



GENERAL TECHNICAL CATALOG

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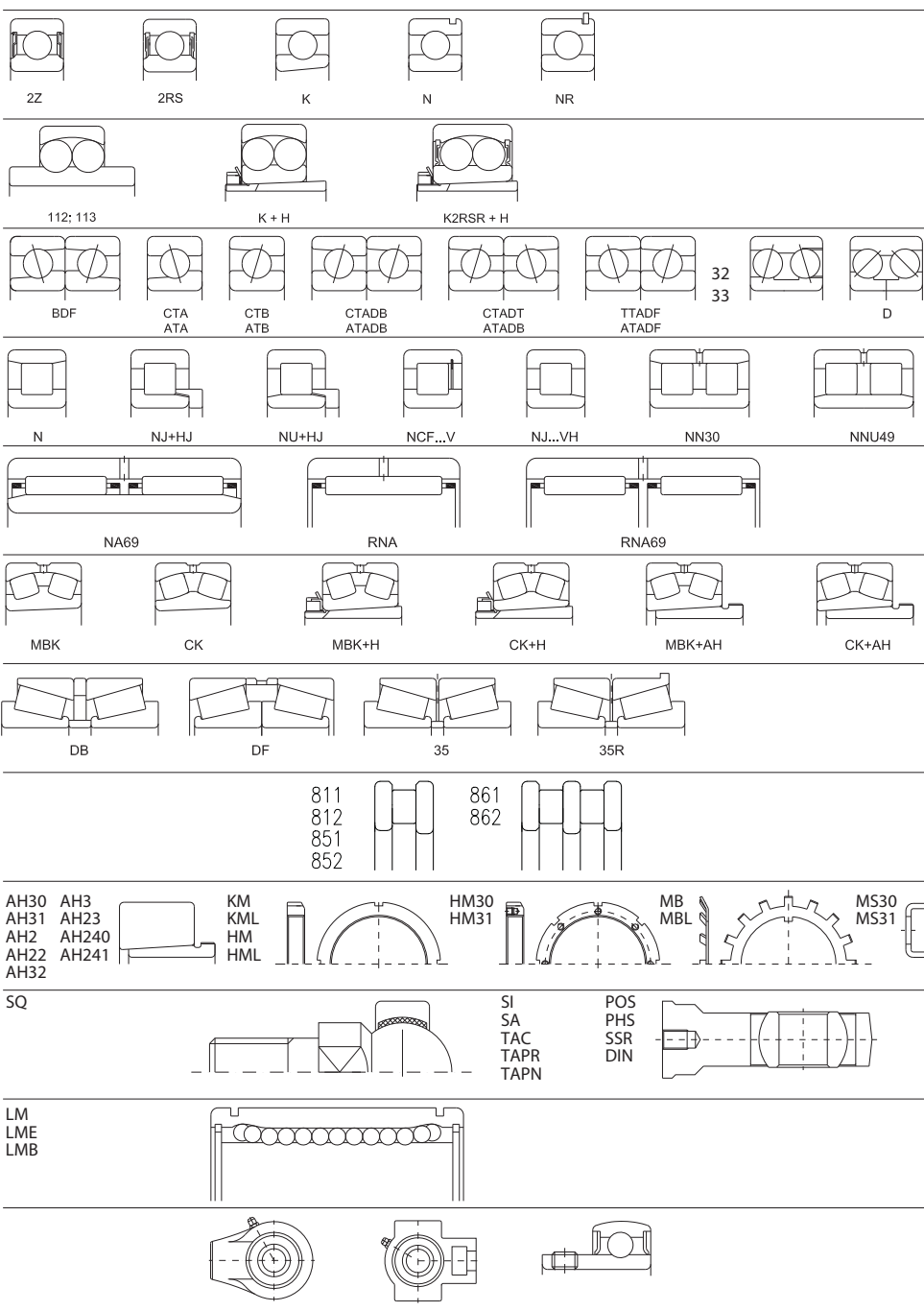
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Measuring units of the international system SI

Lenght

1 mm = 0,039 in
1 in = 25,4 mm

Mass

1 kg = 2,205 lb

Force

1 kN = 1 000 N = 225 lbf
1 kgf = 9,81 N
1 lbf = 4,45 N

Moment

1 N mm = 0,102 kgf mm
1 kgf mm = 9,81 N mm
1 N m = 8,85 in lbf
1 in lbf = 0,113 N mm

Pressure per unit of area (surface)

1 N/mm² = 1 MPa = 145 psi
1 psi = 0,102 kgf/mm²
1 kgf/mm² = 9,81 N/mm²

Power

1 W = 1 J/s = 1 N m/s = 0,102 kgf m/s
1 kW = 1,36 CP = 102 kgf m/s
1 kgf m/s = 9,81 N m/s = 9,81 j/s

Mechanical work

1 kgf m = 9,81 W s = 9,81 N m
1 J (Joule) = 1 N m = 1 W s = 0,102 kgf m

Kinematic viscosity

1 mm²/s = 1 cSt (centiStokes)



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Selection of bearing type

Each type of bearing displays characteristics features which make it suitable for a certain application. Therefore, many bearings 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 directions. For loads acting in both directions, double direction thrust ball bearings are used. Angular contact thrust ball bearing are 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 speed, 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 204.

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 adjoin 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 (suffix NA).

Bearings with non interchangeable parts have a smaller radial clearance than bearings with interchangeable parts. Changing rings from one bearing to another 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

URB bearing producers can be manufacture bearings of various type and size so that they can meet the customers' requirements assuring a proper reliability for various applications.

Table 1.1 shows quantitative 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

 - excellent		 - poor	Purely radial load	Purely axial load	Combined load	Moment load
 - good		 - unsuitable				
 - fair		 - single direction  - double direction				
Deep groove ball bearings						
Self-aligning ball bearings						
Angular contact ball bearings - single row	 		 _a	 _b		
- high precision	 		 _a	 _b		
- 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	 		 _a	 _b		

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

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 permissible load which will give a basic rating life up to 1000 000 revolutions.

The basic dynamic load ratings of URB 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 permanent deformations 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 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:

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

- 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):

$$P_r = F_r, \text{ kN,} \quad \text{- for pure radial load}$$

$$P_r = XF_r + YF_a, \text{ kN,} \quad \text{- for combined load}$$

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

$$P_a = F_a, \text{ kN,} \quad \text{- for pure axial load}$$

$$P_a = XF_r + YF_a, \text{ kN,} \quad \text{- for combined load}$$

where:

$$F_r = \text{the radial component of the load, kN}$$

$$F_a = \text{the axial component of the load, kN}$$

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:

$$L_{10h} = \frac{1000000}{60n} C/P \text{ h} \text{ or } L_{10h} = \frac{16666}{n} C/P \text{ h}$$

where:

$$n = \text{rotational speed, r/min}$$

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

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

$$L_{10h} = \frac{1000}{r D} L_{10s}, \text{ respectively: } L_{10s} = \frac{r D}{1000} L_{10}$$

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	L_{10}	C/P Ball bearings	Roller bearings
0,5	0,793	0,812	240	6,21	5,18	2000	12,6	9,78
0,75	0,909	0,917	260	6,38	5,3	2200	13	10,1
1	1	1	280	6,54	5,42	2400	13,4	10,3
1,5	1,14	1,13	300	6,69	5,54	2600	13,8	10,6
2	1,26	1,24	320	6,84	5,64	2800	14,1	10,8
3	1,44	1,39	340	6,98	5,75	3000	14,4	11
4	1,59	1,52	360	7,11	5,85	3200	14,7	11,3
5	1,71	1,62	380	7,24	5,94	3400	15	11,5
6	1,82	1,71	400	7,37	6,03	3600	15,3	11,7
8	2	1,87	420	7,49	6,12	3800	15,6	11,9
10	2,15	2	440	7,61	6,21	4000	15,9	12
12	2,29	2,11	460	7,72	6,29	4500	16,5	12,5
14	2,41	2,21	480	7,83	6,37	5000	17,1	12,9
16	2,52	2,3	500	7,94	6,45	5500	17,7	13,2
18	2,62	2,38	550	8,19	6,64	6000	18,2	13,6
20	2,71	2,46	600	8,43	6,81	6500	18,7	13,9
25	2,92	2,63	650	8,66	6,98	7000	19,1	14,2
30	3,11	2,77	700	8,88	7,14	7500	19,6	14,5
35	3,27	2,91	750	9,09	7,29	8000	20	14,8
40	3,42	3,02	800	9,28	7,43	8500	20,4	15,1
45	3,56	3,13	850	9,47	7,56	9000	20,8	15,4
50	3,68	3,23	900	9,65	7,7	9500	21,2	15,6
60	3,91	3,42	950	9,83	7,82	10000	21,5	15,8
70	4,12	3,58	1000	10	7,94	12000	22,9	16,7
80	4,31	3,72	1100	10,3	8,17	14000	24,1	17,5
90	4,48	3,86	1200	10,6	8,39	16000	25,2	18,2
100	4,64	3,98	1300	10,9	8,59	18000	26,2	18,9
120	4,93	4,2	1400	11,2	8,79	20000	27,1	1,5
140	5,19	4,4	1500	11,4	8,97	25000	29,2	20,9
160	5,43	4,58	1600	11,7	9,15	30000	31,1	22
180	5,65	4,75	1700	11,9	9,31			
200	5,85	4,9	1800	12,2	9,48			
220	6,04	5,04	1900	12,4	9,63			

**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	1000	1500
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
1000	1,44		1,82	2,08	2,29	2,47	2,62	2,88	3,11	3,56	3,91	4,48
1250	1,55		1,96	2,24	2,47	2,66	2,82	3,11	3,35	3,83	4,22	4,83
1600	1,69		2,13	2,43	2,68	2,88	3,07	3,37	3,63	4,16	4,58	5,24
2000	1,82		2,29	2,62	2,88	3,11	3,30	3,63	3,91	4,48	4,93	5,65
2500	1,96		2,47	2,82	3,11	3,35	3,56	3,91	4,22	4,83	5,31	6,08
3200	2,13		2,68	3,07	3,37	3,63	3,86	4,25	4,58	5,24	5,77	6,60
4000	2,29		2,88	3,30	3,63	3,91	4,16	4,58	4,93	5,65	6,21	7,11
5000	2,47		3,11	3,56	3,91	4,22	4,48	4,93	5,31	6,08	6,69	7,66
6300	2,66		3,36	3,84	4,23	4,55	4,84	5,33	5,74	6,57	7,23	8,28
8000	2,88		3,63	4,16	4,58	4,93	5,24	5,77	6,21	7,11	7,83	8,96
10000	3,11		3,91	4,48	4,93	5,31	5,65	6,21	6,69	7,66	8,43	9,65
12500	3,35		4,22	4,83	5,31	5,27	6,08	6,69	7,21	8,25	9,09	10,4
16000	3,63		4,58	5,24	5,77	6,21	6,60	7,27	7,83	8,96	9,86	11,3
20000	3,91		4,93	5,65	6,21	6,69	7,11	7,83	8,43	9,65	10,6	12,2
25000	4,22		5,31	6,08	6,69	7,21	7,66	8,43	9,09	10,4	11,4	13,1
32000	4,58		5,77	6,60	7,27	7,83	8,32	9,16	9,86	11,3	12,4	14,2
40000	4,93		6,21	7,11	7,83	8,43	8,96	9,86	10,6	12,2	13,4	15,3
50000	5,31		6,69	7,66	8,43	9,09	9,65	10,6	11,4	13,1	14,4	16,5
63000	5,74		7,23	8,28	9,11	9,81	10,4	11,5	12,4	14,2	15,6	17,8
80000	6,21		7,83	8,96	9,86	10,6	11,3	12,4	13,4	15,3	16,9	19,3
100000	6,69		8,43	9,65	10,6	11,4	12,2	13,4	14,4	16,5	18,2	20,8
200000	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 =	2000	2500	3000	4000	5000	6000	8000	10000	15000	20000	30000
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
1000	4,93		5,31	5,65	6,21	6,69	7,11	7,83	8,43	9,65	10,6	12,2
1250	5,31		5,72	6,08	6,69	7,21	7,66	8,43	9,09	10,4	11,4	13,1
1600	5,77		6,21	6,60	7,27	7,83	8,32	9,16	9,86	11,3	12,4	14,2
2000	6,21		6,69	7,11	7,83	8,43	8,96	9,86	10,6	12,2	13,4	15,3
2500	6,69		7,21	7,66	8,43	9,09	9,65	10,6	11,4	13,1	14,4	16,5
3200	7,27		7,83	8,32	9,16	9,86	10,5	11,5	12,4	14,2	15,7	17,9
4000	7,83		8,43	8,96	9,86	10,6	11,3	12,4	13,4	15,3	16,9	19,3
5000	8,43		9,09	9,65	10,6	11,4	12,2	13,4	14,4	16,5	18,2	20,8
6300	9,11		9,81	10,4	11,5	12,4	13,1	14,5	15,6	17,8	19,6	22,5
8000	9,86		10,6	11,3	12,4	13,4	14,2	15,7	16,9	19,3	21,3	24,3
10000	10,6		11,4	12,2	13,4	14,4	15,3	16,9	18,2	20,8	22,9	26,2
12500	11,4		12,3	13,1	14,4	15,5	16,5	18,2	19,6	22,4	24,7	28,2
16000	12,4		13,4	14,2	15,7	16,9	17,9	19,7	21,3	24,3	26,8	30,7
20000	13,4		14,4	15,3	16,9	18,2	19,3	21,3	22,9	26,2	28,8	33,0
25000	14,4		15,5	16,5	18,2	19,6	20,8	22,9	24,7	28,2	31,1	35,6
32000	15,7		16,9	17,9	19,7	21,3	22,6	24,9	26,8	30,7	33,7	38,6
40000	16,9		18,2	19,3	21,3	22,9	24,3	26,8	28,8	33,0	36,3	41,6
50000	18,2		19,6	20,8	22,9	24,7	26,1	28,8	31,1	35,6	39,1	44,8
63000	19,6		21,1	22,5	24,7	26,6	28,3	31,2	33,6	38,4	42,3	48,4
80000	21,3		22,9	24,3	26,8	28,8	30,7	33,7	36,3	41,6	45,8	52,4
100000	22,9		24,7	26,2	28,8	31,1	33,0	36,3	39,1	44,8	49,3	56,5
200000	28,8		31,1	33,0	36,3	39,1	41,6	45,8	49,3	56,5	62,1	71,1

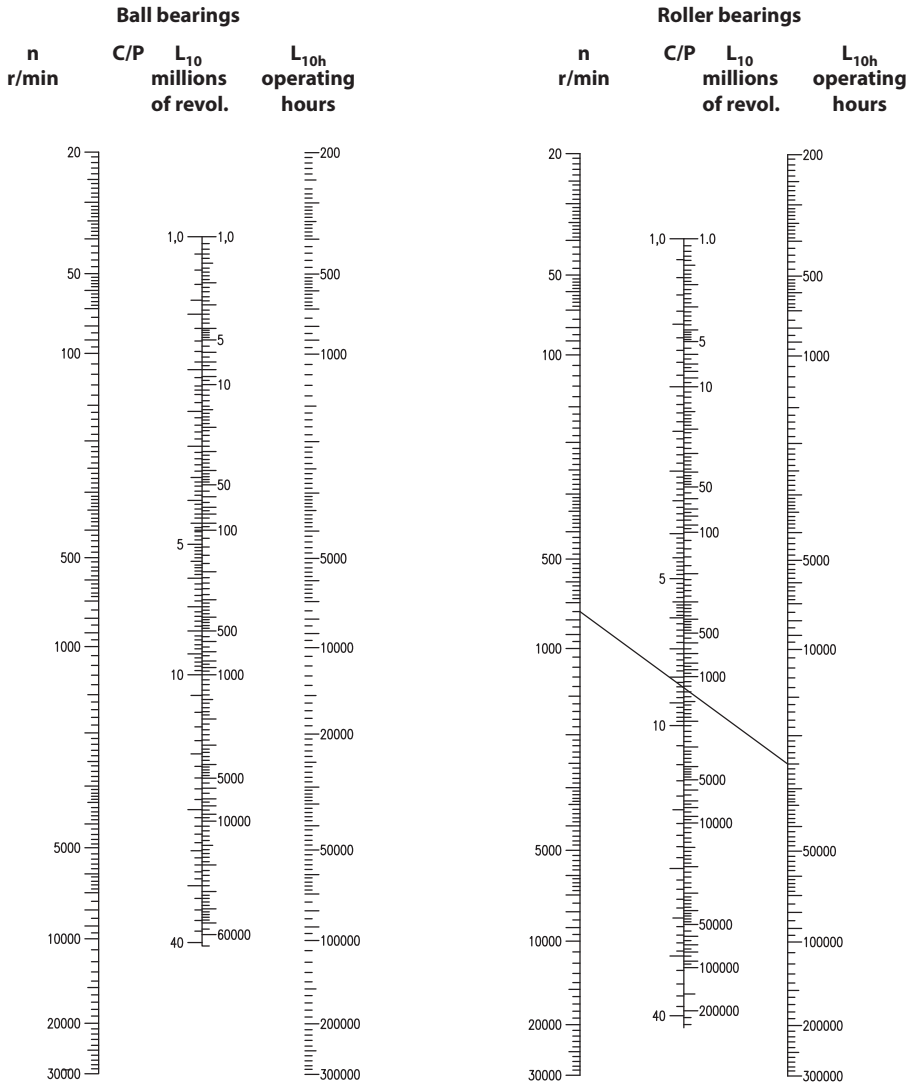
**Roller bearings - load ratio C/P for various basic rating lives L_{10h} (operating hours)
at various speeds n (r/min)**

Table 2.3

L_{10h}	C/P when n = 50	100	150	200	250	300	400	500	750	1000	1500
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	5,24	2,77	3,13
1000	1,39	1,71	1,93	2,11	2,25	2,38	2,59	2,77	3,13	3,42	3,86
1250	1,49	1,83	2,07	2,25	2,41	2,54	2,77	2,97	3,35	3,65	4,12
1600	1,60	1,97	2,23	2,43	2,59	2,74	2,99	3,19	3,61	3,93	4,44
2000	1,71	2,11	2,38	2,59	2,77	2,93	3,19	3,42	3,86	4,20	4,75
2500	1,83	2,25	2,54	2,77	2,97	3,13	3,42	3,65	4,12	4,50	5,08
3200	1,97	2,43	2,74	2,99	3,19	3,37	3,68	3,93	4,44	4,84	5,47
4000	2,11	2,59	2,93	3,19	3,42	3,61	3,93	4,20	4,75	5,18	5,85
5000	2,25	2,77	3,13	3,42	3,65	3,86	4,20	4,50	5,08	5,54	6,25
6300	2,42	2,97	3,36	3,66	3,91	4,13	4,51	4,82	5,44	5,93	6,70
8000	2,59	3,19	3,61	3,93	4,20	4,44	4,84	5,18	5,85	6,37	7,20
10000	2,77	3,42	3,86	4,20	4,50	4,75	5,18	5,54	6,25	6,81	7,70
12500	2,97	3,65	4,12	4,50	4,81	5,08	5,54	5,92	6,68	7,29	8,23
16000	3,19	3,93	4,44	4,84	5,18	5,47	5,96	6,37	7,20	7,85	8,86
20000	3,42	4,20	4,75	5,18	5,54	5,85	6,37	6,81	7,70	8,39	9,48
25000	3,65	4,50	5,08	5,54	5,92	6,25	6,81	7,29	8,23	8,97	10,1
32000	3,93	4,84	5,47	5,96	6,37	6,73	7,34	7,85	8,86	9,66	10,9
40000	4,20	5,18	5,85	6,37	6,81	7,20	7,85	8,39	9,48	10,3	11,7
50000	4,50	5,54	6,25	6,81	7,29	7,70	8,39	8,97	10,1	11,0	12,5
63000	4,82	5,93	6,70	7,30	7,81	8,25	8,99	9,61	10,9	11,8	13,4
80000	5,18	6,37	7,20	7,85	8,39	8,86	9,66	10,3	11,7	12,7	14,4
100000	5,54	6,81	7,70	8,39	8,97	9,48	10,3	11,0	12,5	13,6	15,4
200000	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 = 2000	2500	3000	4000	5000	6000	8000	10000	15000	20000	30000
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
1000	4,20	4,50	4,75	5,18	5,54	5,85	6,37	6,81	7,70	8,39	9,48
1250	4,50	4,81	5,08	5,54	5,92	6,25	6,81	7,29	8,23	8,97	10,1
1600	4,84	5,18	5,47	5,96	6,37	6,73	7,34	7,85	8,86	9,66	10,9
2000	5,18	5,54	5,85	6,37	6,81	7,20	7,85	8,39	9,48	10,3	11,7
2500	5,54	5,92	6,25	6,81	7,29	7,70	8,39	8,97	10,1	11,0	12,5
3200	5,96	6,37	6,73	7,34	7,85	8,29	9,03	9,66	10,9	11,9	13,4
4000	6,37	6,81	7,20	7,85	8,39	8,86	9,66	10,3	11,7	12,7	14,4
5000	6,81	7,29	7,70	8,39	8,97	9,48	10,3	11,0	12,5	13,6	15,4
6300	7,30	7,81	8,25	8,99	9,61	10,2	11,1	11,8	13,4	14,6	16,5
8000	7,85	8,39	8,86	9,66	10,3	10,9	11,9	12,7	14,4	15,7	17,7
10000	8,39	8,97	9,48	10,3	11,0	11,7	12,7	13,6	15,4	16,7	18,9
12500	8,97	9,59	10,1	11,0	11,8	12,5	13,6	14,5	16,4	17,9	20,2
16000	9,66	10,3	10,9	11,9	12,7	13,4	14,6	15,7	17,7	19,3	21,8
20000	10,3	11,0	11,7	12,7	13,6	14,4	15,7	16,7	18,9	20,6	23,3
25000	11,0	11,8	12,5	13,6	14,5	15,4	16,7	17,9	20,2	22,0	24,9
32000	11,9	12,7	13,4	14,6	15,7	16,5	18,0	19,3	21,8	23,7	26,8
40000	12,7	13,6	14,4	15,7	16,7	17,7	19,3	20,6	23,3	25,4	28,7
50000	13,6	14,5	15,4	16,7	17,9	18,9	20,6	22,0	24,9	27,1	30,6
63000	14,6	15,6	16,5	17,9	19,2	20,3	22,1	23,6	26,7	29,1	32,8
80000	15,7	16,7	17,7	19,3	20,6	21,8	23,7	25,4	28,7	31,2	35,3
100000	16,7	17,9	18,9	20,6	22,0	23,3	25,4	27,1	30,6	33,4	37,7
200000	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 $L_{10h} = 25000$ operating hours
- Rotational speed $n = 1000$ 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 100, you can select the bearing 6310 type with the following characteristics: $C_r = 61,8$ kN; $n = 7000$ 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 rotational speed $n = 750$ r/min?

See page 219 in the catalogue and you will find for the bearing, NU 210E type, the following values: $C_r = 63,7$ kN, $n = 8000$ 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 $L_{10h} = 25000$.

Recommended basic rating lives for general purpose machines

Table 2.4

Application	Recommended basic rating life L_{10h} (operating hours)
Household machines, technical apparatus for medical use, instruments, agricultural machines:	300...3000
Machines used for short periods or intermittently: electric hand tools, cranes, lifting tackles in workshops, building machines:	3000...8000
Machines used intermittently or for short periods with high operational reliability: lifts, small cranes:	8000...12000
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:	10000...25000
Machines operating 8 hours/day at full capacity: machine tools, woodworking machines, large cranes, printing equipment, ventilators, separators, centrifuges:	20000...30000
Machines for continuous use 24 hours/day: Rolling mill gear units, medium sized electrical machinery, compressors, pumps, textile machines, mine hoists:	40000-50000
Hydraulic machines, rotary furnaces, capstans, propulsion machinery for sea vessel (propellers for sea vessels):	50000...100000
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:	100000...

