3 800	5 600	NA4913 NA6913	0,472
	90	45	1	72	91,3	193	3 800	5 600		0,881
70	95	25	1	80	53,4	115	3 400	5 000	NA709525 NA4914 TN NA4914V NA6914	0,538
	100	30	1	80	76,5	148	3 400	5 000		0,725
	100	30	1	80	103	231	1 200	2 700		0,774
	100	54	1	80	125	254	3 400	5 000		1,39
75	105	30	1	85	80,6	158	3 200	4 800	NA4915 NA6915	0,796
	105	54	1	85	127	270	3 200	4 800		1,51
80	110	30	1	90	84,9	169	3 000	4 500	NA4916 NA6916	0,870
	110	54	1	90	144	316	3 000	4 500		1,48
85	115	26	1	95	74,3	137	2 800	4300	NA85/26 NA4917 NA6917 NA4617 V	0,830
	120	35	1,1	100	98,8	222	2 600	4 000		1,28
	120	63	1,1	100	143	378	2 600	4 000		2,33
	130	45	1,1	104	121	408	900	1 800		2,57
90	125	35	1,1	105	110	222	2 400	3 800	NA4918 NA6918	1,34
	125	63	1,1	105	144	400	2 400	3 800		2,47
95	130	35	1,1	110	105	244	2 200	3 600	NA4919 NA6919	1,39
	130	63	1,1	110	149	411	2 200	3 600		2,63
100	130	30	1,1	110	99,6	210	2 200	3 600	NA100/30 NA4920	1,00
	140	40	1,1	115	124	267	2 200	3 600		1,93
110	140	30	1	120	102	222	2 000	3 400	NA4822 NA4922	1,15
	150	40	1,1	125	127	283	2 000	3 400		2,09
120	150	30	1	130	86,8	228	1 800	3 000	NA4824 NA4924	1,23
	165	45	1,1	135	170	385	1 800	3 000		2,95
130	165	35	1,1	145	122	316	1 700	2 800	NA4826 NA4926	1,90
	180	50	1,5	150	188	421	1 700	2 800		3,98
140	175	35	1,1	155	128	323	1 600	2 600	NA4828 NA140/32 NA4928	1,99
	180	32	1,5	155	116	258	1 600	2 600		2,05
	190	50	1,5	160	190	484	1 600	2 600		4,32
150	190	40	1,1	165	150	386	1 500	2 400	NA4830	2,85

Needle roller bearings without inner ring



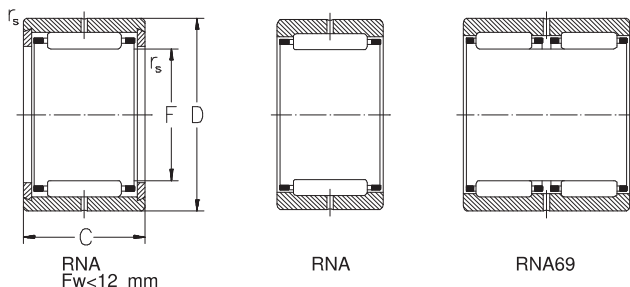
RNA
Fw<12 mm

RNA

RNA69

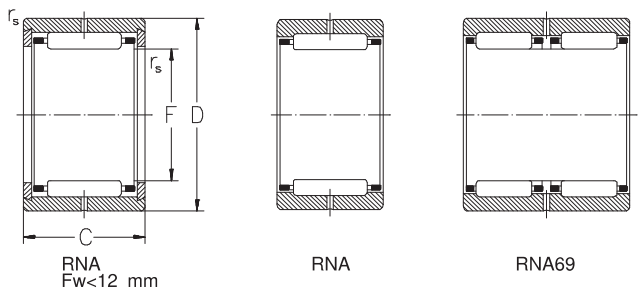
Dimensions				Basic radial load		Speed limit	oil	Designation	Weight
Fw	D	C	rs min.	dyn. Cr	stat. C0r	grease			
mm				kN		min ⁻¹		—	kg
8	15	12	0,3	3,7	3,95	19 000	32 000	RNA081512	0,008
	15	16	0,3	4,95	5,65	19 000	32 000	RNA081516	0,012
9	16	12	0,3	4,3	4,8	18 000	30 000	RNA091612	0,010
	16	16	0,3	5,6	6,9	18 000	30 000	RNA091616	0,013
10	17	12	0,3	4,5	5,35	17 000	28 000	RNA101712	0,011
	17	16	0,3	5,8	6,5	17 000	28 000	RNA101716	0,014
12	18	15	0,3	5,6	7,75	16 000	26 000	RNA121815 TN	0,012
	19	12	0,3	4,65	5,8	16 000	26 000	RNA121912	0,013
	19	16	0,3	6,15	8,1	16 000	26 000	RNA121916	0,017
	22	12	0,3	5,3	6,65	16 000	26 000	RNA122212	0,021
14	22	13	0,3	8,25	9,1	15 000	24 000	RNA4900	0,017
	22	16	0,3	9,8	11,3	15 000	24 000	RNA142216	0,021
	22	20	0,3	11,8	15,4	15 000	24 000	RNA142220	0,028
16	24	13	0,3	9,1	10,6	15 000	24 000	RNA4901	0,018
	24	22	0,3	14,8	20,2	15 000	24 000	RNA6901	0,032
18	28	15	0,3	9,5	11,9	14 000	22 000	RNA182815	0,036
20	28	13	0,3	10,4	13,2	13 000	20 000	RNA4902	0,022
	28	23	0,3	16,8	24,5	13 000	20 000	RNA6902	0,040
22	30	13	0,3	10,7	13,9	11 000	18 000	RNA4903	0,023
	30	23	0,3	18,2	27,8	11 000	18 000	RNA6903	0,043
25	37	17	0,3	20	24,4	9 500	16 000	RNA4904	0,053
	37	30	0,3	33	47,6	9 500	16 000	RNA6904	0,101
30	40	20	0,3	21	33	8 000	13 000	RNA304020	0,065
	42	17	0,3	22,2	28,3	8 000	13 000	RNA4905	0,068
	42	30	0,3	40,1	60,1	8 000	13 000	RNA6905	0,155
35	45	20	0,3	24,2	38,5	7 000	11 000	RNA354520	0,074
	47	17	0,3	23,7	32,1	7 000	11 000	RNA4906	0,140
	47	30	0,3	43,1	49,3	7 000	11 000	RNA6906	0,131
38	48	20	0,3	24,3	41,4	7 000	11 000	RNA384820	0,080
42	55	20	0,6	29,8	45,5	6 300	9 500	RNA4907	0,109
	55	36	0,6	52,7	95	6 300	9 500	RNA6907	0,214
45	55	30	0,3	40,2	86,9	6 000	9 000	RNA455530	0,137
48	62	22	0,6	38,7	60,9	5 600	8 500	RNA4908	0,147
	62	40	0,6	63,8	116	5 600	8 500	RNA6908	0,266
50	62	22	1	35,5	60,3	5 300	8 000	RNA506222	0,153
	62	25	0,6	36,3	76	5 300	8 000	RNA506225	0,157

Needle roller bearings without inner ring



Dimensions				Basic radial load		Speed limit	oil	Designation	Weight
Fw	D	C	rs min.	dyn. Cr	stat. Cor	grease			
mm				kN		min ⁻¹		—	kg
50	62	35	0,6	49,4	114	5 300	8 000	RNA506235	0,209
52	68	22	0,6	46,4	73,9	5 000	7 500	RNA4909	0,197
	68	40	0,6	64,5	123	5 000	7 500	RNA6909	0,283
55	68	25	0,6	38,5	82,2	5 000	7 500	RNA556825 TN	0,181
58	72	22	0,6	45	73,5	4 800	7 000	RNA4910	0,167
	72	40	0,6	67,3	136	4 800	7 000	RNA6910	0,335
60	72	25	0,6	40,2	87	4 500	6 700	RNA607225 TN	0,160
	72	35	0,6	55,7	130	4 500	6 700	RNA607235	0,224
63	80	25	1	59,3	101	4 500	6 700	RNA4911	0,278
	80	45	1	83,8	173	4 500	6 700	RNA6911	0,477
68	85	25	1	62	109	4 000	6 000	RNA4912	0,296
	85	45	1	89,1	175	4 000	6 000	RNA6912	0,493
72	90	25	1	58,3	110	3 800	5 600	RNA4913	0,318
	90	45	1	91,3	193	3 800	5 600	RNA6913	0,545
80	95	25	1	53,4	115	3 400	5 000	RNA809525	0,312
	100	30	1	76,5	148	3 400	5 000	RNA4914 TN	0,485
	100	54	1	125	254	3 400	5 000	RNA6914	0,545
85	105	30	1	80,6	158	3 200	4 800	RNA4915	0,504
	105	54	1	127	270	3 200	4 800	RNA6915	0,965
90	110	30	1	84,9	169	3 000	4 500	RNA4916	0,520
	110	54	1	144	316	3 000	4 500	RNA6916	0,973
95	115	26	1	74,3	137	2 800	4 300	RNA95/26	0,523
100	120	35	1,1	98,8	222	2 600	4 000	RNA4917	0,672
	120	63	1,1	143	378	2 600	4 000	RNA6917	1,24
105	125	35	1,1	110	222	2 400	3 800	RNA4918	0,712
	125	63	1,1	144	400	2 400	3 800	RNA6918	1,36
110	130	30	1,1	99,6	210	2 200	3 600	RNA110/30	0,626
	130	35	1,1	105	244	2 200	3 600	RNA4919	0,729
	130	63	1,1	149	411	2 200	3 600	RNA6919	1,48
115	140	40	1,1	124	267	2 200	3 600	RNA4920	1,17
120	140	30	1	102	222	2 000	3 400	RNA4822	0,729
125	150	40	1,1	127	283	2 000	3 400	RNA4922	1,25
130	150	30	1	86,8	228	1 800	3 000	RNA4824	0,730

Needle roller bearings without inner ring



Dimensions				Basic radial load		Speed limit	oil	Designation	Weight
Fw	D	C	rs min.	dyn. Cr	stat. Cor	grease			
mm				kN		min ⁻¹		—	kg
135	165	45	1,1	170	385	1 800	3 000	RNA4924	1,93
145	165	35	1,1	122	316	1 700	2 800	RNA4826	1,02
150	180	50	1,5	188	421	1 700	2 800	RNA4926	2,25
155	175	35	1,1	128	323	1 600	2 600	RNA4828	1,21
	180	32	1,5	116	258	1 600	2 600	RNA155/32	1,22
160	190	50	1,5	190	484	1 600	2 600	RNA4928	2,50
165	190	40	1,1	150	386	1 500	2 400	RNA4830	1,68



Spherical roller bearings



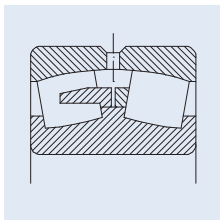
Spherical roller bearings

Spherical roller bearings operate in arduous conditions. The spherical rollers can be symmetrical or unsymmetrical and are self-aligning in the outer ring sphered raceway. Thus, the possible coaxiality deviations of the supporting bearings as well as shaft bending can be compensated.

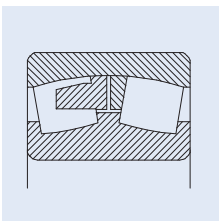
Spherical roller bearings are manufactured in the following constructive versions, depending on the bearing size and series:

MB design

These bearings have a central fixed rib, an one-piece cage guided on the inner ring rib.



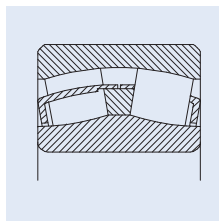
MA design



These bearings have a central fixed rib and machined cages guided on the inner ring rib.

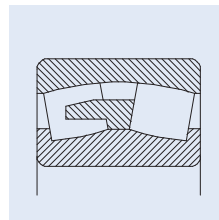
C design

These bearings have a central guide rib floating on the inner ring, symmetrical rollers with larger dimensions so that the load carrying capacity increases. Special pressed sheet cage. Bearings of this design are of small and medium sizes.

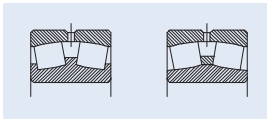


CA design

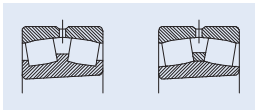
These bearings have side shoulders and central guide rib floating on the inner ring, symmetrical rollers with larger dimensions so that the load carrying capacity increases. They also have an one-piece machined brass cages. This design is available for medium and large-sized bearings.



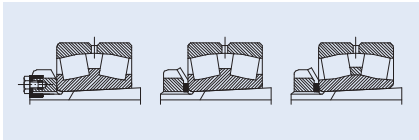
Other constructive versions are shown below:
cylindrical bore



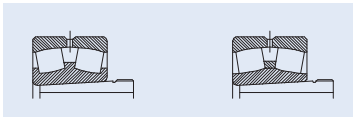
tapered bore
(taper 1:12, 1:30)



with adapter sleeves



with withdrawal sleeves



Suffixes

- C** - modified inner design, increased basic load, symmetrical rollers, pressed sheet cage
- CA** - modified inner design, increased basic load, one-piece machined brass cage
- E** - E - design
- F2, F3-** constructive modifications
- K** - tapered bore bearings, taper 1:12
- K30** - tapered bore bearings, taper 1:30
- MA** - machined brass cage guided on the outer ring
- MB** - machined brass cage guided on the inner ring
- P** - two-piece outer ring
- TN** - polyamide cage
- W33** - lubrication groove and holes in the outer ring

Tolerances

Spherical roller bearings with both cylindrical and tapered bore, are manufactured in normal tolerance class (see page 24).

Radial clearance

Spherical roller bearings are generally manufactured with normal radial clearance. At request, they can be manufactured with clearances larger than normal (C3, C4 etc.) or smaller than normal (C2).

The limit values of the radial clearance measured on unloaded bearings are in accordance with ISO 5753 and are given in tables 1 and 2.

Radial clearance of spherical roller bearings

Table 1

Bore diameter		Radial clearance									
		C2		Normal		C3		C4		C5	
d over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		μm									
14	18	10	20	20	35	35	45	45	60	60	75
18	24	10	20	20	35	35	45	45	60	60	75
24	30	15	25	25	40	40	55	55	75	75	95
30	40	15	30	30	45	45	60	60	80	80	100
40	50	20	35	35	55	55	75	75	100	100	125
50	65	20	40	40	65	65	90	90	120	120	150
65	80	30	50	50	80	80	110	110	145	145	180
80	100	35	60	60	100	100	135	135	180	180	225
100	120	40	75	75	120	120	160	160	210	210	260
120	140	50	95	95	145	145	190	190	240	240	300
140	160	60	110	110	170	170	220	220	280	280	350
160	180	65	120	120	180	180	240	240	310	310	390
180	200	70	130	130	200	200	260	260	340	340	430
200	225	80	140	140	220	220	290	290	380	380	470
225	250	90	150	150	240	240	320	320	420	420	520
250	280	100	170	170	260	260	350	350	460	460	570
280	315	110	190	190	280	280	370	370	500	500	630
315	355	120	200	200	310	310	410	410	550	550	690
355	400	130	220	220	340	340	450	450	600	600	750

Radial clearance of spherical roller bearings

Table 2

Bore diameter		Radial clearance									
		C2		Normal		C3		C4		C5	
d over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		μm									
10	24	15	25	25	35	35	45	45	60	60	75
24	30	20	30	30	40	40	55	55	75	75	95
30	40	25	35	35	50	50	65	65	85	85	105
40	50	30	45	45	60	60	80	80	100	100	130
50	65	40	55	55	75	75	95	95	120	120	160
65	80	50	70	70	95	95	120	120	150	150	200
80	100	55	80	80	110	110	140	140	180	180	230
100	120	65	100	100	135	135	170	170	220	220	280
120	140	80	120	120	160	160	200	200	260	260	330
140	160	90	130	130	180	180	230	230	300	300	380
160	180	100	140	140	200	200	260	260	340	340	430
180	200	110	160	160	220	220	290	290	370	370	470
200	225	120	180	180	250	250	320	320	410	410	520
225	250	140	200	200	270	270	350	350	450	450	570
250	280	150	220	220	300	300	390	390	490	490	620
280	315	170	240	240	330	330	430	430	540	540	680
315	355	190	270	270	360	360	470	470	590	590	740
355	400	210	300	300	400	400	520	520	650	650	820

Dimensions

The main dimensions of spherical roller bearings are in accordance with ISO 15.

The dimensions of the adapter sleeves are in accordance with standard ISO 2982-1.

The dimensions of the safety washers are in accordance with standard DIN 5406.

The dimensions of the bearing nuts are in accordance with standard ISO 2982-2.

The dimensions of the withdrawal sleeves are in accordance with standard ISO 2982-1.

Cages

Small and medium size spherical roller bearings are fitted with pressed sheet or machined brass cages (Y). Bearings of normal design are fitted with machined brass or steel cages guided on the rollers (M), inner ring (MB) or outer ring raceway (MA).

Glass fibre reinforced polyamide 6.6 cages are successfully used for small and medium size bearings if the operating temperature doesn't exceed +120°C.

Large-size bearings are fitted with machined brass cages, CA design.

Designs and some technical data are given in table 4.

Misalignment

Spherical roller bearings allow angular misalignment between the outer ring and inner ring without any influence on the bearing rating life. Under normal loads and operating conditions and when the inner ring rotates, the values of the permissible misalignment depending on the bearing series are given in table 3.

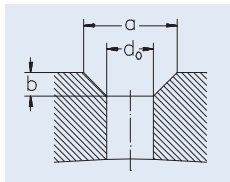
Permissible angular misalignment

Table 3

Bearing series	Permissible angular misalignment
	degrees
213	1
222	1,5
223	2
230	1,5
231	1,5
232	2,5
239	1,5
240	2
241	2,5

Lubrication grooves and holes

Spherical roller bearings are provided with a lubrication groove and holes in the outer ring, excepting those of series 213. Designation suffix W33 is used to identify this feature on bearings. The dimensions of the groove, bore diameter and their number depending on the dimension series are given in table 5.

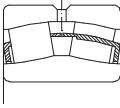
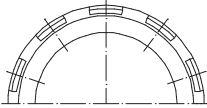
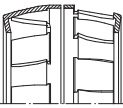
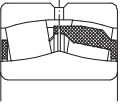
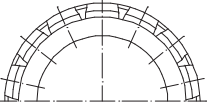
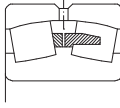
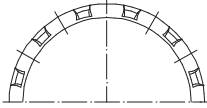
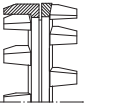
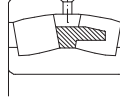
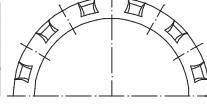


Heat treatment

Spherical roller bearings with outside diameter $D > 240$ mm of all series given in this catalogue are stress revealed. Therefore, they can be used up to an operating

Cage designs and some technical data

Table 4

Cage	Design bearing	cage	Application	Max. value $D_m n$ oil grease	
Pressed sheet cage				- General application - C design - Moderate speeds - Bearings with $d \leq 200$ mm	300×10^3 225×10^3
Polyamide cage TN				- General application - Moderate and high speeds	400×10^3 300×10^3
Machined brass M or steel F cage				- General application - Bearings with $d > 40$ mm	350×10^3 265×10^3
Machined brass cage, CA design				- General application - Bearings with $d > 200$ mm	350×10^3 265×10^3

temperature of +200°C. The hardness of the rings should not be lower than 59 HRC. Small sized bearings operate normally at temperatures up to +120°C.

$$P_r = 0,67 F_r + Y_2 F_a, \text{ kN, for } F_a/F_r > e$$

The values of the factors depending on the bearing type can be found in bearing tables.

Axial load for bearings mounted on adapter sleeves

If the spherical roller bearings are mounted on a smooth shaft using an adapter sleeve, without side support, the axial load carrying capacity depends on the friction between shaft and sleeve.

Considering that the mounting is correctly done, the permissible axial load can be accurately enough determined using the following equation:

$$F_{a \max} = 3 B d, \text{ kN}$$

where:

$F_{a \max}$ - maximum permissible axial load, kN,

B - bearing width, mm,

d - bearing bore diameter, mm.

Equivalent dynamic radial load

$$P_r = F_r + Y_1 F_a, \text{ kN, for } F_a/F_r \leq e,$$

Equivalent static radial load

$$P_{0r} = F_r + Y_0 F_a, \text{ kN}$$

The value of the factor Y_0 depending on the bearing type can be found in bearing tables.

Abutment dimensions

For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum connection radius $r_{u \max}$ should be less than bearing minimum mounting chamfer $r_{s \min}$.

Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

The values of the connection radii and support shoulder height are given in table 6. The mounting dimensions for bearings with withdrawal sleeves are given in table 7.

Dimensions of lubrication grooves and holes

Table 5

Series 23900				Series 23000				Series 24000			
Outer diameter range	Dimensions			Outer diameter range	Dimensions			Outer diameter range	Dimensions		
mm	d0	a	b	mm	d0	a		mm	d0	a	b
250...320	4,5	7,21	1,5	170...210	4,5	7,2	1,5	...180	4,4	7,2	1,5
				225...260	6	9,6	2	200...225	6	9,6	2
				280...290	7,5	12,1	2,5	240...260	7,5	12,1	2,5
				310...400	9	14,5	3	280...400	9	14,5	3

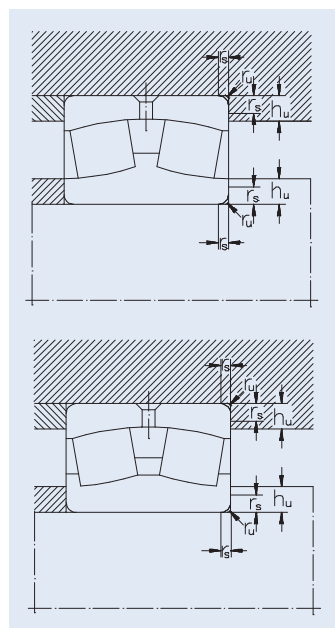
Series 23100				Series 24100				Series 22200			
Outer diameter range	Dimensions			Outer diameter range	Dimensions			Outer diameter range	Dimensions		
mm	d0	a	b	mm	d0	a		mm	d0	a	b
165...200	4,5	7,2	1,5	180...210	3	4,9	1	85	3	4,2	0,8
210...250	6	9,6	2	...225	4,5	7,2	1,5	110...160	3	4,9	1
...270	7,5	12,1	2,5	250...270	4,5	9,6	2	170...200	4,5	7,2	1,5
280...400	9	14,5	3	280...400	6	9,6	5,2	215...250	6	9,6	2
								270...290	7,5	12,1	2,5
								310...360	9	14,5	3

Series 23900				Series 23000				Series 24000			
Outer diameter range	Dimensions			Outer diameter range	Dimensions			Outer diameter range	Dimensions		
mm	d0	a	b	mm	d0	a		mm	d0	a	b
...160	3	4,9	1	90...120	3	4,9	1				
190...200	4,5	7,2	1,5	130...180	4,5	7,2	1,5				
215...250	6	9,6	2	190...215	6	9,6	2				
270...320	7,5	12,1	2,5	240...260	7,5	12,1	2,5				
340...400	9	14,5	3	280...360	9	14,5	3				
				380...400	12	19,7	3,5				

Abutment dimensions

Table 6

r_s min	r_u max	h_u min	
			Bearing series
			230 231, 213
			239 241, 223
			240 222, 233
			232
mm			
1	1	2,3	2,8
1,1	1	3	3,5
1,5	1,5	3,5	4,5
2	2	4,4	5,5
2,1	2,1	5,1	6
3	2,5	6,2	7
4	3	7,3	8,5
5	4	9	10
6	5	11,5	13
7,5	6	14	16
9,5	8	17	20



Spherical roller bearings with withdrawal sleeves

Abutment dimensions

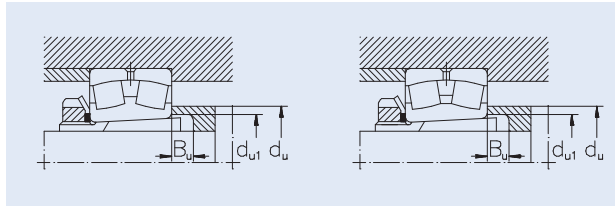


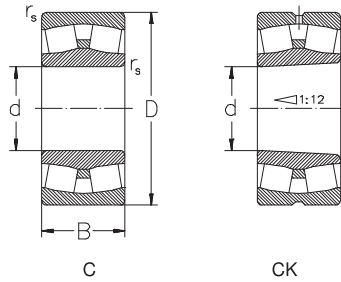
Table 7

Bore symbol	Shaft diameter d	Bearing series								
		239K			230K			231K		
		d_{u1} min.	d_u max.	B_u min.	d_{u1} min.	d_u max.	B_u min.	d_{u1} min.	d_u max.	B_u min.
mm										
20	90							107	115	7
22	100							117	122	7
24	110				127	134	7	128	136	7
26	115				137	145	8	138	146	8
28	125				147	155	8	149	157	8
30	135				158	166	8	160	170	8
32	140				168	177	8	170	183	8
34	150				179	189	8	180	193	8
36	160				189	201	8	191	204	8
38	170				199	211	9	202	216	9
40	180				210	223	9	212	231	9
44	200				231	247	9	233	253	9
48	220				251	268	11	254	276	11
52	240				272	291	11	276	302	11
56	260				292	310	12	296	321	12
60	280				313	337	12	318	347	12
64	300				334	357	12	338	369	12
68	320				355	382	14	360	395	14
72	340				375	402	14	380	416	14
76	360				396	422	15	401	436	15
80	380				417	448	15	421	457	15
84	400				437	468	15	443	483	16
88	410				458	488	17	463	504	17

Table 7 (continued)

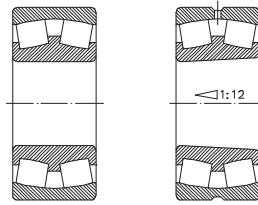
Bore symbol	Shaft diameter	Bearing series											
		222K			232K			213K			223K		
		d _{U1} min.	d _U max.	B _U min.	d _{U1} min.	d _U max.	B _U min.	d _{U1} min.	d _U max.	B _U min.	d _{U1} min.	d _U max.	B _U min.
mm													
05	20	28	31	5									
06	25	33	37	5									
07	30	39	43	5				39	47	7			
08	35	44	48	5				44	53	5	45	52	5
09	40	50	54	7				50	59	5	50	58	5
10	45	55	59	9				55	66	5	56	63	5
11	50	60	67	10				60	72	6	61	68	6
12	55	65	71	9				65	79	6	66	74	6
13	60	70	79	8				70	85	6	72	83	6
14	60	75	84	11				75	92	6	77	86	6
15	65	80	89	12				80	98	6	82	92	6
16	70	85	94	12				85	105	6	88	98	6
17	75	91	99	12				91	111	7	94	104	7
18	80	96	106	10	100	104	18	96	117	7	100	110	7
19	85	102	112	9				102	124	7	105	115	7
20	90	108	118	8	110	116	19	108	131	7	110	124	7
22	100	118	129	6	121	129	17	118	146	9	121	143	7
24	110	128	141	11	131	139	17				131	150	7
26	115	138	151	8	142	150	21				142	162	8
28	125	149	164	8	152	162	22				152	173	8
30	135	160	177	15	163	174	20				163	185	8
32	140	170	190	14	174	186	18				174	191	8
34	150	180	199	10	185	199	18				185	204	8
36	160	191	211	18	195	210	22				195	217	8
38	170	202	223	21	206	222	21				206	228	9
40	180	212	234	23	216	237	19				216	240	9
44	200	233	258	21	236	259	10				236	272	9
48	220	254	283	19	257	284	6				257	296	11
52	240	276	308	25	278	309	2				278	322	11
56	260	296	324	28	299	329	11				299	349	12
60	280	318	352	32	321	353	12						
64	300	338	378	38	343	378	12						
68	320				364	402	14						
72	340				385	424	14						
76	360				405	447	15						
80	380				427	473	15						
84	400				449	495	15						

Spherical roller bearings



Dimensions				Basic radial load. Factors						Speed limit		Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		—	kg
25	52	18	1	43	0,35	1,9	2,9	43	1,8	7 500	10 000	22205 C	0,180
	52	18	1	43	0,35	1,9	2,9	43	1,8	7 500	10 000	22205 CK	0,180
	52	18	1	43				43		7 500	10 000	22205 CA	
	52	18	1	43	0,35	1,9	2,9	43	1,8	7 500	10 000	22205C KW33	0,180
30	62	20	1	59	0,36	1,9	2,8	62	1,9	6 300	8 500	22206 C	0,280
	62	20	1	59	0,36	1,9	2,8	62	1,9	6 300	8 500	22206 CK	0,280
	62	20	1	59	0,36	1,9	2,8	62	1,9	6 300	8 500	22206 CKW33	0,280
	62	20	1	59				62		6 300	8 500	22206 CA	
35	72	23	1,1	81	0,36	1,9	2,8	88	1,9	5 300	7 000	2220 7C	0,430
	72	23	1,1	81	0,36	1,9	2,8	88	1,9	5 300	7 000	22207 CK	0,430
	72	23	1,1	81	0,36	1,9	2,8	88	1,9	5 300	7 000	22207 CKW33	0,430
	72	23	1,1	81				88		5 300	7 000	22207 CA	
40	80	23	1,1	88	0,31	2,2	3,2	98	2,1	4 800	6 300	22208 C	0,520
	80	23	1,1	88	0,31	2,2	3,2	98	2,1	4 800	6 300	22208 CK	0,510
	80	23	1,1	88	0,31	2,2	3,2	98	2,1	4 800	6 300	22208 CKW33	0,510
	80	23	1,1	88				98		4 800	6 300	22208 CA	
	90	23	1,5	99	0,26	2,6	3,9	120	2,6	4 500	6 000	21308 C	0,710
	90	23	1,5	99	0,26	2,6	3,9	120	2,6	4 500	6 000	21308 CK	0,700
	90	23	1,5	99	0,26	2,6	3,9	120	2,6	4 500	6 000	21308 CKW33	0,700
	90	23	1,5	99				120		4 500	6 000	21308 CA	
	90	33	1,5	140	0,4	1,6	2,5	145	1,6	4 300	5 600	22308 C	1,10
	90	33	1,5	140	0,4	1,6	2,5	145	1,6	4 300	5 600	22308 CK	1,00
	90	33	1,5	140	0,4	1,6	2,5	145	1,6	4 300	5 600	22308CA	
	90	33	1,5	125	0,4	1,7	2,5	135	1,6	3 800	5 000	22308 MB	1,20
	90	33	1,5	125				135		3 800	5 000	22308 KMAC4F80W33	1,05
	85	23	1,1	93	0,3	2,3	3,4	105	2,2	4 500	6 000	22209 C	0,560
	85	23	1,1	93	0,3	2,3	3,4	105	2,2	4 500	6 000	22209 CK	0,550
	85	23	1,1	93	0,3	2,3	3,4	105	2,2	4 500	6 000	22209 CKW33	0,550
85	23	1,1	93				105		4 500	6 000	22209 CA		
100	25	1,5	120	0,26	2,6	3,9	135	2,6	4 000	5 300	21309 C	0,950	
45	100	25	1,5	120	0,26	2,6	3,9	135	2,6	4 000	5 300	21309 CK	0,940
	100	25	1,5	120	0,26	2,6	3,9	135	2,6	4 000	5 300	21309 CKW33	0,940
	100	25	1,5	120				135		4 000	5 300	21309 CA	
	100	36	1,5	165	0,4	1,7	2,5	190	1,6	3 800	5 000	22309 C	1,35
	100	36	1,5	165	0,4	1,7	2,5	190	1,6	3 800	5 000	22309 CK	1,30
	100	36	1,5	165				190		3 800	5 000	22309 CA	
	100	36	1,5	150	0,4	1,7	2,5	175	1,6	3 400	4 500	22309 MB	1,36
	90	23	1,1	100	0,26	2,6	3,9	120	2,5	4 000	5 300	22210 C	0,610
	90	23	1,1	100	0,26	2,6	3,9	120	2,5	4 000	5 300	22210 CK	0,600
	90	23	1,1	100	0,26	2,6	3,9	120	2,5	4 000	5 300	22210 CKW33	0,600
90	23	1,1	100				120		4 000	5 300	22210 CA		
110	27	2	120	0,24	2,8	4,1	130	2,7	3 600	4 800	21310 C	1,25	

Spherical roller bearings

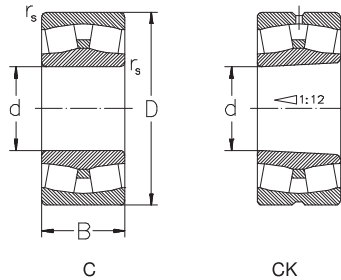


MB

MBK

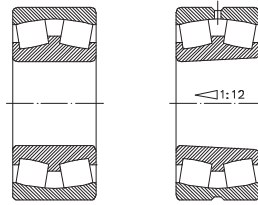
Dimensions				Basic radial load. Factors					Speed limit		Designation	Weight	
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease			oil
mm				kN	-			kN	-	min ⁻¹		kg	
55	110	27	2	120	0,24	2,8	4,1	130	2,7	3 600	4 800	21310 CK	1,20
	110	27	2	120	0,24	2,8	4,1	130	2,7	3 600	4 800	21310 CKW33	1,20
	110	27	2	120				130		3 600	4 800	21310 CA	
	110	40	2	190	0,4	1,7	2,5	220	1,6	3 400	4 500	22310 C	1,85
	110	40	2	190	0,4	1,7	2,5	220	1,6	3 400	4 500	22310 CK	1,80
	110	40	2	190				220		3 400	4 500	22310 CA	
	110	40	2	195	0,4	1,7	2,5	220	1,6	3 000	4 000	22310 MB	1,84
	110	40	2	195				220		3 000	4 000	22310 MAC4F80W33	1,91
	100	25	1,5	120	0,27	2,5	3,8	140	2,5	3 800	5 000	22211 C	0,820
	100	25	1,5	120	0,27	2,5	3,8	140	2,5	3 800	5 000	22211 CK	0,800
	100	25	1,5	120	0,27	2,5	3,8	140	2,5	3 800	5 000	22211 CKW33	0,800
	100	25	1,5	120				140		3 800	5 000	22211 CA	
	120	29	2	135	0,24	2,8	4,1	155	2,7	3 200	4 300	21311 C	1,65
	120	29	2	135	0,24	2,8	4,1	155	2,7	3 200	4 300	21311 CK	1,60
	120	29	2	135				155		3 200	4 300	21311 CA	
	120	43	2	230	0,4	1,7	2,5	265	1,6	3 000	4 000	22311 C	2,35
	120	43	2	230	0,4	1,7	2,5	265	1,6	3 000	4 000	22311 CK	2,30
	120	43	2	230	0,4	1,7	2,5	265	1,6	3 000	4 000	22311 CKW33	2,30
	120	43	2	230				265		3 000	4 000	22311 CA	
	120	43	2	220	0,4	1,7	2,5	255	1,6	2 800	3 600	22311 MA	2,49
	120	43	2	220				255		2 800	3 600	22311 MAC4F80W33	2,44
	120	43	2	220	0,4	1,7	2,5	255	1,6	2 800	3 600	22311 MB	2,43
60	110	28	1,5	145	0,27	2,5	3,7	175	2,4	3 400	4 500	22212 C	1,16
	110	28	1,5	145	1,27	2,5	3,7	175	2,4	3 400	4 500	22212 CK	1,10
	110	28	1,5	145	1,27	2,5	3,7	175	2,4	3 400	4 500	22212 CKW33	1,10
	130	28	1,5	145				175		3 400	4 500	22212 CA	
	130	31	2,1	150	0,24	2,9	4,3	180	2,8	3 000	4 000	21312 C	1,95
	130	31	2,1	150	0,24	2,9	4,3	180	2,8	3 000	4 000	21312 CK	1,90
	130	31	2,1	150				180		3 000	4 000	21312 CA	
	130	46	2,1	270	0,4	1,7	2,5	320	1,7	2 800	3 800	22312 C	2,95
	130	46	2,1	270	0,4	1,7	2,5	320	1,7	2 800	3 800	22312 CK	2,85
	130	46	2,1	270				320		2 800	3 800	22312 CA	
	130	46	2,1	260				310		2 600	3 400	22312 MAC4F80W33	3,04
	130	46	2,1	260	0,4	1,7	2,5	310	1,6	2 600	3 400	22312 MB	2,98
65	120	31	1,5	180	0,28	2,4	3,6	220	2,4	3 000	4 000	22213 C	1,45
	120	31	1,5	180	0,28	2,4	3,6	220	2,4	3 000	4 000	22213 CK	1,40
	120	31	1,5	180	0,28	2,4	3,6	220	2,4	3 000	4 000	22213 CKW33	1,40
	120	31	1,5	180				220		3 000	4 000	22213 CA	
	120	31	1,5	165	0,28	2,4	3,6	200	2,4	2 800	3 600	22213 MB	1,73
	140	33	2,1	220	1,24	2,8	4,2	290	2,8	2 800	3 800	21313 C	2,45
	140	33	2,1	220				290		2 800	3 800	21313 CA	
	140	33	2,1	220	0,24	2,8	4,2	290	2,8	2 800	3 800	21313 CK	2,40
	140	48	2,1	305	0,39	1,7	2,6	360	1,7	2 800	3 600	22313 C	3,55
	140	48	2,1	305	0,39	1,7	2,6	360	1,7	2 800	3 600	22313 CK	3,45

Spherical roller bearings



Dimensions			Basic radial load. Factors						Speed limit		Designation	Weight	
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease			oil
mm				kN	-			kN	-	min ⁻¹		—	kg
70	140	48	2,1	305				360		2 800	3 600	22313 CA	3,56 3,51 3,51 3,51
	140	48	2,1	280	0,39	1,7	2,6	330	1,7	2 400	3 200	22313 MA	
	140	48	2,1	280				330		2 400	3 200	22313 MAC4F80W33	
	140	48	2,1	280	0,38	1,8	2,6	330	1,7	2 400	3 200	22313 MB	
	125	31	1,5	180	0,26	2,6	3,9	225	2,6	2 800	3 800	22214 C	1,55
	125	31	2,1	180	0,26	2,6	3,9	225	2,6	2 800	3 800	22214 CK	1,50
	125	31	2,1	180	0,26	2,6	3,9	225	2,6	2 800	3 800	22214 CKW33	1,50
	125	31	1,5	180				225		2 800	3 800	22214 CA	3,10
	150	35	2,1	250	0,23	2,9	4,4	310	2,9	2 600	3 400	21314 C	
	150	35	2,1	250	0,23	2,9	4,4	310	2,9	2 600	3 400	21314 CK	3,00
	150	35	2,1	250				310		2 600	3 400	21314 CA	4,35 4,30
	150	51	2,1	375	0,38	1,8	2,6	455	1,7	2 400	3 200	22314 C	
	150	51	2,1	375	0,38	1,8	2,6	455	1,7	2 400	3 200	22314 CK	4,30
	150	51	2,1	375				455		2 400	3 200	22314 CA	4,53 4,30
	150	51	2,1	340				420		2 200	2 800	22314 MAC4F80W33	
	150	51	2,1	340	0,37	1,8	2,7	420	1,8	2 200	2 800	22314 MB	
75	130	31	1,5	190	0,24	2,8	4,1	250	2,7	2 800	3 800	22215 CW33	1,65
	130	31	1,5	190	0,24	2,8	4,1	250	2,7	2 800	3 800	22215 CKW33	1,60
	130	31	1,5	190				250		2 800	3 800	22215 CA	1,72 3,55
	130	31	1,5	175	0,24	2,8	4,1	230	2,7	2 600	3 400	22215 MBW33	
	160	37	2,1	280	0,23	2,9	4,4	360	2,9	2 400	3 200	21315 CW33	
	160	37	2,1	280	0,23	2,9	4,4	360	2,9	2 400	3 200	21315 CKW33	3,50
	160	55	2,1	415	0,38	1,8	2,6	520	1,7	2 200	3 000	22315 CW33	5,25
	160	55	2,1	415	0,38	1,8	2,6	520	1,7	2 200	3 000	22315 CKW33	5,15
	160	55	2,1	415				520		2 200	3 000	22315 CA	5,60
	160	55	2,1	380				475		2 200	2 800	22315 MAC4F80W33	
	160	55	2,1	380	0,38	1,8	2,6	475	1,7	2 200	2 800	22315 MBW33	5,26
	140	33	2	210	0,25	2,6	4	275	2,6	2 600	3 400	22216 C	2,05
	140	33	2	210	0,25	2,6	4	275	2,6	2 600	3 400	22216 CW33	2,05
	140	33	2	210	0,25	2,6	4	275	2,6	2 600	3 400	22216 CK	2,05
	140	33	2	210	0,25	2,6	4	275	2,6	2 600	3 400	22216 CKW33	2,05
	140	33	2	210				275		2 600	3 400	22216 CA	6,62 2,14
80	170	58	2,1	410				500		1 800	2 400	22316 MAC4F80W33	
	140	33	2	195	0,24	2,8	4,1	250	2,7	2 200	3 000	22216 MBW33	
	170	39	2,1	310	0,23	2,9	4,4	400	2,9	2 200	3 000	21316 CW33	4,25
	170	39	2,1	310	0,23	2,9	4,4	400	2,9	2 200	3 000	21316 CKW33	4,20
	170	39	2,1	310				400		2 200	3 000	21316 CA	6,29 6,25
	170	58	2,1	450	0,35	1,9	2,9	550	1,8	2 000	2 600	22316 CW33	
	170	58	2,1	410	0,25	2,6	4	500	2,6	1 800	2 400	22316 MB	6,25
	170	58	2,1	410	0,25	2,6	4	500	2,6	1 800	2 400	22316 MBW33	6,20
	170	58	2,1	410	0,25	2,6	4	500	2,6	1 800	2 400	22316 MBKW33	6,10
85	150	36	2	250	0,26	2,6	3,9	325	0,6	2 400	3 200	22217 C	2,57
	150	36	2	250	0,26	2,6	3,9	325	0,6	2 400	3 200	22217 CW33	2,55

Spherical roller bearings

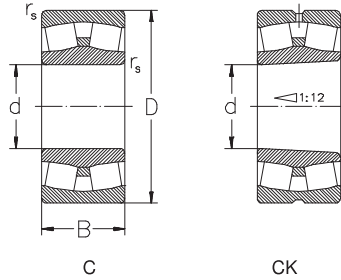


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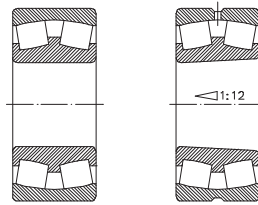
Dimensions				Basic radial load. Factors						Speed limit		Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		—	kg
90	150	36	2	250	0,26	2,6	3,9	325	2,6	2 400	3 200	22217 CKW33	2,50
	150	36	2	250				325		2 400	3 200	22217 CA	
	150	36	2	230	0,25	2,7	4	295	2,6	2 200	2 800	22217 MB	2,78
	180	41	3	350	0,22	3	4,5	450	2,9	2 200	2 800	21317 C	5,10
	180	41	3	350	0,22	3	4,5	450	2,9	2 200	2 800	21317 CK	5,00
	180	41	3	350				450		2 200	2 800	21317 CA	
	180	60	3	460				570		1 700	2 200	22317 MAC4F80W33	7,44
	180	60	3	500	0,33	2	3	620	2	1 800	2 400	22317 C	8,59
	180	60	3	500				620		1 800	2 400	22317 CA	
	180	60	3	460	0,37	1,8	2,7	570	1,8	1 700	2 200	22317 MB	7,22
	180	60	3	460	0,37	1,8	2,7	570	1,8	1 700	2 200	22317 MBW33	7,25
	180	60	3	460	0,37	1,8	2,7	570	1,8	1 700	2 200	22317 MBKW33	7,20
	160	40	2	305	0,27	2,5	3,8	410	2,5	2 200	3 000	22218 C	3,40
	160	40	2	305	0,27	2,5	3,8	410	2,5	2 200	3 000	22218 CW33	3,25
	160	40	2	305	0,27	2,5	3,8	410	2,5	2 200	3 000	22218 CKW33	3,20
	160	40	2	305				410		2 200	3 000	22218 CA	
	160	40	2	280	0,26	2,6	3,8	375	2,5	2 200	2 800	22218 MB	3,57
	160	52 ⁴	2	340				485		1 500	2 000	23218 CA	
	160	52 ⁴	2	340	0,34	2	3	485	2	1 500	2 000	23218 MB	4,60
	160	52 ⁴	2	340	0,34	2	3	485	2	1 500	2 000	23218 MBK	4,50
	190	43	3	385	0,22	3	4,5	510	2,9	2 200	2 800	21318 C	5,80
	190	43	3	385	0,22	3	4,5	510	2,9	2 200	2 800	21318 CK	5,70
	190	43	3	385				510		2 200	2 800	21318 CA	
	190	64	3	570	0,36	1,9	2,8	730	1,8	1 800	2 400	22318 C	8,70
	190	64	3	570	0,36	1,9	2,8	730	1,8	1 800	2 400	22318 CW33	8,60
	190	64	3	570	0,36	1,9	2,8	730	1,8	1 800	2 400	22318 CKW33	8,50
	190	64	3	570				730		1 800	2 400	22318 CA	
	190	64	3	530				670		1 700	2 200	22318 MAC4F80W33	8,80
	190	64	3	530	0,37	1,8	2,7	670	1,8	1 700	2 200	22318 MB	8,69
95	170	43	2,1	340	0,24	2,8	4,2	450	2,8	2 200	2 800	22219 C	4,26
	170	43	2,1	340				450		2 200	2 800	22219 CA	
	170	43	2,1	310	0,26	2,6	3,8	415	2,5	2 000	2 600	22219 MB	4,24
	170	43	2,1	310	0,26	2,6	3,8	415	2,5	2 000	2 600	22219 MBW33	4,10
	170	43	2,1	310	0,26	2,6	3,8	415	2,5	2 000	2 600	22219 MBKW33	4,00
	200	45	3	420	0,22	3	4,5	580	3	2 000	2 600	21319 CA	7,43
	200	45	3	385	0,22	3,1	4,6	530	3	1 800	2 400	21319 MB	7,15
	200	45	3	385	0,22	3,1	4,6	530	3	1 800	2 400	21319 MBK	7,00
	200	67	3	620	0,35	1,9	2,9	800	1,8	1 700	2 200	22319 C	11,3
	200	67	3	620				800		1 700	2 200	22319 CA	
	200	67	3	570	0,38	1,8	2,7	740	1,7	1 500	2 000	22319 MB	10,1
	200	67	3	570	0,38	1,8	2,7	740	1,7	1 500	2 000	22319 MBW33	10,2
	200	67	3	570				740		1 500	2 000	22319 MAC4F80W33	10,7
	200	67	3	570	0,38	1,8	2,7	740	1,7	1 500	2 000	22319 MBKW33	10,0

Spherical roller bearings



Dimensions				Basic radial load. Factors				stat. C _{0r}	Y ₀	Speed limit		Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂			grease	oil		
mm				kN	-			kN	-	min ⁻¹		—	kg
100	165	52	2	355				540		2 000	2 600	23120 CA	
	165	52	2	355	0,31	2,2	3,2	540	2,1	2 000	2 600	23120 MB	4,50
	165	52	2	355	0,31	2,2	3,2	540	2,1	2 000	2 600	23120 MBK	4,40
	180	46	2,1	375	0,24	2,8	4,2	500	2,8	2 200	2 800	22220 C	5,24
	180	46	2,1	375				500		2 200	2 800	22220 CA	
	180	46	2,1	340	0,27	2,5	3,7	455	2,4	2 000	2 600	22220 MB	5,18
	180	46	2,1	340	0,27	2,5	3,7	455	2,4	2 000	2 600	22220 MBW33	4,85
	180	46	2,1	340	0,27	2,5	3,7	455	2,4	2 000	2 600	22220 MBKW33	4,80
	180	60,3	2,1	455	0,33	2	3	660	2	1 500	2 000	23220 TNKW33	6,50
	180	60,3	2,1	495	0,33	2	3	720	2	1 700	2 200	23220 C	7,34
	180	60,3	2,1	495				720		1 700	2 200	23220 CA	
	180	60,3	2,1	455	0,33	2	3	660	2	1 500	2 000	23220 MA	7,03
	180	60,3	2,1	455	0,33	2	3	660	2	1 500	2 000	23220 MAW33	6,70
	180	60,3	2,1	455	0,33	2	3	660	2	1 500	2 000	23220 MAKW33	6,50
	215	47	3	460	0,22	3,1	4,7	640	3,1	1 800	2 400	21320 CA	9,07
	215	47	3	425	0,22	3,1	4,7	580	3,1	1 700	2 200	21320 MB	8,80
	215	47	3	425	0,22	3,1	4,7	580	3,1	1 700	2 200	21320 MBK	8,30
	215	73	3	670				880		1 400	1 800	23220 MAC4F80W33	13,5
	215	73	3	730	0,37	1,8	2,7	960	1,7	1 500	2 000	23220 C	13,2
	215	73	3	730	0,37	1,8	2,7	960	1,7	1 500	2 000	23220 CW33	13,2
	215	73	3	730	0,37	1,8	2,7	960	1,7	1 500	2 000	23220 CKW33	13,0
	215	73	3	730				960		1 500	2 000	23220 CA	
	215	73	3	670	0,37	1,8	2,7	880	1,7	1 400	1 800	23220 MB	12,7
110	170	45	2	295				485		2 000	2 600	23022 CA	
	170	45	2	295	0,26	2,6	3,9	485	2,6	2 000	2 600	23022 MB	3,75
	180	56	2	410	0,3	2,3	3,3	640	2,2	1 800	2 400	23122 TNKW33	5,50
	180	56	2	450	0,3	2,3	3,4	700	2,2	2 000	2 600	23122 C	6,26
	180	56	2	450				700		2 000	2 600	23122 CA	
	180	56	2	410	0,3	2,3	3,3	640	2,2	1 800	2 400	23122 MB	5,29
	180	56	2	410	0,3	2,3	3,3	640	2,2	1 800	2 400	23122 MBW33	5,55
	180	56	2	410	0,3	2,3	3,3	640	2,2	1 800	2 400	23122 MBKW33	5,50
	180	69	2	550	0,39	1,7	2,6	900	1,7	1 200	1 600	24122 CA	6,82
	180	69	2	550	0,39	1,7	2,6	900	1,7	1 200	1 600	24122 CAW33	6,85
	180	69	2	550	0,39	1,7	2,6	900	1,7	1 200	1 600	24122 CAK30W33	6,80
	200	53	2,1	590	0,25	2,7	4	770	2,5	1 800	2 400	22222 C	7,45
	200	53	2,1	590				770		1 800	2 400	22222 CA	
	200	53	2,1	540	0,28	2,4	3,5	700	2,3	1 700	2 200	22222 MB	7,10
	200	53	2,1	540	0,28	2,4	3,5	700	2,3	1 700	2 200	22222 MBW33	7,10
	200	53	2,1	540				700		1 700	2 200	22222 MBKW33	7,00
	200	69,8	2,1	620	0,33	2	3	920	2	1 400	1 800	23222 C	10,8
	200	69,8	2,1	620				920		1 400	1 800	23222 CA	
	200	69,8	2,1	570	0,33	2	3	840	2	1 200	1 600	23222 MB	9,70
	200	69,8	2,1	570	0,33	2	3	840	2	1 200	1 600	23222 MBW33	9,70
	200	69,8	2,1	570	0,33	2	3	840	2	1 200	1 600	23222 MBKW33	9,50

Spherical roller bearings

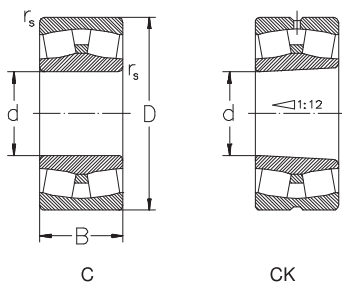


MB

MBK

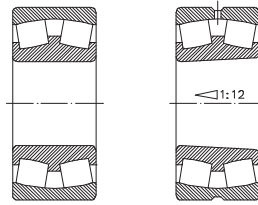
Dimensions				dyn. C _r	Basic radial load. Factors					Speed limit grease oil	Designation	Weight	
d	D	B	r _s min.		e	Y ₁	Y ₂	stat. C _{0r}	Y ₀				
mm				kN	-			kN	-	min ⁻¹	—	kg	
120	240	698	2,1	570				690		1 200	1 600	21322 CA	
	240	50	3	510	0,21	3,2	4,8	690	3,2	1 500	2 000	21322 MB	12,0
	240	50	3	510	0,21	3,2	4,8	690	3,2	1 500	2 000	21322 MBK	11,7
	240	80	3	870	0,37	1,8	2,7	1 160	1,8	1 400	1 900	22322 C	18,0
	240	80	3	870	0,37	1,8	2,7	1 160	1,8	1 400	1 900	22322 CW33	18,0
	240	80	3	870	0,37	1,8	2,7	1 160	1,8	1 400	1 900	22322 CKW33	17,5
	240	80	3	870				1 160		1 400	1 900	22322 CA	
	240	80	3	800	0,37	1,8	2,7	1 060	1,8	1 300	1 700	22322 MA	18,4
	240	80	3	800				1 060		1 300	1 700	22322 MAC4F80W33	18,7
	240	80	3	800	0,37	1,8	2,7	1 060	1,8	1 300	1 700	22322 MB	17,7
	180	46	2	335	0,24	2,8	4,2	560	2,8	1 800	2 400	23024 TNKW33	4,10
	180	46	2	365	0,22	3	4,6	610	2,8	2 000	2 600	23024 C	4,25
	180	46	2	365				610		2 000	2 600	23024 CA	
	180	46	2	335	0,24	2,8	4,2	560	2,8	1 800	2 400	23024 MB	4,20
	180	46	2	335	0,24	2,8	4,2	560	2,8	1 800	2 400	23024 MBW33	4,20
	180	46	2	335	0,24	2,8	4,2	560	2,8	1 800	2 400	23024 MBKW33	4,10
	180	60	2	450				800		1 500	2 000	24024 CA	
	180	60	2	450	0,32	2,1	3,1	800	2	1 500	2 000	24024 CAW33	5,40
	180	60	2	450	0,32	2,1	3,1	800	2	1 500	2 000	24024 CAK30W33	5,30
	180	60	2	410	0,32	2,1	3,1	740	2	1 400	1 800	24024 MB	5,12
	200	62	2	495	0,31	2,2	3,3	770	2,2	1 700	2 200	23124 MBW33	7,80
	200	62	2	495	0,31	2,2	3,3	770	2,2	1 700	2 200	23124 MBKW33	7,60
	200	80	2	630	0,4	1,7	2,5	1 050	1,6	1 000	1 300	24124 MBW33	10,2
	200	80	2	630	0,4	1,7	2,5	1 050	1,6	1 000	1 300	24124 MBK30W33	10,0
	215	58	2,1	560	0,29	2,3	3,5	800	2,3	1 700	2 200	22224 C	8,70
	215	58	2,1	560	0,29	2,3	3,5	800	2,3	1 700	2 200	22224 CW33	8,70
	215	58	2,1	560	0,29	2,3	3,5	800	2,3	1 700	2 200	22224 CKW33	8,60
	215	58	2,1	560				800		1 700	2 200	22224 CA	
	215	58	2,1	510	0,29	2,3	3,5	740	2,3	1 500	2 000	22224 MB	9,04
	215	76	2,1	730	0,35	1,9	2,9	1 120	1,8	1 300	1 700	23224 C	13,1
	215	76	2,1	730				1 120		1 300	1 700	23224 CA	
	215	76	2,1	670	0,37	1,8	2,7	1 020	1,8	1 100	1 500	23224 MB	12,0
	215	76	2,1	670	0,37	1,8	2,7	1 020	1,8	1 100	1 500	23224 MBW33	12,0
	215	76	2,1	670	0,37	1,8	2,7	1 020	1,8	1 100	1 500	23224 MBKW33	11,8
	260	86	3	1 010	0,35	1,9	2,9	1 340	1,8	1 300	1 700	22324 C	24,5
	260	86	3	930				1 340		1 300	1 700	22324 CA	
	260	86	3	930				1 230		1 100	1 500	22324 MAK4F80W33	23,4
	260	86	3	930				1 230		1 100	1 500	22324 MAC4F80W33	23,4
	260	86	3	930	0,36	1,8	2,7	1 230	1,8	1 100	1 500	22324 MB	22,0
	260	86	3	930	0,36	1,8	2,7	1 230	1,8	1 100	1 500	22324 MBW33	22,0
	260	86	3	930	0,36	1,8	2,7	1 230	1,8	1 100	1 500	22324 MBKW33	21,8
130	200	52	2	450	0,23	2,9	4,4	730	2,8	1 800	2 400	23026 C	4,59
	200	52	2	450				730		1 800	2 400	23026 CA	
	200	52	2	410	0,23	2,9	4,4	670	2,8	1 700	2 200	23026 MB	6,10

Spherical roller bearings



Dimensions			Basic radial load. Factors						Speed limit		Designation	Weight	
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		—	kg
140	200	52	2	410	0,23	2,9	4,4	670	2,8	1 700	2 200	23026 MBW33	6,10
	200	52	2	410	0,23	2,9	4,4	670	2,8	1 700	2 200	23026 MBKW33	6,00
	200	69	2	530	0,34	2,3	3	900	1,9	1 200	1 600	24026 MB	7,95
	200	69	2	530	0,34	2,3	3	900	1,9	1 200	1 600	24026 MBW33	7,95
	200	69	2	530	0,34	2,3	3	900	1,9	1 200	1 600	24026 MBK30W33	7,85
	210	64	2	590	0,28	2,4	3,6	940	2,5	1 700	2 200	23126 C	9,70
	210	64	2	590				940		1 700	2 200	23126 CA	
	210	64	2	540	0,3	2,3	3,3	860	2,2	1 500	2 000	23126 MB	8,55
	210	64	2	540	0,3	2,3	3,3	860	2,2	1 500	2 000	23126 MBW33	8,55
	210	64	2	540	0,3	2,3	3,3	860	2,2	1 500	2 000	23126 MBKW33	8,30
	210	64	2	540				860		1 500	2 000	23126 CA	
	210	64	2	540				860		1 500	2 000	24126 CA	
	210	80	2	650	0,37	1,8	2,7	1 100	1,8	900	1 200	24126 MBW33	11,0
	210	80	2	650	0,37	1,8	2,7	1 100	1,8	900	1 200	24126 MBK30W33	10,8
	230	64	3	660	0,29	2,3	3,5	960	2,3	1 700	2 200	22226 C	14,0
	230	64	3	660	0,29	2,3	3,5	960	2,3	1 700	2 200	22226 CW33	14,0
	230	64	3	660	0,29	2,3	3,5	960	2,3	1 700	2 200	22226 CKW33	13,8
	230	64	3	660				960		1 700	2 200	22226 CA	
	230	64	3	600	0,29	2,3	3,4	880	2,2	1 500	2 000	22226 MB	11,2
	230	80	3	830	0,33	2	3	1 270	2	1 300	1 700	23226 C	15,8
	230	80	3	830				1 270		1 300	1 700	23226 CA	
	230	80	3	760	0,33	2	3	1 170	2	1 100	1 500	23226 MB	14,0
	230	80	3	760	0,33	2	3	1 170	2	1 100	1 500	23226 MBW33	14,0
	230	80	3	760	0,33	2	3	1 170	2	1 100	1 500	23226 MBKW33	13,8
	280	93	4	1 170	0,35	1,9	2,9	1 580	1,8	1 200	1 600	22326 C	34,2
	280	93	4	1 170				1 580		1 200	1 600	22326 CA	
	280	93	4	1 080				1 450		1 100	1 400	22326 MAC4F80W33	29,2
	280	93	4	1 080	0,37	1,8	2,7	1 450	1,8	1 100	1 400	22326 MB	28,5
	280	93	4	1 080	0,37	1,8	2,7	1 450	1,8	1 100	1 400	22326 MBW33	28,5
	280	93	4	1 080	0,37	1,8	2,7	1 450	1,8	1 100	1 400	22326 MBKW33	28,3
	210	53	2	475	0,22	3	4,6	820	2,8	1 700	2 200	23028 C	7,20
	210	53	2	475				820		1 700	2 200	23028 CA	
	210	53	2	435	0,22	3	4,6	750	2,8	1 500	2 000	23028 MB	6,55
	210	53	2	435	0,22	3	4,6	750	2,8	1 500	2 000	23028 MBW33	6,55
	210	53	2	435	0,22	3	4,6	750	2,8	1 500	2 000	23028 MBK30W33	6,00
	210	69	2	435				750		1 500	2 000	24028 CA	
	210	69	2	550	0,32	2,1	3,1	990	2,1	1 100	1 500	24028 MBW33	8,45
	210	69	2	550	0,32	2,1	3,1	990	2,1	1 100	1 500	24028 MBK30W33	8,35
	225	68	2,1	660	0,28	2,4	3,6	1 080	2,5	1 500	2 000	23128 C	11,8
	225	68	2,1	660				1 080		1 500	2 000	23128 CA	
	225	68	2,1	600	3	2,3	3,3	990	2,2	1 400	1 800	23128 MB	10,5
	225	68	2,1	600	3	2,3	3,3	990	2,2	1 400	1 800	23128 MBW33	10,5
	225	68	2,1	600	0,3	2,3	3,3	990	2,2	1 400	1 800	23128 MBKW33	10,2
	225	85	2,1	740				1 280		850	1 100	24128 CA	
	225	85	2,1	740	0,37	1,8	2,7	1 280	1,8	850	1 100	24128 MBW33	13,2

Spherical roller bearings

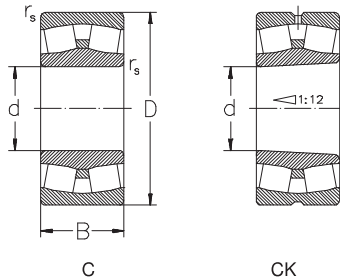


MB

MBK

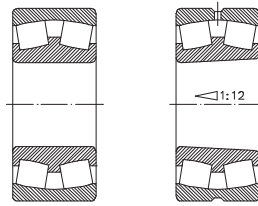
Dimensions				Basic radial load. Factors						Speed limit		Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		—	kg
150	225	85	2,1	740	0,37	1,8	2,7	1 280	1,8	850	1 100	24128 MBK30W33	13,0
	250	68	3	730	0,26	2,6	3,9	1 080	2,5	1 400	1 900	22228 C	14,4
	250	85	3	730				1 080		1 400	1 900	22228 CA	
	250	68	3	670	0,29	2,3	3,5	990	2,3	1 300	1 700	22228 MB	14,0
	250	68	3	670	0,29	2,3	3,5	990	2,3	1 300	1 700	22228 MBW33	14,0
	250	68	3	670	0,29	2,3	3,5	990	2,3	1 300	1 700	22228 MBKW33	13,8
	250	88	3	960	0,33	2	3	1 500	2	1 100	1 400	23228 C	20,8
	250	88	3	960				1 500		1 100	1 400	23228 CA	
	250	88	3	880	0,37	1,8	2,7	1 380	1,8	1 000	1 300	23228 MB	18,5
	250	88	3	880	0,37	1,8	2,7	1 380	1,8	1 000	1 300	23228 MBW33	18,5
	250	88	3	880	0,37	1,8	2,7	1 380	1,8	1 000	1 300	23228 MBKW33	18,2
	300	102	4	1 360	0,35	1,9	2,9	1 870	1,8	1 100	1 400	22328 C	45,7
	300	102	4	1 360				1 870		1 100	1 400	22328 CA	
	300	102	4	1 240				1 720		1 000	1 300	22328 MAC4F80W33	38,2
	300	102	4	1 240	0,38	1,7	2,6	1 720	1,7	1 000	1 300	22328 MB	34,5
	300	102	4	1 240	0,38	1,7	2,6	1 720	1,7	1 000	1 300	22328 MBW33	34,5
	300	102	4	1 240	0,38	1,7	2,6	1 720	1,7	1 000	1 300	22328 MBKW33	34,1
	225	56	2,1	520	0,22	3	4,6	900	2,8	1 500	2 000	23030 C	8,57
	225	56	2,1	520				900		1 500	2 000	23030 CA	
	225	56	2,1	480	0,22	3	4,6	830	2,8	1 400	1 800	23030 MB	7,95
	225	56	2,1	480	0,22	3	4,6	830	2,8	1 400	1 800	23030 MBW33	7,95
	225	56	2,1	480	0,22	3	4,6	830	2,8	1 400	1 800	23030 MBKW33	7,80
	225	56	2,1	480				830		1 400	1 800	23030 CA	
	225	75	2,1	620				1 140		1 100	1 400	24030 CA	
	225	75	2,1	620	0,33	2,1	3,1	1 140	2	1 100	1 400	24030 MB	10,5
	225	75	2,1	620	0,33	2,1	3,1	1 140	2	1 100	1 400	24030 MBW33	10,5
225	75	2,1	620	0,33	2,1	3,1	1 140	2	1 100	1 400	24030 MBK30W33	10,3	
250	100	2,1	1 080	0,37	1,8	2,7	1 840	1,8	850	1 100	24130 C	19,4	
250	100	2,1	1 080	0,4	1,7	2,5	1 840	1,6	850	1 100	24130 CA	19,5	
250	100	2,1	1 080	0,4	1,7	2,5	1 840	1,6	850	1 100	24130 CAW33	19,5	
250	100	2,1	1 080	0,4	1,7	2,5	1 840	1,6	850	1 100	24130 CAK30W33	19,1	
250	80	2,1	800				13240		1300	1 700	23130 CA		
250	80	2,1	800	0,32	2,1	3,2	1 320	2,1	1 300	1 700	23130 MB	16,3	
250	80	2,1	800	0,32	2,1	3,2	1 320	2,1	1 300	1 700	23130 MBW33	16,3	
250	80	2,1	800	0,32	2,1	3,2	1 320	2,1	1 300	1 700	23130 MBKW33	16,0	
270	73	3	880	0,26	2,6	3,9	1 300	2,5	1 400	1 800	22230 C	18,8	
270	73	3	880				1 300		1 400	1 800	22230 CA		
270	73	3	810	0,29	2,3	3,5	1 190	2,3	1 200	1 600	22230 MB	18,0	
270	73	3	810	0,29	2,3	3,5	1 190	2,3	1 200	1 600	22230 MBW33	18,0	
270	73	3	810	0,29	2,3	3,5	1 190	2,3	1 200	1 600	22230 MBKW33	17,71	
270	96	3	810				1 190		1 200	1 600	23230 CA		
270	96	3	1 030	0,38	1,8	2,7	1 610	1,7	1 000	1 300	23230 MB	24,5	
270	96	3	1 030	0,38	1,8	2,7	1 610	1,7	1 000	1 300	23230 MBW33	24,5	

Spherical roller bearings



Dimensions			Basic radial load. Factors						Speed limit			Designation	Weight
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		—	kg
160	270	96	3	1 030	0,38	1,8	2,7	1 610	1,7	1 000	1 300	23230 MBKW33	24,0
	320	108	4	1 520	0,35	1,9	2,9	2 110	1,8	1 100	1 400	22330 C	44,6
	320	108	4	1 520				2 110		1 100	1 400	22330 CA	
	320	108	4	1 450				1 940		1 000	1 300	22330 KMAC4F80W33	43,5
	320	108	4	1 400	0,38	1,7	2,6	1 940	1,7	1 000	1 300	22330 MB	43,5
	320	108	4	1 400	0,38	1,7	2,6	1 940	1,7	1 000	1 300	22330 MBW33	43,5
	320	108	4	1 400	0,38	1,7	2,6	1 940	1,7	1 000	1 300	22330 MBKW33	43,1
	240	60	2,1	610	0,22	3	4,6	1 060	2,8	1 400	1 900	23032 C	10,4
	240	60	2,1	610				1 060		1 400	1 900	23032 CA	
	240	60	2,1	560	0,22	3	4,6	970	2,8	1 300	1 700	23032 MB	9,70
	240	60	2,1	560	0,22	3	4,6	970	2,8	1 300	1 700	23032 MBW33	9,70
	240	60	2,1	560	0,22	3	4,6	970	2,8	1 300	1 700	23032 MBKW33	9,50
	240	80	2,1	720				1 320		1 000	1 300	24032 CA	
	240	80	2,1	720	0,32	2,1	3,1	1 320	2	1 000	1 300	24032 MB	13,3
	240	80	2,1	720	0,32	2,1	3,1	1 320	2	1 000	1 300	24032 MBW33	13,3
	240	80	2,1	720	0,32	2,1	3,1	1 320	2	1 000	1 300	24032 MBK30W33	13,0
	270	109	2,1	1 250	0,41	1,6	2,5	2 110	1,6	850	1 100	24132 C	25,5
	270	109	2,1	1 250	0,41	1,6	2,5	2 110	1,6	850	1 100	24132 CW33	25,5
	270	109	2,1	1 250				2 110		850	1 100	24132 CK30W33	
	270	86	2,1	1 010	0,3	2,3	3,4	1 640	2,2	1 400	1 800	24132 CA	22,9
	270	86	2,1	1 010				1 640		1 400	1 800	23132 C	
	270	86	2,1	930	0,32	2,1	3,2	1 510	2,1	1 200	1 600	23132 MB	20,5
	270	86	2,1	930	0,32	2,1	3,2	1 510	2,1	1 200	1 600	23132 MBW33	20,5
	270	86	2,1	930	0,32	2,1	3,2	1 510	2,1	1 200	1 600	23132 MBKW33	20,1
	290	104	3	1 180	0,38	1,8	2,7	1 830	1,7	900	1 200	23232 MB	31,7
	290	104	3	1 180	0,38	1,8	2,7	1 830	1,7	900	1 200	23232 MBW33	31,7
	290	104	3	1 180	0,38	1,8	2,7	1 830	1,7	900	1 200	23232 MBKW33	31,1
	290	80	3	1 040	0,26	2,6	3,9	1 550	2,5	1 300	1 700	22232 C	24,9
	290	80	3	1 040				1 550		1 300	1 700	22232 CA	
	290	80	3	950	0,29	2,3	3,4	1 420	2,3	1 100	1 500	22232 MB	23,3
	290	80	3	950	0,29	2,3	3,4	1 420	2,3	1 100	1 500	22232 MBW33	23,3
	290	80	3	950	0,29	2,3	3,4	1 420	2,3	1 100	1 500	22232 MBKW33	22,9
	340	114	4	1 660	0,35	1,9	2,9	2 350	1,8	1 000	1 300	22332 C	52,6
	340	114	4	1 660				2 350		1 000	1 300	22332 CA	
	340	114	4	1 520	0,37	1,8	2,7	2 160	1,8	900	1 200	22332 MA	50,5
	340	114	4	1 520	0,37	1,8	2,7	2 160	1,8	900	1 200	22332 MAC4F80W33	50,5
	340	114	4	1 520	0,37	1,8	2,7	2 160	1,8	900	1 200	22332 MB	50,8
	340	114	4	1 520	0,37	1,8	2,7	2 160	1,8	900	1 200	22332 MBW33	50,8
	340	114	4	1 520	0,37	1,8	2,7	2 160	1,8	900	1 200	22332 MBKW33	50,0
170	260	67	2,1	750	0,23	2,9	4,4	1 270	2,8	1 400	1 800	23034 C	14,2
	260	67	2,1	750				1 270		1 400	1 800	23034 CA	
	260	67	2,1	680	0,23	2,9	4,4	1 170	2,8	1 200	1 600	23034 MB	13,4
	260	67	2,1	680	0,23	2,9	4,4	1 170	2,8	1 200	1 600	23034 MBW33	13,4

Spherical roller bearings

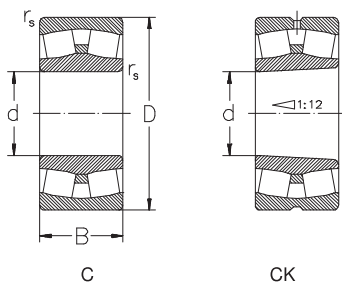


MB

MBK

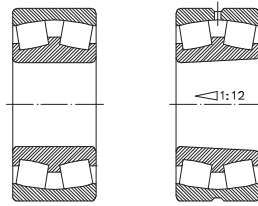
Dimensions				Basic radial load. Factors					Speed limit		Designation	Weight	
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease			oil
mm				kN	-			kN	-	min ⁻¹		kg	
180	260	67	2,1	680	0,23	2,9	4,4	1 170	2,8	1 200	1 600	23034 MBKW33	13,3
	260	90	2,1	680				1 170		1 200	1 600	24034 CA	
	260	90	2,1	880	0,34	2	3	1 610	2	1 000	1 300	24034 MB	17,7
	260	90	2,1	880	0,34	2	3	1 610	2	1 000	1 300	24034 MBW33	17,7
	260	90	2,1	880	0,34	2	3	1 610	2	1 000	1 300	24034 MBK30W33	17,2
	280	109	2,1	1 280	0,37	1,8	2,7	2 230	1,8	750	1 000	24134 C	27,3
	280	109	2,1	1 280	0,39	1,7	2,6	2 230	1,7	750	1 000	24134 CA	26,4
	280	109	2,1	1 280	0,39	1,7	2,6	2 230	1,7	750	1 000	24134 CAW33	26,4
	280	109	2,1	1 280	0,39	1,7	2,6	2 230	1,7	750	1 000	24134 CAK30W33	26,0
	280	88	2,1	1 080	0,3	2,3	3,4	1 800	2,2	1 300	1 700	23134 C	27,3
	280	88	2,1	1 080				1 800		1 300	1 700	23134 CA	
	280	88	2,1	990	0,31	2,2	3,2	1 650	2,1	1 100	1 500	23134 MB	22,3
	280	88	2,1	990	0,31	2,2	3,2	1 650	2,1	1 100	1 500	23134 MBW33	22,3
	280	88	2,1	990	0,31	2,2	3,2	1 650	2,1	1 100	1 500	23134 MBKW33	22,0
	310	110	4	1 460	0,35	1,9	2,9	2 320	1,8	900	1 200	23234 C	35,7
	310	110	4	1 460	0,35	1,9	2,9	2 320	1,8	900	1 200	23234 CA	37,2
	310	110	4	1 340	0,36	1,9	2,8	2 120	1,8	850	1 100	23234 MBW33	37,8
	310	110	4	1 340	0,36	1,9	2,8	2 120	1,8	850	1 100	23234 MBKW33	37,2
	310	86	4	1 170	0,27	2,5	3,7	1 750	2,5	1 200	1 600	22234 C	31,7
	310	86	4	1 170				1 750		1 200	1 600	22234 CA	
	310	86	4	1 080	0,3	2,3	3,4	1 610	2,2	1 100	1 400	22234 MB	28,9
	310	86	4	1 080	0,3	2,3	3,4	1 610	2,2	1 100	1 400	22234 MBW33	28,9
	310	86	4	1 080	0,3	2,3	3,4	1 610	2,2	1 100	1 400	22234 MBKW33	28,4
	360	120	4	1 850	0,33	2	3	2 590	2	900	1 200	22334 C	65,3
	360	120	4	1 850				2 590		900	1 200	22334 CA	
	360	120	4	1 690				2 380		850	1 100	22334 MAC4F80W33	59,0
	360	120	4	1 690	0,37	1,8	2,7	2 380	1,8	850	1 100	22334 MB	62,2
	360	120	4	1 690	0,37	1,8	2,7	2 380	1,8	850	1 100	22334 MBW33	62,2
	360	120	4	1 690	0,37	1,8	2,7	2 380	1,8	850	1 100	22334 MBKW33	60,2
	280	100	2,1	1 030	0,36	1,9	2,8	1 900	1,9	900	1 200	24036 MB	22,9
280	100	2,1	1 030	0,36	1,9	2,8	1 900	1,9	900	1 200	24036 MBW33	23,2	
280	100	2,1	1 030	0,36	1,9	2,8	1 900	1,9	900	1 200	24036 MBK30W33	23,0	
280	74	2,1	870	0,24	2,8	4,2	1 500	2,8	1 300	1 700	23036 C	19,8	
280	74	2,1	870				1 500		1 300	1 700	23036 CA		
280	74	2,1	800	0,24	2,8	4,2	1 380	2,8	1 100	1 500	23036 MB	17,6	
280	74	2,1	800	0,24	2,8	4,2	1 380	2,8	1 100	1 500	23036 MBW33	17,6	
280	74	2,1	800	0,24	2,8	4,2	1 380	2,8	1 100	1 500	23036 MBKW33	17,0	
300	118	3	1 460	0,4	1,7	2,5	2 590	1,6	700	950	24136 C	33,7	
300	118	3	1 460	0,4	1,7	2,5	2 590	1,6	700	950	24136 CW33	33,7	
300	118	3	1 460	0,4	1,7	2,5	2 590	1,6	700	950	24136 CK30W33	33,0	
300	118	3	1 460				2 590		700	950	24136 CA		
300	96	3	1 260	0,3	2,3	3,4	2 110	2,2	1 200	1 600	23136 C	30,6	
300	96	3	1 260				2 110		1 200	1 400	23136 CA		
300	96	3	1 160	0,32	2,1	3,1	1 940	2,1	1 100	1 400	23136 MB	28,4	

Spherical roller bearings



Dimensions				Basic radial load. Factors						Speed limit		Designation	Weight
d	D	B	r _s min.	d _{yn.} C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		—	kg
190	300	96	3	1 160	0,32	2,1	3,1	1 940	2,1	1 100	1 400	23136 MBW33	28,4
	300	96	3	1 160	0,32	2,1	3,1	1 940	2,1	1 100	1 400	23136 MBKW33	28,0
	300	96	3	1 160				1 940		1 100	1 400	23136 CA	
	320	112	3	1 420				2 330		750	1 000	23236 CA	
	320	112	3	1 420	0,36	1,9	2,8	2 330	1,8	750	1 000	23236 MBW33	40,8
	320	112	4	1 420	0,36	1,9	2,8	2 330	1,8	750	1 000	23236 MBKW33	40,1
	320	86	4	1 210	0,26	2,6	3,9	1 870	2,5	1 100	1 500	22236 C	33,1
	320	86	4	1 210				1 870		1 100	1 500	22236 CA	
	320	86	4	1 110	0,29	2,3	3,5	1 720	2,3	1 100	1 400	22236 MB	30,4
	320	86	4	1 110	0,29	2,3	3,5	1 720	2,3	1 100	1 400	22236 MBW33	30,4
	320	86	4	1 110	0,29	2,3	3,5	1 720	2,3	1 100	1 400	22236 MBKW33	29,4
	380	126	4	1 900				2 700		850	1 100	23336 CA	
	380	126	4	1 900				2 700		850	1 100	23336 MAC4F80W33	72,5
	380	126	4	1 900	0,37	1,8	2,7	2 700	1,8	850	1 100	23336 MB	69,0
	380	126	4	1 900	0,37	1,8	2,7	2 700	1,8	850	1 100	23336 MBW33	69,0
	380	126	4	1 900	0,37	1,8	2,7	2 700	1,8	850	1 100	23336 MBKW33	68,2
	290	100	2,1	1 080				1 980		850	1 100	24038 CA	
	290	100	2,1	1 080	0,34	2	3	1 980	2	850	1 100	24038 MB	24,8
	290	100	2,1	1 080	0,34	2	3	1 980	2	850	1 100	24038 MBW33	24,3
	290	100	2,1	1 080	0,34	2	3	1 980	2	850	1 100	24038 MBK30W33	24,0
	290	75	2,1	900	0,23	2,9	4,4	1 610	4,4	1 200	1 600	23038 C	19,8
	290	75	2,1	900				1 610		1 200	1 600	23038 CA	
	290	75	2,1	830	0,26	2,6	3,9	1 470	2,6	1 100	1 400	23038 MB	18,6
	290	75	2,1	830	0,26	2,6	3,9	1 470	2,6	1 100	1 400	23038 MBW33	18,6
	290	75	2,1	830	0,26	2,6	3,9	1 470	2,6	1 100	1 400	23038 MBKW33	18,0
	320	104	3	1 320				2 290		1 100	1 400	23138 CA	
	320	104	3	1 320	0,33	2	3	2 290	2	1 100	1 400	23138 MB	35,6
	320	104	3	1 320	0,33	2	3	2 290	2	1 100	1 400	23138 MBW33	35,6
	320	104	3	1 320	0,33	2	3	2 290	2	1 100	1 400	23138 MBKW33	35,0
	320	128	3	1 680	0,4	1,7	2,5	3 000	1,6	670	900	24138 CA	41,6
320	128	3	1 540	0,41	1,7	2,5	2 750	1,6	600	800	24138 MBW33	41,8	
320	128	3	1 540	0,41	1,7	2,5	2 750	1,6	600	800	24138 MBK30W33	41,2	
340	120	4	1 750	0,35	1,9	2,9	2 880	1,8	850	1 100	23238 C	52,4	
340	120	4	1 750				2 880		850	1 100	23238 CA		
340	120	4	1 610	0,36	1,9	2,8	2 640	1,8	750	1 000	23238 MB	48,9	
340	120	4	1 610	0,36	1,9	2,8	2 640	1,8	750	1 000	23238 MBW33	48,9	
340	120	4	1 610	0,36	1,9	2,8	2 640	1,8	750	1 000	23238 MBKW33	48,1	
340	92	4	1 330	0,26	2,6	3,9	2 040	2,5	1 100	1 400	22238 C	40,0	
340	92	4	1 330				2 040		1 100	1 400	22238 CA		
340	92	4	1 220	0,29	2,3	3,4	1 870	2,3	1 000	1 300	22238 MB	37,7	
340	92	4	1 220	0,29	2,3	3,4	1 870	2,3	1 000	1 300	22238 MBW33	37,7	
340	92	4	1 220	0,29	2,3	3,4	1 870	2,3	1 000	1 300	22238 MBKW33	37,2	
400	92	4	1 220				1 870		1 000	1 300	22338 CA		
400	132	5	2 060	0,37	1,8	2,7	2 920	1,8	750	1 000	22338 MB	84,8	

Spherical roller bearings

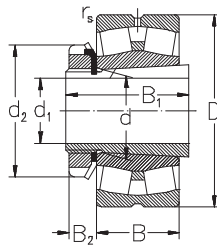


MB

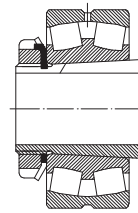
MBK

Dimensions				Basic radial load. Factors						Speed limit		Designation	Weight
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil		
mm				kN	-			kN	-	min ⁻¹		—	kg
200	400	132	5	2 060	0,37	1,8	2,7	2 920	1,8	750	1 000	22338 MBW33	84,8
	400	132	5	2 060	0,37	1,8	2,7	2 920	1,8	750	1 000	22338 MBKW33	83,0
	310	82	2,1	880				1 560		1 100	1 500	23040 CA	
	310	82	2,1	880	0,24	2,8	4,2	1 560	2,8	1 100	1 500	23040 CAW33	23,5
	310	82	2,1	880	0,24	2,8	4,2	1 560	2,8	1 100	1 500	23040 CAKW33	23,5
	340	112	3	1 370				2 460		1 100	1 400	23140 CA	
	340	112	3	1 370	0,35	1,9	2,9	2 460	1,9	1 100	1 400	23140 CAW33	43,5
	340	112	3	1 370	0,35	1,9	2,9	2 460	1,9	1 100	1 400	23140 CAKW33	43,5
	340	140	3	1 400				2 385		560	750	24140 CA	
	340	140	3	1 400	0,4	1,7	2,5	2 385	1,6	560	750	24140 MBW33	51,5
	340	140	3	1 400	0,4	1,7	2,5	2 385	1,6	560	750	24140 MBK30W33	51,5
	360	128	4	1 620				2 590		750	1 000	23240 CA	
	360	128	4	1 620	0,35	1,9	2,9	2 590	1,8	750	1 000	23240 MBW33	58,5
	360	128	4	1 620	0,35	1,9	2,9	2 590	1,8	750	1 000	23240 MBKW33	58,5
	360	98	4	1 250				2 020		1 100	1 400	22240 CA	
	360	98	4	1 250	0,29	2,3	3,4	2 020	2,3	1 100	1 400	22240 CAW33	45,0
	360	98	4	1 250	0,29	2,3	3,4	2 020	2,3	1 100	1 400	22240 CAKW33	45,0
220	420	138	5	1 910				2 750		670	900	22340 CA	
	420	138	5	1 910	0,36	1,8	2,8	2 750	1,8	670	900	22340 MBW33	95,0
	420	138	5	1 910	0,36	1,8	2,8	2 750	1,8	670	900	22340 MBKW33	95,0
	340	118	3	1 190				2 098		750	1 000	24044 CA	
	340	118	3	1 190	0,34	2	3	2 098	1,9	750	1 000	24044 MBW33	39,5
	340	118	3	1 190	0,34	2	3	2 098	1,9	750	1 000	24044 MBK30W33	39,5
	340	90	3	1 155				2 053		1 100	1 400	23044 CA	
	340	90	3	1 155	0,24	2,8	4,2	2 053	2,8	1 100	1 400	23044 CW33	30,5
	340	90	3	1 155	0,24	2,8	4,2	2 053	2,8	1 100	1 400	23044 CKW33	30,5
	340	90	3	1 090	0,24	2,8	4,2	1 890	2,8	1 100	1 400	23044 CAW33	31,0
	340	90	3	1 090	0,24	2,8	4,2	1 890	2,8	1 100	1 400	23044 CAKW33	31,0
	340	90	3	1 025	0,24	2,8	4,2	1 730	2,8	1 000	1 300	23044 MBW33	31,5
	340	90	3	1 025	0,24	2,8	4,2	1 730	2,8	1 000	1 300	23044 MBKW33	31,5
	370	120	4	1 455				2 380		900	1 200	23144 CA	
	370	120	4	1 455	0,3	2,3	3,4	2 380	2,2	900	1 200	23144 MBW33	54,5
	370	120	4	1 455	0,3	2,3	3,4	2 380	2,2	900	1 200	23144 MBKW33	54,5
	400	108	4	1 485				2 483		850	1 100	22244 CA	
	400	108	4	1 485	0,29	2,3	3,4	2 483	2,3	850	1 100	22244 MBW33	63,0
	400	108	4	1 485	0,29	2,3	3,4	2 483	2,3	850	1 100	22244 MBKW33	63,0
	400	144	4	1 850				2 899		600	800	23244 CA	
	400	144	4	1 850	0,35	1,9	2,9	2 899	1,8	600	800	23244 MBW33	82,5
	400	144	4	1 850	0,35	1,9	2,9	2 899	1,8	600	800	23244 MBKW33	82,5

Spherical roller bearings with adapter sleeve

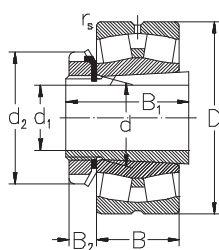


CK+H

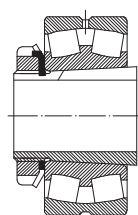


MBK+H

Dimensions								Designation	Adapter sleeve
d ₁	d	D	B	r _s min.	d ₂	B ₁	B ₂	Bearing	
mm								—	
35	40	80	23	1,1	58	36	10	22208 CK	H308
	40	90	23	1,5	58	36	10	21308 CK	H308
	40	90	33	1,5	58	46	10	22308 CK	H2308
40	45	85	23	1,1	65	39	11	22209 CK	H309
	45	100	25	1,5	65	39	11	21309 CK	H309
	45	100	36	1,5	65	50	11	22309 CK	H2309
45	50	90	23	1,1	70	42	12	22210 CK	H310
	50	110	27	2	70	42	12	21310 CK	H310
	50	110	40	2	70	55	12	22310 CK	H2310
50	55	100	25	1,5	75	45	12	22211 CK	H311
	55	120	29	2	75	45	12	21311 CK	H311
	55	120	43	2	75	59	12	22311 CK	H2311
55	60	110	28	1,5	80	47	13	22212 CK	H312
	60	130	31	2,1	80	47	13	21312 CK	H312
	60	130	46	2,1	80	62	13	22312 CK	H2312
60	65	120	31	1,5	85	50	14	22213 CK	H313
	65	140	33	2,1	85	50	14	21313 CK	H313
	65	140	48	2,1	85	65	14	22313 CK	H2313
	70	125	31	2,1	92	52	14	22214 CK	H314
	70	150	35	2,1	92	52	14	21314 CK	H314
	70	150	51	2,1	92	68	14	22314 CK	H2314
65	75	130	31	1,5	98	55	15	22215 CKW33	H315
	75	160	37	2,1	98	55	15	21315 CKW33	H315
	75	160	55	2,1	98	73	15	22315 CKW33	H2315
70	80	140	33	2	105	59	17	22216 CKW33	H316
	80	170	39	2,1	105	59	17	21316 CKW33	H316
	80	170	58	2,1	105	78	17	22316 MBKW33	H2316
75	85	150	36	2	110	63	18	22217 CKW33	H317
	85	180	41	3	110	63	18	21317 CK	H317
	85	180	60	3	110	82	18	22317 MBKW33	H2317
80	90	160	40	2	120	65	18	22218 CKW33	H318
	90	160	52,4	2	120	86	18	23218 MBK	H2318
	90	190	43	3	120	56	18	21318 CK	H318
	90	190	64	3	120	86	18	22318 CKW33	H2318
85	95	170	43	2,1	125	68	19	22219 MBKW33	H319
	95	200	45	3	125	68	19	21319 MBK	H319
	95	200	67	3	125	90	19	22319 MBKW33	H2319
90	100	180	46	2,1	130	71	20	22220 MBKW33	H320
	100	180	60,3	2,1	130	97	20	23220 MAKW33	H2320
	100	180	60,3	2,1	130	97	20	22320 TNKW33	H2320



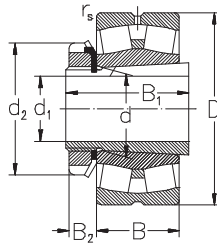
CK+H



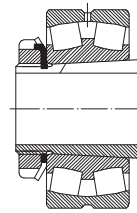
MBK+H

Basic radial load. Factors						Speed limit		Weight
dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil	
kN	—			kN	—	min ⁻¹		kg
88	0,31	2,2	3,2	98	2,1	4 800	6 300	0,699
99	0,26	2,6	3,9	120	2,6	4 500	6 000	0,889
140	0,4	1,6	2,5	145	1,6	4 300	5 600	1,22
93	0,3	2,3	3,4	105	2,2	4 500	6 000	0,798
120	0,26	2,6	3,9	135	2,6	4 000	5 300	1,19
165	0,4	1,7	2,5	190	1,6	3 800	5 000	1,58
100	0,26	2,6	3,9	120	2,5	4 000	5 300	0,903
120	0,24	2,8	4,1	130	2,7	3 600	4 800	1,50
190	0,4	1,7	2,5	220	1,6	3 400	4 500	2,16
120	0,27	2,5	3,8	140	2,5	3 800	5 000	1,15
135	0,24	2,8	4,1	155	2,7	3 200	4 300	1,95
230	0,4	1,7	2,5	265	1,6	3 000	4 000	2,72
145	1,27	2,5	3,7	175	2,4	3 400	4 500	1,49
150	0,24	2,9	4,3	180	2,8	3 000	4 000	2,29
270	0,4	1,7	2,5	320	1,7	2 800	3 800	3,33
180	0,28	2,4	3,6	220	2,4	3 000	4 000	1,86
220	0,24	2,8	4,2	290	2,8	2 800	3 800	2,86
305	0,39	1,7	2,6	360	1,7	2 800	3 600	4,01
180	0,26	2,6	3,9	225	2,6	2 800	3 800	2,22
250	0,23	2,9	4,4	310	2,9	2 600	3 400	3,72
375	0,38	1,8	2,6	455	1,7	2 400	3 200	5,20
190	0,24	2,8	4,1	250	2,7	2 800	3 800	2,43
280	0,23	2,9	4,4	360	2,9	2 400	3 200	4,33
415	0,38	1,8	2,6	520	1,7	2 200	3 000	6,20
210	0,25	2,6	4	275	2,6	2 600	3 400	3,08
310	0,23	2,9	4,4	400	2,9	2 200	3 000	5,23
410	0,25	2,6	4	500	2,6	1 800	2 400	7,38
250	0,26	2,6	3,9	325	2,6	2 400	3 200	3,68
350	0,22	3	4,5	450	2,9	2 200	2 800	6,18
460	0,37	1,8	2,7	570	1,8	1 700	2 200	8,65
305	0,27	2,5	3,8	410	2,5	2 200	3 000	4,57
340	0,34	2	3	485	2	1 500	2 000	6,19
385	0,22	3	4,5	510	2,9	2 200	2 800	7,07
570	0,36	1,9	2,8	730	1,8	1 800	2 400	10,2
310	0,26	2,6	3,8	415	2,5	2 000	2 600	5,56
385	0,22	3,1	4,6	530	3	1 800	2 400	8,56
570	0,38	1,8	2,7	740	1,7	1 500	2 000	11,9
340	0,27	2,5	3,7	455	2,4	2 000	2 600	6,49
455	0,33	2	3	660	2	1 500	2 000	8,65
455	0,33	2	3	660	2	1 500	2 000	8,65

Spherical roller bearings with adapter sleeve

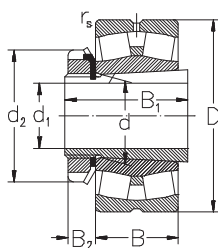


CK+H

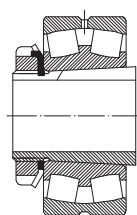


MBK+H

Dimensions							Designation		
d ₁	d	D	B	r _s min.	d ₂	B ₁	B ₂	Bearing	Adapter sleeve
mm							—		
90	100	215	47	3	130	71	20	21320 MBK	H320
	100	215	73	3	130	97	20	22320 CKW33	H2320
100	110	180	56	2	145	81	21	23122 MBKW33	H3122
	110	180	56	2	145	81	21	23122 TNKW33	H3122
	110	200	53	2,1	145	77	21	22222 MBKW33	H322
	110	200	69,8	2,1	145	105	21	23222 MBKW33	H2322
	110	240	50	3	145	77	21	21322 MBK	H322
	110	240	80	3	145	105	21	22322 CKW33	H2322
	110	240	80	3	145	105	21	22322 CKW33	H2322
110	120	180	46	2	145	72	22	23024 MBKW33	H3024
	120	180	46	2	145	72	22	23024 TNKW33	H3024
	120	200	62	2	155	88	22	23124 MBKW33	H3124
	120	215	58	2,1	155	88	22	22224 CKW33	H3124
	120	215	76	2,1	155	112	22	23224 MBKW33	H2324
	120	260	86	3	155	112	22	22324 MBKW33	H2324
	120	260	86	3	155	112	22	22324 MBKW33	H2324
115	130	200	52	2	155	80	23	23026 MBKW33	H3026
	130	210	64	2	165	92	23	23126 MBKW33	H3126
	130	230	64	3	165	92	23	22226 CKW33	H3126
	130	230	80	3	165	121	23	23226 MBKW33	H2326
	130	280	93	4	165	121	23	22326 MBKW33	H2326
	130	280	93	4	165	121	23	22326 MBKW33	H2326
125	140	210	53	2	165	82	24	23028 MBKW33	H3028
	140	225	68	2,1	180	97	24	23128 MBKW33	H3128
	140	250	68	3	180	97	24	22228 MBKW33	H3128
	140	250	88	3	180	131	24	23228 MBKW33	H2328
	140	300	102	4	180	131	24	22328 MBKW33	H2328
	140	300	102	4	180	131	24	22328 MBKW33	H2328
135	150	225	56	2,1	180	87	26	23030 MBKW33	H3030
	150	250	80	2,1	195	111	26	23130 MBKW33	H3130
	150	270	73	3	195	111	26	22230 MBKW33	H3130
	150	270	96	3	195	139	26	23230 MBKW33	H2330
	150	320	108	4	195	139	26	22330 MBKW33	H2330
	150	320	108	4	195	139	26	22330 MBKW33	H2330
140	160	240	60	2,1	190	93	28	23032 MBKW33	H3032
	160	270	86	2,1	210	119	28	23132 MBKW33	H3132
	160	290	104	3	210	147	28	23232 MBKW33	H2332
	160	290	80	3	210	119	28	22232 MBKW33	H3132
	160	340	114	4	210	147	28	22332 MBKW33	H2332
	160	340	114	4	210	147	28	22332 MBKW33	H2332
150	170	260	67	2,1	200	101	29	23034 MBKW33	H3034
	170	280	88	2,1	220	122	29	23134 MBKW33	H3134
	170	310	110	4	220	154	29	23234 MBKW33	H2334
	170	310	86	4	220	122	29	22234 MBKW33	H3134
	170	360	120	4	220	154	29	22334 MBKW33	H2334
160	180	280	74	2,1	210	109	30	23036 MBKW33	H3036
	180	300	96	3	230	131	30	23136 MBKW33	H3136
	180	320	112	4	230	161	30	23236 MBKW33	H2336



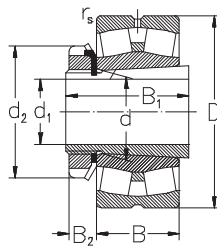
CK+H



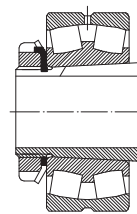
MBK+H

Basic radial load. Factors						Speed limit		Weight
dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil	
kN	—			kN	—	min ⁻¹		kg
425	0,22	3,1	4,7	580	3,1	1 700	2 200	9,99
730	0,37	1,8	2,7	960	1,7	1 500	2 000	15,2
410	0,3	2,3	3,3	640	2,2	1 800	2 400	7,75
410	0,3	2,3	3,3	640	2,2	1 800	2 400	7,75
540	0,28	2,4	3,5	700	2,3	1 700	2 200	9,18
570	0,33	2	3	840	2	1 200	1 600	12,2
510	0,21	3,2	4,8	690	3,2	1 500	2 000	13,9
870	0,37	1,8	2,7	1 160	1,8	1 400	1 900	20,2
335	0,24	2,8	4,2	560	2,8	1 800	2 400	6,03
335	0,24	2,8	4,2	560	2,8	1 800	2 400	6,03
495	0,31	2,2	3,3	770	2,2	1 700	2 200	10,2
560	0,29	2,3	3,5	800	2,3	1 700	2 200	11,2
670	0,37	1,8	2,7	1 020	1,8	1 100	1 500	15,0
930	0,36	1,8	2,7	1230	1,8	1 100	1 500	25,0
410	0,23	2,9	4,4	670	2,8	1 700	2 200	8,85
540	0,3	2,3	3,3	860	2,2	1 500	2 000	12,0
660	0,29	2,3	3,5	960	2,3	1 700	2 200	17,5
760	0,33	2	3	1 170	2	1 100	1 500	18,4
1 080	0,37	1,8	2,7	1 450	1,8	1 100	1 400	32,9
435	0,22	3	4,6	750	2,8	1 500	2 000	9,16
600	0,3	2,3	3,3	990	2,2	1 400	1 800	14,5
670	0,29	2,3	3,5	990	2,3	1 300	1 700	18,1
880	0,37	1,8	2,7	1 380	1,8	1 000	1 300	23,8
1 240	0,38	1,7	2,6	1 720	1,7	1 000	1 300	39,7
480	0,22	3	4,6	830	2,8	1 400	1 800	11,7
800	0,32	2,1	3,2	1 320	2,1	1 300	1 700	21,5
810	0,29	2,3	3,5	1 190	2,3	1 200	1 600	23,2
1 030	0,38	1,8	2,7	1 610	1,7	1 000	1 300	30,6
1 400	0,38	1,7	2,6	1 940	1,7	1 000	1 300	49,7
560	0,22	3	4,6	970	2,8	1 300	1 700	14,7
930	0,32	2,1	3,2	1 510	2,1	1 200	1 600	27,8
1 180	0,38	1,8	2,7	1 830	1,7	900	1 200	40,2
950	0,29	2,3	3,4	1 420	2,3	1 100	1 500	30,6
1 520	0,37	1,8	2,7	2 160	1,8	900	1 200	59,1
680	0,23	2,9	4,4	1 170	2,8	1 200	1 600	19,3
990	0,31	2,2	3,2	1 650	2,1	1 100	1 500	30,4
1 340	0,36	1,9	2,8	2 120	1,8	850	1 100	47,4
1 080	0,3	2,3	3,4	1 610	2,2	1 100	1 400	36,8
1 690	0,37	1,8	2,7	2 380	1,8	850	1 100	70,4
800	0,24	2,8	4,2	1 380	2,8	1 100	1 500	23,8
1 160	0,32	2,1	3,1	1 940	2,1	1 100	1 400	37,5
1 420	0,36	1,9	2,8	2 330	1,8	750	1 000	51,4

Spherical roller bearings with adapter sleeve

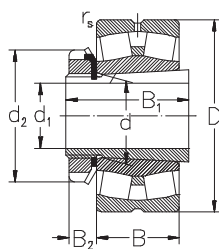


CK+H

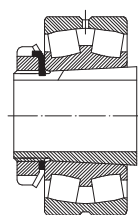


MBK+H

Dimensions								Designation	Adapter sleeve
d ₁	d	D	B	r _s min.	d ₂	B ₁	B ₂	Bearing	
mm								—	
160	180	320	86	4	230	131	30	22236 MBKW33	H3136
	180	380	126	4	230	161	30	22336 MBKW33	H2336
170	190	290	75	2,1	220	112	31	23038 MBKW33	H3038
	190	320	104	3	240	141	31	23138 MBKW33	H3138
	190	340	120	4	240	169	31	23238 MBKW33	H2338
	190	340	92	4	240	141	31	22238 MBKW33	H3138
	190	400	132	5	240	169	31	22338 MBKW33	H2338
180	200	310	82	2,1	240	120	32	23040 CAKW33	H3040
	200	340	112	3	250	150	32	23140 CAKW33	H3140
	200	360	128	4	250	176	32	23240 MBKW33	H2340
	200	360	98	4	250	150	32	22240 CAKW33	H3140
	200	420	138	5	250	176	32	22340 MBKW33	H2340
200	220	340	90	3	260	126	30	23044 CAKW33	H3044H
	220	340	90	3	260	126	30	23044 CKW33	H3044
	220	340	90	3	260	126	30	23044 MBKW33	H3044
	220	370	120	4	280	161	35	23144 MBKW33	H3144
	220	400	108	4	280	161	35	22244 MBKW33	H3144
	220	400	144	4	280	186	35	23244 MBKW33	H2344



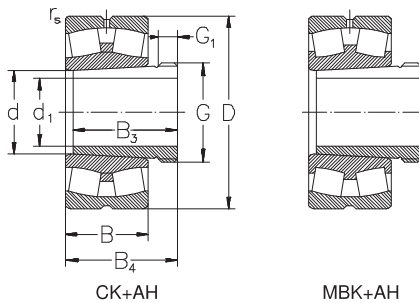
CK+H



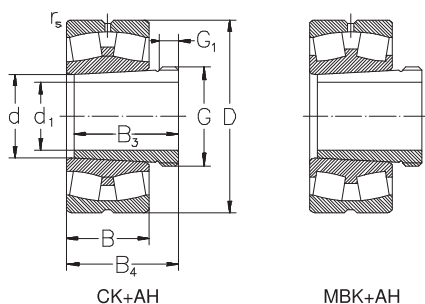
MBK+H

Basic radial load. Factors						Speed limit		Weight
dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil	
kN	—			kN	—	min ⁻¹		kg
1 110	0,29	2,3	3,5	1 720	2,3	1 100	1 400	38,9
1 900	0,37	1,8	2,7	2 700	1,8	850	1 100	79,5
830	0,26	2,6	3,9	1 470	2,6	1 100	1 400	25,5
1 320	0,33	2	3	2 290	2	1 100	1 400	45,8
1 610	0,36	1,9	2,8	2 640	1,8	750	1 000	60,7
1 220	0,29	2,3	3,4	1 870	2,3	1 000	1 300	48,0
2 060	0,37	1,8	2,7	2 920	1,8	750	1 000	95,6
880	0,24	2,8	4,2	1 560	2,8	1 100	1 500	32,69
1 370	0,35	1,9	2,9	2 460	1,9	1 100	1 400	55,6
1 620	0,35	1,9	2,9	2 590	1,8	750	1 000	72,4
1 250	0,29	2,3	3,4	2 020	2,3	1 100	1 400	57,1
1 910	0,36	1,8	2,8	2 750	1,8	670	900	108,9
1 090	0,24	2,8	4,2	1 890	2,8	1 100	1 400	41,3
1 155	0,24	2,8	4,2	2 053	2,8	1 100	1 400	40,8
1 025	0,24	2,8	4,2	1 730	2,8	1 000	1 300	41,8
1 455	0,3	2,3	3,4	2 380	2,2	900	1 200	69,2
1 485	0,29	2,3	3,4	2 483	2,3	850	1 100	77,7
1 850	0,35	1,9	2,9	2 899	1,8	600	800	99,2

Spherical roller bearings with withdrawal sleeve

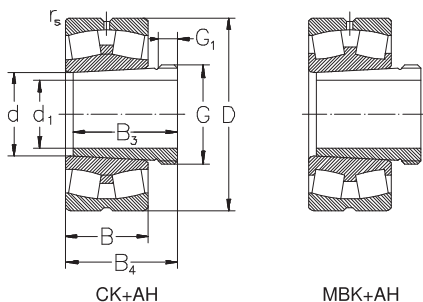


Dimensions									Designation Bearing	Withdrawal sleeve
d ₁	d	D	B	r _s min.	G	G ₁	B ₃	B ₄		
mm									—	
35	40	80	23	1,1	M45× 1,5	6	29	32	22208 CK	AH308
	40	90	23	1,5	M45× 1,5	6	29	32	21308 CK	AH308
	40	90	33	1,5	M45× 1,5	7	40	43	22308 CK	AH2308
40	45	85	23	1,1	M50× 1,5	6	31	34	22209 CK	AH309
	45	100	25	1,5	M50× 1,5	6	31	34	21309 CK	AH309
	45	100	36	1,5	M50× 1,5	7	44	47	22309 CK	AH2309
45	50	90	23	1,1	M55× 2	7	35	38	22210 CK	AH310
	50	110	27	2	M55× 2	7	35	38	21310 CK	AH310
	50	110	40	2	M55× 2	9	50	53	22310 CK	AH2310
50	55	100	25	1,5	M60× 2	7	37	40	22211 CK	AH311
	55	120	29	2	M60× 2	7	37	40	21311 CK	AH311
	55	120	43	2	M60× 2	10	54	57	22311 CK	AH2311
55	60	110	28	1,5	M65× 2	8	40	43	22212 CK	AH312
	60	130	31	2,1	M65× 2	8	40	43	21312 CK	AH312
	60	130	46	2,1	M65× 2	11	58	61	22312 CK	AH2312
60	65	120	31	1,5	M75× 2	8	42	45	22213 CK	AH313
	65	140	33	2,1	M75× 2	8	42	45	21313 CK	AH313
	65	140	48	2,1	M75× 2	12	61	64	22313 CK	AH2313
65	70	125	31	2,1	M80× 2	8	43	47	22214 CK	AH314
	70	150	35	2,1	M80× 2	8	43	47	21314 CK	AH314
	70	150	51	2,1	M80× 2	12	64	68	22314 CK	AH2314
70	75	130	31	1,5	M85× 2	8	45	49	22215 CKW33	AH315
	75	160	37	2,1	M85× 2	8	45	49	21315 CKW33	AH315
	75	160	55	2,1	M85× 2	12	68	72	22315 CKW33	AH2315
75	80	140	33	2	M90× 2	8	48	52	22216 CKW33	AH316
	80	170	39	2,1	M90× 2	8	48	52	21316 CKW33	AH316
	80	170	58	2,1	M90× 2	12	71	75	22316 MBKW33	AH2316
80	85	150	36	2	M95× 2	9	52	56	22217 CKW33	AH317
	85	180	41	3	M95× 2	9	52	56	21317 CK	AH317
	85	180	60	3	M95× 2	13	74	78	22317 MBKW33	AH2317
85	90	160	40	2	M100× 2	9	53	57	22218 CKW33	AH318
	90	160	52,4	2	M100× 2	10	63	67	23218 MBK	AH3218
	90	190	43	3	M100× 2	9	53	57	21318 CK	AH318
	90	190	64	3	M100× 2	14	79	83	22318 CKW33	AH2318
90	95	170	43	2,1	M105× 2	10	57	61	22219 MBKW33	AH319
	95	200	45	3	M105× 2	10	57	61	21319 MBK	AH319
	95	200	67	3	M105× 2	16	85	89	22319 MBKW33	AH2319
95	100	165	52	2	M110× 2	11	64	68	2312 MBK	AH3120
	100	180	46	2,1	M110× 2	10	59	63	22220 MBKW33	AH320
	100	180	60,3	2,1	M110× 2	11	73	77	23220 MAKW33	AH3220

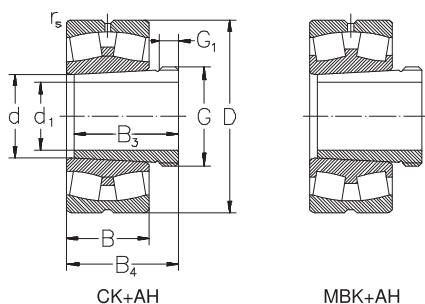


Basic radial load. Factors						Speed limit		Weight
dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil	
kN	—			kN	—	min ⁻¹		kg
88	0,31	2,2	3,2	98	2,1	4 800	6 300	0,600
99	0,26	2,6	3,9	120	2,6	4 500	6 000	0,790
140	0,4	1,6	2,5	145	1,6	4 300	5 600	1,13
93	0,3	2,3	3,4	105	2,2	4 500	6 000	0,659
120	0,26	2,6	3,9	135	2,6	4 000	5 300	1,05
165	0,4	1,7	2,5	190	1,6	3 800	5 000	1,46
100	0,26	2,6	3,9	120	2,5	4 000	5 300	0,737
120	0,24	2,8	4,1	130	2,7	3 600	4 800	1,34
190	0,4	1,7	2,5	220	1,6	3 400	4 500	2,01
120	0,27	2,5	3,8	140	2,5	3 800	5 000	0,961
135	0,24	2,8	4,1	155	2,7	3 200	4 300	1,76
230	0,4	1,7	2,5	265	1,6	3 000	4 000	2,55
145	1,27	2,5	3,7	175	2,4	3 400	4 500	1,29
150	0,24	2,9	4,3	180	2,8	3 000	4 000	2,09
270	0,4	1,7	2,5	320	1,7	2 800	3 800	3,15
180	0,28	2,4	3,6	220	2,4	3 000	4 000	1,65
220	0,24	2,8	4,2	290	2,8	2 800	3 800	2,65
305	0,39	1,7	2,6	360	1,7	2 800	3 600	3,85
180	0,26	2,6	3,9	225	2,6	2 800	3 800	1,78
250	0,23	2,9	4,4	310	2,9	2 600	3 400	3,28
375	0,38	1,8	2,6	455	1,7	2 400	3 200	4,77
190	0,24	2,8	4,1	250	2,7	2 800	3 800	1,91
280	0,23	2,9	4,4	360	2,9	2 400	3 200	3,81
415	0,38	1,8	2,6	520	1,7	2 200	3 000	5,68
210	0,25	2,6	4	275	2,6	2 600	3 400	2,42
310	0,23	2,9	4,4	400	2,9	2 200	3 000	4,57
410	0,25	2,6	4	500	2,6	1 800	2 400	6,70
250	0,26	2,6	3,9	325	2,6	2 400	3 200	2,93
350	0,22	3	4,5	450	2,9	2 200	2 800	5,43
460	0,37	1,8	2,7	570	1,8	1 700	2 200	7,87
305	0,27	2,5	3,8	410	2,5	2 200	3 000	3,66
340	0,34	2	3	485	2	1 500	2 000	5,07
385	0,22	3	4,5	510	2,9	2 200	2 800	6,16
570	0,36	1,9	2,8	730	1,8	1 800	2 400	9,28
310	0,26	2,6	3,8	415	2,5	2 000	2 600	4,53
385	0,22	3,1	4,6	530	3	1 800	2 400	7,53
570	0,38	1,8	2,7	740	1,7	1 500	2 000	10,9
355	0,31	2,2	3,2	540	2,1	2 000	2 800	5,05
340	0,27	2,5	3,7	455	2,4	2 000	2 600	5,38
455	0,33	2	3	660	2	1 500	2 000	7,27

Spherical roller bearings with withdrawal sleeve

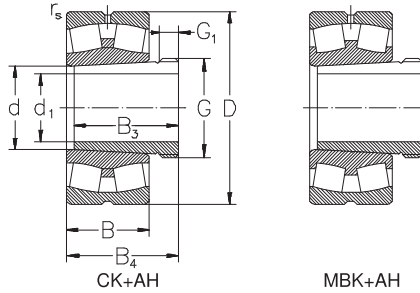


Dimensions									Designation	Withdrawal
d ₁	d	D	B	r _s min.	G	G ₁	B ₃	B ₄	Bearing	sleeve
mm									—	
95	100	180	60,3	2,1	M110×2	11	73	77	23220 TNKW33	AH3220
	100	215	47	3	M110×2	10	59	63	21320 MBK	AH320
	100	215	73	3	M110×2	16	90	94	22320 CKW33	AH2320
105	110	180	56	2	M120×2	11	68	72	23122 MBKW33	AH3122
	110	180	56	2	M120×2	11	68	72	23122 TNKW33	AH3122
	110	180	69	2	M115×2	13	82	91	24122 CAK30W33	AH24122
	110	200	53	2,1	M120×2	11	68	72	22222 MBKW33	AH3122
	110	200	69,8	2,1	M125×2	11	82	86	23222 MBKW33	AH3222
	110	240	50	3	M120×2	11	68	72	21322 MBK	AH322
	110	240	80	3	M125×2	16	98	102	22322 CKW33	AH2322
	120	180	46	2	M130×2	13	60	64	23024 MBKW33	AH3024
	120	180	46	2	M130×2	13	60	64	23024 TNKW33	AH3024
	120	180	60	2	M125×2	13	73	82	24024 CAK30W33	AH24024
115	120	200	62	2	M130×2	12	75	79	23124 MBKW33	AH3124
	120	200	80	2	M130×2	13	93	102	24124 MBK30W33	AH24124
	120	215	58	2,1	M125×2	12	75	79	22224 CKW33	AH3124
	120	215	76	2,1	M135×2	13	90	94	23224 MBKW33	AH3224
	120	260	86	3	M135×2	17	105	109	22324 MBKW33	AH2324
	130	200	52	2	M140×2	14	67	71	23026 MBKW33	AH3026
	130	200	69	2	M135×2	14	83	93	24026 MBK30W33	AH24026
	130	210	64	2	M140×2	12	78	82	23126 MBKW33	AH3126
	130	210	80	2	M140×2	14	94	104	24126 MBK30W33	AH24126
	130	230	64	3	M140×2	12	78	82	22226 CKW33	AH3126
125	130	230	80	3	M145×2	15	98	102	23226 MBKW33	AH3226
	130	280	93	4	M145×2	19	115	119	22326 MBKW33	AH2326
	140	210	53	2	M150×2	14	68	73	23028 MBKW33	AH3028
	140	210	69	2	M145×2	14	83	93	24028 MBK30W33	AH24028
	140	225	68	2,1	M150×2	14	83	88	23128 MBKW33	AH3128
	140	225	85	2,1	M150×2	14	99	109	24128 MBK30W33	AH24128
	140	250	68	3	M150×2	14	83	88	22228 MBKW33	AH3128
	140	250	88	3	M155×3	15	104	109	23228 MBKW33	AH3228
	140	300	102	4	M155×3	20	125	130	22328 MBKW33	AH2328
	150	225	56	2,1	M160×3	15	72	77	23030 MBKW33	AH3030
145	150	225	75	2,1	M155×3	15	90	101	24030 MBK30W33	AH24030
	150	250	100	2,1	M160×3	15	115	126	24130 CAK30W33	AH24130
	150	250	80	2,1	M165×3	15	96	101	23130 MBKW33	AH3130
	150	270	73	3	M165×3	15	96	101	22230 MBKW33	AH3130
	150	270	96	3	M165×3	17	114	119	23230 MBKW33	AH3230
	150	320	108	4	M165×3	24	135	140	22330 MBKW33	AH2330
	160	240	60	2,1	M170×3	16	77	82	23032 MBKW33	AH3032
	160	240	80	2,1	M170×3	15	95	106	24032 MBK30W33	AH24032

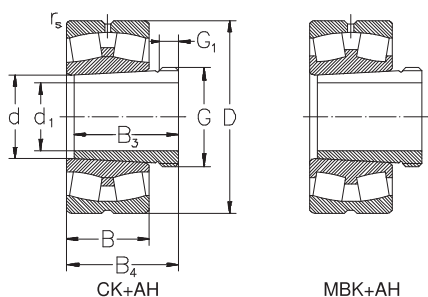


Basic radial load. Factors						Speed limit		Weight
dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil	
kN	—			kN	—	min ⁻¹		kg
455	0,33	2	3	660	2	1 500	2 000	7,27
425	0,22	3,1	4,7	580	3,1	1 700	2 200	8,88
730	0,37	1,8	2,7	960	1,7	1 500	2 000	14,0
410	0,3	2,3	3,3	640	2,2	1 800	2 400	6,26
410	0,3	2,3	3,3	640	2,2	1 800	2 400	6,26
550	0,39	1,7	2,6	900	1,7	1 200	1 600	7,53
540	0,28	2,4	3,5	700	2,3	1 700	2 200	8,04
570	0,33	2	3	840	2	1 200	1 600	10,2
510	0,21	3,2	4,8	690	3,2	1 500	2 000	12,4
870	0,37	1,8	2,7	1 160	1,8	1 400	1 900	18,9
335	0,24	2,8	4,2	560	2,8	1 800	2 400	4,85
335	0,24	2,8	4,2	560	2,8	1 800	2 400	4,85
450	0,32	2,1	3,1	800	2	1 500	2 000	5,95
495	0,31	2,2	3,3	770	2,2	1 700	2 200	8,55
630	0,4	1,7	2,5	1 050	1,6	1 000	1 300	11,0
560	0,29	2,3	3,5	800	2,3	1 700	2 200	9,55
670	0,37	1,8	2,7	1 020	1,8	1 100	1 500	13,1
930	0,36	1,8	2,7	1 230	1,8	1 100	1 500	23,4
410	0,23	2,9	4,4	670	2,8	1 700	2 200	6,93
530	0,34	2	3	900	1,9	1 200	1 600	8,69
540	0,3	2,3	3,3	860	2,2	1 500	2 000	9,38
650	0,37	1,8	2,7	1 100	1,8	900	1 200	11,9
660	0,29	2,3	3,5	960	2,3	1 700	2 200	14,9
760	0,33	2	3	1 170	2	1 100	1 500	15,4
1 080	0,37	1,8	2,7	1 450	1,8	1 100	1 400	30,3
435	0,22	3	4,6	750	2,8	1 500	2 000	7,01
550	0,32	2,1	3,1	990	2,1	1 100	1 500	9,26
600	0,3	2,3	3,3	990	2,2	1 400	1 800	11,5
740	0,37	1,8	2,7	1 280	1,8	850	1 100	14,2
670	0,29	2,3	3,5	990	2,3	1 300	1 700	15,1
880	0,37	1,8	2,7	1 380	1,8	1 000	1 300	20,0
1 240	0,38	1,7	2,6	1 720	1,7	1 000	1 300	36,4
480	0,22	3	4,6	830	2,8	1 400	1 800	8,95
620	0,33	2,1	3,1	1 140	2	1 100	1 400	11,3
1 080	0,4	1,7	2,5	1 840	1,6	850	1 100	20,7
800	0,32	2,1	3,2	1 320	2,1	1 300	1 700	17,8
810	0,29	2,3	3,5	1 190	2,3	1 200	1 600	19,5
1 030	0,38	1,8	2,7	1 610	1,7	1 000	1 300	26,2
1 400	0,38	1,7	2,6	1 940	1,7	1 000	1 300	45,9
560	0,22	3	4,6	970	2,8	1 300	1 700	11,6
720	0,32	2,1	3,1	1 320	2	1 000	1 300	15,3

Spherical roller bearings with withdrawal sleeve



Dimensions									Designation	Withdrawal
d ₁	d	D	B	r _s min.	G	G ₁	B ₃	B ₄	Bearing	sleeve
mm									—	
150	160	270	109	2,1	M170×3	15	124	135	24132 CK30W33	AH24132
	160	270	86	2,1	M180×3	16	103	108	23132 MBKW33	AH3132
	160	290	104	3	M180×3	20	124	130	23232 MBKW33	AH3232
	160	290	80	3	M180×3	16	103	108	22232 MBKW33	AH3132
	160	340	114	4	M180×3	24	140	146	22332 MBKW33	AH2332
160	170	260	67	2,1	M180×3	17	85	90	23034 MBKW33	AH3034
	170	260	90	2,1	M180×3	16	106	117	24034 MBK30W33	AH24034
	170	280	109	2,1	M180×3	16	125	136	24134 CAK30W33	AH24134
	170	280	88	2,1	M190×3	16	104	109	23134 MBKW33	AH3134
	170	310	110	4	M190×3	24	134	140	23234 MBKW33	AH3234
	170	310	86	4	M190×3	16	104	109	22234 MBKW33	AH3134
	170	360	120	4	M190×3	24	146	152	22334 MBKW33	AH2334
	180	280	100	2,1	M190×3	16	116	127	24036 MBK30W33	AH24036
	180	280	74	2,1	M190×3	17	92	98	23036 MBKW33	AH3036
	180	300	118	3	M190×3	16	134	145	24136 CK30W33	AH24136
170	180	300	96	3	M200×3	19	116	122	23136 MBKW33	AH3136
	180	320	112	4	M200×3	24	140	146	23236 MBKW33	AH3236
	180	320	86	4	M200×3	17	105	110	22236 MBKW33	AH2236H
	180	380	126	4	M200×3	26	154	160	22336 MBKW33	AH2336
	190	290	100	2,1	M200×3	18	118	131	24038 MBK30W33	AH24038
	190	290	75	2,1	Tr205×4	18	96	102	23038 MBKW33	AH3038
	190	320	104	3	Tr210×4	20	125	131	23138 MBKW33	AH3138
	190	320	128	3	M200×3	18	146	159	24138 MBK30W33	AH24138
	190	340	120	4	Tr210×4	25	145	152	23238 MBKW33	AH3238
	190	340	92	4	Tr210×4	18	112	117	22238 MBKW33	AH2238
180	190	400	132	5	Tr210×4	26	160	167	22338 MBKW33	AH2338
	200	310	82	2,1	Tr215×4	19	102	108	23040 CAKW33	AH3040
	200	340	112	3	Tr220×4	21	134	140	23140 CAKW33	AH3140
	200	340	140	3	Tr210×4	18	158	171	24140 MBK30W33	AH24140
	200	360	128	4	Tr220×4	25	153	160	23240 MBKW33	AH3240
	200	360	98	4	Tr220×4	19	118	123	22240 CAKW33	AH2240
	200	420	138	5	Tr220×4	30	170	177	22340 MBKW33	AH2340
	220	340	118	3	Tr230×4	20	138	152	24044 MBK30W33	AH24044H
	220	340	90	3	Tr235×4	20	111	117	23044 CAKW33	AH3044H
	220	340	90	3	Tr235×4	20	111	117	23044 CKW33	AH3044H
200	220	340	90	3	Tr235×4	20	111	117	23044 MBKW33	AH3044H
	220	370	120	4	Tr240×4	23	145	151	23144 MBKW33	AH3144H
	220	400	108	4	Tr240×4	23	145	151	22244 MBKW33	AH3144H
	220	400	144	4	Tr240×4	30	181	189	23244 MBKW33	AH3244H



Basic radial load. Factors						Speed limit		Weight
dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil	
kN	—			kN	—	min ⁻¹		kg
1 250	0,41	4,6	2,5	2 110	1,6	850	1 100	28,1
930	0,32	2,1	3,2	1 510	2,1	1 200	1 600	23,3
1 180	0,38	1,8	2,7	1 830	1,7	900	1 200	35,2
950	0,29	2,3	3,4	1 420	2,3	1 100	1 500	26,1
1 520	0,37	1,8	2,7	2 160	1,8	900	1 200	54,7
680	0,23	2,9	4,4	1 170	2,8	1 200	1 600	15,7
880	0,34	2	3	1 610	2	1 000	1 300	20,0
1 280	0,39	1,7	2,6	2 230	1,7	750	1 000	29,2
990	0,31	2,2	3,2	1 650	2,1	1 100	1 500	25,4
1 340	0,36	1,9	2,8	2 120	1,8	850	1 100	42,0
1 080	0,3	2,3	3,4	1 610	2,2	1 100	1 400	31,8
1 690	0,37	1,8	2,7	2 380	1,8	850	1 100	65,5
1 030	0,36	1,9	2,8	1 900	1,9	900	1 200	26,1
800	0,24	2,8	4,2	1 380	2,8	1 100	1 500	19,8
1 460	0,4	1,7	2,5	2 590	1,6	700	950	36,7
1 160	0,32	2,1	3,1	1 940	2,1	1 100	1 400	32,2
1 420	0,36	1,9	2,8	2 330	1,8	750	1 000	45,4
1 110	0,29	2,3	3,5	1 720	2,3	1 100	1 400	33,2
1 900	0,37	1,8	2,7	2 700	1,8	850	1 100	74,0
1 080	0,34	2	3	1 980	2	850	1 100	27,5
830	0,26	2,6	3,9	1 470	2,6	1 100	1 400	21,3
1 320	0,33	2	3	2 290	2	1 100	1 400	39,9
1 540	0,41	1,7	2,5	2 750	1,6	600	800	45,5
1 610	0,36	1,9	2,8	2 640	1,8	750	1 000	54,0
1 220	0,29	2,3	3,4	1 870	2,3	1 000	1 300	41,5
2 060	0,37	1,8	2,7	2 920	1,8	750	1 000	89,4
880	0,24	2,8	4,2	1 560	2,8	1 100	1 500	27,3
1 370	0,35	1,9	2,9	2 460	1,9	1 100	1 400	48,99
1 400	0,4	1,7	2,5	2 385	1,6	560	750	56,6
1 620	0,35	1,9	2,9	2 590	1,8	750	1 000	65,18
1 250	0,29	2,3	3,4	2 020	2,3	1 100	1 400	49,68
1 910	0,36	1,8	2,8	2 750	1,8	670	900	102,54
1 190	0,34	2	3	2 098	1,9	750	1 000	47,75
1 090	0,24	2,8	4,2	1 890	2,8	1 100	1 400	38,4
1 155	0,24	2,8	4,2	2 053	2,8	1 100	1 400	37,9
1 025	0,24	2,8	4,2	1 730	2,8	1 000	1 300	38,9
1 455	0,3	2,3	3,4	2 380	2,2	900	1 200	64,9
1 485	0,29	2,3	3,4	2 483	2,3	850	1 100	72,3
1 850	0,35	1,9	2,9	2 899	1,8	600	800	96,0



Tapered roller bearings



Tapered roller bearings

Tapered roller bearings have the rolling elements under the form of frustra of cones. They roll on tapered surfaces which, if extended, converge towards a single point on the bearing axis.

The rollers are guided tangentially by the cage and axially by the big rib of the outer ring, on which they have point contact. As between rollers and raceways there is

linear contact, tapered roller bearings can take heavy radial loads. They can also take heavy axial or combined loads, depending on the contact angle caused by the tapered rolling elements. The contact angle is the angle of the outer raceway generatrix.

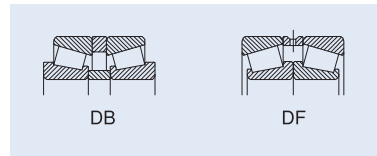
Tapered roller bearings can be manufactured in the versions : single, double and four row rollers.

Basic types and constructive versions:

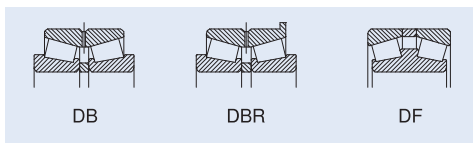
- single row



- paired



- double row



Suffixes

- | | | | |
|-------------|---|-------------|---|
| A | - increased basic load | J | - pressed cage of not hardened steel sheet |
| A... | - axial clearance of bearing set | K | - tapered bore 1:12 |
| B | - enlarged contact angle | M | - machined brass cage |
| DB | - set of two bearings mounted in back-to-back arrangement (O) | P6X | - tolerance class with smaller values than normal |
| DF | - set of two bearings mounted in face-to-face arrangement (X) | P5 | - tolerance class with smaller values than P6X |
| DF | - bearings with double row of rollers in face-to-face arrangement (X) | P4 | - tolerance class with smaller values than P5 |
| F | - machined cage of hardened steel or special cast iron | P2 | - tolerance class with smaller values than P4 |
| F2 | - constructive modifications | R | - rib on the outer ring |
| F32 | - bearings with double row rollers in face-to-face arrangement, without distance ring between the outer rings | S0 | - operating temperature up to +150°C |
| | | S1 | - operating temperature up to +200°C |
| | | T... | - bearing set width |
| | | TN | - polyamide cage |
| | | W6 | - keygroove on the bore |
| | | W7 | - locating hole on the outer ring |

- W28** - helical groove on bore surface
W67 - locating groove on the inner ring face
- W69** - keygroove on the bore and locating ring on the inner ring face
- X** - modified main dimensions according to ISO

Single row tapered roller bearings

Single row tapered roller bearings are of separable design, i.e. the outer ring and the inner ring with rollers and cage assembly can be separately mounted. These two assemblies are interchangeable.

Tapered roller bearings can be manufactured both in standardized constructive versions with dimensions series 320, 302, 322, 303, 323, 313 and with non-standardized dimensions, mm or inch.

Tapered roller bearings can carry only single direction axial loads. Under pure radial loads, an axial force occurs which is supposed to distance the bearing rings in axial direction. Therefore, tapered roller bearings are generally pair mounted on both ends of the shaft, in "X" or "O" arrangements, so that the shaft will be axially located in both directions (table 4). Thus, the optimum clearance in these two bearings can be adjusted.

Single row tapered roller bearings can also be manufactured with rib on the outer ring. This design is to be used when the housing cannot be manufactured with shoulder, but only with a passed through bore. In this case, axial location can be provided by the bearing ring.

Paired single row tapered roller bearings

If tapered roller bearings are pair mounted in "X" or "O" arrangements, the load carrying capacity increases and loads can be taken in both directions in the same bearing.

These bearing sets have guaranteed clearance after mounting since the distance rings are mounted between the bearing rings.

For certain applications, paired bearings can be delivered with small clearance or lightly preloaded.

Double row tapered roller bearings

Double row tapered roller bearings are used where load carrying capacity should be greater, loads should be taken in both directions and axial space is smaller than in case of a set of two single row tapered roller bearings.

Double row tapered roller bearings can have the rollers in face- to-face arrangement, double inner ring and two outer rings respectively or the rollers in back-to-back arrangement, i.e. double outer ring and two inner rings.

The first design provides greater stiffness, can take tilting moments and shaft expansions can be compensated.

The bearings of the second design can be manufactured with tapered bore so that they can be frequently mounted /dismounted.

Double row tapered roller bearings can have or not

distance rings with lubrication holes, mounted between the simple rings.

In case of bearings with distance rings, the bearing clearance or preload are pre-adjusted; in case of those without distance rings, bearing clearance and preload can and should be adjusted while mounting.

Double row tapered roller bearings with rollers in back-to-back arrangement can also be manufactured in the following two versions:

- with rib on the outer ring; the housing has no shoulder and the bearing is axially located by the rib
- with two seals; this design is used in motor vehicles construction. The bearings are delivered filled with grease and relubrication is not needed.

Dimensions

Tapered roller bearings are manufactured with the following dimensions:

- metric dimensions (mm), according to ISO 355;
- inch dimensions

Misalignment

As between rollers and raceway there is a linear contact, tapered roller bearings have low capacity to compensate for errors of alignment between shaft and housing.

Permissible values of misalignment between shaft and housing are given in table 1, depending on bearing size and load magnitude.

Permissible misalignment

Table 1

Bearing series	Load magnitude	Permissible t misalignmen
329, 320, 302, 322, 303, 313	Fr/C0r < 0,1 Fr/C0r > 0,1	2' 4'
323, 34	Fr/C0r < 0,1 Fr/C0r > 0,1	1'30" 3'
35, 36 seturi DB, DF	Fr/C0r < 0,1 Fr/C0r > 0,1	1' 2'

Tolerances

Tapered roller bearings are generally manufactured to the normal tolerance class ISO and AFBMA, respectively (for bearings with inch dimensions).

For certain applications (e.g. bearings for machine-tools), they can be also manufactured to tolerance classes P5 and P6X or 3 AFBMA.

At request, they can be manufactured to tolerance class P4.

Single row tapered roller bearings have the outer rings interchangeable with the inner ring - rollers - cage assembly (if they have the same mark) and also with bearings produced by other companies, according to ISO and

AFBMA respectively.

The parts of the two and four row tapered roller bearings are non-interchangeable.

The tolerances for bearings overall dimensions are given in tables on page 24 for tapered roller bearings, both with metric and inch dimensions. Tolerances for mounting chamfer are given in tables on page 41.

Radial and axial clearance

In case of tapered roller bearings, clearance should be in radial direction, but it is measured and adjusted in axial direction. As tapered roller bearings are dismountable, their clearance is not guaranteed by design and it is adjusted while mounting. Thus, optimum clearance can be obtained for that application.

In case of double and four row tapered roller bearings with distance rings between bearing rings, the clearance is guaranteed and its values are given in table 2. The bearing parts are numbered for each bearing so that the prescribed clearance on each row should be observed while mounting.

In case of bearings without distance rings, clearance is adjusted as for single row tapered roller bearings: for DB design - by the inner rings and for DF design by the outer rings. The above specifications are also available for bearings matched in sets.

The values of the axial clearance can be calculated using the equation:

$$\text{axial clearance} = \frac{\text{radial clearance}}{2 \operatorname{tg} \alpha}$$

where α is the contact angle.

In case of certain applications where clearance between shaft and housing should be avoided, tapered roller bearings can also be pre-tightened. This can be adjusted while mounting or is pre-adjusted by distance rings, in case of two or four row tapered roller bearings.

Contact angle

Contact angle of tapered roller bearings is the angle of the outer ring raceway generatrix. In case of standardized single row tapered roller bearings, this angle can be found in the standard of dimensions (ISO 355 and national standard STAS 3920 respectively). Bearings series 329, 302, 322, 303 and 323 have a contact angle between 10° and 17° and those of series 313 have a contact angle of 28° 48' 39", so that they can take heavier axial loads. Non-standardized single row tapered roller bearings and also all double and four-row tapered roller bearings have the contact angle between 9° and 30°.

Cages

Small and medium sized tapered roller bearings are generally fitted with pressed sheet cages. Large sized bearings are generally fitted with machined steel or brass cages, with welded pins. In some cases, median or large sized bearings can also be fitted with machined steel or brass cages. In all cases, the cage is guided on rollers.

Radial clearance of double tapered roller bearings

Table 2

Bore diameter d		Radial clearance symbol C1		C2		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		μm											
50	65	0	15	15	30	30	50	50	70	70	90	90	120
65	80	0	20	20	40	40	60	60	80	80	110	110	150
80	100	0	20	20	45	45	70	70	100	100	130	130	170
100	120	0	25	25	50	50	80	80	110	110	150	150	200
120	140	0	30	30	60	60	90	90	120	120	170	170	230
140	160	0	30	30	65	65	100	100	140	140	190	190	260
160	180	0	35	35	70	70	110	110	150	150	210	210	280
180	200	0	40	40	80	80	120	120	170	170	230	230	310
200	225	0	40	40	90	90	140	140	190	190	260	260	340
225	250	0	50	50	100	100	150	150	210	210	290	290	380
250	280	0	50	50	110	110	170	170	230	230	320	320	420
280	315	0	60	60	120	120	180	180	250	250	350	350	460
315	355	0	70	70	140	140	210	210	280	280	390	390	510
355	400	0	70	70	150	150	230	230	310	310	440	440	580
400	450	0	80	80	170	170	260	260	350	350	490	490	650
450	500	0	90	90	190	190	290	290	390	390	540	540	720
500	560	0	100	100	210	210	320	320	430	430	590	590	790
560	630	0	110	110	230	230	350	350	480	480	660	660	880
630	710	0	130	130	260	260	400	400	540	540	740	740	910
710	800	0	140	140	290	290	450	450	610	610	830	830	1 100
800	900	0	160	160	330	330	500	500	670	670	920	920	1 240

For small and medium sized bearings, glass fibre reinforced polyamide 6.6 cages can be successfully used if the operating temperature doesn't exceed +120°C. They have low weight, are noiseless in operation and have low coefficient of friction.

Designs and some technical data are given in table 3.

Equivalent dynamic radial load

Equivalent dynamic radial load can be calculated using the following equations:

- for single row tapered roller bearings:

$$P_r = F_r, \text{ kN}, \quad \text{when } F_a/F_r \leq e$$
$$P_r = 0,4 F_r + Y F_a, \text{ kN}, \text{ when } F_a/F_r > e$$

- for paired bearings and double or four-row tapered roller bearings:

$$P_r = F_r + Y_1 F_a, \text{ kN}, \quad \text{when } F_a/F_r \leq e$$
$$P_r = 0,67 F_r + Y_2 F_a, \text{ kN}, \text{ when } F_a/F_r > e$$

For single row tapered roller bearings, the F_a values can be calculated using the equations in table 4. These equations are available when bearings are mounted so that axial clearance is in fact zero without preloading. F_{rA} and F_{rB} should always be considered as being positive, even if they act in the opposite direction to that in the figure.

In case of paired bearings and of double or four row tapered roller bearings, F_a and F_r are the loads acting upon the paired bearings or single bearings.

The values of e , Y , Y_1 and Y_2 are given in bearing tables.

Equivalent static radial load

Equivalent static radial load can be calculated using the equations:

- for single row tapered roller bearings:

$$P_{0r} = F_r, \text{ kN}, \quad \text{when } F_a/F_r \leq 1/2 Y_0$$
$$P_{0r} = 0,5 F_r + Y_0 F_a, \text{ kN}, \text{ when } F_a/F_r > 1/2 Y_0$$

- for paired double or four row tapered roller bearings

$$P_{0r} = F_r + Y_0 F_a, \text{ kN}$$

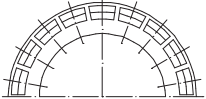
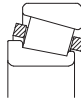
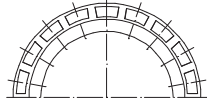
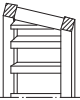
F_a is calculated as in case of equivalent dynamic radial load. The values of Y_0 are given in bearing tables.

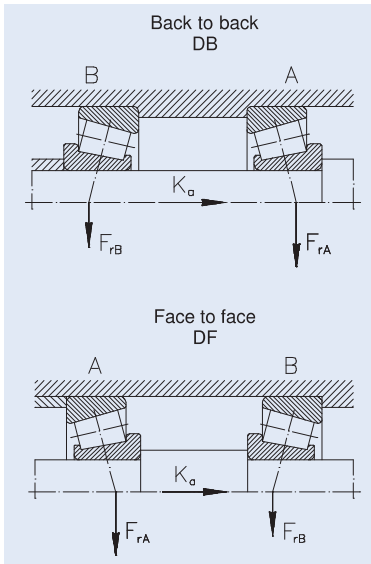
Abutment dimensions

The mounting dimensions of tapered roller bearings are given in the bearings tables, for single row tapered roller bearings. These dimensions are also available for bearings with ribs and for standardized paired bearings. For the other types of tapered roller bearings, the mounting dimensions should be adapted depending on the cross section size and mounting chamfer.

Cage designs and some technical data

Table 3

Cage	Design Bearing	Cage	Application	Max. value $D_m n$ oil	grease
Pressed sheet cage				- General application - Small and medium sized bearings $d \leq 250 \text{ mm}$	350×10^3 245×10^3
Machined brass cage M				- General application - Median and large sized bearings $d > 150 \text{ mm}$	450×10^3 315×10^3

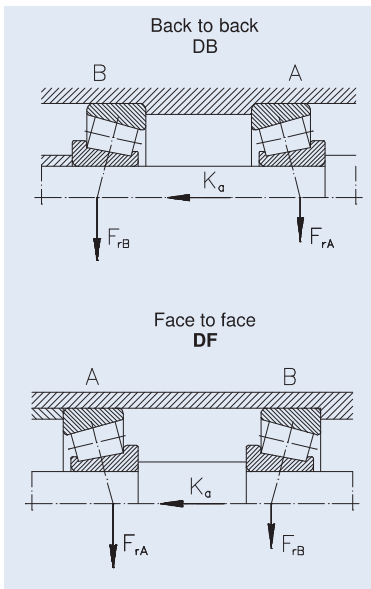


Loading versions Axial load

1a) $\frac{F_{rA}}{Y_A} \geq \frac{F_{rB}}{Y_B} \quad F_{aA} = \frac{0,5 F_{rA}}{Y_A}$
 $K_a \geq 0 \quad F_{aB} = F_{aA} + K_a$

1b) $\frac{F_{rA}}{Y_A} < \frac{F_{rB}}{Y_B} \quad F_{aA} = \frac{0,5 F_{rA}}{Y_A}$
 $K_a \geq 0,5 \left(\frac{F_{rB}}{Y_B} - \frac{F_{rA}}{Y_A} \right) \quad F_{aB} = F_{aA} + K_a$

1c) $\frac{F_{rA}}{Y_A} < \frac{F_{rB}}{Y_B} \quad F_{aA} = F_{aB} - K_a$
 $K_a < 0,5 \left(\frac{F_{rB}}{Y_B} - \frac{F_{rA}}{Y_A} \right) \quad F_{aB} = \frac{0,5 F_{rB}}{Y_B}$

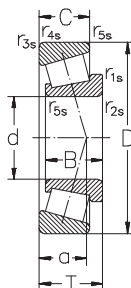


2a) $\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B} \quad F_{aA} = F_{aB} + K_a$
 $K_a \geq 0 \quad F_{aB} = \frac{0,5 F_{rB}}{Y_B}$

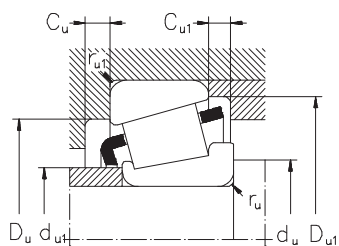
2b) $\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B} \quad F_{aA} = F_{aB} + K_a$
 $K_a \geq 0,5 \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B} \right) \quad F_{aB} = \frac{0,5 F_{rB}}{Y_B}$

2c) $\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B} \quad F_{aA} = \frac{0,5 F_{rA}}{Y_A}$
 $K_a < 0,5 \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B} \right) \quad F_{aB} = F_{aA} - K_a$

Tapered roller bearings, single row

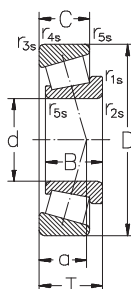


Dimensions					Designation				ISO series	Basic radial load. Factors					
d	D	B	C	T	r1s, r2s min.	r3s, r4s min.	r5s	a		dyn. Cr	e	Y	stat. C0r	Y0	
mm										kN			kN		
15	42	13	11	14,25	1	1	0,3	9	30302 A	2FB	21,5	0,28	2,1	19,8	1,1
17	40	12	11	13,25	1	1	0,3	10	30203 A	2DB	18,3	0,35	1,7	190,9	
	47	14	12	15,25	1	1	0,3	10	30303 A	2FB	26	0,28	2,1	24,5	1,1
	47	19	16	20,25	1	1	0,3	12	32303 A	2FD	34	0,28	2,1	35,5	1,1
20	42	15	12	15	0,6	0,6	0,3	10	32004 XA	3CC	26	0,37	1,6	28,5	0,9
	47	14	12	15,25	1	1	0,3	11	30204 A	2DB	25,8	0,35	1,7	26,4	0,9
	52	15	13	16,25	1,5	1,5	0,6	11	30304 A	2FB	32	0,3	2	32,1,1	
	52	21	18	22,25	1,5	1,5	0,6	14	32304 A	2FD	42,5	0,3	2	47,1,1	
25	47	15	11,5	15	0,6	0,6	0,3	11	32005 XA	4CC	26	0,43	1,4	33,5	0,8
	52	15	13	16,25	1	1	0,3	12	30205 A	3CC	30,1	0,37	1,6	32,9	0,9
	52	18	15	19,25	1	1	0,3	16	32205 A	2CD	31	0,33	1,8	37,1	
	62	17	15	18,25	1,5	1,5	0,6	13	30305 A	2FB	43	0,3	2	43,1,1	
	62	17	13	18,25	1,5	1,5	0,6	20	31305 A	7FB	39	0,83	0,7	410,4	
	62	24	20	25,25	1,5	1,5	0,6	15	32305 A	2FD	58,3	0,3	2	60,3	1,1
30	55	17	13	17	1	1	0,3	13	32006 XA	4CC	34	0,43	1,4	45,5	0,8
	62	16	14	17,25	1	1	0,3	14	30206 A	3DB	40,5	0,37	1,6	45,1	0,9
	62	20	17	21,25	1	1	0,3	15	32206 A	3DC	49	0,37	1,6	610,9	
	72	19	16	20,75	1,5	1,5	0,6	15	30306 A	2FB	52,9	0,31	1,9	51,8	1,1
	72	19	14	20,75	1,5	1,5	0,6	22	31306 A	7FB	46,5	0,83	0,7	49,5	0,4
	72	27	23	28,75	1,5	1,5	0,6	18	32306 A	2FD	75,8	0,31	1,9	82,7	1,1
35	62	18	14	18	1	1	0,3	15	32007 XA	4CC	35,9	0,46	1,3	52,4	0,7
	72	17	15	18,25	1,5	1,5	0,6	15	30207 A	3DB	50,5	0,37	1,6	54,7	0,9
	72	23	19	24,25	1,5	1,5	0,6	17	32207 A	3DC	66,2	0,37	1,6	77,5	0,9
	80	21	18	22,75	2	2	0,6	16	30307 A	2FB	71,2	0,31	1,9	72,5	1,1
	80	21	15	22,75	2	2	0,6	25	31307 A	7FB	58,1	0,83	0,7	640,4	
	80	31	25	32,75	2	2	0,6	20	32307 A	2FE	95,3	0,31	1,9	106	1,1
40	68	19	14,5	19	1	1	0,3	15	32008 XA	3CD	48,8	0,37	1,6	65,6	0,9
	80	18	16	19,75	1,5	1,5	0,6	16	30208 A	3DB	57,9	0,37	1,6	62,4	0,9
	80	23	19	24,75	1,5	1,5	0,6	19	32208 A	3DC	66,2	0,37	1,6	79,5	0,9
	90	23	20	25,25	2	2	0,6	19	30308 A	2FB	83,9	0,35	1,7	91,3	0,9
	90	23	17	25,25	2	2	0,6	28	31308 A	7FB	74,6	0,83	0,7	60,8	0,4
	90	33	27	35,25	2	2	0,6	23	32308 A	2FD	105	0,35	1,7	122	0,9
45	75	20	15,5	20	1	1	0,3	16	32009 XA	3CC	57	0,4	1,5	82,2	0,8
	85	19	16	20,75	1,5	1,5	0,6	18	30209 A	3DB	60,1	0,4	1,5	67,1	0,8
	85	23	19	24,75	1,5	1,5	0,6	20	32209 A	3DC	76,5	0,4	1,5	91,6	0,8
	100	25	22	27,25	2	2	0,6	21	30309 A	2FB	106	0,35	1,7	118	0,9
	100	25	18	27,25	2	2	0,6	31	31309 A	7FB	88,9	0,83	0,7	97,1	0,4
	100	36	30	38,25	2	2	0,6	25	32309 A	2FD	133	0,35	1,7	159	0,9
50	80	20	15,5	20	1	1	0,3	18	32010 XA	3CC	58,5	0,43	1,4	88,5	0,8

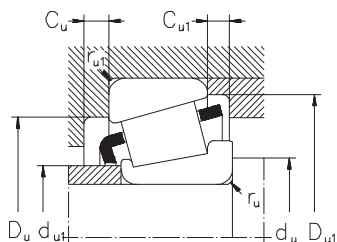


Speed limit		Weight	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		kg	mm								
9 000	13 000	0,090	22	21	36	36	38	2	3	1	1
9 000	13 000	0,074	23	23	34	34	37	2	2	1	1
8 500	12 000	0,130	25	23	40	41	42	2	3	1	1
8 000	11 000	0,170	24	23	39	41	43	3	4	1	1
8 500	12 000	0,097	25	25	36	37	39	3	3	0,6	0,6
8 000	11 000	0,120	27	26	40	41	43	2	3	1	1
8 000	11 000	0,170	28	27	44	45	47	2	3	1,5	1,5
7 500	10 000	0,221	27	27	43	45	47	3	4	1,5	1,5
8 000	11 000	0,113	30	30	40	42	44	3	3,5	0,6	0,6
7 500	10 000	0,150	31	31	44	46	48	2	3	1	1
7 500	10 000	0,182	31	31	44	46	48	3	4	1	1
6 700	9 000	0,250	34	32	54	55	57	2	3	1,5	1,5
5 600	7 500	0,255	34	32	47	55	59	3	5	1,5	1,5
6 000	8 000	0,360	33	32	53	55	57	3	5	1,5	1,5
6 700	9 000	0,017	35	36	48	49	52	3	4	1	1
6 300	8 500	0,220	37	36	53	56	57	2	3	1	1
6 300	8 500	0,280	37	36	52	56	59	3	4	1	1
5 600	7 500	0,380	40	37	62	65	66	3	4,5	1,5	1,5
5 000	6 700	0,390	40	37	55	65	68	3	6,5	1,5	1,5
5 300	7 000	0,550	39	37	59	65	66	4	5,5	1,5	1,5
6 000	8 000	0,220	40	41	54	56	59	4	4	1	1
5 300	7 000	0,320	44	42	62	65	67	3	3	1,5	1,5
5 300	7 000	0,420	43	42	61	65	67	3	5,5	1,5	1,5
5 000	6 700	0,520	45	44	70	71	74	3	4,5	2	1,5
4 500	6 000	0,520	44	44	62	71	76	4	7,5	2	1,5
4 800	6 300	0,730	44	44	66	71	74	4	7,5	2	1,5
5 300	7 000	0,270	46	46	60	62	65	4	4,5	1	1
4 800	6 300	0,420	49	47	69	73	74	3	3,5	1,5	1,5
4 800	6 300	0,510	48	47	68	73	75	3	5,5	1,5	1,5
4 500	6 000	0,700	52	49	77	81	82	3	5	2	1,5
4 000	5 300	0,685	51	49	71	81	86	4	8	2	1,5
4 000	5 300	0,993	50	49	73	81	82	4	8	2	1,5
4 800	6 300	0,330	51	51	67	69	72	4	4,5	1	1
4 500	6 000	0,470	54	52	74	78	80	3	4,5	1,5	1,5
4 500	6 000	0,560	53	52	73	78	80	3	5,5	1,5	1,5
4 000	5 300	0,920	59	54	86	91	92	3	5	2	1,5
3 400	4 500	0,915	56	54	79	91	95	4	9	2	1,5
3 600	4 800	1,25	56	54	82	91	93	4	8	2	1,5
4 500	6 000	0,360	56	56	72	74	77	4	4,5	1	1

Tapered roller bearings, single row

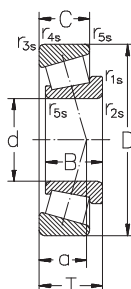


Dimensions					Designation					ISO series	Basic radial load. Factors				
d	D	B	C	T	r1s,r2s min.		r3s,r4s min.		r5s	a	dyn. Cr	e	Y	stat. C0r	Y0
mm										—	kN	—		kN	—
50	90	20	17	21,75	1,5	1,5	0,6	19	30210 A	3DB	69,7	0,43	1,4	81,3	0,8
	90	23	19	24,75	1,5	1,5	0,6	21	32210 A	3DC	79,1	0,43	1,4	95,8	0,8
	110	27	23	29,25	2,5	2	0,6	23	30310 A	2FB	120	0,35	1,7	133	0,9
	110	27	19	29,25	2,5	2	0,6	34	31310 A	7FB	102	0,83	0,7	112	0,4
	110	40	33	42,25	2,5	2	0,6	27	32310 A	2FD	160	0,35	1,7	194	0,9
55	90	23	17,5	23	1,5	1,5	0,6	20	32011 XA	3CC	77	0,4	1,5	117	0,8
	100	21	18	22,75	2	1,5	0,6	20	30211 A	3DB	83	0,4	1,5	95,2	0,8
	100	25	21	26,75	2	1,5	0,6	22	32211 A	3DC	96,2	0,4	1,5	115	0,8
	120	29	25	31,5	2,5	2	0,6	24	30311 A	2FB	146	0,35	1,7	166	0,9
	120	29	21	31,5	2,5	2	0,6	37	31311 A	7FB	118	0,83	0,7	133	0,4
	120	43	35	45,5	2,5	2	0,6	29	32311 A	2FD	191	0,35	1,7	235	0,9
	120	43	35	45,5	2,5	2	0,6	29	32311 A	2FD	191	0,35	1,7	235	0,9
60	95	23	17,5	23	1,5	1,5	0,6	21	32012 XA	4CC	78,5	0,43	1,4	119	0,8
	110	22	19	23,75	2	1,5	0,6	22	30212 A	3EB	91,6	0,4	1,5	105	0,8
	110	28	24	29,75	2	1,5	0,6	24	32212 A	3EC	122	0,4	1,5	152	0,8
	130	31	26	33,5	3	2,5	1	26	30312 A	2FB	164	0,35	1,7	187	0,9
	130	31	22	33,5	3	2,5	1	39	31312 A	7FB	140	0,83	0,7	158	0,4
	130	46	37	48,5	3	2,5	1	31	32312 A	2FD	229	0,35	1,7	288	0,9
	130	46	37	48,5	3	2,5	1	31	32312 A	2FD	229	0,35	1,7	288	0,9
65	100	23	17,5	23	1,5	1,5	0,6	22	32013 XA	4CC	80,6	0,46	1,3	123	0,7
	120	23	20	24,75	2	1,5	0,6	23	30213 A	3EB	111	0,4	1,5	129	0,8
	120	31	27	32,75	2	1,5	0,6	27	32213 A	3EC	149	0,4	1,5	189	0,8
	140	33	28	36	3	2,5	1	28	30313 A	2GB	191	0,35	1,7	220	0,9
	140	33	23	36	3	2,5	1	42	31313 A	7GB	164	0,83	0,7	189	0,4
	140	48	39	51	3	2,5	1	33	32313 A	2GO	256	0,35	1,7	322	0,9
	140	48	39	51	3	2,5	1	33	32313 A	2GO	256	0,35	1,7	322	0,9
70	110	25	19	25	1,5	1,5	0,6	23	32014 XA	4CC	95,6	0,43	1,4	143	0,8
	125	24	21	26,25	2	1,5	0,6	25	30214 A	3EB	119	0,43	1,4	143	0,8
	125	31	27	33,25	2	1,5	0,6	28	32214 A	3EC	157	0,43	1,4	204	0,8
	150	35	30	38	3	2,5	1	29	30314 A	2GB	224	0,35	1,7	264	0,9
	150	35	25	38	3	2,5	1	45	31314 A	7GB	185	0,83	0,7	215	0,4
	150	51	42	54	3	2,5	1	36	32314 A	2GD	297	0,35	1,7	381	0,9
	150	51	42	54	3	2,5	1	36	32314 A	2GD	297	0,35	1,7	381	0,9
75	115	25	19	25	1,5	1,5	0,6	25	32015 XA	4CC	97,3	0,46	1,3	149	0,7
	130	25	22	27,25	2	1,5	0,6	27	30215 A	4DB	134	0,43	1,4	166	0,8
	130	31	27	33,25	2	1,5	0,6	29	32215 A	4DC	157	0,43	1,4	205	0,8
	160	37	31	40	3	2,5	1	31	30315 A	2GB	246	0,35	1,7	289	0,9
	160	37	26	40	3	2,5	1	48	31315 A	7GB	213	0,83	0,7	251	0,4
	160	55	45	58	3	2,5	1	38	32315 A	2GD	350	0,35	1,7	460	0,9
	160	55	45	58	3	2,5	1	38	32315 A	2GD	350	0,35	1,7	460	0,9
80	125	29	22	29	1,5	1,5	0,6	27	32016 XA	3CC	130	0,43	1,4	198	0,8
	140	26	22	28,25	2,5	2	0,6	28	30216 A	3EB	145	0,43	1,4	177	0,8
	140	33	28	35,25	2,5	2	0,6	30	32216 A	3EC	180	0,43	1,4	232	0,8
	170	39	33	42,5	3	2,5	1	33	30316 A	2GB	277	0,35	1,7	329	0,9
	170	39	27	42,5	3	2,5	1	52	31316 A	7GB	222	0,83	0,7	275	0,4

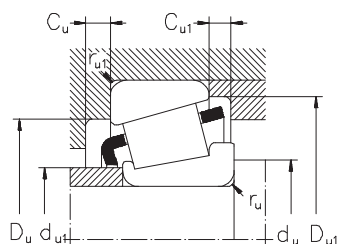


Speed limit			Weight		Mounting dimensions						
grease	oil		d_u1 max.	d_u min.	D_u min.	max.	D_u1 min.	C_u min.	C_u1 min.	r_u max.	r_u1 max.
min ⁻¹		kg	mm								
4 300	5 600	0,530	58	57	79	83	85	3	4,5	1,5	1,5
4 300	5 600	0,600	58	57	78	83	85	3	5,5	1,5	1,5
3 600	4 800	1,19	65	60	95	100	102	4	6	2,5	2
3 200	4 300	1,16	62	60	87	100	104	4	10	2,5	2
3 200	4 300	1,83	62	60	90	100	102	5	9	2,5	2
4 000	5 300	0,540	63	62	81	83	86	4	5,5	1,5	1,5
3 800	5 000	0,690	64	64	88	91	94	4	4,5	1,5	1,5
3 800	5 000	0,820	63	64	87	91	95	4	5,5	1,5	1,5
3 200	4 300	1,53	71	65	104	110	111	4	6,5	2	2
2 800	3 800	1,49	68	65	94	110	113	4	10,5	2	2
3 000	4 000	2,21	68	65	99	110	111	5	10,5	2	2
3 800	5 000	0,580	67	67	85	88	91	4	5,5	1,5	1,5
3 400	4 500	0,860	70	69	96	101	103	4	4,5	2	1,5
3 400	4 500	1,10	69	69	95	101	104	4	5,5	2	1,5
3 000	4 000	1,90	77	72	112	118	120	5	7,5	3	2,5
2 600	3 600	1,83	73	72	103	118	123	5	11,5	3	2,5
2 600	3 600	2,80	74	72	107	118	120	6	11,5	3	2,5
3 400	4 500	0,620	72	72	90	93	97	4	5,5	1,5	1,5
3 000	4 000	1,10	77	74	106	111	113	4	4,5	2	1,5
3 000	4 000	1,48	76	74	104	111	115	4	5,5	2	1,5
2 600	3 600	2,30	83	77	122	128	130	5	8	3	2,5
2 200	3 200	2,25	79	77	111	128	132	5	13	3	2,5
2 400	3 400	3,49	80	77	117	128	130	6	12	3	2,5
3 200	4 300	0,830	78	77	98	103	105	5	6	1,5	1,5
3 000	4 000	1,22	81	79	110	116	118	4	5	2	1,5
2 800	3 800	1,56	80	79	108	116	119	4	6	2	1,5
2 400	3 400	3,00	89	82	130	138	140	5	8	3	2,5
2 000	3 000	2,82	84	82	118	138	141	5	13	3	2,5
2 200	3 200	4,10	86	82	125	138	140	6	12	3	2,5
3 000	4 000	0,880	83	82	103	108	110	5	6	1,5	1,5
2 800	3 800	1,33	86	84	115	121	124	4	5	2	1,5
2 600	3 600	2,62	85	84	115	121	124	4	6	2	1,5
2 600	3 600	3,40	95	87	139	148	149	5	9	3	2,5
1 900	2 800	3,50	91	87	127	148	151	6	14	3	2,5
2 000	3 000	5,00	91	87	133	148	149	7	13	3	2,5
2 600	3 600	1,24	89	87	112	117	120	6	7	1,5	1,5
2 400	3 400	1,59	91	90	124	130	132	4	6	2,5	2
2 400	3 400	2,00	90	90	122	130	134	5	7	2,5	2
2 000	3 000	4,00	102	92	148	158	159	5	9,5	3	2,5
1 900	2 800	4,07	97	92	134	158	159	6	15,5	3	2,5

Tapered roller bearings, single row

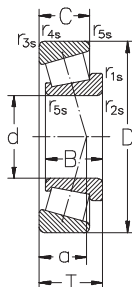


Dimensions					Designation					ISO series	Basic radial load. Factors				
d	D	B	C	T	r _{1s} ,r _{2s} min.	r _{3s} ,r _{4s} min.	r ₅		a	dyn. C _r	e	Y	stat. C _{0r}	Y ₀	
mm								—		kN	—		kN	—	
80	170	58	48	61,5	3	2,5	1	41	32316 A	2GD	383	0,35	1,7	503	0,9
85	130	29	22	29	1,5	1,5	0,6	28	32017 XA	4CC	136	0,44	1,4	213	0,8
	150	28	24	30,5	2,5	2	0,6	30	30217 A	3EB	167	0,43	1,4	206	0,8
	150	36	30	38,5	2,5	2	0,6	33	32217 A	3EC	213	0,43	1,4	283	0,8
	180	41	34	44,5	4	3	1	35	30317 A	2GB	298	0,35	1,7	354	0,9
	180	41	28	44,5	4	3	1	55	31317 A	7GB	245	0,83	0,7	298	0,4
	180	60	49	63,5	4	3	1	42	32317 A	2GD	400	0,35	1,7	555	0,9
90	140	32	24	32	2	1,5	0,6	30	32018 XA	3CC	159	0,43	1,4	246	0,8
	160	30	26	32,5	2,5	2	0,6	31	30218 A	3FB	190	0,43	1,4	238	0,8
	160	40	34	42,5	2,5	2	0,6	36	32218 A	3FC	251	0,43	1,4	340	0,8
	190	43	36	46,5	4	3	1	36	30318 A	2GB	328	0,35	1,7	394	0,9
	190	43	30	46,5	4	3	1	57	31318 A	7GB	270	0,83	0,7	330	0,4
	190	64	53	67,5	4	3	1	44	32318 A	2GD	461	0,35	1,7	612	0,9
95	145	32	24	32	2	1,5	0,6	31	32019 XA	4CC	163	0,44	1,4	257	0,8
	170	32	27	34,5	3	2,5	1	33	30219 A	2FB	210	0,43	1,4	264	0,8
	170	43	37	45,5	3	2,5	1	39	32219 A	3FC	281	0,43	1,4	390	0,8
	200	45	38	49,5	4	3	1	39	30319 A	2GB	350	0,35	1,7	449	0,9
	200	45	32	49,5	4	3	1	60	31319 A	7GB	300	0,83	0,7	365	0,4
	200	67	55	71,5	4	3	1	47	32319 A	2GD	500	0,35	1,7	670	0,9
100	150	32	24	32	2	1,5	0,6	32	32020 XA	4CC	171	0,46	1,3	277	0,7
	180	34	29	37	3	2,5	1	35	30220 A	3FB	238	0,43	1,4	303	0,8
	180	46	39	49	3	2,5	1	41	32220 A	3FC	320	0,43	1,4	444	0,8
	215	47	39	51,5	4	3	1	40	30320 A	2GB	404	0,35	1,7	492	0,9
	215	73	60	77,5	4	3	1	53	32320 A	2GD	578	0,35	1,7	780	0,9
	160	35	26	35	2,5	2	0,6	34	32021 XA	4DC	204	0,44	1,4	334	0,8
105	190	36	30	39	3	2,5	1	37	30221 A	3FB	270	0,43	1,4	350	0,8
	190	50	43	53	3	2,5	1	44	32221 A	3FC	358	0,43	1,4	510	0,8
	225	77	63	81,5	4	3	1	53	32321 A	2GD	405	0,35	1,7	815	0,9
	170	38	29	38	2,5	2	0,6	36	32022 XA	4DC	235	0,43	1,4	382	0,8
	200	38	32	41	3	2,5	1	39	30222 A	3FB	304	0,43	1,4	396	0,8
	200	53	46	56	3	2,5	1	46	32222 A	3FC	406	0,43	1,4	580	0,8
110	240	50	42	54,5	4	3	1	43	30322 A	2GB	479	0,35	1,7	588	0,9
	240	80	65	84,5	4	3	1	55	32322 A	2GD	699	0,35	1,7	956	0,9
	180	38	29	38	2,5	2	0,6	39	32024 XA	4DC	238	0,46	1,3	397	0,7
	215	40	34	43,5	3	2,5	1	43	30224 A	4FB	340	0,43	1,4	459	0,8
120	215	58	50	61,5	3	2,5	1	51	32224 A	4FD	446	0,43	1,4	653	0,8
	260	55	46	59,5	4	3	1	47	30324 A	2GB	568	0,35	1,7	712	0,9
	260	86	69	90,5	4	3	1	60	32324 A	2GD	799	0,35	1,7	1104	0,9
	130	200	45	34	45	2,5	2	0,6	42	32026 XA	4EC	315	0,43	1,4	526
230		40	34	43,75	4	3	1	45	30226 A	4FB	367	0,43	1,4	485	0,8
230		64	54	67,75	4	3	1	56	32226 A	4FD	551	0,43	1,4	836	0,8

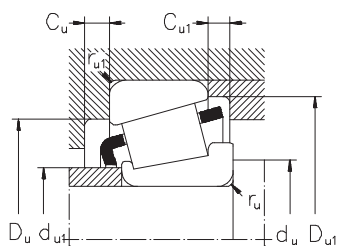


Speed limit		Weight	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		kg	mm								
1 900	2 800	5,90	98	92	142	158	159	7	13,5	3	2,5
2 400	3 400	1,30	94	92	117	122	125	6	7	1,5	1,5
2 200	3 200	2,00	97	95	132	140	141	5	6,5	2,5	2
2 200	3 200	2,50	96	95	130	140	142	5	8,5	2,5	2
1 900	2 800	4,70	107	99	156	166	167	6	10,5	4	3
1 800	2 600	5,08	103	99	143	166	169	6	16,5	4	3
1 800	2 600	6,85	103	99	150	166	167	8	14,5	4	3
2 200	3 200	1,70	100	99	125	131	134	6	8	2	1,5
2 200	3 000	2,49	103	100	140	150	150	5	6,5	2,5	2
2 000	3 000	3,30	102	100	138	150	152	5	8,5	2,5	2
1 700	2 400	5,50	113	104	165	176	176	6	10,5	4	3
1 700	2 400	5,92	109	104	151	176	179	6	16,5	4	3
1 700	2 400	8,21	108	104	157	176	177	8	14,5	4	3
2 200	3 200	1,80	105	104	130	136	140	6	8	2	1,5
1 900	2 800	2,96	110	107	149	158	159	5	7,5	3	2,5
1 900	2 800	4,00	108	107	145	158	161	5	8,5	3	2,5
1 800	2 600	6,70	118	109	172	186	184	6	11,5	4	3
1 700	2 400	6,95	114	109	157	186	187	6	17,5	4	3
1 700	2 400	11,0	115	109	166	186	186	8	16,5	4	3
2 000	3 000	1,85	109	109	134	141	144	6	8	2	1,5
1 900	2 800	3,54	116	112	157	168	168	5	8	3	2,5
1 800	2 600	4,76	114	112	154	168	171	5	10	3	2,5
1 700	2 400	7,90	127	114	184	201	197	6	12,5	4	3
1 600	2 200	14,0	123	114	177	201	200	8	17,5	4	3
1 900	2 800	2,42	116	115	143	150	154	6	9	2,5	2
1 800	2 600	4,26	122	117	165	178	177	6	9	3	2,5
1 800	2 600	5,90	120	117	161	178	180	5	10	3	2,5
1 500	2 000	14,5	128	119	185	211	209	9	18,5	4	3
1 800	2 600	3,06	122	120	152	160	163	7	9	2,5	2
1 700	2 400	5,00	129	122	174	188	187	6	9	3	2,5
1 700	2 400	6,90	126	122	170	188	190	6	10	3	2,5
1 600	2 200	12,5	141	124	206	226	220	8	12,5	4	3
1 400	1 900	16,4	137	124	198	226	222	9	19,5	4	3
1 700	2 400	3,25	131	130	161	170	173	7	9	2,5	2
1 600	2 200	6,01	140	132	187	203	201	6	9,5	3	2,5
1 600	2 200	8,59	136	132	181	203	204	7	11,5	3	2,5
1 500	2 000	13,6	152	134	221	246	237	10	13,5	4	3
1 300	1 800	24,5	148	134	213	246	239	9	21,5	4	3
1 600	2 200	4,93	144	140	178	190	192	8	11	2,5	2
1 500	2 000	7,60	152	144	203	216	217	7	9,5	4	3
1 500	2 000	10,7	146	144	193	216	219	7	13,5	4	3