Values for basic rating life L_{10s}

Table 2.5

Type of vehicle	$L_{10s}/10^6$
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	3-4
- motorailers	3-4
- Diesel and electric locs	

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:

$$L_{10sc} = \frac{180}{2c} L_{10}, \text{ where:}$$

L_{10sc} - bearing 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

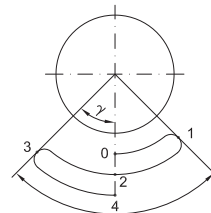


Fig. 1

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 ($n=n_1+n_2+\dots$) 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. 3a and b, the mean load can be obtained from:

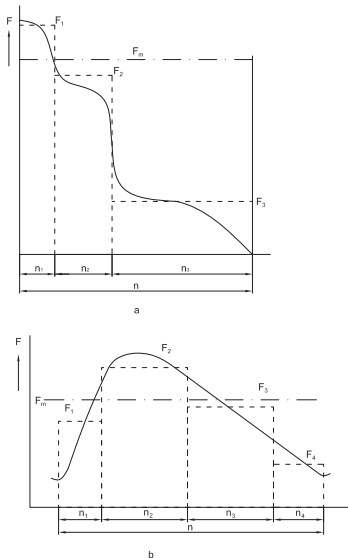


Fig. 2

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

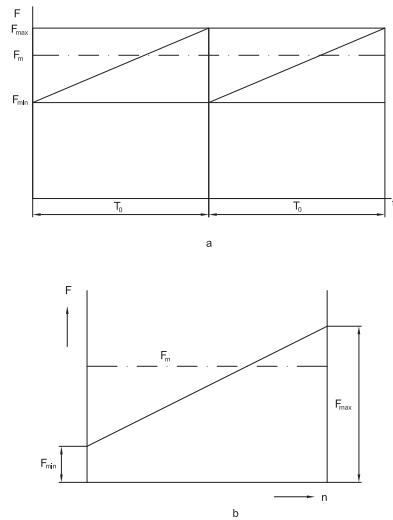


Fig. 3

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:

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

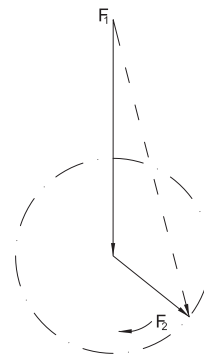


Fig. 4

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:

$$F_m = \sqrt[p]{\frac{4}{3r}} F_{max}, \text{ kN}$$

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

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

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

$$F_m = \sqrt[p]{\frac{C}{90C}} F_r, \text{ kN},$$

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

$$P_r = XF_r + YF_a, \text{ kN}$$

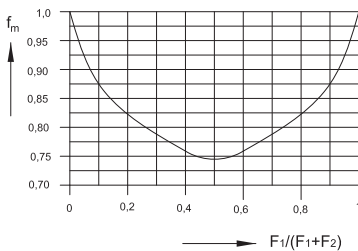


Fig. 5

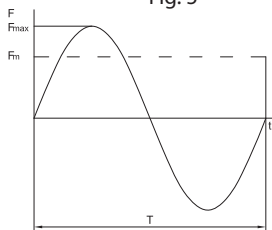


Fig. 6

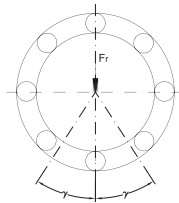


Fig. 7

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:

$$P_m = XF_{rm} + YF_{am},$$

where:

- P_m - equivalent mean dynamic load, kN
- F_{rm} - radial mean load, kN
- F_{am} - 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:

$$L_{na} = a_1 a_2 a_3 L_{10} \text{ or } L_{na} = a_1 a_2 a_3 \cdot \left(\frac{C}{P}\right)^p$$

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 URB 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:

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

These values of a_{23} coefficient depend on the lubricant used for bearing lubrication, namely on the ratio of the oil viscosity at +40°C, v (initial value) to the viscosity required for adequate lubrication at the operating temperature v_1 . The values are given in table 2.8.

Values for factor a_{23}									
Table 2.8									
$\frac{v}{v_1}$	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 v_1 , as a function of the mean bearing diameter and operating speed, are given in the diagram fig. 8.

Kinematic viscosity v 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.

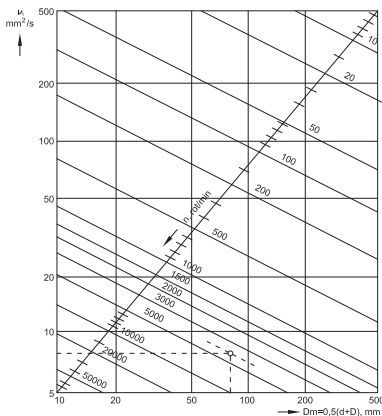


Fig. 8

Values for operating temperature factor f_t				
Table 2.9				
Operating temperature, $t^\circ\text{C}$	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 is 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.

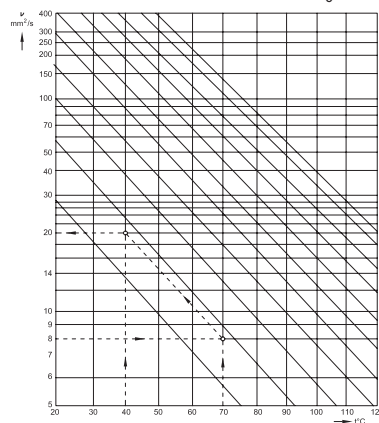


Fig. 9

The requisite basic static load is calculated using the equation:

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

where:

- 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, $t^\circ\text{C}$	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	Ball bearings	Roller	Ball bearings	Roller
Smooth, vibration-free	0,5	1	1	1,5	2	3
Normal	0,5	1	1	1,5	2	3,5
Heavy shock loads	>1,5	>2,5	>1,5	>3	>2	>4

For bearing 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 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.

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE



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:

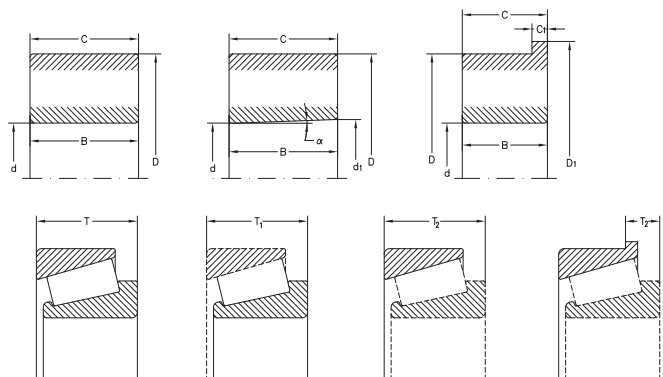
- the overall dimensions of:
 - deep groove ball bearings, angular contact ball bearings, self-aligning ball bearings, spherical roller bearings, cylindrical roller bearings, needle roller bearings, tapered roller bearings,
 - tapered roller bearing with metric (mm) and inch dimensions,
 - tapered bore 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 directions 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
Δ_{ds}	- deviation of a single bore diameter $\Delta_{ds} = d_s - d$
d_{mp}	- mean bore diameter, in a single radial plane $d_{mp} = (d_{psmax} + d_{psmin})/2$
Δ_{dmp}	- 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 $\Delta_{dmp} = d_{mp} - d$
Δ_{d1mp}	- deviation of the mean diameter at the theoretical large end of the tapered bore $\Delta_{d1mp} = d_{1mp} - d$
Δ_{d2mp}	- deviation of the mean bore diameter of the shaft washer for a double directions thrust bearings, 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 directions thrust bearings, in a single radial plane
V_{dmp}	- mean bore diameter variation (valid only for cylindrical bore) $V_{dmp} = d_{mpmax} - d_{mpmin}$
α	- 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	Δ_{T1s}	- deviation of the single width of inner ring and tapered roller assembly $\Delta T_{1s} = T_{1s} - T_1$
D_{psmin}	- minimum outside diameter in a single radial plane	T_2	- nominal width of the outer ring assembly
ΔD_s	- deviation of the single outside diameter $\Delta D_s = D_s - D$	T_{2s}	- single width of the outer ring assembly
D_{mp}	- mean outside diameter, in a single plane = $(D_{psmax} + D_{psmin})/2$	Δ_{T2s}	- deviation of the single width of outer ring assembly $\Delta T_{2s} = T_{2s} - T_2$
Δ_{Dmp}	- 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 $\Delta D_{mp} = D_{mp} - D$	K_{ia}	- radial runout of assembled bearing inner ring
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 $V_{DP} = D_{psmax} - D_{psmin}$	K_{ea}	- radial runout of assembled bearing outer ring
V_{Dmp}	- mean outside diameter variation	S_d	- side face runout with reference to bore of the inner ring
B	- nominal width of the inner ring	S_D	- variation in inclination of outside cylindrical surface to outer ring side face
B_s	- single width of the inner ring	S_{ia}	- side face runout of assembled inner ring with reference to raceway
Δ_{Bs}	- inner ring single width deviation $\Delta B_s = B_s - B$	S_{ea}	- side face runout of assembled outer ring with reference to raceway
V_{Bs}	- inner ring single width variation	S_i	- thickness variation measured from middle of raceway to back seating face of shaft washer
C	- nominal width of the outer ring	S_e	- thickness variation measured from middle of raceway to back face of housing washer
C_s	- single width of the outer ring	Δ_{Hs}	- deviation of mounting height of single direction thrust ball and roller bearings
Δ_{Cs}	- deviation of the outer ring single width $\Delta C_s = C_s - C$	Δ_{H1s}	- deviation of mounting height of thrust ball bearings with sphered housing washer
V_{Cs}	- single width variation of the outer ring $V_{Cs} = C_{smax} - C_{smin}$	Δ_{H2s}	- deviation of mounting height of double direction thrust ball and roller bearings
T	- nominal width of tapered roller bearings	Δ_{H3s}	- deviation of mounting height of double direction thrust ball bearings with sphered housing washer
T_s	- single width of tapered roller bearings		
Δ_{T_s}	- deviation of the single width of taper roller bearings $\Delta T_s = T_s - T$		
T_1	- nominal width of the inner ring and tapered roller assembly		
T_{1s}	- single width of the inner ring and tapered roller assembly		



Radial bearings (excepting tapered roller bearings)
Tolerance class P0

Inner ring													Table 3.1
Deviations μm													
d mm	Δ_{dmp}	V_{dp}						V_{dmp}	K_{ia}	Δ_{Bs}			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	low	max.	
0,6¹⁾	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	
400	500	0	-45	56	56	34	34	65	0	-450	-	50	
500	630	0	-50	63	63	38	38	70	0	-500	-	60	
630	800	0	-75	-	-	-	-	80	0	-750	-	70	

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		Δ_{Dmp}	$V_{\text{Dp}}^{2)}$						$V_{\text{Dmp}}^{2)}$	K_{ea}	Δ_{Cs}	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.	high	low	max.	
2,5¹⁾	6	0	-8	10	8	6	10	6	15	Values are identical to Δ_{Bs} and V_{Bs} 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				
500	630	0	-50	63	63	38	-	38	100				
630	800	0	-75	94	94	55	-	55	120				
800	1000	0	-10	125	125	75	-	75	140				

1) This value included.

2) 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	Δ_{dmp}	V_{dp}				V_{dmp}		K_{ia}	Δ_{Bs}		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	low	max.	
0,6¹⁾	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	
400	500	0	-35	44	44	26	26	35	0	-450	-	55	
500	630	0	-40	50	50	30	30	40	0	-500	-	50	

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	Δ_{Dmp}	$V_{\text{Dp}}^{2)}$				$V_{\text{Dmp}}^{2)}$		K_{ea}	Δ_{Cs}	V_{Cs}			
		Open bearings				Shielded bearings							
		Diameter series											
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	max.	
2,5¹⁾	6	0	-7	9	7	5	9	5	8	Values are identical to Δ_{Bs} 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				
500	630	0	-38	48	48	29	-	29	50				
630	800	0	-45	56	56	34	-	34	60				
800	1000	0	-60	75	75	45	-	45	75				

1) This value included.

2) Values are valid before mounting the snap ring or shields or after their dismounting

Tolerance class P5

Inner ring														Table 3.5
Deviations μm														
d mm	Δ_{dp}	V_{dp}		V_{dmp}		K_{ia}	S_d	$S_{ia}^{2)}$	Δ_{Bs}	V_{Bs}				
		Diameter series								all	normal	modified ³⁾		
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	low	max.	
0,6¹⁾	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	-23	23	18	12	15	15	20	0	-400	-630	15	

1) This value included.

2) Applies only to ball bearings.

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

Outer ring													Table 3.6
Deviations μm													
D mm	Δ_{Dmp}	V_{Dmp}				V_{Dmp}	K_{ea}	$S_{\text{D}}^{2)}$	$S_{\text{ea}}^{2,3)}$	Δ_{Cs}	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.	
2,5¹⁾	6	0	-5	5	4	3	5	8	8	Identical to Δ_{Bs} 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	
500	630	0	-28	28	21	14	25	18	25			18	
630	800	0	-35	35	26	18	30	20	30			20	

1) This value included.

2) Do not apply to shielded bearings.

3) Apply to ball bearings.

Tolerance class P4

Inner ring														Table 3.7
Deviations μm														
d mm	$\Delta_{\text{dmp}}, \Delta_{\text{ds}}^{2)}$		V_{dp}		V_{dmp}		K_{ia}	S_{d}	$S_{\text{ia}}^{3)}$	Δ_{Bs}		V_{Bs}		
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) Applies 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		$\Delta_{\text{Dmp}}, \Delta_{\text{Ds}}^{2)}$		V_{Dp}		V_{Dmp}		K_{ea}	$S_{\text{D}}^{3)}$	$S_{\text{ea}}^{3,4)}$	Δ_{Cs}			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 Δ_{Bs} 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		$\Delta_{\text{dmp}}, \Delta_{\text{ds}}^{2)}$			$V_{\text{dp}}^{2)}$	V_{dmp}	K_{ia}	S_{d}	$S_{\text{ia}}^{3)}$	Δ_{Bs}		V_{Bs}		
d	mm								all	normal	modified ⁴⁾			
over	up to	high	low	max.	max.	max.	max.	max.	high	low	low	max		
0,6¹⁾	2,5	0	-2,5	2,5	1,5	1,5	1,5	1,5	0	-40	-250	1,5		
2,5	10	0	-2,5	2,5	1,5	1,5	1,5	1,5	0	-40	-250	1,5		
10	18	0	-2,5	2,5	1,5	1,5	1,5	1,5	0	-80	-250	1,5		
18	30	0	-2,5	2,5	1,5	2,5	1,5	2,5	0	-120	-250	1,5		
30	50	0	-2,5	2,5	1,5	2,5	1,5	2,5	0	-120	-250	1,5		
50	80	0	-4	4	2	2,5	1,5	2,5	0	-150	-250	1,5		
80	120	0	-5	5	2,5	2,5	2,5	2,5	0	-200	-380	2,5		
120	150	0	-7	7	3,5	2,5	2,5	2,5	0	-250	-380	2,5		
150	180	0	-7	7	3,5	5	4	5	0	-300	-380	4		
180	250	0	-8	8	4	5	5	5	0	-350	-500	5		

1) This value included.

2) Applies 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 3.10	
Deviations μm		$\Delta_{\text{Dmp}}, \Delta_{\text{Ds}}^{2)}$			$V_{\text{Dp}}^{2)}$	V_{Dmp}	K_{ea}	$S_{\text{D}}^{3)}$	$S_{\text{ea}}^{3,4)}$	Δ_{Cs}		V_{Cs}		
D	mm									high	low			
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	max.		
2,5¹⁾	6	0	-2,5	2,5	1,5	1,5	1,5	1,5	1,5	Identical to ΔB_s for the inner ring.		1,5		
6	18	0	-2,5	2,5	1,5	1,5	1,5	1,5	1,5			1,5		
18	30	0	-4	4	2	2,5	1,5	2,5	2,5			1,5		
30	50	0	-4	4	2	2,5	1,5	2,5	2,5			1,5		
50	80	0	-4	4	2	4	1,5	4	4			1,5		
80	120	0	-5	5	2,5	5	2,5	5	5			2,5		
120	150	0	-5	5	2,5	5	2,5	5	5			2,5		
150	180	0	-7	7	3,5	5	2,5	5	5			2,5		
180	250	0	-8	8	4	7	4	7	7			4		
250	315	0	-8	8	4	7	5	7	7			5		
315	400	0	-10	10	5	8	7	8	8			7		

1) This value included.

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

3) Do not apply to shielded bearings.

4) Apply only to ball bearings.

Tolerance class SP

Inner ring															
Deviations μm															
d mm	Cylindrical bore					Tapered bore									
	Δ_{dmp}	$\Delta_{\text{ds}}^{(2)}$	V_{dp}	Δ_{ds}	V_{dp}	Δ_{d1mp}	$-\Delta_{\text{dmp}}$	Δ_{Bs}	V_{Bs}	K_{ia}	S_{d}	S_{ia}			
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	-125	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

Table 3.11

Outer ring									
Deviations μm									
D mm		Δ_{Dmp}	Δ_{Ds}	V_{Dp}	K_{ea}	S_{D}	S_{ea}	Δ_{Cs}	V_{Cs}
over	up to	low	high	max.	max.	max.	max.	high	max.
30	50	-7	0	4	5	8	8	Identical to Δ_{Bs} 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		

Table 3.12

Tolerance class UP

Inner ring															
Deviations μm															
d mm		Cylindrical bore				Tapered bore				Δ_{Bs}		V_{Bs}	K_{ia}	S_d	S_{ia}
		Δ_{dmp}	$\Delta_{ds}^{(2)}$	V_{dp}	Δ_{ds}	V_{dp}	Δ_{d1mp}	$-\Delta_{dmp}$							
over	up to	low	high	max.	low	high	max.	low	high	low	high	max.	max.	max.	max.
-	18	-4	0	2	0	-	-	-	-	-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

Outer ring									
Deviations μm									
D mm		Δ_{Dmp} Δ_{Ds}		V_{Dp}	K_{ea}	S_D	S_{ea}	Δ_{Cs}	V_{Cs}
		low	high	max.	max.	max.	max.	high	max.
30	50	-5	0	3	3	2	4	Identical to Δ_{Bs} and V_{Bs} for the inner 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		

3.2. Tapered roller bearings Tolerance class P0 and P6X

Inner ring						
Deviations μm						
Table 3.15						
d mm		Δ_{dmp}	V_{dp}	V_{dmp}	K_{ia}	
over	up to	high	low	max.	max.	max.
10¹⁾	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		Δ_{Dmp}	V_{Dp}	V_{Dmp}	K_{ea}	
over	up to	high	low	max.	max.	max.
18¹⁾	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		$\Delta_{\text{Bs}}, \Delta_{\text{Cs}}$		Δ_{Ts}		Δ_{T1s}		Δ_{T2s}	
over	up to	high	low	high	low	high	low	high	low
10¹⁾	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 3.18
d mm		Δ_{Bs}		Δ_{Cs}		Δ_{Ts}		Δ_{T1s}		Δ_{T2s}		
over	up to	high	low	high	low	high	low	high	low	high	low	
10¹⁾	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												Table 3.19
d mm		Δ_{dmp}		V_{dp}	V_{dmp}	K_{ia}	S_d	Δ_{Bs}		Δ_{Ts}		
over	up to	high	low	max.	max.	max.	max.	high	low	high	low	
10¹⁾	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											Table 3.20
D mm		Δ_{Dmp}		V_{Dp}	V_{Dmp}	K_{ea}	S_D	Δ_{Cs}			
over	up to	high	low	max.	max.	max.	max.	high	low		
18¹⁾	30	0	-8	6	5	6	8	Identical to Δ_{Bs} 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.

Tolerance class P4

Inner ring													Table 3.21
Deviations μm		$\Delta_{\text{dmp}}, \Delta_{\text{ds}}$			V_{dp}	V_{dmp}	K_{ia}	S_{d}	S_{ia}	Δ_{Bs}		Δ_{Ts}	
d	mm	over	up to	high	low	max.	max.	max.	max.	high	low	high	low
10¹⁾	18			0	-5	4	4	3	3	3	0	-200	+200
18	30			0	-6	5	4	3	4	4	0	-200	+200
30	50			0	-8	6	5	4	4	4	0	-240	+200
50	80			0	-9	7	5	4	5	4	0	-300	+200
80	120			0	-10	8	5	5	5	5	0	-400	+200
120	180			0	-13	10	7	6	6	7	0	-500	+350
180	250			0	-15	11	8	7	7	8	0	-600	+350

1) This value included.

Outer ring											Table 3.22
Deviations μm		$\Delta_{\text{Dmp}}, \Delta_{\text{Ds}}$		V_{Dp}	V_{Dmp}	K_{ea}	S_{D}	S_{ea}	Δ_{Cs}		
D	mm	over	up to	high	low	max.	max.	max.	max.	high	low
18¹⁾	30			0	-6	5	4	4	4	5	
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 the diameter D_1 of the outer ring rib for bearings with ribs are in accordance with tolerance class h9.

Tapered roller bearings, inch-metric sizes (AFBMA)

Inner ring - Δ_{dmp}											
Deviations μm		Tolerances 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	-	-

Table 3.23

Outer ring - Δ_{Dmp}											
Deviations μm		Tolerances 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	-	-	-	-

Table 3.24

Assembled bearing - K_{ia} , K_{ea}											
Deviations μm		Tolerances 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		-		-	

Table 3.25

Tapered roller bearings, inch-metric sizes (AFBMA)

Assembled bearing - Δ_{Ts}											
Table 3.26											
Deviations μm											
Tolerances classes											
d mm											
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 - Δ_{T1s}											
Table 3.27											
Deviations μm											
Tolerances classes											
d mm											
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 - Δ_{T2s}											
Table 3.28											
Deviations μm											
Tolerances classes											
d mm											
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

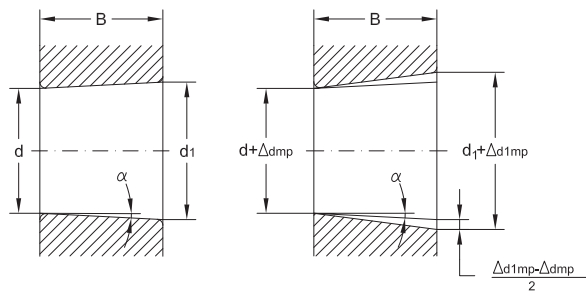
Tapered bore bearings

Taper 1:12											
Deviations μm											
Table 3.29											
d mm		Normal tolerance class, P6					Tolerance class P5				
		Δ_{dmp}	$V_{\text{dp}}^{1)}$			$\Delta_{\text{d1mp}} - \Delta_{\text{dmp}}$	Δ_{dmp}	$V_{\text{dp}}^{1)}$			$\Delta_{\text{d1mp}} - \Delta_{\text{dmp}}$
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						
Deviations μm						
Table 3.30						
d mm		Normal tolerance class				
		Δ_{dmp}	$V_{\text{dp}}^{1)}$			$\Delta_{\text{d1mp}} - \Delta_{\text{dmp}}$
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

$\alpha = 2^\circ 23' 9,4''$ (taper 1:12)
 $\alpha = 0^\circ 57' 17,4''$ (taper 1:30)

Nominal diameter, d_1 at the theoretical large end of bore

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

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

Thrust ball bearings

Shaft washer							
Deviations μm							
$d \sim i$ mm		P0;P6;P5		V_{dp} V_{d2p}	P4;P2		V_{dp} V_{d2p}
		Δ_{dmp} Δ_{d2mp}			Δ_{dmp} Δ_{d2mp}		
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
400	500	0	-45	34	0	-35	26
500	630	0	-50	38	0	-40	30

Housing washer							
Deviations μm							
D mm		P0;P6;P5		V_{Dp}	P4;P2		V_{Dp}
		Δ_{Dmp}			Δ_{Dmp}		
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
500	630	0	-50	38	0	-38	29
630	800	0	-75	55	0	-45	34

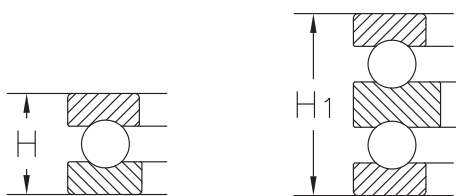
1) This value included.

Variation of shaft washer and housing washer thickness							
Deviations μm							Table 3.33
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	
400	500	30	18	9	6	-	
500	630	35	21	11	7	-	

*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		Δ_{Hs}		Δ_{H1}		
over	up to	high	low	high	low	
18	30	+20	-250	+150	-400	
30	50	+20	-250	+150	-400	
50	80	+20	-300	+150	-500	
80	120	+25	-300	+200	-500	
120	180	+25	-400	+200	-600	
180	250	+30	-400	+250	-600	
250	315	+40	-400	+350	-700	
315	400	+40	-500	+350	-700	
400	500	+50	-500	+400	-900	
500	630	+60	-600	+500	-1100	

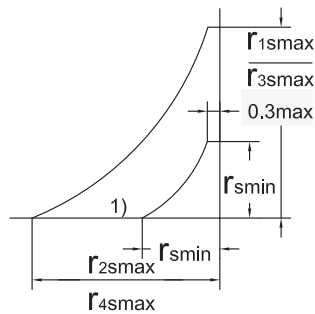
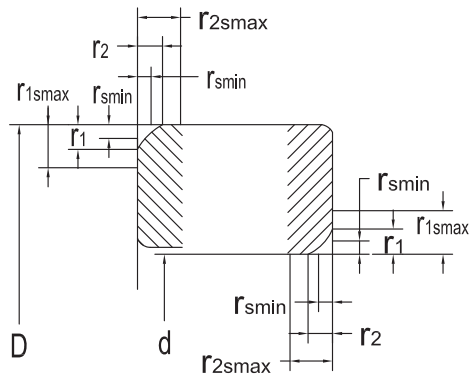
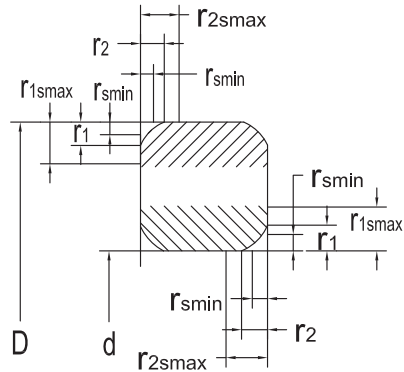


Mounting chamfer dimensions tolerances

Symbols:

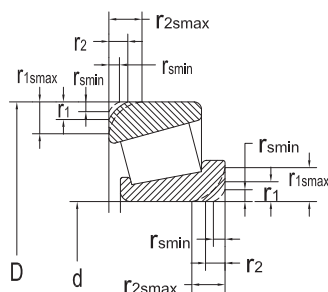
r_1, r_3 - chamfer dimension in radial direction,
 r_2, r_4 - chamfer dimension in axial direction,
 $r_{s \min}$ - general symbol for minimum limit of r_1, r_2, r_3, r_4 ,
 $r_{1s \max}, r_{3s \max}$ - maximum dimension in radial direction,
 $r_{2s \max}, r_{4s \max}$ - maximum dimension in axial direction.

Mounting chamfer dimension limits for radial and thrust bearings					
Values in mm					
Table 3.37					
		Radial bearings		Thrust bearings	
$r_{s \min}$	d	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 $d < 30$ 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 Nominal bore diameter d		Maximum values		Outer ring Nominal outer diameter D	Maximum	
$r_{s \min}$			$r_{1s \max}$	$r_{2s \max}$		$r_{3s \max}$	$r_{4s \max}$
	over	up to			over	up to	
See bearing tables	-	50,8	$r_{s \min} + 0,4$	$r_{s \min} + 0,9$	-	101,6	$r_{s \min} + 0,6$
	50,8	101,6	$r_{s \min} + 0,5$	$r_{s \min} + 1,3$	101,6	168,3	$r_{s \min} + 1,1$
							$r_{s \min} + 1,2$
	101,6	254	$r_{s \min} + 0,6$	$r_{s \min} + 1,18$	168,3	266,7	$r_{s \min} + 0,8$
					266,7	355,6	$r_{s \min} + 1,7$
1	254	-	1,9	3	355,6	-	1,9
1,5	254	-	3,5	4	355,6	-	3,5
2,5	254	-	4,5	6	355,6	-	4,5
3	254	-	5,5	7,5	355,6	-	5,5
3,3	254	-	6,5	9	355,6	-	6,5
3,5	254	-	6,5	9	355,6	-	6,5
6,4	254	-	12,5	17	355,6	-	12,5
8,5	254	-	15	19	355,6	-	15

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Bearing applications

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 shaft, 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.

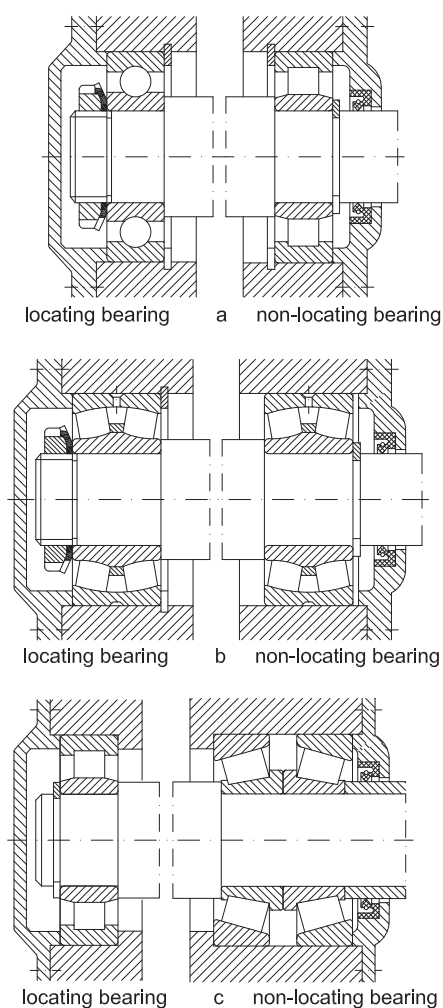


Fig. 4.1

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

e) The locating bearings 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 outside) which takes over axial loads in both directions. The non-locating 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 tight fit.

A high tightening is recommended for roller bearings and large- sized bearings in comparasion 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 table 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 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 stationary, 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.

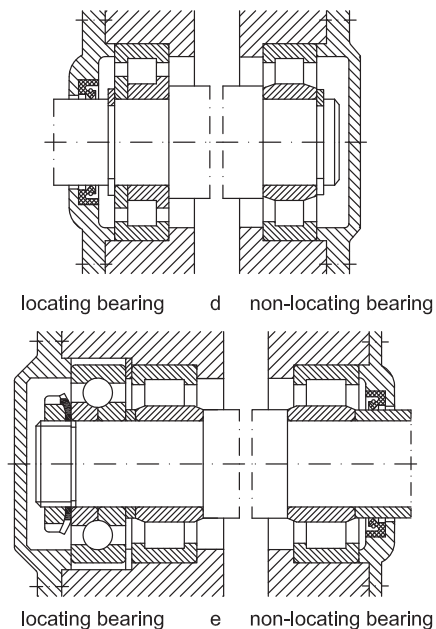
In table 4.1, there are given recommendations to select the tolerance class for shaft as function of: bearing type, loading and shaft diameter. In table 4.3, one can find recommendations to select the tolerance class for housing.

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 34 and table 3.31 and 3.32 on page 40)



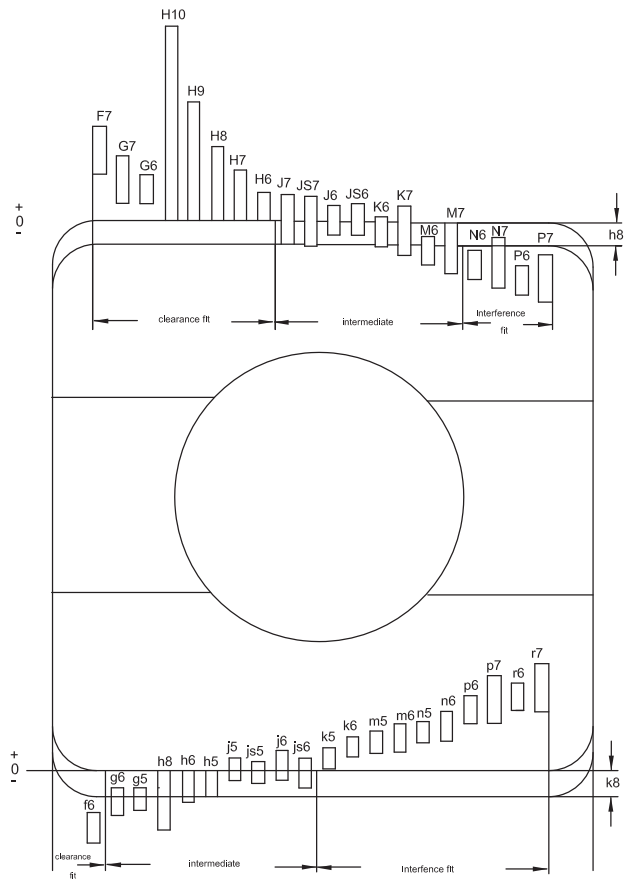
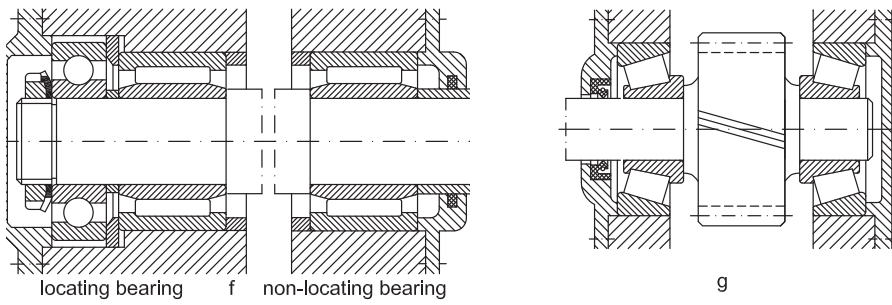


Fig.4.2

Bearing application

Tolerance classes for shafts

Operating conditions	Examples	Shaft diameter (mm)			Table 4.1 Tolerance class symbol
		Ball bearings	Cylindrical, needle and tapered roller bearings	Spherical roller bearings	
Radial bearings with cylindrical core 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<0,006C)	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, pumps, 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...100 >140...200	- - - -	h5 j5 k5 m5
Axial loads					
	All kind of bearing application	≤250 >250	≤250 >250	<250 >250	j6 js6

Bearing application

Tolerance classes for shafts

Operating conditions	Examples	Shaft diameter (mm)			Table 4.1
		Ball bearings	Cylindrical, needle and tapered roller bearings	Spherical roller bearings	Tolerance class symbol
Tapered bore bearings with withdrawal or adapter sleeve	Axle shaft for railway vehicles General mechanical engineering	All diameters			h9 h10
Thrust bearings Axial loads Thrust ball bearings Cylindrical and needle roller thrust bearings Cylindrical, needle roller and cage thrust assembly		All sizes All sizes All sizes			h6 h6(h8) h8
Combined loads on spherical roller thrust bearings Stationary load on shaft washer Rotating load on shaft washer or indeterminate load direction		≤250 >250 ≤200 >200...400 >400			j6 js6 k6 m6 n8

Bearing application

Shaft fits

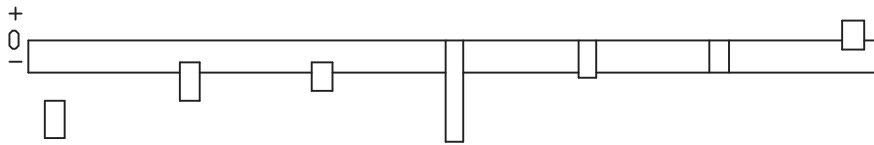


Table 4.2

Shaft Diameter		Bearing Bore diameter tolerance		Deviations of shaft diameter, resultant fits Tolerances													
nominal d		Δ_{dmp}		f6	g6	g5	h8	h6	h5	j5							
over		up to		a) Deviations (shaft diameter) 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 +4 +3	-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 -2 -1
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 -4 -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

Bearing application

Shaft fits



Table 4.2 (continued)

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

Shaft fits

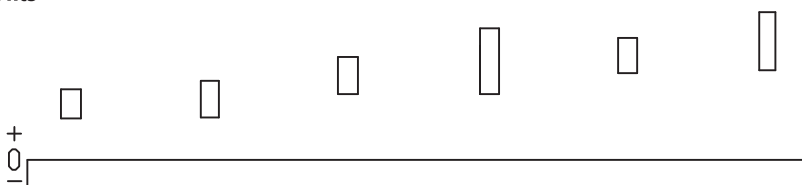


Table 4.2 (continued)

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

Bearing application

Shaft fits

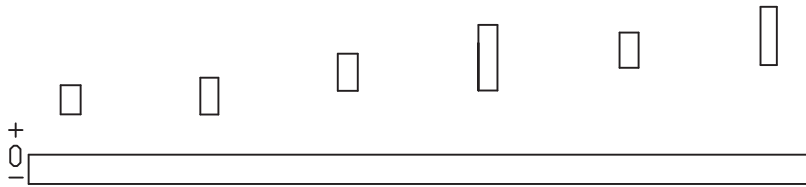


Table 4.2 (continued)

Table 4.2 (continued)																
Shaft Diameter		Bearing Bore diameter tolerance		Deviations of shaft diameter, resultant fits Tolerances												
nominal d		Δ_{dmp}														
				n5		n6		p6		p7		r6		r7		
				a) Deviations (shaft diameter) b) Tightening/Theoretical clearance c) Tightening/Probable clearance												
over	up to	low	high													
mm		μm														
180	200	-30	0	a)	+51	+31	+60	+31	+79	+50	+96	+50	+106	+77	+123	+77
				b)	+81	+31	+90	+31	+109	+50	+126	+50	+136	+77	+153	+77
				c)	+75	+37	+82	+39	+101	+58	+116	+60	+128	+85	+143	+87
200	225	-30	0	+51	+31	+60	+31	+79	+50	+96	+50	+109	+80	+126	+80	
				+81	+31	+90	+31	+109	+50	+126	+50	+139	+80	+156	+80	
				+75	+37	+82	+39	+101	+58	+116	+60	+131	+88	+146	+90	
225	250	-30	0	+51	+31	+60	+31	+79	+50	+96	+50	+113	+84	+130	+84	
				+81	+31	+90	+31	+109	+50	+126	+50	+143	+84	+160	+84	
				+75	+37	+82	+39	+101	+58	+116	+60	+135	+92	+150	+94	
250	280	-35	0	+57	+34	+66	+34	+88	+56	+108	+56	+126	+94	+146	+94	
				+92	+34	+101	+34	+123	+56	+143	+56	+161	+94	+181	+94	
				+84	+42	+92	+43	+114	+65	+131	+68	+152	+103	+169	+106	
280	315	-35	0	+57	+34	+66	+34	+88	+56	+108	+56	+130	+98	+150	+98	
				+92	+34	+101	+34	+123	+56	+143	+56	+165	+98	+185	+98	
				+84	+42	+92	+43	+114	+65	+131	+68	+156	+107	+173	+110	
315	355	-40	0	+62	+37	+73	+37	+98	+62	+119	+62	+144	+108	+165	+108	
				+102	+37	+113	+37	+138	+62	+159	+62	+184	+108	+205	+108	
				+94	+45	+102	+48	+127	+73	+146	+75	+173	+119	+192	+121	
355	400	-40	0	+62	+37	+73	+37	+98	+62	+119	+62	+150	+114	+171	+114	
				+102	+37	+113	+37	+138	+62	+159	+62	+190	+114	+211	+114	
				+94	+45	+102	+48	+127	+73	+146	+75	+179	+125	+198	+127	

Bearing 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 loads (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 > 0,06C). Outer ring displacement is not necessary	Electric motors, pumps crankshaft main bearings	K7	

Split or solid housing			
Operating conditions	Examples	Tolerance class symbol	Outer ring displacement
Direction of load indeterminate			
Light and normal loads Desirable outer ring displacement ($P \leq 0,12C$)	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 ($P \leq 0,12C$)		H8	
Heat conduction through shaft	Drying cylinders, large electrical machines with spherical roller bearings	G7	

Bearing application

Tolerance classes for housing bores

Radial bearings

Split housing		Table 4.3 (continued)		
Operating conditions	Examples	Tolerance class symbol	Outer ring displacement	
High accuracy rotation, quiet running				
High shiftiness 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 bearing, 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

Thrust bearings		
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

Bearing application

Housing fits

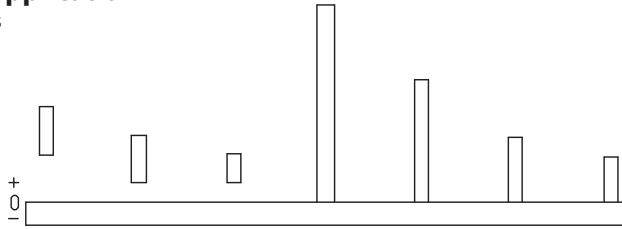


Table 4.4

Table 4.4																	
Housing Diameter		Bearing Outside diameter tolerance Δ_{Dmp}		Deviations of housing bore diameter, resultant fits Tolerances													
				F7			G7		G6		H10		H9		H8		H7
nominal D				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) +13	+28	+5	+20	+5	+14	0	+58	0	+36	0	+22	0	+15
				b) -13	-36	-5	-28	-5	-22	0	-66	0	-44	0	-30	0	-23
				c) -16	-33	-8	-25	-7	-20	-3	-63	-3	-41	-3	-27	-3	-20
10	18	0	-8	+16	+34	+6	+24	+6	+17	0	+70	0	+43	0	+27	0	+18
				-16	-42	-6	-32	-6	-25	0	-78	0	-51	0	-35	0	-26
				-19	-39	-9	-29	-8	-23	-3	-75	-3	-48	-3	-32	-3	-23
18	30	0	-9	+20	+41	+7	+28	+7	+20	0	+84	0	+52	0	+33	0	+21
				-20	-50	-7	-37	-7	-29	0	-93	0	-61	0	-42	0	-30
				-23	-47	-10	-34	-10	-26	-4	-89	-4	-57	-3	-39	-3	-27
30	50	0	-11	+25	+50	-9	+34	+9	+25	0	+100	0	+62	0	+39	0	+25
				-25	-61	-9	-45	-9	-36	0	-111	0	-73	0	-50	0	-36
				-29	-57	-13	-41	-12	-33	-5	-106	-5	-68	-4	-46	-4	-32
50	80	0	-13	+30	+60	+10	+40	+10	+29	0	+120	0	+74	0	+46	0	+30
				-30	-73	-10	-53	-10	-42	0	-133	0	-87	0	-59	0	-43
				-35	-68	-15	-48	-14	-38	-6	-127	-5	-82	-5	-54	-5	-38
80	120	0	-15	+36	+71	+12	+47	+12	+34	0	+140	0	+87	0	+54	0	+35
				-36	-86	-12	-62	-12	-49	0	-155	0	-102	0	-69	0	-50
				-41	-81	-17	-57	-17	-44	-7	-148	-6	-96	-6	-63	-5	-45
120	150	0	-18	+43	+83	+14	+54	+14	+39	0	+160	0	+100	0	+63	0	+40
				-43	-101	-14	-72	-14	-57	0	-178	0	-118	0	-81	0	-58
				-50	-94	-21	-65	-20	-51	-8	-170	-8	-110	-7	-74	-7	-51
150	180	0	-25	+43	+83	+14	+54	+14	+39	0	+160	0	+100	0	+63	0	+40
				-43	-108	-14	-79	-14	-64	0	-185	0	-125	0	+88	0	-65
				-51	-100	-22	-71	-21	-57	-11	-174	-10	-115	-10	-78	-8	-57
180	250	0	-30	+50	+96	+15	+61	+15	+44	0	+185	0	+115	0	+72	0	+46
				-50	-126	-15	-91	-15	-74	0	-215	0	-145	0	-102	0	-76
				-60	-116	-25	-81	-23	-66	-13	-202	-13	-132	-12	-90	-10	-66
250	315	0	-35	+56	+108	-17	+69	+17	+49	0	+210	0	+130	0	+81	0	+52
				-56	-143	-17	-104	-17	-84	0	-245	0	-165	0	-116	0	-87
				-68	-131	-29	-92	-26	-75	-16	-229	-15	-150	-13	-103	-12	-75
315	400	0	-40	+62	+119	+18	+75	+18	+54	0	+230	0	+140	0	+89	0	+57
				-62	-159	-18	-115	-18	-94	0	-270	0	-180	0	-129	0	-97
				-75	-146	-31	-102	-29	-83	-18	-252	-17	-163	-15	-114	-13	-84
400	500	0	-45	+68	+131	+20	+83	+20	+60	0	+250	0	+155	0	+97	0	+63
				-68	-176	-20	-128	-20	-105	0	-295	0	-200	0	-142	0	-108
				-83	-161	-35	-113	-32	-93	-20	-275	-19	-181	-17	-125	-15	-93

Bearing application

Housing fits

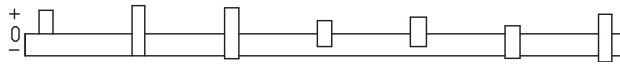


Table 4.4 (continued)

Table 4.4 (continued)																	
Housing Diameter		Bearing Outside diameter tolerance Δ_{Dmp}		Deviations of housing bore diameter, resultant fits Tolerances													
				H6		J7		JS7		J6		JS6		K6		K7	
nominal D				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) 0	+9	-7	+8	-7,5	+7,5	-4	+5	-4,5	+4,5	-7	+2	-10	+5
				b) 0	-17	+7	-16	+7,5	-15,5	+4	-13	+4,5	-12,5	+7	-10	+10	-13
				c) -2	-15	+4	-13	+5	-13	+2	-11	+3	-11	+5	-8	+7	-10
10	18	0	-8	0	+11	-8	+10	-9	+9	-5	+6	-5,5	+5,5	-9	+2	-12	+6
				0	-19	+8	-18	+9	-17	+5	-14	+5,5	-13,5	+9	-10	+12	-14
				-2	-17	+5	-15	+6	-14	+3	-12	+3	-11	+7	-8	+9	-11
18	30	0	-9	0	+13	-9	+12	-10,5	+10,5	-5	+8	-6,5	+6,5	-11	+2	-15	+6
				0	-22	+9	-21	+10,5	-19,5	+5	-17	+6,5	-15,5	+11	-11	+15	-15
				-3	-19	+6	-18	+7	-16	+2	-14	+4	-13	+8	-8	+12	-12
30	50	0	-11	0	+16	-11	+14	-12,5	+12,5	-6	+10	-8	+8	-13	+3	-18	+7
				0	-27	+11	-25	+12,5	-23,5	+6	-21	+8	-19	+13	-14	+18	-18
				-3	-24	+7	-21	+9	-20	+3	-18	+5	-16	+10	-11	+14	-14
50	80	0	-13	0	+19	-12	+18	-15	+15	-6	+13	-9,5	+9,5	-15	+4	-21	+9
				0	-32	+12	-31	+15	-28	+6	-26	+9,5	-22,5	+15	-17	+21	-22
				-4	-28	+7	-26	+10	-23	+2	-22	+6	-19	+11	-13	+16	-17
80	120	0	-15	0	+22	-13	+22	-17,5	+17,5	-6	+16	-11	+11	-18	+4	-25	+10
				0	-37	+13	-37	+17,5	-32,5	+6	-31	+11	-26	+18	-19	+25	-25
				-5	-32	+8	-32	+12	-27	+1	-26	+6	-21	+13	-14	+20	-20
120	150	0	-18	0	+25	-14	+26	-20	+20	-7	+18	-12,5	+12,5	-21	+4	-28	+12
				0	-43	+14	-44	+20	-38	+7	-36	+12,5	-30,5	+21	-22	+28	-30
				-6	-37	+7	-37	+13	-31	+1	-30	+7	-25	+15	-16	+21	-23
150	180	0	-25	0	+25	-14	+26	-20	+20	-7	+18	-12,5	+12,5	-21	+4	-28	+12
				0	-50	+14	-51	+20	-45	+7	-43	+2,5	-37,5	+21	-29	+28	-37
				-7	-43	+6	-43	+12	-37	0	-36	+6	-31	+14	-22	+20	-29
180	250	0	-30	0	+29	-16	+30	-23	+23	-7	+22	-14,5	+14,5	-24	+5	-33	+13
				0	-59	+16	-60	+23	-53	+7	-52	+14,5	-44,5	+24	-35	+33	-43
				-8	-51	+6	-50	+13	-43	-1	-44	+6	-36	+16	-27	+23	-33
250	315	0	-35	0	+32	-16	+36	-26	+26	-7	+25	-16	+16	-27	+5	-36	+16
				0	-67	+16	-71	+26	-61	+7	-60	+16	+51	+27	-40	+36	-51
				-9	-58	+4	-59	+14	-49	-2	-51	+7	-42	+18	-31	+24	-39
315	400	0	-40	0	+36	-18	+39	-28,5	+28,5	-7	+29	-18	+18	-29	+7	-40	+17
				0	-76	+18	-79	+28,5	-68,5	+7	-69	+18	-58	+29	-47	+40	-57
				-11	-65	+5	-66	+15	-55	-4	-58	+7	-47	+18	-36	+27	-44
400	500	0	-45	0	+40	-20	+43	-31,5	+31,5	-7	+33	-20	+20	-32	+8	-45	+18
				0	-85	+20	-88	+31,5	-76,5	+7	-78	+20	-65	+32	-53	+45	-63
				-12	-73	+5	-73	+17	-62	-5	-66	+8	-53	+20	-41	+30	-48