Tapered roller bearings, single row

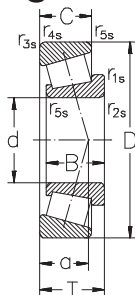


Dimensions					Designation				ISO series	Basic radial load. Factors					
d	D	B	C	T	r1s, r2s min.	r3s, r4s min.	r5	a		dyn. Cr	e	Y	stat. C0r	Y0	
mm										kN			kN		
130	280	58	49	63,75	5	4	1,5	51	30326 A	2GB	640	0,35	1,7	820	0,9
	280	66	44	72	5	4	1,5	87	31326 XA	7GB	597	0,83	0,7	761	0,4
	280	93	78	98,75	5	4	1,5	66	32326 A	-	947	0,35	1,7	1333	0,9
140	210	45	34	45	2,5	2	0,6	46	32028 XA	4DC	312	0,46	1,3	529	0,7
	250	42	36	45,75	4	3	1	47	30228 A	4FB	396	0,43	1,4	527	0,8
	250	68	58	71,75	4	3	1	60	32228 A	4FD	602	0,43	1,4	907	0,8
	300	70	47	77	5	4	1,5	90	31328 XA	7GB	714	0,83	0,7	935	0,4
150	225	48	36	48	3	2,5	1	49	32030 XA	4EC	355	0,46	1,3	620	0,7
	270	45	38	49	4	3	1	50	30230 A	4GB	457	0,43	1,4	618	0,8
	270	73	60	77	4	3	1	64	32230 A	4GD	705	0,43	1,4	1 080	0,8
160	240	51	38	51	3	2,5	1	52	32032 XA	4EC	402	0,46	1,3	696	0,7
	290	48	40	52	4	3	1	54	30232 A	4GB	520	0,43	1,4	710	0,8
	290	80	67	84	4	3	1	70	32232 A	4GD	840	0,43	1,4	1 400	0,8
170	230	38	30	38	2,5	2	0,6	42	32934 A	3DC	280	0,37	1,6	572	0,9
	260	57	43	57	3	2,5	1	56	32034 XA	4EC	480	0,44	1,4	865	0,8
	310	52	43	57	5	4	1,5	58	30234 A	4GB	610	0,43	1,4	844	0,8
	310	86	71	91	5	4	1,5	75	32234 A	4GD	889	0,43	1,4	1 377	0,8
180	250	45	34	45	2,5	2	0,6	53	32936 A	4DC	350	0,48	1,3	727	0,7
	280	64	48	64	3	2,5	1	59	32036 XA	3FD	599	0,43	1,4	1 037	0,8
	320	52	43	57	5	4	1,5	61	30236 A	4GB	584	0,46	1,3	825	0,7
	320	86	71	91	5	4	1,5	78	32236 A	4GD	974	0,46	1,3	1 571	0,7
190	260	45	34	45	2,5	2	0,6	55	32938 A	4DC	358	0,48	1,3	772	0,7
	290	64	48	64	3	2,5	1	62	32038 XA	4FD	609	0,44	1,4	1 077	0,8
	340	92	75	97	5	4	1,5	81	32238 A	4GD	1 080	0,43	1,4	1 860	0,8
200	280	51	39	51	3	2,5	1	53	32940 A	3EC	474	0,4	1,5	950	0,8
	310	70	53	70	3	2,5	1	66	32040 XA	4FD	716	0,43	1,4	1 356	0,8
	310	70	53	70	3	2,5	1	66	T-32040 X	4FD	716	0,43	1,4	1 356	0,8
	310	70	53	70	3	2,5	1	66	T-32040 XP5	4FD	716	0,43	1,4	1 356	0,8
	360	98	82	104	5	4	1,5	83	32240 A	3GD	1 220	0,4	1,5	2 020	0,8
220	300	51	39	51	3	2,5	1	58	32944 M	3EC	407	0,43	1,4	827	0,8
	340	76	57	76	4	3	1	72	32044 XA	4FD	850	0,43	1,4	1 537	0,8

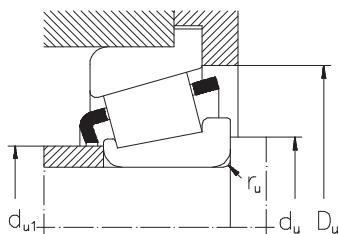


Speed limit			Weight	Mounting dimensions							
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		kg	mm								
1 300	1 800	19,5	164	148	239	262	255	8	14,5	5	4
1 200	1 700	18,6	157	148	218	262	261	9	28	5	4
1 100	1 600	27,6	160	148	230	262	260	10	20,5	5	4
1 600	2 200	5,23	153	150	187	200	202	8	11	2,5	2
1 400	1 900	8,50	163	154	219	236	234	9	9,5	4	3
1 400	1 900	13,9	159	154	210	236	238	8	13,5	4	3
1 200	1 700	23,9	169	158	235	282	280	9	30	5	4
1 500	2 000	6,35	164	162	200	213	216	8	12	3	2,5
1 300	1 800	10,7	175	164	234	256	250	9	11	4	3
1 200	1 700	17,9	171	164	226	256	254	8	17	4	3
1 300	1 800	7,75	175	172	213	228	231	8	13	3	2,5
1 100	1 600	13,6	189	174	252	276	269	9	12	4	3
1 100	1 600	25,5	183	174	242	276	274	10	17	4	3
1 400	1 900	4,50	183	180	213	220	222	7	8	2,5	2
1 200	1 700	10,5	187	182	230	248	249	10	14	3	2,5
1 000	1 500	19,0	203	188	269	292	288	8	14	5	4
1 000	1 500	29,3	196	188	259	292	294	10	20	5	4
1 200	1 700	6,65	193	190	225	240	241	8	11	2,5	2
1 100	1 600	14,5	199	192	247	268	267	10	16	3	2,5
1 000	1 500	20,0	211	198	278	302	297	9	14	5	4
950	1 400	27,4	204	198	267	302	303	10	20	5	4
1 100	1 600	7,00	204	200	235	249	251	8	11	2,5	2
1 000	1 500	15,0	209	202	257	278	279	10	16	3	2,5
900	1 300	39,5	216	207	286	322	323	10	22	5	4
1 000	1 500	9,50	216	212	257	268	271	9	12	3	2,5
950	1 400	19,5	221	212	273	298	297	11	17	3	2,5
950	1 400	19,5	221	212	273	298	297	11	17	3	2,5
950	1 400	19,5	221	212	273	298	297	11	17	3	2,5
900	1 300	33,0	226	217	302	342	340	11	22	5	4
950	1 400	11,2	234	232	275	288	290	9	12	3	2,5
900	1 300	25,5	243	234	300	326	326	12	19	4	3

Tapered roller bearings, single row with flanged outer ring

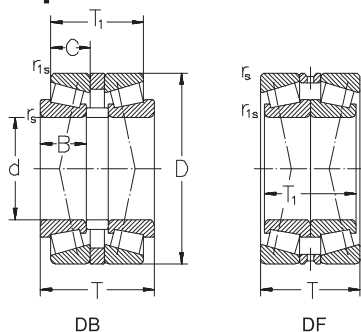


Dimensions										Designation	ISO series
d	D	B	C	T	r1s,r2s min.	r3s,r4s min.	D1	b	a		
mm											
20	47	14	12	6,25	1	1	51	3	11	30204 AR	2DB
25	52	15	13	6,25	1	1	57	3,5	12	30205 AR	3CC
30	62	16	14	6,75	1	1	67	3,5	14	30206 AR	3DB
	62	20	17	8,25	1	1	67	4	15	32206 AR	3DC
	72	19	16	8,75	1,5	1,5	77	4	15	30306 AR	2FB
	72	27	23	11,75	1,5	1,5	77	6	18	32306 AR	2FD
35	72	17	15	7,25	1,5	1,5	77	4	15	30207 AR	3DB
	72	23	19	10,25	1,5	1,5	77	4,5	17	32207 AR	3DC
	80	21	18	8,25	2	1,5	85	4,5	16	30307 AR	2FB
	80	31	25	13,75	2	1,5	85	6	20	32307 AR	2FE
40	80	18	16	7,75	1,5	1,5	85	4	16	30208 AR	3DB
	80	23	19	10,25	1,5	1,5	85	4,5	19	32208 AR	3DC
	90	23	20	9,75	2	1,5	95	4,5	19	30308 AR	2FB
	90	33	27	14,25	2	1,5	95	6	23	32308 AR	2FD
45	85	19	16	8,75	1,5	1,5	90	4	18	30209 AR	3DB
	85	23	19	10,25	1,5	1,5	90	4,5	20	32209 AR	3DC
	100	25	22	10,25	2	1,5	106	5	21	30309 AR	2FB
	100	36	30	15,25	2	1,5	106	7	25	32309 AR	2FD
50	90	20	17	8,75	1,5	1,5	95	4	19	30210 AR	3DB
	90	23	19	10,25	1,5	1,5	95	4,5	21	32210 AR	3DC
	110	27	23	11,25	2,5	2	116	5	23	30310 AR	2FB
	110	40	33	17,25	2,5	2	116	8	27	32310 AR	2FD
55	100	21	18	9,25	2	1,5	106	4,5	20	30211 AR	3DB
	100	25	21	10,75	2	1,5	106	5	22	32211 AR	3DC
	120	43	35	18,5	2,5	2	127	8	29	32311 AR	2FD
60	110	22	19	9,25	2	1,5	116	4,5	22	30212 AR	2EB
	110	28	24	10,75	2	1,5	116	5	24	32212 AR	2EC
	130	46	37	19,5	3	2,5	137	8	31	32312 AR	2FD
65	120	23	20	9,25	2	1,5	127	4,5	23	30213 AR	3EB
	120	31	27	11,75	2	1,5	127	6	27	32213 AR	3EC
70	125	24	21	10,25	2	1,5	132	5	25	30214 AR	3EB
	125	31	27	12,25	2	1,5	132	6	28	32214 AR	3EC

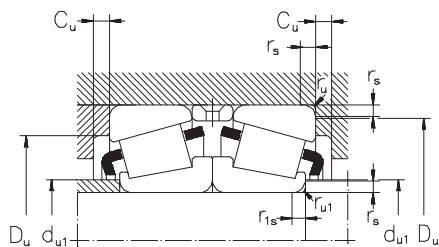
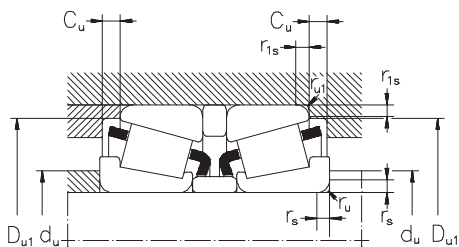


Basic radial load. Factos					Speed limit		Weight	Mounting dimensions			
dyn. C _r	e	Y	stat. C _{0r}	Y ₀	grease	oil		d _{u1} max.	d _u min.	D _u min.	r _u max.
kN	—		kN	—	min ⁻¹		kg	mm			
26	0,35	1,7	29	0,9	8 000	11 000	0,127	27	26	43	1
29,5	0,37	1,6	36	0,9	7 500	10 000	0,161	31	31	48	1
38	0,37	1,6	48	0,9	6 300	8 500	0,233	37	36	57	1
47,5	0,37	1,6	65	0,9	6 300	8 500	0,290	37	36	59	1
53	0,31	1,9	65	1,1	5 600	7 500	0,398	39	37	66	1,5
72,3	0,31	1,9	97	1,1	5 300	7 000	0,577	40	37	66	1,5
49,4	0,37	1,6	58	0,9	5 300	7 000	0,338	44	42	67	1,5
61,6	0,37	1,6	80	0,9	5 300	7 000	0,422	43	42	67	1,5
68,2	0,31	1,9	83	1,1	5 000	6 700	0,543	45	44	74	2
88,2	0,31	1,9	120	1,1	4 800	6 300	0,760	44	44	74	2
58,5	0,37	1,6	70	0,9	4 800	6 300	0,440	49	47	74	1,5
71	0,37	1,6	95	0,9	4 800	6 300	0,533	48	47	75	1,5
81	0,35	1,7	105	0,9	4 500	6 000	0,725	52	49	82	2
110	0,35	1,7	156	0,9	4 000	5 300	1,027	50	49	82	2
63	0,4	1,5	83	0,8	4 500	6 000	0,491	54	52	80	1,5
75	0,4	1,5	103	0,8	4 500	6 000	0,584	53	52	80	1,5
101	0,35	1,7	130	0,9	4 000	5 300	0,958	59	54	92	2
132	0,35	1,7	188	0,9	3 600	4 800	1,30	56	54	93	2
70,5	0,43	1,4	95	0,8	4 300	5 600	0,552	58	57	85	1,5
76,5	0,43	1,4	106	0,8	4 300	5 600	0,625	58	57	85	1,5
120	0,35	1,7	156	0,9	3 600	4 800	1,23	65	60	102	2,5
165	0,35	1,7	239	0,9	3 200	4 300	1,89	62	60	102	2,5
84,5	0,4	1,5	112	0,8	3 800	5 000	0,724	64	64	94	1,5
99	0,4	1,5	138	0,8	3 800	5 000	0,858	63	64	95	1,5
187	0,35	1,7	276	0,9	3 000	4 000	2,29	68	65	111	2
91,5	0,4	1,5	122	0,8	3 400	4 500	0,897	70	69	103	2
120	0,4	1,5	170	0,8	3 400	4 500	1,14	69	69	104	2
216	0,35	1,7	318	0,9	2 600	3 600	1,92	74	72	120	3
110	0,4	1,5	147	0,8	3 000	4 000	1,14	77	74	113	2
142	0,4	1,5	206	0,8	3 000	4 000	1,54	76	74	115	2
120	0,43	1,4	163	0,8	3 000	4 000	1,27	81	79	118	2
150	0,43	1,4	220	0,8	2 800	3 800	1,62	80	79	119	2

Tapered roller bearings, single row, paired mounted



Dimensions								Designation	Speed limit		Weight
d	D	B	C	T	T ₁	r _s min.	r _{1s} min.		grease	oil	
mm								—	min ⁻¹		kg
45	85	21	19	57,5	46	1,5	0,6	32209AP2F2DBT57,5	3 600	4 800	1,28
	85	23	19	55	43,5	1,5	0,6	32209AP4DBT55	3 600	4 800	1,26
55	100	22,52	21	69,5	57,66	2	0,6	32211AP2F2DBT69,5	3 000	4 000	2,06
	100	25	21	69,5	58	2	0,6	32211AUPDBT69,5	3 000	4 000	1,15
70	110	25	19	58	46	1,5	0,5	32014XADBT58	2 600	3 400	1,87
80	125	29	22	70	56	1,5	0,6	32016XADBT70	2 000	2 800	3,08
90	140	32	24	75	59	2	0,6	32018XADBT75	1 800	2 600	3,95
100	180	46	39	140	120	3	0,8	32220AS1DBT140	1 400	2 000	12,6
110	200	52,5	46	112	105	0,6	2,5	32222ADFT112	1 400	1 900	7,77
	240	50	42	109	100	1	3	30322ADFT109	1 300	1 800	12,6
120	215	58	50	123	116	0,6	2	32224ADFT123	1 300	1 800	18,7
	260	55	46	119	110	1	3	30324ADFT119	1 200	1 600	29,8
	260	86	69	181	172	1	3	32324ADFT181	1 000	1 400	46,2
130	200	45	34	90	90	0,6	2	32026XAP5S0DFT90	1 300	1 800	10,6
	230	64	54	135,5	128	1	3	32226ADFT135,5	1 200	1 600	23,1
	280	66	45	144	132	2	4	31326ADFT144	950	1 400	40,5
140	250	68	58	163,5	136	3	1	32228ADBT164	1 100	1 500	30,9
170	310	86	71	202	162	5	1,5	32234AMDBT202	800	1 200	64,1
	310	86	71	202	162	5	1,5	32234AMP5DBT202	800	1 200	64,1



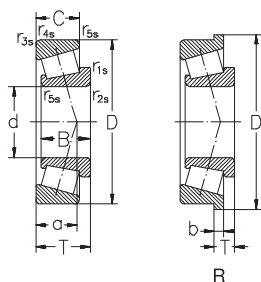
Basic radial load. Factors

Mounting dimensions

dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	d_u min./max.	D_u min.	max.	C_u min.	r_u max.	r_{u1} max.
kN	—			kN	—	mm					
125	0,4	1,7	2,5	185	1,6	52	80		5,5	1,5	0,6
125	0,4	1,7	2,5	185	1,6	52	80		5,5	1,5	0,6
155	0,4	1,7	2,5	230	1,6	64	95		5,5	1,5	0,6
155	0,4	1,7	2,5	230	1,6	64	95		5,5	1,5	0,6
155	0,43	1,6	2,3	285	1,6	77	105		6	1,5	0,6
210	0,43	1,6	2,3	395	1,6	87	120		7	1,5	0,6
260	0,43	1,6	2,3	490	1,6	99	134		8	2	0,6
520	0,43	1,6	2,3	890	1,6	112	171		10	3	1
660	0,43	1,6	2,3	1 160	1,6	126	170	188	6	2,5	1
780	0,35	1,9	2,8	1 180	1,8	141	206	226	8	3	1
720	0,43	1,6	2,3	1 310	1,6	136	181	203	7	2,5	1
920	0,35	1,9	2,8	1 420	1,8	152	221	246	10	3	1
1 290	0,35	1,9	2,8	2 210	1,8	148	213	246	9	3	1
510	0,43	1,6	2,3	1 050	1,6	144	178	190	8	2	0,6
890	0,43	1,6	2,3	1 670	1,6	146	193	216	7	3	1
970	0,83	0,8	1,2	1 520	0,8	157	218	262	9	4	1,5
980	0,43	1,6	2,3	1 810	1,6	154	238		13,5	4	1
1 440	0,43	1,6	2,3	2 750	1,6	188	294		20	5	1,5
1 440	0,43	1,6	2,3	2 750	1,6	188	294		20	5	1,5

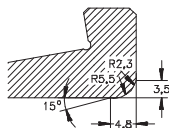
Tapered roller bearings, single row

Inch dimensions



Dimensions										Designation
d	D	B	C	T	r1s,r2s min.	r3s,r4s min.	D1	b	a	
mm										—
11,112	34,988	10,988	8,73	10,998	1,3	1,3			9	A4044/A4138
12,7	34,988	10,988	8,73	10,998	1,3	1,3			9	A4050/4138
14,989	34,988	10,988	8,73	10,998	0,8	1,3			9	A4059/4138
17,462	39,878	14,605	10,668	13,843	1,3	1,3			9	LM11749/LM11710
19,05	45,237	16,637	12,065	15,494	1,3	1,3			10	LM11949/LM11910
	45,237	16,637	12,065	15,494	1,3	1,3			10	LM11949/LM11910
	49,225	19,05	14,288	18,034	1,3	1,3			11	09067/09195
21,43	50,005	18,288	13,97	17,526	1,3	1,3			11	M12649/M12610
	50,005	18,288	13,97	17,526	1,3	1,3			11	M12649/M12610
21,986	45,237	16,637	12,065	15,494	1,3	1,3			10	LM12749/LM12710
	45,237	16,637	12,065	15,494	1,3	1,3			10	LM12749/LM12710
	45,974	16,637	12,065	15,494	1,3	1,3			10	LM12749/LM12711
25	51,994	14,26	12,7	15,011	1,5	1,3			12	07097/07204
25,4	50,005	14,26	9,525	13,495	1	1			11	07100/07196
	50,292	14,732	10,668	14,224	1,3	1,3			11	L44643/L44610
	50,292	14,732	10,668	14,224	1,3	1,3			11	L44643/L44610
26,988	50,292	14,732	10,668	14,224	3,5	1,3			11	L44649/L44610
	50,292	14,732	10,668	14,224	3,5	1,3			11	44649/L44610
29	50,292	14,732	10,688	14,224	3,5	1,3			11	L45449/L45410
31,75	59,131	16,764	11,811	15,875	*	1,3			13	LM67048/LM67010
	59,131	16,764	11,811	15,875	*	1,3			13	LM67048/LM67010
	62	19,05	14,288	18,161	3,5	1,3			13	15123/15245
34,925	65,088	18,288	13,97	18,034	*	1,3			14	LM485448/LM48510
	65,088	18,288	13,97	18,034	*	1,3			14	LM485448/LM48510
	72,233	25,4	19,842	25,4	2,3	2,3			21	HM88649/HM88610
	76,2	28,575	23,02	29,37	3,5	3,3			23	HM89446/HM894410
34,988	59,131	16,764	11,938	15,875	*	1,3			13	L68149/L68110
	59,131	16,764	11,938	15,875	*	1,3			13	L68149/L68110
	59,974	16,764	11,938	15,875	*	1,3			13	L68149/L68111
	59,974	16,764	11,938	15,875	*	1,3			13	L68149/L68111
38	63	17	13,5	17	*	1,3			14	JL69349/JL69310
	63	17	13,5	17	*	1,3			14	JL69349/JL69310
38,1	65,088	18,288	13,97	18,04	2,3	1,3			13	LM29749/LM29710
	79,375	29,771	23,812	29,37	3,5	3,3			20	3490/3420

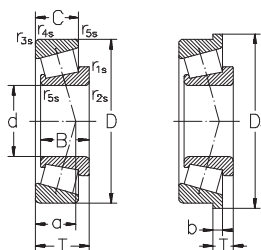
* Special mounting chamfer.



Basic radial load. Factors					Speed limit		Weight
dyn. C _r	e	Y	stat. C _{0r}	Y ₀	grease	oil	
kN	—		kN	—	min ⁻¹		kg
12,0	0,45	1,3	11,85	0,7	11 000	15 000	0,055
12,0	0,45	1,3	11,85	0,7	10 000	15 000	0,058
12,0	0,45	1,3	11,85	0,7	10 000	14 000	0,063
19,8	0,29	2,1	21,1	1,2	8 500	12 000	0,081
25,5	0,30	2,0	25,104	1,1	7 500	11 000	0,123
25,5	0,30	2,0	25,104	1,1	7 500	11 000	0,123
31,1	0,27	2,3	33,1	1,2	7 000	10 000	0,160
34,1	0,28	2,2	38	1,2	7 000	10 000	0,160
34,9	0,28	2,2	35,265	1,2	7 000	10 000	0,180
25,2	0,31	2,0	27,7	1,1	7 500	10 000	0,122
25,2	0,31	2,0	27,70	1,1	7 500	10 000	0,122
25,2	0,31	2,0	27,7	1,1	7 000	10 000	0,123
23,7	0,4	1,5	27,5	0,8	6 300	9 000	0,140
23,7	0,4	1,5	27,5	0,8	6 300	9 500	0,115
23,4	0,37	1,6	25,913	0,9	6 300	9 000	0,125
23,4	0,37	1,6	25,913	0,9	6 300	9 000	0,125
23,4	0,37	1,6	25,913	0,9	6 300	9 000	0,115
23,4	0,37	1,6	25,913	0,9	6 300	9 000	0,115
24,1	0,37	1,6	32,2	0,9	6 300	9 000	0,115
31,1	0,41	1,5	35,912	0,8	5 300	7 500	0,180
31,1	0,41	1,5	35,912	0,8	5 300	7 500	0,180
43,9	0,35	1,7	49,708	0,9	5 300	7 500	0,228
42,9	0,38	1,6	50,696	0,9	4 800	7 000	0,248
42,9	0,38	1,6	50,696	0,9	4 800	7 000	0,248
66,5	0,55	1,1	86,61	0,6	4 500	6 700	0,487
72,5	0,55	1,1	97,9	0,6	4 500	6 300	0,570
30,1	0,42	1,4	38,841	0,8	5 300	7 500	0,170
30,1	0,42	1,4	38,841	0,8	5 300	7 500	0,170
30,1	0,42	1,4	38,841	0,8	5 300	7 500	0,180
30,1	0,42	1,4	38,841	0,8	5 300	7 500	0,180
32,9	0,42	1,4	43,8	0,8	4 800	7 000	0,221
32,9	0,42	1,4	43,785	0,8	4 800	7 000	0,221
38,4	0,33	1,8	48,72	1,0	4 800	6 700	0,227
79,3	0,36	1,6	103	0,9	4 300	6 000	0,550

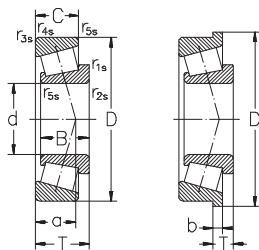
Tapered roller bearings, single row

Inch dimensions



R

Dimensions							Designation		
d	D	B	C	T	r _{1s} , r _{2s} min.	r _{3s} , r _{4s} min.	D ₁	b	a
mm									
39,688	73,025	22,098	21,336	25,654	0,8	2,3			18
41,275	73,431	19,812	14,732	19,559	3,5	0,8			16
44,45	73,025	18,258	15,083	18,258	1,5	1,5			14
	82,931	25,4	19,05	23,813	3,6	0,8			18
	95,25	28,575	22,225	27,783	0,8	0,8			20
45,242	73,431	19,812	15,748	19,558	3,5	0,8			15
45,618	82,931	25,4	19,05	23,812	3,5	0,8			18
	82,931	25,4	22,225	26,988	3,5	2,3			19
46,038	85	25,608	20,638	25,4	0,8	1,3			19
47,625	93,264	30,302	23,812	30,162	3,5	0,8			21
	93,264	30,302	23,812	30,162	3,5	0,8			21
50	90	22,225	15,875	8,887	2	0,8	94,661	4,762	16
50,8	82,55	22,225	16,51	21,59	3,5	1,3			16
	92,075	25,4	19,845	24,608	3,5	0,8			20
	95,25	28,575	22,225	27,783	3,5	0,8			20
	97,63	24,608	19,446	9,124	3,5	0,8	101,549	3,962	21
	107,95	29,317	22,225	27,783	3,5	0,8			21
53,975	123,825	32,791	25,4	17,462	3,5	3,3	130,073	6,35	37
57,15	104,775	29,317	24,605	30,162	2,3	3,3			23
	110	29,317	27	27,795	3,5	2			24
	110	29,317	27	27,795	3,5	2			24
	112,712	30,162	23,812	30,162	8	3,3			23
60,325	127	36,512	26,988	36,512	3,5	3,3			32
63,485	95	15,5	12	17	1	1			28
63,5	92,075	12,7	9,525	13,495	1,5	1,5			16
	112,712	30,048	23,812	11,112	3,5	3,3			25
	112,712	30,048	23,812	30,162	3,5	3,3			25
	112,712	30,048	23,812	30,162	3,5	0,8			25
	112,712	30,048	23,812	30,162	3,5	3,3			25
	112,712	30,048	23,812	30,162	3,5	0,8			25
	112,712	30,048	23,812	30,162	3,5	3,3			25
	112,712	30,162	23,812	30,162	3,5	3,3			23
	120	29,007	23,444	29,007	3,5	3,3			26
	122,238	38,43	29,77	38,305	3,5	2			27
66,675	110	25,4	19,05	25,4	3,5	1,3			24
	112,712	30,048	23,812	30,162	3,5	3,3			25
	122,238	38,354	29,718	38,1	3,5	3,3			27
							Designation		
							—		
							M201047/M201011		
							LM501349/LM501310		
							L102849/L102810		
							25580/25520		
							460/453A		
							LM102949/LM102910		
							25590/25520		
							25590/25523		
							2984A/2924		
							3779/3730		
							3779/3730		
							365/362B cl. 3		
							LM104949/LM104911		
							28580/28521		
							33889/33822		
							28678/28622B		
							33885/33822		
							72212/72487B		
							462A/453X		
							462/454		
							462/454		
							39581/39520		
							HM813841/HM813810		
							L910349/L910310		
							LL510749/LL510710		
							3982/3920B		
							3982/3920		
							3982/3928		
							3982/3920		
							3982/39208		
							39585/39520		
							483/472A		
							X3962/X3963		
							29590/29521		
							3984/3920		
							HM212049/HM212011		

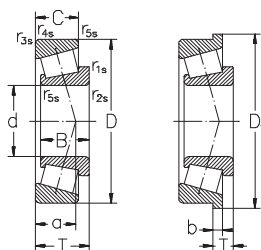


R

Basic radial load. Factors					Speed limit		Weight
dyn. Cr	e	Y	stat. Cor	Y0	grease	oil	
kN	—		kN	—	min ⁻¹		kg
57,5	0,33	1,8	72,0	1,0	4 300	6 300	0,460
48,6	0,40	1,5	64,3	0,8	4 300	6 000	0,320
47,0	0,32	1,9	68,9	1,0	4 300	6 000	0,300
75,7	0,33	1,8	95,1	1,0	3 800	5 600	0,554
96,8	0,33	1,8	127,0	1,0	3 600	5 000	0,970
97,8	0,34	1,8	134	1,0	3 000	4 500	1,10
48,5	0,31	2,0	66,4	1,1	4 000	6 000	0,300
70	0,33	1,8	95,2	1,0	3 800	5 300	0,550
70	0,33	1,8	95,2	1,0	3 800	5 300	0,580
68,3	0,35	1,7	97	1,0	3 800	5 300	0,600
98,0	0,34	1,8	128	1,0	3 400	5 000	0,905
98,0	0,34	1,8	128	1,0	3 400	5 000	0,905
74,3	0,32	1,9	87,26	1,0	3 400	5 000	0,554
65,2	0,31	2,0	86,2	1,1	3 600	5 300	0,411
71	0,38	1,6	103	0,9	3 400	4 800	0,690
102	0,33	1,8	135	1,0	3 400	4 800	0,860
101	0,40	1,5	147	0,8	3 400	4 800	0,850
143	0,74	0,8	162	0,4	2 800	4 000	2,10
97,8	0,34	1,8	134	1,0	3 000	4 300	1,10
97,8	0,34	1,8	134	1,0	3 000	4 500	1,10
109	0,34	1,8	139	1,0	3 000	4 300	1,22
109	0,34	1,8	139	1,0	3 000	4 300	1,22
130	0,34	1,8	196	1,0	2 800	4 000	1,03
161	0,50	1,2	226	0,7	2 600	3 800	2,16
42,3	0,78	0,8	56,8	0,4	3 000	4 500	0,400
31,2	0,40	1,5	46,0	0,8	3 200	4 500	0,250
116	0,40	1,5	174	0,8	2 800	4 000	1,26
116	0,40	1,5	174	0,8	2 800	4 000	1,24
116	0,40	1,5	174	0,8	2 800	4 000	1,24
116	0,40	1,5	174	0,8	2 800	4 000	1,24
116	0,40	1,5	174	0,8	2 800	4 000	1,24
116	0,40	1,5	174	0,8	2 800	4 000	1,24
130	0,34	1,8	196	1,0	2 800	4 000	1,22
133	0,38	1,6	167	0,9	2 600	3 800	1,44
189	0,34	1,8	248	1,0	2 600	3 800	2,03
92,0	0,44	1,4	138	0,7	2 800	4 000	0,900
113	0,40	1,5	172	0,8	2 800	4 000	1,20
189	0,34	1,8	248	1,0	2 600	3 800	1,92

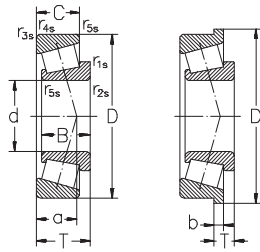
Tapered roller bearings, single row

Inch dimensions



R

Dimensions							Designation		
d	D	B	C	T	r1s,r2s min.	r3s,r4s min.	D1	b	a
mm							—		
71,438	127	36,17	28,575	36,512	3,5	3,3		28	567A/563 cl. 3
	136,525	46,038	36,512	46,038	3,5	3,3		38	H715345/H715311
	136,525	46,038	36,512	46,038	3,5	3,3		38	H715345/H715311
73,025	127	36,17	28,575	36,512	3,5	3,3		28	567/563 cl. 3
	146,05	41,275	31,75	41,275	3,5	3,3		34	657/653
	146,05	41,275	31,75	41,275	3,5	3,3		34	657/653
76,2	139,992	36,098	28,575	36,512	3,5	3,3		31	575/572
	161,925	55,1	42,862	53,975	3,5	3,3		40	6576/6535
	161,925	55,1	42,862	53,975	3,5	3,3		40	6576/6535
77,788	120	23,012	16	23	3,5	2,3		24	34306/34472X
	120	23,012	16	23	3,5	2,3		24	34306/34472X
82,55	139,992	36,098	28,575	36,512	3,5	3,3		31	580/572
	146,05	41,275	31,75	41,275	3,5	3,3		34	663/653
	161,925	48,26	38,1	47,625	3,5	3,3		35	757/752
	161,925	48,26	38,1	47,625	3,5	3,3		35	757/752
85,725	133,35	29,769	25,4	33,338	3,5	3,3		31	497/492W cl. 0
	146,05	41,275	31,75	41,275	6,4	3,3		34	665A/653 cl. 0
88,9	152,4	39,688	30,163	39,688	6,4	3,3		34	HM518445/HM518410
	190,5	57,531	46,038	57,15	8	3,3		41	HM221434/HM221410
89,974	146,975	40	32,5	40	7	3,5		31	HM218248/HM218210
92	140	30	22	30	3,5	1,5		32	LM718947/XC18140D
	140	30	22	30	3,5	1,5		32	LM718947/XC18140D
92,075	152,4	36,322	30,162	39,688	6,4	3,3		35	598A/592A
	171,45	48,26	38,1	47,625	3,5	3,3		37	77362/77675
	171,45	48,26	38,1	47,625	3,5	3,3		37	77362/77675
95,25	148,43	28,971	21,433	28,575	3	3		33	42375/42584
	148,43	28,971	21,433	28,575	3	3		33	42375/42584
	152,4	36,322	30,162	15,875	3,5	3,3	158,648	6,35	594/592 cl. 0
96,838	149,225	28,971	24,608	12,7	3,5	3,3	154,681	5,558	42381/42587B cl. 3
100,012	157,162	36,116	26,195	36,512	3,5	3,3		36	52393/52618 cl. 0
101,6	180,975	48,006	38,1	17,462	3,5	3,3	188,798	7,938	780/772B cl. 0
	212,725	66,675	53,975	66,675	7	3,3		48	HH224335/HH224310
	212,725	66,675	53,975	66,675	7	3,3		48	HH224335/HH224310



R

Basic radial load. Factors

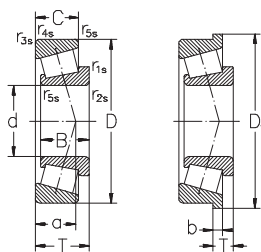
Speed limit

Weight

dyn. Cr	e	Y	stat. Cor	Y0	grease	oil	
kN	—		kN	—	min ⁻¹		kg
161	0,36	1,7	226	0,9	2 400	3 600	1,64
219	0,48	1,2	296	0,7	2 400	3 400	2,91
219	0,48	1,2	296	0,7	2 400	3 400	2,91
161	0,36	1,7	226	0,9	2 400	3 400	2,68
213	0,41	1,5	307	0,8	2 200	3 200	3,31
213	0,41	1,5	307	0,8	2 200	3 200	3,31
184	0,40	1,5	239	0,8	2 200	3 200	2,35
327	0,40	1,5	448	0,8	2 000	3 000	5,37
327	0,40	1,5	448	0,8	2 000	3 000	5,37
84,91	0,45	1,3	117	0,7	2 400	3 600	0,836
84,91	0,45	1,3	117	0,7	2 400	3 600	0,836
168	0,40	1,5	247	0,8	2 200	3 200	2,13
201	0,41	1,5	286	0,8	2 200	3 000	2,73
272	0,34	1,8	358	1,0	2 000	2 800	4,70
272	0,34	1,8	358	1,0	2 000	2 800	4,70
135	0,45	1,3	203	0,7	2 200	3 200	1,34
213	0,41	1,5	307	0,8	2 200	3 000	2,60
235	0,40	1,5	338	0,8	2 000	3 000	2,80
395	0,34	1,8	526	1,0	1 800	2 600	8,85
220	0,33	1,8	386	1,0	2 000	3 000	2,59
140	0,48	1,3	213	0,7	2 200	3 000	1,52
140	0,48	1,3	213	0,7	2 200	3 000	1,52
174	0,44	1,4	268	0,7	2 000	2 800	2,59
305	0,37	1,6	416	0,9	1 900	2 600	4,79
305	0,37	1,6	416	0,9	1 900	2 600	4,79
136	0,49	1,2	416	0,7	2 000	2 800	1,72
136	0,49	1,2	416	0,7	2 000	2 800	1,72
204	0,44	1,4	313	0,7	2 000	2 800	2,64
136	0,49	1,2	210	0,7	2 000	2 800	1,74
142	0,47	1,3	195	0,7	1 900	2 800	2,47
321	0,39	1,6	462	0,9	1 700	2 400	5,50
557	0,33	1,8	783	1,0	1 600	2 200	11,1
557	0,33	1,8	783	1,0	1 600	2 200	11,1

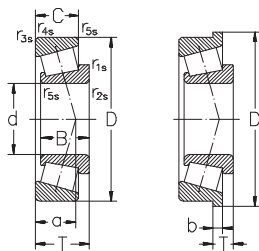
Tapered roller bearings, single row

Inch dimensions



R

Dimensions										Designation
d	D	B	C	T	r _{1s} , r _{2s} min.	r _{3s} , r _{4s} min.	D ₁	b	a	
mm										—
120,65	174,625	36,512	27,783	35,72	3,5	1,5			32	M224749/M224710
	174,625	36,512	27,783	35,72	3,5	1,5			32	M224749/M224710
	206,375	47,625	34,925	47,625	3,5	3,5			45	795/792
127	215,9	47,625	34,925	47,625	3,5	3,3			49	74500/74850
130	234,95	63,5	49,213	63,5	6	3,3			50	95512/95925
133,35	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938	49	74525/74850B cl. 0
136,525	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938	49	74537/74850B cl. 0
139,7	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938	49	74550/74850B
	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938	49	74550/74850B cl. 0
	215,9	47,625	34,925	47,625	3,5	3,3			49	74550/74850
	215,9	47,625	34,925	47,625	3,5	3,3			49	74550/74850 cl.0
158,75	225,425	39,688	33,338	13,495	3,5	3,3	230,881	5,558	43	46780/46720B cl. 0
	225,425	39,688	33,338	41,275	3,5	3,3			43	46780/46720 cl. 0
180	250	45	37	47	3	3			55	JM736149/JM736110
196,85	254	27,783	21,433	28,575	1,5	1,5			41	L540049/L540010
203,2	261,142	27,783	21,433	28,575	1,5	1,5			44	LL641149/LL641110
209,55	282,575	46,038	36,512	46,038	3,5	3,3			62	67989/67920
	317,5	63,5	46,038	63,5	4,3	3,3			62	93825/93125 cl. 3
234,95	327,025	52,388	36,512	52,388	6,4	3,3			59	8575/8520
	327,025	52,388	36,512	52,388	6,4	3,3			59	8575/8520 cl. 3
241,3	327,025	52,388	36,512	25,4	6,4	3,3	336,448	9,525	59	8578/8520B
	327,025	52,388	36,512	25,4	6,4	3,3	336,448	9,525	59	8578/8520B cl. B

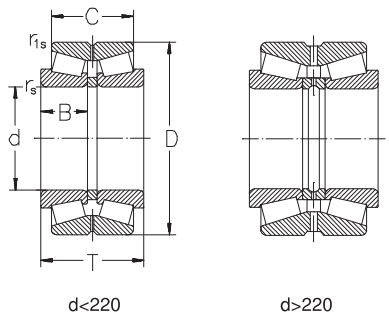


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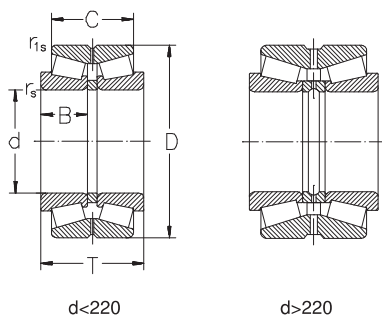
Basic radial load. Factors

dyn. Cr	e	Y	stat. Cor	Y0	Speed limit grease	Weight oil	
kN	—		kN	—	min ⁻¹		kg
220	0,33	1,8	375	1,0	1 700	2 400	2,70
317	0,46	1,3	525	0,7	1 500	2 200	6,10
308	0,49	1,2	523	0,7	1 400	2 000	6,97
507	0,36	1,6	784	0,9	1 300	1 900	11,3
313	0,49	1,2	528	0,7	1 400	2 000	6,78
313	0,49	1,2	528	0,7	1 400	2 000	6,53
310	0,49	1,2	531	0,7	1 400	2 000	6,17
310	0,49	1,2	531	0,7	1 400	2 000	6,17
310	0,49	1,2	531	0,7	1 400	2 000	6,08
310	0,49	1,2	531	0,7	1 400	2 000	6,08
305	0,38	1,6	541	0,9	1 300	1 800	5,40
305	0,38	1,6	541	0,9	1 300	1 800	5,35
334	0,48	1,3	703	0,7	1 100	1 600	7,85
170	0,39	1,5	334	0,9	1 100	1 600	3,32
174	0,41	1,5	353	0,8	1 100	1 500	3,56
331	0,51	1,2	661	0,6	1 000	1 400	8,84
651	0,52	1,2	1 098	0,6	950	1 300	18,5
468	0,41	1,5	934	0,8	850	1 200	12,3
468	0,41	1,5	934	0,8	850	1 200	12,3
468	0,41	1,5	934	0,8	850	1 200	11,9
468	0,41	1,5	934	0,8	850	1 200	11,9

Tapered roller bearings, double row



Dimensions						Designation	
d	D	B	C	T	r ₁ min.	r _{1s} min.	
mm							—
160	240	48	94	115	3	1	35032
180	280	60	108	134	3	1	35036
200	310	66	123	152	3	1	35040
220	340	72	130	165	4	1	35044



Basic radial load. Factors						Speed limit		Weight
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil	
kN	—			kN	—	min^{-1}		kg
662	0,37	1,8	2,7	1 288	1,8	950	1 400	17,0
1 154	0,29	2,3	3,5	2 352	2,3	850	1 200	29,9
1268	0,37	1,0	2,7	2 526	1,8	800	1 100	39,3
1 469	0,34	2,0	2,9	3 032	1,9	750	1 000	50,1

Tapered roller bearings, double row

Inch dimensions

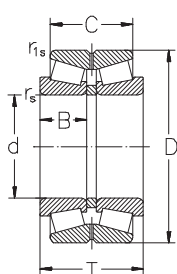


Fig. 1

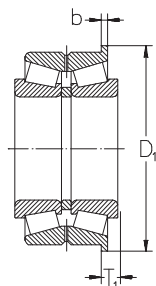


Fig. 2

Dimensions						Designation	
d	D	B	C	T	r1 min.	r1s min.	
mm						—	
69,85	114,287	25,4	46,038	58,738	1,5	0,8	29675/29622DC
	114,287	25,4	46,038	58,738	1,5	0,8	29675/29622DC
	120	29,007	53,975	65,09	3,5	0,8	482/472D
73,025	114,287	25,4	46,038	58,738	3,5	0,8	29685/29622D
	114,287	25,4	46,038	58,738	3,5	0,8	29685/29622D
82,55	136,525	29,769	53,975	69,85	3,5	0,8	495/493D
85,725	136,525	29,769	53,975	69,85	3,5	0,8	497/493DC
92,075	149,225	28,971	52,387	66,672	3,5	0,8	42362/42587D
107,95	158,75	21,4	39,688	53,978	3,5	0,8	37425/37626D cl. 3
	159,987	34,925	58,738	74,89	3,6	0,8	LM4522546/LM522510DC
	159,987	34,925	58,738	74,89	3,6	0,8	LM4522546/LM522510DC
114,3	190,5	49,2	80,962	106,362	3,5	1,5	71450/71751D
	190,5	49,2	80,962	106,362	3,5	1,5	71450/71751D
115	190,5	50	82,6	108	3,5	1	181115/181190XG
127	196,85	46	85,725	101,6	3,5	0,8	67388/67322D
	196,85	46	85,725	101,6	3,5	0,8	67388/67322D
136,525	190,5	39,7	73,025	85,725	3,5	0,8	48393/48320D
	215,9	51	92	110	2,5	1	200136X/200215XH ¹⁾
152,4	222,25	46,8	76,2	100,01	3,5	0,8	M231649/M231610D
	222,25	46,8	76,2	100,01	3,5	0,8	M231649/M231610D
	222,25	46,8	76,2	100,01	3,5	0,8	M231649/M231610D cl. 3
203,2	282,575	46,038	82,55	101,6	3,5	0,8	67983/67920DC cl. 0
	282,575	46,038	82,55	101,6	3,5	0,8	67983/67920DC cl. 0

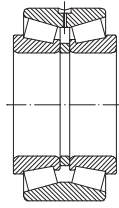


Fig. 3

Basic radial load. Factors						Speed limit		Weight	Fig.
dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil	kg	
kN	—			kN	—	min ⁻¹			
180	0,49	1,4	2,1	295	1,4	2 400	3 000	2,05	3
180	0,49	1,4	2,1	295	1,4	2 400	3 000	2,05	3
255	0,38	1,8	2,6	415	1,7	2 200	2 800	2,45	1
180	0,49	1,4	2,1	295	1,4	2 400	2 800	1,91	1
180	0,49	1,4	2,1	295	1,4	2 400	2 800	1,91	1
255	0,44	1,5	2,3	450	1,5	2 000	2 400	3,84	1
255	0,44	1,5	2,3	450	1,5	1 900	2 400	3,72	3
275	0,49	1,4	2,1	510	1,4	1 800	2 200	4,37	1
170	0,61	1,1	1,7	335	1,1	1 600	2 000	3,26	1
280	0,40	1,7	2,5	630	1,6	1 600	2 000	4,97	3
280	0,40	1,7	2,5	630	1,6	1 600	2 000	4,97	3
530	0,42	1,6	2,4	980	1,6	1 400	1 800	10,8	1
530	0,42	1,6	2,4	980	1,6	1 400	1 800	10,8	1
435	0,26	2,6	3,8	750	2,5	1 400	1 800	10,1	1
540	0,34	2,0	2,9	1 130	1,9	1 300	1 700	10,6	1
540	0,34	2,0	2,9	1 130	1,9	1 300	1 700	10,6	1
395	0,33	2,1	3,1	940	2,0	1 300	1 700	6,88	1
540	0,25	2,7	4,1	960	2,7	1 200	1 500	12,2	2
540	0,33	2,0	3,0	1 190	2,0	1 200	1 400	11,7	1
540	0,33	2,0	3,0	1 190	2,0	1 200	1 400	11,7	1
540	0,33	2,0	3,0	1 190	2,0	1 200	1 400	11,7	1
600	0,51	1,3	2,0	1 410	1,3	900	1 100	17,8	1
600	0,51	1,3	2,0	1 410	1,3	900	1 100	17,8	1



Thrust ball bearings

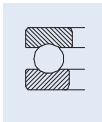


Thrust ball bearings

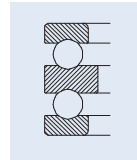
Thrust ball bearings are manufactured in two versions: single and double direction. These bearings can carry

single or double direction heavy axial loads.

Single direction



Double direction



Suffixes

- F** - machined steel cage
- J** - pressed sheet cage
- M** - machined brass cage
- P6** - tolerance class with smaller values than normal
- P5** - tolerance class with values smaller than P6
- TN** - polyamide cage
- V** - bearing without cage

These bearings are dismountable and their housing washers and cages are interchangeable with those of the corresponding single direction thrust ball bearings.

Dimensions

The overall dimensions of thrust ball bearings, single and double direction, are in accordance with ISO 104.

Thrust ball bearings, single direction

Thrust ball bearings, single direction, are used to take single direction axial loads. They cannot take radial loads.

Such a bearing consists of a shaft washer, a housing washer with flat support surface and a ball cage.

These bearings are dismountable.

Misalignment

Thrust ball bearings with flat washers do not allow any errors of angle between the position of shaft washer axis and position of the housing washer axis. Thrust ball bearings are provided either with sphered housing washer or with sphered housing washer and lock washer to enable them to compensate for these errors of alignment.

Thrust ball bearings, double direction

Thrust ball bearings, double direction, can take axial loads in both directions. They cannot take radial loads.

Such a bearing consists of a shaft washer, two housing washers with flat support surfaces and two ball cages.

Tolerances

Thrust ball bearings are generally manufactured to the normal tolerance class. Bearings series 511 can be manufactured at request to tolerance classes P6 and P5. The tolerances of thrust ball bearings are in accordance with ISO 199 and are given on page 24.

Cages

Thrust ball bearings are generally fitted with pressed sheet cages. At special request and for large sized bearings, they can be fitted with machined brass or steel cages.

Cage designs and some technical data are given in table 1.

Minimum axial load

In order to guarantee a proper arrangement of balls on the raceways, these bearings should be subjected to a minimum axial load. This is also true in case of thrust ball bearings if they operate at high speeds where the centrifugal forces and gyroscopic moments have detrimental influence on balls, i.e. sliding movements between the raceways and balls.

Minimum axial load can be calculated using the equation:

$$F_{a\ min} = M \left(\frac{n}{1\ 000} \right)^2, \text{ kN,}$$

where:
F_{a min} - minimum axial load, kN
M - minimum load factor, see bearing tables

n - speed, r/min

The weight of the components supported by the bearing, together with the external forces, often exceeds the requisite minimum load. If this is not the case, the bearings should be preloaded (e.g. by springs).

Equivalent dynamic load

For single and double row thrust ball bearings, equivalent dynamic load is:

P_a = F_a, kN

Equivalent static load

For single and double direction thrust ball bearings, equivalent static load is:

P_{0a} = F_a, kN

Abutment dimensions

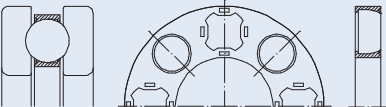
For a proper location of the washers on the shaft and housing shoulder respectively, shaft (housing) maximum connection radius r_{u max} should be less than bearing minimum mounting chamfer r_s.

Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

The values of the connection radius r_u and mounting dimensions are given in table 2, depending on the bearing series.

Cage designs and some technical data

Table 1

Cage	Design bearing cage	Application	Max. value D _m n oilgrease	
Pressed sheet cage		- General application	140× 10 ³	100× 10 ³
Machined brass cage M		- Large bearings - Special application bearings	140× 10 ³	100× 10 ³

Thrust ball bearings, single direction

Abutment dimensions

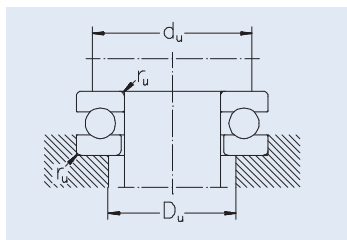


Table 2

Bore symbol	Shaft diameter d	Bearing series 511			512			513			514		
		d _u min.	D _u max.	r _u max.	d _u min.	D _u max.	r _u max.	d _u min.	D _u max.	r _u max.	d _u min.	D _u max.	r _u max.
—	mm												
00	10	18	16	0,3	20	16	0,6						
01	12	20	18	0,3	22	18	0,6						
02	15	23	20	0,3	25	22	0,6						
03	17	25	22	0,3	28	24	0,6						
04	20	29	26	0,3	32	28	0,6						
05	25	35	32	0,6	38	34	0,6	41	36	1	46	39	1
06	30	40	37	0,6	43	39	0,6	48	42	1	54	46	1
07	35	45	42	0,6	51	46	1	55	48	1	62	53	1
08	40	52	48	0,6	57	51	1	63	55	1	70	60	1
09	45	57	53	0,6	62	56	1	69	61	1	78	67	1
10	50	62	58	0,6	67	61	1	77	68	1	86	74	1,5
11	55	69	64	0,6	76	69	1	85	75	1	94	81	1,5
12	60	75	70	1	81	74	1	90	80	1	102	88	1,5
13	65	80	75	1	86	79	1	95	85	1	110	95	2
14	70	85	80	1	91	84	1	103	92	1	118	102	2
15	75	90	85	1	96	89	1	111	99	1,5	126	109	2
16	80	95	90	1	101	94	1	116	104	1,5	134	116	2,1
17	85	100	95	1	109	101	1	124	111	1,5	142	123	2,1
18	90	108	102	1	117	108	1	129	116	1,5	150	130	2,1
20	100	121	114	1	130	120	1	142	128	1,5	166	144	2,5
22	110	131	124	1	140	130	1	158	142	2	182	158	2,5
24	120	141	134	1	150	140	1	174	156	2,1	198	172	3
26	130	154	146	1	166	154	1,5	187	168	2,1	214	186	3
28	140	164	156	1	176	164	1,5	200	180	2,1	224	196	3
30	150	174	166	1	189	176	1,5	210	190	2,1	240	210	3
32	160	184	176	1	199	186	1,5	226	204	2,5			
34	170	197	188	1	212	198	1,5	236	214	2,5			
36	180	207	198	1	222	208	1,5	252	228	2,5			
38	190	220	210	1	238	222	2	268	242	3			
40	200	230	220	1	248	232	2	284	256	3			
44	220	250	240	1	268	252	2						
48	240	276	264	1,5	300	280	2,1						
52	260	296	284	1,5	320	300	2,1						
56	280	322	308	1,5	340	320	2,1						
60	300	348	332	2	372	348	2,5						
64	320	368	352	2	392	368	2,5						
68	340	388	372	2	412	388	2,5						
72	360	408	392	2	444	416	3						
76	380	428	412	2									
80	400	448	432	2									

Thrust ball bearings, double direction

Abutment dimensions

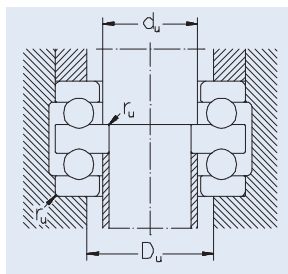
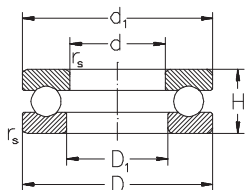


Table 3

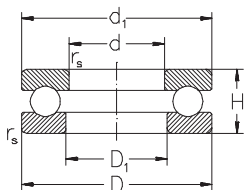
Bore symbol	Shaft diameter d	Bearing series				523 d _u min.	D _u max.	r _u max.	r _{u1} max.	524 d _u min.	D _u max.	r _u max.	r _{u1} max.	Shaft diameter d	Bearing series			
		d _u min.	D _u max.	r _u max.	r _{u1} max.										r _u min.	D _u max.	r _u max.	r _{u1} max.
		mm																
02	10	15	22	0,6	0,3													
04	15	20	28	0,6	0,3													
05	20	25	34	0,6	0,3	25	36	1	0,3	15	25	39	1	0,6				
06	25	30	39	0,6	0,3	30	42	1	0,3	20	30	46	1	0,6				
07	30	35	46	1	0,3	35	48	1	0,3	25	35	53	1	0,6				
08	30	40	51	1	0,6	40	55	1	0,6	30	40	60	1	0,6				
09	35	45	56	1	0,6	45	61	1	0,6	35	45	67	1	0,6				
10	40	50	61	1	0,6	50	68	1	0,6	40	50	74	1	0,6				
11	45	55	69	1	0,6	55	75	1	0,6	45	55	81	1,5	0,6				
12	50	60	74	1	0,6	60	80	1	0,6	50	60	88	1,5	0,6				
13	55	65	79	1	0,6	65	85	1	0,6	50	65	95	2	1				
14	55	70	84	1	1	70	92	1	1	55	70	102	2	1				
15	60	75	89	1	1	75	99	1,5	1	60	75	109	2	1				
16	65	80	94	1	1	80	104	1,5	1	65	80	116	2,1	1				
17	70	85	101	1	1	85	111	1,5	1	65	85	123	2,1	1				
18	75	90	108	1	1	90	116	1,5	1	70	90	130	2,1	1				
20	85	100	120	1	1	100	128	1,5	1	80	100	144	2,5	1				
22	95	110	130	1	1	110	142	2	1									
24	100	120	140	1	1	120	156	2,1	1									
26	110	130	154	1,5	1	130	168	2,1	1									
28	120	140	164	1,5	1	140	180	2,1	1									
30	130	150	176	1,5	1													
32	140	160	186	1,5	1													
34	150	170	198	1,5	1													

Thrust ball bearings, single direction



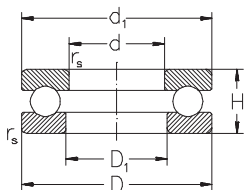
Dimensions						Basic axial load		Factor	Speed limit		Designation	Weight
d	D	H	r _s min.	d ₁	D ₁	dyn. C _a	stat. C _{0a}	M	grease	oil		
mm						kN		—	min ⁻¹		—	kg
10	24	9	0,3	24	11	10	14	0,001	7 000	9 500	51 100	0,020
	26	11	0,6	26	12	12,7	17,1	0,002	6 000	8 000	51 200	0,030
12	26	9	0,3	26	13	10,3	15,4	0,001	6 700	9 000	51101	0,022
	28	11	0,6	28	14	13,2	19	0,002	6 000	8 000	51201	0,034
15	28	9	0,3	28	16	10,5	16,8	0,001	6 000	8 000	51102	0,024
	32	12	0,6	32	17	16,6	24,8	0,004	5 000	6 700	51202	0,046
17	30	9	0,3	30	18	11,4	19,5	0,002	6 000	8 000	51103	0,028
	35	12	0,6	35	19	17,2	27,3	0,004	5 000	6 700	51203	0,053
20	35	10	0,3	35	21	15	26,6	0,003	5 300	7 000	51104	0,04
	40	14	0,6	40	22	22,3	37,7	0,008	4 300	5 600	51204	0,082
25	42	11	0,6	42	26	19,5	37,2	0,005	4 800	6 300	51105	0,059
	47	15	0,6	47	27	27,7	50,4	0,014	3 800	5 000	51205	0,120
	52	18	1	52	27	35,7	61,4	0,02	3 200	4 300	51305	0,180
	60	24	1	60	27	55,6	89,4	0,044	2 600	3 600	51405	0,340
30	47	11	0,6	47	32	20,4	42,2	0,007	4 300	5 600	51106	0,068
	52	16	0,6	52	32	28,1	54,3	0,014	3 600	4 800	51206	0,144
	60	21	1	60	32	42,8	78,7	0,029	2 800	3 800	51306	0,270
	70	28	1	70	32	72,8	126	0,08	2 000	3 000	51406	0,530
35	52	12	0,6	52	37	21,9	49,6	0,09	4 000	5 300	51107	0,090
	62	18	1	62	37	40,7	83,8	0,029	3 000	4 000	51207	0,220
	68	24	1	68	37	55,5	105	0,05	2 400	3 400	51307	0,390
	80	32	1,1	80	37	87,1	155	0,13	1 800	2 600	51407	0,790
40	60	13	0,6	60	42	26,9	62,8	0,017	3 600	4 800	51108	0,120
	68	19	1	68	42	46,9	98,3	0,05	2 800	3 800	51208	0,270
	78	26	1	78	42	69,3	135	0,08	2 000	3 000	51308	0,550
	90	36	1,1	90	42	113	205	0,23	1 700	2 400	51408	1,14
45	65	14	0,6	65	47	27,8	69,1	0,02	3 400	4 500	51109	0,150
	73	20	1	73	47	47,7	105	0,044	2 600	3 600	51209	0,320
	85	28	1	85	47	80,8	163	0,12	1 900	2 800	51309	0,690
	100	39	1,1	100	47	130	242	0,32	1 600	2 200	51409	1,47
50	70	14	0,6	70	52	28,8	75,4	0,025	3 200	4 300	51110	0,160
	78	22	1	78	52	48,5	111	0,07	2 400	3 400	51210	0,390
	95	31	1,1	95	52	91,6	186	0,18	1 800	2 600	51310	1,00
	110	43	1,5	110	52	148	283	0,48	1 500	2 000	51410	1,99
55	78	16	0,6	78	57	34,8	93,1	0,04	2 800	3 800	51111	0,240
	90	25	1	90	57	69,4	159	0,12	1 900	2 800	51211	0,610
	105	35	1,1	105	57	119	246	0,26	1 600	2 200	51311	1,34
	120	48	1,5	120	57	178	359	0,67	1 300	1 800	51411	2,64
60	85	17	1	85	62	41,4	113	0,055	2 600	3 600	51112	0,290
	95	26	1	95	62	73,6	179	0,12	1 900	2 800	51212	0,690

Thrust ball bearings, single direction



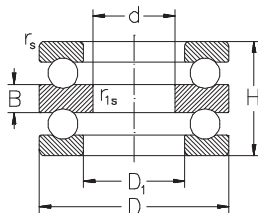
Dimensions						Basic axial load		Factor	Speed limit		Designation	Weight
d	D	H	r _s min.	d ₁	D ₁	dyn. C _a	stat. C _{0a}	M	grease	oil		
mm						kN		—	min ⁻¹		—	kg
60	110	35	1,1	110	62	124	267	0,28	1 600	2 200	51312	1,43
	130	51	1,5	130	62	201	397	0,85	1 100	1 600	51412	3,51
65	90	18	1	90	67	41,7	117	0,06	2 400	3 400	51113	0,340
	100	27	1	100	67	74,8	189	0,14	1 800	2 600	51213	0,770
	115	36	1,1	115	67	128	287	0,32	1 500	2 000	51313	1,57
	140	56	2	140	68	232	493	1,1	1 000	1 500	51413	4,47
70	95	18	1	95	72	43	127	0,067	2 400	3 400	51114	0,360
	105	27	1	105	72	73,6	189	0,16	1 800	2 600	51214	0,810
	125	40	1,1	125	72	148	339	0,53	1 400	1 900	51314	2,06
	150	60	2	150	73	250	553	1,4	950	1 400	51414	5,48
75	100	19	1	100	77	42,3	127	0,1	2 200	3 200	51115	0,420
	110	27	1	110	77	77,4	209	0,18	1 700	2 400	51215	0,860
	135	44	1,5	135	77	171	396	0,75	1 200	1 700	51315	2,68
	160	65	2	160	78	252	560	1,8	900	1 300	51415	6,75
80	105	19	1	105	82	44,6	141	0,1	2 000	3 000	51116	0,430
	115	28	1	115	82	78,5	218	0,22	1 700	2 400	51216	0,950
	140	44	1,5	140	82	176	424	0,8	1 200	1 700	51316	2,82
	170	68	2,1	170	83	270	621	2,2	850	1 200	51416	7,97
85	110	19	1	110	87	45,9	150	0,17	2 000	3 000	51117	0,460
	125	31	1	125	88	92,3	251	0,38	1 600	2 200	51217	1,29
	150	49	1,5	150	88	206	489	1,1	1 100	1 600	51317	3,66
	180	72	2,1	177	88	307	753	2,8	850	1 200	51417	9,29
90	120	22	1	120	92	59,7	190	0,2	1 800	2 600	51118	0,680
	135	35	1,1	135	93	117	326	0,55	1 500	2 000	51218	1,77
	155	50	1,5	155	93	213	524	1,2	1 000	1 500	51318	3,88
	190	77	2,1	187	93	327	826	3,4	800	1 100	51418	11,0
100	135	25	1	135	102	85	268	0,36	1 700	2 400	51120	0,990
	150	38	1,1	150	103	147	410	0,7	1 300	1 800	51220M	2,36
	170	55	1,5	170	103	236	596	1,8	950	1 400	51320M	5,11
	210	85	3	205	103	368	983	5,3	700	950	51420M	14,6
110	145	25	1	145	112	87,1	288	0,45	1 600	2 200	51122M	1,08
	160	38	1,1	160	113	148	431	0,8	1 200	1 700	51222M	2,57
	190	63	2	187	113	280	754	2,8	850	1 200	51322M	7,72
120	155	25	1	155	122	89	308	0,5	1 600	2 200	51124	1,16
	170	39	1,1	170	123	154	472	1	1 100	1 600	51224M	2,86
	210	70	2,1	205	123	325	931	4,5	800	1 100	51324M	10,6
	250	102	4	245	123	480	1460	9	600	800	51424M	25,0
130	170	30	1	170	132	104	352	0,75	1 400	1 900	51126M	1,87
	190	45	1,5	187	133	203	622	1,7	950	1 400	51226M	4,09
	225	75	2,1	220	134	346	1 030	6	750	1 000	51326M	13,3
	270	110	4	265	134	498	1 540	15	580	750	51426M	31,4

Thrust ball bearings, single direction



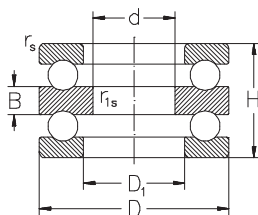
Dimensions						Basic axial load		Factor	Speed limit		Designation	Weight
d	D	H	r _s min.	d ₁	D ₁	dyn. C _a	stat. C _{0a}	M	grease	oil		
mm						kN		—	min ⁻¹		—	kg
140	180	31	1	178	142	107	377	0,9	1 300	1 800	51128M	2,02
	200	46	1,5	197	143	215	669	2	950	1 400	51228M	4,46
	240	80	2,1	235	144	367	1130	8	700	950	51328M	15,5
150	190	31	1	188	152	109	402	1	1 200	1 700	51130M	2,15
	215	50	1,5	212	153	244	768	2,8	900	1 300	51230M	5,64
	250	80	2,1	245	154	377	1 200	9	670	900	51330M	15,7
160	200	31	1	198	162	112	427	1	1 200	1 700	51132M	2,28
	225	51	0,5	222	163	247	803	3,2	850	1 200	51232M	6,53
	270	87	3	265	164	470	1 570	12	630	850	51332M	21,0
170	215	34	1,1	213	172	134	512	1,4	1 100	1 600	51134M	3,25
	240	55	1,5	237	173	269	874	4,5	800	1 100	51234M	8,12
	280	87	3	275	174	463	1 570	13	600	800	51334M	22,0
180	225	34	1,1	222	183	135	528	1,5	1 000	1 500	51136M	3,39
	250	56	1,5	247	183	294	986	5	800	1 100	51236M	8,68
	300	95	3	295	184	463	1 580	20	560	750	51336M	28,1
190	240	37	1,1	237	193	170	657	2,4	950	1 400	51138M	3,95
	270	62	2	267	194	298	1 010	7	750	1 000	51238M	11,7

Thrust ball bearings, double direction



Dimensions						Basic axial load		Factor	Speed limit		Designation	Weight	
d	D	H	r _s min.	r _{1s} min.	D ₁	B	dyn. C _a	stat. C _{0a}	M	grease	oil		
mm							kN		—	min ⁻¹		—	kg
10	32	22	0,6	0,3	17	5	16,6	24,8	0,004	5 000	6 700	52202	0,085
15	40	26	0,6	0,3	22	6	22,3	37,7	0,008	4 300	5 600	52204	0,150
	60	45	1	0,3	27	11	55,6	89,4	0,044	2 600	3 600	52405	0,630
20	47	28	0,6	0,3	27	7	27,7	50,4	0,014	3 800	5 000	52205	0,230
	52	34	1	0,3	27	8	35,7	61,4	0,02	3 200	4 300	52305	0,33
	70	52	1	0,6	32	12	72,8	126	0,08	2 000	3 000	52406	1,00
25	52	29	0,6	0,3	32	7	28,1	54,3	0,014	3 600	4 800	52206	0,272
	60	38	1	0,3	32	9	42,8	78,7	0,029	2 800	3 800	52306	0,490
	80	59	1,1	0,6	37	14	87,1	155	0,13	1 800	2 600	52407	1,44
30	62	34	1	0,3	37	8	40,7	83,8	0,029	3 000	4 000	52207	0,402
	68	36	1	0,6	42	9	46,9	98,3	0,05	2 800	3 800	52208	0,540
	68	44	1	0,3	37	10	55,5	105	0,05	2 400	3 400	52307	0,710
	78	49	1	0,6	42	12	69,3	135	0,08	2 000	3 000	52308	1,06
	90	65	1,1	0,6	42	15	113	205	0,23	1 700	2 400	52408	2,08
35	73	37	1	0,6	47	9	47,7	105	0,044	2 600	3 600	52209	0,620
	85	52	1	0,6	47	12	80,8	163	0,12	1 900	2 800	52309	1,29
	100	72	1,1	0,6	47	17	130	242	0,32	1 600	2 200	52409	2,71
40	78	39	1	0,6	52	9	48,5	111	0,07	2 400	3 400	52210	0,710
	95	58	1,1	0,6	52	14	91,6	186	0,18	1 800	2 600	52310	1,86
	110	78	1,5	0,6	52	18	148	283	0,48	1 500	2 000	52410	3,56
45	90	45	1	0,6	57	10	69,4	159	0,12	1 900	2 800	52211	1,12
	105	64	1,1	0,6	57	15	119	246	0,26	1 600	2 200	52311	2,51
	120	87	1,5	0,6	57	20	178	359	0,67	1 300	1 800	52411	4,70
50	95	46	1	0,6	62	10	73,6	179	0,12	1 900	2 800	52212	1,25
	110	64	1,1	0,6	62	15	124	267	0,28	1 600	2 200	52312	2,68
	130	93	1,5	0,6	62	21	201	397	0,85	1 100	1 600	52412	6,33
	140	101	2	1	68	23	232	493	1,1	1 000	1 500	52413	8,03
55	100	47	1	0,6	67	10	74,8	189	0,14	1 800	2 600	52213	1,36
	105	47	1	1	72	10	73,6	189	0,16	1 800	2 600	52214	1,48
	115	65	1,1	0,6	67	15	128	287	0,32	1 500	2 000	52313	2,90
	125	72	1,1	1	72	16	148	339	0,53	1 400	1 900	52314	3,90
60	110	47	1	1	77	10	77,4	209	0,18	1 700	2 400	52215	1,57
	135	79	1,5	1	77	18	171	396	0,75	1 200	1 700	52315	4,83
65	115	48	1	1	82	10	78,5	218	0,22	1 700	2 400	52216	1,69
	140	79	1,5	1	82	18	176	424	0,8	1 200	1 700	52316	5,06
70	125	55	1	1	88	12	92,3	251	0,38	1 600	2 200	52217	2,34
	150	87	1,5	1	88	19	206	489	1,1	1 100	1 600	52317	6,43
75	135	62	1,1	1	93	14	117	326	0,55	1 500	2 000	52218	3,22
	155	88	1,5	1	93	19	213	524	1,2	1 000	1 500	52318	6,60

Thrust ball bearings, double direction

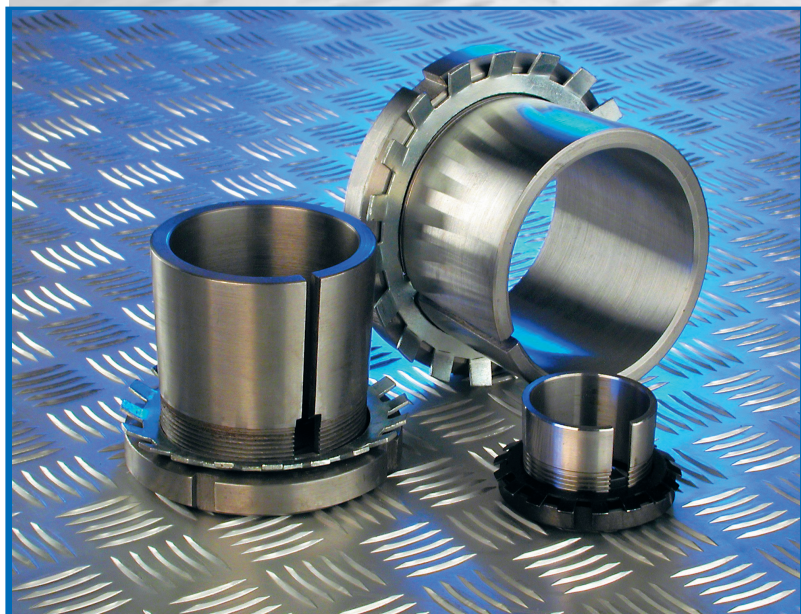


Dimensions							Basic axial load		Factor	Speed limit		Designation	Weight
d	D	H	$r_{s \text{ min.}}$	$r_{1s \text{ min.}}$	D ₁	B	dyn. C _a	stat. C _{0a}	M	grease	oil		
mm							kN		—	min ⁻¹		—	kg
80	210	150	2	1	103	33	368	983	5,3	700	950	52420	26,6
85	150	67	1,1	1	103	15	147	410	0,7	1 300	1 800	52220	4,29
	170	97	1,5	1	103	21	236	596	1,8	950	1 400	52320	8,90
95	160	67	1,1	1	113	15	148	431	0,8	1 200	1 700	52222	4,68
	190	110	2	1	113	24	280	754	2,8	850	1 200	52322	13,8
100	170	68	1,1	1,1	123	15	154	472	1	1 100	1 600	52224	5,24
	210	123	2,1	1,1	123	27	325	931	4,5	800	1 100	52324	17,2
110	190	80	1,5	1,1	133	18	203	622	1,7	950	1 400	52226	7,74
120	200	81	1,5	1,1	143	18	215	669	2	950	1 400	52228	8,95
130	215	89	1,5	1,1	153	20	244	768	2,8	900	1 300	52230	10,6
	250	140	2,1	1,1	154	31	377	1 200	9	670	900	52330	27,4
140	225	90	1,5	1,1	163	20	247	803	3,2	850	1 200	52232	12,2
	270	140	2,1	1,1	164	31	470	1 570	12	630	850	52332	26,2
150	240	97	1,5	1,1	173	21	269	874	4,5	800	1 100	52234	15,2



BEARINGS

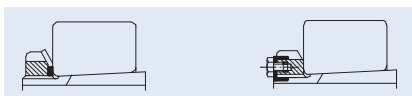
Accessories



Accessories

The accessories for bearings include: adapter sleeves, withdrawal sleeves, lock nuts, locking washers and locking clamps.

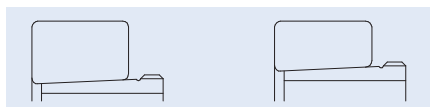
Adapter sleeves



◁ 1:12
H 30, $d_1 \leq 180$ mm
H 31, $d_1 \leq 260$ mm
H 2, H 3, H 23

◁ 1:12
H 30, $d_1 > 180$ mm
H 31, $d_1 > 260$ mm
H 39, H 32

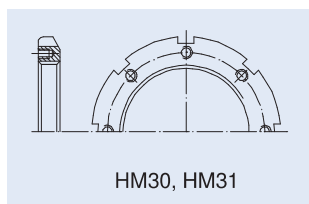
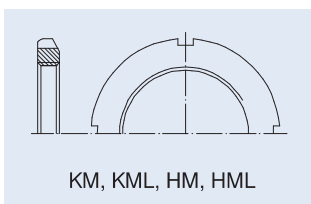
Withdrawal sleeves



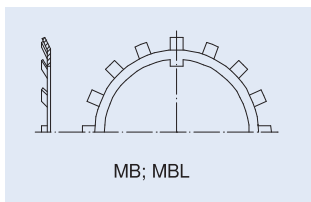
◁ 1:12
AH 39, AH 30
AH 31, AH 32
AH 3, AH 23

◁ 1:30
AH 240
AH 241

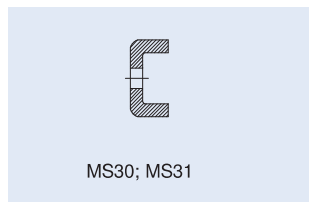
Lock nuts



Locking washers



Locking clamps



Adapter and withdrawal sleeves

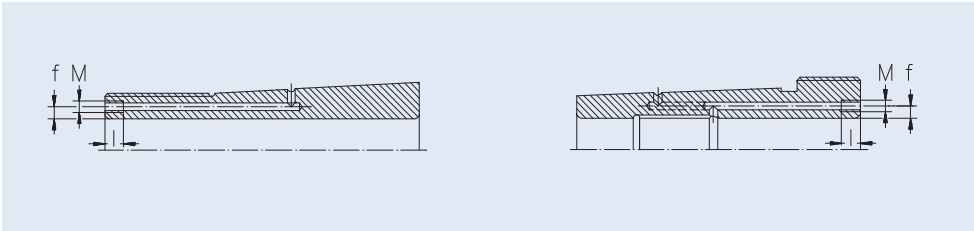
Adapter (H) and withdrawal (AH) sleeves are used when mounting tapered bore bearings on cylindrical shafts. In this case, shaft tolerances are larger than in case of bearings seated directly on the shaft. The tolerance classes recommended for shafts are h9 and h10. Form and position deviations will be in accordance with tolerance classes IT5/2 and IT7/2 (see pages 63, 80).

Adapter sleeves are manufactured according to standard ISO 2982-1 and withdrawal sleeves according to

standard ISO 2982-1.

For large-sized bearings, both adapter sleeves and withdrawal sleeves are provided with lubrication grooves, so that hydraulic systems can be used when mounting and dismounting (suffix H). The dimensions of threads for the connection to the hydraulic system are given in the tables below.

Tapered bore bearing mounting with adapter or withdrawal sleeves, bearing radial clearance after mounting and axial displacement necessary to obtain proper clearance are subjects treated in the chapter "Bearing mounting and dismounting", on page 72.



Connecting threads for adapter sleeves

Symbol		Connection dimensions		Number of entries	
over	up to	M	f	l	
—			mm		—
H3032H	H3060H	M6	4,2	9	1
H3132H	H3160H	M6	4,2	9	1
	H3260H	M6	4,2	9	1
H2332H	H2356H	M6	4,2	9	1
H3964H	H3984H	M6	3,5	9	1
H3064H	H3084H	M6	3,5	9	1
H3164H	H3184H	M6	3,5	9	1
H3264H	H3284H	M6	3,5	9	1
H3988H	H39/500H	M8	6,5	12	1
H3088H	H30/500H	M8	6,5	12	1
H3188H	H31/500H	M8	6,5	12	1
H3288H	H32/500H	M8	6,5	12	1
H39/530H	H39/560H	M8	6	12	1
H30/530H	H30/560H	M8	6	12	1
H39/630H		M8	6	12	1

Connecting threads for withdrawal sleeves

Symbol		Connection dimensions		Number of entries	
over	up to	M	f	l	
—			mm		—
AH3032H	AH3040H	M6	4,2	9	1
AH3132H	AH3140H	M6	4,5	9	1
AH3232H	AH3240H	M6	4,5	9	1
AH2332H	AH2340H	M6	4,5	9	1
AH2236H	AH2240H	M6	4,5	9	1
AH24044H	AH24064H	M6	8	9	2
AH24144H		M6	8	9	2

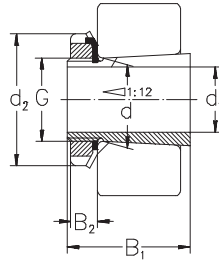
Lock nuts, locking washers and locking clamps

Lock nuts are used to fasten bearings and other parts on shafts. They are also used for bearing mounting on adapter sleeves or their dismounting from withdrawal sleeves.

Lock nuts are manufactured according to standard ISO 2982-2.

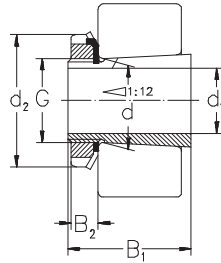
Locking washers and locking clamps are used for lock nuts securing. They are manufactured according to standard DIN 5406.