Bearing application

Housing fits

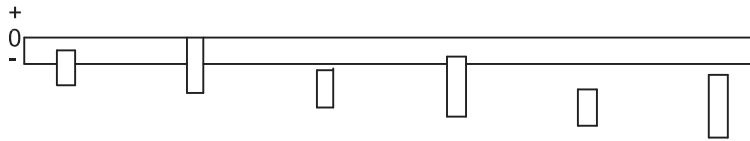


Table 4.4 (continued)

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

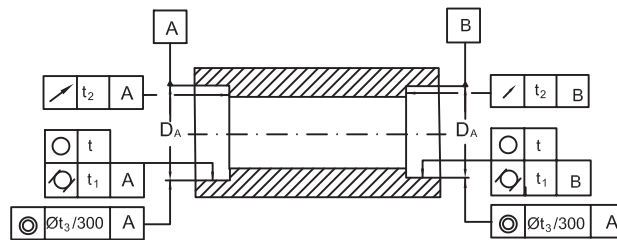
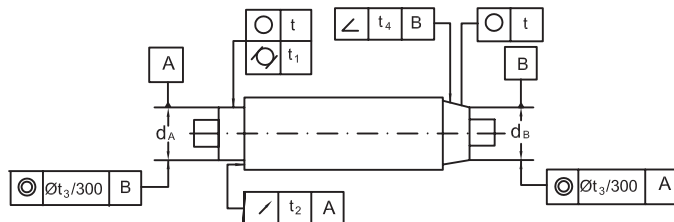


Table 4.5

Tolerance name	Fit	Symbol of deviation	Permissible deviation depending on the tolerance class					
			P0	P6X	P6	P5	P4(SP)	P2(UP)
Tolerance of dimension	shaft housing	-	-	IT6(IT5) IT7(IT6)	IT5 IT6	IT4 IT5	IT4 IT4	IT3 IT4
Tolerance of roundness and cylindricity	shaft		t, t ₁	$\frac{IT4}{2}, \frac{IT3}{2}$	$\frac{IT3}{2}, \frac{IT2}{2}$	$\frac{IT2}{2}$	$\frac{IT1}{2}$	$\frac{IT0}{2}$
	housing		t, t ₁	$\frac{IT5}{2}, \frac{IT4}{2}$	$\frac{IT4}{2}, \frac{IT2}{2}$	$\frac{IT3}{2}$	$\frac{IT2}{2}$	$\frac{IT1}{2}$
Tolerance of face runout	shaft housing		t ₂	IT4 (IT3) IT5 (IT4)	IT3 (IT2) IT4 (IT3)	IT2 IT3	IT1 IT2	IT0 IT1
Tolerance of concentricity	shaft housing		t ₃	IT5 IT6	IT4 IT5	IT4 IT5	IT3 IT4	IT3 IT3
Tolerance of angularity	shaft		t ₄	$\frac{IT7}{2}$	$\frac{IT6}{2}$	$\frac{IT4}{2}$	$\frac{IT3}{2}$	$\frac{IT2}{2}$

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 Diameter d, mm		Housing Diameter D, mm		
	≤80	80...500	≤80	80...500	
Roughness R _a , 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. $R_a = 1,6 \mu\text{m}$.

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

Tolerance ISO (IT)															Table 4.7
Nominal dimension															
over up to	1 3	3 6	6 10	10 18	18 30	30 50	50 80	80 120	120 180	180 250	250 315	315 400	400 500	500 630	
mm	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).

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 (i) are used between the outer rings, the width of the spacer ring being experimentally determined, during mounting.

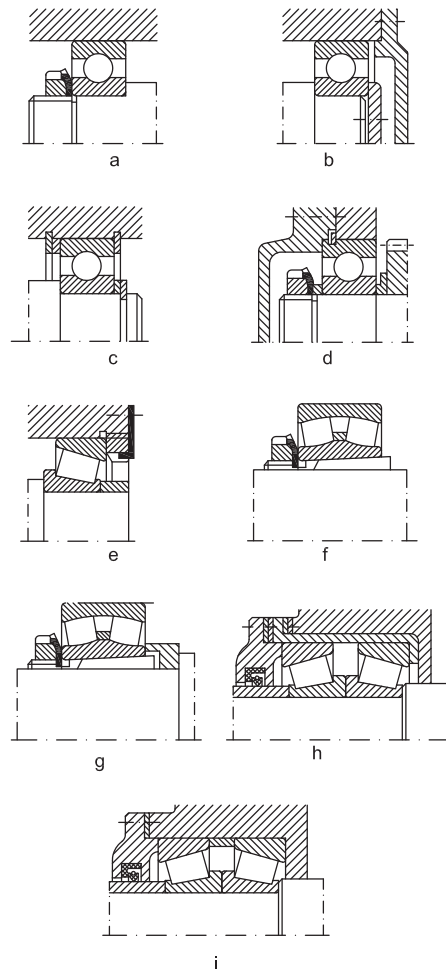


Fig. 4.4

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 (surrounding 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)

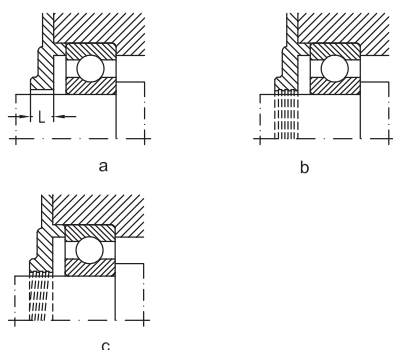


Fig. 4.5

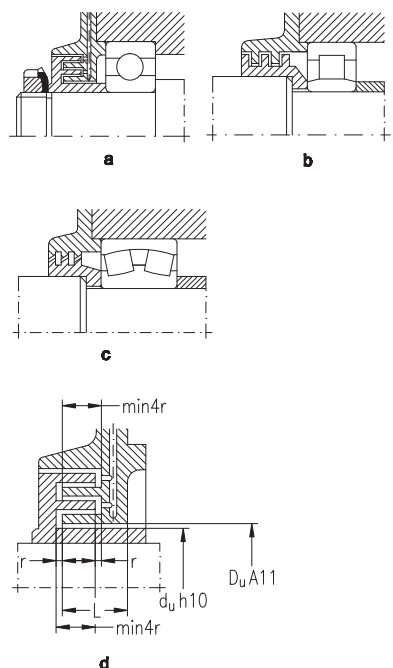


Fig. 4.6

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.

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-in-soluble grease (e.g. Lithium or Calcium base grease) is to be supplied.

The tongues of the labyrinth seals can be radically (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.

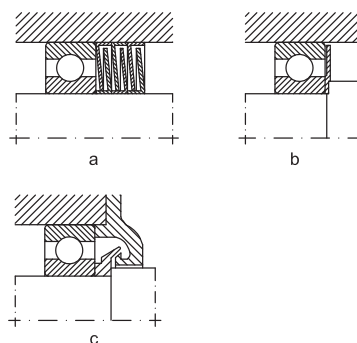


Fig. 4.7

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 $R_a = 1,6 \mu\text{m}$ 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.

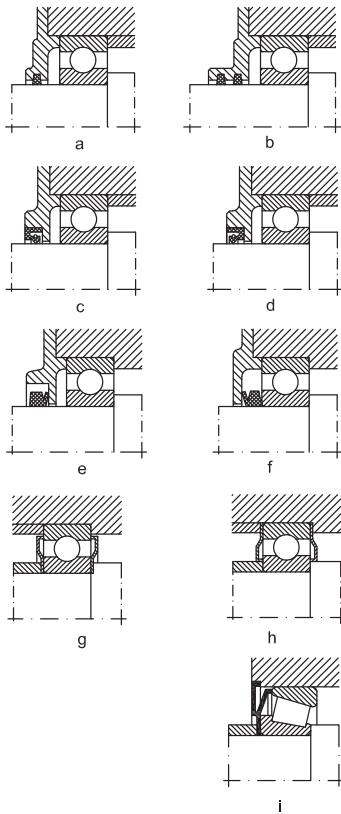


Fig. 4.8

Inclined sealing surfaces are recommended to be ground $R_a=0,8 \mu\text{m}$ 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 ($2^\circ \dots 3^\circ$), 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.

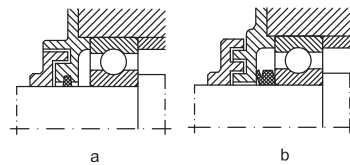


Fig. 4.9

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.

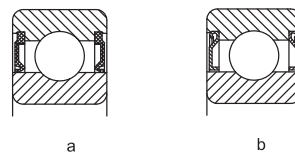


Fig. 4.10

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

Table 5.1

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 characteristic 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_{mn} , as show in table 5.2.

Corelation between D_{mn} and lubricant type		
D_{mn} over	Lubricant type	
	up to	
-	150x10 ³	Mineral oil and grease with medium or high viscosity
150x10 ³	300x10 ³	Mineral oil with medium viscosity and grease
300x10 ³	500x10 ³	Mineral oil with low viscosity and grease
500x10 ³	1200x10 ³	Mineral oil with low viscosity and lubricating equipment

Table 5.2

Grease lubrication

Grease can be used to lubricate rolling bearings only when product $Dm \leq 500 \times 10^3$ 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 bracked, 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 $Dm n < 10 \times 10^3$.

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:

$$T_{ur} = k_0 c \frac{14 \# 10^6}{n \sqrt{d}} - 4d rff_2$$

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 Relubrication interval service life	Grease
Angular contact ball bearings		
Tapered roller bearings		
Thrust ball bearings	1	2
Cylindrical roller bearings	5	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 +60 deg C, light operating conditions. What is the grease service life and relubrication interval?

Grease service life will be:

$$T_u = k_0 C \frac{14 \# 10^6}{n \sqrt{d}} - 4d \text{ mm} \quad T_u = 32\,893 \text{ hours.}$$

$k_0 = 25$ from table 5.3

$d = 40 \text{ mm}$

$f_1 = 1$, from table 5.4

$f_2 = 1$, from table 5.5

Relubrication interval:

$$T_r = k_0 C \frac{14 \# 10^6}{n \sqrt{d}} - 4d \text{ mm} \quad T_r = 13\,157 \text{ hours.}$$

$k_0 = 10$, 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 13500 operating hours.

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

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

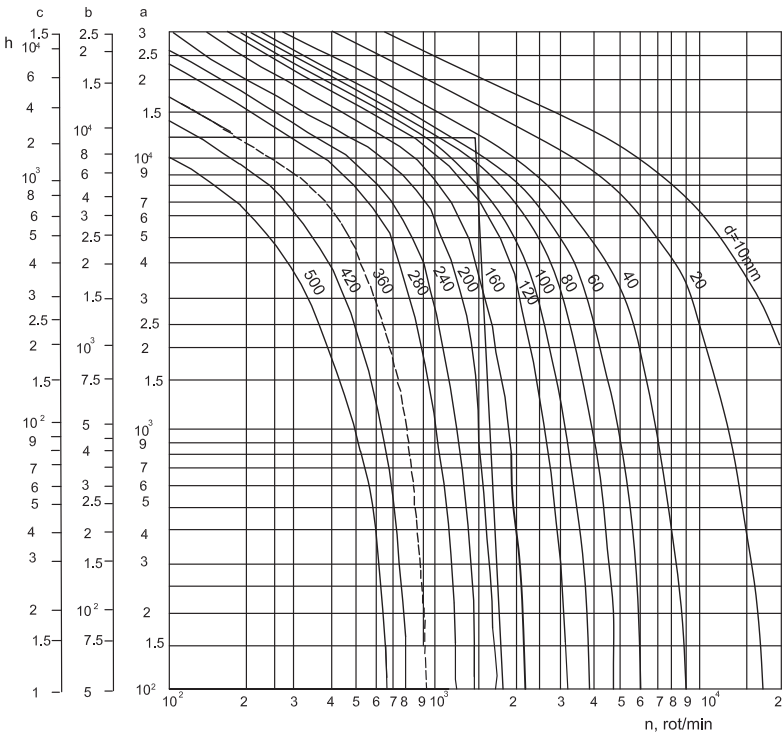


Fig.5.1

Scale a; deep groove ball bearings

Scale b; cylindrical roller bearings

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

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

The chart in fig. 5.1 applies to operating temperatures which do not exceed +70°C. For operating temperatures over +70°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)

m₁... m₃ = exponents which take into account the following factors:

m₁ = $4,4 \times 10^{-6} D_m n$,

m₂ = $2,5 (P/C - 0,05)$,

m₃ = $(0,021 - 1,80 \times 10^{-6} D_m n) t$,

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, °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°C, then t = +50°C

- when speed factor D_m n < 125000, then D_m n = 125000

- when ratio P/C < 0,05, then P/C = 0,05

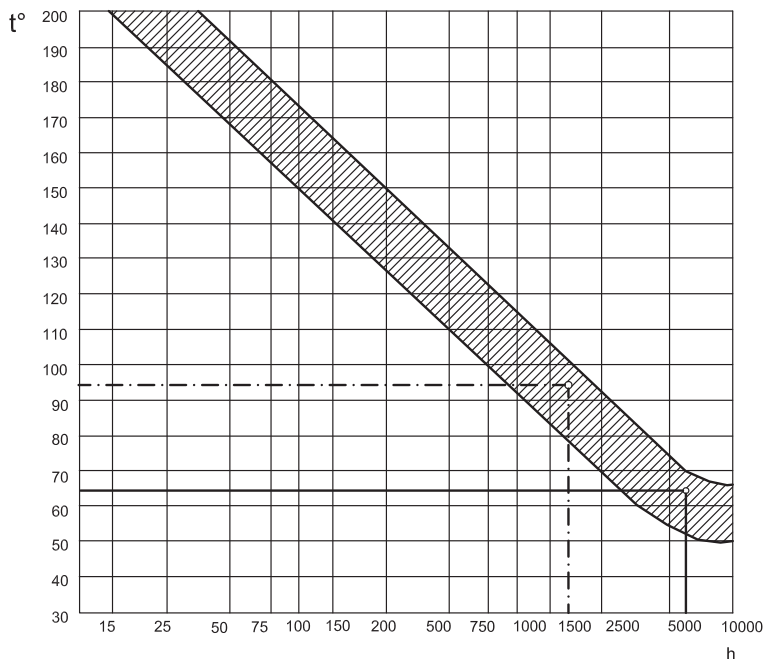


Fig.5.2.

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

$C_r = 35,1$ kN, tables on page 132. bearing 6210

$$L = 10^{a \cdot (m_1 + m_2 + m_3)} = 10^{6,1 - 2,273} = 6214 \text{ hours}$$

$a = 6,1$, for Mobil grease,

$$D_m n = 65 \times 3000 = 195 \times 10^3$$

$$P_r / C_r = 5 / 35,1 = 0,143$$

$$m_1 = 4,4 \times 10^{-6} D_m n = 0,858$$

$$m_2 = 2,5 (P_r / C_r - 0,05) = 0,23$$

$$m_3 = (0,021 - 1,80 \times 10^{-8} D_m n) 65 = 1,119$$

$$m_1 + m_2 + m_3 = 2,273$$

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 $t = 95^\circ\text{C}$.

$$m_3 = 1,66$$

$$m_1 + m_2 + m_3 = 2,794$$

$$L = 10^{6,1 - 2,794} = 10^{3,306} = 1774 \text{ operating hours}$$

From the diagram fig. 5.2, we can find approximately the same value, respectively 6000 operating hours at $+65^\circ\text{C}$ and 1700 operating hours at $+95^\circ\text{C}$.

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 assembled and machines.

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 speed, - 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	-50°C...+120°C	Bearings for electrical motors, generators, electronic equipment, - small sizes, - light loads, - high speeds $D_m \times n \leq 1000 \times 10^3$	- 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 $D_m \times n \leq 1000 \times 10^3$	- 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	Whithout soap, syntetic thickener	indeterminate	-30°C...-250°C	Bearings for general applications, - large sizes, - low speeds $D_m \times n < 200 \times 10^3$, - high temperature	- Barleta 1S, Klüber Lubrication Germany
Syntetic oil + additive for excessive pressure (EP)	Whithout soap, syntetic 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	Whithout soap, inorganic thickener	260°C	-50°C...+177°C	Bearings 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 $D_m \times n \leq 300 \times 10^3$	- 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°C.

- synthetic oils, used up to a temperature of +220°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 tables 5.8.

Oil lubricating systems				
Lubricating system	Operating conditions	Factor $D_m n$	Oil viscosity at 40°C	Example in fig.
			m ² /s	
Oil bath	Bath is filled up to the lowest rolling element for horizontal shaft and 70-80% of bath width for vertical shaft	$< 250 \times 10^3$	$(17 \dots 300) \times 10^{-6}$	5.3 a), b)
Oil bath with external circulation	Central tank, oil circulates under a pressure of 1,5 MPa. High speeds.	$< 600 \times 10^3$	$(45 \dots 175) \times 10^{-6}$	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.	$< 900 \times 10^3$	$(13,5 \dots 80) \times 10^{-6}$	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 for small and medium sized bearings, heavy loads and high speeds.	$< 1200 \times 10^3$	$(10 \dots 45) \times 10^{-6}$	5.6

Table 5.8

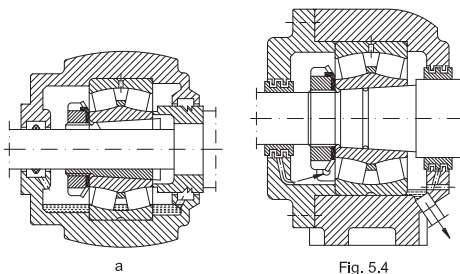


Fig. 5.4

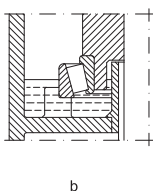


Fig. 5.3

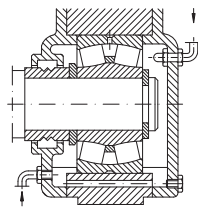


Fig. 5.5

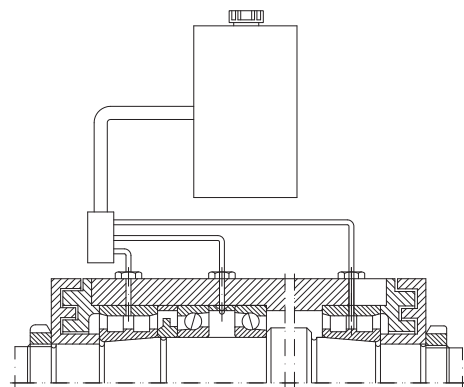


Fig. 5.6

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

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°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, v₁ = 13 cSt and viscosity at + 40°C, v = 32cSt.

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.

Recommended oils by ISO standards				
Table 5.10				
Class ISO	Kinematic viscosity at +40°C, mm²/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 1000	1000	900	1100	
ISO VG 1500	1500	1350	1650	

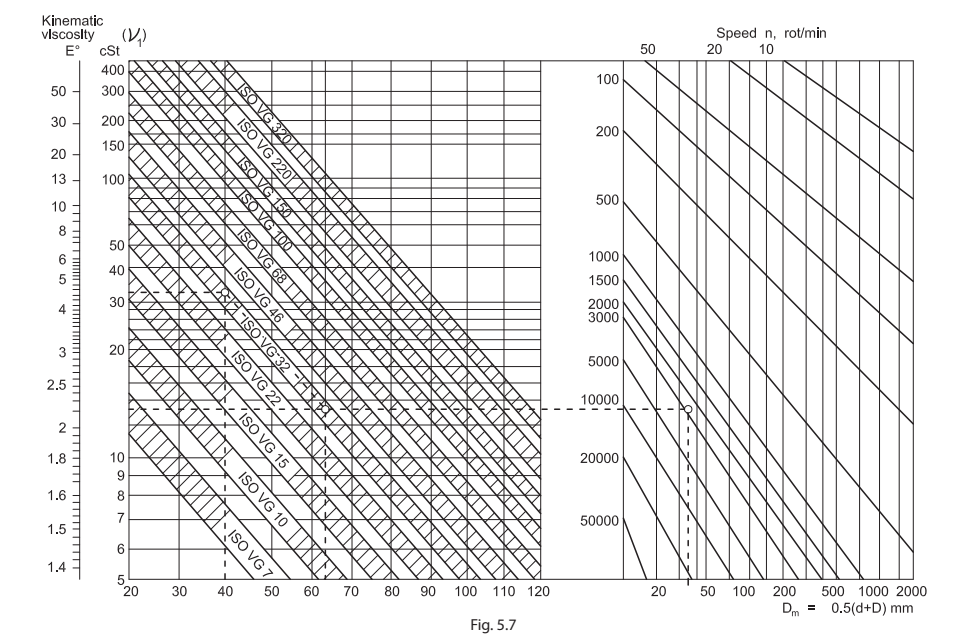


Fig. 5.7

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. Designation of URB rolling bearings are in accordance with those used by

world-know bearing companies: SKF, GAF, INA, KOYO etc.

The completed 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.

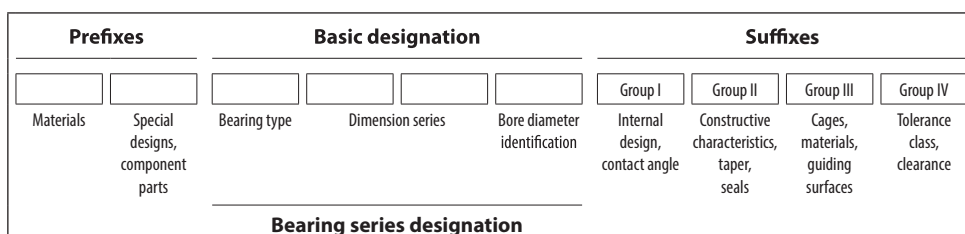


Fig. 6.1.

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

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

- bore diameter from 1 to 9 mm
- one figure, representing the bore diameter (e.g. 623, 608);
- bore diameter from 10 to 495 mm
- 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 500 mm

- 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 catalogues 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			
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	NU208
	NJ	03 23 04	NJ2206
	N		N310
	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.