Adapter sleeves



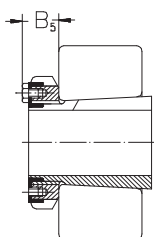
Dimensions		d ₂	B ₁	B ₂	B ₅	G	Designation sleeve	lock nut	lock washer	Weight
d ₁	d									
mm							—			kg
17	20	32	24	7		M20× 1	H204	KM4	MB4	0,041
	20	32	28	7		M20× 1	H304	KM4	MB4	0,045
	20	32	31	7		M20× 1	H2304	KM4	MB4	0,049
20	25	38	26	8		M25× 1,5	H205	KM5	MB5	0,070
	25	38	29	8		M25× 1,5	H305	KM5	MB5	0,075
	25	38	35	8		M25× 1,5	H2305	KM5	MB5	0,087
25	30	45	27	8		M30× 1,5	H206	KM6	MB6	0,099
	30	45	31	8		M30× 1,5	H306	KM6	MB6	0,109
	30	45	38	8		M30× 1,5	H2306	KM6	MB6	0,126
30	35	52	29	9		M35× 1,5	H207	KM7	MB7	0,125
	35	52	35	9		M35× 1,5	H307	KM7	MB7	0,142
	35	52	43	9		M35× 1,5	H2307	KM7	MB7	0,165
35	40	58	31	10		M40× 1,5	H208	KM8	MB8	0,174
	40	58	36	10		M40× 1,5	H308	KM8	MB8	0,189
	40	58	46	10		M40× 1,5	H2308	KM8	MB8	0,224
40	45	65	33	11		M45× 1,5	H209	KM9	MB9	0,227
	45	65	39	11		M45× 1,5	H309	KM9	MB9	0,248
	45	65	50	11		M45× 1,5	H2309	KM9	MB9	0,280
45	50	70	35	12		M50× 1,5	H210	KM10	MB10	0,274
	50	70	42	12		M50× 1,5	H310	KM10	MB10	0,303
	50	70	55	12		M50× 1,5	H2310	KM10	MB10	0,362
50	55	75	37	12		M55× 2	H211	KM11	MB11	0,308
	55	75	45	12		M55× 2	H311	KM11	MB11	0,345
	55	75	59	12		M55× 2	H2311	KM11	MB11	0,420
55	60	80	38	13		M60× 2	H212	KM12	MB12	0,346
	60	80	47	13		M60× 2	H312	KM12	MB12	0,394
	60	80	62	13		M60× 2	H2312	KM12	MB12	0,481
60	65	85	40	14		M65× 2	H213	KM13	MB13	0,401
	65	85	50	14		M65× 2	H313	KM13	MB13	0,458
	65	85	65	14		M65× 2	H2313	KM13	MB13	0,557
	70	92	41	14		M70× 2	H214	KM14	MB14	0,593
	70	92	52	14		M70× 2	H314	KM14	MB14	0,723
	70	92	68	14		M70× 2	H2314	KM14	MB14	0,897
65	75	98	43	15		M75× 2	H215	KM15	MB15	0,707
	75	98	55	15		M75× 2	H315	KM15	MB15	0,831
	75	98	73	15		M75× 2	H2315	KM15	MB15	1,05
70	80	105	46	17		M80× 2	H216	KM16	MB16	0,882
	80	105	59	17		M80× 2	H316	KM16	MB16	1,03
	80	105	78	17		M80× 2	H2316	KM16	MB16	1,28

Adapter sleeves



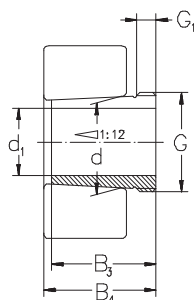
Dimensions		d ₂	B ₁	B ₂	B ₅	G	Designation sleeve	lock nut	lock washer	Weight
d ₁	d									
mm							—	kg		
75	85	110	50	18		M85× 2	H217	KM17	MB17	1,02
	85	110	63	18		M85× 2	H317	KM17	MB17	1,18
	85	110	82	18		M85× 2	H2317	KM17	MB17	1,45
80	90	120	52	18		M90× 2	H218	KM18	MB18	1,19
	90	120	65	18		M90× 2	H318	KM18	MB18	1,37
	90	120	86	18		M90× 2	H2318	KM18	MB18	1,69
85	95	125	55	19		M95× 2	H219	KM19	MB19	1,37
	95	125	68	19		M95× 2	H319	KM19	MB19	1,56
	95	125	90	19		M95× 2	H2319	KM19	MB19	1,92
90	100	130	58	20		M100× 2	H220	KM20	MB20	1,49
	100	130	71	20		M100× 2	H320	KM20	MB20	1,69
	100	130	76	20		M100× 2	H3120	KM20	MB20	1,80
	100	130	97	20		M100× 2	H2320	KM20	MB20	2,15
100	110	145	63	21		M110× 2	H222	KM22	MB22	1,93
	110	145	77	21		M110× 2	H322	KM22	MB22	2,18
	110	145	81	21		M110× 2	H3122	KM22	MB22	2,25
	110	145	105	21		M110× 2	H2322	KM22	MB22	2,74
110	120	145	72	22		M120× 2	H3024	KML24	MBL24	1,93
	120	155	88	22		M120× 2	H3124	KM24	MB24	2,64
	120	155	112	22		M120× 2	H2324	KM24	MB24	3,19
115	130	155	80	23		M130× 2	H3026	KML26	MBL26	2,85
	130	165	92	23		M130× 2	H3126	KM26	MB26	3,66
	130	165	121	23		M130× 2	H2326	KM26	MB26	4,60
125	140	165	82	24		M140× 2	H3028	KML28	MBL28	3,16
	140	180	97	24		M140× 2	H3128	KM28	MB28	4,34
	140	180	131	24		M140× 2	H2328	KM28	MB28	5,55
135	150	180	87	26		M150× 2	H3030	KML30	MBL30	3,89
	150	195	111	26		M150× 2	H3130	KM30	MB30	5,52
	150	195	139	26		M150× 2	H2330	KM30	MB30	6,63
140	160	190	93	27,5		M160× 3	H3032	KML32	MBL32	5,21
	160	210	119	28		M160× 3	H3132	KM32	MB32	7,67
	160	210	147	28		M160× 3	H2332	KM32	MB32	9,14
150	170	200	101	28,5		M170× 3	H3034	KML34	MBL34	5,99
	170	220	122	29		M170× 3	H3134	KM34	MB34	8,38
	170	220	154	29		M170× 3	H2334	KM34	MB34	10,2
160	180	210	109	29,5		M180× 3	H3036	KML36	MBL36	6,83
	180	230	131	30		M180× 3	H3136	KM36	MB36	9,50
	180	230	161	30		M180× 3	H2336	KM36	MB36	11,3

Adapter sleeves



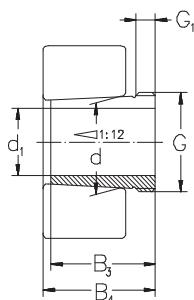
Dimensions							Designation			Weight
d ₁	d	d ₂	B ₁	B ₂	B ₅	G	sleeve	lock nut	lock washer	
mm							—			kg
170	190	220	112	30,5		M190× 3	H3038	KML38	MBL38	7,45
	190	240	141	31		M190× 3	H3138	KM38	MB38	10,8
	190	240	169	31		M190× 3	H2338	KM38	MB38	12,6
180	200	240	120	31,5		M200× 3	H3040	KML40	MBL40	9,19
	200	250	150	32		M200× 3	H3140	KM40	MB40	12,1
	200	250	176	32		M200× 3	H2340	KM40	MB40	13,9

Withdrawal sleeves



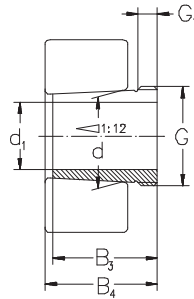
Dimensions		B ₃	B ₄	G	G ₁	Designation sleeve	Weight lock nut	
d ₁	d							
mm						—	kg	
35	40	29	32	M45× 1,5	6	AH308	KM9	0,090
	40	40	43	M45× 1,5	7	AH2308	KM9	0,128
40	45	31	34	M50× 1,5	6	AH309	KM10	0,109
	45	44	47	M50× 1,5	7	AH2309	KM10	0,164
45	50	35	38	M55× 2	7	AH310	KM11	0,137
	50	50	53	M55× 2	9	AH2310	KM11	0,209
50	55	37	40	M60× 2	7	AH311	KM12	0,161
	55	54	57	M60× 2	10	AH2311	KM12	0,253
55	60	40	43	M65× 2	8	AH312	KM13	0,189
	60	58	61	M65× 2	11	AH2312	KM13	0,297
60	65	42	45	M75× 2	8	AH313	KM15	0,253
	65	61	64	M75× 2	12	AH2313	KM15	0,395
65	70	43	47	M80× 2	8	AH314	KM16	0,280
	70	64	68	M80× 2	12	AH2314	KM16	0,466
70	75	45	49	M85× 2	8	AH315	KM17	0,313
	75	68	72	M85× 2	12	AH2315	KM17	0,534
75	80	48	52	M90× 2	8	AH316	KM18	0,365
	80	71	75	M90× 2	12	AH2316	KM18	0,597
80	85	52	56	M95× 2	9	AH317	KM19	0,429
	85	74	78	M95× 2	13	AH2317	KM19	0,670
85	90	53	57	M100× 2	9	AH318	KM20	0,461
	90	63	67	M100× 2	10	AH3218	KM20	0,570
	90	79	83	M100× 2	14	AH2318	KM20	0,779
90	95	57	61	M105× 2	10	AH319	KM21	0,532
	95	67		M105× 2	11	AH3219	KM21	0,655
	95	85	89	M105× 2	16	AH2319	KM21	0,886
95	100	59	63	M110× 2	10	AH320	KM22	0,582
	100	64	68	M110× 2	11	AH3120	KM22	0,650
	100	73	77	M110× 2	11	AH3220	KM22	0,767
	100	90	94	M110× 2	16	AH2320	KM22	0,998
105	110	68	72	M120× 2	11	AH3122	KM24	0,760
	110	68	72	M120× 2	11	AH322	KM24	0,663
	110	82	86	M125× 2	11	AH3222	KM25	1,04
	110	82	91	M115× 2	13	AH24122	KM23	0,730
	110	98	102	M125× 2	16	AH2322	KM25	1,35
115	120	60	64	M130× 2	13	AH3024	KM26	0,750
	120	73	82	M125× 2	13	AH24024	KM25	0,650

Withdrawal sleeves



Dimensions		B ₃	B ₄	G	G ₁	Designation sleeve	Weight lock nut
d ₁	d						
mm						—	kg
115	120	75	79	M130× 2 12	AH3124	KM26	0,950
	120	90	94	M135× 2 13	AH3224	KM27	1,30
	120	93	102	M130× 2 13	AH24124	KM26	1,00
	120	105	109	M135× 2 17	AH2324	KM27	1,60
125	130	67	71	M140× 2 14	AH3026	KM28	0,930
	130	78	82	M140× 2 12	AH3126	KM28	1,08
	130	83	93	M135× 2 14	AH24026	KM27	0,840
	130	94	104	M140× 2 14	AH24126	KM28	1,11
	130	98	102	M145× 2 15	AH3226	KM29	1,58
	130	115	119	M145× 2 19	AH2326	KM29	1,97
	140	68	73	M150× 2 14	AH3028	KM30	1,01
	140	83	88	M150× 2 14	AH3128	KM30	1,28
135	140	83	93	M145× 2 14	AH24028	KM29	0,910
	140	99	109	M150× 2 14	AH24128	KM30	1,25
	140	104	109	M155× 3 15	AH3228	KM31	1,84
	140	125	130	M155× 3 20	AH2328	KM31	2,33
	150	72	77	M160× 3 15	AH3030	KM32	1,15
	150	90	101	M155× 3 15	AH24030	KM31	1,04
145	150	96	101	M165× 3 15	AH3130	KM33	1,79
	150	114	119	M165× 3 17	AH3230	KM33	2,22
	150	115	126	M160× 3 15	AH24130	KM32	1,56
	150	135	140	M165× 3 24	AH2330	KM33	2,82
	160	77	82	M170× 3 16	AH3032	KM34	2,06
	160	95	106	M170× 3 15	AH24032	KM34	2,33
150	160	103	108	M180× 3 16	AH3132	KM36	3,21
	160	124	130	M180× 3 20	AH3232	KM36	4,08
	160	124	135	M170× 3 15	AH24132	KM34	3,00
	160	140	146	M180× 3 24	AH2332	KM36	4,72
	170	85	90	M180× 3 17	AH3034	KM36	2,43
	170	104	109	M190× 3 16	AH3134	KM38	3,40
160	170	106	117	M180× 3 16	AH24034	KM36	2,80
	170	125	136	M180× 3 16	AH24134	KM36	3,21
	170	134	140	M190× 3 24	AH3234	KM38	4,80
	170	146	152	M190× 3 24	AH2334	KM38	5,25
	180	92	98	M190× 3 17	AH3036	KM38	2,81
	180	105	110	M200× 3 17	AH2236H	KM40	3,75
170	180	116	122	M200× 3 19	AH3136	KM40	4,22
	180	116	127	M190× 3 16	AH24036	KM38	3,10
	180	134	145	M190× 3 16	AH24136	KM38	3,68

Withdrawal sleeves



Dimensions		B ₃	B ₄	G	G ₁	Designation sleeve	Weight lock nut	
d ₁	d							
mm						—	kg	
170	180	140	146	M200× 3 24		AH3236	KM40	5,32
	180	154	160	M200× 3 26		AH2336	KM40	5,83
180	190	96	102	Tr205× 4 18		AH3038	HML41T	3,32
	190	112	117	Tr210× 4 18		AH2238	HM42T	4,25
	190	118	131	M200× 3 18		AH24038	KM40	3,50
	190	125	131	Tr210× 4 20		AH3138	HM42T	4,89
	190	145	152	Tr210× 4 25		AH3238	HM42T	5,90
	190	146	159	M200× 3 18		AH24138	KM40	4,28
	190	160	167	Tr210× 4 26		AH2338	HM42T	6,36
	190	160	167	Tr210× 4 26		AH2338	HM42T	6,36
190	200	102	108	Tr215× 4 19		AH3040	HML43T	3,80
	200	118	123	Tr220× 4 19		AH2240	HM44T	4,68
	200	127	140	Tr210× 4 18		AH24040	HM42T	3,93
	200	134	140	Tr220× 4 21		AH3140	HM44T	5,49
	200	153	160	Tr220× 4 25		AH3240	HM44T	6,68
	200	158	171	Tr210× 4 18		AH24140	HM42T	5,10
	200	170	177	Tr220× 4 30		AH2340	HM44T	7,54
	200	170	177	Tr220× 4 30		AH2340	HM44T	7,54

II. Spherical plain bearing and rod ends



Spherical plain bearings Rod ends

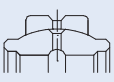
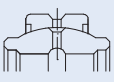
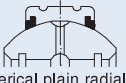


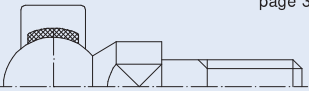
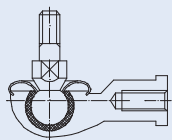
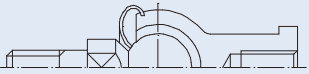
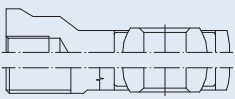
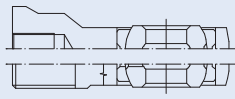
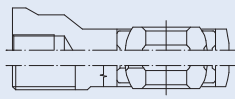
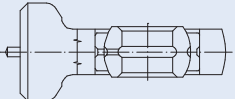
Spherical plain bearings

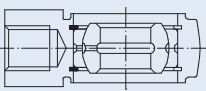
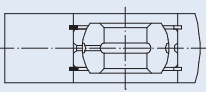
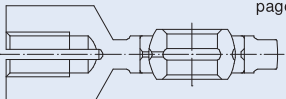
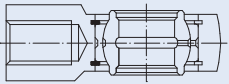
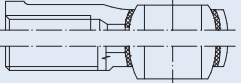
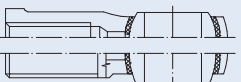
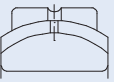
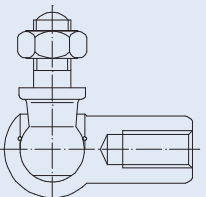
Rod ends

Spherical plain bearings and rod ends MTK are manufactured with material of the best quality on machines of high precision, therefore we are able to guarantee that they are products of high quality, suitable to a many lot of uses in sector of industry, farming, hydraulics, pneumatics and everywhere it is requested a precision use, or hard loads, or maintenance free. The tolerances of manufacture and assembly respect the rules of standard ISO (and DIN for some series used for hydraulics) and they are interchangeable with the products of the most important manufactures.

Name and number	Equivalent			Bore diameter range mm	Design feature
	SKF	INA	IKO		
 page 299 Spherical plain radial bearings with fitting crack GE...E GEG...E	GE...E —	GE...DO GE...FO	GE...E GE...G	4-12 4-12	Outer ring without single split in axial direction. No lubrication grooves and holes, both outer and inner rings are properly phosphorlytate-treated
 page 299 Spherical plain radial bearings with fitting crack GE...ES GEG...ES	GE...ES GEH...ES	GE...DO GE...FO	GE...ES GE...GS	15-3000 15-280	Outer ring with single split in axial direction. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorlytate-treated.
 page 301 Spherical plain radial bearings with two seals and fitting crack GE...ES 2RS GEG...ES 2RS	GE...ES 2RS GEH...ES 2RS	GE...DO 2RS GE...FO 2RS	GE...ES 2RS GE...GS 2RS	15-300 15-280	Outer ring with single split in axial direction. With two seals. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorlytate-treated.

Name and number	Equivalent			Bore diameter range mm	Design feature
	SKF	INA	IKO		
 page 303 Spherical plain radial bearings with wide inner ring and fitting crack. GEEW...ES	GEG...ES	GE...LO	—	12-100	Outer ring with single split in axial direction. Inner ring with cylindrical extension at either side. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorylate-treated.
 page 303 Spherical plain radial bearings with two seals and wide inner ring and fitting crack. GEEW...ES 2RS GEEM...ES 2RS	GEM...ES 2RS	GE...HO 2RS	—	20-80 12-100	Outer ring with single split in axial direction. With two seals. Inner ring with cylindrical extension at either side. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorylate-treated.
 page 305 Maintenance-free spherical plain radial bearings GE...C GE...ET 2RS GEG...C GEG...ET 2RS	GE...C GE...TE 2RS GEH...C GEH...C 2RS	GE...UK GE...UK 2RS GE...FW GE...FW 2RS	GE...EC GE...EL 2RS	4-30 20-140 4-30 30-140	Outer ring pressed around inner ring. To line SF1 material on the surface of spherical plain. Spherical surface of inner ring with chromium plating.
 page 308 Angular contact spherical plain bearings. GAC...S	GAC...F	GE...SW	—	25-120	Separable outer and inner rings. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorylate-treated.
 page 309 Spherical plain thrust bearings GX...S	GX...F	GE...AW	—	10-120	Separable shaft and housing washers. Lubrication grooves and holes in the housing washer. Both shaft and housing washers are properly phosphorylate-treated.
 page 310 Spherical plain radial bearings with fitting crack. Dimension in inches. GEZ...ES GEZ...ES 2RS	GEZ...ES GEZ...ES 2RS	GE...ZO GE...ZO 2RS	SBB... SBB...2RS	12,7-152,4 12,7-152,4	As type GE...ES, but dimension inches.
 page 312 Spherical plain radial bearings with two pieces GE...XS K	—	—	SB...	12-150	Outer ring with two pieces in axial direction. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorylate-treated.
 page 314 Spherical plain radial bearings with two seals, two pieces GEK...XS 2RS	—	—	—	25-60	Outer ring with two axial pieces and two seals. Spherical surface of inner ring with chromium plating. Lubrication grooves and holes in the inner ring.

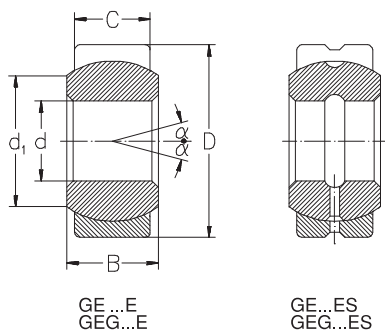
Name and number	Equivalent			Bore diameter range mm	Design feature
	SKF	INA	IKO		
 page 315 Ball joint rod ends with one shank. SQD...C	—	—	—	5-16	Ball joint housing is an outer ring of spherical plain radial bearing. To line SF1 material on the surface of spherical plain.
 page 316 winding shape ball joint rod ends with a dust cover SQ...C RS	—	—	—	5-22	Ball joint housing is a "L" shaped shank with dust cover with female tread. They are available for right or left hand thread. To line SF1 material on the surface of spherical plain.
 page 318 Straight ball joint rod ends with a dust cover SQZ...C RS	—	—	—	5-22	Ball joint housing is an axial shank with dust cover with female thread. Stretching rod with right or left hand thread. To line SF1 material on the surface of spherical plain.
 page 320 page 324 Combination rod ends SI...E SA...E	SI...E SA...E	GIR...DO GAR...DO	— —	5-12 5-12	Bearings with a stretching rod. Stretching rod with right or left-hand, male or female thread. It is made up of a spherical plain radial bearing of type GE...E and rod body.
 page 320 page 324 Combination rod ends SI...ES SA...ES SI...ES 2RS SA...ES 2RS	SI...ES/SIA...ES SA...ES/SIA...ES — —	GIR...DO GAR...DO GIR...DO 2RS GAR...DO 2RS	— — — —	15-80 15-80 15-80 15-80	Bearings with a stretching rod. Stretching rod with right or left-hand, male or female thread. It is made up of a spherical plain radial bearing of type GE...ES and rod body. The housing with a lubrication hole or a grease nipple.
 page 320 page 324 Combination rod ends SI...C SA...C SI...C 2RS SA...C 2RS	SI...C SA...C SI...TE 2RS SA...TE 2RS	GIR...UK GAR...UK GIR...UK 2RS GAR...UK 2RS	— — — —	15-80 15-80 35-80 35-80	Bearings with a stretching rod. Stretching rod with right or left-hand, male or female thread. It is made up of a spherical plain radial bearing of type GE...ES and rod body. To line SF1 material on the surface of spherical plain.
 page 326 Ball joint ends for hydraulics with grease nipple, welding steel body TAC		GK...DO	—	10-18	Round ball joint ends to weld on the bottom of cylinder. Standard dimensions DIN 648. Sliding contact surface: steel/steel.

Name and number	Equivalent			Bore diameter range mm	Design feature
	SKF	INA	IKO		
 page 327 Screwed ball joint ends for hydraulics also with screw clamping device and grease nipple TAPR...N	SIR...ES	GIHR...DO GIHRK...DO	— —	20-120 20-120	Screwed ball joint ends with screw on shank and also with body equipped of clamping screws in hard execution. Sliding contact surface: steel/steel.
 page 329 Ball joint ends for hydraulics with grease nipple, welding steel body TPN	SCF...ES	GF...DO	—	2020	Ball joint ends in strong execution to weld advisable with alternate loads. Sliding contact surface: steel/steel.
 page 330 Screw on ball joint ends for hydraulics with screw clamping device and grease nipple TAPR...DO	SIJ...ES	GIHO-K...DO	—	12-100	Ball joint ends with internal thread and damping device through two screws on two sides Standard DIN 24555. Sliding contact surface: steel/steel
 page 331 Screw on ball joint ends for hydraulics with screw clamping device and grease nipple TAPR...CE	SIQG...ES	GIHN K...LO	—	12-125	Stout ball joint ends with internal thread Standard DIN 24338 with screws clamping device sliding contact surface: steel/steel.
 page 332 page 333 Rod ends POS... PHS...	SAKAC...M SIKAC...M	GAKFR...PB GIKFR...PB	POS... PHS...	5-30 5-30	Bearings with a stretching rod. Stretching rod with right or left-hand, male or female thread. To line bronze material on the surface of spherical plain. Spherical surface of ball with chromium plating.
 page 333 page 333 Maintenance-free rod POS...EC PHS...EC	SAKB...F SIKB...F	GAKFR...PW GIKFR...PW	POS...EC PHS...EC	5-30 5-30	Bearings with a stretching rod with right or left-hand, male or female thread. To line SF1 material on the surface of spherical plain. Spherical surface of ball with chromium plating.
 page 334 Spherical plain radial bearings SSR	—	—	—	5-30	Outer ring with single split in axial direction. Lubrication grooves and holes in the outer rings. Sliding contact surfaces: bronze/steel.
 page 335 Ball joints rod ends DIN 71802	—	—	—	8-19	Ball joints rod ends with shank and spring clamping.

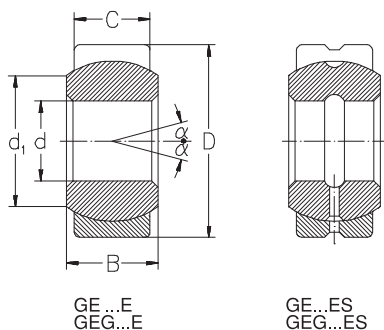
Spherical plain radial bearings with fitting crack

Two seals and fitting crack, fitting groove

ISO 6124-1979, ISO 6125-1979



Dimensions				Load ratings			α^*	Designation	Weight
d	D	B	C	d ₁ min.	dyn.	stat.		—	kg
mm					kN	kN			
4	12	5	3	6	2	10	16	GE4E	0,0033
5	14	6	4	7	3,4	17	13	GE5S	0,0038
6	14	6	4	8	3,4	17	13	GE6S	0,0042
8	16	8	5	10	5,5	27	15	GE8E	0,0075
10	19	9	6	13	8,1	40	12	GE10E	0,011
12	22	10	7	15	10	54	10	GE12E	0,015
15	26	12	9	18	17	85	8	GE15E	0,027
	26	12	9	18	17	85	8	GE15ES 2RS	0,027
17	30	14	10	20	21	106	10	GE17ES	0,041
	30	14	10	20	21	106	10	GE17ES 2RS	0,041
20	35	16	12	24	30	146	9	GE20ES	0,066
	35	16	12	24	30	146	9	GE20ES 2RS	0,066
25	42	20	16	29	48	240	7	GE25ES	0,119
	42	20	16	29	48	240	7	GE25ES 2RS	0,119
30	47	22	18	34	62	310	6	GE30ES	0,153
	47	22	18	34	62	310	6	GE30ES 2RS	0,153
35	55	25	20	39	80	400	6	GE35ES	0,233
	55	25	20	39	80	400	6	GE35ES 2RS	0,233
40	62	28	22	45	100	500	7	GE40ES	0,306
	62	28	22	45	100	500	7	GE40ES 2RS	0,306
45	68	32	25	50	127	640	7	GE45ES	0,427
	68	32	25	50	127	640	7	GE45ES 2RS	0,427
50	75	35	28	55	156	780	6	GE50ES	0,546
	75	35	28	55	156	780	6	GE50ES 2RS	0,546
60	90	44	36	66	245	1220	6	GE60ES	1,045
	90	44	36	66	245	1220	6	GE60ES 2RS	1,045
70	105	49	40	77	315	1560	6	GE70ES	1,55
	105	49	40	77	315	1560	6	GE70ES 2RS	1,55
80	120	55	45	88	400	2000	6	GE80ES	2,31
	120	55	45	88	400	2000	6	GE80ES 2RS	2,31
90	130	60	50	98	490	2450	5	GE90ES	2,75



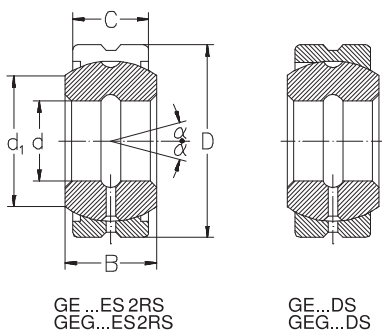
Dimensions				Load ratings			α^*	Designation	Weight
d	D	B	C	d ₁ min.	dyn.	stati.		—	kg
mm					kN	kN			
90	130	60	50	98	490	2450	5	GE90ES 2RS	2,75
100	150	70	55	109	610	3050	7	GE100ES	4,45
	150	70	55	109	610	3050	7	GE100ES 2RS	4,45
110	160	70	55	120	655	3250	6	GE110ES	4,82
	160	70	55	120	655	3250	6	GE110ES 2RS	4,82
120	180	85	70	130	950	4750	6	GE120ES	8,05
	180	85	70	130	950	4750	6	GE120ES 2RS	8,05
140	210	90	70	150	1080	5400	7	GE140ES	11,02
	210	90	70	150	1080	5400	7	GE140ES 2RS	11,02
160	230	105	80	170	1370	6800	8	GE160ES	14,01
	230	105	80	170	1370	6800	8	GE160ES 2RS	14,01
180	260	105	80	192	1530	7650	6	GE180ES	18,65
	260	105	80	192	1530	7650	6	GE180ES 2RS	18,65
	260	105	80	192	1530	7650	6	GE180DS	18,65
200	290	130	100	212	2120	10600	7	GE200ES	28,03
	290	130	100	212	2120	10600	7	GE200ES 2RS	28,03
	290	130	100	212	2120	10600	7	GE200DS	28,03
220	320	135	100	238	2320	11600	8	GE220ES	35,91
	320	135	100	238	2320	11600	8	GE220ES 2RS	35,91
	320	135	100	238	2320	11600	8	GE220DS	35,91
240	340	140	100	265	2550	12700	8	GE240ES	39,91
	340	140	100	265	2550	12700	8	GE240ES 2RS	39,91
	340	140	100	265	2550	12700	8	GE240DS	39,91
260	370	150	110	285	3050	15300	7	GE260ES	51,84
	370	150	110	285	3050	15300	7	GE260ES 2RS	51,84
	370	150	110	285	3050	15300	7	GE260DS	51,84
280	400	155	120	310	3550	18000	6	GE280ES	65,36
	400	155	120	310	3550	18000	6	GE280ES 2RS	65,36
	400	155	120	310	3550	18000	6	GE280DS	65,36
300	430	165	120	330	3800	19000	7	GE300ES	78,07
	430	165	120	330	3800	19000	7	GE300ES 2RS	78,07
	430	165	120	330	3800	19000	7	GE300DS	78,07

*The sizes are not binding.

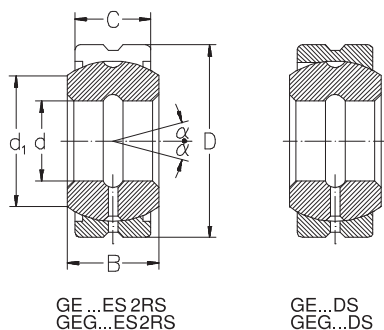
Spherical plain radial bearings with fitting crack

Two seals and fitting crack, fitting groove

ISO 6124-1979, ISO 6125-1979



Dimensions				Load ratings			α^*	Designation	Weight
d	D	B	C	d ₁ min.	dyn.	stat.			
mm					kN	kN		—	kg
4	14	7	4	7	3,4	17	20	GEG4E	0,0045
5	16	9	5	8	5,5	27	21	GEG5S	0,0066
6	16	9	5	9	5,5	27	21	GEG6S	0,0081
8	19	11	6	11	8,1	40	21	GEG8E	0,014
10	22	12	7	13	10	54	18	GEG10E	0,021
12	26	15	9	16	17	85	18	GEG12E	0,033
15	30	16	10	19	21	106	16	GEG15E	0,049
	30	16	10	19	21	106	16	GEG15ES 2RS	0,049
17	35	20	12	21	30	146	19	GEG17ES	0,083
	35	20	12	21	30	146	19	GEG17ES 2RS	0,083
20	42	25	16	24	48	240	17	GEG20ES	0,153
	42	25	16	24	48	240	17	GEG20ES 2RS	0,153
25	47	28	18	29	62	310	17	GEG25ES	0,203
	47	28	18	29	62	310	17	GEG25ES 2RS	0,203
30	55	32	20	34	80	400	17	GEG30ES	0,304
	55	32	20	34	80	400	17	GEG30ES 2RS	0,304
35	62	35	22	39	100	500	16	GEG35ES	0,408
	62	35	22	39	100	500	16	GEG35ES 2RS	0,408
40	68	40	25	44	127	640	17	GEG40ES	0,542
	68	40	25	44	127	640	17	GEG40ES-2RS	0,542
45	75	43	28	50	156	780	15	GEG45ES	0,713
	75	43	28	50	156	780	15	GEG45ES 2RS	0,713
50	90	56	36	57	245	1220	17	GEG50ES	1,44
	90	56	36	57	245	1220	17	GEG50ES 2RS	1,44
60	105	63	40	67	315	1560	17	GEG60ES	1,60
	105	63	40	67	315	1560	17	GEG60ES 2RS	1,60
70	120	70	45	77	400	2000	16	GEG70ES	3,01
	120	70	45	77	400	2000	16	GEG70ES 2RS	3,01
80	130	75	50	87	490	2450	14	GEG80ES	3,64
	130	75	50	87	490	2450	14	GEG80ES 2RS	3,64



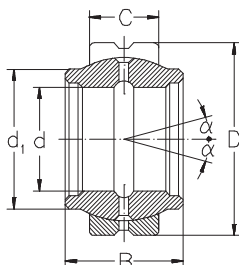
Dimensions				Load ratings			α^*	Designation	Weight
d	D	B	C	d1 min.	dyn.	stat.		—	kg
mm					kN	kN			
90	150	85	55	98	610	3050	15	GEG90ES	5,22
	150	85	55	98	610	3050	15	GEG90ES 2RS	5,22
100	160	85	55	110	655	3250	14	GEG100ES	6,05
	160	85	55	110	655	3250	14	GEG100ES 2RS	6,05
110	180	100	70	122	950	4750	12	GEG110ES	9,68
	180	100	70	122	950	4750	12	GEG110ES 2RS	9,68
120	210	115	70	132	1080	5400	16	GEG120ES	14,72
	210	115	70	132	1080	5400	16	GEG120ES 2RS	14,72
140	230	130	80	151	1370	6800	16	GEG140ES	19,01
	230	130	80	151	1370	6800	16	GEG140ES 2RS	19,01
160	260	135	80	176	1530	7650	16	GEG160ES	20,02
	260	135	80	176	1530	7650	16	GEG160ES 2RS	20,02
	260	135	80	176	1530	7650	16	GEG160DS	20,02
180	290	155	100	196	2120	10600	14	GEG180ES	32,21
	290	155	100	196	2120	10600	14	GEG180ES 2RS	32,21
	290	155	100	196	2120	10600	14	GEG180DS	32,21
200	320	165	100	220	2320	11600	15	GEG200ES	45,28
	320	165	100	220	2320	11600	15	GEG200ES 2RS	45,28
	320	165	100	220	2320	11600	15	GEG200DS	45,28
220	340	175	100	243	2550	12700	16	GEG220ES	51,12
	340	175	100	243	2550	12700	16	GEG220ES 2RS	51,12
	340	175	100	243	2550	12700	16	GEG220DS	51,12
240	370	190	110	263	3050	15300	15	GEG240ES	65,12
	370	190	110	263	3050	15300	15	GEG240ES 2RS	65,12
	370	190	110	263	3050	15300	15	GEG240DS	65,12
260	400	205	120	285	3550	18000	15	GEG260ES	82,44
	400	205	120	285	3550	18000	15	GEG260ES 2RS	82,44
	400	205	120	285	3550	18000	15	GEG260DS	82,44
280	430	210	120	310	3800	19000	15	GEG280ES	97,21
	430	210	120	310	3800	19000	15	GEG280ES 2RS	97,21
	430	210	120	310	3800	19000	15	GEG280DS	97,21

*The sizes are not binding.

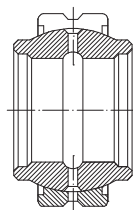
Spherical plain radial bearings with wide inner ring and fitting crack

Two seals and wide inner ring and fitting crack

ISO 61204/2-1982



GEEW...ES



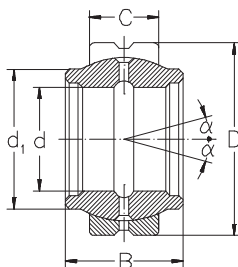
GEEW...ES2RS
GEEM...ES2RS

Dimensions				Load ratings			α*	Designation	Weight
d	D	B	C	d ₁ min.	dyn.	stat.			
mm					kN	kN		—	kg
12	22	12	7	15,5	10	54	4	GEEW12ES	0,022
	22	12	7	15,5	10	54	4	GEEW12ES 2RS*	0,022
15	26	15	9	18,5	17	85	5	GEEW15ES	0,031
	26	15	9	18,5	17	85	5	GEEW15ES 2RS	0,031
16	28	16	9	20	17	85	4	GEEW16ES	0,035
	28	16	9	20	17	85	4	GEEW16ES 2RS	0,035
17	30	17	10	21	21	106	7	GEEW17ES	0,044
	30	17	10	21	21	106	7	GEEW17ES 2RS	0,044
20	35	20	12	25	30	146	4	GEEW20ES	0,071
	35	20	12	25	30	146	4	GEEW20ES 2RS	0,071
25	42	25	16	30,5	48	240	4	GEEW25ES	0,131
	42	25	16	30,5	48	240	4	GEEW25ES 2RS	0,131
30	47	30	18	34	62	310	4	GEEW30ES	0,168
	47	30	18	34	62	310	4	GEEW30ES 2RS	0,168
32	52	32	18	37	62	31	4	GEEW32ES	0,182
	52	32	18	37	62	31	4	GEEW32ES 2RS	0,182
35	55	35	20	40	80	400	4	GEEW35ES	0,253
	55	35	20	40	80	400	4	GEEW35ES 2RS	0,253
40	62	40	22	46	100	500	4	GEEW40ES	0,338
	62	40	22	46	100	500	4	GEEW40ES 2RS	0,338
45	68	45	25	52	127	640	4	GEEW45ES	0,481
	68	45	25	52	127	640	4	GEEW45ES 2RS	0,481
50	75	50	28	57	156	780	4	GEEW50ES	0,558
	75	50	28	57	156	780	4	GEEW50ES 2RS	0,558
60	90	60	36	68	245	1220	3	GEEW60ES	1,15
	90	60	36	68	245	1220	3	GEEW60ES 2RS	1,15
63	95	63	36	71,5	245	1220	4	GEEW63ES	1,23
	95	63	36	71,5	245	1220	4	GEEW63ES	1,23
70	105	70	40	78	315	1560	4	GEEW70ES	1,71
	105	70	40	78	315	1560	4	GEEW70ES 2RS	1,71

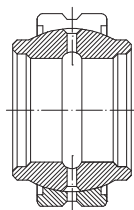
Spherical plain radial bearings with wide inner ring and fitting crack

Two seals and wide inner ring and fitting crack

ISO 61204/2-1982



GEEW...ES



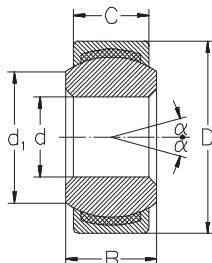
GEEW...ES2RS
GEEM...ES2RS

Dimensions				Load ratings			α^*	Designation	Weight
d	D	B	C	d ₁ min.	dyn.	stat.			
mm					kN	kN		—	kg
80	120	80	45	91	400	2000	4	GEEW80ES	2,39
	120	80	45	91	400	2000	4	GEEW80ES 2RS	2,39
100	150	100	55	113	610	3050	4	GEEW100ES	4,80
	150	100	55	113	610	3050	4	GEEW100ES 2RS	4,80
125	180	125	70	138	950	4750	4	GEEW125ES	8,50
	180	125	70	138	950	4750	4	GEEW125ES 2RS	8,50
20	35	24	12	24	30	146	6	GEEM20ES 2RS	0,073
25	42	29	16	29	48	240	4	GEEM25ES 2RS	0,13
30	47	30	18	34	62	310	4	GEEM30ES 2RS	0,17
35	55	35	20	40	80	400	4	GEEM35ES 2RS	0,25
40	62	38	22	45	100	500	4	GEEM40ES 2RS	0,35
45	68	40	25	52	127	640	4	GEEM45ES 2RS	0,49
50	75	43	28	57	156	780	4	GEEM50ES 2RS	0,60
60	90	54	36	68	245	1220	3	GEEM60ES 2RS	1,15
70	105	65	40	78	315	1560	4	GEEM70ES 2RS	1,65
80	120	74	45	90	400	2000	4	GEEM80ES 2RS	2,50

*The sizes are not binding.

Maintenance free spherical plain radial bearings

GB304.7-81, GB304.9-81 (ISO6124-1979, ISO6125-1979)

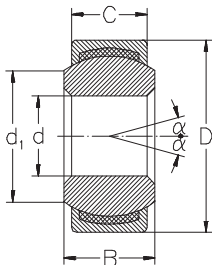


GE...C
GE...ET2RS

Dimensions				Load ratings			α^*	Designation	Weight
d	D	B	C	d ₁ min.	dyn.	stat.			
mm					kN	kN		—	kg
4	12	5	3	6	2,1	5,4	16	GE4C	0,0033
5	14	6	4	7	3,6	9,1	13	GE5C	0.0038
6	14	6	4	8	3,6	9,1	13	GE6C	0,0042
8	16	8	5	10	5,8	14	15	GE8C	0,0075
10	19	9	6	13	8,6	21	12	GE10C	0,011
12	22	10	7	15	11	28	10	GE12C	0.015
15	26	12	9	18	18	45	8	GE15C	0,027
17	30	14	10	20	22	56	10	GE17C	0,041
20	35	16	12	24	31	78	9	GE20C	0,066
	35	16	12	24	31	78	9	GE20ET 2RS	0,066
25	42	20	16	29	51	127	7	GE25C	0,119
	42	20	16	29	51	127	7	GE25ET 2RS	0,119
30	47	22	18	34	65	166	6	GE30C	0,163
	47	22	18	34	65	166	6	GE30ET 2RS	0,163
35	55	25	20	-	110	220	6	GE35ET 2RS	0,25
40	62	28	22	-	140	280	6	GE40ET 2RS	0,30
45	68	32	25	-	180	350	6	GE45ET 2RS	0,35
50	75	35	28	-	220	430	6	GE50ET 2RS	0,50
60	90	44	36	-	340	690	6	GE60ET 2RS	1.00
70	105	49	40	-	430	870	6	GE70ET 2RS	1,40
80	120	55	45	-	560	1140	6	GE80ET 2RS	2,00
90	130	60	50	-	690	1350	6	GE90ET 2RS	2,50

Maintenance free spherical plain radial bearings

GB304.7-81, GB304.9-81 (ISO6124-1979, ISO6125-1979)



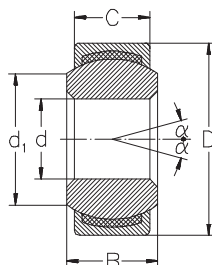
GE...C
GE...ET2RS

Dimensions					Ratings load		α^*	Designation	Weight
d	D	B	C	d ₁ min.	dyn.	stat.			
mm					kN	kN		—	kg
100	150	70	55	-	850	1700	6	GE100ET 2RS	4,00
110	160	70	55	-	900	1850	6	GE110ET 2RS	4,50
120	180	85	70	-	1300	2700	6	GE120ET 2RS	7,20
140	210	90	70	-	1500	3000	6	GE140ET 2RS	10,00

*The sizes are not binding.
ET/C - To line SF1 material on the surface of spherical plain.

Maintenance free spherical plain radial bearings

ISO6124-1979, ISO6125-1979

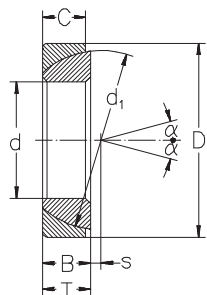


GEG...C
GEG...ET2RS

Dimensions				Load ratings			α^*	Designation	Weight
d	D	B	C	d ₁ min.	dyn.	stat.			
mm					kN	kN		—	kg
4	14	7	4	7	3,6	9,1	20	GEG4C	0,0045
5	16	9	5	8	5,8	14	21	GEG5C	0,0066
6	16	9	5	9	5,8	14	21	GEG6C	0,0081
8	19	11	6	11	8,8	21	21	GEG10C	0,014
10	22	12	7	13	11	28	18	GEG10C	0,021
12	26	15	9	16	18	45	18	GEG12C	0,033
15	30	16	10	19	22	56	16	GEG15C	0,049
17	35	20	12	21	31	78	19	GEG17C	0,083
20	42	25	16	24	51	127	17	GEG20C	0,153
25	47	28	18	29	65	166	17	GEG25C	0,203
30	55	32	20	34	83	212	17	GEG30C	0,304
	55	32	20	-	110	220	17	GEG30ET 2RS	0,30
35	62	35	22	-	140	270	17	GEG35ET 2RS	0,35
40	68	40	25	-	180	350	15	GEG40ET 2RS	0,50
45	75	43	28	-	220	430	15	GEG45ET 2RS	0,60
50	90	56	36	-	340	680	15	GEG50ET 2RS	1,40
60	105	63	40	-	430	850	15	GEG60ET 2RS	2,00
70	120	70	45	-	550	1100	16	GEG70ET 2RS	2,80
80	130	75	50	-	680	1350	14	GEG80ET 2RS	3,40
90	150	85	55	-	850	1700	15	GEG90ET 2RS	5,00
100	160	85	55	-	900	1800	14	GEG100ET 2RS	5,50
110	180	100	70	-	1300	2700	12	GEG110ET 2RS	9,00
120	210	115	70	-	1500	3000	15	GEG120ET 2RS	14,50
140	230	130	80	-	1900	3500	15	GEG140ET 2RS	18,20

*The sizes are not binding.
ET/C - To line SF1 material on the surface of spherical plain.

Angular contact spherical plain bearings

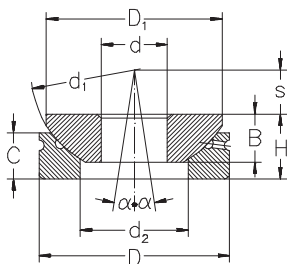


GAC...S

Dimensions							Load ratings		α^*	Designation	Weight
d	D	B	C	T	d ₁	S	dyn.	stat.			
mm							kN	kN	—	kg	
25	47	15	14	15	42	0,6	47,5	236	3,5	GAC25S	0,148
30	55	17	15	17	49,5	1,3	63	315	3	GAC30S	0,208
35	62	18	16	18	55,5	2,1	76,5	390	3	GAC35S	0,268
40	68	19	17	19	62	2,8	90	450	3	GAC40S	0,327
45	75	20	18	20	68,5	3,5	106	530	3	GAC45S	0,416
50	80	20	19	20	74	4,3	118	585	3	GAC50S	0,455
60	95	23	21	23	88,5	5,7	160	800	3	GAC60S	0,714
70	110	25	23	25	102	7,2	208	1040	2,5	GAC70S	1,04
80	125	29	25,5	29	115	8,6	250	1250	2,5	GAC80S	1,54
90	140	32	28	32	128,5	10,1	320	1600	2,5	GAC90S	2,09
100	150	32	31	32	141	11,6	345	1760	2	GAC100S	2,34
110	170	38	34	38	155	13	475	2360	2	GAC110S	3,68
120	180	38	37	38	168	14,5	510	2550	2	GAC120S	3,97

*The sizes are not binding.
On request: sliding contact surface steel / PTFE, example GX...C.

Spherical plain thrust bearings

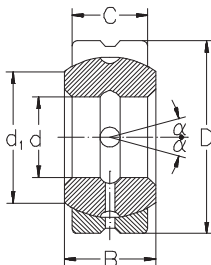


GX...S

Dimensions										Load ratings		α^*	Designation	Weight
d	D	H	B	C	d ₁	d ₂	D ₁	S		dyn.	stat.			
mm										kN	kN	—		kg
10	30	9,5	7,5	7	32	15,5	27,5	7	24	120	9	8	GX10S	0,036
12	35	13	9,5	9,3	38	18	32	8	32,5	163	8	8	GX12S	0,072
15	42	15	11	10,8	46	22,5	39	10	52	260	8	8	GX15S	0,108
17	47	16	11,8	11,2	52	27	43,5	11	58,5	300	10	8	GX17S	0,137
20	55	20	14,5	13,8	60	31	50	12,5	75	375	9	8	GX20S	0,246
25	62	22,5	16,5	16,7	68	34,5	58,5	14	129	640	7	8	GX25S	0,415
30	75	26	19	19	82	42	70	17,5	170	850	7	8	GX30S	0,614
35	90	28	22	20,7	98	50,5	84	22	260	1290	8	8	GX35S	0,973
40	105	32	27	21,5	114	59	97	24,5	375	1860	9	8	GX40S	1,59
45	120	36,5	31	25,5	128	67	110	27,5	490	2450	9	8	GX45S	2,24
50	130	42,5	33	30,5	139	70	120	30	655	3250	7	8	GX50S	3,14
60	150	45	37	34	160	84	140	35	735	3650	8	8	GX60S	4,63
70	160	50	42	36,5	176	94,5	153	35	800	4050	8	8	GX70S	5,37
80	180	50	43,5	38	197	107,5	172	42,5	1040	5200	8	8	GX80S	6,91
100	210	59	51	46	222	127	198	45	1200	6000	8	8	GX100S	10,98
120	230	64	53,5	50	250	145	220	52,5	1250	6200	6	8	GX120S	13,97

*The sizes are not binding.
On request: sliding contact surface steel / PTFE, example GX...C.

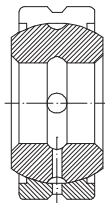
Spherical plain radial bearings dimension in inches with fitting crack Two seals and fitting crack



GE.Z....ES

Dimensions		B	C	d ₁ min.	Load ratings		α^*	Designation	Weight
d	D				dyn.	stat.			
mm					kN	kN		—	kg
12,7	22,225	11,1	9,525	14,1	13,7	41,5	6	GEZ12ES	0,022
15,875	26,988	13,894	11,913	18,3	22,0	65,5	6	GEZ15ES	0,036
19,05	31,75	16,662	14,275	21,8	31,5	95,0	6	GEZ19ES	0,053
22,225	36,513	19,431	16,662	25,4	4,25	127	6	GEZ22ES	0,085
25,4	41,275	22,225	19,05	27,6	56,0	166	6	GEZ25ES	0,121
	41,275	22,225	19,05	27,6	56,0	166	6	GEZ25ES 2RS	0,121
31,75	50,8	27,762	23,8	36,0	86,5	260	6	GEZ31ES	0,232
	50,8	27,762	23,8	36,0	86,5	260	6	GEZ31ES 2RS	0,232
34,925	55,563	30,15	26,187	38,6	102	310	6	GEZ34ES	0,351
	55,563	30,15	26,187	38,6	102	310	6	GEZ34ES 2RS	0,351
38,1	61,913	33,325	28,575	41,2	125	375	6	GEZ38ES	0,422
	61,913	33,325	28,575	41,2	125	375	6	GEZ38ES 2RS	0,422
44,5	71,438	38,887	33,325	50,7	170	510	6	GEZ44ES	0,641
	71,438	38,887	33,325	50,7	170	510	6	GEZ44ES 2RS	0,641
50,8	80,963	44,45	38,1	57,9	224	670	6	GEZ50ES	0,932
	80,963	44,45	38,1	57,9	224	670	6	GEZ50ES 2RS	0,932
57,15	90,488	50,013	42,85	64,9	280	850	6	GEZ57ES	1,33
	90,488	50,013	42,85	64,9	280	850	6	GEZ57ES 2RS	1,33
63,5	100,013	55,55	47,625	73,3	355	1060	6	GEZ63ES	1,85
	100,013	55,55	47,625	73,3	355	1060	6	GEZ63ES 2RS	1,85
69,85	111,125	61,112	52,375	79,1	415	1250	6	GEZ69ES	2,42
	111,125	61,112	52,375	79,1	415	1250	6	GEZ69ES 2RS	2,42
76,2	120,65	66,675	57,15	86,8	500	1500	6	GEZ76ES	3,10
	120,65	66,675	57,15	86,8	500	1500	6	GEZ76ES 2RS	3,10
82,55	130,175	72,238	61,9	94,5	585	1760	6	GEZ82ES	3,82
	130,175	72,238	61,9	94,5	585	1760	6	GEZ82ES 2RS	3,82
88,9	139,7	77,775	66,675	101,6	680	2040	6	GEZ88ES	4,79
	139,7	77,775	66,675	101,6	680	2040	6	GEZ88ES 2RS	4,79

Spherical plain radial bearings dimension in inches with fitting crack Two seals and fitting crack

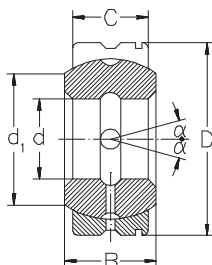


GEZ...ES2RS

Dimensions		B	C	d ₁ min.	Lload ratings		α^*	Designation	Weight
d	D				dyn.	stat.			
mm					kN	kN		—	kg
95,25	149,225	83,337	71,425	108,7	780	2360	6	GEZ95ES	5,78
	149,225	83,337	71,425	108,7	780	2360	6	GEZ95ES 2RS	5,78
101,6	158,75	88,9	76,2	115,8	900	2650	6	GEZ101ES	6,99
	158,75	88,9	76,2	115,8	900	2650	6	GEZ101ES 2RS	6,99
107,95	168,275	94,463	80,95	122,8	1000	3000	6	GEZ107ES	8,41
	168,275	94,463	80,95	122,8	1000	3000	6	GEZ107ES 2RS	8,41
114,3	177,8	100,013	85,725	130,6	1120	3400	6	GEZ114ES	9,79
	177,8	100,013	85,725	130,6	1120	3400	6	GEZ114ES 2RS	9,79
120,65	187,325	105,562	90,475	137,6	1250	3750	6	GEZ120ES	11,5
	187,325	105,562	90,475	137,6	1250	3750	6	GEZ120ES 2RS	11,5
127	196	111,125	95,25	145,3	1400	4150	6	GEZ127ES	13,5
	196	111,125	95,25	145,3	1400	4150	6	GEZ127ES 2RS	13,5
152,4	222,25	120,65	104,775	168,2	1730	5200	5	GEZ152ES	17,5
	222,25	120,65	104,775	168,2	1730	5200	5	GEZ152ES 2RS	17,5

*The sizes are not binding.

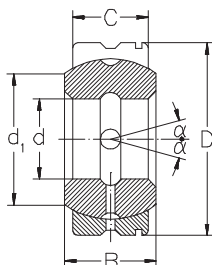
Spherical plain radial bearings with two piece outer ring



GE.....XSK

Dimensions		B	C	d ₁ min.	Load ratings		α^*	Designation	Weight
d	D				dyn.	stat.			
mm					kN	kN		—	kg
12	22	11	9	14	12,9	39,2	7	GE12XS K	0,019
15	26	13	11	17,5	19,5	57,8	6	GE15XS K	0,028
20	32	16	14	23	31,3	94,8	4	GE20XS K	0,053
22	37	19	16	25,5	40,3	122	6	GE22XS K	0,085
25	42	21	18	29	51,1	155	5	GE25XS K	0,116
30	50	27	23	36	81,2	248	6	GE30XS K	0,225
35	55	30	26	40	103	314	5	GE35XS K	0,302
40	62	33	28	44	122	370	6	GE40XS K	0,375
45	72	36	31	50,5	152	461	5	GE45XS K	0,598
50	80	42	36	58,5	225	622	5	GE50XS K	0,869
55	90	47	40	64,5	253	768	6	GE55XS K	1,26
60	100	53	45	72,5	321	980	6	GE60XS K	1,72
65	105	55	47	76	350	1060	5	GE65XS K	2,05
70	110	58	50	81,5	396	1220	5	GE70XS K	2,23
75	120	64	55	89,5	478	1450	5	GE75XS K	3,01
80	130	70	60	97,5	571	1730	5	GE80XS K	3,98
85	135	74	63	100,5	624	1890	6	GE85XS K	4,31
90	140	76	65	105,5	670	2030	5	GE90XS K	4,72
95	150	82	70	113,5	776	2350	5	GE95XS K	6,05
100	160	88	75	121,5	891	2700	5	GE100XS K	7,43
110	170	93	80	130	1010	3070	5	GE110XS K	8,54
115	180	98	85	132,5	1110	3370	5	GE115XS K	10,3

Spherical plain radial bearings with two piece outer ring

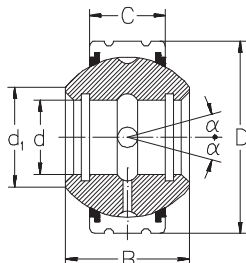


GE.....XSK

Dimensions		B	C	d ₁ min.	Load ratings		α^*	Designation	Weight
d	D				dyn.	stat.			
mm					kN	kN		—	kg
120	190	105	90	140	1250	3780	6	GE120XS K	12,4
130	200	110	95	148,5	1390	4220	5	GE130XS K	13,8
150	220	120	105	166	1710	5170	5	GE150XS K	17,1

*The sizes are not binding.

Spherical plain radial bearings with two seals and two piece outer ring

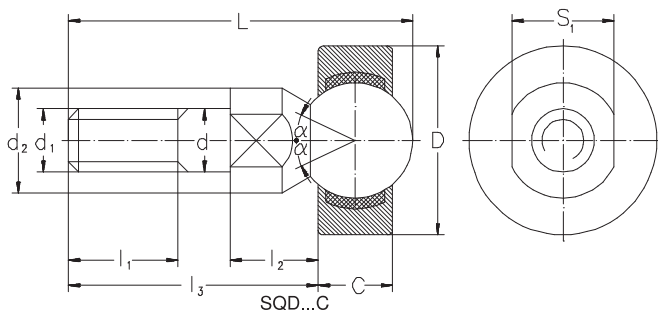


GEK.....XS2ES

Dimensions		B	C	d ₁ min.	Load ratings		α^*	Designation	Weight
d	D				dyn.	stat.			
mm					kN	kN		—	kg
25	68	40	28	30	117	590	19	GEK25XS2RS	0,516
30	70	47	32	37,3	163	813	19	GEK30XS2RS	0,785
35	80	54	38	44,5	226	1130	17	GEK35XS2RS	1,23
40	90	64	44	48	298	1490	19	GEK40XS2RS	1,83
45	100	72	52	54	398	1990	17	GEK45XS2RS	2,56
50	110	80	58	60	493	2450	17	GEK50XS2RS	3,43
55	125	90	64	63,2	598	2990	19	GEK55XS2RS	5,02
60	135	98	72	69,3	732	3660	17	GEK60XS2RS	6,43

*The sizes are not binding.

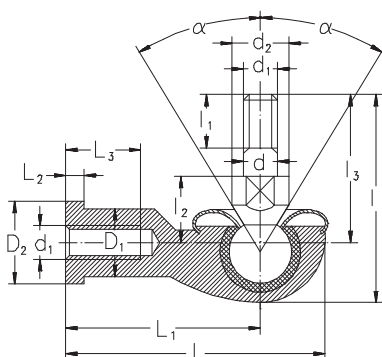
Ball joint rod ends with one shank



Dimensions										Load ratings		α^*	Designation	Weight
d	d ₁	d ₂ min	Lmax	l ₁ min	l ₂	l ₃ max	S ₁	C	D	dyn.	stat.			
mm										kN	kN		—	kg
5	M5	9	27,5	8	8	19	7	6	16	2,4	6,2	25	SQD5C	0,014
6	M6	10	33,5	11	8,8	23,8	8	6,75	18	3,2	8,1	25	SQD6C	0,021
8	M8	12	41	12	11,6	28,6	10	9	22	5,5	14	25	SQD8C	0,042
10	M10x1,25	14	49	15	14,2	34,2	11	10,5	26	7,8	20	25	SQD10C	0,067
12	M12x1,25	19	55,1	17	15,1	38,1	16	12	30	10	27	25	SQD12C	0,108
14	M14x1,25	19	70,7	22	16,8	51,3	16	13,5	34	13	35	20	SQD14C	0,167
16	M16x1,25	22	76,3	23	18	54,5	18	15	38	17	45	20	SQD16C	0,238

*The sizes are not binding.
To line SF1 material on the surface of spherical plain.

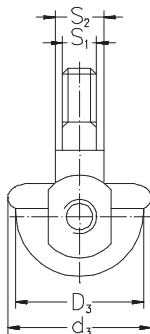
Winding shape ball joint rod ends



SQ...CRS

Dimensions		d ₂ min	d ₃ max	l max	l ₁ min	l ₂	l ₃ max	S ₁	L max	L ₁
d d ₁										
mm										
5	M5	9	20	30	8	10	21	7	36	27
	M5	9	20	30	8	10	21	7	36	27
6	M6	10	20	36	11	11	26	8	40,5	30
	M6	10	20	36	11	11	26	8	40,5	30
8	M8	12	24	43,5	12	14	31	10	49	36
	M8	12	24	43,5	12	14	31	10	49	36
10	M10x1,25	14	30	51,5	15	17	37	11	58	43
	M10x1,25	14	30	51,5	15	17	37	11	58	43
12	M12x1,25	19	32	57,5	17	19	42	16	66	50
	M12x1,25	19	32	57,5	17	19	42	16	66	50
14	M14x1,5	19	38	73,5	22	21,5	56	16	75	57
	M14x1,5	19	38	73,5	22	21,5	56	16	75	57
16	M16x1,5	22	44	79,5	23	23,5	60	18	84	64
	M16x1,5	22	44	79,5	23	23,5	60	18	84	64
18	M18x1,5	25	45	90	25	26,5	68	21	93	71
	M18x1,5	25	45	90	25	26,5	68	21	93	71
20	M20x1,5	29	50	90	25	27	68	24	99	77
	M20x1,5	29	50	90	25	27	68	24	99	77
22	M22x1,5	29	52	95	26	28	70	24	109	84
	M22x1,5	29	52	95	26	28	70	24	109	84

Winding shape ball joint rod ends



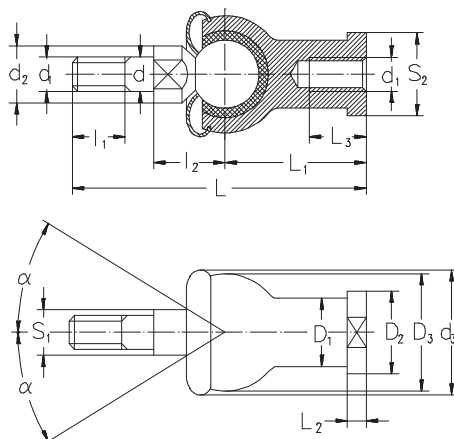
L2 max	L3 min	D1 max	D2 max	D3 max	S2	Load ratings dyn. stat.		α	Designation	Weight
						kN	kN			
4	14	9	12	18	10	2,7	9,2	25	SQ5C	0,025
4	14	9	12	18	10	2,7	9,2	25	SQ5C RS	0,025
5	14	10	13	20	10	3,6	12	25	SQ6C	0,039
5	14	10	13	20	10	3,6	12	25	SQ6C RS	0,039
5	17	12,5	16	25	13	5,7	19	25	SQ8C	0,068
5	17	12,5	16	25	13	5,7	19	25	SQ8C RS	0,068
6,5	21	15	19	29	16	8,2	27	25	SQ10C	0,112
6,5	21	15	19	29	16	8,2	27	25	SQ10C RS	0,112
6,5	25	17,5	22	31	18	11	37	25	SQ12C	0,164
6,5	25	17,5	22	31	18	11	37	25	SQ12C RS	0,164
8	26	20	25	35	21	14	48	25	SQ14C	0,254
8	26	20	25	35	21	14	48	25	SQ14C RS	0,254
8	32	22	27	39	24	16	53	20	SQ16C	0,336
8	32	22	27	39	24	16	53	20	SQ16C RS	0,336
10	34	25	31	44	27	18	61	20	SQ18C	0,464
10	34	25	31	44	27	18	61	20	SQ18C RS	0,464
10	35	27,5	34	44	30	18	612	20	SQ20C	0,538
10	35	27,5	34	44	30	18	612	20	SQ20C RS	0,538
12	41	30	37	50	30	22	75	16	SQ22C	0,713
12	41	30	37	50	30	22	75	16	SQ22C RS	0,713

*The sizes are not binding.

Available with thread M1,5 (SQ10 and SQ12) and M2 (SQ14 and SQ16)

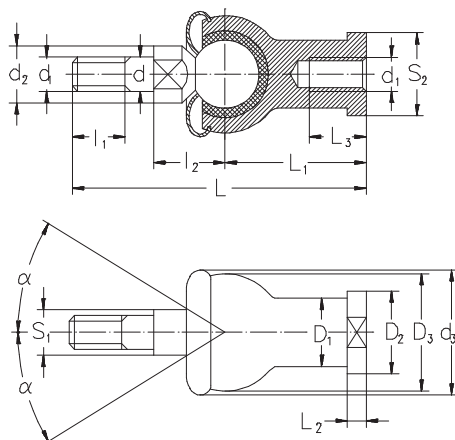
C - to line SF1 material on the surface of spherical plain. The shank of ball joint housing may be left - hand thread, for left - hand thread, suffix "L" is added to bearings number and thread sign, e. g. SQL6C, M6L - 6H.

Straightball joint rod ends



SQZ...CRS

Dimensions		d ₂	d ₃	l ₁	l ₂	S ₁	L	L ₁	L ₂	L ₃
d	d ₁	min	max	min			max		max	min
mm										
5	M5	9	20	8	11	7	46	24	4	12
	M5	9	20	8	11	7	46	24	4	12
6	M6	10	20	11	12,2	8	55,2	28	5	15
	M6	10	20	11	12,2	8	55,2	28	5	15
8	M8	12	24	12	16	10	65	32	5	16
	M8	12	24	12	16	10	65	32	5	16
10	M10x1,25	14	30	15	19,5	11	74,5	35	6,5	18
	M10x1,25	14	30	15	19,5	11	74,5	35	6,5	18
12	M12x1,25	19	32	17	21	16	84	40	6,5	20
	M12x1,25	19	32	17	21	16	84	40	6,5	20
14	M14x1,5	19	38	22	23,5	16	104,5	45	8	25
	M14x1,5	19	38	22	23,5	16	104,5	45	8	25
16	M16x1,5	22	44	23	25,5	18	112	50	8	27
	M16x1,5	22	44	23	25,5	18	112	50	8	27
18	M18x1,5	25	45	25	31	21	130,5	58	10	32
	M18x1,5	25	45	25	31	21	130,5	58	10	32
20	M20x1,5	29	50	25	31	24	133	63	10	38
	M20x1,5	29	50	25	31	24	133	63	10	38
22	M22x1,5	29	52	26	33	24	145	70	12	43
	M22x1,5	29	52	26	33	24	145	70	12	43



SQZ...C RS

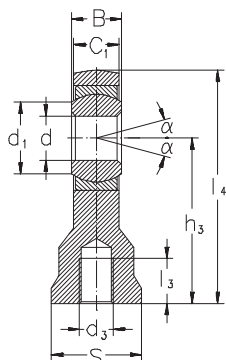
D1 max	D2 max	D3 max	S2	Load ratings		α^*	Designation	Weight
				dyn.	stat.			
mm				kN	kN		—	kg
9	12	17	10	1,7	5,7	15	SQZ5C	0,025
9	12	17	10	1,7	5,7	15	SQZ5C RS	0,025
10	13	20	10	2,2	7,5	15	SQZ6C	0,040
10	13	20	10	2,2	7,5	15	SQZ6C RS	0,040
12,5	16	24	13	3,3	11	15	SQZ8C	0,075
12,5	16	24	13	3,3	11	15	SQZ8C RS	0,075
15	19	28	16	4,8	16	15	SQZ10C	0,121
15	19	28	16	4,8	16	15	SQZ10C RS	0,121
17,5	22	32	18	6,6	22	15	SQZ12C	0,187
17,5	22	32	18	6,6	22	15	SQZ12C RS	0,187
20	25	36	21	8,7	29	11	SQZ14C	0,277
20	25	36	21	8,7	29	11	SQZ14C RS	0,277
22	27	40	24	10	33	11	SQZ16C	0,361
22	27	40	24	10	33	11	SQZ16C RS	0,361
25	31	45	27	11	37	11	SQZ18C	0,539
25	31	45	27	11	37	11	SQZ18C RS	0,539
27,5	34	45	30	11	37	7,5	SQZ20C	0,575
27,5	34	45	30	11	37	7,5	SQZ20C RS	0,575
30	37	50	30	14	46	7,5	SQZ22C	0,757
30	37	50	30	14	46	7,5	SQZ22C RS	0,757

*The sizes are not binding.

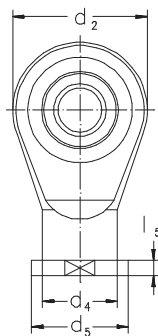
C - to line SF1 material on the surface of spherical plain. The shank of ball joint housing may be left - hand thread, for left - hand thread, suffix "L" is added to bearings number and thread sign, eg. SQL6C, M6L - 6H.

Combination (series e) rod ends

(ISO 6126 - 1982)

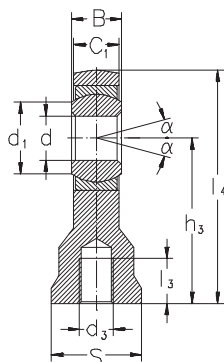


Dimensions		C ₁	d ₁	d ₂	d ₃	h ₁	l ₃	l ₄	l ₅	d ₄
d	B	max	min	max			min	max	max	max
mm										
5	6	4,5	7	21	M5	30	11	42	5	10
6	6	4,5	8	21	M6	30	11	42	5	11
	6	4,5	8	21	M6	30	11	42	5	11
8	8	6,5	10	24	M8	36	15	49	5	13
	8	6,5	10	24	M8	36	15	49	5	13
10	9	7,5	13	29	M10	43	15	58	6,5	16
	9	7,5	13	29	M10	43	15	58	6,5	16
12	10	8,5	15	34	M12	50	18	67	7	18
	10	8,5	15	34	M12	50	18	67	7	18
15	12	10,5	18	40	M14	61	21	81	8	21
	12	10,5	18	40	M14	61	21	81	8	21
	12	10,5	18	40	M14	61	21	81	8	21
17	14	11,5	20	46	M16	67	24	90	10	24
	14	11,5	20	46	M16	67	24	90	10	24
	14	11,5	20	48	M16	67	24	90	10	24
20	16	13,5	24	53	M20x1,5	77	30	104	10	28
	16	13,5	24	53	M20x1,5	77	30	104	10	28
	16	13,5	24	53	M20x1,5	77	30	104	10	28
25	20	18	29	64	M24x2	94	36	126	12	35
	20	18	29	64	M24x2	94	36	126	12	35
	20	18	29	64	M24x2	94	36	126	12	35
30	22	20	34	73	M30x2	110	45	147	15	42
	22	20	34	73	M30x2	110	45	147	15	42
	22	20	34	73	M30x2	110	45	147	15	42
35	25	22	39	82	M36x3	125	60	167	15	48
	25	22	39	82	M36x3	125	60	167	15	48
	25	22	39	82	M36x3	125	60	167	15	48
40	28	24	45	92	M39x3	142	65	190	18	52
	28	24	45	92	M39x3	142	65	190	18	52
	28	24	45	92	M39x3	142	65	190	18	52
45	32	28	50	102	M42x3	145	65	199	20	58
	32	28	50	102	M42x3	145	65	199	20	58

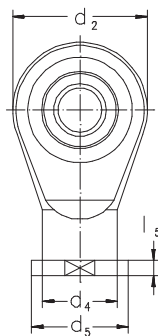


d_5 max	S	Load ratings		α^*	Designation	Weight
		dyn.	stat.			
mm		kN	kN		—	kg
13	10	3,4	8,1	13	SI5E	0,016
13	11	3,4	8,1	13	SI6E	0,017
13	11	3,4	8,1	13	SI6C**	0,017
16	13	5,5	12,9	15	SI8E	0,035
16	13	5,5	12,9	15	SI8C**	0,035
19	16	8,1	17,6	12	SI10E	0,061
19	16	8,1	17,6	12	SI10C**	0,061
22	18	10,8	24,5	10	SI12E	0,096
22	18	10,8	24,5	10	SI12C**	0,096
26	21	17	36	8	SI15ES	0,162
26	21	17	36	8	SI15ES 2RS	0,162
26	21	17	36	8	SI15C**	0,162
29	24	21	45	10	SI17ES	0,233
29	24	21	45	10	SI17ES 2RS	0,233
29	24	21	45	10	SI17C**	0,233
34	30	30	60	9	SI20ES	0,324
34	30	30	60	9	SI20ES 2RS	0,324
34	30	30	60	9	SI20C**	0,324
42	36	48	83	7	SI25ES	0,625
42	36	48	83	7	SI25ES 2RS	0,625
42	36	48	83	7	SI25C**	0,625
50	46	62	110	6	SI30ES	0,976
50	46	62	110	6	SI30ES 2RS	0,976
50	46	62	110	6	SI30C**	0,976
58	55	80	146	6	SI35ES	1,52
58	55	80	146	6	SI35ES 2RS	1,52
58	55	80	146	6	SI35C 2RS**	1,52
65	60	100	180	7	SI40ES	2,06
65	60	100	180	7	SI40ES 2RS	2,06
65	60	100	180	7	SI40C 2RS**	2,06
70	65	127	240	7	SI45ES	2,72
70	65	127	240	7	SI45ES 2RS	2,72

Combination (series e) rod ends (ISO 6126 - 1982)



Dimensions		C ₁ max	d ₁ min	d ₂ max	d ₃	h ₁	l ₃ min	l ₄ max	l ₅ max	d ₄ max
d	B									
mm										
45	32	28	50	102	M42x3	145	65	199	20	58
50	35	31	55	112	M45x3	160	68	221	20	62
	35	31	55	112	M45x3	160	68	221	20	62
	35	31	55	112	M45x3	160	68	221	20	62
60	44	39	66	135	M52x3	175	70	247	20	70
	44	39	66	135	M52x3	175	70	247	20	70
	44	39	66	135	M52x3	175	70	247	20	70
70	49	43	77	160	M56x4	200	80	283	20	80
	49	43	77	160	M56x4	200	80	283	20	80
	49	43	77	160	M56x4	200	80	283	20	80
80	55	48	88	180	M64x4	230	85	325	25	95
	55	48	88	180	M64x4	230	85	325	25	95
	55	48	88	180	M64x4	230	85	325	25	95



d5 max	S	Load ratings		α^*	Designation	Weight
		dyn.	stat.			
mm		kN	kN	~	—	kg
70	65	127	240	7	SI45C 2RS**	2,72
75	70	156	290	6	SI50ES	3,57
75	70	156	290	6	SI50ES 2RS	3,57
75	70	156	290	6	SI50C 2RS**	3,57
88	80	245	450	6	SI60ES	5,63
88	80	245	450	6	SI60ES 2RS	5,63
88	80	245	450	6	SI60C 2RS**	5,63
98	85	315	610	6	SI70ES	8,33
98	85	315	610	6	SI70ES 2RS	8,33
98	85	315	610	6	SI70C 2RS**	8,33
110	95	400	750	6	SI80ES	13,04
110	95	400	750	6	SI80ES 2RS	13,04
110	95	400	750	6	SI80C 2RS**	13,04

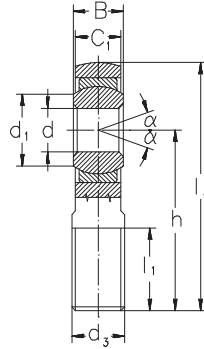
SIL...ES - for left hand thread. Suffix "L" is added to bearings number and thread sign, eg. SIL30ES. Sliding contact surface: steel/steel. Available with increased thread.

*The sizes are not binding.

**Sliding contact surface: steel/PTFE.

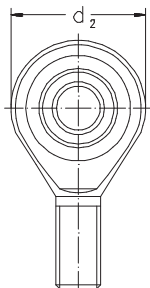
Combination (series e) rod ends

ISO 6126 - 1982



SA...E/ES
SA...ES2RS

Dimensions									Load ratings		α^*	Designation	Weight
d	B	C1 max	d1 min	d2 max	d3	h	l1 min	l2 max	dyn.	stat.			
mm						kN	kN					—	kg
5	6	4,5	7	21	M5	36	16	48	3,4	8,1	1	SA5E	0,011
6	6	4,5	8	21	M6	36	16	48	3,4	8,1	13	SA6E	0,013
	6	4,5	8	21	M6	42	21	48	3,4	8,1	13	SA6C**	0,013
8	8	6,5	10	24	M8	42	21	55	5,5	12,9	15	SA8E	0,026
	8	6,5	10	24	M8	42	21	55	5,5	12,9	15	SA8C**	0,026
10	9	7,5	13	29	M10	48	26	63	8,1	17,8	12	SA10E	0,044
	9	7,5	13	29	M10	48	26	63	8,1	17,6	12	SA10C**	0,044
12	10	8,5	15	34	M12	54	28	71	10,8	24,5	10	SA12E	0,066
	10	8,5	15	34	M12	54	28	71	10,8	24,5	10	SA12C**	0,066
15	12	10,5	18	40	M14	63	34	83	17	36	8	SA15ES	0,121
	12	10,5	18	40	M14	63	34	83	17	36	8	SA15ES 2RS	0,121
	12	10,5	18	40	M14	63	34	83	17	36	8	SA15C**	0,121
17	14	11,5	20	46	M16	69	36	92	21	45	10	SA17ES	0,172
	14	11,5	20	46	M16	69	36	92	21	45	10	SA17ES 2RS	0,172
	14	11,5	20	46	M16	69	36	92	21	45	10	SA17C**	0,172
20	16	13,5	24	53	M20x1,5	78	43	105	30	60	9	SA20ES	0,283
	16	13,5	24	53	M20x1,5	78	43	105	30	60	9	SA20ES 2RS	0,283
	16	13,5	24	53	M20x1,5	78	43	105	30	60	9	SA20C**	0,283
25	20	18	29	64	M24x2	94	53	126	48	83	7	SA25ES	0,504
	20	18	29	64	M24x2	94	53	126	48	83	7	SA25ES 2RS	0,504
	20	18	29	64	M24x2	94	53	126	48	83	7	SA25C**	0,504
30	22	20	34	73	M30x2	110	65	147	62	110	6	SA30ES	0,835
	22	20	34	73	M30x2	110	65	147	62	110	6	SA30ES 2RS	0,835
	22	20	34	73	M30x2	110	65	147	62	110	6	SA30C**	0,835
35	25	22	39	82	M36x3	140	82	182	80	148	6	SA35ES	1,41
	25	22	39	82	M36x3	140	82	182	80	148	6	SA35ES 2RS	1,41
	25	22	39	82	M36x3	140	82	182	80	146	6	SA35C 2RS**	1,41
40	28	24	45	92	M39x3	150	86	198	100	180	7	SA40ES	1,86
	28	24	45	92	M39x3	150	86	198	100	180	7	SA40ES 2RS	1,86
	28	24	45	92	M39x3	150	86	198	100	180	7	SA40C 2RS**	1,86
45	32	28	50	102	M42x3	163	92	217	127	240	7	SA45ES	2,57
	32	28	50	102	M42x3	163	92	217	127	240	7	SA45ES 2RS	2,57



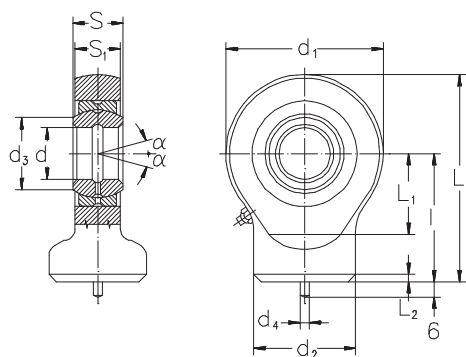
Dimensions									Load ratings		α*	Designation	Weight
d	B	C ₁ max	d ₁ min	d ₂ max	d ₃	h	l ₁ min	l ₂ max	dyn.	stat.			
mm						kN	kN					—	kg
45	32	28	50	102	M42x3	163	92	217	127	240	7	SA45C 2RS**	2,57
50	35	31	55	112	M45x3	185	104	246	156	290	6	SA50ES	3,58
	35	31	55	112	M45x3	185	104	246	156	290	6	SA50ES 2RS	3,58
	35	31	55	112	M45x3	185	104	246	156	290	6	SA50C 2RS**	3,58
60	44	39	66	135	M52x3	210	115	282	245	450	6	SA60ES	5,73
	44	39	66	135	M52x3	210	115	282	245	450	6	SA60ES 2RS	5,73
	44	39	66	135	M52x3	210	115	282	245	450	6	SA60C 2RS**	5,73
70	49	43	77	160	M56x4	235	125	318	315	610	6	SA70ES	7,94
	49	43	77	160	M56x4	235	125	318	315	610	6	SA70ES 2RS	7,94
	49	43	77	160	M56x4	235	125	318	315	610	6	SA70C 2RS**	7,94
80	55	48	88	180	M64x4	270	140	365	400	750	6	SA80ES	12,06
	55	48	88	180	M64x4	270	140	365	400	750	6	SA80ES 2RS	12,06
	55	48	88	180	M64x4	270	140	365	400	750	6	SA80C 2RS**	12,06

For left hand thread, suffix "L" is added to bearings number and thread sign, eg. SAL30ES. Sliding contact surface: steel/steel. Available with increased thread.

*The sizes are not binding.

** Sliding contact surface: steel/PTFE.

Rod ends for hydraulic components

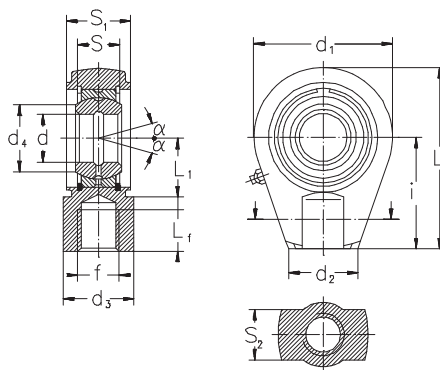


TAC....

Dimensions											Designation
d	S	d ₁	l	d ₂	d ₃	d ₄	S ₁	L	L ₁	L ₂	—
mm											
10	9	29	24	15	13	3	7	38,5	14	2	TAC 210
12	10	34	27	17,5	15	3	8	44	16	2	TAC 212
15	12	40	31	21	18	4	10	51	18	2,5	TAC 215
17	14	46	35	24	20,5	4	11	58	20	3	TAC 217
20	16	53	38	27,5	24	4	13	65,4	23	3	TAC 220
25	20	64	45	33,5	29	4	17	77	27	4	TAC 225
30	22	73	51	40	34	4	19	87,5	30	4	TAC 230
35	25	82	61	47	39,5	4	21	102	37	4	TAC 235
40	28	92	69	52	45	4	23	115	44	5	TAC 240
45	32	102	77	58	50,5	6	27	128	48	5	TAC 245
50	35	112	88	62	56	6	30	144	58	6	TAC 250
60	44	135	100	70	66,5	6	38	167,5	68	8	TAC 260
70	49	160	115	80	77,5	6	42	195	78	10	TAC 270
80	55	180	141	95	89	6	47	231	91	10	TAC 280

Contact surface: steel / steel
 The sizes are not binding.

Rod ends for hydraulic components

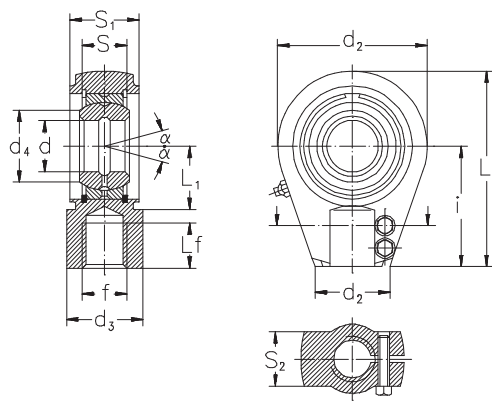


TAPR...N

Dimensions													Designation
d	S	d ₁	L	L _f	d ₂	d ₃	d ₄	S ₁	S ₂	L	L ₁	f	—
mm													
20	16	56	50	17	36	25	24	19	17	80	25	M16x1,5	TAPR 420 N
25	20	56	50	17	36	25	29	23	21	80	28	M16x1,5	TAPR 425 N
30	22	64	60	23	40	32	34	28	26	94	30	M22x1,5	TAPR 430 N
35	25	78	70	29	50	40	39,5	30	28	112	38	M28x1,5	TAPR 435 N
40	28	94	85	36	60	49	45	35	33	135	45	M35x1,5	TAPR 440 N
50	35	116	105	46	72	61	56	40	37	168	55	M45x1,5	TAPR 450 N
60	44	130	130	59	90	75	66,5	50	46	200	65	M58x1,5	TAPR 460 N
70	49	154	150	66	100	86	77,5	55	51	232	75	M65x1,5	TAPR 470 N
80	55	176	170	81	125	102	89	60	55	265	80	M80x2	TAPR 480 N
90	60	206	210	101	146	124	98	65	60	323	90	M100x2	TAPR 490 N
100	70	230	235	111	166	138	109,5	70	65	360	105	M110x2	TAPR 495 N
110	70	265	265	125	190	152	121	80	75	407,5	115	M120x3	TAPR 496 N
120	85	340	310	135	257	172	135,5	90	85	490	140	M130x5	TAPR 497 N

Contact surface: steel / steel.
The sizes are not binding.

Rod ends for hydraulic components

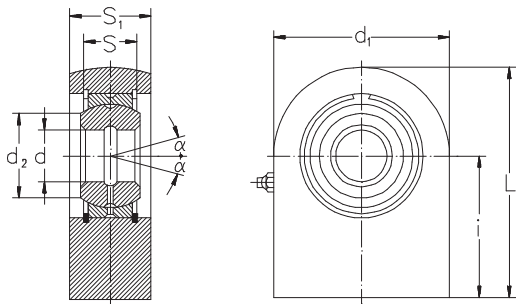


TAPR...U

Dimensions													Designation
d	S	d ₁	l	L _f	d ₂	d ₃	d ₄	S ₁	S ₂	L	L ₁	f	—
mm													
20	16	56	50	17	36	25	24	19	17	80	25	M16x1,5	TAPR 520 U
25	20	56	50	17	36	25	29	23	21	80	28	M16x1,5	TAPR 525 U
30	22	64	60	23	40	32	34	28	26	94	30	M16x1,5	TAPR 530 U
35	25	78	70	29	50	40	39,5	30	28	112	38	M28x1,5	TAPR 535 U
40	28	94	85	36	60	49	45	35	33	135	45	M35x1,5	TAPR 540 U
50	35	116	105	46	72	61	56	40	37	168	55	M45x1,5	TAPR 550 U
60	44	130	130	59	90	75	66,5	50	46	200	65	M58x1,5	TAPR 560 U
70	49	154	150	66	100	86	77,5	55	51	232	75	M65x1,5	TAPR 570 U
80	55	176	170	81	125	102	89	60	55	265	80	M80x2	TAPR 580 U
90	60	206	210	101	146	124	98	65	60	323	90	M100x2	TAPR 590 U
100	70	230	235	111	168	138	109,5	70	65	360	105	M110x2	TAPR 595 U
110	70	265	265	125	190	152	121	80	75	407,5	115	M120x3	TAPR 596 U
120	85	340	310	135	257	172	135	90	85	490	140	M130x5	TAPR 597 U

Contact surface: steel / steel.
The sizes are not binding.

Rod ends for hydraulic components



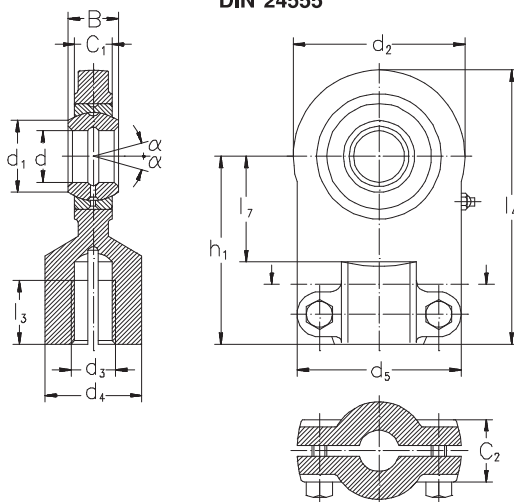
TPN....

Dimensions							Dessignation
d	S	d1	i	d2	S1	L	—
mm							
20	16	50	38	24	19	63	TPN 320
25	20	55	45	29	23	72,5	TPN 325
30	22	65	51	34	28	83,5	TPN 330
35	25	83	61	39,5	30	102,5	TPN 335
40	28	100	69	45	35	119	TPN 340
45	32	110	77	50,5	40	132	TPN 345
50	35	123	88	56	40	149,5	TPN 350
60	44	140	100	66,5	50	170	TPN 360
70	49	164	115	77,5	55	197	TPN 370
80	55	180	141	89	60	231	TPN 380
90	60	226	150	98	65	263	TPN 390
100	70	250	170	109,5	70	295	TPN 395
110	70	295	185	121	80	332,5	TPN 396
120	85	360	210	135,5	90	390	TPN 397

Contact surface: steel / steel
 The sizes are not binding.

Rod ends for hydraulic components

DIN 24555



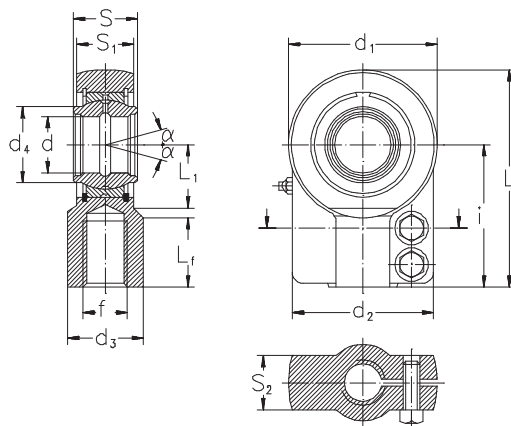
TAPR...DO

Dimensions													Designation
d	B	d ₂	d ₁	d ₃	d ₄	d ₅	C ₁	C ₂	h ₁	l ₃	l ₄	l ₇	—
mm													—
12	10	32	15	M10x1,25	17	40	8	13	42	15	58	18	TAPR 701 DO
16	14	42	20	M12x1,25	21	45	11	13	48	17	69	22	TAPT 702 DO
20	16	50	25	M14X1,5	25	55	13	17	58	19	83	28	TAPR. 703 DO
25	20	62	29	M16X1,5	30	62	—	68	23	99	34		TAPR 704 DO
30	22	76	34	M20X1,5	36	80	19	—	85	29	123	38	TAPR 705 DO
40	28	96	45	M27X2	45	90	23	—	105	37	153	48	TAP 706 DO
50	35	116	55	M33X2	55	105	30	—	130	46	188	62	TAPR 707 DO
60	44	150	66	M42X2	68	134	38	—	150	57	255	74	TAPR 708 DO
80	55	195	88	M48X2	78	156	47	—	185	64	282,5	98	TAPR 709 DO
100	70	235	109	M64X3	100	190	57	—	240	86	357,5	122	TAPR 710 DO

The sizes are not binding.
Contact surface: steel / steel

Rod ends for hydraulic components

DIN 24338



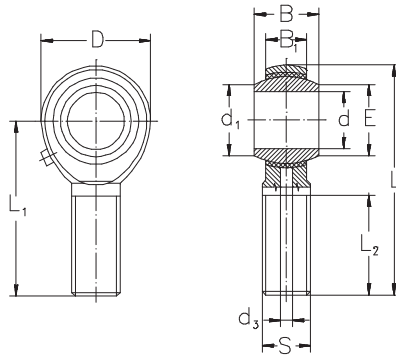
TAPR...CE

Dimensions													Designation
d	S	d ₁	I	L _f	d ₂	d ₃	d ₄	S ₁	S ₂	L	L ₁	f	—
mm													
12	12	32	38	17	32	16	15,5	10,5	12	54	14	M12x1,25	TAPR 612 CE
16	16	40	44	19	40	21	20	13	11,5	64	18	M14x1,5	TAPR 616 CE
20	20	47	52	23	47	25	25	17	14	77	22	M16x1,5	TAPR 620 CE
25	25	58	65	29	54	30	30,5	21	17	96	27	M20x1,5	TAPR 625 CE
32	32	70	80	37	66	38	38	27	22	118	32	M27x2	TAPR 632 CE
40	40	89	97	46	80	47	46	32	26	145,5	41	M33x2	TAPR 640 CE
50	50	108	120	57	96	58	57	40	32	179	50	M24x2	TAPR 650 CE
63	63	132	140	64	114	70	71,5	52	38	211	62	M48x2	TAPR 663 CE
70	70	155	160	76	135	80	79	57	42	245	70	M56x2	TAPR 670 CE
80	80	168	180	86	148	90	91	66	48	270	78	M64x3	TAPR 680 CE
90	90	185	195	91	160	100	99	72	52	296	85	M72x3	TAPR 690 CE
100	100	210	210	96	178	110	113	84	62	322	98	M80x3	TAPR 695 CE
110	110	235	235	101	190	125	124	88	62	364	105	M90x3	TAPR 696 CE
125	125	264	260	106	200	135	138	103	72	405	120	M100x3	TAPR 697 CE

Contact surface: steel / steel
The sizes are not binding.