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 bearing 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

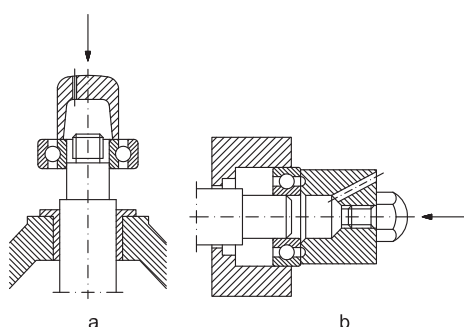


Fig. 7.1

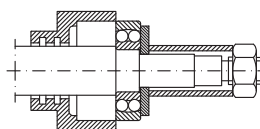


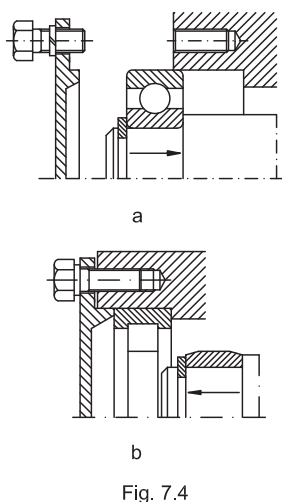
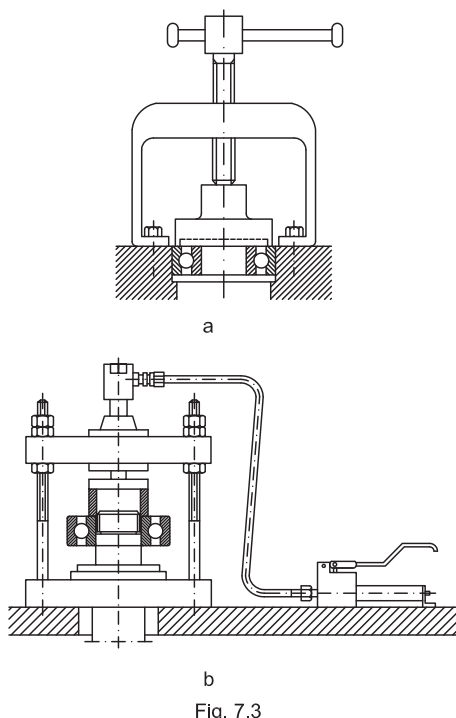
Fig. 7.2

bearings or spherical roller thrust bearings, a plate is mounted for a proper location of the outer rings, 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.

In case of dismountable 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.

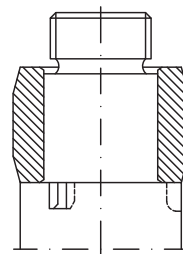


Fig. 7.5

Thermic ring bore diameter is equal to inner ring raceway diameter of dismountable bearings. The ring outside diameter can be calculated using the equation:

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

where:

D_{ex} = outside diameter of the thermic ring,
 d_1 = diameter of the inner ring raceway, mm
 d = bearing bore diameter, mm

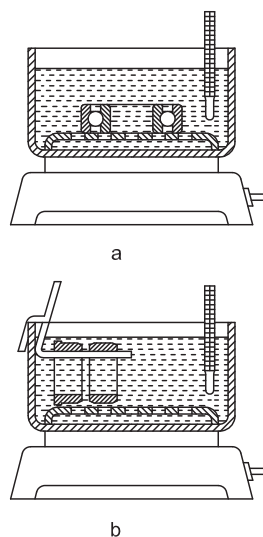


Fig. 7.6

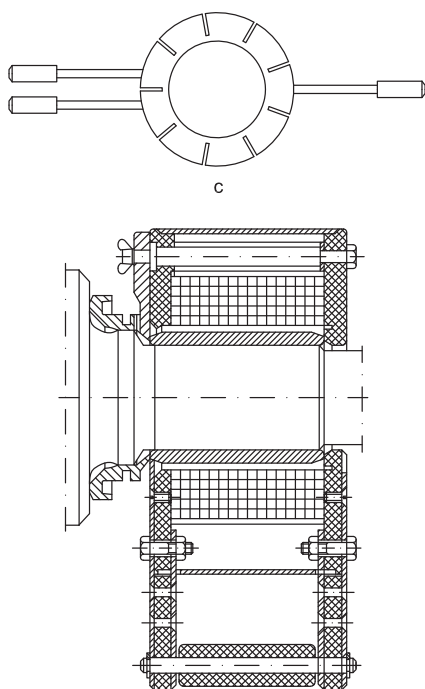


Fig. 7.6 (continued)

The mass of the thermic ring is approximately equal to the mass 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.

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 bearings 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

S = distance initially measured, mm

a = axial displacement, from table 7.1, mm

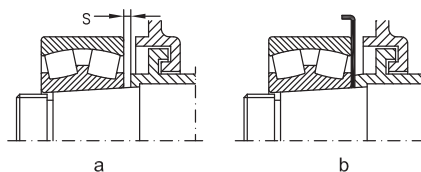


Fig. 7.7

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. 7.11 are used to mount medium and large-sized bearings.

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.

Values for self-aligning ball bearings radial clearance, after mounting									
Values in mm								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	
				on tapered shaft		on tapered sleeve			
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	0,9	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
400	450	0,2	0,26	3,1	4,1	3,4	4,4	7,7	10	8	10,2	0,13	0,2	0,31
450	500	0,21	0,28	3,3	4,4	3,6	4,8	8,2	11	8,4	11,2	0,16	0,23	0,35
500	560	0,24	0,32	3,7	5	4,1	5,4	9,2	12,5	9,6	12,8	0,17	0,25	0,36
560	630	0,26	0,35	4	5,4	4,4	5,9	10	13,5	10,4	14	0,2	0,29	0,41
630	710	0,3	0,4	4,6	6,2	5,1	6,8	11,5	15,5	12	16	0,21	0,31	0,45

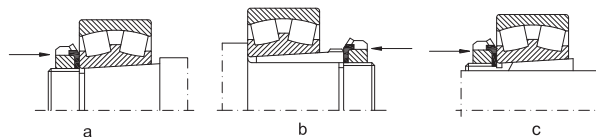


Fig. 7.8

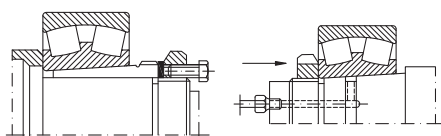


Fig. 7.9

Fig. 7.10

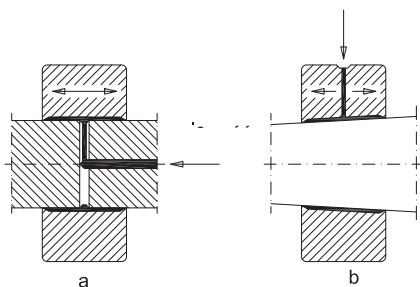


Fig. 7.11

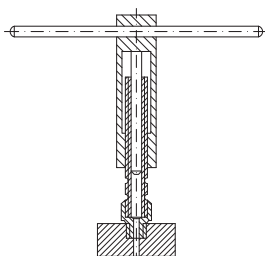


Fig. 7.12

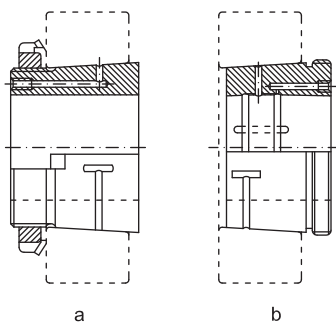


Fig. 7.13

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.

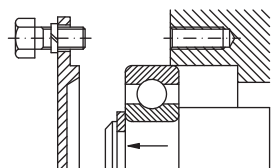


Fig. 7.14

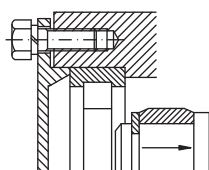


Fig. 7.15

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.

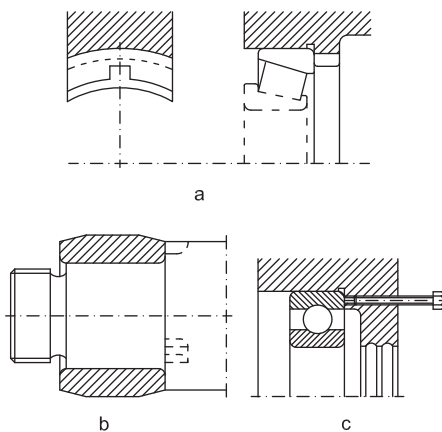


Fig. 7.16

Medium and small-sized bearings which are mounted with a tight fit are dismantled 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.

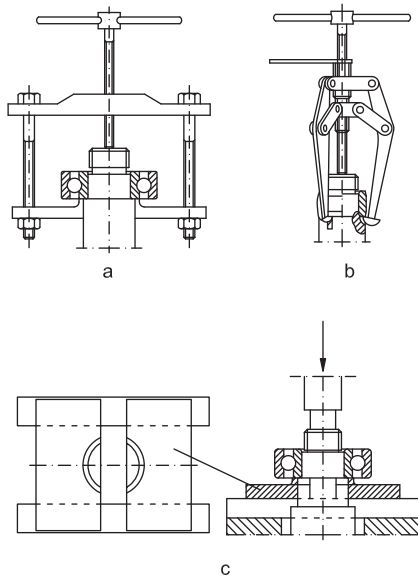


Fig. 7.17

To reduce the frictional force when dismantling largesized 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.

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

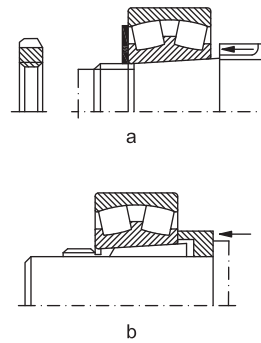


Fig. 7.18

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

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.

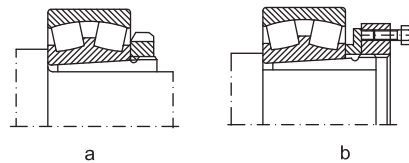


Fig. 7.19

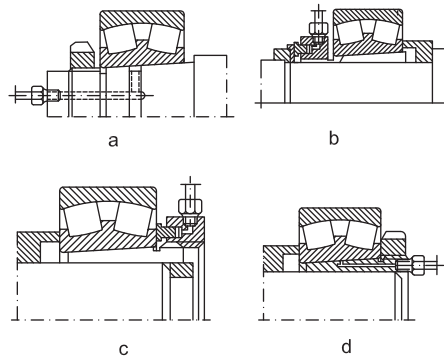


Fig. 7.20

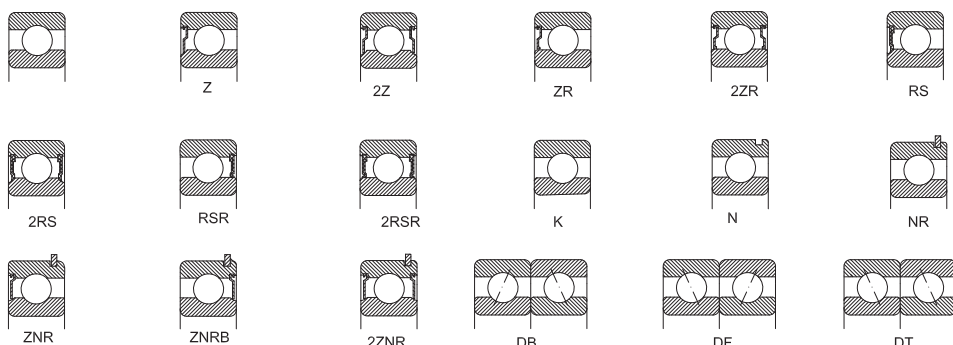


Deep groove ball bearing

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 the bearings. 2ZR, 2RSR or 2RS type, as shown in the below 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
- MA - 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 the 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, diameter 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

URB 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 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 the snap ring groove

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

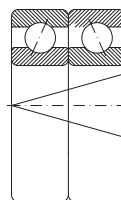
Because of their simple and space saving mounting, these bearings simplify the assembly design. The groove for the snap ring and the snap rings are in accordance with ISO 464 and tables 7 and 8 respectively.

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 preloaded. 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 multiple 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 error 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.

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									
		-		C2		Normal		C3		C4	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm											
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	6	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.

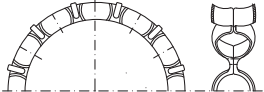
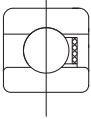
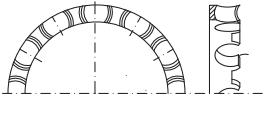
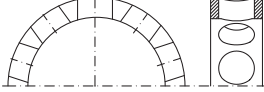
Cages of glass fibre reinforced polyamide 6.6 are also suitable if the operating temperature doesn't exceed +120°C. They have reduced mass, low coefficient of friction and are noiseless in operation. Large-sized bearings are fitted with machined brass cages.

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.

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.

Cage	Design bearing	cage	Application	Max. value D_m n oil	grease
Pressed cage of sheet with fins			- General application - Bearings with $d > 10$ mm - Low frictional moment - Low inertia - Moderate speeds	100×10^3	550×10^3
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 - High speeds	1400×10^3	1100×10^3
Brass machined cage			- General application - Bearings: 61836-618/1400 61936-619/950 16036-16072 6030-60630 6230-6248 6320-6330	1000×10^3	800×10^3

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 bearing 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:

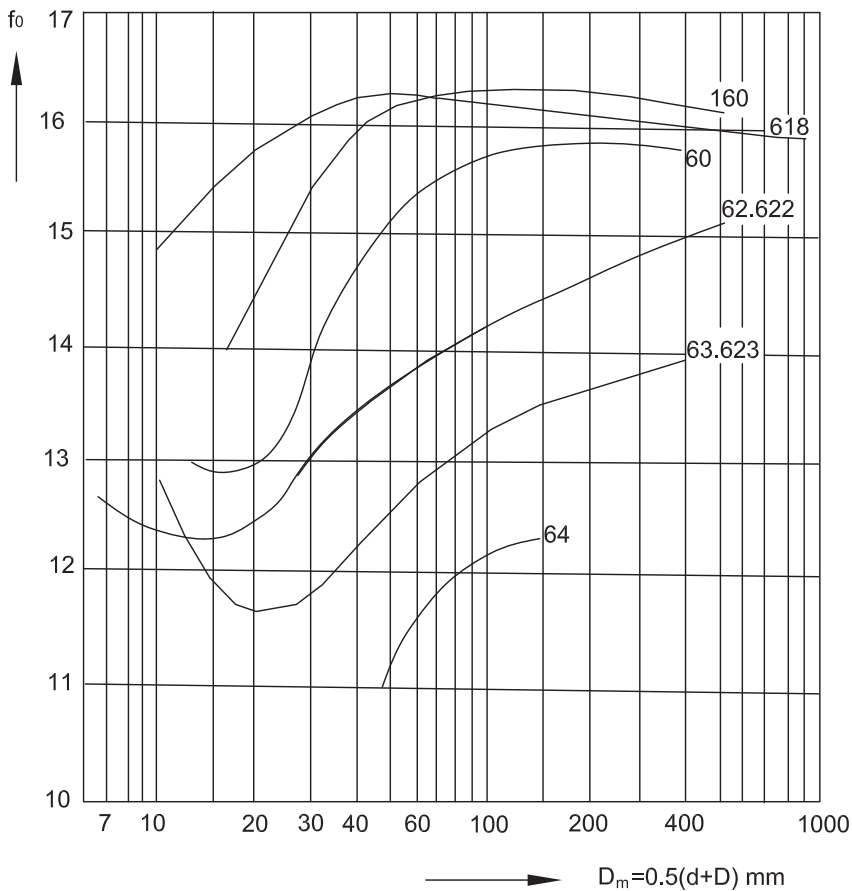
$$P_r = F_r, \text{ kN, when } F_a/F_r < e$$

$$P_r = XF_r + YF_a, \text{ when } F_a/F_r > e$$

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

Factor e , X and Y depend on the ratio $f_0 F_a / C_{0r}$. Factor f_0 can be determined using the diagram in the bellow figure, as a function of dimension series and mean diameter $(d+D)/2$. F_a is the axial and C_{0r} 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 $f_0 F_a / C_{0r}$. The values in table 4 apply to bearings mounted with normal fit, i.e. shaft manufactured to tolerance class j5 or k5 and housing in J6, respectively.



Calculation factors e, X and Z 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:

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

$$P_r = 0,75 F_r + Y_2 F_a, \text{ kN when } F_a/F_r > e.$$

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

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

Table 5

f ₀ 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

Equivalent static radial load

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

$$P_0 = F_r, \text{ kN, when } F_a/F_r < 0,8$$

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

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

$$P_0 = F_r + 1,7 F_a, \text{ kN.}$$

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, respectively, maximum shaft (housing) connection radius

Abutment dimension

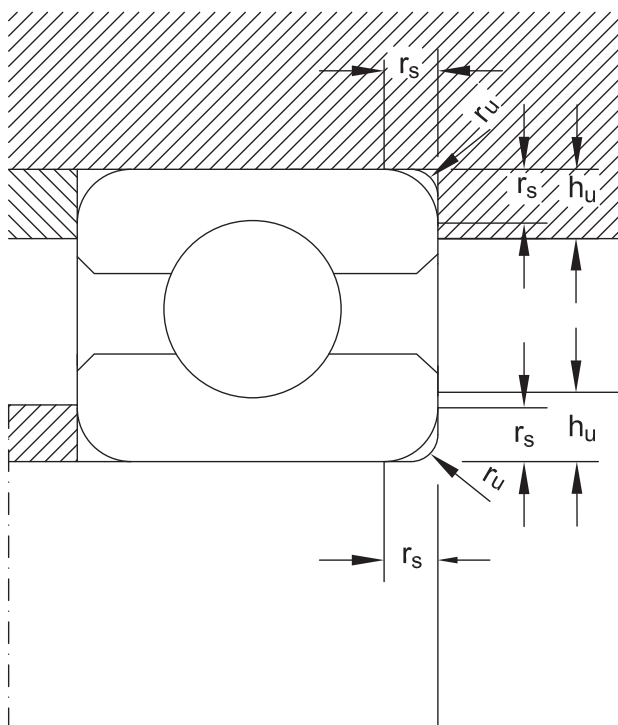
Table 6

r _s min	r _u max	h _u min		
		Bearing series		
		618, 619, 160	161, 60, 62, 63	64
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	-	-

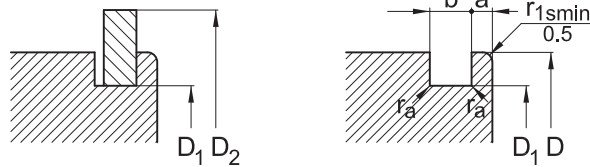
$r_{u \max}$ should be less than minimum bearing mounting chamfer $r_{s \min}$.

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 function of mounting chamfers are given in table 6.



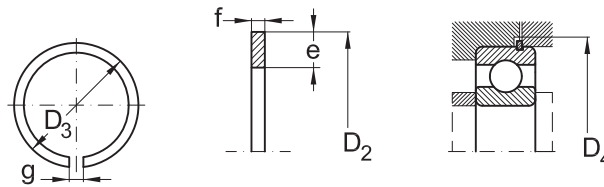
Snap ring groove and snap ring dimensions and tolerances



Snap ring groove

Outer diameter D	D ₁		a		Dimensions series		b		r ₀	
	nom.	toler.	18 nom.	18 toler.	19 nom.	19 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	- 0,3	-	-	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	142,7	- 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 dimensions series 18, up to D = 78 mm included and for dimensions series 19, up to D = 47 mm included;
0,5 mm for dimensions series 18, for D > 78 mm and for dimensions series 19, for D > 47 mm



Snap ring

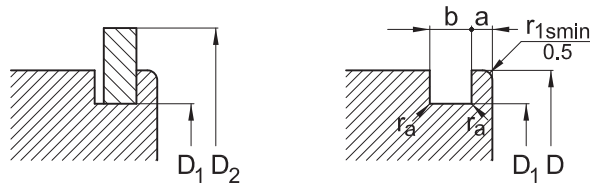
Table 7

Outer diameter	D ₂ ¹⁾	D ₃ ²⁾		D ₄	e	f	g	r	Mass	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 dimensions refers to the mounted snap ring

2) D₃ represents dimensions before mounting

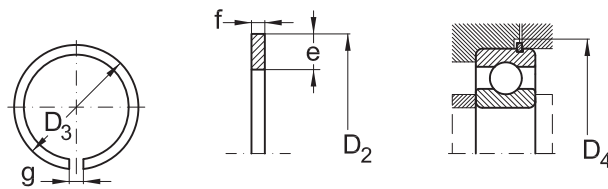
Snap ring groove and snap ring dimensions and tolerances



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										
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 dimensions series 18, up to D = 78 mm included and for dimensions series 19, up to D = 47 mm included;
0,5 mm for dimensions series 18, for D > 78 mm and for dimensions series 19, for D > 47 mm



Snap ring

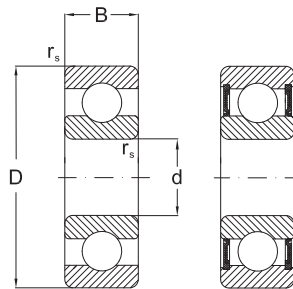
Table 8

Outer diameter	D ₂ ¹⁾	D ₃ ²⁾		D ₄	e	f	g	r	Mass	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 dimensions refers to the mounted snap ring

2) D₃ represents dimensions before mounting

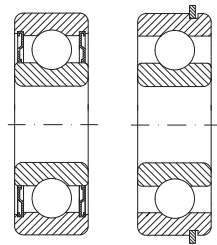
Deep groove ball bearings



2RSR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r_s min	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
3	10	4	0,1	0,64	0,23	40000	48000	623	0,002
	10	4	0,1	0,64	0,23	40000		623 2ZR	0,002
4	13	5	0,2	1,3	0,49	38000	45000	624	0,003
	13	5	0,2	1,3	0,49	38000		624 2ZR	0,003
	16	5	0,3	1,2	0,5	34000	40000	634	0,005
	16	5	0,3	1,2	0,5	34000		634 2ZR	0,005
5	11	3	0,1	0,64	0,26	55000	65000	618/5	0,001
	16	5	0,3	1,9	0,69	34000	40000	625	0,005
	16	5	0,3	1,9	0,69	34000		625 2ZR	0,005
	16	5	0,3	1,9	0,69	22000		625 2RSR	0,005
	19	6	0,3	1,7	0,72	32000	38000	635	0,009
	19	6	0,3	1,7	0,72	32000		635 2ZR	0,009
6	13	3,5	0,1	1	0,44	50000	59000	618/6	0,002
	15	5	0,2	1,45	0,6	47000	56000	619/6	0,004
	19	6	0,3	2,2	0,89	32000	38000	626	0,008
	19	6	0,3	2,2	0,89	32000		626 2ZR	0,008
	19	6	0,3	2,2	0,89	22000		626 2RSR	0,008
7	14	3,5	0,1	0,96	0,4	47000	56000	618/7	0,002
	17	5	0,3	2,1	0,8	44000	51000	619/7Y	0,005
	19	6	0,3	2,25	0,89	32000	38000	607	0,008
	19	6	0,3	2,25	0,89	32000		607 2ZR	0,008
	19	6	0,3	2,25	0,89	22000		607 2RSR	0,008
	22	7	0,3	3,3	1,35	30000	36000	627	0,012
	22	7	0,3	3,3	1,35	30000		627 2ZR	0,012
	22	7	0,3	3,3	1,35	20000		627 2RSR	0,012
8	16	4	0,2	1,35	0,57	44000	51000	618/8	0,003
	19	6	0,3	1,6	0,74	40000	47000	619/8	0,007
	22	7	0,3	3,3	1,35	30000	36000	608	0,015
	22	7	0,3	3,3	1,35	30000		608 2ZR	0,015
	22	7	0,3	3,3	1,35	20000		608 2RSR	0,015
9	17	4	0,2	1,45	0,64	40000	47000	618/9	0,003
	20	6	0,3	2,65	1,1	37000	43000	619/9	0,007
	24	7	0,3	3,35	1,4	30000	36000	609	0,018
	24	7	0,3	3,35	1,4	30000		609 2ZR	0,018
	24	7	0,3	3,35	1,4	20000		609 2RSR	0,018

Deep groove ball bearings

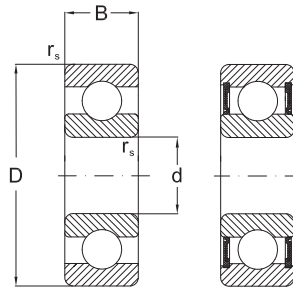


2ZR

NR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_{s \min}$	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
9	26	8	0,3	4,55	1,95	28000	34000	629	0,020
	26	8	0,3	4,55	1,95	26000		629 2ZR	0,020
	26	8	0,3	4,55	1,95	18000		629 2RSR	0,020
10	19	5	0,3	1,7	0,83	37000	43000	61800	0,005
	22	6	0,3	1,95	0,75	34000	41000	61900 TN	0,010
	26	8	0,3	4,6	1,95	28000	34000	6000 TN	0,020
	26	8	0,3	4,6	1,95	28000		6000 2ZR	0,020
	26	8	0,3	4,6	1,95	17000		6000 2RSR	0,020
	28	8	0,3	4,6	1,95	28000	34000	16100	0,023
	30	9	0,6	5,1	2,4	32000	38000	6200 TN	0,032
	30	9	0,6	5,1	2,4	26000		6200 2ZR	0,032
	30	9	0,6	5,1	2,4	17000		6200 2RSR	0,032
	35	11	0,6	8,1	3,45	20000	26000	6300	0,057
	35	11	0,6	8,2	3,5	20000		6300 2ZR	0,057
	35	11	0,6	8,2	3,5	15000		6300 2RSR	0,057
12	21	5	0,3	1,8	0,95	33000	39000	61801	0,006
	21	5	0,3	1,45	0,67	33000	39000	61801 NR	0,006
	24	6	0,3	2,9	1,45	31000	36000	61901	0,011
	24	6	0,3	2,9	1,45	31000	36000	61901 NR	0,011
	28	8	0,3	5,1	2,4	26000	32000	6001	0,022
	28	8	0,3	5,1	2,4	26000	32000	6001 TN	0,022
	28	8	0,3	5,1	2,4	26000		6001 2ZR	0,022
	28	8	0,3	5,1	2,4	17000		6001 2RSR	0,022
	30	8	0,3	5,1	2,4	26000	32000	16101	0,026
	32	10	0,6	6,9	3,1	22000	28000	6201	0,037
	32	10	0,6	6,9	3,1	22000	28000	6201 TN	0,037
	32	10	0,6	6,9	3,1	22000		6201 2ZR	0,037
	32	10	0,6	6,9	3,1	15000		6201 2RSR	0,037
	32	14	0,6	6,9	3,1	22000		62201 2RSR	0,049
	37	12	1	9,8	4,2	19000	24000	6301	0,065
	37	12	1	9,8	4,2	19000		6301 2ZR	0,065
	37	12	1	9,8	4,2	12000		6301 2RSR	0,065
15	24	5	0,3	2	1,25	28000	33000	61802	0,007
	24	5	0,3	2	1,25	28000	33000	61802 NR	0,007
	28	7	0,3	4	2,05	26000	30000	61902	0,017

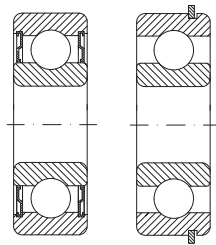
Deep groove ball bearings



2RSR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
15	28	7	0,3	4	2,05	26000	30000	61902 NR	SR28
	30	8	0,3	4	2,05	22000	28000	16002	
	32	9	0,3	5,6	2,9	22000	28000	6002	
	32	9	0,3	5,6	2,9	22000		6002 2ZR	
	32	9	0,3	5,6	2,9	14000		6002 2RSR	
	35	11	0,6	7,8	3,8	19000	24000	6202	
	35	11	0,6	7,8	3,8	19000		6202 2ZR	
	35	11	0,6	7,65	3,75	19000	24000	6202 TN	
	35	11	0,6	7,8	3,8	13000		6202 2RSR	
	35	14	0,6	7,8	3,8	13000		62202 2RSR	
	42	13	1	11,5	5,5	17000	20000	6302	
	42	13	1	11,5	5,5	17000		6302 2ZR	
	42	13	1	11,5	5,5	11000		6302 2RSR	
	42	17	1	11,5	5,5	17000		62302 2RSR	
17	26	5	0,3	2,2	1,4	26000	32000	61803	
	30	7	0,3	4,35	2,3	26000	32000	61903	
	35	8	0,3	6	3,25	20000	26000	16003	
	35	10	0,3	6	3,3	20000	26000	6003	
	35	10	0,3	6	3,3	20000		6003 2ZR	
	35	10	0,3	6	3,3	12000		6003 2RSR	
	40	12	0,6	9,6	4,8	17000	20000	6203	
	40	12	0,6	9,6	4,8	17000	20000	6203 TN	
	40	12	0,6	9,6	4,8	17000		6203 2ZR	
	40	12	0,6	9,6	4,8	11000		6203 2RSR	
	40	12	0,6	9,6	4,8	17000	20000	6203 NR	
	40	16	1	9,55	4,8	17000	20000	62203 2RSR	
	47	14	1	13,7	6,7	16000	19000	6303	
	47	14	1	13,7	6,7	16000		6303 2ZR	
	47	14	1	13,7	6,7	11000		6303 2RSR	
	47	19	1	13,4	6,55	16000		62303 2RSR	
	62	17	1,1	22,7	11	12000	15000	6403	
	62	17	1,1	22,7	11	12000	15000	6403 NR	
20	32	7	0,3	3,45	2,25	20000	26000	61804	
	32	7	0,3	3,45	2,25	21000	25000	61804 NR	
	37	9	0,3	6,55	3,65	19000	23000	61904	

Deep groove ball bearings

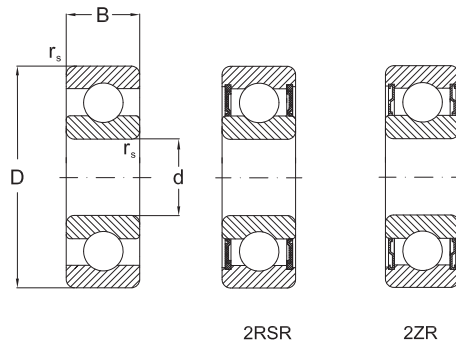


2ZR

NR

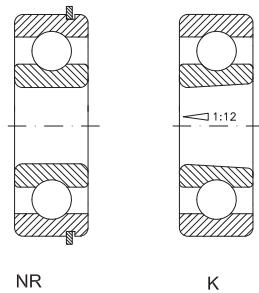
Dimensions				Basical radial load		Speed limit		Designation		Mass	
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring		
mm				kN		min ⁻¹		-		kg	
20	37	9	0,3	6,55	3,65	19000	23000	61904 NR	SR37	0,036	
	42	8	0,3	7,95	4,5	17000	20000	16004		0,050	
	42	12	0,6	9,4	5,1	17000	20000	6004		0,070	
	42	12	0,6	9,4	5,1	17000		6004 2ZR		0,070	
	42	12	0,6	9,4	5,1	11000		6004 2RSR		0,070	
	47	14	1	12,8	6,7	15000	18000	6204		0,118	
	47	14	1	12,8	6,7	15000	18000	6204 TN		0,118	
	47	14	1	12,8	6,7	15000		6204 2ZR		0,118	
	47	14	1	12,8	6,7	10000		6204 2RSR		0,118	
	47	14	1	12,8	6,7	15000	18000	6204 NR		SP47	0,118
	47	18	1	12,8	6,7	15000		62204 2RSR		0,131	
	52	15	1,1	15,9	7,9	13000	16000	6304		0,158	
	52	15	1,1	15,9	7,9	13000	16000	6304 TN		0,158	
	52	15	1,1	15,9	7,9	13000	16000	6304 MAP5		0,158	
	52	15	1,1	15,9	7,9	13000		6304 2ZR		0,158	
	52	15	1,1	15,9	7,9	8000		6304 2RSR		0,158	
	52	15	1,1	15,9	7,9	13000	16000	6304 NR	SP52	0,158	
	52	21	1,1	15,9	7,9	13000		62304 2RSR			0,197
	72	19	1,1	31	15,2	10000	13000	6404			0,420
22	50	14	1	12,9	6,8	15000	17000	62/22		0,118	
	50	14	1	12,9	6,8	15000		62/22 2ZR		0,118	
	50	14	1	12,9	6,8	15000		62/22 2RSR		0,118	
	56	16	1,1	18,5	9,5	13000	15000	63/22		0,201	
	56	16	1,1	18,5	9,5	13000		63/22 2ZR		0,201	
	56	16	1,1	18,5	9,5	13000		63/22 2RSR		0,201	
25	37	7	0,3	4,35	2,6	18000	25000	61805		0,022	
	42	9	0,3	6,65	4,1	16000	19000	61905		0,041	
	47	8	0,3	8,4	5,1	15000	18000	16005		0,058	
	47	12	0,6	10,1	5,9	15000	18000	6005 TN		0,086	
	47	12	0,6	10,1	5,9	15000		6005 2ZR		0,086	
	47	12	0,6	10,1	5,9	9500		6005 2RSR		0,086	
	52	15	1	14	7,9	12000	15000	6205		0,142	
	52	15	1	14	7,9	12000		6205 2ZR		0,142	
	52	15	1	14	7,9	8000		6205 2RSR		0,142	
	52	15	1	14	7,9	12000	15000	6205 NR	SP52	0,142	

Deep groove ball bearings



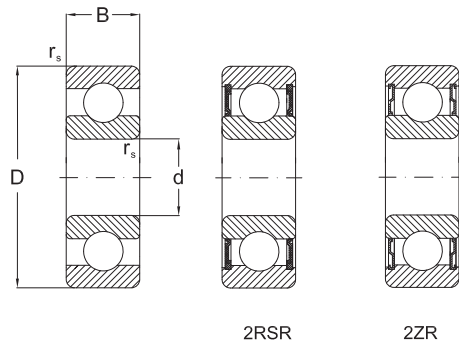
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r_s min	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
25	52	18	1	14	7,9	12000		62205 2RSR	0,148
	62	17	1,1	20,6	11,3	11000	14000	6305	0,250
	62	17	1,1	20,6	11,3	11000	14000	6305 MAP5	0,250
	62	17	1,1	20,6	11,3	11000		6305 2ZR	0,250
	62	17	1,1	20,6	11,3	7500		6305 2RSR	0,250
	62	17	1,1	20,6	11,3	11000	14000	6305 NR	0,250
	62	24	1,1	20,6	11,3	11000		62305 2RSR	0,317
	80	21	1,5	37,6	19	9000	11000	6405	0,575
	80	21	1,5	37,6	19	9000	11000	6405 NR	0,575
28	58	16	1	10,7	6,65	14000	16000	62/28	0,173
	58	16	1	10,7	6,65	14000		62/28 2ZR	0,173
	58	16	1	10,7	6,65	14000		62/28 2RSR	0,173
	68	18	1,1	19,5	11,5	10000	12000	63/28	0,328
	68	18	1,1	19,5	11,5	10000		63/28 2ZR	0,328
	68	18	1,1	19,5	11,5	10000		63/28 RSR	0,328
30	42	7	0,3	4,4	2,9	15000	18000	61806	0,027
	42	7	0,3	4,4	2,9	15000	18000	61806 NR	0,027
	47	9	0,3	7,8	4,7	14000	17000	61906	0,045
	47	9	0,3	7,8	4,7	14000	17000	61906 NR	0,045
	55	9	3	11,2	7,35	12000	15000	16006	0,087
	55	13	1	13,2	8,25	12000	15000	6006TN	0,129
	55	13	1	13,2	8,25	12000		6006 2ZR	0,129
	55	13	1	13,2	8,25	7000		6006 2RSR	0,129
	55	13	1	13,2	8,25	12000	15000	6006 NR	0,129
	62	16	1	19,5	11,3	10000	13000	6206	0,210
	62	16	1	19,5	11,3	10000		6206 2ZR	0,210
	62	16	1	19,5	11,3	7500		6206 2RSR	0,210
	62	16	1	19,5	11,3	10000	13000	6206 NR	0,210
	62	20	1	19,5	11,3	10000		62206 2RSR	0,236
	72	19	1,1	29,5	15,8	9000	11000	6306	0,371
	72	19	1,1	29,5	15,8	9000	11000	6306 MAP5	0,371
	72	19	1,1	29,5	15,8	9000		6306 2ZR	0,371
	72	19	1,1	29,5	15,8	6000		6306 2RSR	0,371
	72	19	1,1	29,5	15,8	9000	11000	6306 NR	0,371
	72	27	1,1	26,6	14,9	9000		62306 2RSR	0,473

Deep groove ball bearings



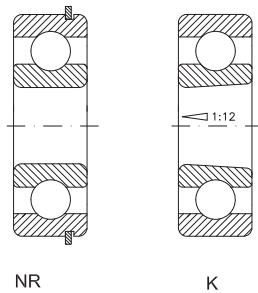
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
30	90	23	1,5	47,3	24,5	8500	10000	6406	0,785
	90	23	1,5	47,3	24,5	8500	10000	6406 NR	SP90 0,785
32	65	17	1	23	13	10000	12000	62/32	0,228
	65	17	1	23	13	10000		62/32 2ZR	0,228
	65	17	1	23	13	10000		62/32 2RSR	0,228
	75	20	1,1	30	16	9000	11000	63/32	0,437
	75	20	1,1	30	16	9000		63/32 2ZR	0,437
	75	20	1,1	30	16	9000		63/32 2RSR	0,437
35	47	7	0,3	4	3,25	13000	16000	61807	0,031
	55	10	0,6	9,5	6,2	12000	14000	61907	0,073
	62	9	0,3	12,2	8,85	10000	13000	16007	0,111
	62	14	1	15,9	10,3	10000	13000	6007	0,164
	62	14	1	15,9	10,3	10000		6007 2ZR	0,164
	62	14	1	15,9	10,3	7000		6007 2RSR	0,164
	62	14	1	15,9	10,3	10000	13000	6007 NR	SP62 0,164
	72	17	1,1	25,7	15,6	9000	11000	6207 K	0,315
	72	17	1,1	25,7	15,4	9000	11000	6207 TN	0,315
	72	17	1,1	25,7	15,4	9000	11000	6207 MAP6	0,315
	72	17	1,1	25,7	15,4	9000	11000	6207 P6	0,315
	72	17	1,1	25,7	15,4	9000	11000	6207 P5	0,315
	72	17	1,1	25,7	15,6	9000		6207 2ZR	0,315
	72	17	1,1	25,7	15,6	6000		6207 2RSR	0,315
	72	17	1,1	25,7	15,6	9000	11000	6207 NR	SP72 0,315
	72	17	1,1	25,7	15,6	9000	11000	6207 NRP6	SP72 0,315
	72	17	1,1	25,7	15,6	9000	11000	6207 MA	0,315
	72	23	1,1	25,7	15,6	9000		62207 2RSR	0,375
	80	21	1,5	33,5	19,2	8500	10000	6307	0,450
	80	21	1,5	33,5	19,2	8500	10000	6307 K	0,450
	80	21	1,5	33,5	19,2	8500	10000	6307 P6	0,450
	80	21	1,5	33,5	19,2	8500	10000	6307 P5	0,450
	80	21	1,5	33,5	19,2	8500		6307 2ZR	0,450
	80	21	1,5	33,5	19,2	8500		6307 2ZRP5	0,450
	80	21	1,5	33,5	19,2	6500		6307 2RSR	0,450
	80	21	1,5	33,5	19,2	6500		6307 2RSRP6	0,450
	80	21	1,5	33,5	19,2	6500		6307 2RSRP5	0,450

Deep groove ball bearings



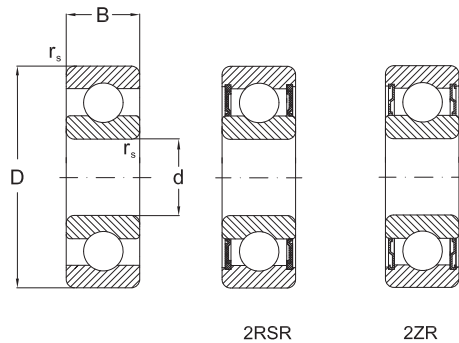
Dimensions				Basical radial load		Speed limit		Designation		Mass	
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring		
mm				kN		min ⁻¹		-		kg	
35	80	31	1,5	33,5	19,2	8500	10000	6307 NR	SP80	0,450	
	80	31	1,5	33,5	19,2	8500		62307 2RSR		0,658	
	100	25	1,5	55,5	29,4	7000	8500	6407		0,954	
	100	25	1,5	55,5	29,4	7000	8500	6407 NR	SP100	0,954	
40	52	7	0,3	4,5	4,05	11000	14000	61808 P5	SR52	0,034	
	52	7	0,3	4,5	4,05	12000	14000	61808 NR		0,034	
	62	12	0,6	14,5	10,2	11000	13000	61908	SR62	0,110	
	62	12	0,6	14,5	10,2	11000	13000	61908 NR		0,110	
	68	9	0,3	13,3	9,8	95000	12000	16008		0,130	
	68	15	1	16,8	11,6	9500	12000	6008		0,210	
	68	15	1	16,8	11,6	9500		6008 2ZR		0,210	
	68	15	1	16,8	11,6	6000		6008 2RSR		0,210	
	68	15	1	16,8	11,6	9500	12000	6008 NR	SP68	0,210	
	80	18	1,1	32,6	20	8500	10000	6208		0,402	
	80	18	1,1	32,6	20	8500	10000	6208 K		0,402	
	80	18	1,1	32,6	20	8500	10000	6208 P6		0,402	
	80	18	1,1	32,6	20	8500	10000	6208 P5		0,402	
	80	18	1,1	32,6	20	8500		6208 2ZR		0,402	
	80	18	1,1	32,6	20	8500		6208 2ZRP5		0,402	
	80	18	1,1	32,6	20	5600		6208 2RSR		0,402	
	80	18	1,1	32,6	20	5600		6208 2RSRP5		0,402	
	80	18	1,1	32,6	20	8500	10000	6208 NR	SP80	0,402	
	80	18	1,1	32,6	20	8500	10000	6208 MB		0,402	
	80	18	1,1	32,6	20	8500	10000	6208 NMA		0,402	
	80	23	1,1	32	19,8	8500			62208 2RSR		0,460
	90	23	1,5	40,8	24	7500	9000		6308		0,635
	90	23	1,5	40,8	24	7500	9000		6308 K		0,635
	90	23	1,5	40,8	24	7500	9000		6308 TN		0,635
	90	23	1,5	40,8	24	7500	9000		6308 P6		0,635
	90	23	1,5	40,8	24	7500	9000		6308 P5		0,635
	90	23	1,5	40,8	24	7500			6308 2ZR		0,635
	90	23	1,5	40,8	24	7500			6308 2ZRP5		0,635
	90	23	1,5	40,8	24	7500			6308 2RSR		0,635
	90	23	1,5	40,8	24	7500	9000		6308 NMA		0,635
	90	23	1,5	40,8	24	7500	9000		6308 NR	SP90	0,635

Deep groove ball bearings



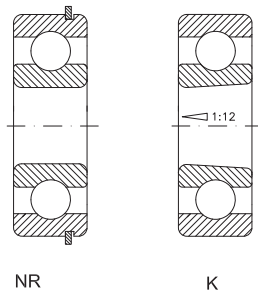
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_{s \min}$	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN			min^{-1}	-	kg
40	90	33	1,5	40,8	24	7500		62308 2RSR	0,874
	110	27	2	64	35	6700	7500	6408	1,23
	110	27	2	64	35	6700	8000	6408 NR	SP110 1,23
45	58	7	0,3	6,4	5,6	9500	12000	61809	0,043
	68	12	0,6	14	9,8	9700	11000	61909	0,120
	75	10	0,6	15,5	12,3	9000	11000	16009	0,170
	75	16	1	21	15	9000	11000	6009	0,261
	75	16	1	21	15	9000	11000	6009 P5	0,261
	75	16	1	21	15	9000	11000	6009 P4	0,261
	75	16	1	21	15	9000		6009 2ZR	0,261
	75	16	1	21	15	9000		6009 2ZRP4	0,261
	75	16	1	21	15	5600		6009 2RSR	0,261
	75	16	1	21	15	9000	11000	6009 NR	SP75 0,261
	85	19	1,1	32,7	20,6	7500	9000	6209	0,414
	85	19	1,1	32,7	20,6	7500	9000	6209 K	0,414
	85	19	1,1	32,7	20,6	7500	9000	6209 P6	0,414
	85	19	1,1	32,7	20,6	7500	9000	6209 P5	0,414
	85	19	1,1	32,7	20,6	9000		6209 2ZR	0,414
	85	19	1,1	32,7	20,6	8000		6209 2ZRP5	0,414
	85	19	1,1	32,7	20,6	5600		6209 2RSR	0,414
	85	19	1,1	32,7	20,6	5600		6209 2RSRP6	0,414
	85	19	1,1	32,7	20,6	5600		6209 2RSRP5	0,414
	85	19	1,1	32,7	20,6	8000	9500	6209 NR	SP85 0,414
	85	23	1,1	32,7	20,2	8000		62209 2RSR	0,481
	100	25	1,5	52,8	31,7	6700	8000	6309	0,838
	100	25	1,5	52,8	31,7	6700	8000	6309 K	0,838
	100	25	1,5	52,8	31,7	6700	8000	6309 MB	0,838
	100	25	1,5	52,8	31,7	6700	8000	6309 MAP6	0,838
	100	25	1,5	52,8	31,7	6700	8000	6309 P6	0,838
	100	25	1,5	52,8	31,7	6700	8000	6309 P5	0,838
	100	25	1,5	52,8	31,7	6700		6309 2ZR	0,838
	100	25	1,5	52,8	31,7	6700		6309 2ZRP5	0,838
	100	25	1,5	52,8	31,7	4500		6309 2RSR	0,838
	100	25	1,5	52,8	31,7	4500		6309 2RSRP6	0,838
	100	25	1,5	52,8	31,7	4500		6309 2RSRP5	0,838

Deep groove ball bearings



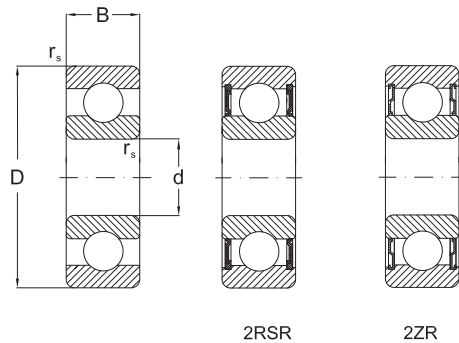
Dimensions				Basical radial load		Speed limit		Designation		Mass
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring	
mm				kN		min ⁻¹		-		kg
45	100	25	1,5	52,8	31,7	6700	8000	6309 NR	SP100	0,838
	100	36	1,5	52,8	31,7	6700		62309 2RSR		1,18
	120	29	2	76,8	44,9	5600	6700	6409		1,54
	120	29	2	76,8	44,9	5600	6700	6409 NR	SP120	1,54
50	65	7	0,3	6,8	6,3	9500	12000	61810	SR65	0,057
	65	7	0,3	6,8	6,3	9700	11000	61810 NR		0,057
	72	12	0,6	14,5	10,4	9000	11000	61910	SR72	0,130
	72	12	0,6	14,5	10,4	9000	11000	61910 NR		0,130
	80	10	0,6	16,3	13,1	8500	10000	16010		0,188
	80	16	1	21,8	16,6	8500	10000	6010 K		0,260
	80	16	1	21,8	16,6	8500		6010 2ZR		0,260
	80	16	1	21,8	16,6	5300		6010 2RSR		0,260
	90	20	1,1	35,1	23,2	7000	8500	6210		0,460
	90	20	1,1	35,1	23,2	7000	8500	6210 K		0,460
	90	20	1,1	35,1	23,2	7000	8500	6210 M		0,460
	90	20	1,1	35,1	23,2	7000	8500	6210 MAP6		0,460
	90	20	1,1	35,1	23,2	7000	8500	6210 P6		0,460
	90	20	1,1	35,1	23,2	7000	8500	6210 P5		0,460
	90	20	1,1	35,1	23,2	7000		6210 2ZR		0,460
	90	20	1,1	35,1	23,2	7000		6210 2ZRP5		0,460
	90	20	1,1	35,1	23,2	4500		6210 2RSR		0,460
	90	20	1,1	35,1	23,2	4500		6210 2RSRP6		0,460
	90	20	1,1	35,1	23,2	4500		6210 2RSRP5		0,460
	90	20	1,1	35,1	23,2	7000	8500	6210 NR	SP90	0,460
	90	23	1,1	35,1	23,2	7000		62210 2RSR		0,514
	110	27	2	61,8	37,9	6300	7000	6310		1,06
	110	27	2	61,8	37,9	6300	7000	6310 K		1,06
	110	27	2	61,8	37,9	6300	7000	6310 MAP6		1,06
	110	27	2	61,8	37,9	6300		6310 2ZR		1,06
	110	27	2	61,8	37,9	4000		6310 2RSR		1,06
	110	27	2	61,8	37,9	6000	7000	6310 NR	SP10	1,06
	110	40	2	61,8	37,9	6000		62310 2RSR		1,65
	130	31	2,1	87,1	52	5000	6000	6410		1,89
	130	31	2,1	87,1	52	5000	6000	6410 NR	SP130	1,89