Rod ends

ISO 6126 - 1982



POS
POS...EC

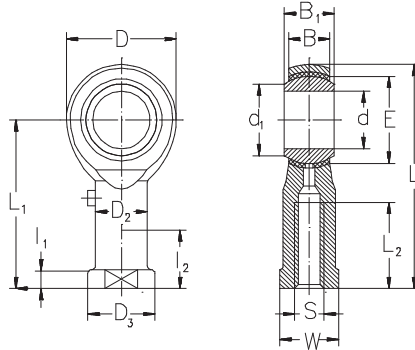
Dimensions									Load ratings		Designation	Weight
d	d ₁	B ₁	E	B	D	S	L ₁	L ₂	dyn. stat.			
mm									kN	kN	—	kg
5	7,7 7,7	8	11,11 11,11	7 7,5	16 18	M5x0,8 M5	33 33	20 20	3,2 3,2	7 7	POS 5* POS 5EC**	0,014 0,014
6	9 8,9	9	12,70 12,70	7 7,5	18 20	M6x1 M6	36 36	22 22	3,5 3,5	8 8	POS 6* POS 6 EC**	0,019 0,019
8	10,4 10,3	12	15,88 15,88	9 9,5	22 24	M8x1,25 M8	42 42	25 25	5,8 5,8	13 13	POS 8* POS 8 EC**	0,036 0,036
10	12,9 12,9	14	19,05 19,05	11 11,5	26 30	M10x1,5 M10	48 48	29 29	8,6 8,6	18 18	POS 10* POS 10 EC**	0,060 0,070
12	15,4 15,4	16	22,23 22,23	12 12,5	30 34	M12x1,75 M12	54 54	33 33	11,5 11,5	24 24	POS 12* POS 12 EC**	0,089 0,110
14	16,9 16,8	19	25,40 25,40	14 14,5	34 38	M14x2 M14	60 60	36 36	17,5 17,5	36 36	POS 14* POS 14 EC**	0,129 0,130
16	19,4 19,3	21	28,58 28,58	15 15,5	38 42	M16X2 M16	66 66	40 40	20 20	40 40	POS 16* POS 16 EC**	0,181 0,220
17	20,6	22	30,16	16	40	M16x1,5	69	42	22	45	POS 17*	0,206
18	21,9 21,8	23	31,75 31,75	17 17,5	42 46	M18x1,5 M18X1,5	72 72	44 44	27 27	50 50	POS 18* POS 18 EC**	0,250 0,290
20	24,4 24,3	25	34,93 34,93	18 18,5	46 50	M20x1,5 M20X1,5	78 78	47 47	31 31	60 60	POS 20* POS 20 EC**	0,333 0,360
22	25,9 25,8	28	38,10 38,1	20 21	50 56	M22x1,5 M22X1,5	84 84	51 51	43 43	72 72	POS 22* POS 22 EC**	0,430 0,490
25	29,5 29,5	31	42,86 42,86	22 23	56 60	M24x2 M24X2	94 94	57 57	50 50	85 85	POS 25* POS 25 EC**	0,575 0,65
28	32,3 32,2	35	47,59 47,59	25 26	66 66	M27x2 M27X2	103 103	62 62	60 60	90 90	POS 28* POS 28 EC**	0,800 0,870
30	34,9 34,8	37	50,80 50,80	26 27	67 70	M30x2 M30X2	110 110	66 66	66 66	110 110	POS 30* POS 30 EC**	0,996 1,060

*For left hand thread, suffix "L" is added to bearings number and thread sign, eg. TSML. Sliding contact surface: steel/steel. Available with increased thread. Sliding contact surface: steel/bronze.

**For left hand thread, suffix "L" is added to bearings number and thread sign, eg. TSML...C. Sliding contact surface: steel/steel. Available with increased thread. Sliding contact surface: steel/PTFE. The sizes are not binding.

Rod ends

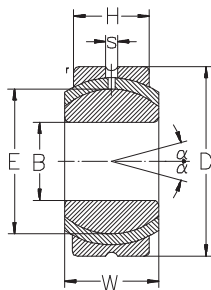
ISO 6126 - 1982



PHS
PHS...EC

Dimensions														Rating load dyn.	Design. stat.	Weight
d	d ₁	B ₁	E	B	D	S	L ₁	L ₂	D ₂	D ₃	I ₁	W				
mm															—	kg
5	7,7 7,7	8	11,11 11,11	7 7,5	16 18	M5x0,8 M5	27 27	8	9	12	4	9 10	3,2 3,2	7	PHS 5 PHS 5 EC	0,018 0,018
6	9,0 8,9	9	12,71 12,71	7 7,5	18 20	M6x1 M6	30 30	9	10	13	5	11 10	3,5 3,5	8	PHS 6 PHS 6 EC	0,026 0,026
8	10,4 10,3	12	15,88 15,88	9 9,5	22 24	M8x1,25 M8	36 36	12	12,5 12,5	16	5	14 13	5,8 5,8	13	PHS 8 PHS 8 EC	0,045 0,045
10	12,9 12,9 12,9 12,9	14	19,05 19,05 19,05 19,05	11 11 11,5 11,5	26 26 30 30	M10x1,5 M10x1,25 M10 M10x1,25	43 43 43 43	15 15 15 15	15 15 15 15	19 19 19 19	6,5 6,5 6,5 6,5	17 17 16 16	8,6 8,6 8,6 8,6	18 18 18 18	PHS 10 PHS 10,1 PHS 10 EC PHS 10,1 EC	0,076 0,076 0,088 0,088
12	15,4 15,4 15,4 15,4	16	22,23 22,23 22,23 22,23	12 12 12,5 12,5	30 30 34 34	M12x1,75 M12x1,25 M12 M12x1,25	50 50 50 50	18 18 18 18	17,5 17,5 17,5 17,5	22 22 22 22	6,5 6,5 6,5 6,5	19 19 18 18	11,5 11,5 11,5 11,5	24 24 24 24	PHS 12 PHS 12,1 PHS 12 EC PHS 12,1 EC	0,114 0,114 0,120 0,120
14	16,9 16,8	19	25,40 25,40	14 14,5	34 38	M14x2 M14	57 57	21	20	25	8	22 21	17,5 17,5	36 36	PHS 14 PHS 14 EC	0,158 0,140
16	19,4 19,4 19,3 19,3	21	28,58 28,58 28,58 28,58	15 15 15,5 15,5	38 38 42 42	M16x2 M16x1,5 M16 M16x1,5	64 64 64 64	24 24 24 24	22 22 22 22	27 27 27 27	8 8 8 8	22 20 24 20	40 40 40 40	PHS 16 PHS 16,1 PHS 16 EC PHS 16,1 EC	0,200 0,200 0,240 0,240	
17	20,6	22	30,16	16	40	M16x1,5	67	25	24	31	10	27	22	45	PHS 17	0,259
18	21,9 21,8	23	31,75 31,75	17 17,5	42 46	M18x1,5 M18	71 71	27 27	25 25	31 31	10 10	27 27	27 27	50 50	PHS 18 PHS 18 EC	0,288 0,320
20	24,4 24,3	25	34,93 34,93	18 18,5	46 50	M20x1,5 M20	77 77	30	27,5 27,5	37 37	10 10	30 30	31 31	60 60	PHS 20 PHS 20 EC	0,372 0,430
22	25,9 25,8 29,6	28	38,10 38,10 42,86	20 21 22	50 56 56	M22x1,5 M22 M24x2	84 84 94	33 33 36	30 30 33,5	37 37 42	12 12 12	32 34 36	43 43 50	72 72 85	PHS 22 PHS 22 EC PHS 25	0,475 0,610 0,673
25	29,5	31	42,86	23	60	M24	94	36	33,5	42	12	36	50	85	PHS 25 EC	0,810
28	32,3 32,2	35	47,59 47,59	25 26	66 66	M27x2 M27	103 103	41 41	37 37	46 46	14 14	41 41	60 60	90 90	PHS 28 PHS 28 EC	0,950 1,120
30	34,9 34,8	37	50,80 50,80	26 27	67 70	M30x2 M30	110 110	45 45	40 40	50 50	15 15	41 46	66 66	110 110	PHS 30 PHS 30 EC	1,050 1,350

Spherical plain bearings



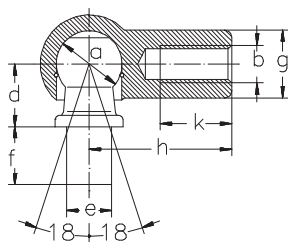
SSR

Dimensions									Max static load ratings		Designation	Weight
B	W	H	O	D	R	S	E	α	radial	axial	—	kg
mm									kN	kN	—	kg
5	8	7	7,71	16	0,5	1,5	11,11	24	9,30	2,30	SSR 5	0,010
6	9	7	8,96	18	0,5	1,5	12,7	28	10,70	2,70	SSR 6	0,012
8	12	9	10,4	22	0,5	1,5	15,88	25	17,20	4,30	SSR 8	0,024
10	14	11	12,92	26	0,5	1,5	19,05	23	25,10	6,30	SSR 10	0,040
12	16	12	15,43	30	1	2	22,23	24	32,00	8,00	SSR 12	0,058
14	19	14	16,86	34	1	2	25,4	23	42,70	10,70	SSR 14	0,086
15	20	14	18,2	36	1	2	26,99	24	45,30	11,30	SSR 15	0,098
16	21	15	19,39	38	1	2	28,58	24	51,40	12,90	SSR 16	0,116
17	22	16	20,63	40	1	2,5	30,16	23	57,90	14,50	SSR 17	0,135
18	23	17	21,89	42	1,5	2,5	31,75	23	64,80	162,0	SSR 18	0,157
20	25	18	24,38	46	1,5	2,5	34,93	24	75,40	18,90	SSR 20	0,200
22	28	20	25,84	50	1,5	2,5	38,1	23	91,40	22,90	SSR 22	0,262
25	31	22	29,6	56	1,5	3	42,86	23	113,20	28,30	SSR 25	0,362
28	35	25	32,29	62	1,5	3	47,83	22	142,90	35,70	SSR 28	0,500
30	37	26	34,81	67	2	3	50,8	23	158,50	39,60	SSR 30	0,608

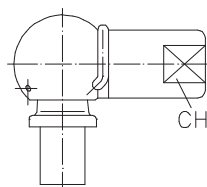
Materials: -housing—steel
 -insert—bronze
 -ball—chrome steel
 The sizes are not binding.

Ball joint rod end with spring clamping

DIN 71802



B



BS

a H9/h8	Dimensions							Weight	
	b	d	e h11	f	g	h	k	CH*	B and BS
mm									g
8	M5	9	5	4	8	22	10,2	7	12,85
8	M5	9	5	7,5	8	22	10,2	7	13,35
10	M6	11	6	4,5	10	25	11,5	8	21,3
10	M6	11	6	8	10	25	11,5	8	22
13	M8	13	8	5	13	30	14	11	43,2
13	M8	13	8	10	13	30	14	11	45
16	M10	16	10	6	16	35	15,5	13	82,3
16	M10	16	10	13	16	35	15,5	13	86,6
19	M14x1,5	20	14	12	22	45	21,5	17	181
19	M14x2	20	14	18	22	45	21,5	17	188,7

Surface: zinc - plating FeZn7 Uni 4721 - or coarse oiled surface by request.

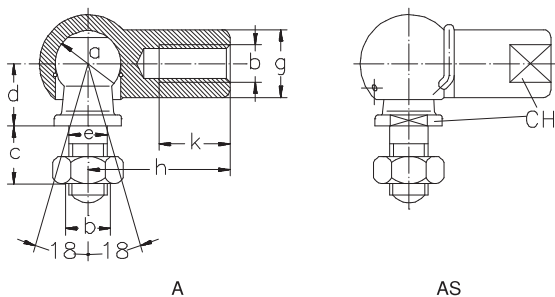
*Clamping plains.

C45 special.

The sizes are not binding.

Ball joint rod end with spring clamping and safety ring

DIN 71802



Dimensions		c	d	e h11	g	h	L ₁	L ₂	k	CH*	Weight A and AS
a	b										
H9/h8											
	mm										
8	M 5	10	9	5	8	22	25,2	28,5	10,2	7	15,2
10	M 6	12	11	6	10	25	30,2	32,5	11,5	8	25,2
13	M 8	16	13	8	13	30	38,2	39,5	14	11	53,1
16	M10	19	16	10	16	35	47,5	47	15,5	13	102,8
19	M14x1,5	27	20	14	22	45	62,5	60	21,5	17	220,9
19	M14x2	27	20	14	22	45	62,5	60	21,5	17	220,9

Surface: zinc - plating FeZn7 Uni 4721 - or coarse oiled surface by request.

*Clamping plains.

C45 special.

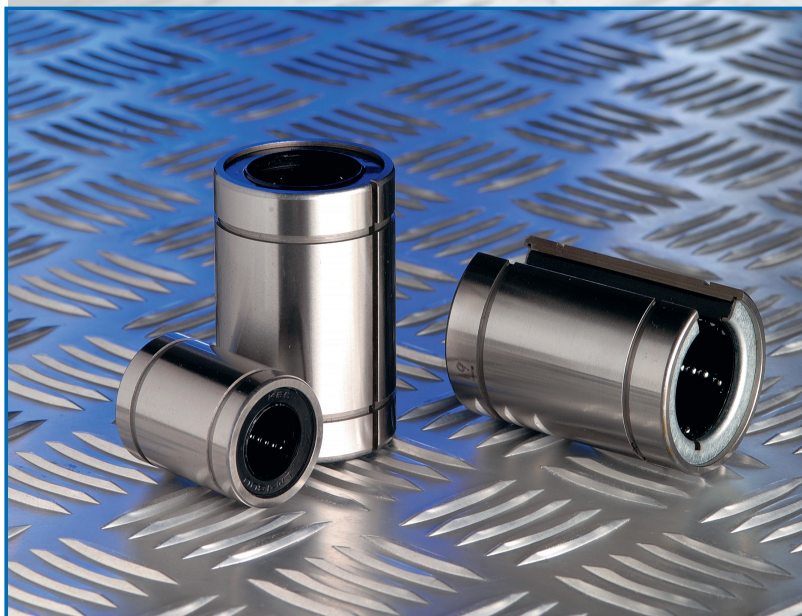
The sizes are not binding.

III. Linear ball bearings



BEARINGS

Linear ball bushings



Linear ball bushings

Load rating

Basic dynamic load rating

This term is arrived at based on an evaluation of a number of identical linear systems individually run in the same conditions, if 90% of them can run with the load (with a constant value in a constant direction) for a distance of 50 km without damage caused by rolling fatigue. This is the basis of the rating.

Allowable static moment

This term defines the allowable limit value of static moment load, with reference to the amount of permanent deformation similar to that used for evaluation of basic rated load (Co).

Static safety factor

This factor is used based on the application condition as shown in Table 1.

Basic static load rating

This term defines a static load such that, at the contacting position where the maximum stress is exercised, the sum of the permanent deformation of the rolling elements and that of the rolling plane is 0,0001 time of the diameter of the rolling elements.

Static safety factors

Condition of use	Low limit of fs
When the shaft has less deflection and shock	1 to 2
When elastic deformation should be considered whith respect to pinch load	2 to 4
When the equipment is subject to vibration and impacts	3 to 5

Table 1.

Rating Life

Rating life of the linear system

As long as linear system reciprocates while being loaded, continuous stress acts on the linear system to couse flaking on the rolling bodies and planes because of material fatigue. The travelling distance of linear system until the fist flaking occurs is called the life of the system. The life of the dimensions, structure, material, heat treatment and processing method, when used in the same conditions. This variation is brought about from the essential variations in the material fatigue itself. The rating life defined bellow is used as an index for the life expectancy of the linear system.

Rating life

Rating life is the total travelling distance that 90% of a group of systems of the same size can reach without causing any flaking when they operate under the same conditions.

The rating life can be obtained from the following equation with the basic dynamic load rating and the load on the linear system:

For ball type:

$$L = \left(\frac{C}{P}\right)^3 50,$$

where:

- L - rating life, km,
- C - basic dynamic load rating. N
- P -load, N.

Consideration and influence of vibration impact loads and distribution of load should be taken into account when designing a linear motion system. It is difficult to calculate the actual load. The rating life is also affected by the operating temperature. In these conditions, the expression (1) is arranged as follows:

For ball type:

$$L = \left(\frac{f_H^3 \times f_T \times f_C}{f_W \times P}\right) \times 50,$$

where:

- L -rating life, km,
- f_H -hardness factor (see figure 1),
- C -basic dynamic load rating, N,
- f_T -temperature coefficient (see figure 2),
- P -load, N,
- f_c -contact coefficient (see table 2),
- f_w -load coefficient (see table 3).

The rating life in hours can be calculated by obtaining the travelling distance per unit time. The rating life in hours can be obtained from the following expression when the stroke length and the number of strokes are constant:

$$L_h = \frac{L \times 10^3}{2 l_s \times n_1 \times 60},$$

where:

- L_h -rating life in hours, hr,
- l_s -stroke length, m,
- L -rating life, km,
- n_1 -no of strokes per minute, cpm.

Hardness factor

The shaft be sufficiently hardened when a linear bushing is used. If not properly hardened, permissible load is lowered and the life of the bushing will be shortened

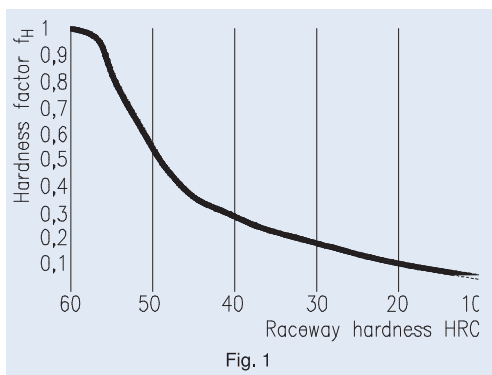


Fig. 1

Temperature coefficient

If the temperature of the linear system exceeds 100°C, Hardness of the linear system and the shaft lowers to decrease the permissible load compared to that of the linear system used at room temperature rise shortens the rating life.

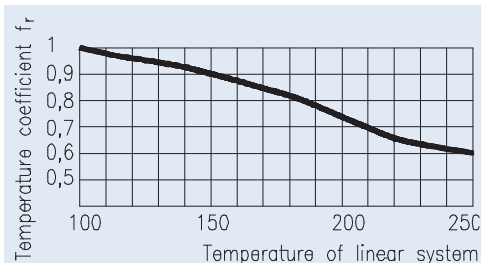


Fig. 2

Contact coefficient

Generally two or more linear bushings are used on one shaft. Thus, the load on each linear system differs depending on each precessing accuracy. Because the linear bushings are not loaded equally, the number of linear bushings per shaft changes the permissible load of system.

Contact coefficient

Table 2

Number of linear systems per shaft	Contact coefficient f_c
1	1,00
2	0,81
3	0,72
4	0,66
5	0,61

Load coefficient

When calculating the load on the linear system, it is necessary to accurately obtain object weight, inertial force based on motion speed, moment load, and each transition as time passes. However, it is difficult to calculate those values accurately because reciprocating motion involves the repetition of start and stop as well as vibration and impact. A more practical approach is to obtain the load coefficient by taking the actual operating conditions into account.

Load coefficient

Table 3

Operating Conditions	f_w
Operation at low speed(15m/min. or less) without impulsive shock from outside	1,0 to 1,5
Operation at intermediate speed (60 m/min. or less) without impulsive shock	1,5 to 2,0
Operation at high speed (over 60 m/min.) With impulsive shock from outside	2,0 to 3,5

Frictional resistance

The static frictional resistance of the MTK linear system is so low as to be only slightly different from the kinetic frictional resistance, enabling smooth linear movement from low to high speeds. In general, the friction resistance is expressed by the following equation.

$$F = \mu W + f,$$

where:

- F -frictional resistance,
- μ -coefficient of friction,
- W -load weight,
- f -sealing resistance.

The frictional resistance of each MTK linear system depends on the model, load weight, speed, and lubricant. The sealing resistance depends on lip interference and lubricant, regardless of the load weigh. The sealing resistance of one linear system is about 200 to 500 gf. The coefficient of friction depends on the load weight, moment load, and preload. Table 6 shows the coefficient of kinetic friction of each type of linear system which has been installed and lubricated properly and applied with normal load (P/C= 0,2)

Coefficient of linear system friction

Table 4

Linear System Type	Models	Coefficient of Friction
Linear Bushing	LM LME LMB	0,002 to 0,003

Ambient working temperature

The ambient working temperature range for each MTK linear system depends on the model. Consult MTK on use outside the recommended temperature range.

Temperature conversion equation:

C = 5/9 (F-32)

F = 32+ 9/5 C

Ambient working temperature

Table 5

Linear System Type	Models	Ambient Working Temperature
Linear Bushing	LM LME LMB	-20 to 80°C

Lubrication and dust prevention

Using MTK linear systems without lubrication increases the abrasion of the rolling elements, shortening the life span. The MTK linear systems, therefore require appropriate lubrication. For lubrication MTK recommends turbine oil conforming to ISO Standards G32 to G68 or lithium base soap grease no. 2. Some MTK linear systems are sealed to block dust out and seal lubricant in. If used in a harsh or corrosive environment, however, apply a protective cover to the part involving linear motion.

Structure and features

The MTK linear bushing consists of an outer cylinder, ball retainer, balls and two end rings. The ball retainer which holds the balls in the recirculating trucks inheld inside the outer cylinder by end rings.

Those parts are assembled to optimize their required func-

tions.

The outer cylinder is maintained sufficient hardness by heat treatment, therefore it ensures the bushings projected travel life and satisfactory durability.

The ball retainer is made from synthetics to reduce running noise.

High precision and rigidity

The MTK linear bushing is reduced from a solid steel outer cylinder and incorporates an industrial strength resin retainer.

Ease of assembly

The standard type of MTK linear bushing can be loaded from any direction. Precision control is possible using only the shaft supporter, and the mounting surface can be machined easily.

Ease of replacement

MTK linear bushing of each type are completely interchangeable because of their standardized dimensions and strict precision control. Replacement because of wear or damage is therefore easy and accurate.

Variety of types

MTK offers a full line of linear bushing: The standard, integral single - retainer closed type, the clearance adjustable type and the open types. The user can choose from among these according to the application requirements to be met.

Linear ball bushing designation

Designation			
Group I	Group II	Group III	Group IV
Type	Nominal shaft diameter	Modification	Seal
Example: LM 25 UU AJ			
Type:			
LM	-metric dimension series most widely used in Japan,		
LME	-metric dimension series generally used in Europe,		
LMB	-inch dimension series used mainly in USA.		
Modification:			
No entry	-standard type,		
AJ	-adjustable type,		
OP	-open type.		

Seal:
 No entry -no seal,
 U -seal on one side,
 UU -seals on both sides.

f_T -temperature coefficient (see page 340),
 f_C -contact coefficient (see page 340).
 The lifespan of a linear bushing in hours can be obtained by calculating the travelling distance per unit time.
 The lifespan can be obtained from the following equation if the stroke length and the number of strokes are constant:

Tolerance

Note that precision of inscribed circle diameters and outside diameters for the clearance adjustable type (...-AJ) and the open type (...-OP) indicates the value obtained before the corresponding type is subjected to cutting process.

Load rating and life expectancy

The life of a linear bushing can be obtained from the following equation with the basic dynamic load rating and the load applied to the bush:

$$L = \left(\frac{f_H \times f_T \times f_C}{f_W \times P} \times \frac{C}{P} \right)^3 \times 50, \tag{1}$$

where:
 L -ratedlife, km,
 C -basic dynamic load rating, N,
 P -working load, N,
 f_W -load coefficient,
 f_H -hardness factor (see page 340),

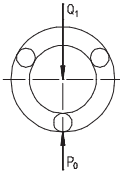
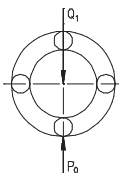
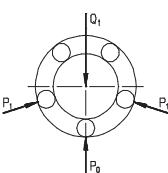
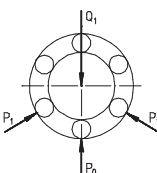
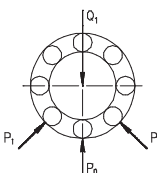
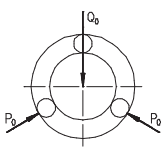
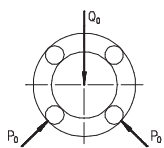
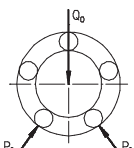
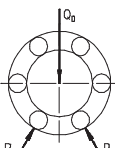
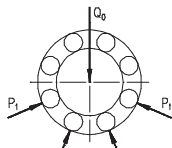
$$L_h = \left(\frac{L \times 10^3}{2 \times l_s \times n_1 \times 60} \right), \tag{2}$$

where:
 L_h -lifespan, hr,
 l_s -stroke length, m,
 L -rated life, km,
 n_1 -number of strokes per minute, cpm.

Relation between ball circuits and load rating

The MTK linear bushing includes ball circuits that are spaced equally and circumferentially. The load rating varies according to the loaded position on the circumference.
 The value in the dimension table indicates the load rating when the load is placed on top of one ball circuit. If the MTK linear bushing is used with two ball circuits loaded uniformly, the load rating will be greater. The following table shows the values by the number of ball circuits in such cases:

Tabel 6

Row position load ratio	Number of rows				
	3	4	5	6	8
Row position load ratio	 $Q_1 = P_0$	 $Q_1 = P_0$	 $Q_1 = 1,106P_0$	 $Q_1 = 1,354P_0$	 $Q_1 = 1,841P_0$
Row position	 $Q_0 = P_0$	 $Q_0 = 1,414P_0$	 $Q_0 = 1,618P_0$	 $Q_0 = 1,732 P_0$	 $Q_0 = 2,052P_0$
Load ratio	$Q_0/Q_1 = 1$	$Q_0/Q_1 = 1,414$	$Q_0/Q_1 = 1,463$	$Q_0/Q_1 = 1,280$	$Q_0/Q_1 = 1,115$

Sample calculations

Obtaining the rated life and lifespan the MTK linear bushing used in the following conditions:

Linear bushing	LM20
Stroke length	50 mm
Number of strokes per minute	50 cpm
Load per bush	490 N

The basic dynamic load rating of the linear bushing is 882N from the dimension table. From equation (1) therefore, the rated life is obtained as follows:

$$L = \left(\frac{f_H \times f_T \times f_C}{f_W \times P} \times \frac{C}{P} \right)^3 \times 50 = \left(\frac{882}{490} \right)^3 \times 50 = 292 \text{ km,}$$

where:
 $f_H = f_T = f_C = f_W = 1.0$

From equation (2), the lifespan is obtained as follows:

$$L_h = \left(\frac{L \times 10^3}{2 \times e_s \times n_1 \times 60} \right) = \left(\frac{292 \times 10^3}{2 \times 0.05 \times 50 \times 60} \right) = 973 \text{ hr}$$

Selecting the linear bushing type satisfying the following conditions:

Number of linear bushing used	4
Stroke length	1 m
Traveling speed	10 m/min
Number of strokes per minute	5 cpm
Lifespan	10 hr
Total load	980 N

From equation (2), the travelling distance within the lifespan is obtained as follows

$$L = 2 \times l_s \times n_1 \times 60 \times L_h = 6\,000 \text{ km}$$

From equation (1), the basic dynamic load rating is obtained as follows:

$$C = \sqrt[3]{\frac{L}{50} \times \left(\frac{f_W}{f_H \times f_T \times f_C} \right) \times P} = 1492 \text{ N}$$

Assume the following with a pair of shafts each with two linear bushings:

$$f_C = 0.81, f_W = f_T = f_H = 1$$

As a result, LM30 is selected from the dimension table as the MTK linear bushing type satisfying the value of C.

Clearance and fit

When a standard-type MTK linear bushing is used with a shaft, inadequate clearance, adjustment may cause early bush failure and/or poor, rough traveling. The clearance adjustable linear bush and open linear bush can be clearance adjusted when assembled in the housing which can control the outside cylinder diameter. However, too much clearance adjustment increases the deformation of the outside cylinder, to affect its precision and life. Therefore, the appropriate clearance between the bush and shaft, and clearance

between the bush and housing are required according to the application. Table 7 shows recommended fit of the bush:

Table 7

Division	Shaft Normal fit High class	Transi-tional	Housing Loose fit	Tight fit
Model				
LM	g6	h6	H7	J7
LMB				
LME	h6	j6	H7	J7

Note. The clearance may be zero or negative. Please attention the movement.

Shaft and housing

To optimize performance of the MTK linear bushing high precision of the shaft and housing is required.

Shaft

The rolling balls in the MTK linear bushing are in point contact with the shaft surface. Therefore, the shaft dimensions, tolerance, surface finish and hardness greatly affect the travelling performance of the bush. The shaft should be manufactured with due attention to the following points:

- Since the surface finish critically affects smooth rolling of balls, grind the shaft at 1.5 S or better.
- The best hardness of the shaft is HRC 60 to 64; Hardness less than HRC 60 decreases the life considerably, and hence reduces the permissible load. On the other hand, hardness over HRC 64 accelerates ball wear.
- The shaft diameter for the clearance adjustable linear bush and open linear bush should as much as possible be of the lower value of the inscribed circle diameter in the specification table. Do not set the shaft diameter to the upper value.
- Zero clearance or negative clearance increases the frictional resistance slightly. If the negative clearance is too tight, the deformation of the outside cylinder will become larger, to shorten the bush life.

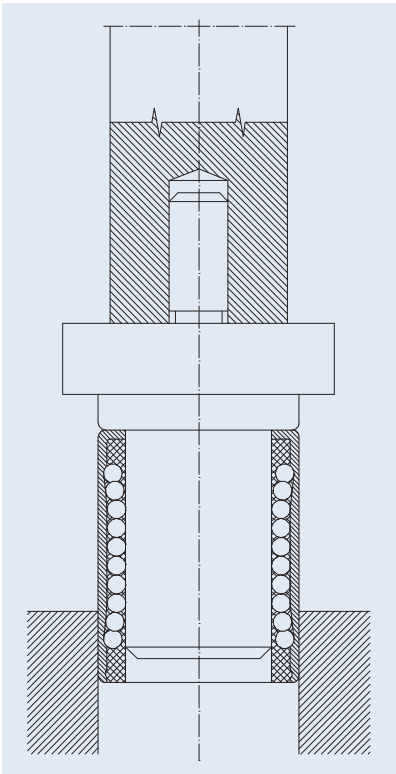
Housing

There is a wide range of housings differing in design, machining and mounting. For the fitness and shapes of housings see in table 8 and the following section on mounting.

Mounting

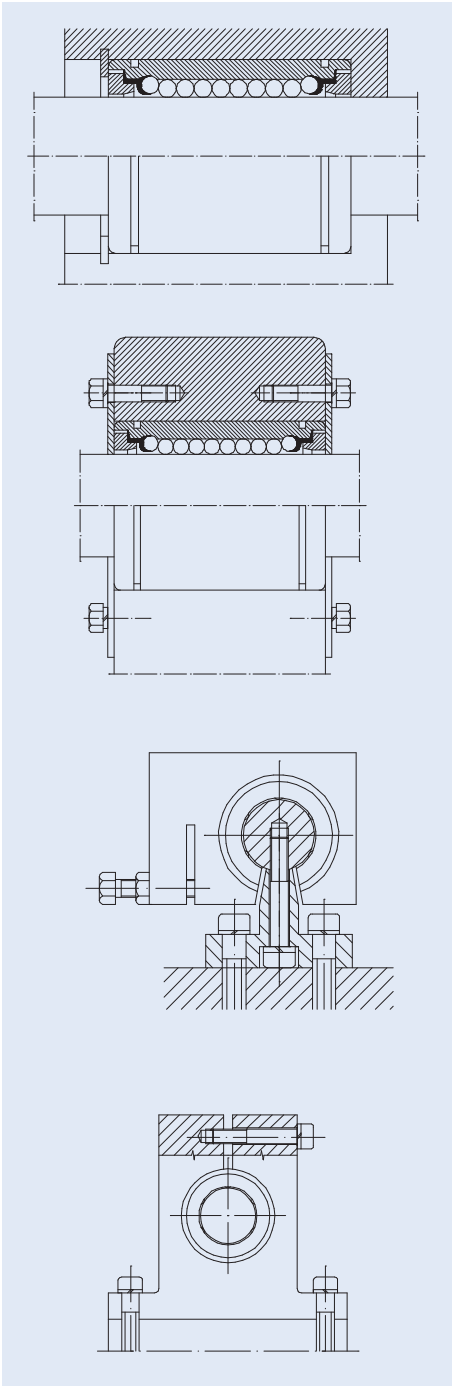
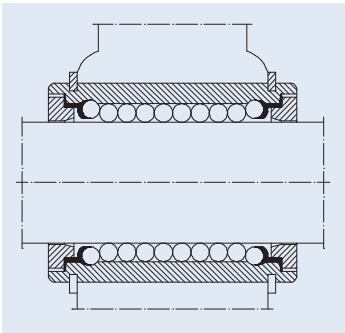
When inserting the linear bush into the bushing do not hit the linear bush on the side ring holding the retainer but apply the cylinder circumference with a proper jig and push the linear bush into the housing by hand or lightly knock it in. In inserting the shaft after mounting the bush,

be careful not to shock the balls. Note that if two shafts are used in parallel, the parallelism is the most important factor to assure the smooth linear movement. Take care in setting the shafts.



Exemples of mounting

The popular way to mount a linear bush is to operate it with an appropriate interference. It is recommended, however, to make a loose fit in principle because otherwise precision is apt to be minimized. The following examples show assembling of the inserted bush in terms of designing and mounting for reference.



MTK ball bushing interchangeability list

Ball bushing compact type

MTK	NTN	STAR	INA	SKF	FAG
KH . . .	KH . . .	0658 - 0 . . . -00	KH . . .	LBBR . . .	LNA . . .
KH . . .PP	KH . . .LL	0658 - 2 . . . -40	KH . . .PP	LBBS . . .	LFA . . .
				LBBR . . .2LS	LNA . . .2RS
				LBBS . . .2LS	LFA . . .2RS

Ball bushing resin retainer

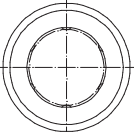
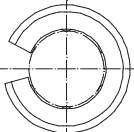
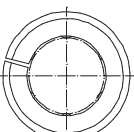
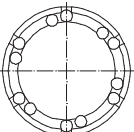
MTK	NB	INA	SKF	THK	IKO	THOMSON	EASE
LME	KB...G	KB	LBAR / LBCR	LME...	LBE...	MA M...	SDE
LME...UU	KB...GUU	KB...PP	LBAR / LBCR ...2LS	LME...UU	LBE...UU	MA M...WW	SDE ...UU
LME...AJ	KB...GAJ	KBS...	LBAS...	LME...AJ	LBE...AJ	MA M...ADJ	SDE ...AJ
LME...UUAJ	KB...GUUAJ	KBS...PP	LBAS...2LS	LME...UUAJ	LBE...UUAJ	MA M...ADJ WW	SDE...UUAJ
LME...OP	KB...GOP	KBO...	LBAT / LBCT...	LME...OP	LBE...OP	MA M...OPN	SDE...OP
LME...UUOP	KB...GUUOP	KBO...PP	LBAT / LBCT...2LS	LME...UUOP	LBE...UUOP	MA M...OPN WW	SDE...UUOP

The above types are metric dimension series generally used in Europe.

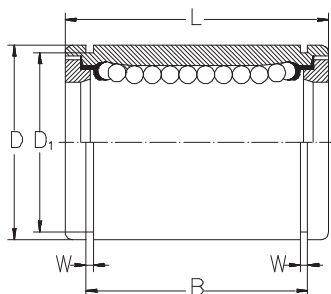
MTK	NB	THK	EASE	MTK	NB	THK	EASE
LM...	SM...G	LM	SDM	LMB...	SW...G	LMB	SDB
LM...UU	SM...GUU	LM...UU	SDM...UU	LMB...UU	SW...GUU	LMB...UU	SDB...UU
LM...AJ	SM...GAJ	LM...AJ	SDM...AJ	LMB...AJ	SW...GAJ	LMB...AJ	SDB...AJ
LM...UUAJ	SM...GUUAJ	LM...UUAJN	SDM...UUAJ	LMB...UUAJ	SW...GUUAJ	LMB...UUAJ	SDB...UUAJ
LM...OP	SM...GOP	LM...OP	SDM...OP	LMB...OP	SW...GOP	LMB...OP	SDB...OP
LM...UUOP	SM...GUUOP	LM...UUOP	SDM...UUOP	LMB...UUOP	SW...GUUOP	LMB...UUOP	SDB...UUOP

The above types are metric dimension series generally used in Japan and other countries.

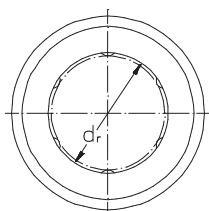
The above types are inch dimension series generally used in US.

Standard type 	page 346 page 348 page 350	
Open type 	page 346 page 348 page 350	One ball circuit (50° - 80°) is removed to allow an opening slot to fit over rail supports.
Adjustable type 	page 346 page 348 page 350	This type has a slot in the outside cylinder. This design allows for clearance adjustment.
Drawn cup type 	page 345	This type linear ball bushings consist of thin walled drawn cups, plastic cages and grade 10 steel balls. Bushings are available with seals at one or both ends.

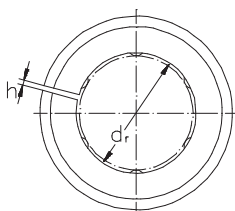
Linear ball bushing



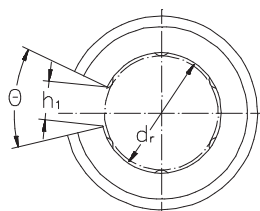
Nominal part no. Standard type	Seal type	Ball circuit	Weight gr	Adjustable type	Open type	Nominal shaft diameter Tolerance mm	
LM 5	LM 5UU	4	4	—	—	5 ⁰	-0,008
LM 6	LM 6UU	4	8	LM 6 AJ	—	6 ⁰	-0,009
LM 8S	LM 8SUU	4	11	LM 8S AJ	—	8	
LM 8	LM 8UU	4	16	LM 8 AJ	—	8	
LM 10	LM 10UU	4	30	LM 10 AJ	—	10	
LM 12	LM 12UU	4	31,5	LM 12 AJ	LM 12 OP	12	
LM 13	LM 13UU	4	43	LM 13 AJ	LM 13 OP	13	
LM 16	LM 16UU	4	69	LM 16 AJ	LM 16 OP	16 ⁰	
LM 20	LM 20UU	5	87	LM 20 AJ	LM 20 OP	20	-0,010
LM 25	LM 25UU	6	220	LM 25 AJ	LM 25 OP	25	
LM 30	LM 30UU	6	250	LM 30 AJ	LM 30 OP	30 ⁰	
LM 35	LM 35UU	6	390	LM 35 AJ	LM 35 OP	35	-0,012
LM 40	LM 40UU	6	585	LM 40 AJ	LM 40 OP	40	
LM 50	LM 50UU	6	1580	LM 50 AJ	LM 50 OP	50 ⁰	
LM 60	LM 60UU	6	2000	LM 60 AJ	LM 60 OP	60	-0,015



LM



LM AJ



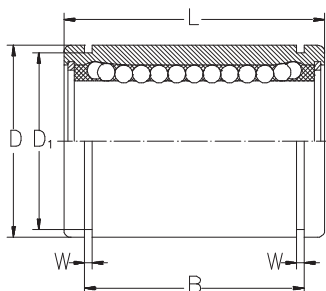
LM OP

Major dimensions and tolerance												
D Tolerance	L Tolerance	B Tolerance	W	D1	H	h1		Eccentricity max	Radial clearance max	Basic Load C	Rating C ₀	Nominal part no.
mm								μm		kN		
10-0,009 ⁰	15-0,012 ⁰	10,2-0,2	1,1	9,6	—	—	—	8	-3	0,17	0,21	LM 5
12-0,011 ⁰	19-0,02 ⁰	13,5-0,2	1,1	11,5	1	—	—	12	-5	0,21	0,27	LM 6
15-0,011 ⁰	17-0,02 ⁰	11,5-0,2	1,1	14,3	1	—	—	12	-5	0,18	0,23	LM 8S
15-0,011 ⁰	24-0,02 ⁰	17,5-0,2	1,1	14,3	1	—	—	12	-5	0,27	0,41	LM 8
19-0,013 ⁰	29-0,02 ⁰	22-0,2	1,3	18	1			12	-5	0,38	0,56	LM 10
21-0,013 ⁰	30-0,02 ⁰	23-0,2	1,3	20	1,5	8	80°	12	-5	0,42	0,61	LM 12
23-0,013 ⁰	32-0,02 ⁰	23-0,2	1,3	22	1,5	9	80°	12	-7	0,52	0,79	LM 13
28-0,013 ⁰	37-0,02 ⁰	26,5-0,2	1,6	27	1,5	11	80°	12	-7	0,79	1,2	LM 16
32-0,016 ⁰	42-0,02 ⁰	30,5-0,2	1,6	30,5	1,5	11	60°	15	-9	0,88	1,4	LM 20
40-0,016 ⁰	59-0,03 ⁰	41-0,3	1,85	38	2	12	50°	15	-9	1	1,6	LM 25
45-0,016 ⁰	64-0,03 ⁰	44,5-0,3	1,85	43	2,5	15	50°	15	-9	1,6	2,8	LM 30
52-0,019 ⁰	70-0,03 ⁰	49,5-0,3	2,1	49	2,5	17	50°	20	-13	1,7	3,2	LM 35
60-0,019 ⁰	80-0,03 ⁰	60,5-0,3	2,1	57	3	20	50°	20	-13	2,2	4,1	LM 40
70-0,022 ⁰	100-0,03 ⁰	74-0,3	2,6	76,5	3	25	50°	20	-13	3,9	8,1	LM 50
80-0,022 ⁰	110-0,03 ⁰	85-0,3	3,15	86,5	3	30	50°	25	-16	4,8	10,2	LM 60

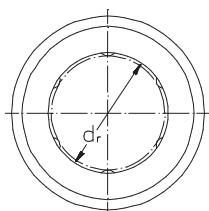
LM<Built- in synthetics resin retainers>

This type is a metric dimension series widely used in Japan and other countries

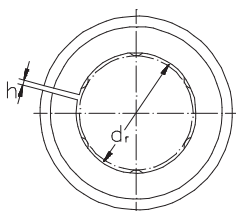
Linear ball bushing



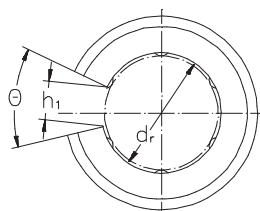
Nominal part no.		Ball circuit	Weight	Adjustable type	Open type	Nominal shaft diameter	
Standard type	Seal type					Tolerance	
—	—		gr	—	—	mm	
LME 5	LME 5UU	3	11	LME 5 AJ	—	5 ₀	+0,008
LME 8	LME 8UU	4	20	LME 8 AJ	—	8	
LME 12	LME 12UU	4	41	LME 12 AJ	LME 12 OP	12 _{+0,009}	
LME 16	LME 16UU	4	57	LME 16 AJ	LME 16 OP	16	-0,001
LME 20	LME 20UU	5	91	LME 20 AJ	LME 20 OP	20	
LME 25	LME 25UU	6	215	LME 25 AJ	LME 25 OP	25 _{+0,011}	-0,001
LME 30	LME 30UU	6	325	LME 30 AJ	LM E 30 OP	30	
LME 40	LME 40UU	6	705	LME 40 AJ	LME 40 OP	40 _{+0,013}	-0,002
LME 50	LME 50UU	6	1130	LME 50 AJ	LM E 50 OP	50	
LME 60	LME 60UU	6	2220	LME 60 AJ	LM E 60 OP	60	



LME



LME AJ



LME OP

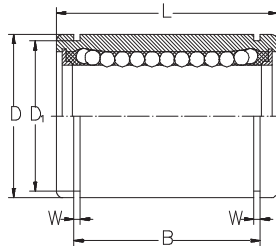
Major dimensions and tolerance

D _{Tolerance}	L _{Tolerance}	B _{Tolerance}	W	D1	H	h1		Eccen- tricity max	Radial clearance max	Basic load C	Rating C ₀	Nominal part no.
mm								μm	kgF			
12-0,008 ⁰	22-0,02 ⁰	14,5-0,2	1,1	11,5	1	—	—	12	-5	21	27	LME 5
16-0,008 ⁰	25-0,02 ⁰	16,5-0,2	1,1	15,2	1	—	—	12	-5	21	41	LME 8
22-0,009 ⁰	32-0,02 ⁰	22,9-0,2	1,3	21	1,5	7,5	78°	12	-7	52	79	LME 12
26-0,009 ⁰	36-0,02 ⁰	24,9-0,2	1,3	24,9	1,5	10	78°	12	-7	59	91	LME 16
32-0,011 ⁰	45-0,02 ⁰	31,5-0,2	1,6	30,3	2	10	60°	15	-9	88	140	LME 20
40-0,011 ⁰	58-0,03 ⁰	44,1-0,3	1,85	37,5	2	12,5	60°	15	-9	100	160	LME 25
47-0,011 ⁰	68-0,03 ⁰	52,1-0,3	1,85	44,5	2	12,5	50°	15	-9	160	280	LME 30
62-0,013 ⁰	80-0,03 ⁰	60,6-0,3	2,15	59	3	16,8	50°	17	-13	220	410	LME 40
75-0,013 ⁰	100-0,03 ⁰	77,6-0,3	2,65	72	3	21	50°	17	-13	390	810	LME 50
90-0,015 ⁰	125-0,04 ⁰	101,7-0,4	3,15	86,5	3	27,2	54°	20	-16	480	1020	LME 60

LME<Built- in synthetics resin retainer>

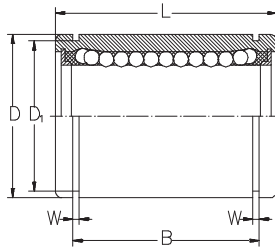
This type is a metric dimension series generally used in Europe.

Linear ball bushing



Nominal diameter	Nominal part number						Nominal shaft diameter		Major dimensions and tolerance	
	Standard type	Seal type	Ball circuit	Weight	Adjustable type	Open type		Tolerance	D	Tolerance
inch/mm	kg						inch/mm			
1/4 6,350	LMB 4	LMB 4UU	4	0,008	LMB 4 AJ	—	0,250 6,350	0 -0,0040	0,5000 12,700	0 -0,00045 0 -0,011
3/8 9,525	LMB 6	LMB 6UU	4	0,014	LMB 6 AJ	—	0,3750 9,525		0,6250 15,875	0 -0,00050
1/2 12,700	LMB 8	LMB 8UU	4	0,037	LMB 8 AJ	LMB 8 OP	0,5000 12,700	0 -0,0090	0,8750 22,225	0 -0,013
5/8 15,875	LMB 10	LMB 10UU	4	0,076	LMB 10 AJ	LMB 10 OP	0,625 15,875		1,1250 28,575	
3/4 19,050	LMB 12	LMB 12UU	5	0,095	LMB 12 AJ	LMB 12 OP	0,7500 19,050	0 -0,0040	1,2500 31,750	0 -0,00065
1 25,400	LMB 16	LMB 16UU	6	0,200	LMB 16 AJ	LMB 16 OP	1,0000 25,400		1,5625 39,688	
1-1/4 31,750	LMB 20	LMB 20UU	6	0,440	LMB 20 AJ	LMB 20 OP	1,2500 31,750	0 -0,0050	2,0000 50,800	0 -0,00075
1-1/2 38,000	LMB 24	LMB 24UU	6	0,670	LMB 24 AJ	LMB 24 OP	1,5000 38,100		2,3750 60,325	0 -0,019
2 50,800	LMB 32	LMB 32UU	6	0,114	LMB 32 AJ	LMB 32 OP	2,0000 50,800	0 -0,010	3,0000 76,200	0 -0,00090 0 -0,022

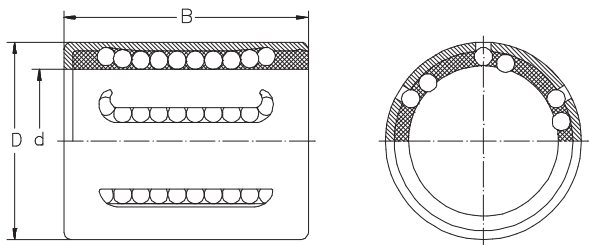
LM<Built- in synthetics Resin Retainer>
This type is a metric dimension series widely used in Japan and other countries



									Eccen- tricity	Radial clearance	Basic load rating			Nominal part no.
L	Tolerance B		Tolerance W		D ₁	h	h ₁		max	max	C	C ₀		
inch/mm														N
0,7500 19,050	0 -0,008	0,5110 12,98	0 -0,008	0,390 0,992	0,4687 11,906	0,04 1	—	—	0,0005 12	-0,0001 -3	206	265	LMB 4	
	0 -0,200		0 -0,200											
0,8750 22,225		0,6358 16,15		0,390 0,992	0,5880 14,935	0,04 1	—	—	0,0005 12	-0,0001 -3	225	314	LMB 6	
1,2500 31,750		0,9625 24,46		0,0459 1,168	0,8209 20,853	0,06 1,5	0,34 7,9375	80°	0,0005 12	-0,0001 -4	510	764	LMB 8	
1,5000 38,100		1,1039 28,04		0,0559 1,422	1,0590 26,899	0,06 1,5	0,375 9,525	80°	0,0005 12	-0,0001 -4	774	1180	LMB 10	
1,6250 41,275		1,1657 29,61		0,0559 1,422	1,1760 29,870	0,06 1,5	0,4375 11,1125	60°	0,0006 15	-0,0002 -6	862	1370	LMB 12	
2,2500 57,150	0 -0,012	1,7547 44,57	0 -0,012	0,0679 1,727	1,4687 37,306	0,06 1,5	0,5625 14,2875	50°	0,0006 15	-0,0002 -6	980	1570	LMB 16	
2,6250 66,675	0 -0,300	2,0047 50,92	0 -0,300	0,0679 1,727	1,8859 47,904	0,10 2,5	0,625 15,875	50°	0,0008 20	-0,0003 -8	1570	2740	LMB 20	
3,0000 76,200		2,4118 61,26		0,0859 2,184	2,2389 56,870	0,12 3	0,75 19,05	50°	0,0008 20	-0,0003 -8	2180	4020	LMB 24	
4,0000 101,600		3,1917 81,07		0,1029 2,616	2,8379 72,085	0,12 3	1,0 25,40	50°	0,0010 25	-0,0005 -13	3820	7940	LMB 32	
	0 -0,022													

Standard linear ball bushing

Steel drawn cup/cage plastic



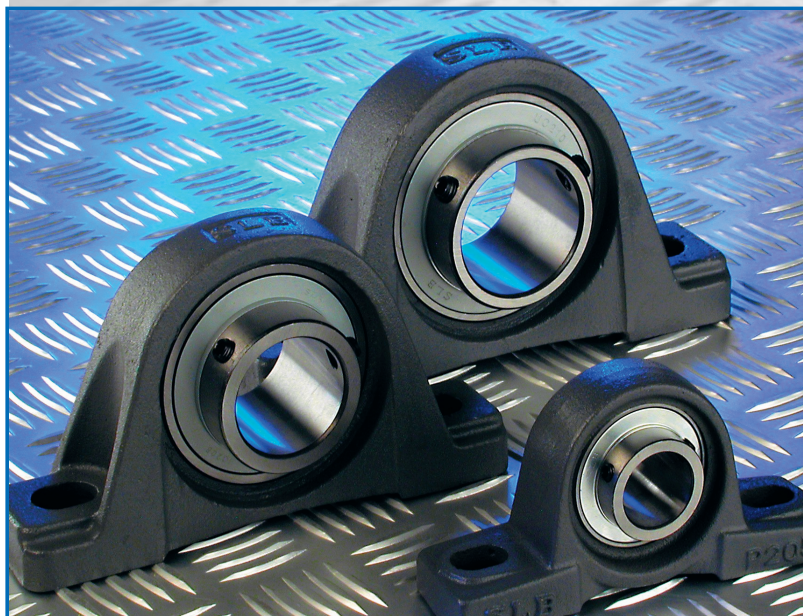
Dimensions		B	Load capacity		Designation	Weight
d	D		dyn.	stat.		
mm			N		—	g
6	12	22	400	239	KH 0622	7
8	15	24	435	280	KH 0824	12
10	17	26	500	370	KH 1026	14,5
12	19	28	620	510	KH 1228	18,5
14	21	28	620	520	KH 1428	20,5
16	24	30	800	620	KH 1630	27,5
20	28	30	950	790	KH 2030	32,5
25	35	40	1990	1670	KH 2540	66
30	40	50	2800	2700	KH 3050	95
40	52	60	4400	4450	KH 4060	182
50	62	70	5500	6300	KH 5070	252

IV. Pillow blocks



BEARINGS

Pillow blocks



Pillow blocks

Feature

The spherical outside surface ball bearings of MTK are deep groove ball bearings with wide and narrow inner rings, consisting of insert bearings (SA200, SB200, UC200, UEL200, UK200, UCX00 and UC300) and various housings. The types of bearing units are defined according to the different mounting methods of the bearings to shafts : the set-screws type, the adapter type, the ac-centric locking collar type.

The MTK housings are mainly casting housings. There are pressed steel plate housings as well align with ease during operation and can be conveniently mounted or dismounted.

The bearing units can operate satisfactorily under working conditions, especially for machines operating in dusty or muddy surroundings. Thus, they are widely used in agricultural, construction and transmission machineries, etc.

There are various types of sealing devices for our products, such as synthetic rubber seals, slinger with synthetic rubber seals and triple lip seals etc..

Sufficient lubricating grease has been put into the bearings during manufacturing, which can act as lubricating as well as rust proof. No more grease is needed to put in during the lubricating period when the bearings operate under normal conditions. Lubricating grease can be added from the fittings when the rebubricate bearings operate under hard conditions.

The outer ring of the bearing, has spherical outside surface which can be fitted to the concave spherical surface of the housing, and the fit between them can be clearance fit or interference fit according to different conditions. This combination provides self-alignment between the self-contained bearing and the housing, and compensates for a certain alignment errors or flexing of the shaft when the bearing is in operation. This definitely increases the bearing service life

surface ball bearings during manufacturing.

Physical chemical properties of lubricating grease
Table 1

Density 1/mm	Without operation	268
	Operated 60 times	260
Dropping point °C		128
Mechanical impurities pc/gr	10-25 μm	within 1000
	25-75 μm above 75 μm	within 500 0
Base oil kinematical viscosity 40° cst		80,3

The bearings usually operate below the temperature of 120°C (the measuring temperature of the outer rings is 100°C). Grease life reduction has to be taken into account when the bearing continues to operate at a temperature above 70°C. The lowest operating temperature should not be lower than -30°C.

The permissible speed of rotations is connected with the fit between shaft and bearing. It is recommended that, under normal operating conditions, the fit between the bearing and the shaft is h7. Looser fit allowing lower speed is recommended when heavier load is applied.

Lubrication

The Spherical Outside Surface Ball Bearings of MTK generally use CG-2 rust proof lithium based lubricating grease, with physical chemical properties shown in the following table 1. Grease is filled in the spherical outside

Tolerance for bearing units

Tolerances on inner rings of bearing with cylindrical bore

Unit: 0.001 mm

Table 2

Nominal bore diameter		Cylindrical bore bore diameter dm		d deviations		width Bi deviations		Radial run-out
d over	incl.	high	low	high	low	high	low	max.
mm								
10	18	+18	0	+22	-4	0	-120	12
18	30	+21	0	+25	-4	0	-120	15
30	50	+25	0	+30	-5	0	-120	18
50	80	+30	0	+36	-6	0	-150	22
80	120	+35	0	+42	-7	0	-200	28
120	150	+40	0	+48	-8	0	-250	35

Note: dm is defined as the arithmetical mean of the largest and smallest diameter obtained by two-point measurements.

Tolerances on inner rings of bearings with tapered bore

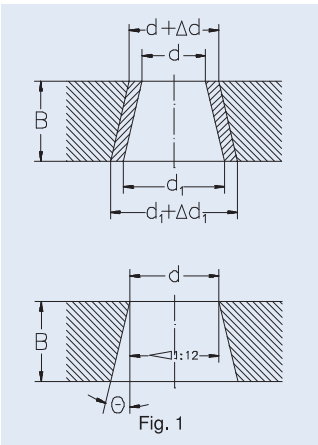
Unit: 0.001 mm

Table 3

Nominal bore diameter		Δd		$\Delta d_1 - \Delta d$	
d over	incl.	high	low	max.	min.
mm					
18	30	+33	0	+21	0
30	50	+39	0	+25	0
50	80	+46	0	+30	0
80	120	+54	0	+35	0
120	150	+63	0	+40	0

Note: The deviations from nominal taper are defined by the limits of $(\Delta d_1 - \Delta d)$, where (Δd_1) is actual deviations of d_1 from nominal diameter at the largest end of bore and Δd is actual deviation of d from bearing bore nominal diameter.
 d_1 is obtained by the following formula: $d_1 = d + 0.083333 B$, where B is width of the bearing inner ring.
The nominal taper angle = $2^\circ 23' 9.4''$.

Please refer to the figures 1.



Tolerances on outer ring

Unit: 0.001 mm

Table 4

Nominal bore diameter		Dm		Radial run-out
D over	incl.	high	low	max.
mm				
40	50	0	-11	20
50	80	0	-13	25
80	120	0	-15	35
120	150	0	-18	40
150	160	0	-25	45

Note: Dm is defined as the arithmetical means of the largest and the smallest diameter obtained by two-point measurement.
The low deviation of outside diameter Dm does not apply within the distance of 1/4 the width of outer ring from the sides.

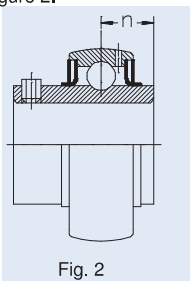
Tolerance for distance 'h' between the radial plane passing through center of outer ring and a side of inner ring

Unit: 0.001 mm

Table 5

Nominal bore diameter		n
d over	incl.	deviations
mm		
40	50	± 200
50	80	± 250
80	120	± 300
120	160	± 350

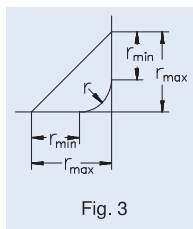
Please refer to figure 2.



Chamfer dimensions

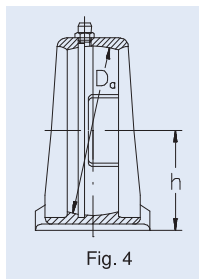
Nominal dimensions r mm	r	
	max.	min.
1	1.5	0.6
1.5	2	1
2	2.5	1.5
2.5	3	2
3	3.5	2.5
3.5	4	3
4	4.5	3.5
5	6	4

Please refer to fig. 3.



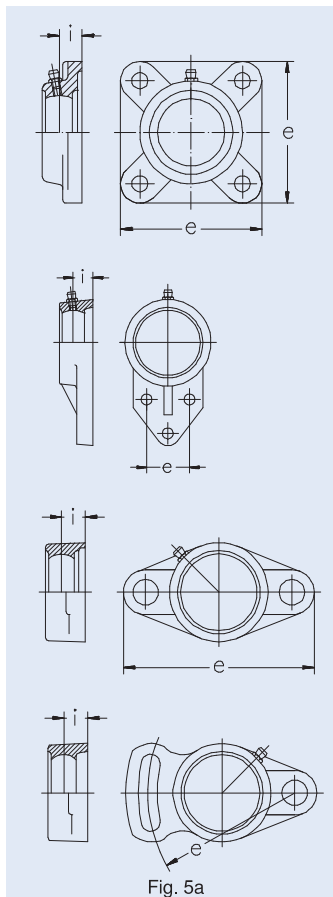
Center height tolerances for pillow block type housings

Please refer to below figures 4 and table7



Tolerances for flanged type housings (F, FS, FL, FT, FA, FB, FC)

Please refer below figures 5a, 5b and table 8a, 8b.



Tolerances for flanged type housings (F, FS, FL, FT, FA, FB,)

Center height tolerances for pillow block type housings

Unit: 0.001 mm

Housing number

Table 7
h
deviations

P203			AK204	PA203		
P204			AK205	PA204	PH204	
P205		P305	AK206	PA205	PH205	
P206	PX05	P306	AK207	PA206	PH206	± 150
P207	PX06	P307	AK208	PA207	PH207	
P208	PX07	P308	AK209	PA208	PH208	
P209	PX08	P309	AK210	PA209	PH209	
P210	PX09	P310	AK211	PA210	PH210	
P211			AK212			
P212	PX10	P311	AK213	PA211	PH211	
P213	PX11	P312	AK214	PA212	PH212	
P214	PX12	P313	AK215	PA213	PH213	
P215	PX13	P314			PH214	
P216	PX14	P315			PH215	± 200
P217	PX15	P316			PH216	
P218	PX16					

Unit: 0.001 mm

Table 8a

Housing number								e deviations	i deviations
F204		FL204		FT204	FS204	FA204	FB204	± 700	± 500
F205	F305	FL205	FL305	FT205	FS205	FA205	FB205		
F206	F306	FL206	FL306	FT206	FS206	FA206	FB206		
F207	F307	FL207	FL307	FT207	FS207	FA207	FB207		
F208	F308	FL208	FL308	FT208	FS208	FA208	FB208		
F209	F309	FL209	FL309	FT209	FS209	FA209	FB209		
F210	F310	FL210	FL310	FT210	FS210	FA210	FB210		
F211	F311	FL211	FL311	FT211	FS211	FA211	FB211	± 1000	± 800
F212	F312	FL212	FL312	FT212	FS212	FA212	FB212		
F213	F313	FL213	FL313	FT213	FS213	FA213	FB213		
F214	F314	FL214	FL314	FT214	FS214				
F215	F315	FL215	FL315		FS215				
F216		FL216							
F217		FL217							
F218		FL218							

Tolerance for take-up type housing (T,ST)

Please refer to below figure 6 and table 9a, 9b.

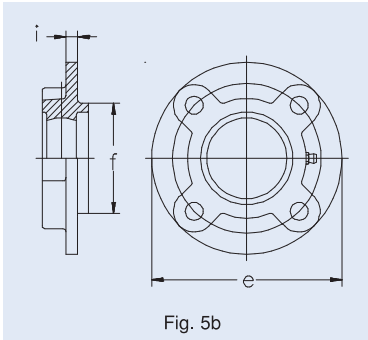


Fig. 5b

Tolerance for flanged type housing (FC)

Unit: 0,001 mm

Table 8b

Housing number	f deviations		e deviations	i deviations	Radial run-out of machined pilot max
	high	low			
FC 204					
FC 205	0	-46			
FC 206					
FC 207			± 700	± 500	200
FC 208					
FC 209	0	-54			
FC 210					
FC 211					
FC 212					
FC 213					
FC 214					
FC 215	0	-63	± 1000	± 800	300
FC 216					
FC 217					
FC 218	0	-72			

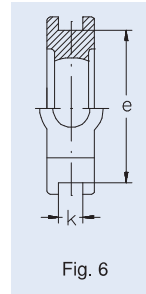


Fig. 6

Tolerance for take-up type housing (T)

Unit: 0,001mm

Table 9a

Housing number	k deviations		e deviations	Parallelism of guide max.
	high	low		
T204	+200	0		500
T210	0	- 500		
T211	+300	0		600
T217	0	- 800		

Tolerance for take-up type housing (ST)

Unit:0.001mm

Table 9b

Housing number	k deviations		e deviations	Parallelism o guide max.
	high	low		
ST204	+500		± 250	500
ST210	- 250			
ST211	+1000		± 250	600
ST215	- 250			

Tolerance on spherical inside diameter Unit: 0,001mm

Table 10

Nominal spherical inside diameter Da		Symbol H7		Symbol J7		Dam		Da	
over	incl.	Dam deviations high	deviations low	Da deviations high	deviations low	high	low	high	low
mm									
30	50	+25	0	+30	-5	+14	-11	+19	-16
50	80	+30	0	+36	-6	+18	-12	+24	-18
80	120	+35	0	+42	-7	+22	-13	+29	-20
120	180	+40	0	+48	-8	+26	-14	+34	-22
180	250	+46	0	+55	-9	+30	-16	+39	-25

Note: $Dam = (Da_{max} + Da_{min}) / 2$

Da max - maximum measured value of Da

Da min - minimum measured value of Da

Dimensional tolerances for spherical inside diameter of housing are classified as H7 for clearance fit and J7 for interference fit.

As the self - contained for bearings are equipped with locking-pin, clearance fit H7 is normally applied.

Machining tolerances

Table 11

Nominal dimension		Dimensional tolerance
over	incl.	
mm		
4	16	± 0,2
16	63	± 0,3
63	250	± 0,5

One side machining tolerances

Table 14

Nominal dimension		Dimensional tolerance
over	incl.	
mm		
up	5	± 1
5	100	± 1,5
100	200	± 2
200	400	± 3

Note: Dimensional tolerances and deviations are for ordinary grade;.

Dimensional tolerances on length and thickness may be added with deviations on draft taper.

Casting tolerances on length

Table 12

Nominal dimension		Dimensional tolerance
over	incl.	
mm		
up	100	± 1,5
100	200	± 2,0
200	400	± 3,0
400	800	± 4,0

Casting tolerances on thickness

Table 13

Nominal dimension		Dimensional tolerance
over	incl.	
mm		
up	5	± 1
5	10	± 1,5
10	20	± 2
20	30	± 3
30	50	± 3,5

Radial internal clearance of bearings

The radial internal clearance of the bearing for the unit is the same as the value of ISO 5753, the internal radial clearance for the spherical outside surface ball bearing is usually greater than that for the same size of deep groove ball bearing. The clearance for the cylindrical bore bearing is shown in table 15 while the clearance for the tapered bore bearing is shown in table 16.

**Radial internal clearance of cylindrical bore bearings
(with set-screws and eccentric locking collar)
Unit: 0,001mm**

Table 15

Nominal bore diameter		Clearance symbol					
over	incl.	C2		normal		C3	
mm		min.	max.	min.	max.	min.	max.
10	18	3	18	10	25	18	33
18	24	5	20	12	28	20	36
24	30	5	20	12	28	23	41
30	40	6	20	13	33	28	46
40	50	6	23	14	36	30	51
50	65	8	28	18	43	38	61
65	80	10	30	20	51	46	71
80	100	12	36	24	58	53	84
100	120	15	41	28	66	61	97
120	140	18	48	33	88	71	114

**Radial internal clearance of tapered bore bearings (with adapter sleeve)
Unit: 0,001mm**

Table 16

Nominal bore diameter		Clearance symbol					
over	incl.	C2		normal		c3	
mm		min.	max.	min.	max.	min.	max.
10	18	10	25	18	33	25	45
18	24	12	28	20	36	28	48
24	30	12	28	23	43	30	61
30	40	13	33	28	46	40	64
40	50	14	36	30	51	45	73
50	65	18	43	38	61	55	90
65	80	20	51	46	71	65	105
80	100	24	58	53	84	75	120
100	120	28	66	61	97	90	140
120	140	33	81	71	114	150	160

Bearing Size selection

The bearing size is usually selected according to the required life and reliability under a specific type of load charged on the spherical outside surface ball bearing

The load applied to the bearing operating under static or slow oscillating and rotating ($n < 10r/min$) condition is defined as static load, while the load applied to the bearing operating under a speedy rotating ($n > 10r/min$) condition is defined as dynamic load.

The load capacity of the bearing is expressed by the basic dynamic load rating which is shown in the spherical outside surface ball bearing's table.

Under normal mounting, lubricating and maintaining conditions, the operating bearing will have fatigue flaking due to the repeating action of variable load charged on the contact area between the rings and rolling elements. Generally, the fatigue flaking is the cause of normal damage of rolling bearings. Therefore, the usual bearing

life refers to the bearing fatigue life. The life of group of apparently identical bearings operating under a considerable dispersion. For this reason, the bearing life is closely connected with the damaging probability or the reliability requirement.

The radial rating load of ball bearing with 90% reliability and 500 hours minimum life is shown in figure 7.

Life:

The life of a rolling bearing is defined as the total number of revolution which the bearing is capable of enduring before the first evidence of fatigue flaking develops on any one rings or rolling elements.

Reliability:

The reliability is the percentage of the bearings of a group of apparently identical bearings operating under identical conditions which can expect to attain or exceed a certain defined life. The reliability of individual bearings is the probability of the bearing to attain or exceed a defined life.

Basic rating life:

For a group of apparently identical rolling bearings operating under identical

conditions, the basic rating life is defined as the total number of revolutions that 90% of the bearings can be expected to complete or exceed.

Basic rating life

The fatigue rating life of spherical outside surface ball bearings is calculated by the following formula:

$$L_{10} = \left(\frac{C}{P} \right)^3, \text{ or } \frac{C}{P} = L_{10}^{1/3}$$

where:

- L_{10} - basic rating life, $10^6 r$
- P - basic dynamic load rating, N
- N - equivalent dynamic bearing load, N

The basic dynamic load rating C is a hypothetical constant load with a fixed direction under which the bearing can attain a basic life of one million revolutions theoretically. For radial bearings, the load refers to the radial load.

The equivalent dynamic bearing load P is a constant load with a fixed direction under which the bearing life is identical to that of the bearing operating under actual load.

For a bearing operating with a constant rotation speed, the basic rating life can be expressed in terms of operating hours:

$$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P} \right)^3 \text{ or } L_{10h} = \frac{10^6}{60n} L_{10} = \frac{16666}{n} \left(\frac{C}{P} \right)^3,$$

where:

- L_{10h} - basic rating life, h
- n - bearing operating speed of rotation, r/min

For easier calculation, 500 hours as base of rating life is taken, and the speed factor f_n and the life factor f_h is introduced.

$$f_n = \left(\frac{331/3}{n} \right)^{1/3}, \quad f_h = \left(\frac{L_{10h}}{500} \right)^{1/3}$$

In this, the formula is simplified to:

$$C = \frac{f_h}{f_n} P,$$

The values of f_h and f_n can be found in figure 7 by referring to the operation speed n and the anticipated bearing service life L_{10h} . Then, with the radial load (or the equivalent dynamic bearing load), the basic dynamic load rating can be determined. By this way, the bearing size can be determined according to the basic dynamic load rating value in the spherical outside surface ball bearing's table. If the bearing operate under indeterminate loads and rotation speed, the following formula should be applied when calculating the bearing life:

$$P_m = \sqrt[3]{\frac{1}{N} \int_0^N P^3 dN}$$

where:

- P_m - mean equivalent dynamic bearing load, N
- P - equivalent dynamic bearing load, N

- N - total revolution numbers within one load changing cycle, r

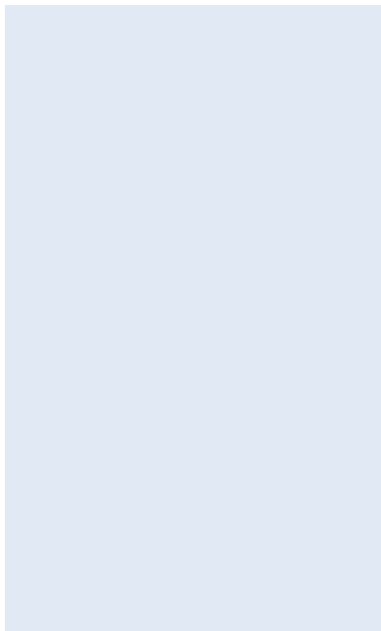


Fig. 7

Anticipated bearing service life

When selecting a bearing, one should usually predetermine an appropriate service life according to the relevant machine type, operating condition and reliability requirement. Generally the anticipated bearing service life can be determined by referring to the maintenance period of a machine.

Calculating method of equivalent dynamic bearing load P .

The basic equivalent dynamic bearing load is determined under a hypothetical condition. When calculating the bearing life, the actual load has to be converted to dynamic bearing load which is in conformity with the load condition determining the dynamic load rating. General equation for calculating the equivalent dynamic bearing load:

$$P = X F_r + Y F_a,$$

where:

- P - equivalent dynamic bearing load, N
- F_r - actual radial load, N
- F_a - actual axial load, N
- X - radial factor
- Y - thrust factor

The values of X and Y are determined by the ratio between the applied axial load F_a and the basic static load rating C_0 . The axial load which the spherical outside surface ball bearing can carry is determined by the mounting method of the bearing on the shaft.

For bearing of set-screw Locking type or eccentric Locking collar type, if flexible shafts are applied and the set-screws are tightened enough, the axial load F_a which the bearings can carry not surpass 20% of the radial load F_r .

For bearing of adapter sleeve Locking type, if the nut is properly tightened, the axial load F_a can be maximally 15% to 20% of the radial load.

The value of radial and thrust factors X and Y for spherical outside surface ball bearings can be obtained from the following Table 17.

When twist load is applied to the bearing, the equivalent dynamic bearing load is calculated by the following equation:

$$P_m = f_m P$$

where:

- P_m - equivalent dynamic bearing load when considering twist load
- f_m - twist load factor, which is defined as follows:
 - when the twist load is small: $f_m = 1,5$
 - when the twist load is big: $f_m = 2$

Example of bearing size selection

When shocking load is applied to the bearing, the equivalent dynamic bearing load can be calculated by the following equation:

$$P_d = f_d P$$

where:

- P_d - equivalent dynamic bearing load when considering shocking load
- f_d - shocking load factor, which is defined as follows:
 - when no shocking load or mirror shocking load is applied: $f_d = 1-1,2$
 - when adequate shocking load is applied: $f_d = 1,2-1,8$

How to select the size of bearing:
one spherical outside surface ball bearings is to operate at a rotation speed of 1000r/min under only a radial load of $F_r = 3000N$, with a basic rating life of at least 20,000 hours.

Select the bearing size.

From the required rotation speed it can be found that: $f_n = 0,322$ (figure 7 shows about 0,32, refer to page 357).

From the required basic rating life (anticipated service life), it can be found that:

$f_n = 3,42$ (figure 7 shows about 3,4, refer to page 357).
Under only radial load, i.e.

$$P = F_r = 3000 N$$

Therefore,

$$C = \frac{\int \frac{h}{n} P = \frac{3,42}{0,322} = 31,863 N$$

A simplified way to calculate the bearing life can be applied by using figure 8.

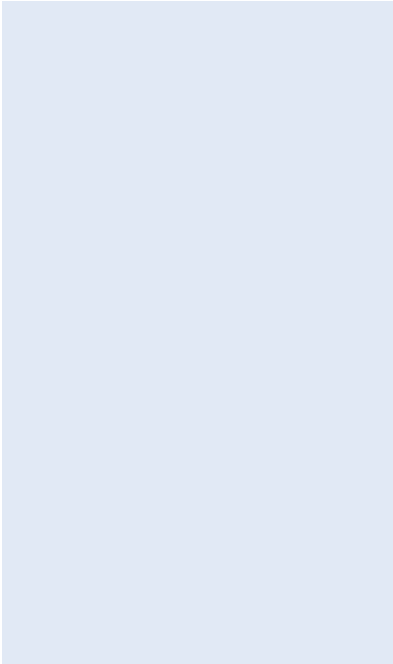


Fig. 8

Radial and thrust factors X and Y for spherical outside surface ball bearings

Table 17

Clearance for normal					Clearance for C3					
$\frac{F_a}{C_a}$	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$		e	$\frac{F_a}{F_r} \leq e$	e	$\frac{F_a}{F_r} > e$	e	
	X	Y	X	Y		X	Y	X	Y	
0,025	1	0	0,56	2	0,22	1	0	0,46	1,74	0,3
0,04	1	0	0,56	1,8	0,24	1	0	0,46	1,61	0,33
0,07	1	0	0,56	1,6	0,27	1	0	0,46	1,46	0,36
0,13	1	0	0,56	1,4	0,31	1	0	0,46	1,3	0,41
0,25	1	0	0,56	1,2	0,37	1	0	0,46	1,14	0,47
0,5	1	0	0,56	1	0,44	1	0	0,46	1	0,54

By connecting n and the required basic rating life L_{10h} with a straight line, it can be found that C/P value is 10,6. As is known, $P = F_r = 3000N$, thus the required basic dynamic load rating is:
 $C = 3000 \times 10,6 = 31,800, N$

In this way, we can select the spherical outside surface ball bearings inside this catalogue (refer to pages 116-127).

Adjusted rating life equation

The basic rating life L_{10} calculated with bearing life calculation formula can be applied to calculate the rating life of bearings made of ordinary bearing steel (i.e.bearing life with reliability of 90%)
Due to more and more of machinery products demanding higher reliability and better quality steel (ISO 281/1-1977), an adjusted rating life calculation equation is suggested, i.e.

$$L_n = a_1 a_2 a_3 L_{10}$$

For spherical outside surface ball bearing:

$$L_n = a_1 a_2 a_3 (C/P)^3$$

- where
- L_n under specified material and lubricating conditions, bearing life with (100-n)% no breaking probability (i.e.reability).
- a_1 life adjustment factor for reability (table 18)
- a_2 life adjustment factor materials (table 19)
- a_3 life adjustment factor for operating conditions (table 20)

Life adjustment factor for reability a_1 Table 18

Reability %	90	95	96	97	98	99
L_n	L_{10}	L_5	L_4	L_3	L_2	L_1
a_1	1	0,62	0,53	0,44	0,33	0,21

Life adjustment factor for materials a_2 Table 19

Normal chromium bearing steel		$a_2 = 1$
Special smelted bearing steel	Vacuum degassed bearing steel	$a_2 = 3$
	vacuum resmelted bearing steel	$a_2 = 5$
When material hardness lowered by high frequency tempering		$a_2 < 1$

Life adjustment factor for operating conditions a_3 Table 20

When under normal operating conditions: -properly mounted -sufficiently lubricated -without outside matters intrusion	$a_3 = 1$
When under operating temperature, the spherical outside suface ball bearings lubricating grease viscosity lower than 13 mm ² /s	$a_3 < 1$

Selection of shaft

The shaft on which bearing units are mounted shall be free from band and flexure.
For the units with cylindrical bore (with set-screws or eccentric locking collar) clearance fit is usually adopted for mounting the units on the shaft, and shaft tolerances in table 21 are recommended for such loose fit, but for high speed or highly accurate operation or such application which is accompanied by heavy shock loads, interference fit is to be adopted. Table 22 shows recommended shaft tolerances for interference fit, when bearing units with eccentric locking collar are mounted on the shaft with interference fit, the eccentric locking collar may omitted.
Tapered bore bearings permit wider tolerances of the shaft since they are locked to the shaft by means of adapted sleeves.
Recommended shaft tolerances for tapered bore bearings listed in table 23.

Shaft tolerances for clearance fit for bearing with cylindrical bore

Shaft diameter over incl.	Deviation of tolerances in shaft							
	For lower speed h9		For medium speed h8		For rather high speed h7		For high speed J6	
mm	max.	min.	max.	min.	max.	min.	max.	min.
10	18	0	-43	0	-27	0	+8	-3
18	30	0	-52	0	-33	0	+9	-4
30	50	0	-62	0	-39	0	+11	-5
50	80	0	-74	0	-46	0	+12	-7
80	120	0	-87	0	-54	0	+13	-9
120	180	0	-100	0	-63	0	+14	-11

Table 21

Shaft tolerance for interference fit for bearing with cylindrical bore

Table 22

Shaft diameter		Deviation of tolerances in shaft				Highest load		Heavy load	
over	incl.	Higher speed		Rather heavy load		m6		m7	
mm		max.	min.	max.	min.	max.	min.	max.	min.
10	18	+18	+7	+25	+7	+23	+12	+30	+12
18	30	+21	+8	+29	+8	+28	+15	+36	+15
30	50	+25	+9	+34	+9	+33	+17	+42	+17
50	80	+30	+11	+41	+11	+39	+20	+50	+20
80	120	+35	+13	+48	+13	+45	+23	+58	+23
120	180	+40	+15	+55	+15	+52	+27	+67	+27

Shaft tolerances for bearing with tapered bore

Table 23

Shaft diameter		Deviation of tolerances in shaft			
over	incl.	For shot shaft		For shot shaft	
mm		max.	min.	max.	min.
10	18	0	-43	0	-70
18	30	0	-52	0	-84
30	50	0	-62	0	-100
50	80	0	-74	0	-120
80	120	0	-87	0	-140
120	180	0	-100	0	-160

Mounting of bearing units on shaft

The bearing units can be easily installed in principle at any place. However, in order to have a long service life, it is desirable that the mounting base is flat and rigid.

In case of either the vibration is caused to the bearing, the alternating movement takes place, the load applied to the bearing is large, or the shaft rotation speed is rapid, it is desired to provide with the filed seat or concave section at the part where the set-screws contact with the shaft. If large thrust load is charged, it is recommended that joggling tightened with nuts be used to install the bearing most effectively to the shaft: as shown in figure 9.

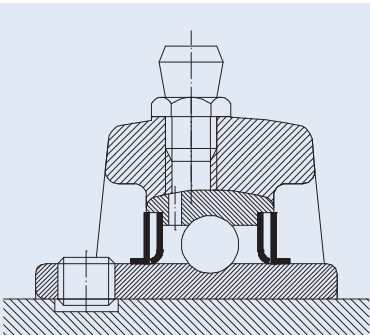


Fig. 9

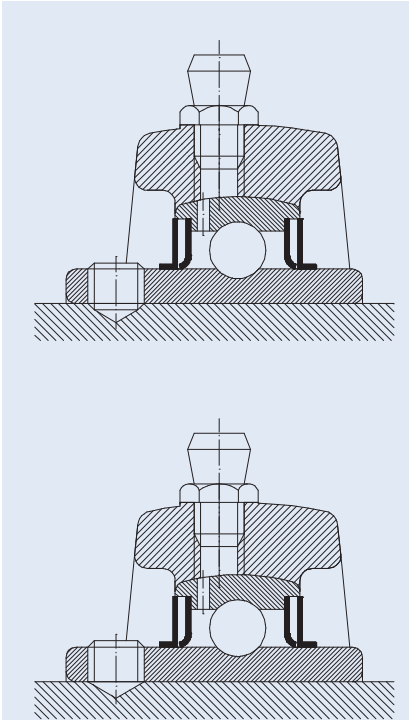


Fig. 9 (continued)

Bearings units with adapter sleeve

Bearing unit with adapter sleeve permits wider shaft tolerance and can be used in applications where vibrations and shocks are heavy.

Mounting processes of these units as follows:

First, the sleeve is installed to an arbitrary position. After the shark proof washer is inserted, the nut is tightened. The proper nut tightening condition can be obtained if it

is tightened enough by hand and then rotated by 2/5 to 3/5 revolution with a spanner.

After tightening the nut, bend the shark proof washer within the slot. Otherwise, the nut may be loosened and creep may be caused between the shaft and sleeve. It is necessary the nut can not be tightened too much.

Bearings units with eccentric locking collar

The eccentric part of the collar mates with the inner ring of the bearing which is made eccentric with the collar. When locked to the shaft by hand in direction of the shaft rotation, the eccentric locking collar tightens automatically to the shaft by force of working radial load. Then, lock the set-screws provided on the collar to fix the eccentric collar to the shaft. At the shaft rotation force or load is not charged on the set-screws directly, it will not loosen during operation.