Deep groove ball bearings



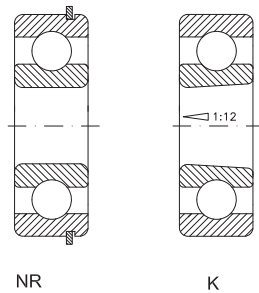
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
55	72	9	0,3	9	8,5	8500	10000	61811	0,083
	90	11	0,6	19,3	16,3	7500	9000	16011	0,26
	90	18	1,1	28,3	21,3	7500	9000	6011 MB	0,39
	90	18	1,1	28,3	21,3	7500		6011 2ZR	0,39
	90	18	1,1	28,3	21,3	4500		6011 2RSR	0,39
	90	18	1,1	28,3	21,3	7500	9000	6011 NR	0,39
	100	21	1,5	43,4	29,4	6300	7500	6211	0,611
	100	21	1,5	43,4	29,4	6300	7500	6211 K	0,611
	100	21	1,5	43,4	29,4	6300	7500	6211 MA	0,611
	100	21	1,5	43,4	29,4	6300		6211 2ZR	0,611
	100	21	1,5	43,4	29,4	4000		6211 2RSR	0,611
	100	21	1,5	43,4	29,4	6300	7500	6211 NR	0,611
	120	29	2	71,7	45	5300	6300	6311	1,38
	120	29	2	71,7	45	5300	6300	6311 K	1,38
	120	29	2	71,7	45	5300	6300	6311 MA	1,38
	120	29	2	71,7	45	5300		6311 2ZR	1,38
	120	29	2	71,7	45	3600		6311 2RSR	1,38
	120	29	2	71,7	45	5300	6300	6311 NR	1,38
	140	33	2,1	100	62	4800	5600	6411	2,30
	140	33	2,1	100	62	4800	5600	6411 NR	2,30
60	78	10	0,3	8,7	6,7	8000	9500	61812	0,120
	95	11	0,6	20	17,6	7000	8500	16012	0,280
	95	18	1,1	29,4	23,3	6700	8000	6012	0,420
	95	18	1,1	29,4	23,3	6700		6012 2ZR	0,420
	95	18	1,1	29,4	23,3	4300		6012 2RSR	0,420
	95	18	1,1	29,4	23,3	7000	8500	6012 NR	0,420
	110	22	1,5	52,4	36,3	6000	7000	6212	0,780
	110	22	1,5	52,4	36,3	6000	7000	6212 K	0,780
	110	22	1,5	52,4	36,3	6000	7000	6212 MA	0,780
	110	22	1,5	52,4	36,3	6000		6212 2ZR	0,780
	110	22	1,5	52,4	36,3	4000		6212 2RSR	0,780
	110	22	1,5	52,4	36,3	6000	7000	6212 NR	0,780
	130	31	2,1	81,9	52,2	5000	6000	6312	1,72
	130	31	2,1	81,9	52,2	5000	6000	6312 K	1,72
	130	31	2,1	81,9	52,2	5000		6312 2ZR	1,72

Deep groove ball bearings



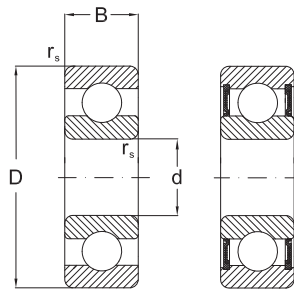
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r_s min	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
60	130	31	2,1	81,9	52,2	3400		6312 2RSR	1,72
	130	31	2,1	81,9	52,2	5000	6000	6312 NR	SP130 1,72
	150	35	2,1	110	70,8	4300	5000	6412	2,76
	150	35	2,1	110	70,8	4300	5000	6412 NR	SP150 2,76
62	110	22	1,5	47,5	28	6000	7000	62/62	0,600
65	85	10	0,6	12,2	12	7000	8500	61813	0,130
	100	11	0,6	22,9	19,6	6300	7500	16013	0,300
	100	18	1,1	30,5	25,4	6300	7500	6013 K	0,440
	100	18	1,1	30,5	25,4	6300		6013 2ZR	0,440
	100	18	1,1	30,5	25,4	4000		6013 2RSR	0,440
	100	18	1,1	30,5	25,4	6300	7500	6013 NR	SP100 0,440
	120	23	1,5	57,2	40	5300	6300	6213	0,995
	120	23	1,5	57,2	40	5300	6300	6213 M	0,995
	120	23	1,5	57,2	40	5300	6300	6213 MA	0,995
	120	23	1,5	57,2	40	5300		6213 2ZR	0,995
	120	23	1,5	57,2	40	3600		6213 2RSR	0,995
	120	23	1,5	57,2	40	5300	6300	6213 NR	SP120 0,995
	140	33	2,1	92,7	59,7	4800	5600	6313	2,10
	140	33	2,1	92,7	59,7	4800	5600	6313 MA	2,10
	140	33	2,1	92,7	59,7	4800	5600	6313 MB	2,10
	140	33	2,1	92,7	59,7	4800		6313 2ZR	2,10
	140	33	2,1	92,7	59,7	3000		6313 2RSR	2,10
	140	33	2,1	92,7	59,7	4800	5600	6313 NR	SP140 2,10
	160	37	2,1	118	79	4000	4800	6413	3,300
	160	37	2,1	118	79	4000	4800	6413 NR	SP160 3,300
70	90	10	0,6	12,5	10	6700	8000	61814	0,160
	110	13	0,6	27,9	25	6000	7000	16014	0,433
	110	20	1,1	38,1	30,9	6000	7000	6014	0,600
	110	20	1,1	38,1	30,9	6000	7000	6014 MAP5	0,600
	110	20	1,1	38,1	30,9	6000		6014 2ZR	0,600
	110	20	1,1	38,1	30,9	3600		6014 2RSR	0,600
	110	20	1,1	38,1	30,9	6000	7000	6014 NR	SP110 0,600
	125	24	1,5	62,2	44,1	5000	6000	6214	1,07
	125	24	1,5	62,2	44,1	5000	6000	6214 MA	1,07
	125	24	1,5	62,2	44	5000		6214 2ZR	1,07

Deep groove ball bearings



Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_{s \min}$	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN		min^{-1}		-	kg
70	125	24	1,5	62,2	44	3400		6214 2RSR	
	125	24	1,5	62,2	44	5000	6000	6214 NR	SP125
	150	35	2,1	104	68,1	4500	5300	6314	
	150	35	2,1	104	68,1	4500	5300	6314 K	
	150	35	2,1	104	68,1	4500	5300	6314 MAP6	
	150	35	2,1	104	68,1	4500		6314 2ZR	
	150	35	2,1	104	68,1	2800		6314 2RSR	
	150	35	2,1	104	68,1	4500	5300	6314 NR	SP150
	180	42	3	144	104	3800	4500	6414	
75	95	10	0,6	12,8	12,1	6300	7500	61815 P5	
	95	10	0,6	12,8	12,1	4000		61815 2RSR	
	115	13	0,6	28,5	26,8	5600	6700	16015	
	115	20	1,1	39,7	33,5	5600	6700	6015 M	
	115	20	1,1	39,7	33,5	5600	6700	6015 MAP5	
	115	20	1,1	39,7	33,5	5600		6015 2ZR	
	115	20	1,1	39,7	33,5	3400		6015 2RSR	
	115	20	1,1	39,7	33,5	5600	6700	6015 NR	SP115
	130	25	1,5	67,4	49,3	4800	5600	6215	
	130	25	1,5	67,4	49,3	4800	5600	6215 K	
	130	25	1,5	67,4	49,3	4800		6215 2ZR	
	130	25	1,5	67,4	49,3	3200		6215 2RSR	
	130	25	1,5	67,4	49,3	4800	5600	6215 NR	SP130
	160	37	2,1	113	77	4000	4800	6315	
	160	37	2,1	113	77	4000	4800	6315 MP6	
	160	37	2,1	113	77	4000		6315 2ZR	
	160	37	2,1	113	77	2800		6315 2RSR	
	160	37	2,1	113	77	4000	5000	6315 NR	SP160
	190	45	3	154	115	3600	4300	6415	
80	100	10	0,6	12,9	13,7	6000	7000	61816	
	110	16	1	25,1	20,5	5600	6700	61916	
	125	14	0,6	31,9	29,7	5300	6300	16016	
	125	22	1,1	47,6	39,8	5300	6300	6016 MA	
	125	22	1,1	47,6	39,8	5300		6016 2ZR	
	125	22	1,1	47,6	39,8	3600		6016 2RSR	
	125	22	1,1	47,6	39,8	5300	6300	6016 NR	SP125
	125	22	1,1	47,6	39,8	5300	6300	6016 NR	

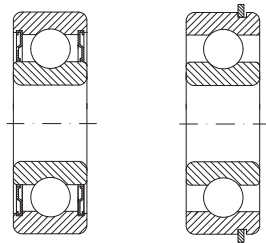
Deep groove ball bearings



2RSR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
80	140	26	2	72,7	53	4500	5300	6216	1,40
	140	26	2	72,7	53	4500	5300	6216 K	1,40
	140	26	2	72,7	53	4500	5300	6216 MA	1,40
	140	26	2	72,7	53	4500		6216 2ZR	1,40
	140	26	2	72,7	53	3000		6216 2RSR	1,40
	140	26	2	72,7	53	4500	5300	6216 NR	SP140 1,40
	170	39	2,1	123	86,5	3800	4500	6316 K	3,60
	170	39	2,1	123	86,5	3800	4500	6316 M	3,60
	170	39	2,1	123	86,5	3800		6316 2ZR	3,60
	170	39	2,1	123	86,5	3800	4500	6316 NR	SP170 3,60
	200	48	3	164	125	3400	4000	6416	7,50
85	110	13	1	19,3	20	5300	6300	61817	0,290
	130	14	1	33,8	33,5	5000	6000	16017	0,630
	130	22	1,1	49,5	43,1	5000	6000	6017	0,890
	130	22	1,1	49,5	43,1	5000		6017 2ZR	0,890
	130	22	1,1	49,5	43,1	3400		6017 2RSR	0,890
	130	22	1,1	49,5	43,1	5000	6000	6017 NR	SP130 0,890
	150	28	2	84	61,9	4300	5000	6217	1,80
	150	28	2	84	61,9	4300	5000	6217 K	1,80
	150	28	2	84	61,9	4300	5000	6217 MP6	1,80
	150	28	2	84	61,9	4300		6217 2ZR	1,80
	150	28	2	84	61,9	2800		6217 2RSR	1,80
	150	28	2	84	61,9	4300	5000	6217 NR	SP150 1,80
	180	41	3	133	96,9	3600	4300	6317	4,20
	180	41	3	133	96,9	3600	4300	6317 K	4,20
	180	41	3	133	96,9	3600	4300	6317 MA	4,20
	180	41	3	133	96,9	3600	4300	6317 MB	4,20
	180	41	3	133	96,9	3600		6317 2ZR	4,20
	180	41	3	133	96,9	3600	4300	6317 NR	SP180 4,20
	210	52	4	173	136	3200	3800	6417	9,00
90	115	13	1	19,6	20,4	5300	6300	61818	0,300
	140	16	1	41,9	40,4	4500	5300	16018	0,850
	140	24	1,5	58,2	49,7	4500	5300	6018 MA	1,16
	140	24	1,5	58,2	49,7	4500	5300	6018 MP6	1,16
	140	24	1,5	58,2	49,7	4500		6018 2ZR	1,16

Deep groove ball bearings

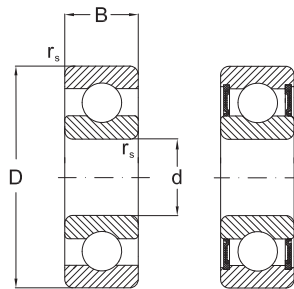


2ZR

NR

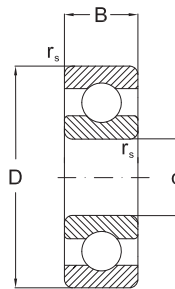
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_{s \min}$	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
90	140	24	1,5	58,2	49,7	3000		6018 2RSR	1,16
	140	24	1,5	58,2	49,7	4500	5600	6018 NR	1,6
	160	30	2	96	71,5	3800	4500	6218	2,16
	160	30	2	96	71,5	3800	4500	6218 K	2,16
	160	30	2	96	71,5	3800	4500	6218 MA	2,16
	160	30	2	96	71,5	3800	4500	6218 MP6	2,16
	160	30	2	96	71,5	3800	4500	6218 2ZR	2,16
	160	30	2	96	71,5	3800	4500	6218 NR	2,16
	190	43	3	143	107	3400	4000	6318	4,90
	190	43	3	143	107	3400	4000	6318 K	4,90
	190	43	3	143	107	3400	4000	6318 M	4,90
	190	43	3	143	107	3400	4000	6318 2ZR	4,90
	190	43	3	143	107	3400	4000	6318 NR	4,90
	225	54	4	190	160	3000	3600	6418	11,5
	145	16	1	42,3	41,5	4300	5000	16019	0,890
	145	24	1,5	60,5	53,6	4300	5000	6019	1,20
95	145	24	1,5	60,5	53,6	4300		6019 2ZR	1,20
	145	24	1,5	60,5	53,6	2800		6019 2RSR	1,20
	145	24	1,5	60,5	53,6	4300	5000	6019 NR	1,20
	170	32	2,1	109	81,9	3600	4300	6219 MBP6	2,60
	170	32	2,1	109	81,9	3600	4300	6219 NR	2,60
	200	45	3	153	118	3200	3800	6319	5,60
	200	45	3	153	118	3200	3800	6319 MAP6	5,60
100	125	13	1	19,6	21,2	4800	5600	61820 MAP5	0,320
	150	16	1	45	44	4300	5000	16020	0,910
	150	24	1,5	60,5	54	4300	5000	6020 MAP6	1,25
	150	24	1,5	60,5	54	4300		6020 2ZR	1,25
	150	24	1,5	60,5	54	2800		6020 2RSR	1,25
	150	24	1,5	60,5	54	4300	5000	6020 NR	1,25
	180	34	2,1	124	93	3400	4000	6220	3,10
	180	34	2,1	124	93	3400	4000	6220 MA	3,15
	180	34	2,1	124	93	3400	4000	6220 MP6	3,15
	180	34	2,1	124	93	3400	4000	6220 NR	3,15
	215	47	3	173	140	3000		6320 2ZR	7,00
	215	47	3	173	140	3000	3600	6320 MAP6	7,00

Deep groove ball bearings



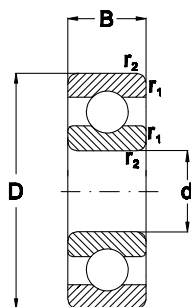
2RSR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r _s min	dyn. C _r	stat. C _{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
105	130	13	1	20,8	19,	4500	5300	61821 MAP5	0,350
	160	18	1	52	51	4000	4800	16021	1,20
	160	26	2	72,3	65,8	3800	4500	6021 M	1,60
	190	36	2,1	133	104	3200	3800	6221	3,70
	190	36	2,1	133	104	3200	3800	6221 MA	3,70
	225	49	3	184	153	2800	3400	6321 MA	8,00
110	140	16	1	28,1	29	4300	5000	61882	0,600
	170	19	1	57,5	56,7	3800	4500	16022	1,46
	170	28	2	82	73	3600	4300	6022	1,95
	200	38	2,1	143	118	3000	3600	6222	4,35
	200	38	2,1	143	118	3000	3600	6222 M	4,35
	200	38	2,1	143	118	3000	3600	6222 NR	4,35
	240	50	3	203	178	2600	3200	6322	9,58
	240	50	3	203	178	2600	3200	6322 MA	9,58
								SP200	
120	150	16	1	29,1	32,5	3800	4500	61824	0,650
	180	19	1	63,2	63,3	3400	4000	16024	1,70
	180	28	2	85	79,3	3400	4000	6024 MP6	2,09
	215	40	2,1	155	131	2800	3400	6224	5,15
	215	40	2,1	155	131	2800	3400	6224 MB	5,15
	215	40	2,1	155	131	2800	3400	6224 MAP6	5,15
	215	40	2,1	155	131	2800	3400	6224 ZZR	5,15
	215	40	2,1	155	131	2800	3400	6224 NR	5,15
	260	55	3	212	190	2400	3000	6324 MA	13,6
								SP215	
130	165	18	1,1	38	43	3600	4300	61826 MAP5	0,930
	200	22	1,1	79	81	3200	3800	16026	2,50
	200	33	2	106	101	3000	3600	6026	3,25
	230	40	3	167	146	2600	3200	6226	6,00
	230	40	3	167	146	2600	3200	6226 M	6,00
	280	58	4	229	214	2200	2800	6326 MA	17,0
140	175	18	1,1	39	46	3400	4000	61828 MAP5	1,00
	210	22	1,1	80,5	86	2800	3400	16028	2,70
	210	33	2	110	109	2800	3400	6028 MP6	3,35
	250	42	3	176	164	2400	3000	6228	7,50
	250	42	3	176	164	2400	3000	6228 MA	7,50
	300	62	4	253	246	2000	2600	6328 MA	21,0



Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r_s min	dyn. C_r	stat. C_{0r}	grease	oil	bearing	snap ring
mm				kN		min ⁻¹		-	kg
150	190	20	1,1	48,8	61	3000	3600	61830	1,40
	225	24	1,1	92,3	98	2600	3200	16030	3,40
	225	35	2,1	125	126	2600	3200	6030 MA	4,75
	270	45	3	176	170	2000	2600	6230 MA	9,60
	320	65	4	275	284	1900	2400	6330 MA	25,0
160	200	20	1,1	52	62	2800	3400	61832	1,49
	240	25	1,5	99,4	107	2400	3000	16032	3,60
	240	38	2,1	140	143	2400	3000	6032 MA	5,85
	290	48	3	185	186	1900	2400	6232 MA	15,0
170	215	22	1,1	61,8	73,5	2600	3200	61834 P6	2,00
	260	28	1,5	118	127	2200	2800	16034	5,70
	260	42	2,1	168	172	2200	2800	6034 MA	7,80
	310	52	4	212	224	1900	2400	6234 MA	17,5
180	225	22	1,1	62,3	78,5	2400	3000	61836 P5	2,00
	250	33	2	128	137	2200	2800	61936 MA	4,90
	280	31	2	140	146	2000	2600	16036 MA	7,00
	280	46	2,1	186	194	2000	2600	6036	10,5
	320	52	4	227	242	1800	2200	6236	18,5
190	240	24	1,5	74,1	92	2200	2800	61838	2,60
	290	31	2	148	162	2000	2600	16038	7,90
	290	46	2,1	194	210	2000	2600	6038 MA	11,0
	290	46	2,1	194	210	2000	2600	6038 MB	11,0
	290	46	2,1	194	210	2000	2600	6038 MBP6	11,0
	290	46	2,1	194	210	2000	2600	6038 MBP5	11,0
	340	55	4	255	278	1700	2000	6238 MA	23,0
	340	55	4	255	278	1700	2000	6238 MB	23,0
200	250	24	1,5	78	93	2200	2800	61840 MB	2,70
	280	38	2,1	151	160	2200	2800	61940 MB	7,25
	310	34	2	168	187	1900	2400	16040 MBP6	9,00
	310	34	2	168	187	1900	2400	16040 MBP5	9,00
	310	51	2,1	208	226	1900	2400	6040 MA	13,5
	310	51	2,1	208	226	1900	2400	6040 MB	13,5
	310	51	2,1	208	226	1900	2400	6040 MBP52	13,5
	360	58	4	280	314	1700	2000	6240 M	28,0
	360	58	4	280	314	1700	2000	6240 MB	27,0

Single Row Deep Groove Ball Bearings



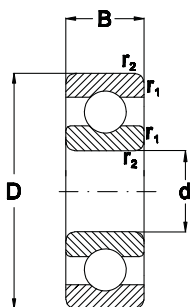
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	rs min.	dyn. Cr	stat. C0r	grease	oil		
mm				kN		min ⁻¹			kg
220	270	24	1,5	78	110	1900	2400	61844	3
	300	38	2,1	151	180	1900	2400	61944	8
	340	37	2,1	174	204	1800	2200	16044	12
	340	56	3	245	290	1700	2000	6044	18
	400	65	4	290	354	1500	1800	6244	36,9
	460	88	5	410	520	1300	1600	6344	74,5
240	300	28	2	108	150	1800	2200	61848	4,5
	320	38	2,1	159	200	1800	2200	61948	8,6
	360	37	2,1	185	228	1600	1900	16048	14,3
	360	56	3	255	315	1600	1900	6048	19,9
	440	72	4	358	475	1400	1700	6248	50,2
	500	95	5	442	585	1100	1400	6348	96
260	320	28	2	96	125	1700	2000	61852	4,8
	360	46	2,1	212	270	1600	1900	61952	14,5
	400	44	3	238	310	1500	1800	16052	21,2
	400	65	4	300	390	1400	1700	6052	31,1
	480	80	5	390	530	1100	1400	6252	66,6
	540	102	6	507	710	1000	1300	6352	119
280	350	33	2	125	170	1600	1900	61856	7,4
	380	46	2,1	216	285	1500	1800	61956	15,5
	420	44	3	240	325	1400	1700	16056	23,1
	420	65	4	305	425	1400	1700	6056	33
	500	80	5	423	600	1100	1400	6256	70,5
	580	108	6	572	850	950	1200	6356	146

Single Row Deep Groove Ball Bearings

Abutment and fillet
dimensions see on
page 86

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
300	380	38	2,1	150	195	1400	1700	61860	10,5
	420	56	3	270	375	1300	1600	61960	24,5
	460	50	4	295	415	1300	1600	16060	32,7
	460	74	4	360	510	1200	1500	6060	43,2
320	400	38	2,1	172	255	1300	1600	61864	11
	440	56	3	276	400	1200	1500	61964	25,5
	480	50	4	305	446	1200	1500	16064	34,4
	480	74	4	375	550	1200	1500	6064	49,4
340	420	38	2,1	178	275	1200	1500	61868	11,5
	460	56	3	281	425	1100	1400	61968	26,5
	520	57	4	347	528	1100	1400	16068	47,3
	520	74	5	440	658	1100	1400	6068	61,4
360	440	38	2,1	182	285	1100	1400	61872	12
	480	56	3	291	450	1100	1400	61972	28
	540	57	4	351	550	1000	1300	16072	49,5
	540	82	5	455	735	1000	1300	6072	64,4
380	480	38	2,1	242	390	1000	1300	61876	20
	520	56	4	338	540	1000	1300	61976	40
380	560	57	4	377	620	950	1200	16076	50,5
	560	82	5	450	723	1000	1300	6076	67,6
400	500	46	2,1	220	335	1000	1300	61880	20,5
	540	65	4	345	570	950	1200	61980	41,5
	600	90	5	523	857	900	1100	6080	87,2

Single Row Deep Groove Ball Bearings



Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r_s min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min^{-1}			kg
420	520	46	2,1	224	345	950	1200	61884	21,5
	560	65	4	351	600	900	1100	61984	43
	620	90	5	507	880	900	1100	6084	93
440	540	46	2,1	228	355	900	1100	61888	22,5
	600	74	4	410	720	900	1100	61988	60,5
	650	94	6	553	965	850	1000	6088	105
460	580	56	3	319	570	900	1100	61892	35
	620	74	4	423	750	850	1000	61992	62,5
	680	100	6	580	1056	900	950	6092	121
480	600	56	3	325	600	850	1000	61896	36,5
	650	78	5	449	815	800	950	61996	74
	700	100	6	615	1130	750	900	6096	126
500	620	56	3	332	620	800	950	618/500	37,5
	670	78	5	462	865	750	900	619/500	77
	720	100	6	607	1138	740	890	60/500	135
530	650	56	3	332	655	850	900	618/530	39,5
	710	82	5	488	930	700	850	619/530	90,5
	780	112	6	670	1290	670	800	60/530	186
560	680	56	3	345	695	700	850	618/560	42
	750	85	5	494	980	670	800	619/560	105
	820	115	6	720	1400	630	750	60/560	208
600	730	60	3	364	765	670	800	618/600	52
	800	90	5	585	1220	630	750	619/600	125
	870	118	6	826	1753	670	750	60/600	236

Single Row Deep Groove Ball Bearings

*Abutment and fillet
dimensions see on
page 86*

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
630	920	128	7,5	819	1760	560	670	60/630	285
670	820	69	4	442	1000	560	670	618/670	77,5
	900	103	6	676	1500	530	630	619/670	185
	980	136	7,5	904	2040	500	600	60/670	345
750	920	78	5	527	1250	500	600	618/750	110
	1000	112	6	663	1500	500	600	619/750	255



Single Row Deep Groove Ball Bearing - Stainless Steel Series

Standards, Boundary dimensions

Standard plans	DIN 616
Deep groove ball bearing	DIN 625

General

URB produce small and medium sized deep groove ball bearing, including thin section bearing in stainless steel.