Bearings units with set-screws

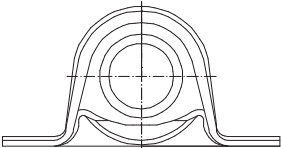
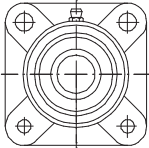
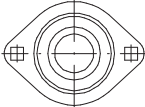
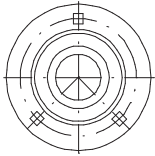
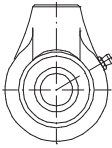
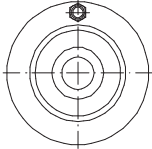
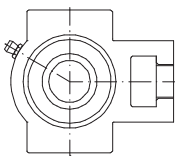
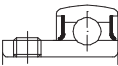
There are two set- screws located at two places on one side of the wide inner ring 120 apart with which the bearing units can be mounted to the shaft. When mounting the bearing to the shaft, the torque shown in the following table 23 is recommended to tighten the set screws to shaft.

The material for cast iron housing

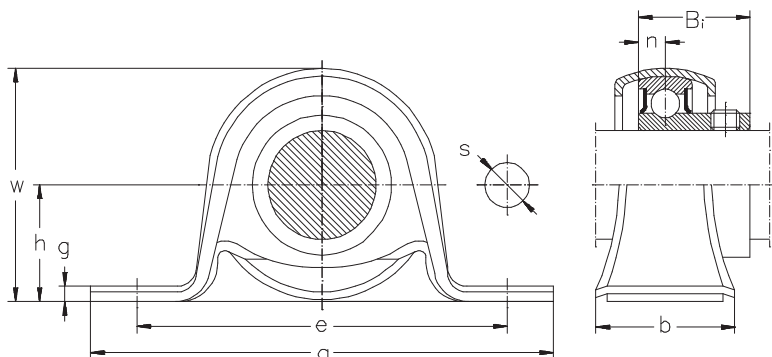
The material of cast iron housing under ISO/DIS GG20, the mechanical properties please refer to table 25.

Proper tightening torque of set-screws				Table 23
Set-screws tap	Bearing type	Tightening torque		
mm	inch		N.m	lbf.in
M 5x0,8	No.10-32 UNF	SB 201 - SB 203, UC 201 - UC 203	3 - 3,5	28
M 6X1	1/4-28 UNF	SB 204 - SB 207, UC 204 - UC 206 SA 201 - SA 206, UEL201 - UEL 205 UC X05, UC 305 - UC306	3,5 - 4	30 - 35,4
M 8X1	5/16-24 UNF	SB 208, UC 207 - UC 209 SA 207 - SA 210, UEL 206 - UEL210 UC X06 - UC X08, UC 307	8,0 - 8,5	69 - 73,5
M 10X1,25	3/8-24 UNF	UC 210 - UC 212 SA 211, UEL 211 - UEL 215 UC X09 - UC X11, UC308 - 309	16,5 - 17,5	144 - 152
M 12X1,25	7/16-20 UNF	UC 213 - UC 218 UC X12 - UC X16 UC 310 - UC 314	26,5 - 27,5	235 - 243
M 14X1,5	1/2-20 UNF	UC 315 - UC 316	33,5 - 34,5	296 - 304

The mechanical properties of cast iron housing				Table 25
Number	Major wall thickness of casting piece	Strain stress	Hardness	
	mm	N/mm ²	HB	
ISO/DIS GG20	2,5-10	220		
U.S.A Grade 35	>10-20	195	170 - 220	
JIS FC20	>20-30	170		
	30-50	160		

Pillow block type	page 368	
Flanged units type	page 383	
Two bolts flanged units type	page 394	
Flanged cartridge units type	page 409	
Hanger units type	page 416	
Cylindrical cartridge units type	page 418	
Take up units type	page 421	
Insert bearings	page 428	

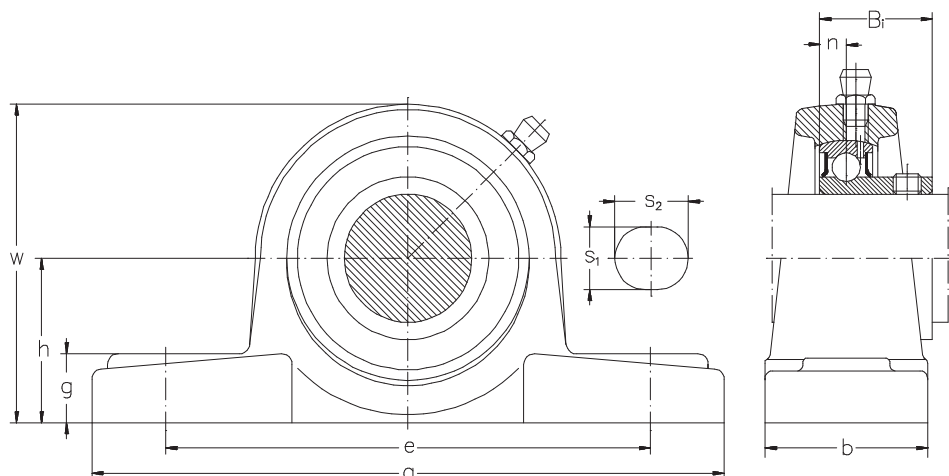
Standard duty pillow blocks pressed steel housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s	g	w	Bi	n						kg
mm												—			
12	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP 201	SB 201	PP 203		0,17
15	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP 202	SB 202	PP 203		0,16
17	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP 203	SB 203	PP 203		0,15
20	25,4	98	76	32	9,5	3,2	50,5	25	7	M8	SBPP 204	SB 204	PP 204		0,22
25	28,6	108	86	32	11,5	4	56,6	27	7,5	M10	SBPP 205	SB 205	PP 205		0,31
30	33,3	117	95	38	11,5	4	66,3	29	8	M10	SBPP 206	SB 206	PP 206		0,45
35	39,7	129	106	42	11,5	4,6	78	32	8,5	M10	SBPP 207	SB 207	PP 207		0,61

Note: Inch sizes available on request.

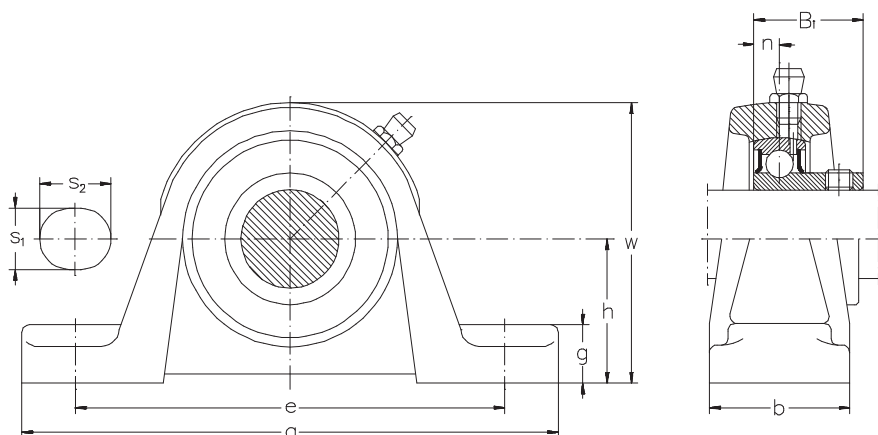
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm												—			kg
20	31,8	128	98	38	11	14	14	63	25	7	M10	SBAK 204	SB 204	AK 204	0,70
25	33,3	140	105	40	11	14	15	66,5	27	7,5	M10	SBAK 205	SB 205	AK 205	0,81
30	39,7	160	121	44	14	19	17	79	29	8	M12	SBAK206	SB 206	AK 206	1,18
35	46	167	127	48	14	19	18	91	32	8,5	M12	SBAK 207	SB 207	AK 207	1,61
40	49,2	181	140	52	14	19	19	98	34	9,5	M12	SBAK 208	SB 208	AK 208	1,99

Note: Inch sizes available on request.

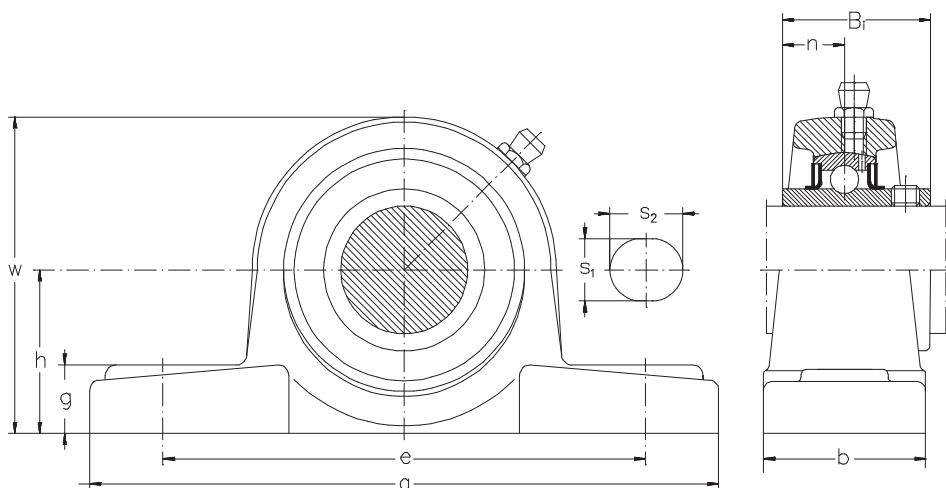
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Weight
mm	h	a	e	b	s ₁	s ₂	g	w	Bi	n			—			kg
20	33,3	127	96	35	13	16	14	65	25	7,0	M10	SBP 204	SB 204	P 204		0,62
25	36,5	140	105	36	13	19	15	71	27	7,5	M10	SBP 205	SB 205	P 205		0,73
30	42,9	160	121	42	14	19	16	84	29	8	M12	SBP 206	SB 206	P 206		1,16
35	47,6	167	127	45	15	19	17	94	32	8,5	M12	SBP 207	SB 207	P 207		1,46
40	49,2	180	137	49	15	21	18	100	34	9,5	M12	SBP 208	SB 208	P 208		1,74

Note: Inch sizes available on request.

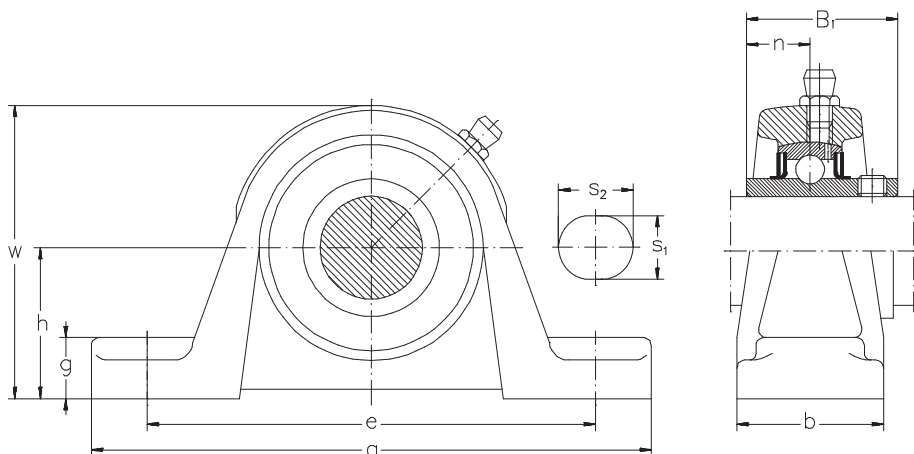
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	s ₁	s ₂	g	w	Bi	n							kg
mm												—				
20	31,8	128	98	38	11	14	14	63	31	12,7	M10	UCAK 204	UC 204	AK 204		0,74
25	33,3	140	105	40	11	14	15	66,5	34	14,3	M10	UCAK 205	UC 205	AK 205		0,85
30	39,7	160	121	44	14	19	17	79	38,1	15,9	M12	UCAK 206	UC 206	AK 206		1,24
35	46,0	167	127	48	14	19	18	91	42,9	17,5	M12	UCAK 207	UC 207	AK 207		1,70
40	49,2	181	140	52	14	19	19	98	49,2	19	M12	UCAK 208	UC 208	AK 208		2,13
45	52,4	189	146	54	14	19	20	105	49,2	19	M12	UCAK 209	UC 209	AK 209		2,39
50	55,6	203	159	57	17,5	21	21	111,5	51,6	19	M16	UCAK 210	UC 210	AK 210		2,83
55	61,9	232	181	60	18	24	23	123	55,6	22,2	M16	UCAK 211	UC 211	AK 211		3,85
60	68,3	241	191	64	18	24	25	136	65,1	25,4	M16	UCAK 212	UC 212	AK 212		4,92
65	74,6	262	203	70	21	28	27	147,5	65,1	25,4	M20	UCAK 213	UC 213	AK 213		6,13
70	77,8	266	210	74	21	28	28	153,5	74,6	30,2	M20	UCAK 214	UC 214	AK 214		6,90
75	82,6	304	241	78	22	32	30	162	77,8	33,3	M20	UCAK 215	UC 215	AK 215		8,56

Note: Inch sizes available on request.

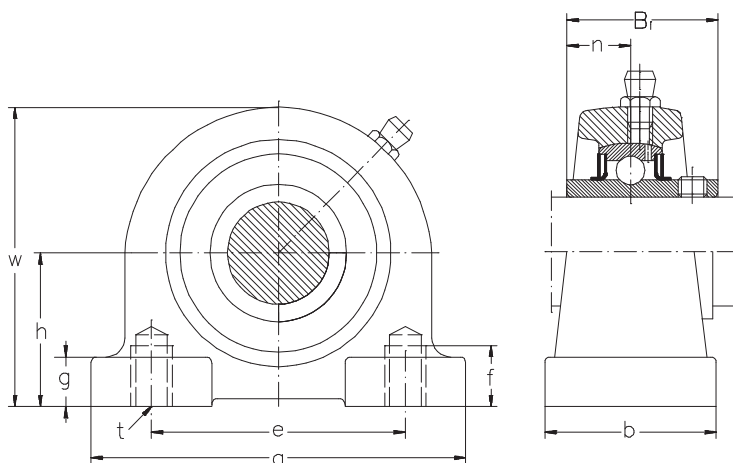
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Weight
mm	h	a	e	b	s ₁	s ₂	g	w	Bi	n						kg
12	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP 201	UC 201	P 203		0,68
15	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP 202	UC 202	P 203		0,67
17	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP 203	UC 203	P 203		0,66
20	33,3	127	96	35	13	16	14	65,0	31	12,7	M10	UCP 204	UC 204	P 204		0,66
25	36,5	140	105	36	13	19	15	71,0	34	14,3	M10	UCP 205	UC 205	P 205		0,77
30	42,9	160	121	42	14	19	16	84,0	38,1	15,9	M12	UCP 206	UC 206	P 206		1,22
35	47,6	167	127	45	15	19	17	94,0	42,9	17,5	M12	UCP 207	UC 207	P 207		1,55
40	49,2	180	137	49	15	21	18	100,0	49,2	19	M12	UCP 208	UC 208	P 208		1,88
45	54	189	146	50	15	21	20	107,5	49,2	19	M12	UCP 209	UC 209	P 209		2,19
50	57,2	204	159	56	19	22	21	114,0	51,6	19	M16	UCP 210	UC 210	P 210		2,73
55	63,5	217	172	58	19	22	22	126	55,6	22,2	M16	UCP 211	UC 211	P 211		3,38
60	69,9	238	186	64	19	25	24	139	65,1	25,4	M16	UCP 212	UC 212	P 212		4,75
65	76,2	262	203	70	23	29	26	149	65,1	25,4	M20	UCP 213	UC 213	P 213		5,81
70	79,4	266	210	72	23	29	27	155	74,6	30,2	M20	UCP 214	UC 214	P 214		6,50
75	82,6	274	217	74	25	29	28	161,6	77,8	33,3	M20	UCP 215	UC 215	P 215		7,11
80	88,9	292	232	78	25	30	30	174	82,6	33,3	M20	UCP 216	UC 216	P 216		8,69
85	95,2	310	247	83	25	30	32	186	85,7	34,1	M20	UCP 217	UC 217	P 217		10,63
90	101,6	326	262	88	27	30	33	198	96	39,7	M22	UCP 218	UC 218	P 218		12,95

Note: Inch sizes available on request.

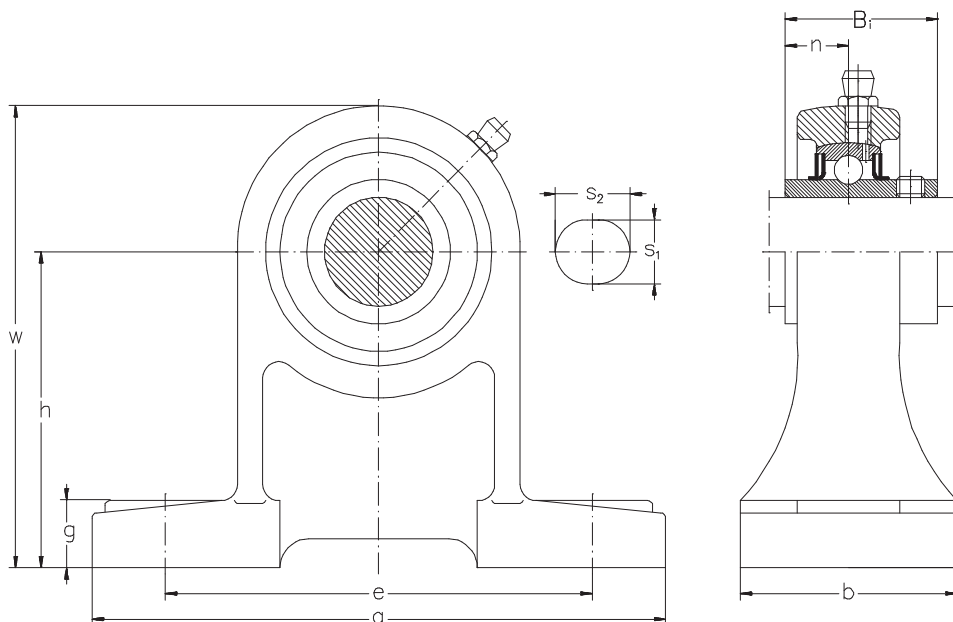
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	g	w	f	t	Bi	n						kg
mm												—			
12	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA 201	UC 201	PA 204	0,57
15	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA 202	UC 202	PA 204	0,56
17	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA 203	UC 203	PA 204	0,55
20	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA 204	UC 204	PA 204	0,53
25	36,5	84	56	38	12	72	15	M10	34	14,3	M10	UCPA 205	UC 205	PA 205	0,71
30	42,9	94	66	48	13	84	18	M14	38,1	15,9	M14	UCPA 206	UC 206	PA 206	1,07
35	47,6	110	80	48	13	95	20	M14	42,9	17,5	M14	UCPA 207	UC 207	PA 207	1,49
40	49,2	116	84	54	13	100	20	M14	49,2	19	M14	UCPA 208	UC 208	PA 208	1,75
45	54,2	120	90	60	13	108	25	M14	49,2	19	M14	UCPA 209	UC 209	PA 209	2,17
50	57,2	130	94	60	14	116	25	M16	51,6	19	M16	UCPA 210	UC 211	PA 210	2,53
55	63,5	140	104	66	14	125	25	M16	55,6	22,2	M16	UCPA 211	UC 211	PA 211	3,17
60	69,9	150	114	68	15	138	25	M16	65,1	25,4	M16	UCPA 212	UC 212	PA 212	4,17
65	76,2	160	124	70	15	150	25	M16	65,1	25,4	M16	UCPA 213	UC 213	PA 213	4,96

Note: Inch sizes available on request.

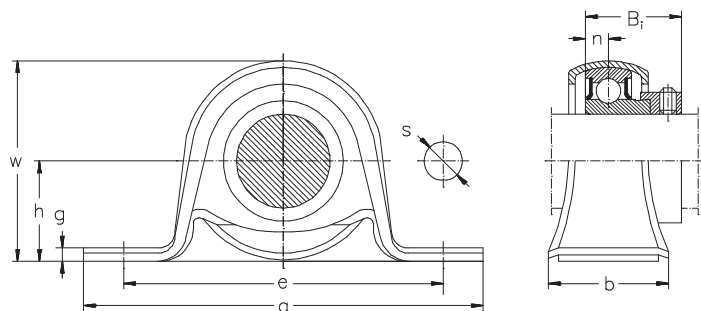
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	s ₁	s ₂	g	w	Bi	n						kg
mm												—			
12	70	127	95	40	12	16	13	101	30	12,7	M10	UCPH 201	UC 201	PH 204	0,81
15	70	127	95	40	12	16	13	101	30	12,7	M10	UCPH 202	UC 202	PH 204	0,80
17	70	127	95	40	12	16	13	101	31	12,7	M10	UCPH 203	UC 203	PH 204	0,79
20	70	127	95	40	12	16	13	101	31	12,7	M10	UCPH 204	UC 204	PH 204	0,77
25	80	140	105	50	13	19	16	114	34	14,3	M10	UCPH 205	UC 205	PH 205	1,01
30	90	165	121	50	17	21	18	130	38,1	15,9	M14	UCPH 206	UC 206	PH 206	1,56
35	95	167	127	60	17	21	19	140	42,9	17,5	M14	UCPH 207	UC 207	PH 207	1,88
40	100	184	137	66	17	21	20	150	49,2	19,0	M14	UCPH 208	UC 208	PH 208	2,44
45	105	190	146	70	17	21	20	158	49,2	19,0	M14	UCPH 209	UC 209	PH 209	2,72
50	110	204	159	70	19	22	22	165	51,6	19,0	M16	UCPH 210	UC 210	PH 210	3,08
55	120	217	171	75	19	22	23	181	55,6	22,2	M16	UCPH 211	UC 211	PH 211	4,05
60	130	236	186	80	19	22	24	197	65,1	25,4	M16	UCPH 212	UC 212	PH 212	4,78
65	140	258	203	85	23	28	26	213	65,1	25,4	M20	UCPH 213	UC 213	PH 213	5,93
70	150	266	210	90	23	28	27	227	74,6	30,2	M20	UCPH 214	UC 214	PH 214	6,99
75	160	274	217	95	23	28	28	240	77,8	33,3	M20	UCPH 215	UC 215	PH 215	7,84
80	170	290	232	100	24	28	30	256	82,6	33,3	M20	UCPH 216	UC 216	PH 216	9,13

Note: Inch sizes available on request.

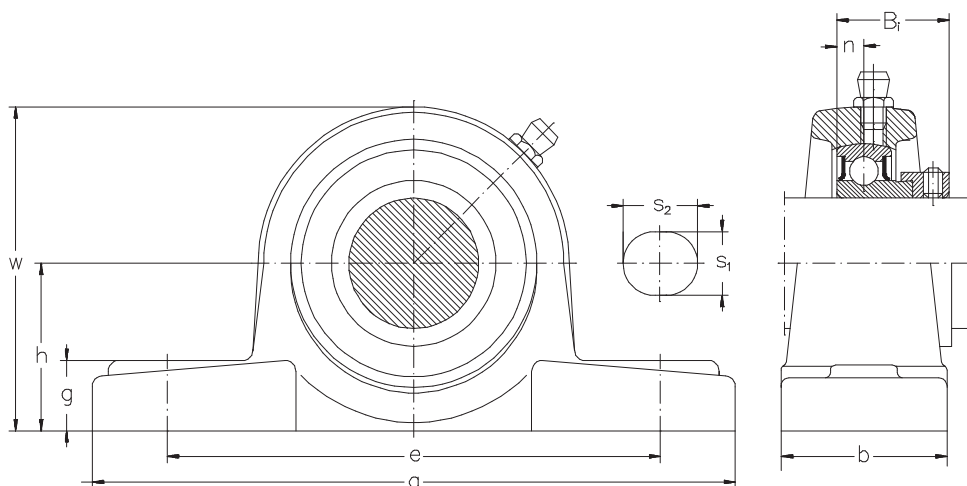
Standard duty pillow blocks pressed steel housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	s	g	w	Bi	n							kg
mm												—			
12	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP 201	SA 201	PP 203		0,21
15	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP 202	SA 202	PP 203		0,20
17	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP 203	SA 203	PP 203		0,19
20	25,4	98	76	32	9,5	3,2	50,5	29,5	7	M8	SAPP 204	SA 204	PP 204		0,27
25	28,6	108	86	32	11,5	4	56,6	30,5	7,5	M10	SAPP 205	SA 205	PP 205		0,34
30	33,3	117	95	38	11,5	4	66,3	33,9	8	M10	SAPP 206	SA 206	PP 206		0,52
35	39,7	129	106	42	11,5	4,6	78	37,5	8,5	M10	SAPP 207	SA 207	PP 207		0,73

Note: Inch sizes available on request.

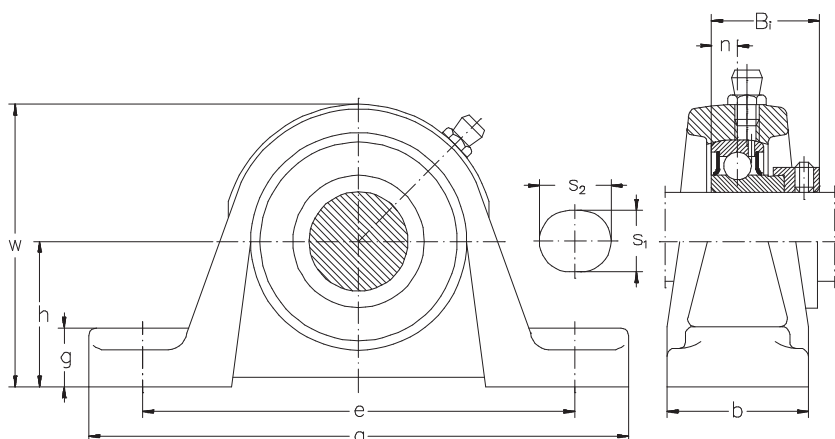
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	B _i	n					
mm															kg
20	31,8	128	98	38	11	14	14	63,0	29,5	7,0	M10	SAAK 204	SA 204	AK 204	0,75
25	33,3	140	105	40	11	14	15	66,5	30,5	7,5	M10	SAAK 205	SA 205	AK 205	0,84
30	39,7	160	121	44	14	19	17	79	33,9	8	M12	SAAK 206	SA 206	AK 206	1,25
35	46	167	127	48	14	19	18	91	37,5	8,5	M12	SAAK 207	SA 207	AK 207	1,73
40	49,2	181	140	52	14	19	19	98	40,5	9,5	M12	SAAK 208	SA 208	AK 208	2,14
45	52,4	189	146	54	14	19	20	105	42,2	10	M12	SAAK 209	SA 209	AK 209	2,40
50	55,6	203	159	57	17,5	21	21	111,5	43,7	10,5	M16	SAAK 210	SA 210	AK 210	2,83
55	61,9	232	181	60	18	24	23	123	48,4	11,5	M16	SAAK 211	SA 211	AK 211	3,60

Note: Inch sizes available on request.

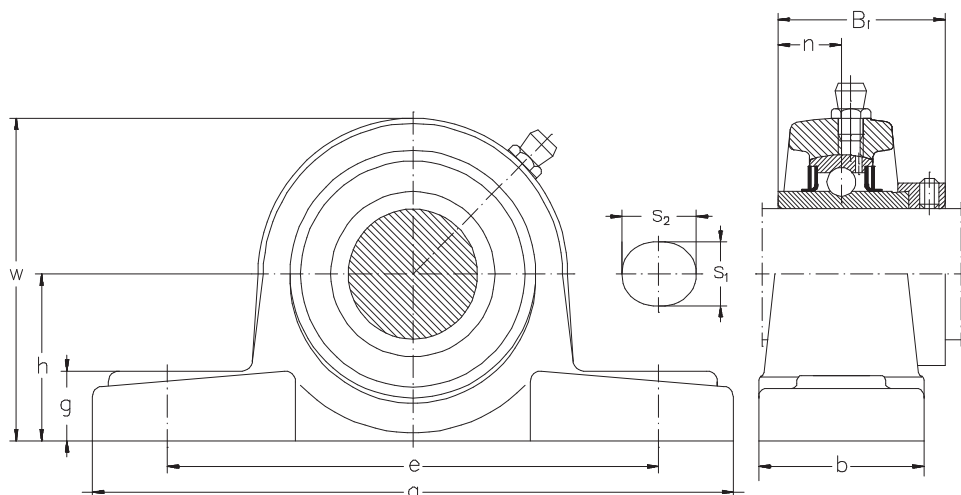
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	s ₁	s ₂	g	w	Bi	n							kg
mm												—				
20	33,3	127	96	35	13	16	14	65	29,5	7	M10	SAP 204	SA 204	P 204		0,67
25	36,5	140	105	36	13	19	15	71	30,5	7,5	M10	SAP 205	SA 205	P 205		0,76
30	42,9	160	121	42	14	19	16	84	33,9	8	M12	SAP 206	SA 206	P 206		1,23
35	47,6	167	127	45	15	19	17	94	37,5	8,5	M12	SAP 207	SA 207	P 207		1,58
40	49,2	180	137	49	15	21	18	100	40,5	9,5	M12	SAP 208	SA 208	P 208		1,89
45	54	189	146	50	15	21	20	107,5	42,2	10	M12	SAP 209	SA 209	P 209		2,20
50	57,2	204	159	56	19	22	21	114	43,7	10,5	M16	SAP 210	SA 210	P 210		2,73
55	63,5	217	172	58	19	22	22	126	48,4	11,5	M16	SAP 211	SA 211	P 211		3,13

Note: Inch sizes available on request.

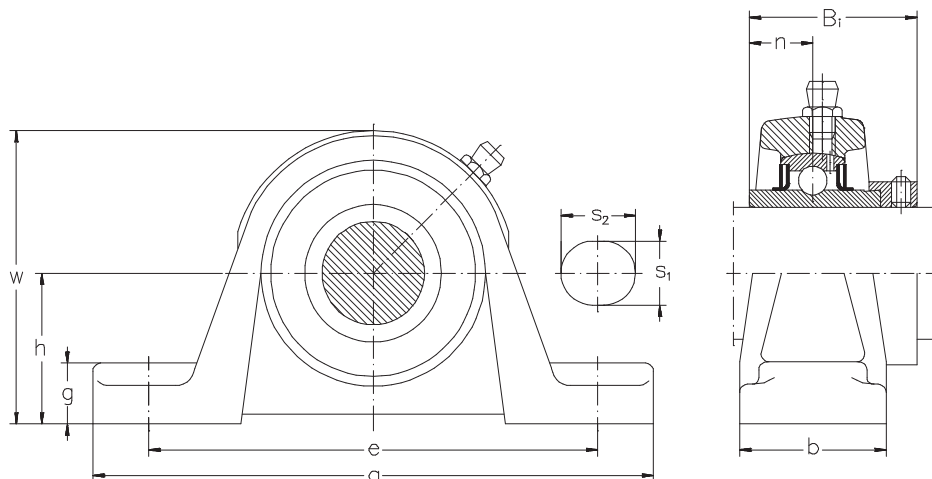
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	s ₁	s ₂	g	w	B _i	n							kg
mm													—			
20	31,8	128	98	38	11	14	14	63,0	43,5	17	M10	UELAK 204	UEL 204	AK 204		0,79
25	33,3	140	105	40	11	14	15	66,5	44,3	17,4	M10	UELAK 205	UEL 205	AK 205		0,89
30	39,7	160	121	44	14	19	17	79,0	48,3	18,2	M12	UELAK 206	UEL 206	AK 206		1,33
35	46,0	167	127	48	14	19	18	91,0	51,1	18,8	M12	UELAK 207	UEL 207	AK 207		1,83
40	49,2	181	140	52	14	19	19	98,0	56,3	21,4	M12	UELAK 208	UEL 208	AK 208		2,27
45	52,4	189	146	54	14	19	20	105,0	56,3	21,4	M12	UELAK 209	UEL 209	AK 209		2,56
50	55,6	203	159	57	17,5	21	21	111,5	62,7	24,6	M16	UELAK 210	UEL 210	AK 210		3,04
55	61,9	232	181	60	18	24	23	123	71,3	27,7	M16	UELAK 211	UEL 211	AK 211		4,12
60	68,3	241	191	64	18	24	25	136	77,7	30,9	M16	UELAK 212	UEL 212	AK 212		5,26
65	74,6	262	203	70	21	28	27	147,5	85,7	34,1	M20	UELAK 213	UEL 213	AK 213		6,68
70	77,8	266	210	74	21	28	28	153,5	85,7	34,1	M20	UELAK 214	UEL 214	AK 214		7,42
75	82,6	304	241	78	21	32	30	162	92,1	37,3	M20	UELAK 215	UEL 215	AK 215		9,19

Note: Inch sizes available on request.

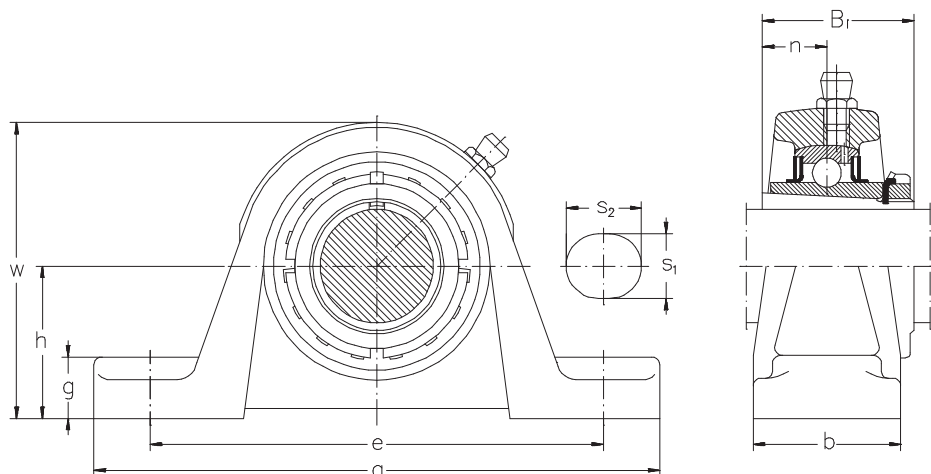
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	s ₁	s ₂	g	w	B _i	n							kg
mm												—				
12	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL P 201	UEL 201	P 203		0,74
15	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL P 202	UEL 202	P 203		0,72
17	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL P 203	UEL 203	P 203		0,71
20	33,3	127	96	35	13	16	14	65,0	43,5	17,0	M10	UEL P 204	UEL 204	P 204		0,71
25	36,5	140	105	36	13	19	15	71,0	44,3	17,4	M10	UEL P 205	UEL 205	P 205		0,81
30	42,9	160	121	42	14	19	16	84,0	48,3	18,2	M12	UEL P 206	UEL 206	P 206		1,31
35	47,6	167	127	45	15	19	17	94,0	51,1	18,8	M12	UEL P 207	UEL 207	P 207		1,68
40	49,2	180	137	49	15	21	18	100,0	56,3	21,4	M12	UEL P 208	UEL 208	P 208		2,02
45	54	189	146	50	15	21	20	107,5	56,3	21,4	M12	UEL P 209	UEL 209	P 209		2,36
50	57,2	204	159	56	19	22	21	114,0	62,7	24,6	M16	UEL P 210	UEL 210	P 210		2,94
55	63,5	217	172	58	19	22	22	126	71,3	27,7	M16	UEL P 211	UEL 211	P 211		3,59
60	69,9	238	186	64	19	25	24	139	77,7	30,9	M16	UEL P 212	UEL 212	P 212		4,95
65	76,2	262	203	70	23	29	26	149	85,7	34,1	M20	UEL P 213	UEL 213	P 213		6,35
70	79,4	266	210	72	23	29	27	155	85,7	34,1	M20	UEL P 214	UEL 214	P 214		6,95
75	82,6	274	217	74	25	29	28	161,6	92,1	37,3	M20	UEL P 215	UEL 215	P 215		7,70

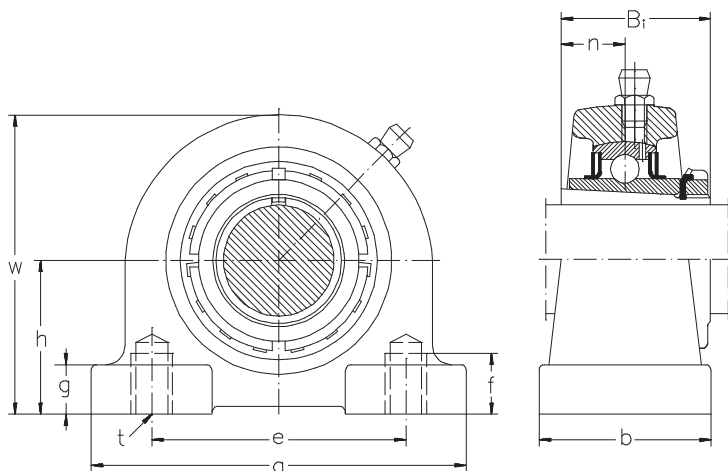
Note: Inch sizes available on request.

Standard duty pillow blocks cast housing adapter type



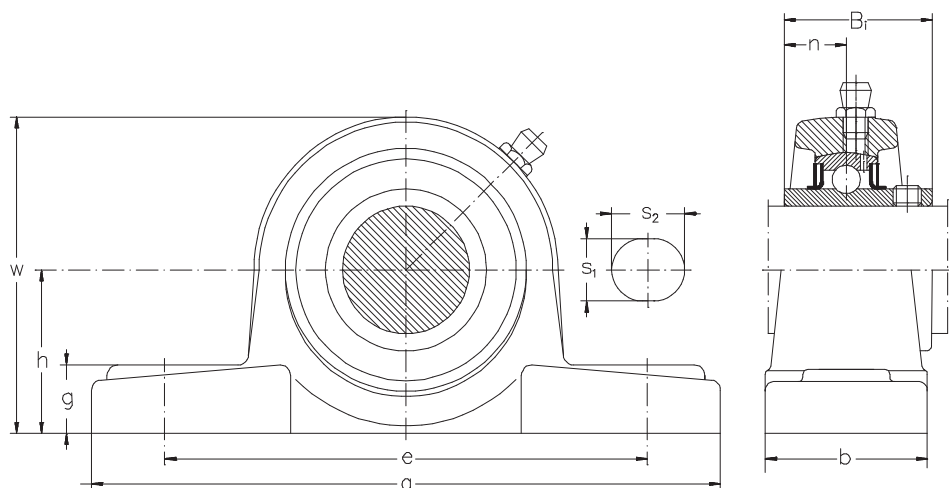
Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	s ₁	s ₂	g	w	Bi							kg
mm															
20	36,5	140	105	36	13	19	15	71	35	M10	UKP 205	UK 205	P 205		0,71
25	42,9	160	121	42	14	19	16	84	38	M12	UKP 206	UK 206	P 206		1,15
30	47,6	167	127	45	15	19	17	94	43	M12	UKP 207	UK 207	P 207		1,45
35	49,2	180	137	49	15	21	18	100	46	M12	UKP 208	UK 208	P 208		1,72
40	54	189	146	50	15	21	20	107,5	50	M12	UKP 209	UK 209	P 209		2,04
45	57,2	204	159	56	19	22	21	114	55	M16	UKP 210	UK 210	P 210		2,52
50	63,5	217	172	58	19	22	22	126	59	M16	UKP 211	UK 211	P 211		3,03
55	69,9	238	186	64	19	25	24	139	62	M16	UKP 212	UK 212	P 212		4,25
60	76,2	262	203	70	23	29	26	149	65	M20	UKP 213	UK 213	P 213		5,31

Standard duty pillow blocks cast housing adapter type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
h	a	e	b	g	w	f	t	Bi						
mm											—			kg
20	36,5	84	56	38	12	72	15	M10	35	M10	UKPA 205	UK 205	PA 205	0,65
25	42,9	94	66	48	13	84	18	M14	38	M14	UKPA 206	UK 206	PA 206	1,00
30	47,6	110	80	48	13	95	20	M14	43	M14	UKPA 207	UK 207	PA 207	1,39
35	49,2	116	84	54	13	100	20	M14	46	M14	UKPA 208	UK 208	PA 208	1,59
40	54,2	120	90	60	13	108	25	M14	50	M14	UKPA 209	UK 209	PA 209	2,02
45	57,2	130	94	60	14	116	25	M16	55	M16	UKPA 210	UK 210	PA 209	2,32
50	63,5	140	104	66	14	125	25	M16	59	M16	UKPA 211	UK 211	PA 211	2,82
55	69,9	150	114	68	15	138	25	M16	62	M16	UKPA 212	UK 212	PA 212	3,67
60	76,2	160	124	70	15	150	25	M16	65	M16	UKPA 213	UK 213	PA 213	4,46

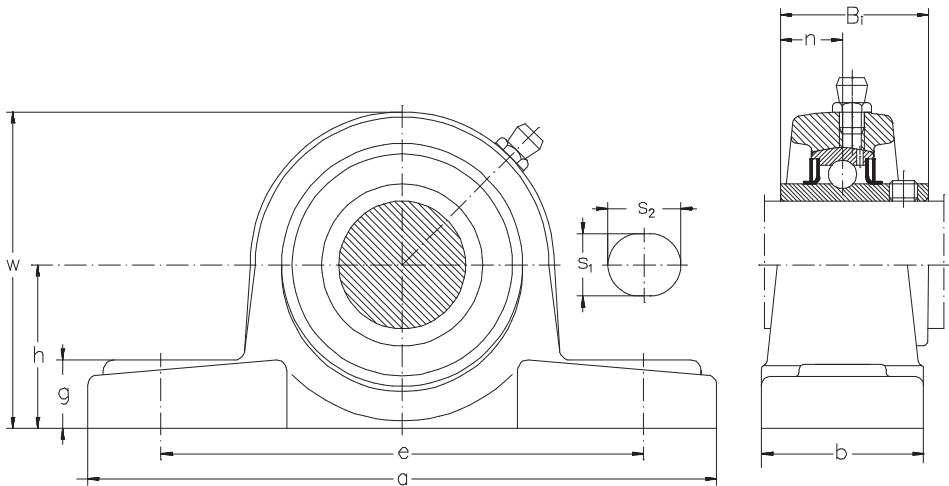
Medium duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm												—			kg
25	44,4	159	119	51	17	20	17	85	38,1	15,9	M14	UCP X05	UC X05	P X05	1,48
30	47,6	175	127	54	17	20	20	93	42,9	17,5	M14	UCP X06	UC X06	P X06	1,85
35	54	203	144	57	17	20	21	105	49,2	19	M14	UCP X07	UC X07	P X07	2,49
40	58,7	222	156	65	20	23	23	112	49,2	19	M16	UCP X08	UC X08	P X08	3,13
45	58,7	222	156	67	20	23	25	116	51,6	19	M16	UCP X09	UC X09	P X09	3,35
50	63,5	240	171	71	20	23	25	126	55,6	22,2	M16	UCP X10	UC X10	P X10	4,17
55	69,8	260	184	79	25	28	29	137	65,1	25,4	M20	UCP X11	UC X11	P X11	5,65
60	76,2	280	203	81	25	28	31	149	65,1	25,4	M20	UCP X12	UC X12	P X12	6,80
65	76,2	286	203	83	25	28	33	152	74,6	30,2	M20	UCP X13	UC X13	P X13	7,42
70	88,9	320	229	85	27	30	34	170	77,8	33,3	M22	UCP X14	UC X14	P X14	9,59
75	88,9	330	229	92	27	30	35	175	82,6	33,3	M22	UCP X15	UC X15	P X15	10,91
80	101,6	378	283	99	27	30	37	194	85,7	34,1	M22	UCP X16	UC X16	PX 16	15,09

Note: Inch sizes available on request.

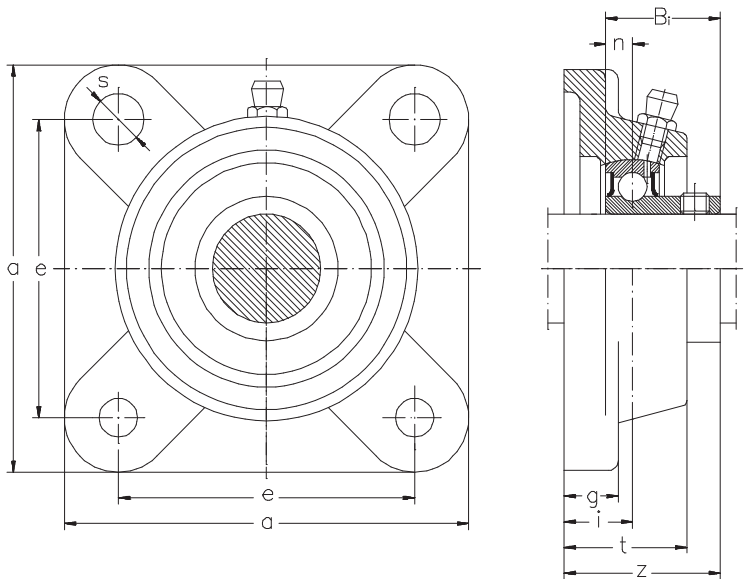
Heavy duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Weight
mm	h	a	e	b	s ₁	s ₂	g	w	Bi	n		—				kg
25	45	173	132	45	17	20	15	85	38	15	M14	UCP 305	UC 305	P 305		1,27
30	50	180	140	50	17	20	15	95	43	17	M14	UCP 306	UC 306	P 306		1,86
35	56	210	160	56	17	25	19	106	48	19	M14	UCP 307	UC 307	P 307		2,66
40	60	218	170	62	18	25	19	116	52	19	M14	UCP 308	UC 308	P 308		3,37
45	67	244	190	66	20	26	23	129	57	22	M16	UCP 309	UC 309	P 309		4,26
50	75	271	212	74	20	30	26	143	61	22	M16	UCP 310	UC 310	P 310		6,17
55	80	300	236	80	20	32	29	154	66	25	M16	UCP 311	UC 311	P 311		7,12
60	85	325	250	85	23	35	31	164	71	26	M20	UCP 312	UC 312	P 312		9,10
65	90	335	260	90	25	38	33	176	75	30	M20	UCP 313	UC 313	P 313		11,04
70	95	360	280	93	27	40	34	187	78	33	M22	UCP 314	UC 314	P 314		12,82
75	100	380	290	100	27	40	35	198	82	32	M22	UCP 315	UC 315	P 315		15,40
80	106	400	300	105	27	40	37	210	86	34	M22	UCP 316	UC 316	P 316		18,00

Note: Inch sizes available on request.

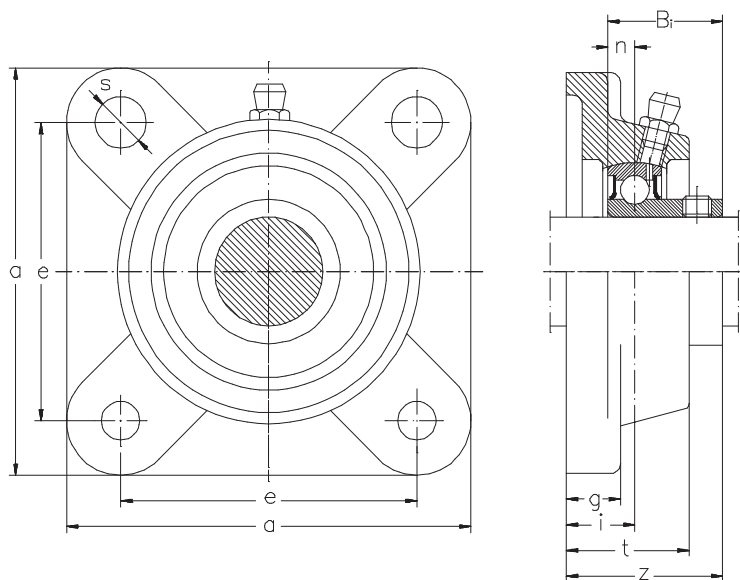
Standard duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Weight
mm	a	e									—			kg
20	86	63,5	19	15	29,5	11,5	37,0	25	7,0	M10	SBFS 204	SB 204	FS 204	0,59
25	93	70,0	19	15	30,0	11,5	38,5	27	7,5	M10	SBFS 205	SB 205	FS 205	0,72
30	106	82,5	20	16	32,5	13,0	41,0	29	8,0	M12	SBFS 206	SB 206	FS 206	0,95
35	116	92,0	21	17	35,0	13,0	44,5	32	8,5	M12	SBFS 207	SB 207	FS 207	1,25
40	129	101,5	24	17	39,0	14,0	48,5	34	9,5	M12	SBFS 208	SB 208	FS 208	1,60

Note: Inch sizes available on request.

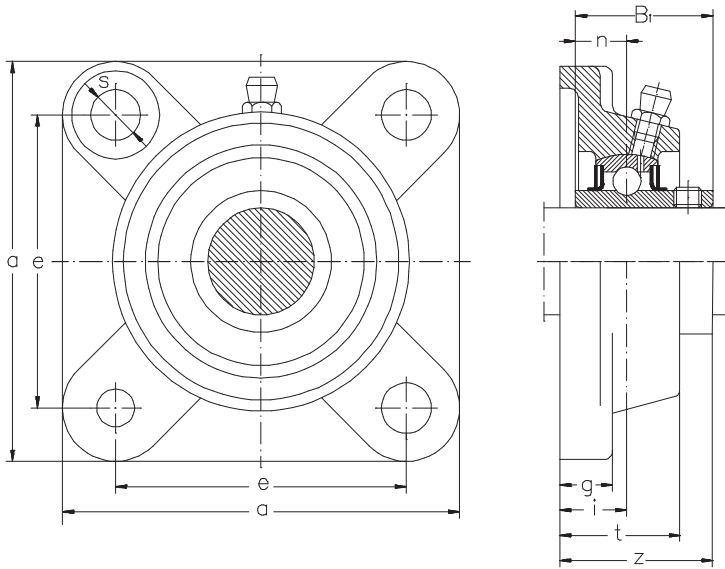
Standard duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
a	e	i	g	t	s	z	B1	n							
mm											—				kg
20	86	64	15	12	25,5	12	33,0	25	7,0	M10	SBF 204	SB 204	F 204		0,49
25	95	70	16	13	27,0	12	35,5	27	7,5	M10	SBF 205	SB 205	F 205		0,70
30	108	83	18	13	31,0	12	39,0	29	8,0	M10	SBF 206	SB 206	F 206		0,99
35	117	92	19	15	34,0	14	42,5	32	8,5	M12	SBF 207	SB 207	F 207		1,25
40	130	102	21	15	36,0	16	45,5	34,0	9,5	M14	SBF 208	SB 208	F 208		1,63

Note: Inch sizes available on request.

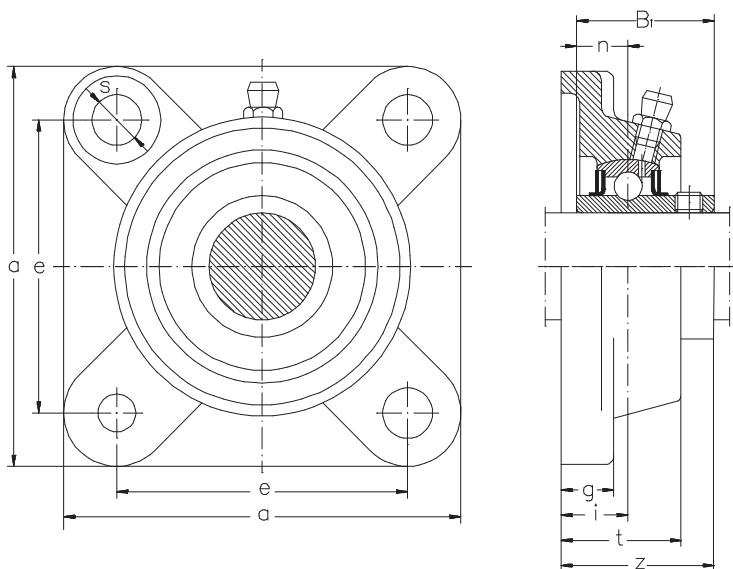
Standard duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Weight
mm	a	e									—			kg
20	86	63,5	19	15	29,5	11,5	37,3	31,0	12,7	M10	UCFS 204	UC 204	FS 204	0,63
25	93	70,0	19	15	30,0	11,5	38,7	34,0	14,3	M10	UCFS 205	UC 205	FS 205	0,76
30	106	82,5	20	16	32,5	13,0	42,2	38,1	15,9	M12	UCFS 206	UC 206	FS 206	1,01
35	116	92,0	21	17	35,0	13,0	46,4	42,9	17,5	M12	UCFS 207	UC 207	FS 207	1,34
40	129	101,5	24	17	39,0	14,0	54,2	49,2	19,0	M12	UCFS 208	UC 208	FS 208	1,74
45	135	105,0	24	18	40,0	16,0	54,2	49,2	19,0	M14	UCFS 209	UC 209	FS 209	1,98
50	143	111,0	28	20	45,0	16,0	60,6	51,6	19,0	M14	UCFS 210	UC 210	FS 210	2,43
55	162	130,0	31	21	49,0	17,0	64,4	55,6	22,2	M14	UCFS 211	UC 211	FS 211	3,43
60	175	143,0	34	22	53,5	17,0	73,7	65,1	25,4	M14	UCFS 212	UC 212	FS 212	4,24
65	184	149,0	38	22	58,0	18,0	77,7	65,1	25,4	M16	UCFS 213	UC 213	FS 213	5,11
70	188	152,0	38	23	60,0	18,0	82,4	74,6	30,2	M16	UCFS 214	UC 214	FS 214	5,30
75	200	152,4	41	24	62,0	20,0	85,5	77,8	33,3	M16	UCFS 215	UC 215	FS 215	6,38

Note: Inch sizes available on request.

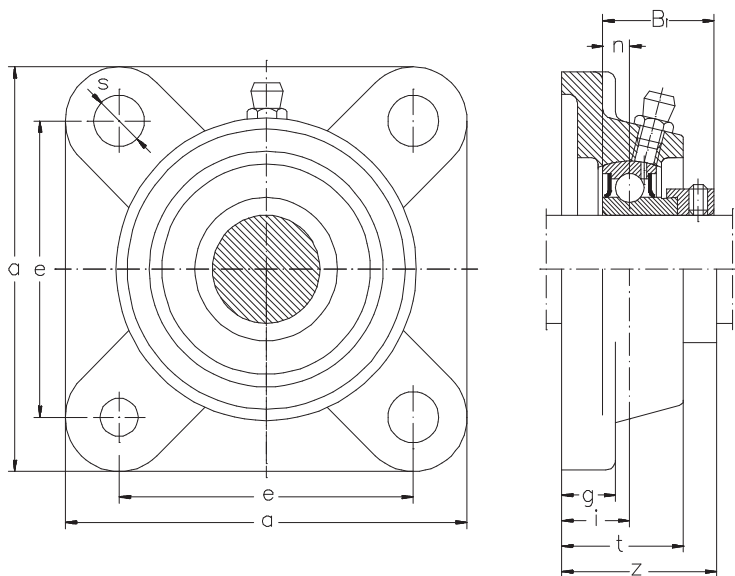
Standard duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Weight
mm	a	e									—			kg
12	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF 201	UC 201	F 204	0,57
15	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF 202	UC 202	F 204	0,56
17	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF 203	UC 203	F 204	0,55
20	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF 204	UC 204	F 204	0,53
25	95	70	16	13	27	12	35,7	34,0	14,3	M10	UCF 205	UC 205	F 205	0,74
30	108	83	18	13	31	12	40,2	38,1	15,9	M10	UCF 206	UC 206	F 206	1,05
35	117	92	19	15	34	14	44,4	42,9	17,5	M12	UCF 207	UC 207	F 207	1,34
40	130	102	21	15	36	16	51,2	49,2	19	M14	UCF 208	UC 208	F 208	1,77
45	137	105	22	16	38	16	52,2	49,2	19	M14	UCF 209	UC 209	F 209	2,05
50	143	111	22	16	40	16	54,6	51,6	19	M14	UCF 210	UC 210	F 210	2,35
55	162	130	25	18	43	19	58,4	55,6	22,2	M16	UCF 211	UC 211	F 211	3,00
60	175	143	29	18	48	19	68,7	65,1	25,4	M16	UCF 212	UC 212	F 212	3,57
65	187	149	30	22	50	19	69,7	65,1	25,4	M16	UCF 213	UC 213	F 213	4,92
70	193	152	31	22	54	19	75,4	74,6	30,2	M16	UCF 214	UC 214	F 214	5,62
75	200	159	34	22	56	19	78,5	77,8	33,3	M16	UCF 215	UC 215	F 215	5,55
80	208	165	34	24	58	23	83,3	82,6	33,3	M20	UCF 216	UC 216	F 216	6,99
85	220	175	36	26	63	23	87,6	85,7	34,1	M20	UCF 217	UC 217	F 217	8,58
90	235	187	40	26	68	23	96,3	96,0	39,7	M20	UCF 218	UC 218	F 218	11,20

Note: Inch sizes available on request.

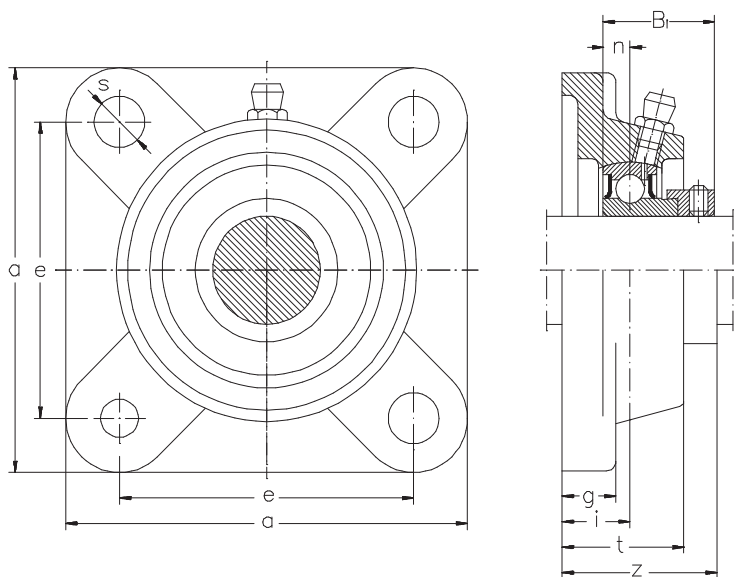
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Weight
mm	a	e									—			kg
20	86	63,5	19	15	29,5	11,5	41,5	29,5	7,0	M10	SAFS 204	SA 204	FS 204	0,64
25	93	70,0	19	15	30,0	11,5	42,0	30,5	7,5	M10	SAFS 205	SA 205	FS 205	0,75
30	106	82,5	20	16	32,5	13,0	45,9	33,9	8,0	M12	SAFS 206	SA 206	FS 206	1,02
35	116	92,0	21	17	35,0	13,0	50,0	37,5	8,5	M12	SAFS 207	SA 207	FS 207	1,37
40	129	101,5	24	17	39,0	14,0	55,0	40,5	9,5	M12	SAFS 208	SA 208	FS 208	1,75
45	135	105,0	24	18	40,0	16,0	56,2	42,2	10,0	M14	SAFS 209	SA 209	FS 209	1,99
50	143	111,0	28	20	45,0	16,0	61,2	43,7	10,5	M14	SAFS 210	SA 210	FS 210	2,43
55	162	130,0	31	21	49,0	17,0	67,9	48,4	11,5	M14	SAFS 211	SA 211	FS 211	3,18

Note: Inch sizes available on request.

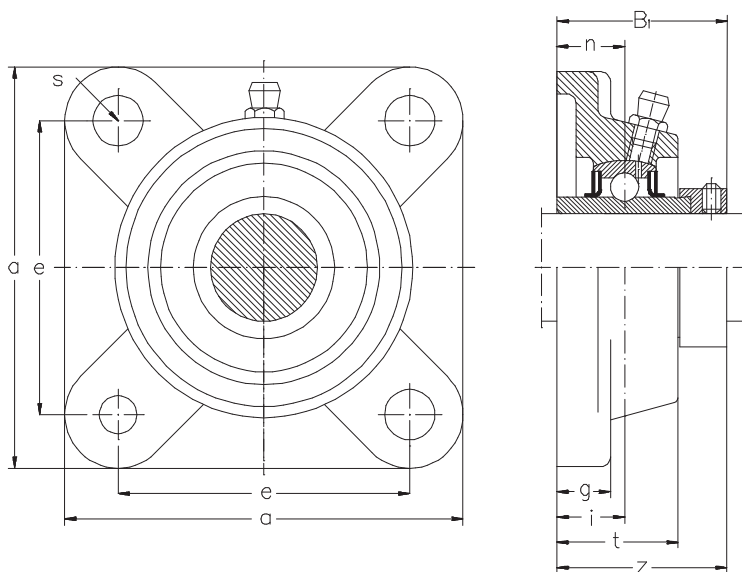
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Weight
mm	a	e									—			kg
20	86	64	15	12	25,5	12	37,5	29,5	7,0	M10	SAF 204	SA 204	F 204	0,54
25	95	70	16	13	27,0	12	39,0	30,5	7,5	M10	SAF 205	SA 205	F 205	0,73
30	108	83	18	13	31,0	12	43,9	33,9	8,0	M10	SAF 206	SA 206	F 206	1,06
35	117	92	19	15	34,0	14	48,0	37,5	8,5	M12	SAF 207	SA 207	F 207	1,37
40	130	102	21	15	36,0	16	52,0	40,5	9,5	M14	SAF 208	SA 208	F 208	1,78
45	137	105	22	16	38,0	16	54,2	42,2	10,0	M14	SAF 209	SA 209	F 209	2,06
50	143	111	22	16	40,0	16	55,2	43,7	10,5	M14	SAF 210	SA 210	F 210	2,35
55	162	130	25	18	43,0	19	61,9	48,4	11,5	M16	SAF 211	SA 211	F 211	2,75

Note: Inch sizes available on request.

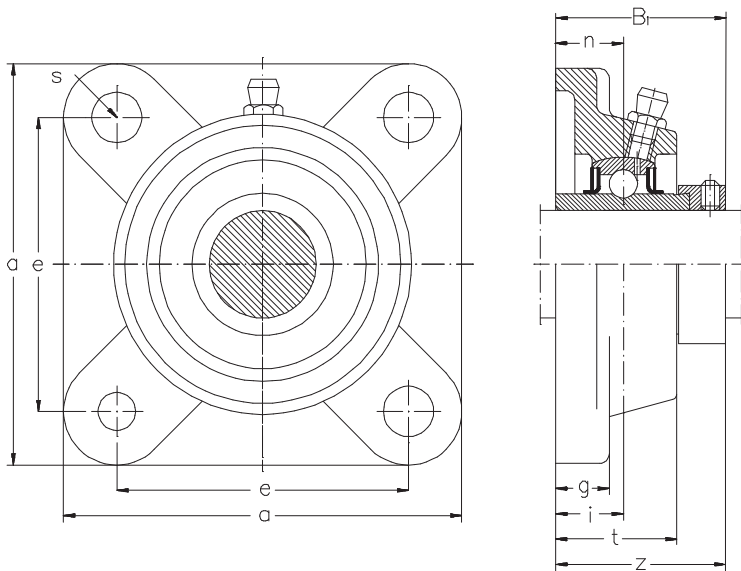
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight
a	e	i	g	t	s	z	Bi	n						kg
mm											—			
20	86	63,5	19	15	29,5	11,5	45,5	43,5	17	M10	UELFS 204	UEL 204	FS 204	0,68
25	93	70	19	15	30	11,5	45,9	44,3	17,4	M10	UELFS 205	UEL 205	FS 205	0,80
30	106	82,5	20	16	32,5	13,0	50,1	48,3	18,2	M12	UELFS 206	UEL 206	FS 206	1,10
35	116	92	21	17	35	13	53,3	51,1	18,8	M12	UELFS 207	UEL 207	FS 207	1,47
40	129	101,5	24	17	39	14	58,9	56,3	21,4	M12	UELFS 208	UEL 208	FS 208	1,88
45	135	105	24	18	40	16	58,9	56,3	21,4	M14	UELFS 209	UEL 209	FS 209	2,15
50	143	111	28	20	45	16	66,1	62,7	24,6	M14	UELFS 210	UEL 210	FS 210	2,64
55	162	130	31	21	49	17	74,6	71,3	27,7	M14	UELFS 211	UEL 211	FS 211	3,70
60	175	143	34	22	53,5	17	80,8	77,7	30,9	M14	UELFS 212	UEL 212	FS 212	4,58
65	184	149	38	22	58	18	89,6	85,7	34,1	M16	UELFS 213	UEL 213	FS 213	5,66
70	188	152	38	23	60	18	89,6	85,7	34,1	M16	UELFS 214	UEL 214	FS 214	5,82
75	200	152,4	41	24	62	20	95,8	92,1	37,3	M16	UELFS 215	UEL 215	FS 215	7,01

Note: Inch sizes available on request.

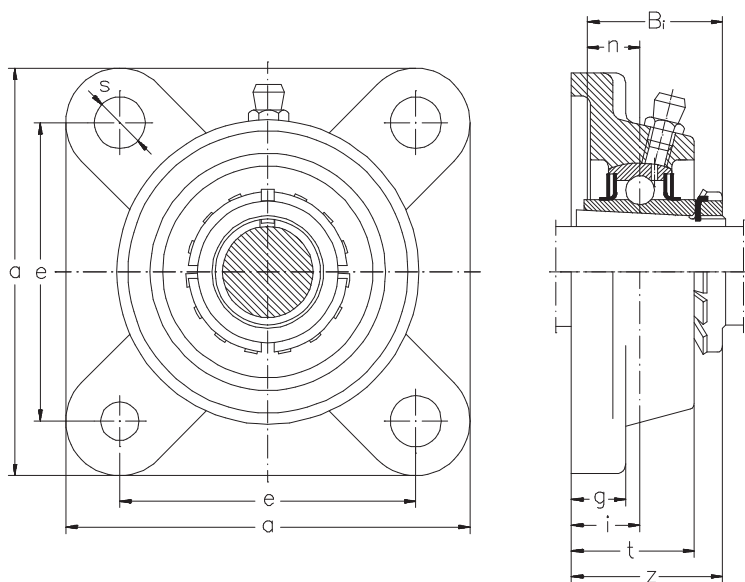
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Weight	
a	e	i	g	t	s	z	Bi	n							
mm											—				kg
12	86	64	15	12	25,5	12	41,5	43,5	17	M10	UELF 201	UEL 201	F 204	0,63	
15	86	64	15	12	25,5	12	41,5	43,5	17	M10	UELF 202	UEL 202	F 204	0,61	
17	86	64	15	12	25,5	12	41,5	43,5	17	M10	UELF 203	UEL 203	F 204	0,60	
20	86	64	15	12	25,5	12	41,5	43,5	17	M10	UELF 204	UEL 204	F 204	0,58	
25	95	70	16	13	27	12	42,9	44,3	17,4	M10	UELF 205	UEL 205	F 205	0,78	
30	108	83	18	13	31	12	48,1	48,3	18,2	M10	UELF 206	UEL 206	F 206	1,14	
35	117	92	19	15	34	14	51,3	51,1	18,8	M12	UELF 207	UEL 207	F 207	1,47	
40	130	102	21	15	36	16	55,9	56,3	21,4	M14	UELF 208	UEL 208	F 208	1,91	
45	137	105	22	16	38	16	56,9	56,3	21,4	M14	UELF 209	UEL 209	F 209	2,22	
50	143	111	22	16	40	16	60,1	62,7	24,6	M14	UELF 210	UEL 210	F 210	2,56	
55	162	130	25	18	43	19	68,6	71,3	27,7	M16	UELF 211	UEL 211	F 211	3,27	
60	175	143	29	18	48	19	75,8	77,7	30,9	M16	UELF 212	UEL 212	F 212	3,91	
65	187	149	30	22	50	19	81,6	85,7	34,1	M16	UELF 213	UEL 213	F 213	5,47	
70	193	152	31	22	54	19	82,6	85,7	34,1	M16	UELF 214	UEL 214	F 214	6,14	
75	200	159	34	22	56	19	88,8	92,1	37,3	M16	UELF 215	UEL 215	F 215	6,18	

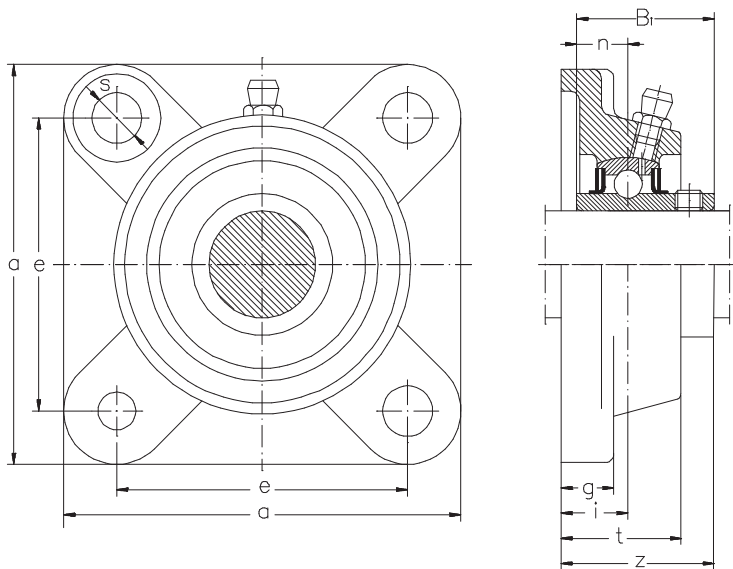
Note: Inch sizes available on request.

Standard duty flanged units cast housing adapter type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	Bolt size	Unit number	Bearing number	Housing number	Weight
mm	a	e								—			kg
20	95	70	16	13	27	12	35,5	35	M10	UKF 205	UK 205	F 205	0,68
25	108	83	18	13	31	12	39,0	38	M10	UKF 206	UK 206	F 206	0,98
30	117	92	19	15	34	14	42,5	43	M12	UKF 207	UK 207	F 207	1,24
35	130	102	21	15	36	16	46,5	46	M14	UKF 208	UK 208	F 208	1,61
40	137	105	22	16	38	16	48,5	50	M14	UKF 209	UK 209	F 209	1,90
45	143	111	22	16	40	16	50,0	55	M14	UKF 210	UK 210	F 210	2,14
50	162	130	25	18	43	19	54,5	59	M16	UKF 211	UK 211	F 211	2,65
55	175	143	29	18	48	19	61,0	62	M16	UKF 212	UK 212	F 212	3,07
60	187	149	30	22	50	19	64,0	65	M16	UKF 213	UK 213	F 213	4,42

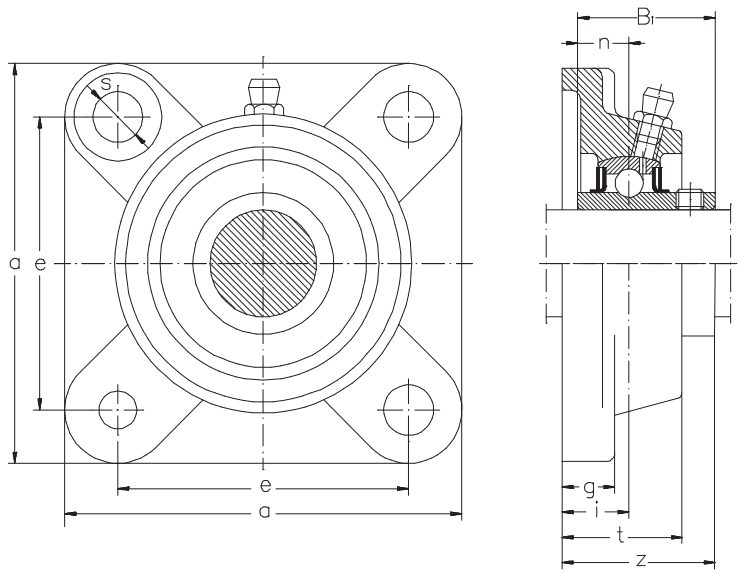
Medium duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Weight
	a	e	i	g	t	s	z	Bi	n						
mm												—			kg
25	108	82,5	18	13	30	12	40,2	38,1	15,9	M10	UCF X05	UC X05	F X05		1,15
30	117	92,0	19	14	34	16	44,4	42,9	17,5	M14	UCF X06	UC X06	F X06		1,50
35	130	101,5	21	14	38	16	51,2	49,2	19,0	M14	UCF X07	UC X07	F X07		1,97
40	137	105,0	22	14	40	19	52,2	49,2	19,0	M16	UCF X08	UC X08	F X08		2,18
45	143	111,0	23	14	40	19	55,6	51,6	19,0	M16	UCF X09	UC X09	F X09		2,37
50	162	130,0	26	20	44	19	59,4	55,6	22,2	M16	UCF X10	UC X10	F X10		3,47
55	175	143,0	29	20	49	19	68,7	65,1	25,4	M16	UCF X11	UC X11	F X11		4,13
60	187	149	34	21	59	19	73,7	65,1	25,4	M16	UCF X12	UC X12	F X12		5,70
65	187	149	34	21	59	19	78,4	74,6	30,2	M18	UCF X13	UC X13	F X13		5,77
70	197	152	37	24	60	23	81,5	77,8	33,3	M20	UCF X14	UC X14	F X14		6,79
75	197	152	40	24	68	23	89,3	82,6	33,3	M20	UCF X15	UC X15	F X15		7,66
80	214	171	40	24	70	23	91,6	85,7	34,1	M20	UCF X16	UC X16	F X16		9,99

Note: Inch sizes available on request.

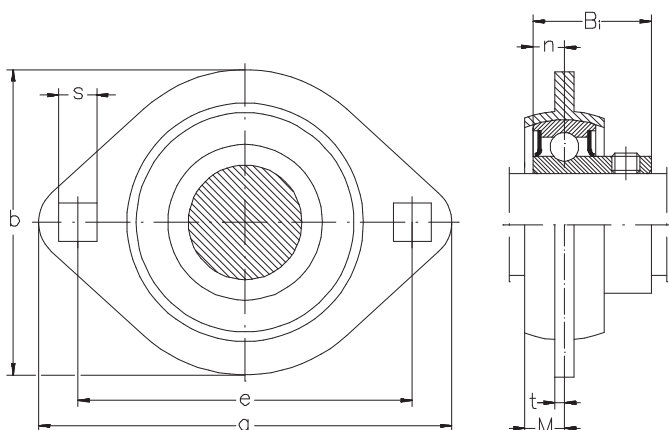
Heavy duty flanged units cast housing set screws type



Shát día.	Nominal dimensions								Bolt	Unit size	
	a	e	i	g	t	s	z	Bi	n		
mm											
25	108	80	16	13	29	16	39	38	15	M14	UC
30	125	95	18	15	32	16	44	43	17	M14	UC
35	135	100	20	16	36	19	49	48	19	M16	UC
40	150	112	23	17	40	19	56	52	19	M16	UC
45	160	125	25	18	44	19	60	57	22	m16	UC
50	175	132	28	20	48	23	67	61	22	M20	UC
55	185	140	30	20	52	23	71	66	25	M20	UC
60	193	150	33	22	56	23	78	71	26	M20	UC
65	208	166	33	22	58	23	78	75	30	M20	UC
70	226	178	36	25	61	25	81	78	33	M22	UC
75	236	184	39	25	66	25	89	82	32	M22	UC
80	250	196	38	27	68	31	90	86	34	M27	UC

Note: Inch sizes available on request.

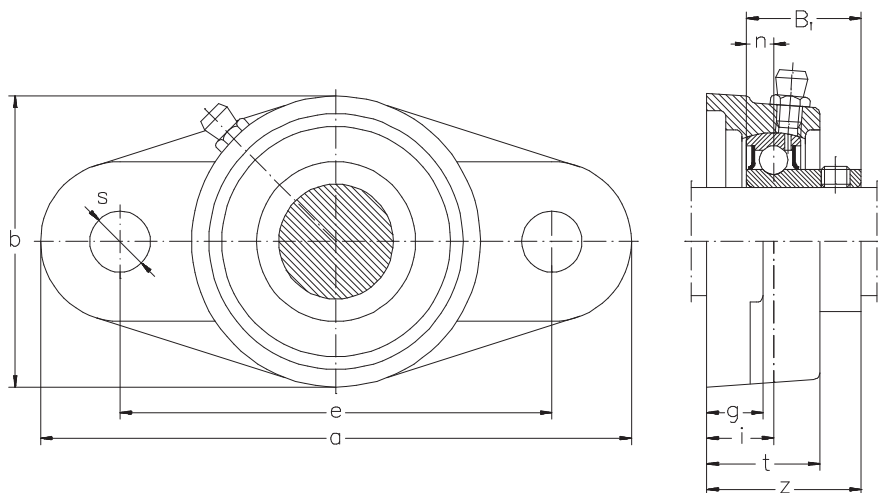
Standard duty two bolts flanged units pressed steel housing set screws type



Shaft dia.	Nominal dimensions							Bolt	Unit	Bearing
	a	e	M	t	s	b	Bi	n	size	number
mm										—
12	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL201SB
15	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL202SB
17	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL203SB
20	90	71,5	8,0	2,0	9	67	25	7	M8	SBPFL204SB
25	95	76,0	9,0	2,0	9	71	27	7,5	M8	SBPFL205SB
30	113	90,5	9,5	2,6	11	84	29	8	M10	SBPFL206SB
35	122	100	11	2,6	11	94	32	8,5	M10	SBPFL207SB

Note: Inch sizes available on request.

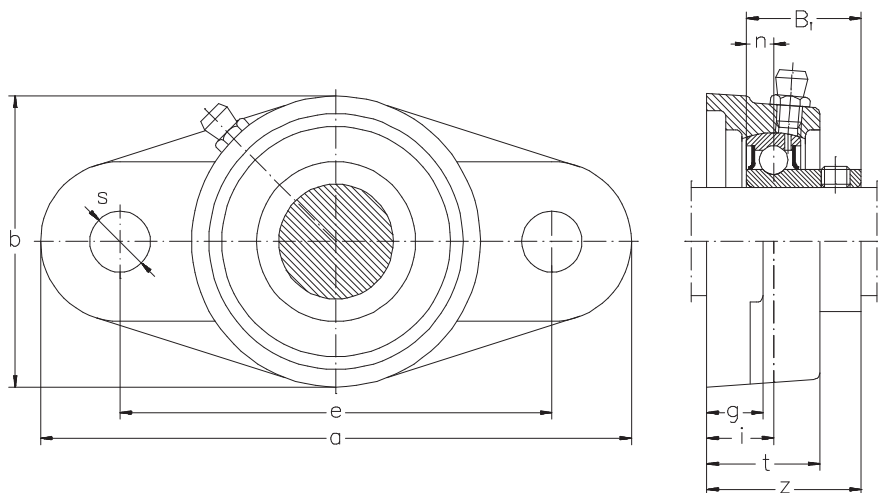
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions									Bolt	
	a	e	i	g	t	s	b	z	Bi	n	
mm											
20	112,5	90	19	15	29,5	10	61	37	25	7	M8
25	123	99	19	15	30	11,5	70	38,5	27	7,5	M1
30	142	116,5	20	16	32,5	11,5	82	41	29	8	M1
35	158	130	21	17	36	13	94	44,5	32	8,5	M1
40	172	143,5	24	17	39	13	103	48,5	34	9,5	M1

Note: Inch sizes available on request.

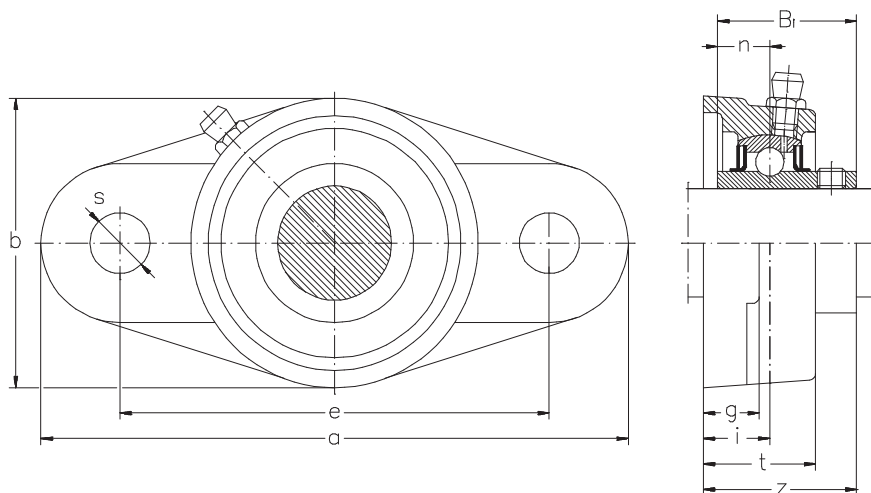
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions									Bolt	
	a	e	i	g	t	s	b	z	Bi	n	
mm											
20	113	90	15	11	25,5	12	60	33	25	7	M12
25	130	99	16	13	27	16	68	35,5	27	7,5	M16
30	148	117	18	13	31	16	80	39	29	8	M16
35	161	130	19	14	34	16	90	42,5	32	8,5	M16
40	175	144	21	14	36	16	100	45,5	34	9,5	M16

Note: Inch sizes available on request.

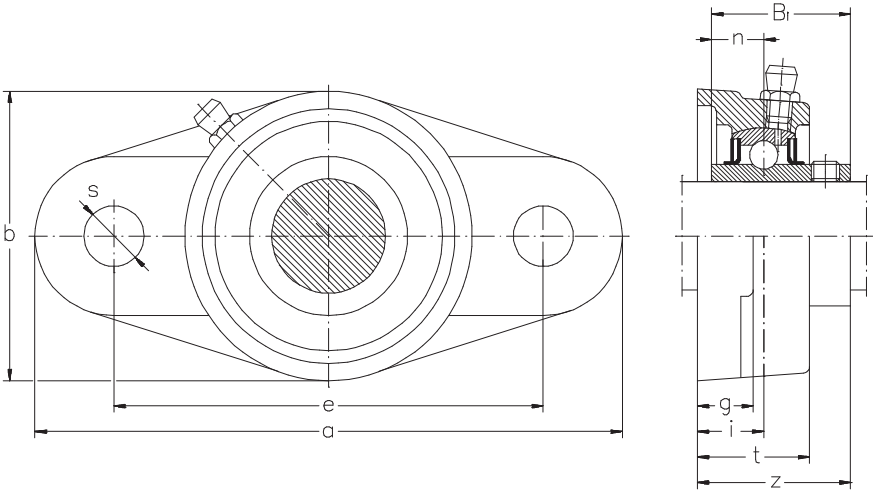
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions									Bolt	
	a	e	i	g	t	s	b	z	Bi	n	
mm											
20	112,5	90	19	15	29,5	10	61	37,3	31	12,7	M8
25	123	99	19	15	30	11,5	70	38,7	34	14,3	M1
30	142	116,5	20	16	32,5	11,5	82	42,2	38,1	15,9	M1
35	158	130	21	17	36	13	94	46,4	42,9	17,5	M1
40	172	143,5	24	17	39	13	103	54,2	49,2	19	M1
45	180	148,5	24	18	40	15	108	54,2	49,2	19	M1
50	190	157	28	20	45	15	114	60,6	51,6	19	M1
55	217	184	31	21	48	16,5	128	64,4	55,6	22,2	M1
60	237	202	34	21	53	16,5	138	73,7	65,1	25,4	M1
65	256	210	38	22	56	21	152	77,7	65,1	25,4	M2
70	264	216	38	23	58	21	157	82,4	74,6	30,2	M2

Note: Inch sizes available on request.

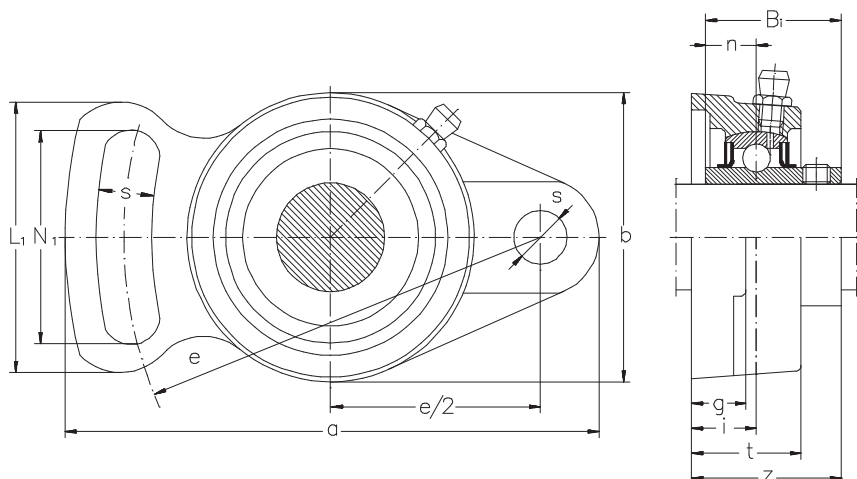
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions											Bolt
mm	a	e	i	g	t	s	b	z	Bi	n		
12	113	90	15	11	25,5	12	60	33,3	31	12,7		M1
15	113	90	15	11	25,5	12	60	33,3	31	12,7		M1
17	113	90	15	11	25,5	12	60	33,3	31	12,7		M1
20	113	90	15	11	25,5	12	60	33,3	31	12,7		M1
25	130	99	16	13	27	16	68	35,7	34	14,3		M1
30	148	117	18	13	31	16	80	40,2	38,1	15,9		M1
35	161	130	19	14	34	16	90	44,4	42,9	17,5		M1
40	175	144	21	14	36	16	100	51,2	49,2	19		M1
45	188	148	22	16	38	19	108	52,2	49,2	19		M1
50	197	157	22	16	40	19	115	54,6	51,6	19		M1
55	224	184	25	18	43	19	130	58,4	55,6	22,2		M1
60	250	202	29	18	48	23	140	68,7	65,1	25,4		M2
65	258	210	30	20	50	23	155	69,7	65,1	25,4		M2
70	265	216	31	20	54	23	160	75,4	74,6	30,2		M2
75	275	225	34	20	56	23	165	78,5	77,8	33,3		M2
80	290	233	34	22	58	25	180	83,3	82,6	33,3		M2
85	305	248	36	22	63	25	190	87,6	85,7	34,1		M2
90	320	265	40	23	68	25	205	96,3	96	39,7		M2

Note: Inch sizes available on request.

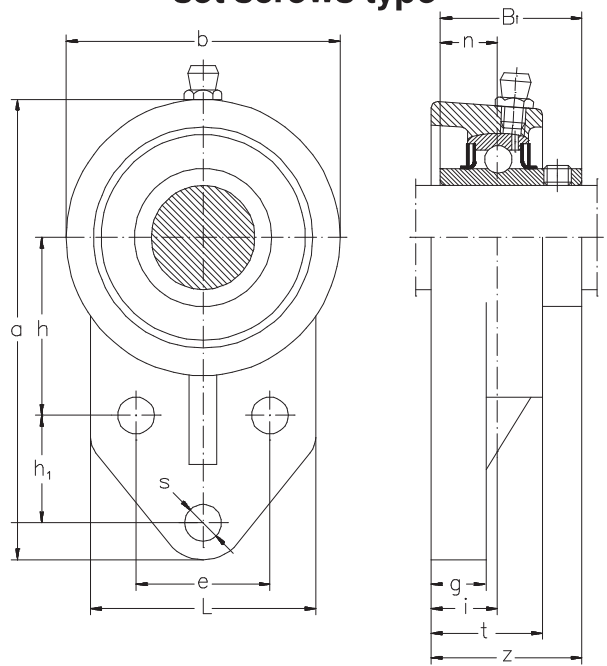
Standard duty flanged units cast housing special type set screws type



Shaf dia.	Nominal dimensions										
	a	e	i	g	t	s	N ₁	b	L ₁	z	
mm											
12	102	78	15	12	25,5	10	40	60	54	33,3	31
15	102	78	15	12	25,5	10	40	60	54	33,3	31
17	102	78	15	12	25,5	10	40	60	54	33,3	31
20	102	78	15	12	25,5	10	40	60	54	33,3	31
25	125	98	16	14	27	12	51	68	65	34,7	34
30	144	117	18	14	31	12	58	80	72	40,2	38,
35	161	130	19	16	34	14	66	90	82	45,4	42,
40	175	144	21	16	36	14	71	100	87	52,2	49,
45	178	146	22	16	38	16	72	108	88	52,2	49,
50	188	155	22	16	39	16	75	114	92	54,6	51,
55	216	182	25	18	42,5	16	84	128	102	58,4	55,
60	238	202	29	19	47,5	18	104	140	122	68,7	65,
65	248	210	30	20	49	18	106	152	126	69,7	65,

Note: Inch sizes available on request.

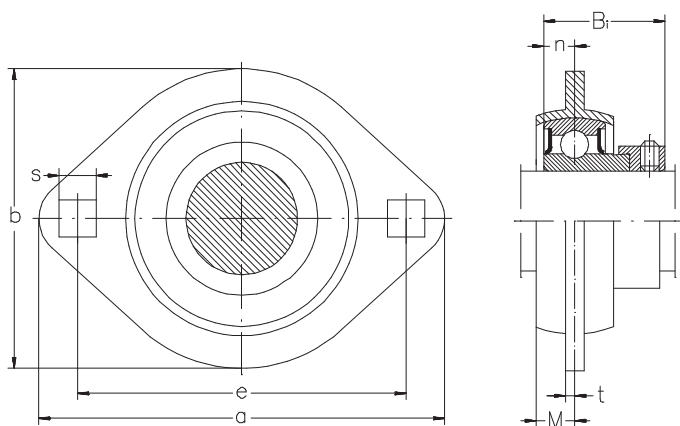
Standard duty flanged units cast housing special type set screws type



Shaft dia.	Nominal dimensions											
	a	e	i	g	t	s	h	h ₁	L	b		
mm												
12	109	32	15	11	25,5	10	42	27	52	60	33,	
15	109	32	15	11	25,5	10	42	27	52	60	33,	
17	109	32	15	11	25,5	10	42	27	52	60	33,	
20	109	32	15	11	25,5	10	42	27	52	60	33,	
25	116	34	16	13	27	10	45	27	56	68	35,	
30	132	40	18	13	31	10	50	29	65	80	40,	
35	144	46	19	14	33	10	55	32	70	90	44,	
40	164	50	21	16	35	12	60	41	78	100	51,	
45	175	54	22	16	38	12	65	43	80	108	52,	
50	184	58	22	16	39	12	68	46	86	114	54,	
55	207	62	25	18	42,5	14	78	50	90	128	58,	
60	224	66	29	19	47,5	14	84	55	94	140	68,	
65	244	70	30	20	49	14	92	60	102	152	69,	

Note: Inch sizes available on request.

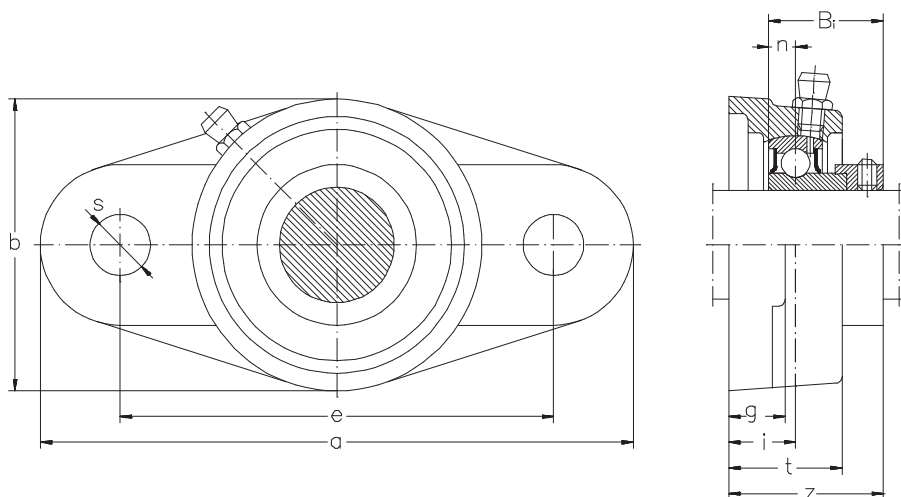
Standard duty two bolts flanged units pressed steel housing eccentric locking collar type



Shaft dia.	Nominal dimensions							Bolt	Unit size	number
	a	e	M	t	s	b	Bi	n		
mm										—
12	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL 201SA
15	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL 202SA
17	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL 203SA
20	90	71,5	8	2	9	67	29,5	7	M8	SAPFL 204SA
25	95	76	9	2	9	71	30,5	7,5	M8	SAPFL 205SA
30	113	90,5	9,5	2,6	11	84	33,9	8	M10	SAPFL 206SA
35	122	100	11	2,6	11	94	37,5	8,5	M10	SAPFL 207SA

Note: Inch sizes available on request.

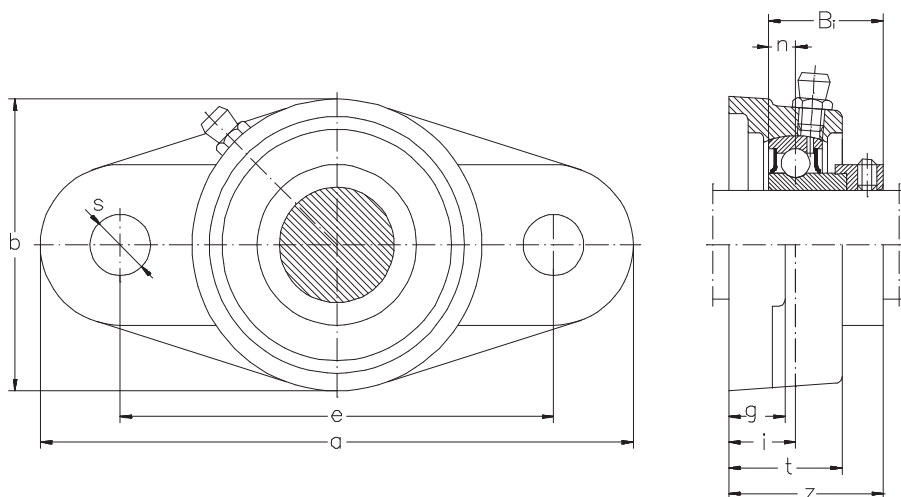
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt	
	a	e	i	g	t	s	b	z	Bi	n	
mm											
20	112,5	90	19	15	29,5	10	61	41,5	29,5	7	M8
25	123	99	19	15	30	11,5	70	42	30,5	7,5	M1
30	142	116,5	20	16	32,5	11,5	82	45,9	33,0	8	M1
35	158	130	21	17	36	13	94	50	37,5	8,5	M1
40	172	143,5	24	17	39	13	103	55	40,5	9,5	M1
45	180	148,5	24	18	40	15	108	56,2	42,2	10	M1
50	190	157	28	20	45	15	114	61,2	43,7	10,5	M1
55	217	184	31	21	48	16,5	128	67,9	48,4	11,5	M1

Note: Inch sizes available on request.

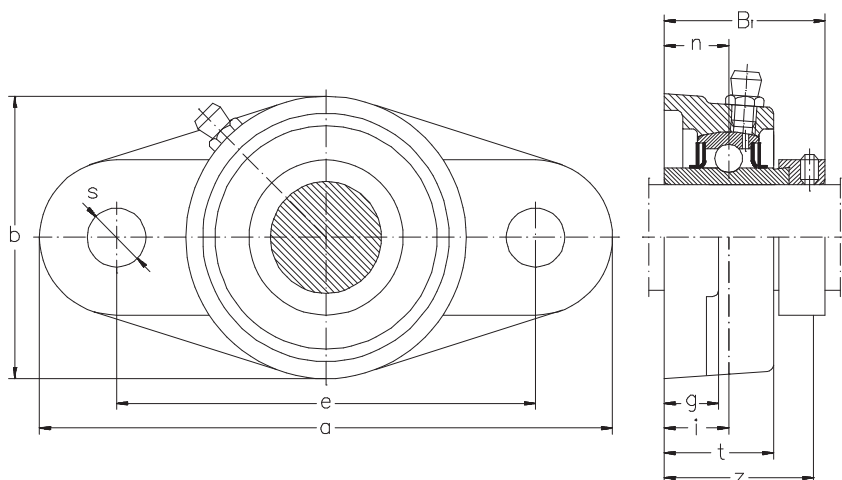
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt
	a	e	i	g	t	s	b	z	Bi	n	
mm											
20	113	90	15	11	25,5	12	60	37,5	29,5	7	M1
25	130	99	16	13	27	16	68	39	30,5	7,5	M1
30	148	117	18	13	31	16	80	43,9	33,9	8	M1
35	161	130	19	14	34	16	90	48	37,5	8,5	m1
40	175	144	21	14	36	16	100	52	40,5	9,5	M1
45	188	148	22	16	38	19	108	54,2	42,2	10	M1
50	197	157	22	16	40	19	115	55,2	43,7	10,5	M1
55	224	184	25	18	43	19	130	61,9	48,4	11,5	M1

Note: Inch sizes available on request.

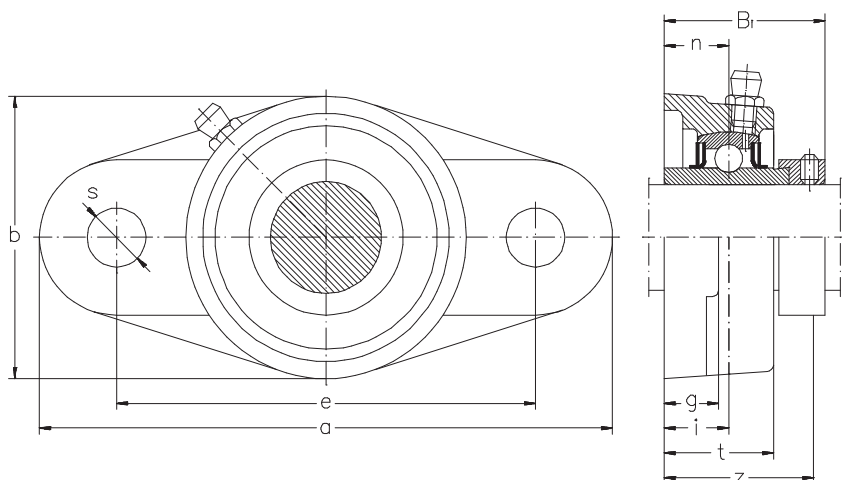
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt	
	a	e	i	g	t	s	b	z	Bi	n	
mm											
20	112,5	90	19	15	29,5	10	61	45,5	43,5	17	M8
25	123	99	19	15	30	11,5	70	45,9	44,3	17,4	M1
30	142	116,5	20	16	32,5	11,5	82	50,1	48,3	18,2	M1
35	158	130	21	17	36	13	94	53,3	51,1	18,8	M1
40	172	143,5	24	17	39	13	103	58,9	56,3	21,4	M1
45	180	148,5	24	18	40	15	108	58,9	56,3	21,4	M1
50	190	157	28	20	45	15	114	66,1	62,7	24,6	M1
55	217	184	31	21	48	16,5	128	74,6	71,3	27,7	M1
60	237	202	34	21	53	16,5	138	80,8	77,7	30,9	M1
65	256	210	38	22	56	21	152	89,6	85,7	34,1	M2
70	264	216	38	23	58	21	157	89,6	85,7	34,1	M2

Note: Inch sizes available on request.

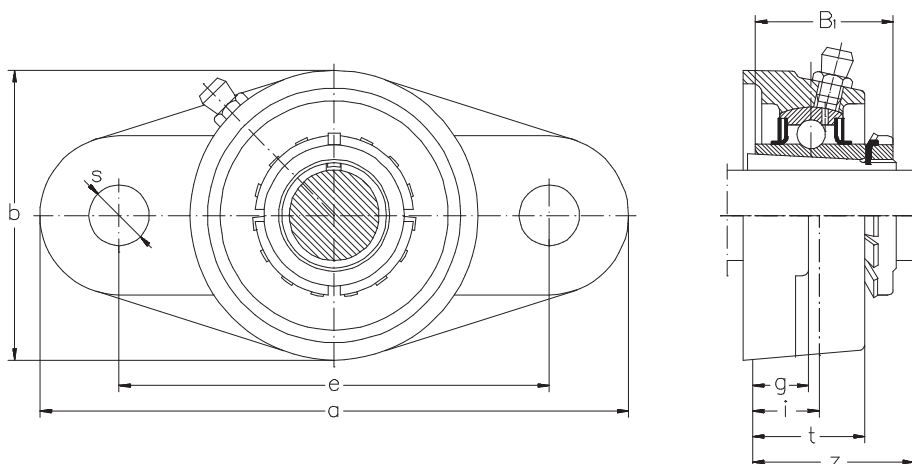
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt	
	a	e	i	g	t	s	b	z	Bi	n	
mm											
12	113	90	15	11	25,5	60	12	41,5	43,5	17	M1
15	113	90	15	11	25,5	60	12	41,5	43,5	17	M1
17	113	90	15	11	25,5	60	12	41,5	43,5	17	M1
20	113	90	15	11	25,5	60	12	41,5	43,5	17	M1
25	130	99	16	13	27	68	16	42,9	44,3	17,4	M1
30	148	117	18	13	31	80	16	48,1	48,3	18,2	M1
35	161	130	19	14	34	90	16	51,3	51,1	18,8	M1
40	175	144	21	14	36	100	16	55,9	56,3	21,4	M1
45	188	148	22	16	38	108	19	56,9	56,3	21,4	M1
50	197	157	22	16	40	115	19	60,1	62,7	24,6	M1
55	224	184	25	18	43	130	19	68,6	71,3	27,7	M1
60	250	202	29	18	48	140	23	75,8	77,3	30,9	M2
65	258	210	30	20	50	155	23	81,6	85,7	34,1	M2
70	265	216	31	20	54	160	23	82,6	85,7	34,1	M2
75	275	225	34	20	56	165	23	88,8	92,1	37,3	M2

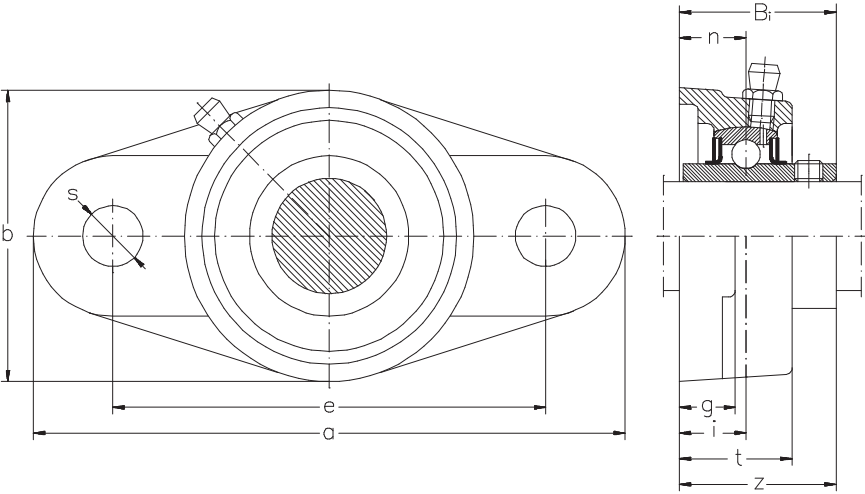
Note: Inch sizes available on request.

Standard duty two bolts flanged units cast housing adapter type



Shaft dia.	Nominal dimensions									Bolt	Unit	
	a	e	i	g	t	b	s	z		Bi	size	
mm												
20	130	99	16	13	27	68	16	35,5	35		M14	UK
25	148	117	18	13	31	80	16	39	38		M14	UK
30	161	130	19	14	34	90	16	42,5	43		M14	UK
35	175	144	21	14	36	100	16	46,5	46		M14	UK
40	188	148	22	16	38	108	19	48,5	50		M16	UK
45	197	157	22	16	40	115	19	50	55		M16	UK
50	224	184	25	18	43	130	19	54,5	59		M16	UK
55	250	202	29	18	48	140	23	61	62		M20	UK
60	258	210	30	20	50	155	23	64	65		M20	UK

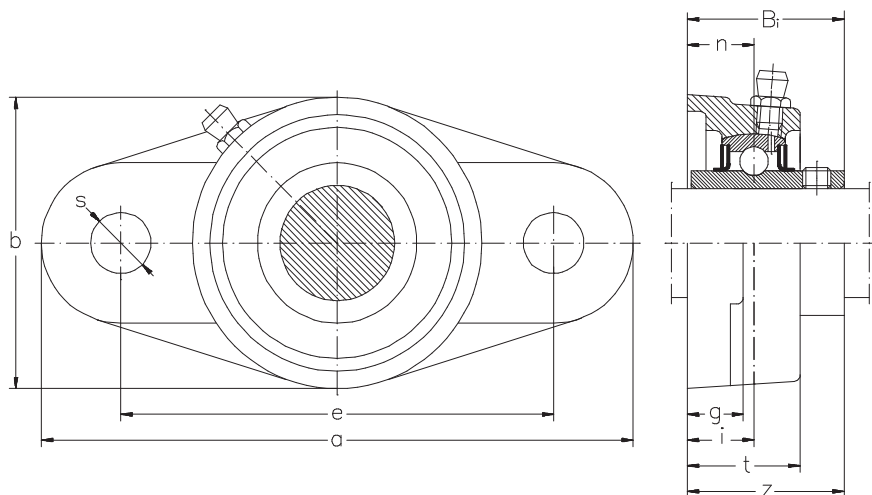
Medium duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions									Bolt	
	a	e	i	g	t	b	s	z	Bi	n	
mm											
25	141	117	18	13	30	83	12	40,2	38,1	15,9	M1
30	156	130	19	15	34	95	16	44,4	42,9	17,5	M1
35	171	144	22	16	38	105	16	51,2	49,2	19	M1
40	179	148	22	16	40	111	16	52,2	49,2	19	M1
45	189	157	23	16	40	116	16	55,6	51,6	19	M1
50	216	184	26	18	44	133	19	59,4	55,6	22,2	M1

Note: Inch sizes available on request.

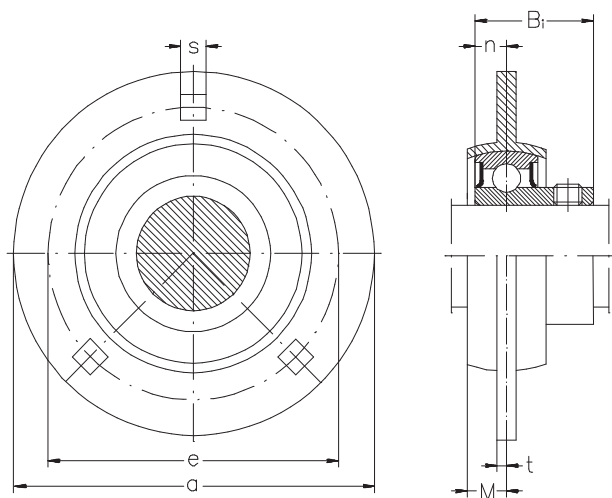
Heavy duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions		i	g	t	b	s	z	Bi	Bolt	
	a	e								n	
mm											
25	150	113	16	13	29	80	19	39	38	15	M1
30	180	134	18	15	32	90	23	44	43	17	M2
35	185	141	20	16	36	100	23	49	48	19	M2
40	200	158	23	17	40	112	23	56	52	19	M2
45	230	177	25	18	44	125	25	60	57	22	M2
50	240	187	28	19	48	140	25	67	61	22	M2
55	250	198	30	20	52	150	25	71	66	25	M2
60	270	212	33	22	56	160	31	78	71	26	M2
65	295	240	33	25	58	175	31	78	75	30	M2
70	315	250	36	28	61	185	35	81	78	33	M3
75	320	260	39	30	66	195	35	89	82	32	M3
80	355	285	38	32	68	210	38	90	86	34	M3

Note: Inch sizes available on request.

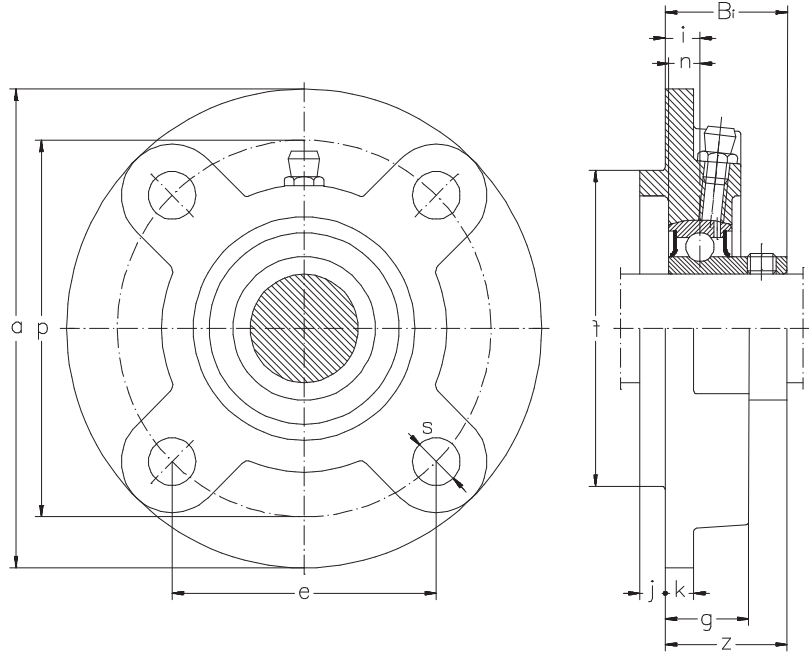
Standard duty flanged cartridge units pressed steel housing set screws type



Shaft dia.	Nominal dimensions						Bolt	Unit size	number	Bearing number	
	a	e	t	s	M	Bi	n				
mm											
12	81	63,5	2	7,1	7	22	6	M6	SBPF 201	SB 201	PF
15	81	63,5	2	7,1	7	22	6	M6	SBPF 202	SB 202	PF
17	81	63,5	2	7,1	7	22	6	M6	SBPF 203	SB 203	PF
20	90	71,5	2	9	8	25	7	M8	SBPF 204	SB 204	PF
25	95	76	2	9	9	27	7,5	M8	SBPF 205	SB 205	PF
30	113	90,5	2,6	11	9,5	29	8	M10	SBPF 206	SB 206	PF
35	122	100	2,6	11	11	32	8,5	M10	SBPF 207	SB 207	PF

Note: Inch sizes available on request.

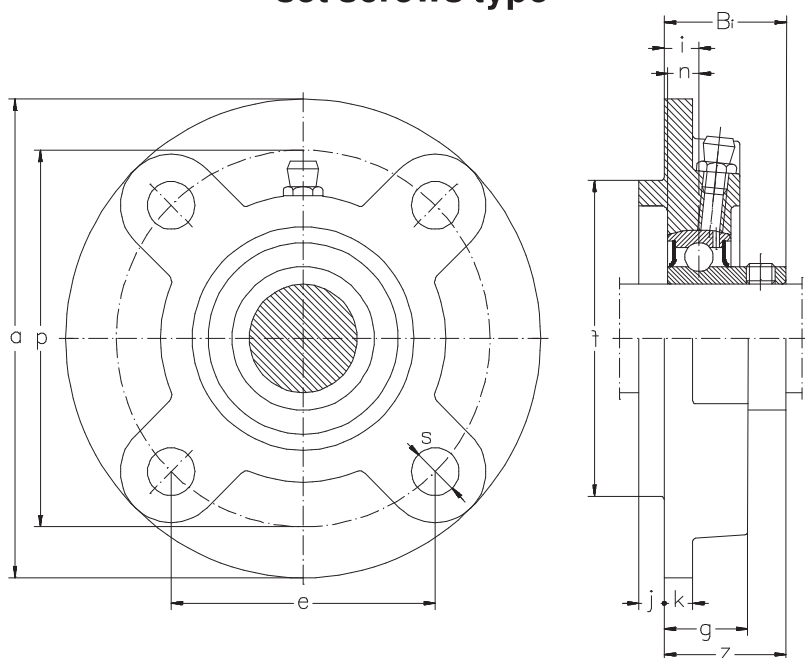
Standard duty flanged cartridge units cast housing set screws type



Shaft dia.	Nominal dimensions										
	a	p	e	i	s	j	k	g	f	z	
mm											
20	100	78	55,1	10	12	5	6	20,5	62	28	25
25	115	90	63,6	10	12	6	7	21	70	29,5	27
30	125	100	70,7	10	12	8	8	23	80	31	29
35	135	110	77,8	11	14	8	9	26	90	34,5	32
40	145	120	84,8	11	14	10	9	26	100	35,5	34

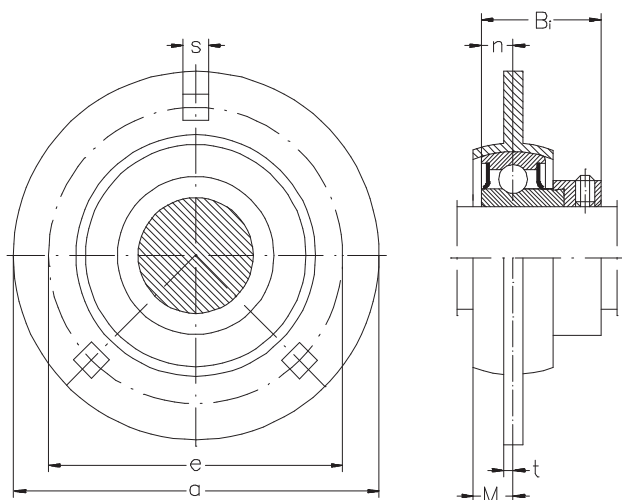
Note: Inch sizes available on request.

Standard duty flanged cartridge units cast housing set screws type



Shaft dia.	Nominal dimensions										
	a	p	e	i	s	j	k	g	f	z	
mm											
12	100	78	55,1	10	12	5	6	20,5	62	28,3	31
15	100	78	55,1	10	12	5	6	20,5	62	28,3	31
17	100	78	55,1	10	12	5	6	20,5	62	28,3	31
20	100	78	55,1	10	12	5	6	20,5	62	28,3	31
25	115	90	63,6	10	12	6	7	21	70	29,7	34
30	125	100	70,7	10	12	8	8	23	80	32,2	38,
35	135	110	77,8	11	14	8	9	26	90	36,4	42,
40	145	120	84,8	11	14	10	9	26	100	41,2	49,
45	160	132	93,3	10	16	12	10	26	105	40,2	49,
50	165	138	97,6	10	16	12	14	28	110	42,6	51,
55	185	150	106,1	13	19	12	13	30	125	46,4	55,
60	195	160	113,1	17	19	12	15	36	135	56,7	65,
65	205	170	120,2	16	19	14	15	35	145	55,7	65,
70	215	177	125,1	17	19	14	16	38	150	61,4	74,
75	220	184	130,1	18	19	16	17	39	160	62,5	77,
80	240	200	141,4	18	23	16	18	42	170	67,3	82,
85	250	208	147,1	18	23	18	20	45	180	69,6	85,
90	265	220	155,5	22	23	20	18	50	190	78,3	96

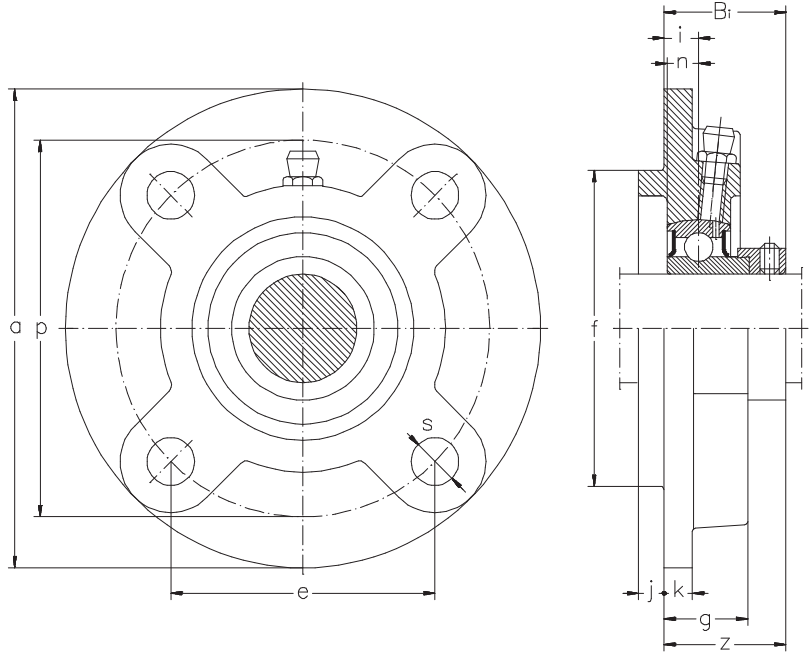
Standard duty flanged cartridge units pressed steel housing set screws type



Shaft dia.	Nominal dimensions						Bolt	Unit size	number	Bearing number	
	a	e	t	s	M	Bi	n				
mm									—		
12	81	63,5	2	7,1	7	28,5	6	M6	SAPF 201	SA 201	PF
15	81	63,5	2	7,1	7	28,5	6	M6	SAPF 202	SA 202	PF
17	81	63,5	2	7,1	7	28,5	6	M6	SAPF 203	SA 203	PF
20	90	71,5	2	9	8	29,5	7	M8	SAPF 204	SA 204	PF
25	95	76	2	9	9	30,5	7,5	M8	SAPF 205	SA 205	PF
30	113	90,5	2,6	11	9,5	33,9	8	M10	SAPF 206	SA 206	PF
35	122	100	2,6	11	11	37,5	8,5	M10	SAPF 207	SA 207	PF

Note: Inch sizes available on request.

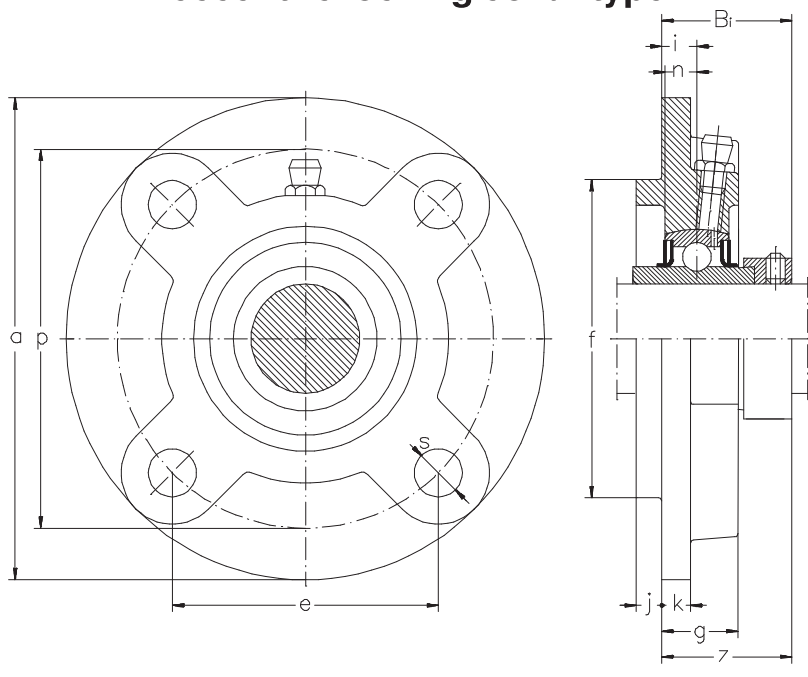
Standard duty flanged cartridge units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions		e	i	s	j	k	g	f	z	
	a	p									
mm											
20	100	78	55,1	10	12	5	6	20,5	62	32,5	29,
25	115	90	63,6	10	12	6	7	21	70	33	30,
30	125	100	70,7	10	12	8	8	23	80	35,9	33,
35	135	110	77,8	11	14	8	9	26	90	40	37,
40	145	120	84,8	11	14	10	9	26	100	42	40,
45	160	132	93,3	10	16	12	10	26	105	42,2	42,
50	165	138	97,6	10	16	12	14	28	110	43,2	43,
55	185	150	106,1	13	19	12	13	30	125	49,9	48,

Note: Inch sizes available on request.

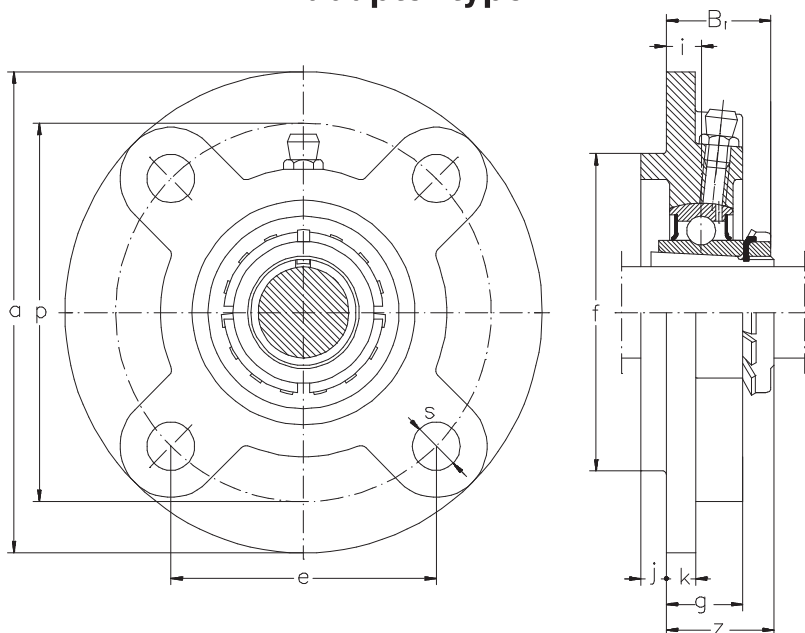
Standard duty flanged cartridge units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										
	a	p	e	i	s	j	k	g	f	z	
mm											
12	100	78	55,1	10	12	5	6	20,5	62	36,5	43,
15	100	78	55,1	10	12	5	6	20,5	62	36,5	43,
17	100	78	55,1	10	12	5	6	20,5	62	36,5	43,
20	100	78	55,1	10	12	5	6	20,5	62	36,5	43,
25	115	90	63,6	10	12	6	7	21	70	36,9	44,
30	125	100	70,7	10	12	8	8	23	80	40,1	48,
35	135	110	77,8	11	14	8	9	26	90	43,3	51,
40	145	120	84,8	11	14	10	9	26	100	45,9	56,
45	160	132	93,3	10	16	12	10	26	105	44,9	56,
50	165	138	97,6	10	16	12	14	28	110	48,1	62,
55	185	150	106,1	13	19	12	13	30	125	56,6	71,
60	195	160	113,1	17	19	12	15	36	135	63,8	77,
65	205	170	120,2	16	19	14	15	35	145	67,6	5,
70	215	177	125,1	17	19	14	16	38	150	68,6	5,
75	220	184	130,1	18	19	16	17	39	160	72,8	92,

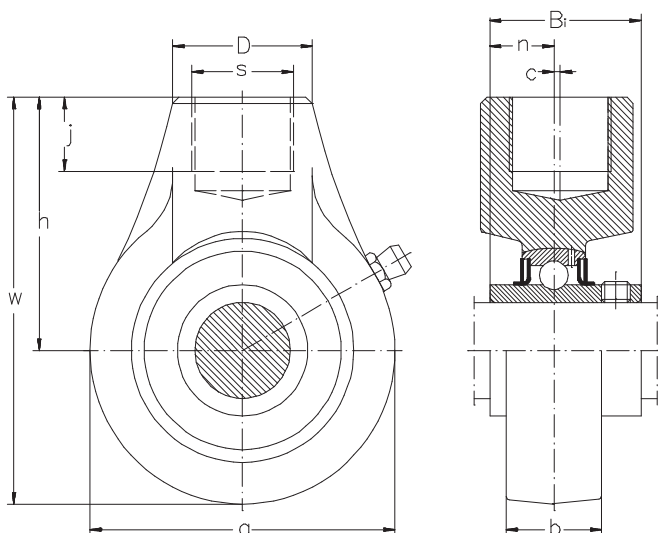
Note: Inch sizes available on request.

Standard duty flanged cartridge units cast housing adapter type



ShaftNominal dia.	Nominal dimensions										
	a	p	e	i	s	j	k	g	f	z	
mm											
20	115	90	63,6	10	12	6	7	21	70	29,5	35
25	125	100	70,7	10	12	8	8	23	80	31	38
30	135	110	77,8	11	14	8	9	26	90	34,5	43
35	145	120	84,8	11	14	10	9	26	100	36,5	46
40	160	132	93,3	10	16	12	10	26	105	36,5	50
45	165	138	97,6	10	16	12	14	28	110	38	55
50	185	150	106,1	13	19	12	13	30	125	42,5	59
55	195	160	113,1	17	19	12	15	36	135	49	62
60	205	170	120,2	16	19	14	15	35	145	50	65

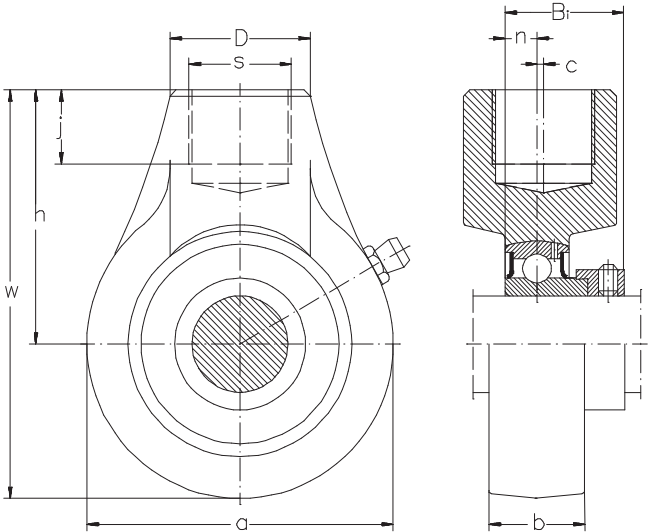
Standard duty hanger units set screws type



Shaft dia.	Nominal dimensions		c	b	h	s	D	j	Bi		
	a	w									
mm											
12	64	96	0	22	64	RP 3/4	40	19	31	12,7	UC
15	64	96	0	22	64	RP 3/4	40	19	31	12,7	UC
17	64	96	0	22	64	RP 3/4	40	19	31	12,7	UC
20	64	96	0	22	64	RP 3/4	40	19	31	12,7	UC
25	78	103	0	23	64	RP 3/4	40	19	34	14,3	UC
30	78	103	0	25	64	RP 3/4	40	19	38,1	15,9	UC
35	92	116	0	26	70	RP 3/4	40	19	42,9	17,5	UC
40	96	121	2	30	73	RP 3/4	40	19	49,2	19	UC
45	108	136	5	30	82	RP 1	48	21	49,2	19	UC
50	115	140,5	5	32	83	RP 1	48	21	51,6	19	UC
55	126	150	7	33	87	RP 1-1/4	60	24	55,6	22,2	UC
60	142	173	9	36	102	RP 1-1/4	60	28	65,1	25,4	UC
65	166	200	9,5	38	117	RP 1-1/2	70	32	65,1	25,4	UC
70	166	200	9,5	40	117	RP 1-1/2	70	32	74,6	30,2	UC
75	166	200	9,5	40	117	RP 1-1/2	70	32	77,8	33,3	UC

Note: Inch sizes available on request.

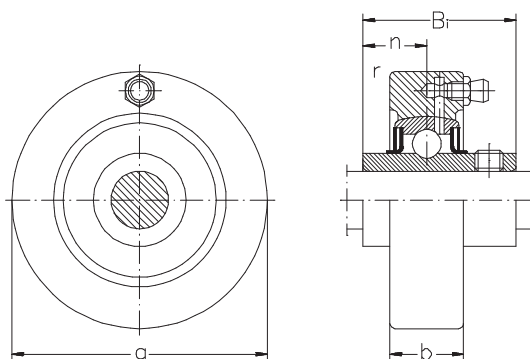
Standard duty hanger units set screws type



Shaft dia.	Nominal dimensions		c	b	h	s	D	j	Bi		
	a	w									
mm											
20	64	96	0	22	64	RP 3/4	40	19	29,5	7	SA
25	78	103	0	23	64	RP 3/4	40	19	30,5	7,5	SA
30	78	103	0	25	64	RP 3/4	40	19	33,9	8	SA
35	92	116	0	26	70	RP 3/4	40	19	37,5	8,5	SA
40	96	121	2	30	73	RP 3/4	40	19	40,5	9,5	SA
45	108	136	5	30	82	RP 1	48	21	42,2	10	SA
50	115	140,5	5	32	83	RP 1	48	21	43,7	10,5	SA
55	126	150	7	33	87	RP 1-1/4	60	24	48,4	11,5	SA

Note: Inch sizes available on request.

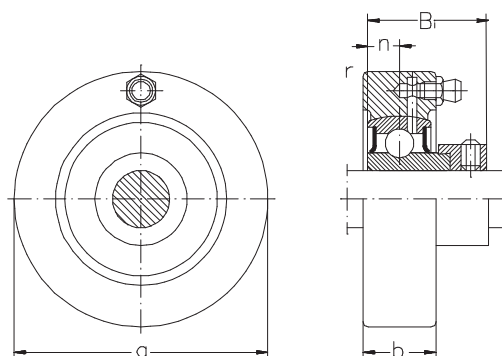
Standard duty cylindrical cartridge units set screws type



Shaft dia.	Nominal dimensions		r	Bi	n	Unit number	Bearing number	Housing number.	Weight
mm	a	b				—			kg
12	72	20	2	31	12,7	UCC 201	UC 201	C 204	0,53
15	72	20	2	31	12,7	UCC 202	UC 202	C 204	0,52
17	72	20	2	31	12,7	UCC 203	UC 203	C 204	0,51
20	72	20	2	31	12,7	UCC 204	UC 204	C 204	0,49
25	80	22	2	34	14,3	UCC 205	UC 205	C 205	0,65
30	85	27	2	38,1	15,9	UCC 206	UC 206	C 206	0,81
35	90	28	2	42,9	17,5	UCC 207	UC 207	C 207	0,90
40	100	30	2,5	49,2	19	UCC 208	UC 208	C 208	1,19
45	110	31	2,5	49,2	19	UCC 209	UC 209	C 209	1,49
50	120	33	2,5	51,6	19	UCC 210	UC 210	C 210	1.92
55	125	35	2,5	55,6	22,2	UCC 211	UC 211	C 211	2,21
60	130	38	2,5	65,1	25,4	UCC 212	UC 212	C 212	2,48
65	140	40	3	65,1	25,4	UCC 213	UC 213	C 213	2,97

Note: Inch sizes available on request.

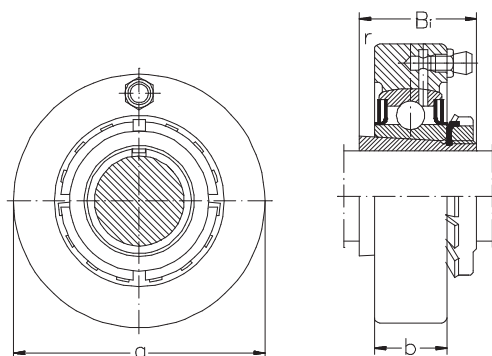
Standard duty cylindrical cartridge units eccentric locking collar type



Shaft dia.	Nominal dimensions		r	n	Bi	Unit number	Bearing number	Housing number	Weight
mm	a	b				—			kg
20	72	20	2	29,5	7	SAC 204	SA 204	C 204	0,50
25	80	22	2	30,5	7,5	SAC 205	SA 205	C 205	0,64
30	85	27	2	33,9	8	SAC 206	SA 206	C 206	0,82
35	90	28	2	37,5	8,5	SAC 207	SA 207	C 207	0,93
40	100	30	2,5	40,5	9,5	SAC 208	SA 208	C 208	1,20
45	110	31	2,5	42,2	10	SAC 209	SA 209	C 209	1,50
50	120	33	2,5	43,7	10,5	SAC 210	SA 210	C 210	1,92
55	125	35	2,5	48,8	11,5	SAC 211	SA 211	C 211	1,96

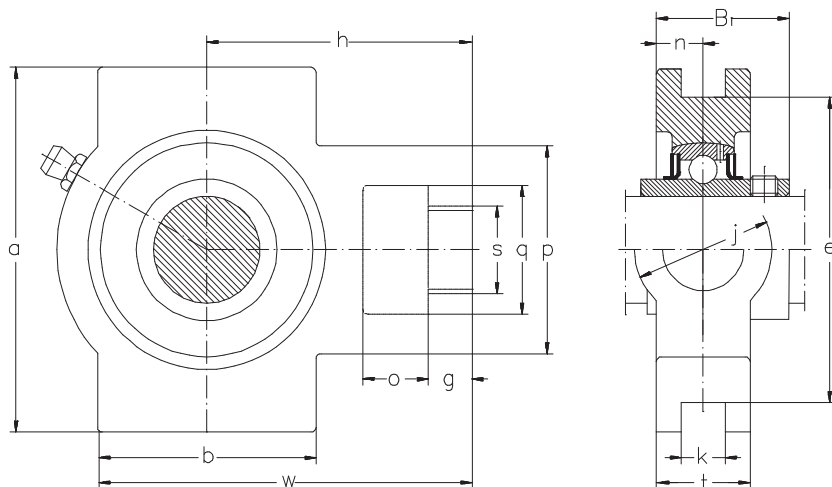
Note: Inch sizes available on request.

Standard duty cylindrical cartridge units adapter type



Shaft dia.	Nominal dimensions		r	Bi	Unit number	Bearing number	Housing number	Weight
mm	a	b			—			kg
20	80	22	2	35	UKC 205	UK 205	C 205	0,59
25	85	27	2	38	UKC 206	UK 206	C 206	0,74
30	90	28	2	43	UKC 207	UK 207	C 207	0,80
35	100	30	2,5	46	UKC 208	UK 208	C 208	1,03
40	110	31	2,5	50	UKC 209	UK 209	C 209	1,34
45	120	33	2,5	55	UKC 210	UK 210	C 210	1,71
50	125	35	2,5	59	UKC 211	UK 211	C 211	1,86
55	130	38	2,5	62	UKC 212	UK 212	C 212	1,98
60	140	40	3	65	UKC 213	UK 213	C 213	2,47

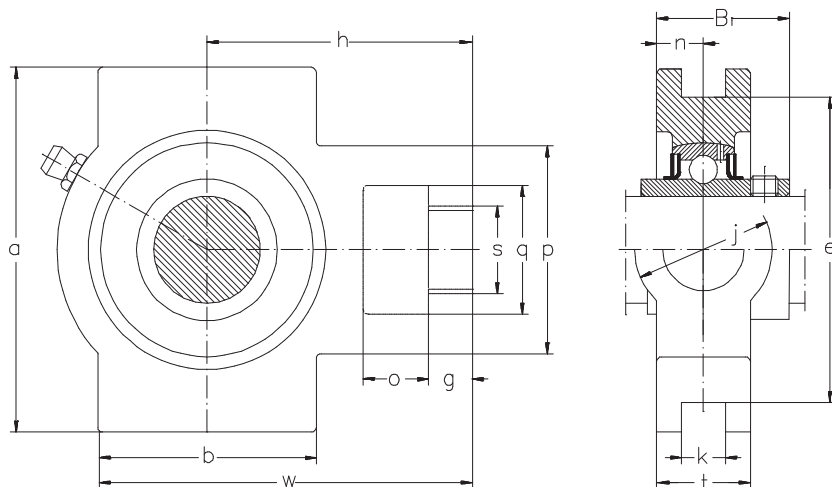
Standard duty take-up units cast housing set screws type



Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Weight	
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi					n
mm															—				kg
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	31	12,7	UCST 204	UC 204	ST 204	0,73
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	34	14,3	UCST 205	UC 205	ST 205	0,83
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	38,1	15,9	UCST 206	UC 206	ST 206	1,26
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	42,9	17,5	UCST 207	UC 207	ST 207	1,58
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	49,2	19	UCST 208	UC 208	ST 208	2,30
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	49,2	19	UCST 209	UC 209	ST 209	2,27
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	51,6	19	UCST 210	UC 210	ST 210	2,49
55	25	19	102	64	35	95	27	130	146	171	64	38	106	55,6	22,2	UCST 211	UC 211	ST 211	3,77
60	32	19	102	64	35	102	27	130	146	194	64	42	119	65,1	25,4	UCST 212	UC 212	ST 212	4,77
65	32	21	111	70	41	121	27	151	167	224	70	44	137	65,1	25,4	UCST 213	UC 213	ST 213	6,65
70	32	21	111	70	41	121	27	151	167	224	70	46	137	74,6	30,2	UCST 214	UC 214	ST 214	6,74
75	32	21	111	70	41	121	27	151	167	232	70	48	140	77,8	33,3	UCST 215	UC 215	ST 215	7,10

Note: Inch sizes available on request.

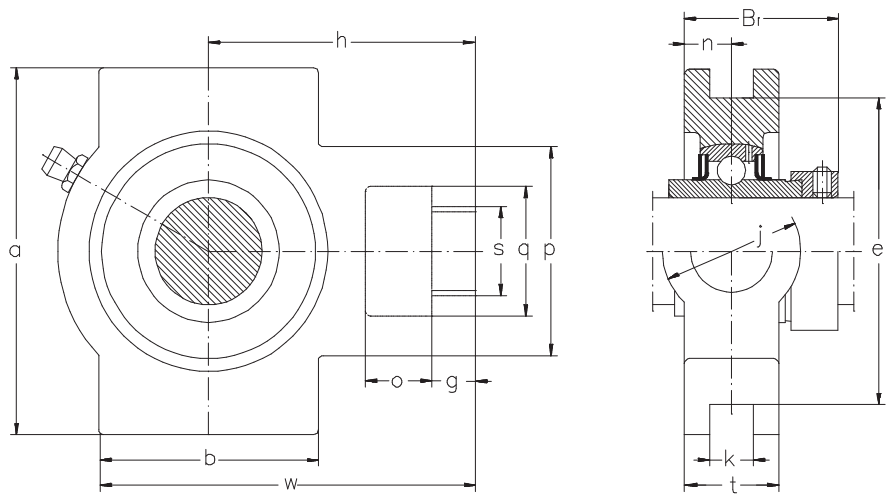
Standard duty take-up units cast housing set screws type



Shaft Nominal dia. dimensions															Unit number	Bearing number	Housing number	Weight	
o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n					
mm															—				kg
12	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT 201	UC 201	T 204	0,70
15	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT 202	UC 202	T 204	0,76
17	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT 203	UC 203	T 204	0,75
20	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT 204	UC 204	T 204	0,73
25	16	10	51	32	19	51	12	76	89	97	32	24	62	34	14,3	UCT 205	UC 205	T 205	0,83
30	16	10	56	37	22	57	12	89	102	113	37	28	70	38,1	15,9	UCT 206	UC 206	T 206	1,26
35	16	13	64	37	22	64	12	89	102	129	37	30	78	42,9	17,5	UCT 207	UC 207	T 207	1,58
40	19	16	83	49	29	83	16	102	114	144	49	33	88	49,2	19	UCT 208	UC 208	T 208	2,31
45	19	16	83	49	29	83	16	102	117	144	49	35	87	49,2	19	UCT 209	UC 209	T 209	2,28
50	19	16	83	49	29	86	16	102	117	149	49	37	90	51,6	19	UCT 210	UC 210	T 210	2,50
55	25	19	102	64	35	95	22	130	146	171	64	38	106	55,6	22,2	UCT 211	UC 211	T 211	3,79
60	32	19	102	64	35	102	22	130	146	194	64	42	119	65,1	25,4	UCT 212	UC 212	T 212	4,79
65	32	21	111	70	41	121	26	151	167	224	70	44	137	65,1	25,4	UCT 213	UC 213	T 213	6,66
70	32	21	111	70	41	121	26	151	167	224	70	46	137	74,6	30,2	UCT 214	UC 214	T 214	6,75
75	32	21	111	70	41	121	26	151	167	232	70	48	140	77,8	33,3	UCT 215	UC 215	T 215	7,11
80	32	21	111	70	41	121	26	165	184	235	70	51	140	82,6	33,3	UCT 216	UC 216	T 216	8,19
85	38	29	124	73	48	157	30	173	198	260	73	54	162	85,7	34,1	UCT 217	UC 217	T 217	10,58

Note: Inch sizes available on request.

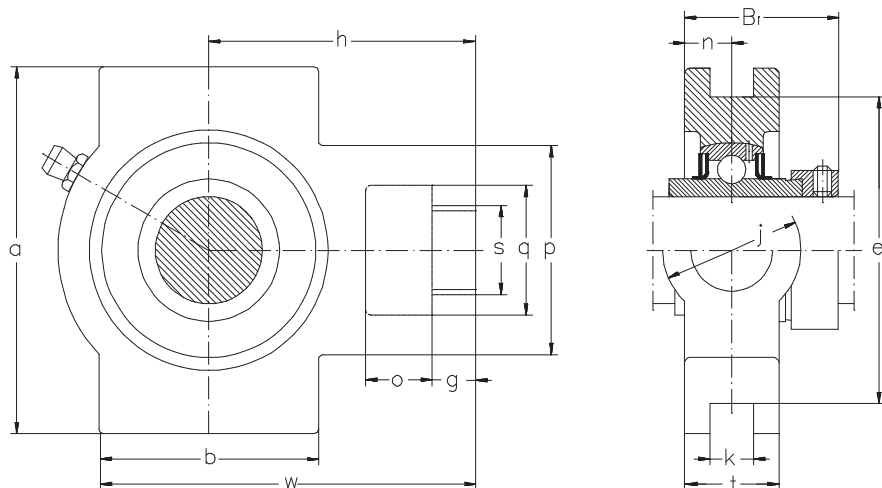
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Weight	
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi					n
mm															—			kg	
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	29,5	7	SAST 204	SA 204	ST 204	0,74
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	30,5	7,5	SAST 205	SA 205	ST 205	0,82
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	33,9	8	SAST 206	SA 206	ST 206	1,27
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	37,5	8,5	SAST 207	SA 207	ST 207	1,61
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	40,5	9,5	SAST 208	SA 208	ST 208	2,31
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	42,2	10	SAST 209	SA 209	ST 209	2,28
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	43,7	10,5	SAST 210	SA 210	ST 210	2,49
55	25	19	102	64	35	95	27	130	146	171	64	38	106	48,4	11,5	SAST 211	SA 211	ST 211	3,52

Note: Inch sizes available on request.

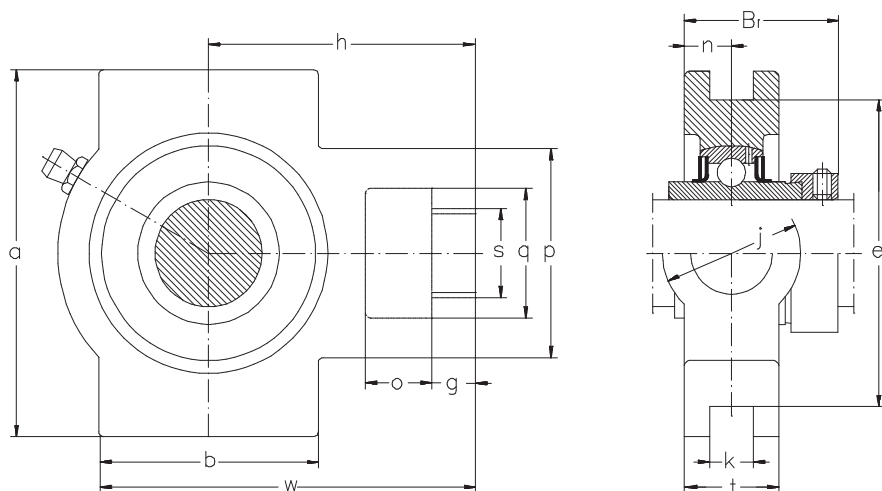
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions														Unit number	Bearing number	Husing number	Weight	
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi					n
mm															—			kg	
20	16	10	51	32	19	51	12	76	89	94	32	21	61	29,5	7	SAT 204	SA 204	T 204	0,74
25	16	10	51	32	19	51	12	76	89	97	32	24	62	30,5	7,5	SAT 205	SA 205	T 205	0,82
30	16	10	56	37	22	57	12	89	102	113	37	28	70	33,9	8	SAT 206	SA 206	T 206	1,27
35	16	13	64	37	22	64	12	89	102	129	37	30	78	37,5	8,5	SAT 207	SA 207	T 207	1,61
40	19	16	83	49	29	83	16	102	114	144	49	33	88	40,5	9,5	SAT 208	SA 208	T 208	2,32
45	19	16	83	49	29	83	16	102	117	144	49	35	87	42,2	10	SAT 209	SA 209	T 209	2,29
50	19	16	83	49	29	86	16	102	117	149	49	37	90	43,7	10,5	SAT 210	SA 210	T 210	2,50
55	25	19	102	64	35	95	22	130	146	171	64	38	106	48,4	11,5	SAT 211	SA 211	T 211	3,54

Note: Inch sizes available on request.

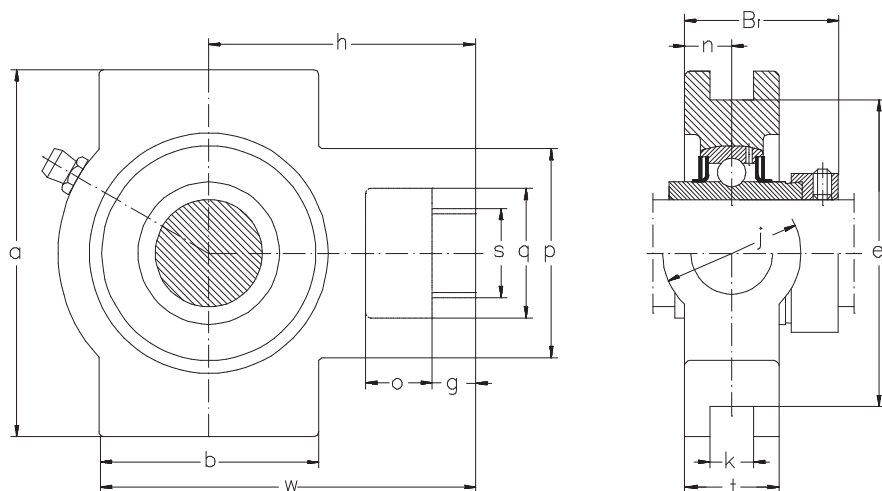
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Weight
mm	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n	—	—	—	kg
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	43,5	17	UELST 204	UEL 204	ST 204	0,78
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	44,3	17,4	UELST 205	UEL 205	ST 205	0,87
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	48,3	18,2	UELST 206	UEL 206	ST 206	1,35
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	51,1	18,8	UELST 207	UEL 207	ST 207	1,71
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	56,3	21,4	UELST 208	UEL 208	ST 208	2,44
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	56,3	21,4	UELST 209	UEL 209	ST 209	2,44
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	62,7	24,6	UELST 210	UEL 210	ST 210	2,70
55	25	19	102	64	35	95	27	130	146	171	64	38	106	71,3	27,7	UELST 211	UEL 211	ST 211	4,04
60	32	19	102	64	35	102	27	130	146	194	64	42	119	77,7	30,9	UELST 212	UEL 212	ST 212	5,11
65	32	21	111	70	41	121	27	151	167	224	70	44	137	85,7	34,1	UELST 213	UEL 213	ST 213	7,20
70	32	21	111	70	41	121	27	151	167	224	70	46	137	85,7	34,1	UELST 214	UEL 214	ST 214	7,26
75	32	21	111	70	41	121	27	151	167	232	70	48	140	92,1	37,3	UELST 215	UEL 215	ST 215	7,73

Note: Inch sizes available on request.

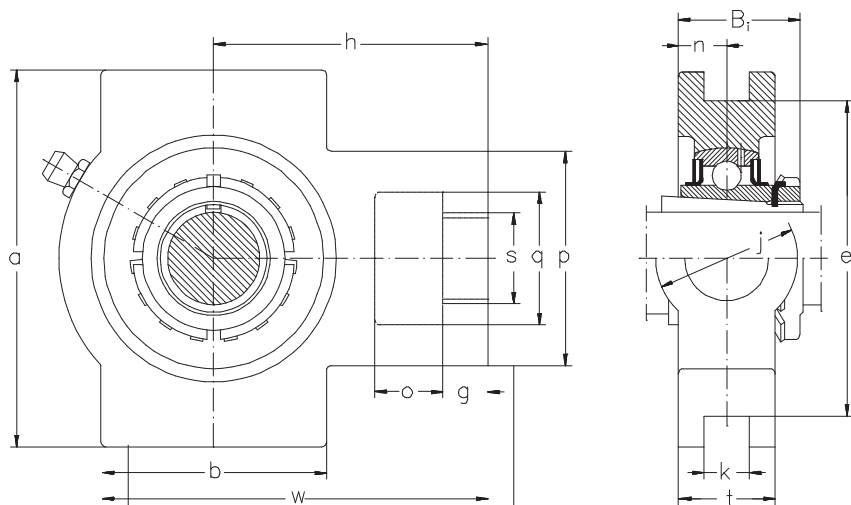
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Weight
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n				
mm																—			kg
12	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL201	UEL 201	T 204	0,83
15	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL202	UEL 202	T 204	0,81
17	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL203	UEL 203	T 204	0,80
20	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL204	UEL 204	T 204	0,78
25	16	12	51	32	19	51	12	76	89	97	32	24	62	44,3	17,4	UEL205	UEL 205	T 205	0,87
30	16	12	56	37	22	57	12	89	102	113	37	28	70	48,3	18,2	UEL206	UEL 206	T 206	1,35
35	16	15	64	37	22	64	12	89	102	129	37	30	78	51,1	18,8	UEL207	UEL 207	T 207	1,71
40	19	18	83	49	29	83	16	102	114	144	49	33	88	56,3	21,4	UEL208	UEL 208	T 208	2,45
45	19	18	83	49	29	83	16	102	117	144	49	35	87	56,3	21,4	UEL209	UEL 209	T 209	2,45
50	19	18	83	49	29	86	16	102	117	149	49	37	90	62,7	24,6	UEL210	UEL 210	T 210	2,71
55	25	21	102	64	35	95	22	130	146	171	64	38	106	71,3	27,7	UEL211	UEL 211	T 211	4,06
60	32	21	102	64	35	102	22	130	146	194	64	42	119	77,7	30,9	UEL212	UEL 212	T 212	5,13
65	32	23	111	70	41	121	26	151	167	224	70	44	137	85,7	34,1	UEL213	UEL 213	T 213	7,21
70	32	23	111	70	41	121	26	151	167	224	70	46	137	85,7	34,1	UEL214	UEL 214	T 214	7,27
75	32	23	111	70	41	121	26	151	167	232	70	48	140	92,1	37,3	UEL215	UEL 215	T 215	7,74

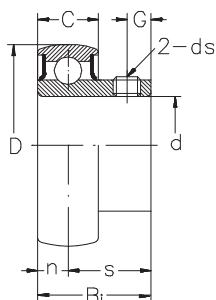
Note: Inch sizes available on request.

Standard duty take-up units cast housing adapter type



Shaft Nominal dia.	dimensions														Unit number	Bearing number	Housing number	Weight
mm	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	—			kg
20	16	12	51	32	19	51	12	76	89	97	32	24	62	35	UKT 205	UK 205	T 205	0,77
25	16	12	56	37	22	57	12	89	102	113	37	28	70	38	UKT 206	UK 206	T 206	1,19
30	16	15	64	37	22	64	12	89	102	129	37	30	78	43	UKT 207	UK 207	T 207	1,48
35	19	18	83	49	29	83	16	102	114	144	49	33	88	46	UKT 208	UK 208	T 208	2,15
40	19	18	83	49	29	83	16	102	117	144	49	35	87	50	UKT 209	UK 209	T 209	2,13
45	19	18	83	49	29	86	16	102	117	149	49	37	90	55	UKT 210	UK 210	T 210	2,29
50	25	21	102	64	35	95	22	130	146	171	64	38	106	59	UKT 211	UK 211	T 211	3,44
55	32	21	102	64	35	102	22	130	146	194	64	42	119	62	UKT 212	UK 212	T 212	4,29
60	32	23	111	70	41	121	26	151	167	224	70	44	137	65	UKT 213	UK 213	T 213	6,16

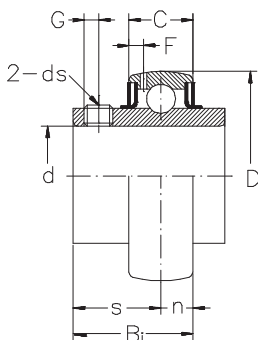
Standard duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions		Bi	C	n	s	G	ds	Bearing number	Basic load ratings		Weight
	d	D								dyn. Cr	stat. Cor	
mm									—	N		kg
12	12	40	22	12	6	16	4	M5X0,8	SB 201	9,6	4,6	0,10
15	15	40	22	12	6	16	4	M5X0,8	SB 202	9,6	4,6	0,09
17	17	40	22	12	6	16	4	M5X0,8	SB 203	9,6	4,6	0,08
20	20	47	25	14	7	18	5	M6X1	SB 204	12,8	6,65	0,13
25	25	52	27	15	7,5	19,5	5,5	M6X1	SB 205	14	7,85	0,17
30	30	62	29	16	8	21	6	M6X1	SB 206	19,5	11,3	0,26
35	35	72	32	17	8,5	23,5	6,5	M6X1	SB 207	25,7	15,3	0,38
40	40	80	34	19	9,5	24,5	7	M8X1	SB 208	29,1	17,8	0,50

Note: Inch sizes available on request.

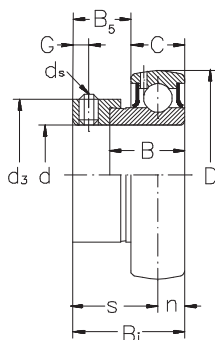
Standard duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions									Bearing number	Basic load ratings		Weight
	d	D	Bi	C	n	s	G	F	ds		dyn. Cr	stat. Cor	
mm										—	N		kg
12	12	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC 201	12,8	6,65	0,21
15	15	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC 202	12,8	6,65	0,20
17	17	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC 203	12,8	6,65	0,19
20	20	47	31	16	12,7	18,3	5	3,5	M6X1	UC 204	12,8	6,65	0,17
25	25	52	34	17	14,3	19,7	5,5	4	M6X1	UC 205	14	7,85	0,21
30	30	62	38,1	19	15,9	22,2	6	4,2	M6X1	UC 206	19,5	11,3	0,32
35	35	72	42,9	20	17,5	25,4	6,5	4,3	M8X1	UC 207	25,7	15,3	0,47
40	40	80	49,2	21	19	30,2	8	4,2	M8X1	UC 208	29,1	17,8	0,64
45	45	85	49,2	22	19	30,2	8	4,2	M8X1	UC 209	32,5	20,4	0,68
50	50	90	51,6	23	19	32,6	9	4,8	M10X1,25	UC 210	35	23,2	0,80
55	55	100	55,6	25	22,2	33,4	9	5,3	M10X1,25	UC 211	43,5	29,2	1,12
60	60	110	65,1	27	25,4	39,7	10,5	5,3	M10X1,25	UC 212	52,5	36	1,53
65	65	120	65,1	28	25,4	39,7	12	6	M12X1,25	UC 213	57,5	40	1,86
70	70	125	74,6	30	30,2	44,4	12	6	M12X1,25	UC 214	62	44	2,05
75	75	130	77,8	30	33,3	44,5	12	6	M12X1,25	UC 215	66	49,5	2,21
80	80	140	82,6	33	33,3	49,3	14	6,3	m12x1,25	UC 216	72,5	53	2,79
85	85	150	85,7	35	34,1	51,6	14	6,5	M12X1,25	UC 217	83,5	64	3,38
90	90	160	96	37	39,7	56,3	14	6,5	M12X1,25	UC 218	96	71,5	4,45

Note: Inch sizes available on request.

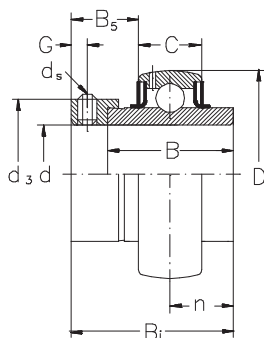
Standard duty spherical outside surface ball bearings eccentric locking collar type



Shaft dia.	Nominal dimensions											Bearing number	Basic load ratings		Weight
	d	D	Bi	B	C	n	s	G	d _s	d ₃	B ₅		dyn. C _r	stat. C _{0r}	
mm												—	N	kg	
12	12	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA 201	9,6	4,6	0,14
15	15	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA 202	9,6	4,6	0,13
17	17	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA 203	9,6	4,6	0,12
20	20	47	29,5	20	14	7	22,5	4,8	M6X1	33,3	13,5	SA 204	12,8	6,65	0,18
25	25	52	30,5	21	15	7,5	23	4,8	M6X1	38,1	13,5	SA 205	14	7,85	0,20
30	30	62	33,9	22	16	8	25,9	6	M6X1	44,5	15,9	SA 206	19,5	11,3	0,33
35	35	72	37,5	24	17	8,5	29	6,8	M8X1	55,6	17,5	SA 207	25,7	15,3	0,50
40	40	80	40,5	27	19	9,5	31	6,8	M8X1	60,3	18,3	SA 208	29,1	17,8	0,65
45	45	85	42,2	28,7	20	10	32,2	6,8	M8X1	63,5	18,3	SA 209	32,5	20,4	0,69
50	50	90	43,7	30,2	21	10,5	33,2	6,8	M8X1	69,9	18,3	SA 210	35	23,2	0,80
55	55	100	48,8	32,4	23	11,5	36,9	8	M10X1,25	76,2	18,3	SA 211	43,5	29,2	0,87

Note: Inch sizes available on request.

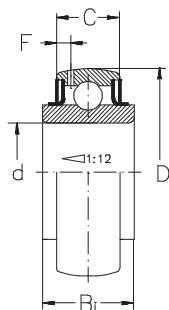
Standard duty spherical outside surface ball bearings eccentric locking collar type



ShaftNominal dia. dimensions												Bearing number	Basic load ratings		Weight
d	D	Bi	C	n	B	G	d ₃	B ₅	F	d _s			dyn. C _r	stat. C _{0r}	kg
mm												—	N		
12	12	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL 201	12,8	6,65	0,27
15	15	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL 202	12,8	6,65	0,25
17	17	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL 203	12,8	6,65	0,24
20	20	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL 204	12,8	6,65	0,22
25	25	52	44,3	17	17,4	34,8	4,8	38,1	13,5	4	M6X1	UEL 205	14	7,85	0,25
30	30	62	48,3	19	18,2	36,4	6	44,5	15,9	4,2	M8X1	UEL 206	19,5	11,3	0,41
35	35	72	51,1	20	18,8	37,6	6,8	55,6	17,5	4,3	M8x1	UEL 207	25,7	15,3	0,60
40	40	80	56,3	21	21,4	42,8	6,8	60,3	18,3	4,2	M8x1	UEL 208	29,1	17,8	0,78
45	45	85	56,3	22	21,4	42,8	6,8	63,5	18,3	4,2	M8X1	UEL 209	32,5	20,4	0,85
50	50	90	62,7	23	24,6	49,2	6,8	69,9	18,3	4,8	M8X1	UEL 210	35	23,2	1,01
55	55	100	71,3	25	27,7	55,4	8	76,2	20,7	5,3	M10X1,25	UEL 211	43,5	29,2	1,39
60	60	110	77,7	27	30,9	61,8	8	84	22,3	5,3	M10X1,25	UEL 212	52,5	36	1,87
65	65	120	85,7	28	34,1	68,2	8,7	86	23,5	6	M10X1,25	UEL 213	57,5	40	2,41
70	70	125	85,7	30	34,1	68,2	8,7	96	23,9	6	M10X1,25	UEL 214	62	44	2,57
75	75	130	92,1	30	37,3	74,6	8,7	102	23,9	6	M10X1,25	UEL 215	66	49,5	2,84

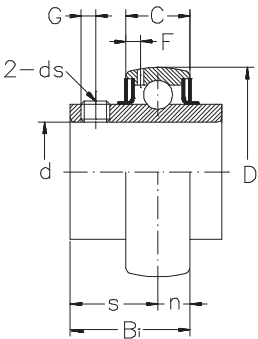
Note: Inch sizes available on request.

Standard duty spherical outside surface ball bearings adapter type



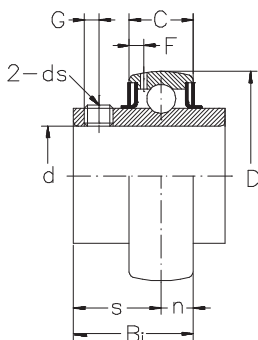
Shaft dia.	Nominal dimensions		B	C	F	Bearing number	Basic load ratings		Weight
	d	D					dyn. C_r	stat. C_{or}	
mm						—	N		kg
20	25	52	21	17	4,2	UK 205	14	7,85	0,15
25	30	62	25	19	4,5	UK 206	19,5	11,3	0,25
30	35	72	27	20	4,2	UK 207	25,7	15,3	0,37
35	40	80	29	21	4,2	UK 208	29,1	17,8	0,48
40	45	85	30	22	4,2	UK 209	32,5	20,4	0,53
45	50	90	31	23	5	UK 210	35	23,2	0,59
50	55	100	33	27	6,3	UK 211	43,5	29,2	0,77
55	60	110	36	27	5,3	UK 212	52,5	36	1,03
60	65	120	36	28	6	UK 213	57,5	40	1,36

Medium duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions									Bearing number	Basic load ratings		Weight
	d	D	Bi	C	n	s	G	F	ds		dyn. Cr	stat. Cor	
mm										—	N		kg
25	25	62	38,1	19	15,9	22,2	6	5	M6X1	UC X05	19,5	11,3	0,39
30	30	72	42,9	22	17,5	25,4	6,5	5,8	M8X1	UC X06	25,7	15,3	0,58
35	35	80	49,2	21	19	30,2	8	6,3	M8X1	UC X07	29,1	17,8	0,74
40	40	85	49,2	22	19	30,2	8	6,8	M8X1	UC X08	32,5	20,4	0,83
45	45	90	51,6	23	19	32,6	9	6,5	M10X1,25	UC X09	35	23,2	0,95
50	50	100	55,6	25	22,2	33,4	9	7,2	M10X1,25	UC X10	43,5	29,2	1,29
55	55	110	65,1	27	25,4	39,7	10,5	8,2	M10X1,25	UC X11	52,5	36	1,80
60	60	120	65,1	28	25,4	39,7	12	8	M12X1,25	UC X12	57,5	40	2,05
65	65	125	74,6	30	30,2	44,4	12	9	M12X1,25	UC X13	62	44	2,52
70	70	130	77,8	30	33,3	44,5	12	9	M12X1,25	UC X14	66	49,5	2,74
75	75	140	82,6	33	33,3	49,3	14	10,3	M12X1,25	UC X15	72,5	53	3,41
80	80	150	85,7	35	34,1	51,6	14	11	M12X1,25	UC X16	83,2	63,8	3,87

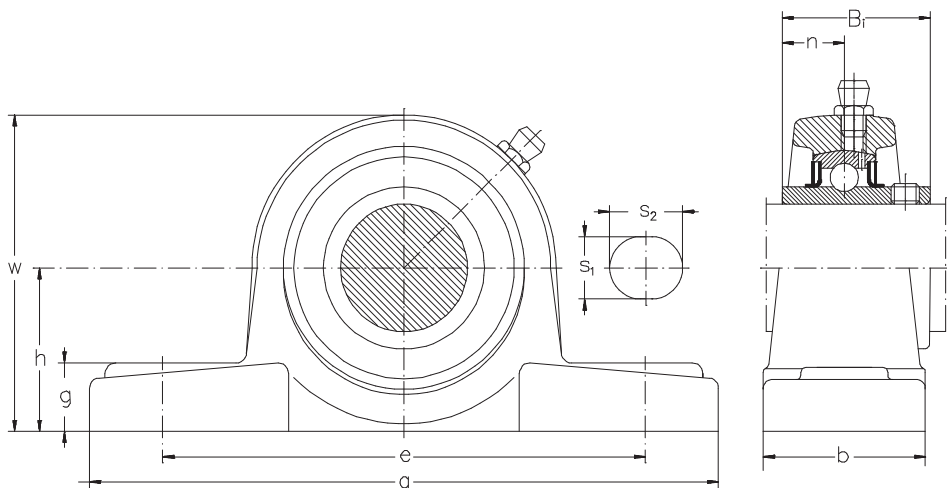
Heavy duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions									Bearing number	Basic load ratings		Weight
	d	D	Bi	C	n	s	G	F	ds		dyn. Cr	stat. Cor	
mm										—	N		kg
25	25	62	38	21	15	23	6	4,3	M6X1	UC 305	21,2	10,9	0,35
30	30	72	43	24	17	26	6	5,5	M6X1	UC 306	26,7	15	0,56
35	35	80	48	25	19	29	8	5,3	M8X1	UC 307	33,5	19,1	0,71
40	40	90	52	28	19	33	10	5,5	M10X1,25	UC 308	40,5	24	0,96
45	45	100	57	30	22	35	10	6	M10X1,25	UC 309	53	32	1,28
50	50	110	61	32	22	39	12	6,1	M12X1,25	UC 310	62	38,5	1,65
55	55	120	66	34	25	41	12	6,4	M12X1,25	UC 311	71,5	45	1,90
60	60	130	71	36	26	45	12	6,7	M12X1,25	UC 312	82	52	2,60
65	65	140	75	38	30	45	12	6,9	M12X1,25	UC 313	92,5	60	3,25
70	70	150	78	40	33	47	12	7,2	M12X1,25	UC 314	104	68	3,95
75	75	160	82	42	32	50	14	7,5	M14X1,5	UC 315	113	77	4,33
80	80	170	86	44	34	52	14	7,5	M14X1,5	UC 316	122	86	5,57

SSUCP series pillow blocks

Normal duty with set screw lock and grease fitting

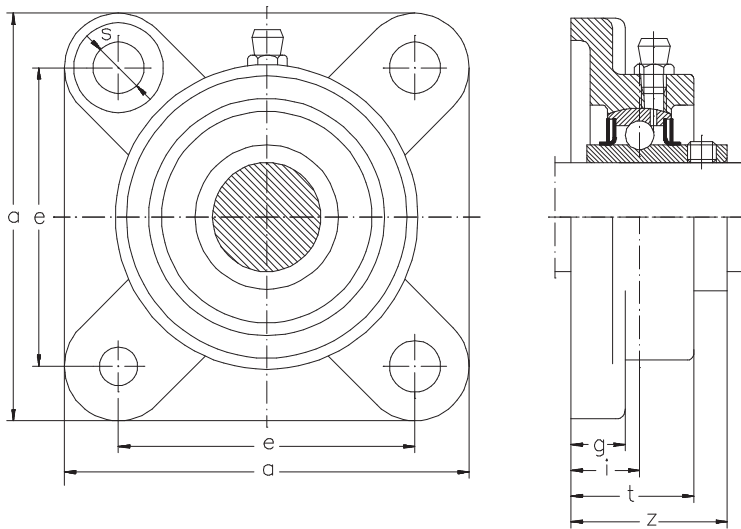


Dimensions											Unit no.	Bolt size	Bearing no.	Housing no.
d	B	n	b	h	g	w	a	e	s1	s2		mm		
mm											—	mm	—	
12	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP201	M10	SSUC201	SSP203
15	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP202	M10	SSUC202	SSP203
17	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP203	M10	SSUC203	SSP203
20	31	12,7	38	33,3	15	65	127	95	12	19	SSUCP204	M10	SSUC204	SSP204
25	34,1	14,3	38	36,5	16	70	140	105	12	19	SSUCP205	M10	SSUC205	SSP205
30	38,1	15,9	48	42,9	18	83	165	121	15	21	SSUCP206	M12	SSUC206	SSP206
35	42,9	17,5	48	47,6	19	94	167	127	15	21	SSUCP207	M12	SSUC207	SSP207
40	49,2	19	54	49,2	19	100	184	137	15	23	SSUCP208	M12	SSUC208	SSP208
45	49,2	19	54	54	20	108	190	146	15	23	SSUCP209	M12	SSUC209	SSP209
50	51,6	19	60	57,2	22	114	206	159	19	25	SSUCP210	M16	SSUC210	SSP210

Note: Grease fitting 1/4 - 28 UNF.

SSUCF series four bolt flanges

Normal duty with set screw lock and grease fitting

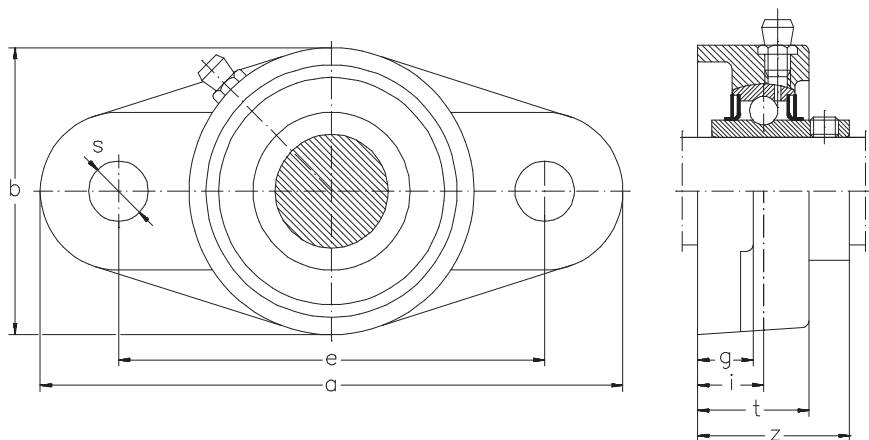


Dimensions		t	g	i	s	a	e	Unit no.	Bolt size	Bearing no.	Housing no.
d	z										
mm								—	mm	—	
12	30,9	24	11	15	12	76	54	SSUCF201	M10	SSUC201	SSF203
15	30,9	24	11	15	12	76	54	SSUCF202	M10	SSUC202	SSF203
17	20,9	24	11	15	12	76	54	SSUCF203	M10	SSUC203	SSF203
20	33,3	25	11	15	12	86	63,5	SSUCF204	M10	SSUC204	SSF204
25	35,8	26,5	13	16	12	95	70	SSUCF205	M10	SSUC205	SSF205
30	40,2	30	13	18	15	108	82,5	SSUCF206	M12	SSUC206	SSF206
35	44,4	33	14	19	15	117	92	SSUCF207	M12	SSUC207	SSF207
40	51,2	36	14	21	15	130	101,5	SSUCF208	M12	SSUC208	SSF208
45	52,2	38	14	22	15	137	105	SSUCF209	M12	SSUC209	SSF209
50	54,6	39	15	22	19	143	111	SSUCF210	M16	SSUC210	SSF210

Note: Grease fitting 1/4 - 28 UNF.

SSUCFL series two bolt flanges

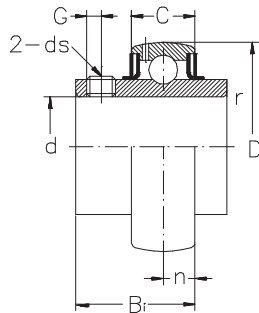
Normal duty with set screw lock and grease fitting



Dimensions									Unit no.	Bolt size	Bearing no.	Housing no
d	z	t	g	i	b	s	a	e				
mm											mm	
12	30,9	24	11	15	55	12	98,5	76,5	SSUCFL201	M10	SSUC201	SSFL203
15	30,9	24	11	15	55	12	98,5	76,5	SSUCFL202	M10	SSUC202	SSFL203
17	30,9	24	11	15	55	12	98,5	76,5	SSUCFL203	M10	SSUC203	SSFL203
20	33,3	25	11	15	60	12	112	90	SSUCFL204	M10	SSUC204	SSFL204
25	35,8	26,5	13	16	68	12	124	99	SSUCFL205	M10	SSUC205	SSFL205
30	40,2	30	13	18	80	15	141	116,5	SSUCFL206	M12	SSUC206	SSFL206
35	44,4	33	14	19	90	15	155,5	130	SSUCFL207	M12	SSUC207	SSFL207
40	51,2	36	14	21	100	15	171,5	143,5	SSUCFL208	M12	SSUC208	SSFL208
45	52,2	38	14	22	108	15	179	148,5	SSUCFL209	M12	SSUC209	SSFL209
50	54,6	39	15	22	115	19	189	157	SSUCFL210	M16	SSUC210	SSFL210

Note: Grease fitting 1/4 - 28 UNF.

SSUC series bearing insert Normal duty with set screw lock



Dimensions		B	S	r _{min}	C	d _s	G	Load cap.		Designation
d H7	D h5							C _r *	C _{or}	
mm								N	—	
12	40	27,4	11,5	0,6	14	M5 x 0,5	4	7350	4750	SSUC201
15	40	27,4	11,5	0,6	14	M5 x 0,5	4	7350	4750	SSUC202
17	40	27,4	11,5	0,6	14	M5 x 0,5	4	7350	4750	SSUC203
20	47	31	12,7	1	17	M6 x 0,75	5	9800	6550	SSUC204
25	52	34,1	14,3	1	17	M6 x 0,75	5	10800	7800	SSUC205
30	62	38,1	15,9	1	19	M6 x 0,75	5	15000	11200	SSUC206
35	72	42,9	17,5	1,1	20	M8 x 1	7	19600	15300	SSUC207
40	80	49,2	19	1,1	21	M8 x 1	8	23600	19000	SSUC208
45	85	49,2	19	1,1	22	M8 x 1	8	25500	21600	SSUC209
50	90	51,6	19	1,1	24	M10 x 1	10	27000	23200	SSUC210

Note: *Multiply the load "C_r" by 1,3 if the tolerance of mounted shaft is "h6" or higher.

V. Plummer blocks



BEARINGS

Plummer blocks



Plummer blocks

Feature

The majority of MTK plummer block housing is made of gray cast iron and is of the models of SN, SNU and SAF. Its basic size conforms with ISO standard and could meet the requirement of bearing with inner ring of 20 mm - 160 mm. It could not be interchangeable with the other parts of the housing cap or the housing base. Two parts through the fixing "pins" to ensure their correct assembly.

Materials

Housing

Grade 200 (FC200), it is equivalents to U.S.A standard ASTM A-48 (Grade 35).

Accessories

Please refer to table 1.

Table 1		
Description	Part number	Materials
Felt Seal	FS	Wool + Rayon
Locating Ring	SR	Aluminum
Hexagon Bolt	M	Mild Steel
U-Ring	U-500 / U-600	NBR + Mild Steel Plate
Labyrinth Seal	LER / LOR	Aluminum + NBR
End Cover	500 NA / 500 UA	NBR + Mild Steel Plate
Eye-Bolt		Mild Steel
Cap		Plastic

Applicable bearings

All MTK plummer block housings applicable to the appropriate self-aligning ball bearings and spherical roller bearings, they are economic bearing units and normally require little maintenance.

Tolerances

Tolerance of housings bore-D

Please refer to table 2.
Unit: 0.001 mm

Table 2				
Bore mm	G7	H7	H8	J7
50 - 80	+40	+30	+46	+18
	+10	0	0	-12
80 - 120	+42	+35	+54	+22
	+12	0	0	-13
120 - 180	+54	+40	+63	+26
	+14	0	0	-14
180 - 250	+61	+46	+72	+30
	+15	0	0	-16
250 - 315	+69	+52	+81	+36
	+17	0	0	-16

Dimension of housings: A, F, d1, d2

Please refer to table 3.
unit:mm

Table 3					
Over	Incl.	A(h13)	F(H13)	d1(H12)	d2(H13)
18	30	0	+0,33	+0,21	+0,33
		-0,33	0	0	0
		0	+0,39	+0,25	+0,39
30	50	-0,39	0	0	0
		0	+0,46	+0,3	+0,46
50	80	-0,46	0	0	0
		0	+0,54	+0,35	+0,54
80	120	-0,54	0	0	0
		0	+0,63	+0,4	+0,63
120	180	-0,63	0	0	0

Tolerances of other dimensions of housings

Please refer to table 4 and table 5.

unit: mm

One side machining		
over	incl.	
5	100	± 1,5
10	200	± 2

Table 4

When the plumber block housing is under high temperature, great speed or heavy loading working environment, constant replacement of the lubricating grease is necessary. At this time, grease nipple is required at the housing cap.

The permitted loading capacity (SN, SNU)

unit:mm

General tolerances for casting					
length over	incl.		thickness over	incl.	
up	120	± 1,5	up	10	± 1,5
120	250	± 2,0	10	18	± 2,0
250	400	± 3,0	18	30	± 3,0
400	800	± 4,0	30	50	± 3,5

Table 5

The permitted loading capacity of SN, SNU plumber block housing are related to the loading capacity and the strength of the bolt-screws. Under normal circumstances, plumber block housing is applicable to axial load. When the loading is from other directions, apart from axial, a check should be carried out to see the bolt-screws between the housing cap and the housing base, between the frame.

When working out the permitted loading capacity, the safety factor should be considered. In normal engineering, the safety factor of bolt-screw is 3. The safety factor of breaking loading capacity of the housing is 6.

The reference value of the breaking loading capacity of housing in different directions and the maximum loading capacity of bolt-screw is set out in below figure 1. The maximum loading capacity of plumber block housing could select P180° direction 2/3 of the breaking loading capacity. When the loading direction exceeds 90°, bolt screws should be fastened evenly with the housing set out in the table 6.

When the loading capacity direction is between 55° to 120° and face the axial load, the plumber block housing should be installed end-cover follow the axial direction or pin should be added between the housing base and frame.

Lubrication

SN and SNU plumber block housings usually uses grease for lubrication. During installation or periodic maintenance, the lubricating grease added is able to ensure that before next maintenance a good lubricating condition could be maintained. Lubricating grease usually uses lithium grease. The suitable temperature range is -30°C to +120°C. The filling quantity is 1/3 of the inner body of the housing base after the installation of the bearing. The normal usage life of the lubricating grease is 6 months. Upon expiry all the lubricating grease should be replaced.

Table 6

Housing size	Breaking loads for load direction						Maximum load of 2 cap bolts for load direction			Cap bolts size	Suggest tightening torque
	Pa	P55°	P90°	P120°	P150°	P180°	P120°	P150°	P180°		
	KN										
SNU 505	48	145	90	65	60	75	40	23	20	M 8x40	25
SNU 506-605, SN 206, 306, 506	55	165	100	75	65	85	40	23	20	M 8x40	25
SNU 507-606, SN 207, 307, 507, 606	60	180	110	80	75	90	60	35	30	M 10x50	40
SNU 508-607, SN 208, 308, 508, 607	67	200	120	90	80	100	60	35	30	M 10x50	40
SNU 509, SN 209, 309, 509	70	210	130	95	85	105	60	35	30	M 10x50	40
SNU 510-608, SN 210, 310, 510	80	240	145	110	95	120	60	35	30	M 10x50	40
SN 608							90	52	45	M 12x60	80
SNU 511-609, SN 211, 311, 511, 609	87	260	155	120	105	130	90	52	45	M 12x60	80
SNU 512-610, SN 213, 313, 512, 611	93	280	170	125	110	140	90	52	45	M 12x60	80
SNU 513-611, SN 213, 313, 513, 611	103	310	185	140	125	155	90	52	45	M 12x65	80
SNU 515-612, SN 215, 315, 515, 612	123	370	220	165	150	185	90	52	45	M 12x65	80
SNU 516-613	130	390	235	175	155	195	90	52	45	M 12x70	80
SN 216, 316, 516, 613							170	98	85	M 16x70	160
SNU 517	147	440	270	200	175	220	90	52	45	M 12x80	80
SN 217, SN 317, 517							170	98	85	M 16x80	160
SNU 518-615, SN 218, 318, 518, 615	173	520	310	235	210	260	170	98	85	M 16x90	160
SNU 519-616, SN 219, 319, 519, 616	180	540	330	245	215	270	170	98	85	M 16x90	160
SNU 520-617, SN 220, 320, 520, 617	190	570	340	255	230	285	260	150	130	M 20x100	200
SNU 522-619, SN 222, 522, 619	207	620	370	280	250	310	260	150	130	M 20x100	200
SNU 524-620, SN 224, 524, 620	243	730	440	330	295	365	260	150	130	M 20x100	200
SNU 526, SN 226, 526	277	830	500	375	330	415	380	220	190	M 24x120	200
SNU 528, SN 228, 528	327	980	590	440	390	490	380	220	190	M 24x120	350
SNU 530, SN 230, 530	370	1110	670	500	445	555	380	220	190	M 24x130	350
SNU 532, SN 232, 532	450	1350	810	610	540	675	380	220	190	M 24x130	350
SNU 530, SN 230, 530	370	1110	670	500	445	555	380	220	190	M24x130	350
SNU 532, SN 232, 532	450	1350	810	610	540	675	380	220	190	M,24x130	350

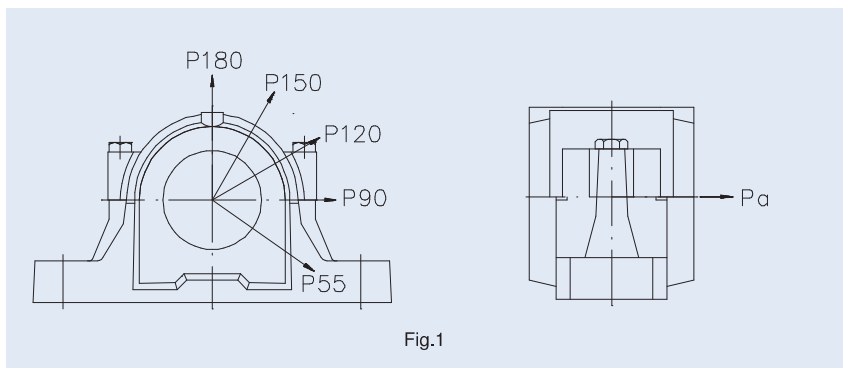


Fig.1

Specification of accessories (SN, SNU)

Locating ring

The bearing seating in the housing bore is machined to a tolerance H8 so that in most cases a loose fit of the bearing outer ring is assured and generally the seating width is such that the bearings has axial freedom. Installation of the locating rings : in case of two rings to be fixed on both sides of the bearing; in case of one ring to be fixed on the side with the sleeve nut. The symbol of the locating ring is SR. When customer place orders for it should state clearly the specification, size and quantity of the required locating ring.

Please refer to below drawing figure 2 and table 7.

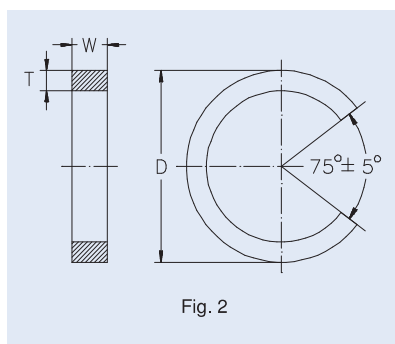


Fig. 2

unit:mm

Selection of locating rings

Table 7

Housing number	T	D	W _{0,2}
SN 206-SN 210 SN 506-SN 510 SN 306-SN 308 SN 606-SN 608 SNU 505-SNU 510	3,5		
SN 211-SN 230 SN 511-SN 530 SN 309-SN 320 SN 609-SN 620 SNU 511-SNU 530	5		Please refer to pages 442-465
SN 232 SN 532 SNU 532	7,5		

Nipple hole

SN, SNU plumber block housings will not supply grease nipple upon delivery under usual circumstances. If customer requests, we could supply according to the size / specification and please refer to table 8.

Selection of nipple holes

Table 8

Housing number	Nipple holes	Remarks
SN 206-SN 210 SN 506-SN 510 SN 306-SN 308 SN 606-SN 608 SNU 505-SNU 510	M6	
SN 211-SN 230 SN 511-SN 520 SN 309-SN 317 SN 609-SN 617 SNU 511-SNU 520	1/8 - 27 NTP	Or base on the request of client
SN 222-SN 232 SN 522-SN 532 SN 318-SN 320 SN 618-SN 622 SNU 522-SNU 532	1/4 - 18 NTP	

Seals

MTK will usually provide customers with 2 kinds of standards of seals. SN plummer block housing uses felt seal. SNU plummer block housing uses U-ring seal.

SN plummer block housing using felt seal is a simple but reliable one. It is of a contact / brushing type. It is suitable for -30°C to +100°C temperature. The perimeter contact rate is less than 4m/sec applicable situation. It can also be used in situation of greater speed. But in such situation there will be space between felt seal and machine shaft.

To ensure the function of felt seal, the coarse degree of the surface of the contact area between felt seal and machine shaft should be less than Ra1,6 µm. Before the fixing of oil seal, it should be soaked in hot oil for several minutes.

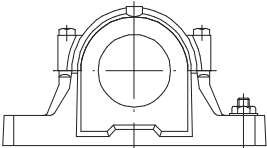
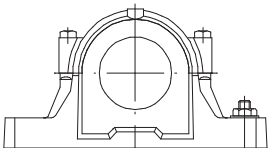
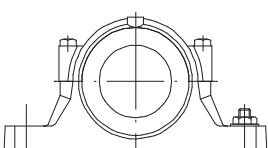
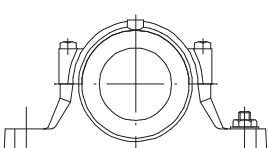
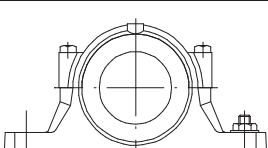
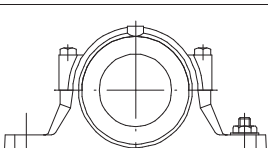
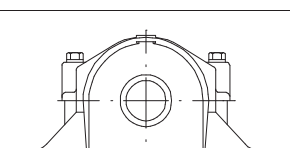
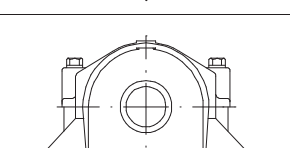
SNU plummer block housing uses U-ring seal is made

of NBR plus mild steel plate. Complete U-ring is made of two equal halves. U-ring seal has 2 thin lips having close contact with the machine shaft surface. It is suitable for temperature between -30°C to +100°C. The perimeter contact speed is less than 8 m/sec applicable situation. During installation, lubricating grease should be added into the space between the two rings. Besides, the contact surface between machine shaft and two lips should be polished before hand.

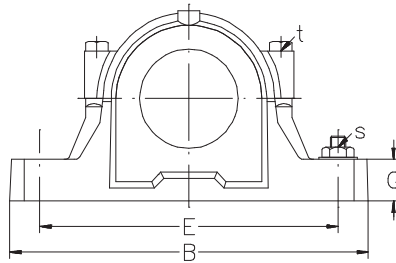
To avoid oil leakage, during installation one layer of very thin silicon should be placed on the two surfaces.

Eye bolts

Only available for sizes of SN224-SN232, SN318-SN320, SN524-SN532, SN618-SN620, SNU524-SNU532.

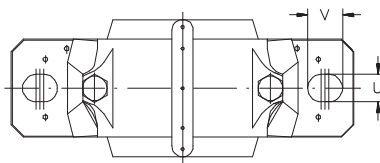
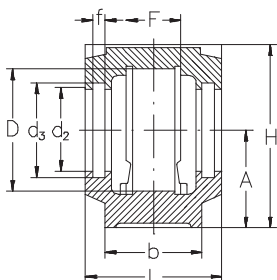
SNU 500 - 600	page 446	
SNU 200 - 300	page 452	
SN 500	page 458	
SN 600	page 462	
SN 200	page 464	
SN 300	page 468	
SAF 500	page 470	
SAF 600	page 472	

Plummer block housings



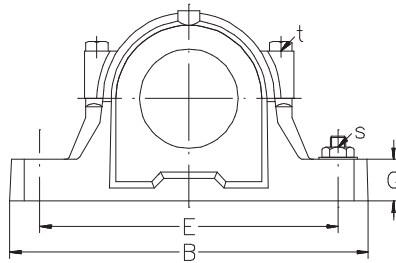
Shaft Plummer block housing
dia. dimensions

d	D	B	b	G	F	A	L	H	E	d ₂	d ₃	f	u	v	s	t
mm																
20	52	165	46	19	25	40	67	73	130	31,5	39,5	5	15	20	M12	M8
	62	185	52	22	32	50	77	88	150	36,5	44,5	5	15	20	M12	M8
25	62	185	52	22	32	50	77	88	150	36,5	44,5	5	15	20	M12	M8
	72	185	52	22	34	50	82	93	150	46,5	54,5	5	15	20	M12	M10
30	72	185	52	22	34	50	82	93	150	46,5	54,5	5	15	20	M12	M10
	80	205	60	25	39	60	85	107	170	51,5	59,5	5	15	20	M12	M10
35	80	205	60	25	39	60	85	107	170	51,5	59,5	5	15	20	M12	M10
	90	205	60	25	41	60	90	112	170	62,0	70,5	5	15	20	M12	M10
40	85	205	60	25	30	60	85	109	170	56,5	64,5	5	15	20	M12	M10
	100	255	70	28	44	70	95	127	210	67	75,5	5	18	24	M16	M12
45	90	205	60	25	41	60	90	112	170	62	70,5	5	15	20	M12	M10
	110	255	70	30	48	70	105	133	210	72	80,5	5	18	24	M16	M12
50	100	255	70	28	44	70	95	127	210	67	75,5	5	18	24	M16	M12
	120	275	80	30	51	80	110	148	230	77	85,5	5	18	24	M16	M12
55	110	255	70	30	48	70	105	133	210	72	80,5	5	18	24	M16	M12
	130	280	80	30	56	80	115	154	230	87	95,5	5	18	24	M16	M12
60	120	275	80	30	51	80	110	148	230	77	85,5	5	18	24	M16	M12
	140	315	90	32	58	95	120	175	260	92,5	101	5	22	28	M20	M16



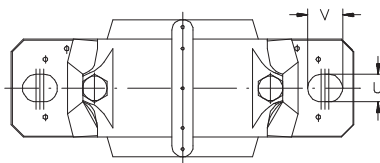
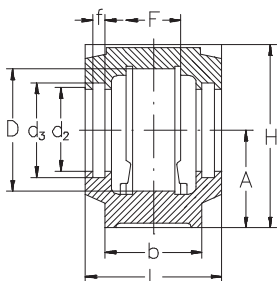
Plummer block housing	Housing size	Appropriate apartment Bearing number	Adapter sleeve	Locating ring number	Seal number	End cover	Weight kg
—	—	—	—	—	—	—	—
SNU 505	SNU 505	1205 K 2205 K	22205 K	H205 SR52x5 H305 SR52x7 H305 SR62x7,5 H2305 SR62x8	2 1 2 1	U 505 505 UA	1,4
SNU 506-605	SNU 605	1305 K 2305 K	22206 K	H206 SR62x8 H306 SR62x6 H306 SR72x7,5 H2306 SR72x7	2 2 2 1	U 605 506 UA	1,9
SNU 506-605	SNU 506	1206 K 2206 K	22206 K	H206 SR62x8 H306 SR62x6 H306 SR72x7,5 H2306 SR72x7	2 2 2 1	U 506 506 UA	1,9
SNU 507-606	SNU 606	1306 K 2306 K	22207 K	H207 SR72x8,5 H307 SR72x5,5 H307 SR80x9 H2307 SR80x8	2 2 2 1	U 605 507 UA	2,0
SNU 507-606	SNU 507	1207 K 2207 K	22207 K	H207 SR72x8,5 H307 SR72x5,5 H307 SR80x9 H2307 SR80x8	2 2 2 1	U 507 507 UA	2,0
SNU 508-607	SNU 607	1307 K 2307 K	22208 K	H208 SR80x10,5 H308 SR80x8 H308 SR90x9 H 308 SR90x8	2 2 2 1	U 507 508 UA	2,7
SNU 508-607	SNU 508	1208 K 2208 K	22208 K	H208 SR80x10,5 H308 SR80x8 H308 SR90x9 H 308 SR90x8	2 2 2 1	U 508 508 UA	2,7
SNU 510-608	SNU 608	1308 K 2308 K	21308 K 22308 K	H308 SR90x9 H 308 SR90x8	2 1	U 608 511 NA-510 UA	2,9
SNU 509	SNU 509	1209 K 2209 K	22209 K	H209 SR85x5,5 H309 SR85x7 H309 SR100x9,5 H2309 SR100x8	2 1 2 1	U 509 509 UA	2,8
SNU 511-609	SNU 609	1309 K 2309 K	21309 K 22309 K	H209 SR85x5,5 H309 SR85x7 H309 SR100x9,5 H2309 SR100x8	2 1 2 1	U 609 512 NA-511 UA	4,5
SNU 510-608	SNU 510	1210 K 2210 K	22210 K	H210 SR90x10,5 H310 SR90x9 H310 SR110x10,5 H2310 SR110x8	2 2 2 1	U 510 511 NA-510 UA	2,9
SNU 512-610	SNU 610	1310 K 2310 K	21310 K 22310 K	H210 SR90x10,5 H310 SR90x9 H310 SR110x10,5 H2310 SR110x8	2 2 2 1	U 610 513 NA-512 UA	5,0
SNU 511-609	SNU 511	1211 K 2211 K	22211 K	H211 SR100x11,5 H311 SR100x9,5 H311 SR120x11 H2311 SR120x8	2 2 2 1	U 511 512 NA-511 UA	4,5
SNU 513-611	SNU 611	1311 K 2311 K	21311 K 22311 K	H211 SR100x11,5 H311 SR100x9,5 H311 SR120x11 H2311 SR120x8	2 2 2 1	U 611 515 NA-513 UA	6,3
SNU 512-610	SNU 512	1212 K 2212 K	22212 K	H212 SR110x13 H312 SR110x10 H312 SR130x12,5 H2312 SR130x10	2 2 2 1	U 512 513 NA-512 UA	5,0
SNU 515-612	SNU 612	1312 K 2312 K	21312 K 22312 K	H212 SR110x13 H312 SR110x10 H312 SR130x12,5 H2312 SR130x10	2 2 2 1	U 612 517 NA-515 UA	6,6
SNU 513-611	SNU 513	1213 K 2213 K	22213 K	H213 SR120x14 H313 SR120x10 H313 SR140x12,5 H2313 SR140x10	2 2 2 2	U 513 515 NA-513 UA	6,3
SNU 516-613	SNU 613	1313 K 2313 K	21313 K 22313 K	H213 SR120x14 H313 SR120x10 H313 SR140x12,5 H2313 SR140x10	2 2 2 2	U 613 518 NA-516 UA	9,4

Plummer block housings



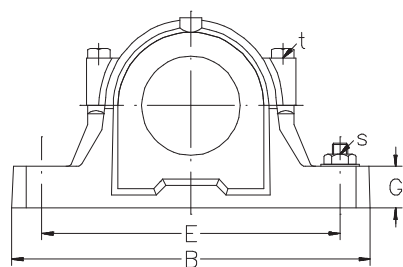
Shaft Plummer block housing
dia. dimensions

d	D	B	b	G	F	A	L	H	E	d ₂	d ₃	f	u	v	s	t
mm																
65	130	280	80	30	56	80	115	154	230	87	95,5	5	18	24	M16	M12
	160	345	100	35	65	100	140	191	290	102,5	111	5	22	28	M20	M16
70	140	315	90	32	58	95	120	175	260	92,5	101	5	22	28	M20	M16
	170	345	100	35	68	112	145	208	290	131,5	141	6	22	28	M20	M16
75	150	320	90	32	61	95	125	181	260	97,5	106	5	22	28	M20	M16
	180	380	110	40	70	112	160	214	320	137,5	147,5	6	26	32	M24	M20
80	160	345	100	35	65	100	140	191	290	102,5	111	5	22	28	M20	M16
85	170	345	100	35	68	112	145	208	290	131,5	141	6	22	28	M20	M16
	200	410	120	45	80	125	175	237	350	147,5	157,5	6	26	32	M24	M20
90	180	380	110	40	70	112	160	214	320	137,5	147,5	6	26	32	M24	M20
	215	410	120	45	86	140	185	271	350	157,5	167,5	6	26	32	M24	M20
100	200	410	120	45	80	125	175	237	350	147,5	157,5	6	26	32	M24	M20
110	215	410	120	45	86	140	185	271	350	157,5	167,5	6	26	32	M24	M20

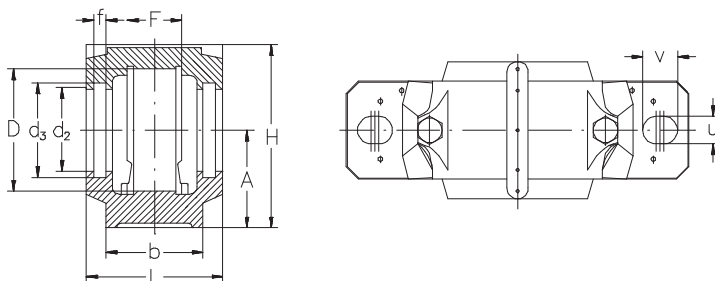


Plummer block housing	Housing size	Appropriate apartment		Adapter sleeve	Locating ring	Seal number	End cover	Weight	
		Bearing number							number
—									kg
SNU 515-612	SNU 515	1215 K 2215 K	22215 K 21315 K 22315 K	H 215 H 315	SR130x15,5 SR130x12,5	2 2	U 515	517 NA-515 UA	6,6
SNU 518-615	SNU 615	1315 K 2315 K		H 315 H 2315	SR160x14 SR160X10	2 1	U 615	520 NA-518 UA	12,3
SNU 516-613	SNU 516	1216 K 2216 K		H216 H316	SR140x16 SR140x12,5	2 2	U 516	518 NA-516 UA	9,4
SNU 519-616	SNU 616	1316 K 2316 K	21316 K 22316 K	H316 H2316	SR170x14,5 SR170x10	2 1	U 616	526 NA-519 UA	13,5
SNU 517	SNU 517	1217 K 2217 K	22217 K	H217 H317	SR150x16,5 SR150x12,5	2 2	U 517	519 NA-517 UA	9,8
SNU 520-617	SNU 617	1317 K 2317 K	21317 K 22317 K	H317 H2317	SR180x14,5 SR180x10	2 1	U 617	520 UA	16,6
SNU 518-615	SNU 518	1218 K 2218 K	22218 K 23218 K	H218 H318 H2318	SR160x17,5 SR160x12,5 SR160x12,5	2 2 1	U 518	520 NA-518 UA	12,3
SNU 519-616	SNU 519	1219 K 2219 K		H219 H319	SR170x18 SR170x12,5	2 2	U 519	526 NA-519 UA	13,5
SNU 522-619	SNU 619	1319 K 2319 K		H319 H2319	SR200x17,5 SR200x13	2 1	U 619	528 NA-522 UA	20,4
SNU 520-617	SNU 520	1220 K 2220 K	22220 K 23220 K	H220 H320 H2320	SR180x18 SR180x12 SR180x9,7	2 2 1	U 520	520 UA	16,6
SNU 524-620	SNU 620	1320 K 2320 K		H320 H2320	SR215x19,5 SR215x13	2 1	U 620	530 NA-524 UA	25,0
SNU 522-619	SNU 522	1222 K 2222 K		H222 H322 H2322	SR200x21 SR200x13,5 SR200x10,2	2 2 1	U 522	528 NA-522 UA	20,4
SNU 524-620	SNU 524		22224 K 23224 K	H3124 H2324	SR215x14 SR215x10	2 1	U 524	530 NA-524 UA	25,0

Plummer block housings

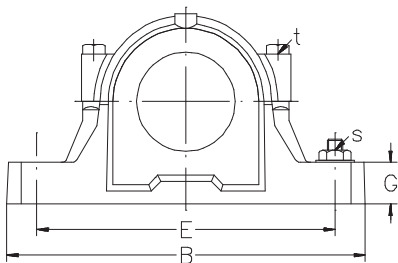


Shaft Plummer block housing																
dia.	dimensions															
d	d ₁	D	B	b	G	F	A	L	H	E	d ₂	d ₃	f	u	vs	t
mm																
115	230	445	130	50	90	150	190	290	380	167,5	177,5	6	28	35	M24	M24
125	250	500	150	50	98	150	205	302	420	177,5	187,5	6	35	42	M30	M24
135	270	530	160	60	106	160	220	323	450	192,5	202,5	6	35	42	M30	M24
140	290	550	160	60	114	170	235	344	470	202,5	212,5	6	35	42	M30	M24

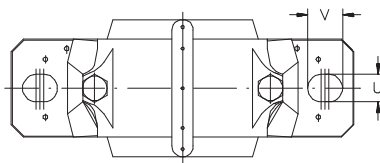
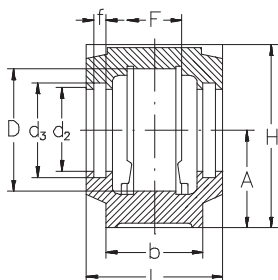


Plummer block housing	Housing size	Appropriate Bearing number	apartment Adapter sleeve	Locating ring number	qty.	Seal number	End cover	Weight kg
SNU 526	SNU 526	22226 K 23226 K	H3126 H2326	SR230x13 SR230x10	2 1	U 526	532 NA-526 UA	29,8
SNU 528	SNU 528	22228 K 23228 K	H3128 H2328	SR250x15 SR250x10	2 1	U 528	528U A	37,5
SNU 530	SNU 530	22230 K 23230 K	H3130 H2330	SR270x16,5 SR270x10	2 1	U 530	530 UA	46,0
SNU 532	SNU 532	22232 K 23232 K	H3132 H2332	SR290x17 SR290x10	2 1	U5 32	532 UA	51,0

Plummer block housings

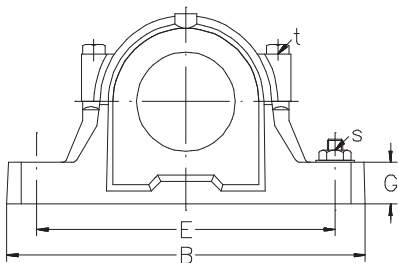


Shaft Plummer block housing																	
dia.	d ₁	D	B	b	G	F	A	L	H	E	d ₂	d ₃	f	u	v	s	t
mm																	
25	30	52	165	46	19	25	40	67	73	130	36,5	44,5	5	15	20	M12	M8
	30	52	165	46	19	25	40	67	73	130	31,5	39,5	5	15	20	M12	M8
	30	62	185	52	22	32	50	77	88	150	46,5	54,5	5	15	20	M12	M8
30	35	62	185	52	22	32	50	77	88	150	46,5	54,5	5	15	20	M12	M8
	35	62	185	52	22	32	50	77	88	150	36,5	44,5	5	15	20	M12	M8
	35	72	185	52	22	34	50	82	93	150	46,5	54,5	5	15	20	M12	M10
35	45	72	185	52	22	34	50	82	93	150	56,5	64,5	5	15	20	M12	M10
	45	72	185	52	22	34	50	82	93	150	46,5	54,5	5	15	20	M12	M10
	45	80	205	60	25	39	60	85	107	170	62	70,5	5	15	20	M12	M10
40	50	80	205	60	25	39	60	85	107	170	62	70,5	5	15	20	M12	M10
	50	80	205	60	25	39	60	85	107	170	51,5	59,5	5	15	20	M12	M10
	50	90	205	60	25	41	60	90	112	170	62	70,5	5	15	20	M12	M10
45	55	85	205	60	25	30	60	85	109	170	67	75,5	5	15	20	M12	M10
	55	85	205	60	25	30	60	85	109	170	56,5	64,5	5	15	20	M12	M10
	55	100	255	70	28	44	70	95	127	210	67	75,5	5	18	24	M16	M12
50	60	90	205	60	25	41	60	90	112	170	72	80,5	5	15	20	M12	M10
	60	90	205	60	25	41	60	90	112	170	62	70,5	5	15	20	M12	M10
	60	110	255	70	30	48	70	105	133	210	72	80,5	5	18	24	M16	M16

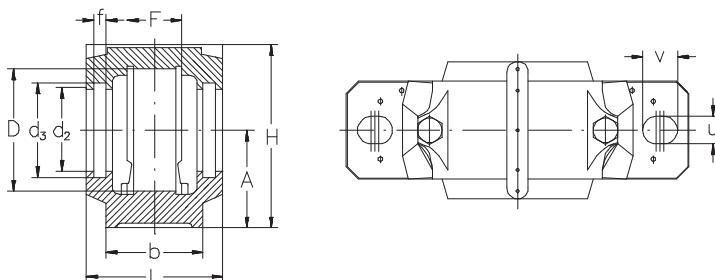


Plummer block housing	Housing size	Appropriate apartment		Locating		cover	Weight Seal	
		Bearing number	ring	number	qty.			
—								kg
SNU 205	SNU 205	1205	22205	SR52X5	2	U 205	506 UA	1,4
		2205		SR52X7	1			
SNU 505	SNU 205/FS	1205	22205	SR52X5	2	FS6X6X115	505 UA	1,4
		2205		SR52X7	2			
SNU 206	SNU 305	1305		SR62X7,5	2	U 305	507 UA	1,8
		2305		SR62X8	1			
SNU 206	SNU 206	1206	22206	SR62X8	2	U 206	507 UA	1,8
		2206		SR62X6	2			
SNU 506-605	SNU 206/FS	1206	22206	SR62X8	2	FS6X6X130	506 UA	1,9
		2206		SR62X6	2			
SNU 507-606	SNU 306	1306		SR72X7,5	2	U 206	507 UA	2,0
		2306		SR72X7	1			
SNU 207	SNU 207	1207	22207	SR72X8,5	2	U 207	509 UA	1,9
		2207		SR72X5,5	2			
SNU 507-606	SNU 207/FS	1207	22207	SR72X8,5	2	FS6X6X160	507 UA	2,0
		2207		SR72X5,5	2			
SNU 208	SNU 307	1307		SR80X9	2	U 510	511 NA-510 UA	2,6
		2307		SR80X8	1			
SNU 208	SNU 208	1208	22208	SR80X10,5	2	U 208	511 NA-510 UA	2,6
		2208		SR80X8	2			
SNU 508-607	SNU 208/FS	1208	22208	SR80X10,5	2	FS6X6X175	508 UA	2,7
		2208		SR80X82	2			
SNU 510-608	SNU 308	1308	21308	SR90X9	2	U 208	511 NA-510 UA	2,9
		2308		SR90X8	1			
SNU 209	SNU 209	1209	22209	SR85X5,5	2	U 209	512 NA-511 UA	2,7
		2209		SR85X7	1			
SNU 509	SNU 209/FS	1209	22209	SR85X5,5	2	FS6X6X190	509 UA	2,8
		2209		SR85X7	1			
SNU 511-609	SNU 309	1309	21309	SR100X9,5	2	U 209	512 NA-511 UA	4,5
		2309		SR100X8	1			
SNU 210	SNU 210	1210	22210	SR90X10,5	2	U 210	513 NA-512 UA	2,7
		2210		SR90X9	2			
SNU 510-608	SNU 210/FS	1210	22210	SR90X10,5	2	FS6X6X210	511 NA-510 UA	2,9
		2210		SR90X9	1			
SNU 512-610	SNU 310	1310	22310	SR110X10,5	2	U 210	513 NA-512 UA	5,0
		2310		SR110X8	1			

Plummer block housings

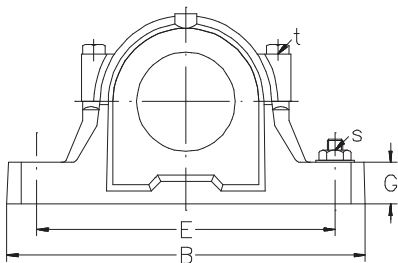


Shaft Plummer block housing dimensions																	
d	D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
mm																	
55	65	100	255	70	28	44	70	95	127	210	77	85,5	5	18	24	M16	M12
	65	100	255	70	28	44	70	95	127	210	67	77,5	5	18	24	M16	M12
	65	120	275	80	30	51	80	110	148	230	77	85,5	5	18	24	M16	M12
60	70	110	255	70	30	48	70	105	133	210	87	95,5	5	18	24	M16	M12
	70	110	255	70	30	48	70	105	133	210	72	80,5	5	18	24	M16	M12
	70	130	280	80	30	56	80	115	154	230	87	95,5	5	18	24	M16	M12
65	75	120	275	80	30	51	80	110	148	230	92,5	101	5	18	24	M16	M12
	75	120	275	80	30	51	80	110	148	230	77	85,5	5	18	24	M16	M12
	75	140	315	90	32	58	95	120	175	260	92,5	101	5	22	28	M20	M16
70	80	150	320	90	32	61	95	125	181	260	97,5	106	5	22	28	M20	M16
75	85	130	280	80	30	56	80	115	154	230	102,5	111	5	18	24	M16	M12
	85	130	280	80	30	56	80	115	154	230	87	95,5	5	18	24	M16	M12
	85	160	345	100	35	65	100	140	191	290	102,5	111	5	22	28	M20	M16
80	90	140	315	90	32	58	95	120	175	260	108	116,5	5	22	28	M20	M16
	90	140	315	90	32	58	95	120	175	260	92,5	101	5	22	28	M20	M16
	90	170	345	100	35	68	112	145	208	290	131	141	6	22	28	M20	M16
85	95	150	320	90	32	61	95	125	181	260	112	120,5	5	22	28	M20	M16
	95	150	320	90	32	61	95	125	181	260	97,5	106	5	22	28	M20	M16
	95	180	380	110	40	70	112	160	214	320	137,5	147,5	6	26	32	M24	M20

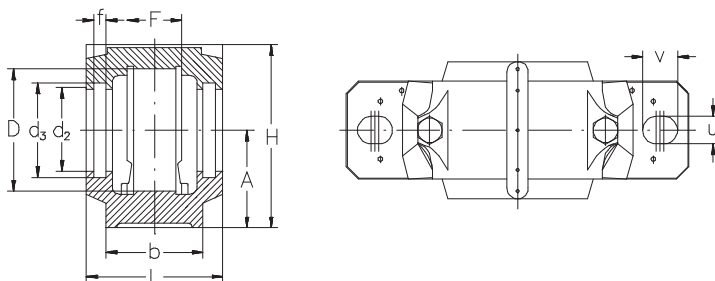


Plummer block housing	Housing size	Appropriate apartment		Seal number	End cover	Weight		
		Bearing number	Locating ring number					
—							kg	
SNU 211	SNU 211	1211	1211	SR100X11,5	2	U 211	515 NA-513 UA	4,3
SNU 511-609	SNU 211/FS	2211	22211	SR100X9,5	2	FS6X6X225	512 NA-511 UA	4,5
		1211		SR100X11,5	2			
SNU 513-611	SNU 311	2211	22211	SR100X9,5	2	U 211	515 NA-513 UA	6,3
		1311	21311	SR120X11	2			
		2311	22311	SR120X8	1			
SNU 212	SNU 212	1212		SR110X13	2	U 212	517 NA-515 UA	4,7
SNU 512-610	SNU 212/FS	2212	22212	SR110X10	2	FS6X6X240	513 NA-512 UA	5,0
		1212		SR110X13	2			
SNU 515-612	SNU 312	2212	22212	SR110X10	2	U 212	517 NA-515 UA	6,6
		1312	21312	SR130X12,5	2			
		2312	22312	SR130X10	1			
SNU 213	SNU 213	1213		SR120X14	2	U 213	518 NA-516 UA	5,9
SNU 513-611	SNU 213/FS	2213	22213	SR120X10	1	FS6X6X255	515 NA-513 UA	6,3
		1213		SR120X14	2			
SNU 516-613	SNU 313	2213	22213	SR120X10	2	U 213	518 NA-516 UA	9,4
		1313	21313	SR140X12,5	2			
		2313	22313	SR140X10	1			
SNU 517	SNU 314	1314	21314	SR150X13	2	U 314	519 NA-517 UA	9,8
		2314	22314	SR150X10	1			
SNU 215	SNU 215	1215		SR130X15,5	2	U 215	520 NA-518 UA	6,2
SNU 515-612	SNU 215/FS	2215	22215	SR130X12,5	2	FS6X6X290	517 NA-515 UA	6,6
		1215		SR130X15,56	2			
SNU 518-615	SNU 315	2215	22215	SR130X12,5	2	U 215	520 NA-518-UA	12,3
		1315	21315	SR160X14	2			
		2315	22315	SR160X10	1			
SNU 216	SNU 216	1216		SR140X16	2	U 216	216 UA	8,9
SNU 516-613	SNU 216/FS	2216	22216	SR140X12,5	2	FS6X6X305	518 NA-516 UA	9,4
		1216		SR140X16	2			
SNU 519-616	SNU 316	2216	22216	SR140X12,5	2	U 316	526 NA-519 UA	13,5
		1316	21316	SR170X14,5	2			
		2316	22316	SR170X10	1			
SNU 217	SNU 217	1217		SR150X16,5	2	U 217	217 UA	9,3
SNU 517	SNU 217/FS	2217	22217	SR150X12,5	2	FS6X6X320	519 NA-517 UA	9,8
		1217		SR150X16,5	2			
SNU 520-617	SNU 317	2217	22217	SR150X12,5	2	U 317	520 UA	16,6
		1317	21317	SR180X14,5	2			
		2317	22317	SR180X10	1			

Plummer block housings

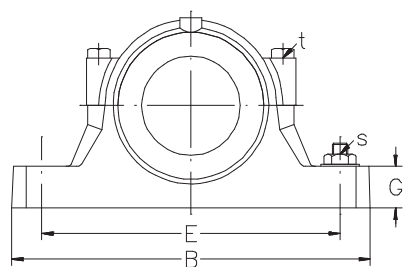


Shaft dia. d	Plummer block housing dimensions			D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
mm																				
90	100	160	345	100	35	65	100	140	191	290	120	128,5	5	22	28	M20	M16			
	100	160	345	100	35	65	100	140	191	290	102,5	111	5	22	28	M20	M16			
95	110	200	410	120	45	80	125	175	237	350	147,5	157,5	6	26	32	M24	M20			
100	115	180	380	110	40	70	112	160	214	320	137,5	147,5	6	26	32	M24	M20			
	115	215	410	120	45	86	140	185	271	350	157,5	167,5	6	26	32	M24	M20			
110	125	200	410	120	45	80	125	175	237	350	147,5	157,5	6	26	32	M24	M20			
120	135	215	410	120	45	86	140	185	271	350	157,5	167,5	6	26	32	M24	M20			
130	145	230	445	130	50	90	150	190	290	380	167,5	177,5	6	28	35	M24	M24			
140	155	250	500	150	50	98	150	205	302	420	177,5	187,5	6	35	42	M30	M24			
150	165	270	530	160	60	106	160	220	323	450	192,5	202,5	6	35	42	M30	M24			
160	175	290	550	160	60	114	170	235	344	470	202,5	212,5	6	35	42	M30	M24			

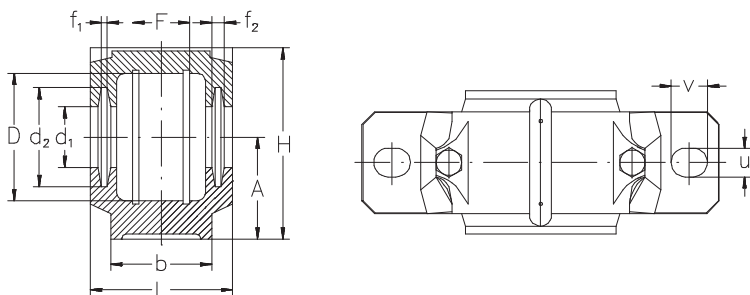


Plummer block housing	Housing size	Appropriate apartment		Locating	Seal number	End cover	Weight	
		Bearing number	number	Ring				qty.
—								kg
SNU 218	SNU 218	1218 2218	22218 23218	SR160X17,5 SR160X12,5 SR160X12,5	2 2 1	U 218	218 UA	12,3
SNU 518-615	SNU 218/FS	1218 2218	22218 23218	SR160X17,5 SR160X12,5 SR160X12,5	2 2 1	FS6X6X340	520 NA-518 UA	12,3
SNU 522-619	SNU 1319	1319 2319	21319 22319	SR200X17,5 SR200X13	2 1	U 319	528 NA-522 UA	20,4
SNU 520-617	SNU 220	1220 2220	22220 23220	SR180X18 SR180X12 SR180X9,7	2 2 1	U 220	520 UA	16,6
SNU 524-620	SNU 320	1320 2320	21320 22320	SR215X19,5 SR215X13	2 1	U 320	530 NA-524 UA	25,0
SNU 522-619	SNU 222	1222 2222	22222 23222	SR200X21 SR200X13,5 SR200X10,2	2 2 1	U 222	528 NA-522 UA	20,4
SNU 524-620	SNU 224		22224 23224	SR215X14 SR215X10	2 1	U224	530 NA-524 UA	25,0
SNU 526	SNU 226		22226 23226	SR230X13 SR230X10	2 1	U 226	532 NA-526 UA	29,8
SNU 528	SNU 228		22228 23228	SR250X15 SR250X10	2 1	U 228	528 UA	37,5
SNU 530	SNU 230		22230 23230	SR270X16,5 SR270X10	2 1	U 230	530 UA	46,0
SNU 532	SNU 232		22232 23232	SR290X17 SR290X10	2 1	U 232	532 UA	51,0

Plummer block housings

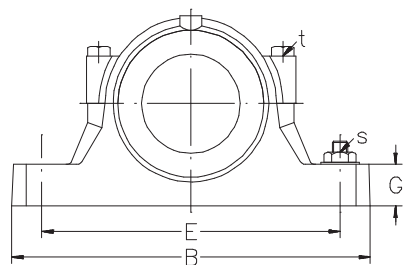


Plummer block housing dimensions																	
Shaft dia. d	D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
mm																	
25	62	185	52	22	30	50	77	90	150	26,5	38	4	5,4	15	20	M12	M8
30	72	185	52	22	33	50	82	95	150	31,5	43	4	5,4	15	20	M12	M10
35	80	205	60	25	33	60	85	112	170	36,5	48	4	5,4	15	20	M12	M10
40	85	205	60	25	31	60	85	112	170	41,5	53	4	5,4	15	20	M12	M10
45	90	205	60	25	33	60	90	115	170	46,5	58	4	5,4	15	20	M12	M10
50	100	255	70	28	33	70	95	130	210	51,5	67	5	6,9	18	23	M16	M12
55	110	255	70	30	38	70	105	135	210	56,5	72	5	6,9	18	23	M16	M12
60	120	275	80	30	43	80	110	150	230	62	77	5	6,8	18	23	M16	M12
65	130	280	80	30	41	80	115	155	230	67	82	5	6,8	18	23	M16	M12
70	140	315	90	32	43	95	120	175	260	72	89	6	8,1	22	27	M20	M16
75	150	320	90	32	46	95	125	185	260	77	94	6	8,1	22	27	M20	M16
80	160	345	100	35	62,4	100	145	195	290	82	99	6	8,1	22	27	M20	M16
85	170	345	100	35	53	112	140	210	290	87	104	6	8,1	22	27	M20	M16
90	180	380	110	40	70,3	112	160	215	320	92	111	7	9,3	26	32	M24	M20

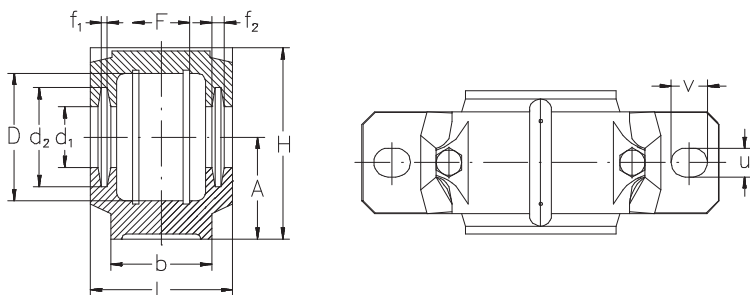


Plummer block housing	Housing size	Appropriate Bearing number	apartment number	Adapter sleeve	Locating ring number	Seal number	End cover	Weight	
								kg	
—	—	—	—	—	—	—	—	—	
SN 506	SN 506	1206 K 2206 K	22206 K	H 206 H 306	SR62X7 SR62X10	2 1	FS6X6X105	506 NA	2,3
SN 507	SN 507	1207 K 2207 K	22207 K	H 207 H 207	SR72X8 SR72X10	2 1	FS6X6X120	507 NA	2,5
SN 508	SN 508	1208 K 2208 K	22208 K	H 208 H 308	SR80X7,5 SR80X10	2 1	FS6X6X135	508 NA	3,4
SN 509	SN 509	1209 K 2209 K	22209 K	H 209 H 309	SR86X6 SR85X8	2 1	FS6X6X150	509 NA	3,4
SN 510	SN 510	1210 K 2210 K	22210 K	H 210 H 310	SR90X6,5 SR90X10	2 1	FS6X6X165	510 NA	—
SN 511	SN 511	1211 K 2211 K	22211 K	H 211 H 311	SR100X6 SR100X8	2 1	FS6X9X190	511 NA-510 UA	4,8
SN 512	SN 512	1212 K 2212 K	22212 K	H 212 H 312	SR110X8 SR110X10	2 1	FS6X9X205	512 NA-511 UA	5,4
SN 513	SN 513	1213 K 2213 K	22213 K	H 213 H 313	SR120X10 SR120X12	2 1	FS6X9X220	513 NA-512 UA	6,3
SN 515	SN 515	1215 K 2215 K	22215 K	H 215 H 315	SR130X8 SR130X10	2 1	FS6X9X235	515 NA-513 UA	7,4
SN 516	SN 516	1216 K 2216 K	22216 K	H 216 H 316	SR140X8,5 SR140X10	2 1	FS8X10X255	516 NA	9,6
SN 517	SN 517	1217 K 2217 K	22217 K	H 217 H 317	SR150X9 SR150X10	2 1	FS8X10X270	517 NA-515 UA	9,8
SN 518	SN 518	1218 K 2218 K	22218 K 23218 K	H 218 H 318 H 2318	SR160X16,2 SR160X11,2 SR160X10	2 2 1	FS8X10X285	518 NA-516 UA	14,2
SN 519	SN 519	1219 K	22219 K	H 219 H 319	SR170X10,5 SR170X10	2 1	FS8X10X300	519 NA-517 UA	15,2
SN 520	SN 520	2220 K	22220 K 22320 K	H 320 H 2320	SR180X12,1 SR180X10	2 1	FS9X10X320	520 NA-518 UA	19,0

Plummer block housings

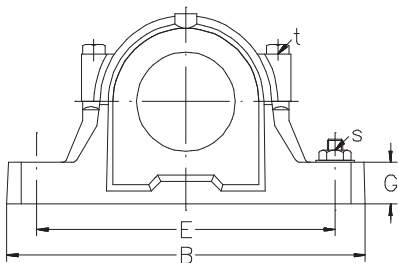


Shaft Plummer block housing																	
dia.	D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
mm																	
100	200	410	120	45	80	125	175	239	350	102	125	8	10,8	26	32	M24	M20
110	215	410	120	45	86	140	185	270	350	113	135	8	10,7	26	32	M2	4 M20
115	230	445	130	50	90	150	190	290	380	118	140	8	10,7	28	36	M24	M24
125	250	500	150	50	98	150	205	305	420	128	154	9	12,2	33	42	M30	M24
135	290	530	160	60	106	160	220	325	450	138	164	9	12,2	33	42	M30	M24
140	290	550	160	60	114	170	235	340	470	143	173	10	13,7	33	42	M30	M24

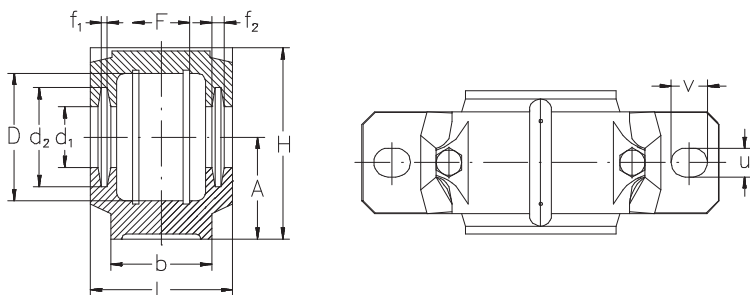


Plummer block housing	Housing size	Appropriate Bearing number	apartment Adapter sleeve	Locating ring number	Seal number	End cover	Weight		
							kg		
SN 522	SN 522	2222 K	22222 K 23222 K	H 322 H 2322	SR200X13,5 SR200X10	2 1	FS 10X13X360	522 NA	23,1
SN 524	SN 524		22224 K 23224 K	H 3124 H 2324	SR215X14 SR215X10	2 1	FS 10X13X390	524 NA	26,0
SN 526	SN 526		22226 K 23226 K	H 3126 H 2326	SR230X13 SR230X10	2 1	FS 10X13X410	526 NA-519 UA	32,7
SN 528	SN 528		22228 K 23228 K	H 3128 H 2328	SR250X15 SR250X10	2 1	FS 12X14X445	528 NA-522 UA	43,5
SN 530	SN 530		22230 K 23230 K	H 3130 H 2330	SR270X16,5 SR270X10	2 1	FS 12X14X475	530 NA- 524 UA	48,7
SN 532	SN 532		22232 K 23232 K	H 3132 H 2332	SR290X17 SR290X10	2 1	FS 12X14X500	532 NA- 526 UA	60,7

Plummer block housings

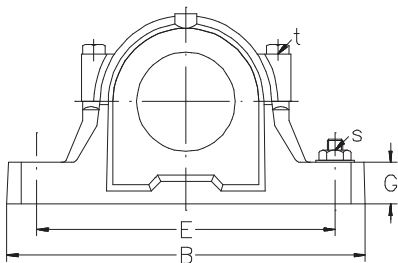


Shaft Plummer block housing dimensions																	
d	D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
mm																	
25	72	185	52	22	37	50	82	95	150	26,5	38	4	5,4	15	20	M12	M10
30	80	205	60	25	41	60	90	110	170	31,5	43	4	5,4	15	20	M12	M10
35	90	205	60	25	43	60	95	115	170	36,5	48	4	5,4	15	20	M12	M12
40	100	255	70	28	46	70	105	130	210	41,5	53	4	5,4	18	23	M16	M12
45	110	255	70	30	50	70	115	135	210	46,5	58	4	5,4	18	23	M16	M12
50	120	275	80	30	53	80	120	150	230	51,5	67	5	6,9	18	23	M16	M12
55	130	280	80	30	56	80	125	155	230	56,5	72	5	6,9	18	23	M16	M12
60	140	315	90	32	58	95	130	175	260	62	77	5	6,8	22	27	M20	M16
65	160	345	100	35	65	100	140	195	290	67	82	5	6,8	22	27	M20	M16
70	170	345	100	35	68	112	145	215	290	72	89	6	8,1	22	27	M20	M16
75	180	380	110	40	70	112	155	218	320	77	94	6	8,1	26	32	M24	M20
80	190	400	110	33	74	112	160	230	320	82	99	6	8,1	26	35	M24	M20
85	200	420	120	36	77	125	170	245	350	87	104	6	8,1	26	35	M24	M20
90	215	420	120	38	83	140	175	280	350	92	111	7	9,3	26	35	M24	M20

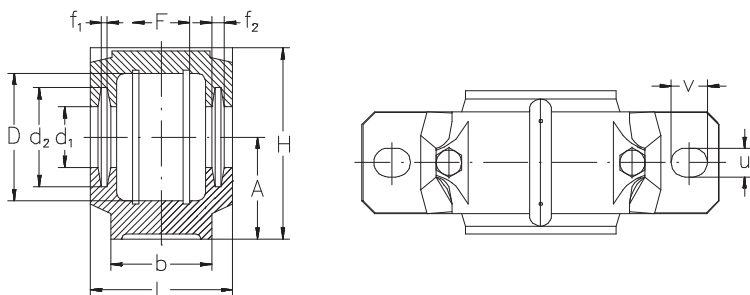


Plummer block housing	Housing size	Appropriate Bearing number	apartment Adapter sleeve	Locating Ring		Seal number	End cover	Weight	
					number	qty.			
—									kg
SN 606	SN 606	1306 K 2306 K	H 306 H 2306	SR 72X9 SR 72X10	2 1	FS 6X6X105	506 NA	2,2	
SN 607	SN 607	1307 K 2307 K	H 307 H 2307	SR 80X10 SR 80X10	2 1	FS 6X6X120	507 NA	3,4	
SN 608	SN 608	1308 K 2308 K	H 308 H 2308	SR 90X10 SR 90X10	2 1	FS 6X6X135	508 NA	3,4	
SN 609	SN 609	1309 K 2309 K	H 309 H 2309	SR 100X10,5 SR 100X10	2 1	FS 6X6X150	509 NA	5,0	
SN 610	SN 610	1310 K 2310 K	H 310 H 2310	SR 110X11,5 SR 110X10	2 1	FS 6X6X165	510 NA	5,4	
SN 611	SN 611	1311 K 2311 K	H 311 H 2311	SR 120X12 SR 120X10	2 1	FS 6X9X190	511 NA-510 UA	6,8	
SN 612	SN 612	1312 K 2312 K	H 312 H 2312	SR 130X12,5 SR 130X10	2 1	FS 6X9X205	512 NA-511 UA	7,1	
SN 613	SN 613	1313 K 2313 K	H 313 H 2313	SR 140X12,5 SR 140X10	2 1	FS 6X9X220	513 NA-512 UA	10,0	
SN 615	SN 615	1315 K 2315 K	H 315 H 2315	SR 160X14 SR 160X10	2 1	FS 6X9X235	515 NA-513 UA	13,8	
SN 616	SN 616	1316 K 2316 K	H 316 H 2316	SR 170X14,5 SR 170X10	2 1	FS 8X10X255	516 NA	16,9	
SN 617	SN 617	1317 K 2317 K	H 317 H 2317	SR 180X14,5 SR 180X10	2 1	FS 8X10X270	517 NA-515 UA	18,9	
SN 618	SN 618	1318 K 2318 K	H 318 H 2318	SR 190X15,5 SR 190X10	2 1	FS 8X10X285	518 NA-516 UA	19,8	
SN 619	SN 619	1319 K 2319 K	H 319 H 2319	SR 200X16 SR 200X10	2 1	FS 8X10X300	519 NA-517 UA	24,7	
SN 620	SN 620	1320 K 2320 K	H 320 H 2320	SR 215X18 SR 215X10	2 1	FS 9X10X320	520 NA-518 UA	27,0	

Plummer block housings

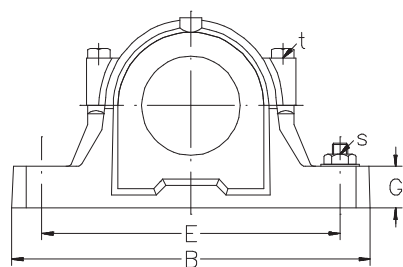


Shaft Plummer block housing																	
dia.	D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
d	D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
mm																	
30	62	185	52	22	30	50	77	90	150	36,5	48	4	5,4	15	20	M12	M8
35	72	185	52	22	33	50	82	95	150	46,5	58	4	5,4	15	20	M12	M10
40	80	205	60	25	33	60	85	112	170	51,5	67	4	5,4	15	20	M12	M10
45	85	205	60	25	31	60	85	112	170	56,5	72	5	6,9	15	20	M12	M10
50	90	205	60	25	33	60	90	115	170	62	77	5	6,8	15	20	M12	M10
55	100	255	70	28	33	70	95	130	210	67	82	5	6,8	18	23	M16	M12
60	110	255	70	30	38	70	105	135	210	72	89	6	8,1	18	23	M16	M12
65	120	275	80	30	43	80	110	150	230	77	94	6	8,1	18	23	M16	M12
75	130	280	80	30	41	80	115	155	230	87	104	6	8,1	18	23	M16	M12
80	140	315	90	32	43	95	120	175	260	92	111	7	9,3	22	27	M20	M16
85	150	320	90	32	46	95	125	185	260	97	120	8	10,8	22	27	M20	M16
90	160	345	100	35	62,4	100	145	195	290	102	125	8	10,8	22	27	M20	M16
100	180	380	110	40	70,3	112	160	215	320	118	140	8	10,7	26	32	M24	M24



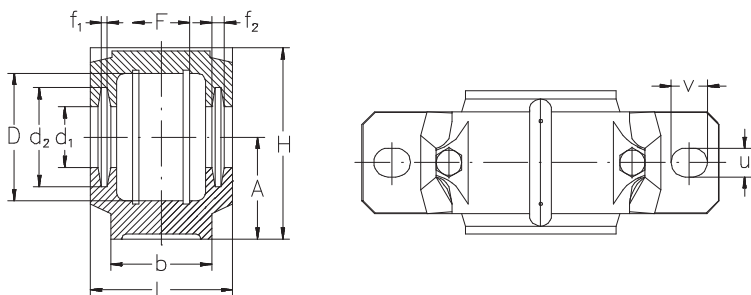
Plummer block housing	Housing size	Appropriate apartment		Locating ring number	qty.	Seal number	End cover	Weight
		Bearing number	number					kg
SN 206	SN 206	1206 2206	22206	SR62X7 SR62X10	2 1	FS6X6X135	508 NA	2,3
SN 207	SN 207	1207 2207	22207	SR72X8 SR72X10	2 1	FS6X6X165	510 NA	3,2
SN 208	SN 208	1208 2208	22208	SR80X7,5 SR80X10	2 1	FS6X9X190	511 NA-510 UA	3,2
SN 209	SN 209	1209 2209	22209	SR85X6 SR85X8	2 1	FS6X9X205	512 NA-511 UA	3,2
SN 210	SN 210	1210 2210	22210	SR90X6,5 SR90X10	2 1	FS6X9X220	513 NA-512 UA	3,3
SN 211	SN 211	1211 2211	22211	SR100X6 SR100X8	2 1	FS6X9X235	515 NA-513 UA	4,4
SN 212	SN 212	1212 2212	22212	SR110X8 SR110X10	2 1	FS8X10X255	516 NA	5,0
SN 213	SN 213	1213 2213	22213	SR120X10 SR120X12	2 1	FS8X10X270	517 NA-515 UA	5,9
SN 215	SN 215	1215 2215	22215	SR130X8 SR130X10	2 1	FS8X10X300	519 NA-517 UA	7,0
SN 216	SN 216	1216 2216	22216	SR140X8,5 SR140X10	2 1	FS9X10X320	520 NA-518 UA	8,9
SN 217	SN 217	1217 2217	22217	SR150X9 SR150X10	2 1	FS 10X13X340	217 NA	9,1
SN 218	SN 218	1218 2218	22218 23218	SR160X16,2 SR160X11,2 SR160X10	2 2 1	FS 10X13X360	522 NA	13,1
SN 220	SN 220	2220	22220 22320	SR180X12,1 SR180X10	2 1	FS 10X13X410	526 NA-519 UA	17,5

Plummer block housings



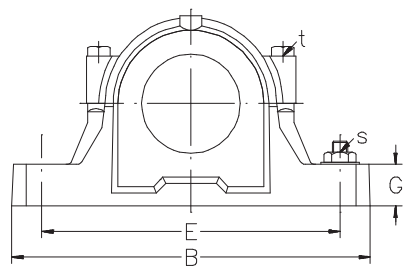
Shaft dia. Plummer block housing dimensions

d	D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
mm																	
110	200	410	120	45	80	125	175	239	350	128	154	9	12,2	26	32	M24	M20
120	215	410	120	45	86	140	185	270	350	138	164	9	12,2	26	32	M24	M20
130	230	445	130	50	90	150	190	290	380	148	178	10	13,7	28	36	M24	M24
140	250	500	150	50	98	150	205	305	420	158	188	10	13,7	33	42	M30	M24
150	270	530	160	60	106	160	220	325	450	168	198	10	13,7	33	42	M30	M24
160	290	550	160	60	114	170	235	340	470	178	208	10	13,7	33	42	M30	M24

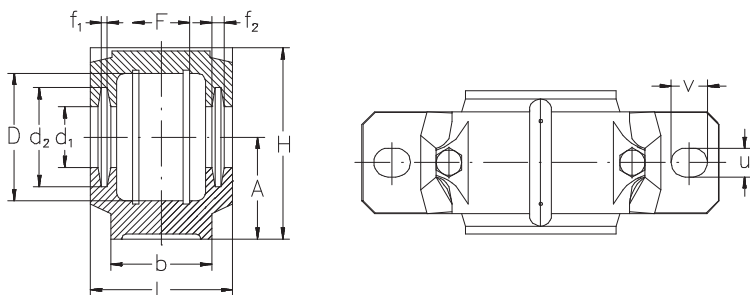


Plummer block housing	Housing size	Appropriate Bearing number	apartment Locating ring number	qty.	Seal number	End cover	Weight	
—								kg
SN 222	SN 222	2222	22222 23222	SR200X13,5 SR200X10	2 1	FS12X14X445	528 NA-522 UA	21,6
SN 224	SN 224		22224 23224	SR215X14 SR215X10	2 1	FS12X14X475	530 NA-524 UA	24,2
SN 226	SN 226		22226 23226	SR230X13 SR230X1	2 1	FS12X17X515	226 NA	30,2
SN 228	SN 228		22228 23228	SR250X15 SR250X10	2 1	FS12X17X545	228 NA	41,0
SN 230	SN 230		22230 23230	SR270X16,5 SR270X10	2 1	FS12X17X580	230 NA	46,0
SN 232	SN 232		22232 23232	SR290X17 SR290X10	2 1	FS12X17X610	232 NA	57,5

Plummer block housings

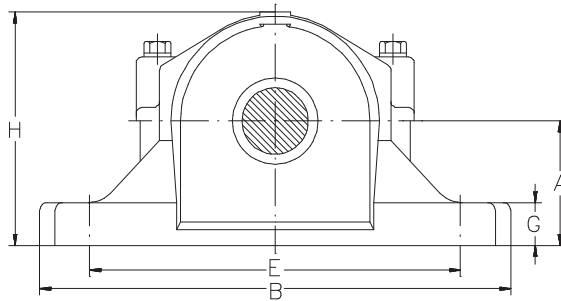


Shaft Plummer block housing dia. dimensions																	
d	D	B	b	G	F	A	L	H	E	d ₁	d ₂	f ₁	f ₂	u	v	s	t
mm																	
30	72	185	52	22	37	50	82	95	150	36,5	48	4	5,4	15	20	M12	M10
35	80	205	60	25	41	60	90	110	170	46,5	58	4	5,4	15	20	M12	M10
40	90	205	60	25	43	60	95	115	170	51,5	67	5	6,9	15	20	M12	M12
45	100	255	70	28	46	70	105	130	210	56,5	72	5	6,9	18	23	M16	M12
50	110	255	70	30	50	70	115	135	210	62	77	5	6,8	18	23	M16	M12
55	120	275	80	30	53	80	120	150	230	67	82	5	6,8	18	23	M16	M12
60	130	280	80	30	56	80	125	155	230	72	89	5	8,1	18	23	M16	M12
65	140	315	90	32	58	95	130	175	260	77	94	6	8,1	22	27	M20	M16
75	160	345	100	35	65	100	140	195	290	87	104	6	8,1	22	27	M20	M16
80	170	345	100	35	68	112	145	215	290	92	111	6	9,3	22	27	M20	M16
85	180	380	110	40	70	112	155	218	320	97	120	7	10,8	26	32	M24	M16
90	190	400	110	33	74	112	160	230	320	102	125	8	10,8	26	35	M24	M20
95	200	420	120	36	77	125	170	245	350	113	135	8	10,7	26	35	M24	M20
100	215	420	120	38	83	140	175	280	350	118	140	8	10,7	26	35	M24	M20

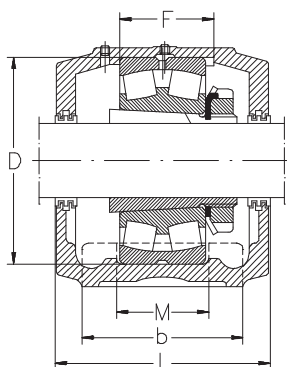


Plummer block housing	Housing size	Appropriateapartment Bearing number		Locating ring number	qty.	Seal number	End cover	Weight
—								kg
SN 306	SN 306	1306 2306		SR72X9 SR72X10	2 1	FS6X6X135	306 NA	2,2
SN 307	SN 307	1307 2307		SR80X10 SR80X10	2 1	FS6X6X165	510 NA	3,2
SN 308	SN 308	1308 2308	21308 22308	SR90X10 SR90X10	2 1	FS6X9X190	511 NA-510 UA	3,2
SN 309	SN 309	1309 2309	21309 22309	SR100X10,5 SR100X10	2 1	FS6X9X205	512 NA-511 UA	4,8
SN 310	SN 310	1310 2310	21310 22310	SR110X11,5 SR110X10	2 1	FS6X9X220	513 NA-512 UA	5,1
SN 311	SN 311	1311 2311	22311 22311	SR120X12 SR120X10	2 1	FS6X9X235	515 NA-513 UA	6,4
SN 312	SN 312	1312 2312	22312 22312	SR130X12,5 SR130X10	2 1	FS8X10X255	516 NA	6,7
SN 313	SN 313	1313 2313	22313 22313	SR140X12,5 SR140X10	2 1	FS8X10X270	517 NA-515 UA	9,6
SN 315	SN 315	1315 2315	21315 22315	SR160X14 SR160X10	2 1	FS8X10X300	519 NA-517 UA	13,4
SN 316	SN 316	1316 2316	21316 22316	SR170X14,5 SR170X10	2 1	FS9X10X320	520 NA-518 UA	16,2
SN 317	SN 317	1317 2317	21317 22317	SR180X14,5 SR180X10	2 1	FS10X13X340	317 NA	18,2
SN 318	SN 318	1318 2318	22318	SR190X15,5 SR190X10	2 1	FS10X13X360	522 NA	18,7
SN 319	SN 319	1319 2319	22319	SR200X16 SR200X10	2 1	FS10X13X390	524 NA	23,6
SN 320	SN 320	1320 2320	22320	SR215X18 SR215X10	2 1	FS10X13X410	526 NA-519 UA	25,7

Plummer block housings

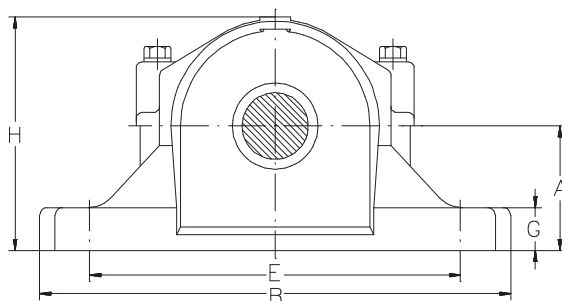


Shaft dia. stand. d	optional	Plummer block housing dimensions										
		D (G7)	B	b	G	F	A	L	H	E	E	
mm											max.	min.
1-3/16	-	72	7-1/4	2	13/16	27	2	3-3/16	4-3/8	6-1/8	5-5/8	
1-7/16	1-3/8;1-1/2	85	8-1/4	2-3/8	13/16	29	2-1/4	3-5/8	4-3/8	7	6-1/4	
1-11/16	1-5/8;1-3/3	90	8-1/4	2-3/8	15/16	30	2-1/2	3-5/8	4-3/4	7	6-1/2	
1-15/16	1-7/8;2	100	9-5/8	2-3/4	15/16	31	2-3/4	3-7/8	5-1/32	7-7/8	7-3/8	
2-3/16	2-1/8;2-1/4	120	11	3-1/8	1	39	3	4-1/2	5-21/32	9-1/2	8-1/8	
2-7/16	2-3/8;2-1/2	130	11-1/4	3-1/8	1-1/4	37	3-1/4	4-11/16	6-1/8	9-5/8	8-5/8	
2-11/16	2-5/8;2-3/3	140	13	3-1/2	1-1/4	43	3-1/2	5-5/16	6-19/32	11	9-5/8	
2-15/16	2-13/16;2-7/8;3	150	13	3-1/2	1-1/4	46	3-3/4	5	7-1/8	11	9-7/8	
3-3/16	3-1/16;3-1/8;3-1/4	160	13-3/4	3-7/8	1-5/8	50	4	5-7/8	7-9/16	11-5/8	10-3/8	
3-7/16	3-5/16;3-3/8;3-1/3	180	15-1/4	4-3/8	1-3/4	56	4-1/2	6-1/8	8-15/32	11-5/8		
3-15/16	3-13/16;3-7/8;4	200	16-1/2	4-3/4	2	63	4-15/16	6-1/2	9-11/32	14-1/2	12-5/8	
4-3/16	4-1/16;4-1/8;4-1/4	215	16-1/2	4-3/4	2-1/8	68	5-1/4	7-3/8	10-3/16	14-1/2	13-1/4	
4-7/16	4-5/16;4-3/8;4-1/2	230	18-3/8	5-1/4	2-3/8	74	6	8-1/8	11-5/16	16	14-5/8	
4-15/16	4-13/16;4-7/8;5	250	20-1/8	5-7/8	2-3/8	78	6	7-5/8	11-3/4	17-1/8	16	
5-3/16	5-1/8;5-1/4	270	21-1/4	6-1/4	2-1/2	83	6-5/16	8-3/8	12-1/2	18-1/4	17	
5-7/16	5-3/8;5-1/2	290	22	6-1/4	2-5/8	90	6-11/16	8-3/4	13-5/16	19-1/4	17-3/8	

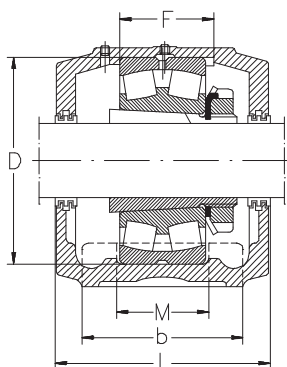


M	Bolts (no. req d)	Plummer block housing	Housing size	Appropriate Bearing number	Adapter sleeve	Stab ring	Triple ring seal	End cover	Weight
mm		—							kg
-	(2)-3/8	SAF 507	SAF 1507 SAF 22507	1207 K 22207 K	SNW 7	SR 72x10x1 SR 72x4x1	LER 14	EPR 3	4,1
-	(2)-1/2	SAF 509	SAF 1509 SAF 22509	1209 K 22209 K	SNW 9	SR 85x10x1 SR 85x6x1	LER 17	EPR 3	5,0
-	-(2)-1/2	SAF 510	SAF 1510 SAF 22510	1210 K 22210 K	SNW 10	SR 90x10x1 SR 90x7x1	LER 24	EPR 5	5,4
-	(2)-5/8	SAF 511	SAF 1511 SAF 22511	1211 K 22211 K	SNW 11	SR 100x10x1 SR 100x6x1	LER 24	EPR 6	6,4
-	(2)-5/8	SAF 513	SAF 1513 SAF 22513	1213 K 22213 K	SNW 13	SR 120x8x2 SR 120x8x1	LER 29	EPR 6	9,5
1-7/8	(2))-5/8;(4)-1/2	SAF 515	SAF 1515 SAF 22515	1215 K 22215	SNW 15	SR 130x6x2 SR 130x6x1	LER 37	EPR 7	10,9
2-1/8	(2)-3/4;(94)-5/8	SAF 516	SAF 1516 SAF 22516	1216 K 22216 K	SNW 16	SR 140x8,5x2 SR 140x10x1	LER 44	EPR 8	14,5
2-1/8	(2)-3/4;(4)-5/8	SAF 517	SAF 1517 SAF 22517	1217 K 22217 K	SNW 17	SR 150x9x2 SR 150x10x1	LER 53	EPR 9	15,9
2-1/8	(2)-3/4;(4)-5/8	SAF 518	SAF 22518	22218 K	SNW 18	SR 160x10x1	LER 188	EPR 11	20,0
2-3/8	(2)-7/8;(4)-3/4	SAF 520	SAF 22520	22220 K	SNW 20	SR 180x10x1	LER 102	EPR 12	33,6
2-3/4	(4)-3/4	SAF 522	SAF 22522	22222 K	SNW 22	SR 200x10x1	LER 109	EPR 13	44,0
2-3/4	(4)-3/4	SAF 524	SAF 22525	22224 K	SNW 24	SR 215x10x1	LER 113	EPR 14	54,4
3-1/4	(4)0-7/8	SAF 526	SAF 22526	22226 K	SNW 26	SR 230x10x1	LER 117	EPR 15	72,6
3-3/8	(4)-1	SAF 528	SAF 22528	22228 K	SNW 28	SR 250x10x1	LER 122	EPR 27	79,4
3-3/4	(4)-1	SAF 530	SAF 22530	22230 K	SNW 30	SR 270x10x1	LER 125	EPR 16	99,8
3-3/4	(4)-1	SAF 532	SAF 22532	22232 K	SNW 32	SR 290x10x1	LER 130	EPR 16	111,1

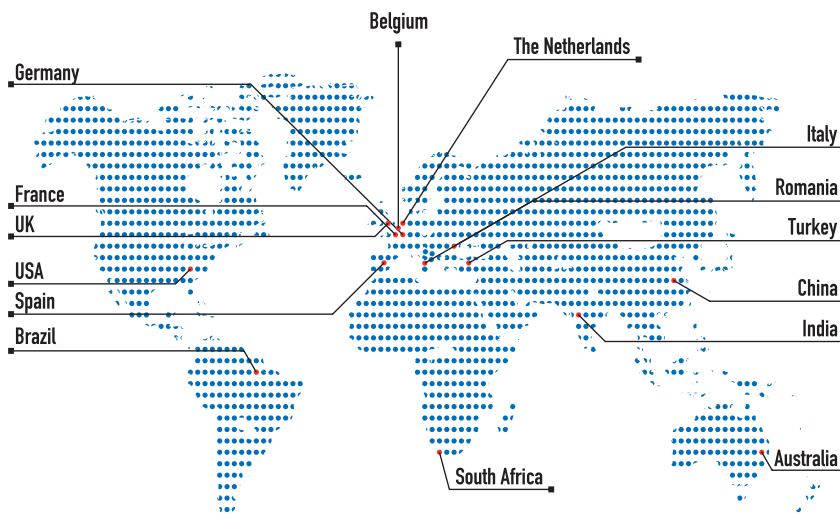
Plummer block housings



Shaft dia. stand. d	optional	Plummer block housing dimensions									
		D	B	b	G	F	A	L	H	E	E
mm										max.	min.
1-7/16	1-3/8;1-1/2	100	9-5/8	2-3/4	1	46	2-3/4	4-1/4	5-5/16	7-7/8	7-3/8
1-11/16	1-5/8;1-3/4	110	10-5/8	2-3/4	1-1/8	51	3	4-5/8	5-13/16	9	7-3/4
1-15/16	1-7/8;2	120	11	3-1/8	1-3/16	53	3-1/4	4-7/8	6-3/16	9-1/2	8-1/8
2-3/16	2-1/8;2-1/4	140	13	3-1/2	1-1/4	58	3-1/2	5-5/16	6-19/32	11	9-5/8
2-7/16	2-3/8;2-1/2	160	13-3/4	3-7/8	1-5/8	65	4	5-7/8	7-9/16	11-5/8	10-3/8
2-11/16	2-5/8;2-3/4	170	14-1/4	3-7/8	1-3/4	68	4-1/4	6-1/2	8-1/4	12-5/8	10-5/8
2-15/16	2-13/16;2-7/8;3	180	15-1/4	4-3/8	1-3/4	70	4-1/2	6-3/4	8-3/4	13-1/8	11-5/8
3-3/16	3-1/16;3-1/8;3-1/4	190	15-1/2	4-3/8	2	74	4-3/4	6-7/8	9-1/4	13-1/2	12
3-7/16	3-5/16;3-3/8;3-1/2	215	16-1/2	4-3/4	2-1/8	83	5-1/4	7-5/16	10-3/16	14-1/2	13-1/4
3-15/16	3-13/16;3-7/8;4	240	18-3/8	5-1/4	2-3/8	90	6	8-1/8	11-5/16	16	14-5/8



Plummer block housing dimensions		Plummer block housing	Housing size	Appropriate apartment Bearing number	Adapter sleeve	Stab ring	Triple ring seal	End cover	Weight
M	Bolts (no. req d)								
mm		—							kg
-	(2)-5/8	SAF 609	SAF 1609 SAF 22609	1309 K 22309 K	SNW 109	SR100X10,5X2 SR100X10X1	LER 17	EPR 2	7,7
-	(2)-5/8	SAF 610	SAF 1610 SAF 22610	1310 K 22310 K	SNW 110	SR110X12X2 SR110X11X1	LER 20	EPR 4	10,0
2	(2)-5/8;(4)-1/2	SAF 611	SAF 1611 SAF 22611	1311 K 22311 K	SNW 111	SE120X12X2 SR120X10X1	LER 24	EPR 5	12,2
2-1/8	(2)-3/5;(4)-5/8	SAF 613	SAF 1613 SAF 22613	1313 K 22313 K	SNW 113	SR140X12,5X2 SR140X10X1	LER 32	EPR 7	17,7
2-1/8	(2)-3/4;(4)-5/8	SAF 615	SAF 1615 SAF 22615	1315 K 22315 K	SNW 115	SR160X14X2 SR160X10X1	LER 37	EPR 7	24,9
2-1/8	(2)-3/4;(4)-5/8	SAF 616	SAF 1616 SAF 22616	1316 K 22316 K	SNW 116	SR170X14,5X2 SR170X10X1	LER 44	EPR 8	29,9
2-3/8	(2)-7/8;(4)-3/4	SAF 617	SAF 1617 SAF 22617	1317 K 22317 K	SNW 117	SR180X14,5X2 SR180X10X1	LER 184	EPR 10	39,5
2-1/4	(4)-3/4	SAF 618	SAF 1618 SAF 22618	1318 K 22318 K	SNW 118	SR190X15,5X2 SR190X10X1	LER 188	EPR 11	44,0
2-3/4	(4)-3/4	SAF 620	SAF 1620 SAF 22620	1320 K 22320 K	SNW 120	SR215X18X2 SR215X10X1	LER 102	EPR 12	56,7
3-1/4	(4)-7/8	SAF 622	SAF 1622 SAF 22622	1322 K 22322 K	SNW 122	SR240X20X2 SR240X10X1	LER 109	EPR 13	74,8



MTK bearings exported to over 67 countries.
These countries are:

- ALGERIA
- ARGENTINA
- AUSTRALIA
- AUSTRIA
- BANGLADESH
- BELGIUM
- BRAZIL
- BULGARIA
- CANADA
- CHILI
- CHINA
- COLOMBIA
- CYPRUS
- CZECH REP.
- DENMARK
- EGYPT
- ESTONIA
- ETHIOPIA
- FINLAND
- FRANCE
- GERMANY
- GHANA
- GREAT BRITAIN
- GREECE
- HOLLAND
- HONG KONG
- HUNGARY
- ICELAND
- INDIA
- IRAN
- IRAQ
- IRELAND
- ISRAEL
- ITALY
- KENYA
- KOREA
- LATVIA
- LEBANON
- LIBYA
- LITHUANIA
- MALTA
- MEXICO
- MOROCCO
- NETHERLANDS
- NEW ZEALAND
- NIGERIA
- NORWAY
- PAKISTAN
- POLAND
- PORTUGAL
- ROMANIA
- RUSSIA
- SAUDI ARABIA
- SLOVAKIA
- SLOVENIA
- SOUTH AFRICA
- SPAIN
- SWEDEN
- SWITZERLAND
- SYRIA
- TURKEY
- TUNISIA
- U.S.A
- UKRAINE
- U. ARAB EMIRATES
- VENEZUELA
- ZIMBABWE