These bearing have rings and balls made from high - chromium alloy stainless steel.

The cage material for bearings with pressed cages is also stainless steel.

The **URB stainless steel bearings** feature similar load ratings as the standard bearings made from normal bearing steel.

URB Stainless steel bearings are resistant to humidity, water, steam and many alkaline solutions.

The resistance to acids, however, is limited. It is dependant upon the individual operating conditions (i.e. acid concentration and its temperature).

In some applications, using sealed stainless steel bearings also the resistance of the lubricant used and the seal material must be considered.

Design variants

URB stainless steel deep groove ball bearings are standard open design.

Sealed (suffixes **RSR** or **.2RSR**) or Shield versions (suffix **ZR** or **.2ZR**) are also produced to order request.

Tolerances

URB stainless steel deep groove ball bearings are produced to normal tolerance class (**PN**) as standard.

The dimensional tolerance values are listed in the chapter "**Bearing tolerances**" on page 27.

Cages

URB stainless steel deep groove ball bearings are fitted with pressed stainless steel cages are standard.

There are several bearing types, cage designs and materials available on request.

Internal clearance

The **URB range of stainless steel deep groove ball bearings** are produced with **normal internal clearance (CN)** as standard.

Other internal clearance groups may be produced upon request (i.e. **C2** or **C3** etc).

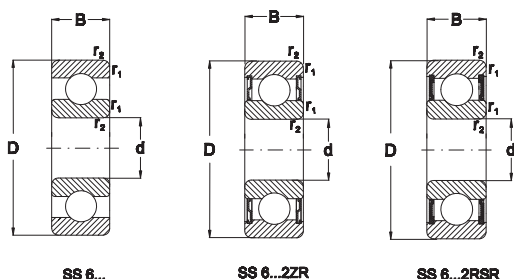
The values of internal clearance groups are as for standard deep groove ball bearings according to DIN 620/part 4 and ISO 5753-1981, respectively.

Designation

URB - Stainless Steel Deep groove ball bearing are identified by a prefix "**SS**" (**SS** stands for "**Stainless Steel**").

Example: **SS 6205.2RSR**

Single Row Deep Groove Ball Bearings - Stainless Steel Series



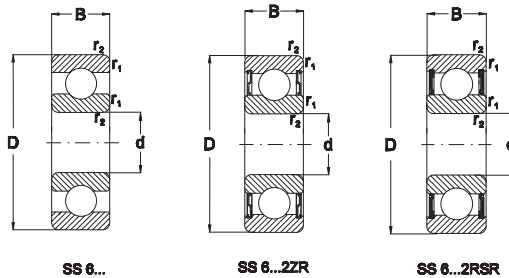
Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min ⁻¹			kg
3	10	4	0,15	0,64	0,32	40000	48000	SS623	0,002
	10	4	0,15	0,64	0,32	40000	-	SS623 2ZR	0,002
4	11	4	0,15	0,96	0,35	48000	56000	SS619/4	0,01
	12	4	0,2	0,8	0,28	52000	62000	SS604	0,002
	13	5	0,2	1,29	0,49	38000	45000	SS624	0,003
	13	5	0,2	1,29	0,49	38000	45000	SS624 ZR	0,003
	13	5	0,2	1,29	0,49	38000	-	SS624 2ZR	0,003
	16	5	0,3	1,46	0,6	36000	43000	SS634	0,006
	16	5	0,3	1,46	0,6	36000	-	SS634 2ZR	0,006
5	13	4	0,2	1,08	0,43	43000	50000	SS619/5	0,02
	16	5	0,3	1,46	0,6	36000	43000	SS625	0,005
	16	5	0,3	1,46	0,6	36000	43000	SS625 ZR	0,005
	16	5	0,3	1,46	0,6	36000	-	SS625 2ZR	0,005
	19	6	0,3	2,45	1,06	32000	38000	SS635	0,009
	19	6	0,3	2,45	1,06	32000	-	SS635 2ZR	0,009
6	17	6	0,3	2,25	0,84	38000	45000	SS619/6	0,04
	19	6	0,3	2,45	1,06	32000	38000	SS626	0,009
	19	6	0,3	2,45	1,06	21500	-	SS626 RSR	0,009
	19	6	0,3	2,45	1,06	21500	-	SS626 2RSR	0,009
	19	6	0,3	2,45	1,06	32000	38000	SS626 ZR	0,009
	19	6	0,3	2,45	1,06	32000	-	SS626 2ZR	0,009
7	17	6	0,3	1,6	0,7	36000	43000	SS619/7	0,05
	19	6	0,3	2,45	1,06	32000	38000	SS607	0,008
	19	6	0,3	2,45	1,06	20000	-	SS607 2RSR	0,008
	19	6	0,3	2,45	1,06	32000	-	SS607 2ZR	0,008
	22	7	0,3	3,25	1,37	30000	36000	SS627	0,013

Single Row Deep Groove Ball Bearings - Stainless Steel Series

Abutment and fillet
dimensions see on
page 86

Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r ₁ , r ₂ min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
7	22	7	0,3	3,25	1,37	20000	-	SS627 RSR	0,013
	22	7	0,3	3,25	1,37	20000	-	SS627 2RSR	0,013
	22	7	0,3	3,25	1,37	30000	36000	SS627 ZR	0,013
	22	7	0,3	3,25	1,37	30000	-	SS627 2ZR	0,013
8	19	6	0,3	2,24	0,91	36000	43000	SS619/8	0,07
	22	7	0,3	3,25	1,37	30000	36000	SS608	0,013
	22	7	0,3	3,25	1,37	20000	-	SS608 2RSR	0,013
	22	7	0,3	3,25	1,37	30000	-	SS608 2ZR	0,013
9	20	6	0,3	1,72	0,84	34000	40000	SS619/9	0,08
	24	7	0,3	3,65	1,63	30000	36000	SS609	0,015
	24	7	0,3	3,65	1,63	18000	-	SS609 2RSR	0,015
	24	7	0,3	3,65	1,63	30000	-	SS609 2ZR	0,015
	26	8	0,6	4,55	1,96	28000	34000	SS629	0,02
	26	8	0,6	4,55	1,96	18500	-	SS629 RSR	0,02
	26	8	0,6	4,55	1,96	18500	-	SS629 2RSR	0,02
	26	8	0,6	4,55	1,96	28000	34000	SS629 2ZR	0,02
	26	8	0,6	4,55	1,96	28000	-	SS629 2ZR	0,02
10	19	5	0,3	1,73	0,83	34000	40000	SS61800	0,005
	19	5	0,3	1,38	0,59	22000	-	61800/2RSR	0,005
	19	5	0,3	1,38	0,59	34000	-	SS61800 2ZR	0,005
	22	6	0,3	0,95	0,75	34000	40000	SS61900	0,01
	22	6	0,3	0,95	0,75	22000	-	61900 2RSR	0,01
	22	6	0,3	0,95	0,75	34000	-	SS61900 2ZR	0,01
	26	8	0,3	4,5	1,95	28000	34000	SS6000	0,018
	26	8	0,3	4,5	1,95	17000	-	SS6000 2RSR	0,02
	26	8	0,3	4,5	1,95	28000	-	SS6000 2ZR	0,02

Single Row Deep Groove Ball Bearings - Stainless Steel Series



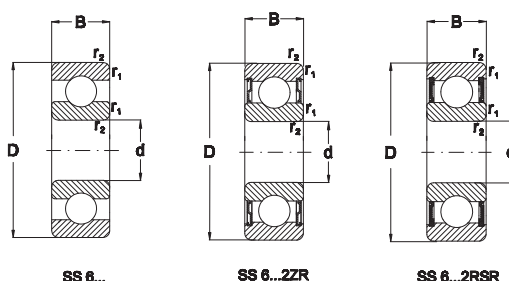
Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min^{-1}			kg
10	30	9	0,6	6	2,6	26000	32000	SS6200	0,03
	30	9	0,6	6	2,6	17000	-	SS6200 2RSR	0,032
	30	9	0,6	6	2,6	26000	-	SS6200 2ZR	0,032
	35	11	0,6	8,2	3,5	22000	28000	SS6300	0,055
	35	11	0,6	8,2	3,5	14500	-	SS6300 2RSR	0,057
	35	11	0,6	8,2	3,5	22000	-	SS6300 2ZR	0,057
12	21	5	0,3	1,4	0,65	32000	37000	SS61801	0,006
	21	5	0,3	1,4	0,65	21000	-	61801 2RSR	0,006
	21	5	0,3	1,4	0,65	32000	-	SS61801 2ZR	0,006
	24	6	0,3	2,3	1,0	30000	36000	SS61901	0,011
	24	6	0,3	2,3	1,0	20000	-	61901 2RSR	0,011
	24	6	0,3	2,3	1,0	30000	-	SS61901 2ZR	0,011
	28	8	0,3	5,1	2,4	26000	32000	SS6001	0,018
	28	8	0,3	5,1	2,4	17000	-	SS6001 2RSR	0,02
	28	8	0,3	5,1	2,4	26000	-	SS6001 2ZR	0,02
	32	10	0,6	6,95	3,1	24000	30000	SS6201	0,037
	32	10	0,6	6,95	3,1	16000	-	SS6201 2RSR	0,04
	32	10	0,6	6,95	3,1	24000	-	SS6201 2ZR	0,04
	37	12	1	9,8	4,2	20000	26000	SS6301	0,06
	37	12	1	9,8	4,2	13000	-	SS6301 2RSR	0,065
	37	12	1	9,8	4,2	20000	-	SS6301 2ZR	0,065
15	24	5	0,3	1,56	0,8	28000	34000	SS61802	0,007
	24	5	0,3	1,56	0,8	18500	-	61802 2RSR	0,007
	24	5	0,3	1,56	0,8	28000	-	SS61802 2ZR	0,007
	28	7	0,3	4,0	2,0	24000	30000	SS61902	0,016
	28	7	0,3	4,0	2,0	16000	-	61902 2RSR	0,016
	28	7	0,3	4,0	2,0	24000	-	SS61902 2ZR	0,016
	32	9	0,3	5,6	2,9	24000	30000	SS6002	0,029

Single Row Deep Groove Ball Bearings - Stainless Steel Series

Abutment and fillet
dimensions see on
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Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r ₁ , r ₂ min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
15	32	9	0,3	5,6	2,9	15000	-	SS6002 2RSR	0,031
	32	9	0,3	5,6	2,9	24000	-	SS6002 2ZR	0,031
	35	11	0,6	7,8	3,8	20000	26000	SS6202	0,043
	35	11	0,6	7,8	3,8	13000	-	SS6202 2RSR	0,046
	35	11	0,6	7,8	3,8	20000	-	SS6202 2ZR	0,046
	42	13	1	11,5	5,5	18000	22000	SS6302	0,09
	42	13	1	11,5	5,5	12000	-	SS6302 2RSR	0,092
	42	13	1	11,5	5,5	18000	-	SS6302 2ZR	0,092
17	26	5	0,3	1,7	0,95	24000	30000	SS61803	0,008
	26	5	0,3	1,7	0,95	16000	-	61803 2RSR	0,008
	26	5	0,3	1,7	0,95	24000	-	SS61803 2ZR	0,008
	28	7	0,3	4,35	2,3	22000	28000	SS61903	0,018
	28	7	0,3	4,35	2,3	14500	-	61903 2RSR	0,018
	28	7	0,3	4,35	2,3	22000	-	SS61903 2ZR	0,018
	35	10	0,3	6	3,25	22000	28000	SS6003	0,037
	35	10	0,3	6	3,25	13000	-	SS6003 2RSR	0,04
	35	10	0,3	6	3,25	22000	-	SS6003 2ZR	0,04
	40	12	0,6	9,6	4,8	18000	22000	SS6203	0,063
	40	12	0,6	9,6	4,8	12000	-	SS6203 2RSR	0,07
	40	12	0,6	9,6	4,8	18000	-	SS6203 2ZR	0,07
	47	14	1	13,7	6,7	16000	19000	SS6303	0,11
	47	14	1	13,7	6,7	10500	-	SS6303 2RSR	0,119
	47	14	1	13,7	6,7	16000	-	SS6303 2ZR	0,119
20	32	7	0,3	2,7	1,5	19000	24000	SS61804	0,018
	32	7	0,3	2,7	1,5	12500	-	61804 2RSR	0,018
	32	7	0,3	2,7	1,5	19000	-	SS61804 2ZR	0,018
	37	9	0,3	6,4	3,7	18000	22000	SS61904	0,018
	37	9	0,3	6,4	3,7	12000	-	61904 2RSR	0,018

Single Row Deep Groove Ball Bearings - Stainless Steel Series



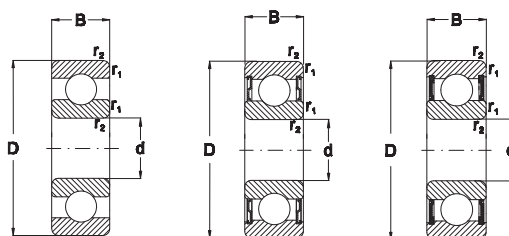
Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r ₁ , r ₂ min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
20	37	9	0,3	6,4	3,7	18000	-	SS61904 2ZR	0,018
	42	12	0,6	9,4	5,1	17000	20000	SS6004	0,057
	42	12	0,6	9,4	5,1	11000	-	SS6004 2RSR	0,06
	42	12	0,6	9,4	5,1	17000	-	SS6004 2ZR	0,06
	47	14	1	12,8	6,7	15000	18000	SS6204	0,104
	47	14	1	12,8	6,7	9900	-	SS6204 2RSR	0,105
	47	14	1	12,8	6,7	15000	-	SS6204 2ZR	0,105
	52	15	1,1	17,3	8,5	14000	17000	SS6304	0,148
	52	15	1,1	17,3	8,5	9300	-	SS6304 2RSR	0,158
	52	15	1,1	17,3	8,5	14000	-	SS6304 2ZR	0,158
25	37	7	0,3	4,35	2,6	17000	20000	SS61805	0,022
	37	7	0,3	4,35	2,6	11000	-	SS61805 2RSR	0,022
	37	7	0,3	4,35	2,6	17000	-	SS61805 2ZR	0,022
	42	9	0,3	6,6	4	16000	19000	SS61950	0,045
	42	9	0,3	6,6	4	10500	-	SS61950 2RSR	0,045
	42	9	0,3	6,6	4	16000	-	SS61950 2ZR	0,045
	47	12	0,6	10,1	5,9	16000	19000	SS6005	0,071
	47	12	0,6	10,1	5,9	10500	-	SS6005 2RSR	0,081
	47	12	0,6	10,1	5,9	16000	-	SS6005 2ZR	0,081
	52	15	1	14,3	8	14000	17000	SS6205	0,134
	52	15	1	14,3	8	9300	-	SS6205 2RSR	0,142
	52	15	1	14,3	8	14000	-	SS6205 2ZR	0,142
	62	17	1,1	22,4	11,4	11000	14000	SS6305	0,25
	62	17	1,1	22,4	11,4	7300	-	SS6305 2RSR	0,269
	62	17	1,1	22,4	11,4	11000	-	SS6305 2ZR	0,269
30	42	7	0,3	4,49	2,9	15000	18000	SS61806	0,027
	42	7	0,3	4,49	2,9	10000	-	SS61806 2RSR	0,027
	42	7	0,3	4,49	2,9	15000	-	SS61806 2ZR	0,027

Single Row Deep Groove Ball Bearings - Stainless Steel Series

Abutment and fillet
dimensions see on
page 86

Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r ₁ , r ₂ min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹			kg
30	47	9	0,3	7,25	4,55	14000	17000	SS61906	0,051
	47	9	0,3	7,25	4,55	9500	-	SS61906 2RSR	0,051
	47	9	0,3	7,25	4,55	14000	-	SS61906 2ZR	0,051
	55	13	1	13,2	8,2	13000	16000	SS6006	0,126
	55	13	1	13,2	8,2	8500	-	SS6006 2RSR	0,131
	55	13	1	13,2	8,2	13000	-	SS6006 2ZR	0,131
	62	16	1	19,3	11,2	11000	14000	SS6206	0,193
	62	16	1	19,3	11,2	7300	-	SS6206 2RSR	0,2
	62	16	1	19,3	11,2	11000	-	SS6206 2ZR	0,2
	72	19	1,1	29	16,3	9500	12000	SS6306	0,348
	72	19	1,1	29	16,3	6300	-	SS6306 2RSR	0,369
	72	19	1,1	29	16,3	9500	-	SS6306 2ZR	0,369
35	47	7	0,3	4,75	3,2	13000	16000	SS61807	0,03
	47	7	0,3	4,75	3,2	8500	-	SS61807 2RSR	0,03
	47	7	0,3	4,75	3,2	13000	-	SS61807 2ZR	0,03
	55	10	0,6	9,55	6,2	11000	14000	SS61907	0,08
	55	10	0,6	9,55	6,2	7500	-	SS61907 2RSR	0,08
	55	10	0,6	9,55	6,2	11000	-	SS61907 2ZR	0,08
	62	14	1	16,3	10,4	11000	14000	SS6007	0,14
	62	14	1	16,3	10,4	7300	-	SS6007 2RSR	0,147
	62	14	1	16,3	10,4	11000	-	SS6007 2ZR	0,147
	72	17	1,1	25,7	15,6	9500	12000	SS6207	0,287
	72	17	1,1	25,7	15,6	6300	-	SS6207 2RSR	0,295
	72	17	1,1	25,7	15,6	9500	-	SS6207 2ZR	0,295
	80	21	1,5	33,5	19,2	8500	10000	SS6307	0,448
	80	21	1,5	33,5	19,2	5600	-	SS6307 2RSR	0,438
	80	21	1,5	33,5	19,2	8500	-	SS6307 2ZR	0,438
40	52	7	0,3	4,9	3,4	11000	14000	SS61808	0,034
40	52	7	0,3	4,9	3,4	7000	-	SS61808 2RSR	0,034

Single Row Deep Groove Ball Bearings - Stainless Steel Series



SS 6...

SS 6...2ZR

SS 6...2RSR

Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min ⁻¹			kg
	52	7	0,3	4,9	3,4	11000	-	SS61808 2ZR	0,034
	62	12	0,6	13,7	9,2	10000	13000	SS61908	0,12
	62	12	0,6	13,7	9,2	6500	-	SS61908 2RSR	0,12
	62	12	0,6	13,7	9,2	10000	-	SS61908 2ZR	0,12
	68	15	1	17	11,8	10000	13000	SS6008	0,182
	68	15	1	17	11,8	6600	-	SS6008 2RSR	0,19
	68	15	1	17	11,8	10000	-	SS6008 2ZR	0,19
	80	18	1,1	32,6	20	8500	10000	SS6208	0,342
	80	18	1,1	32,6	20	5600	-	SS6208 2RSR	0,353
	80	18	1,1	32,6	20	8500	-	SS6208 2ZR	0,353
	90	23	1,5	42,5	25	7500	9000	SS6308	0,641
	90	23	1,5	42,5	25	5000	-	SS6308 2RSR	0,641
	90	23	1,5	42,5	25	7500	-	SS6308 2ZR	0,641
45	58	7	0,3	6,05	4,3	9500	12000	SS61809	0,04
	58	7	0,3	6,05	4,3	6300	-	SS61809 2RSR	0,04
	58	7	0,3	6,05	4,3	9500	-	SS61809 2ZR	0,04
	68	12	0,6	10	6,5	9000	11000	SS61909	0,14
	68	12	0,6	10	6,5	6000	-	SS61909 2RSR	0,14
	68	12	0,6	10	6,5	9000	-	SS61909 2ZR	0,14
	100	25	1,5	53	32	6700	8000	SS6309	0,795
	100	25	1,5	53	32	4400	-	SS6309 2RSR	0,819
	100	25	1,5	53	32	6700	-	SS6309 2ZR	0,819

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE





Single Row Deep Groove Ball Bearing - with filling slots

Designs

A single row deep groove ball bearing with filling slots has a filling slot in both the inner and outer rings (fig. 1) enabling more and larger balls to be incorporated than in standard deep groove ball bearings. Filling slot bearings have a higher radial load carrying capacity than bearings without filling slots, but their axial load carrying capacity is small. They are also unable to operate at such high speeds as bearings without filling slots.

The standard assortment of URB deep groove ball bearings with filling slots comprises

- basic design open bearings
- shielded bearings
- bearings with a snap ring groove.

Basic design bearings

Basic design bearings with filling slots are open. Those bearings that are also produced in shielded version may have seal recesses in the outer ring, for manufacturing reason (fig. 2).

Shielded bearings

URB deep groove ball bearings with filling slots are available with shields on one or both sides, designation suffixes ZR or 2ZR. The shield forms a narrow gap to the inner ring shoulder (fig. 3).

Bearings up to and including sizes 217 and 314 are filled with a high-quality NLGI class 2 grease with polyurea thickener, for a temperature range of -30°C to +150°C. The base oil viscosity is 115 mm²/s at 40°C and 9,4 mm²/s at 100°C.

The quantity of grease fills some 25 to 35% of the free space in the bearing. The bearings are lubricated for life and are maintenance-free. They should therefore not be washed or heated above 80°C before mounting.

Bearings with a snap ring groove

For easy, space saving axial location of the bearing in the housing, URB deep groove ball bearings with filling slots are available with a snap ring groove in the outer ring, designation suffix N (fig. 4a). The appropriate snap ring is shown in the product table with designation and dimensions and may be supplied separately or already mounted on the bearing, designation suffix NR (fig. 4b). URB deep groove ball bearings with filling slots and a snap ring groove can also be supplied with a shield on the side opposite the snap ring groove (fig. 5a) or with two shields (fig. 5b).

Bearing data - general

Dimensions

The boundary dimensions of URB deep groove ball bearings with filling slots are in accordance with ISO 15:1998.

The dimensions of the snap ring groove and snap rings follow ISO 464:1995.

Tolerances

URB deep groove ball bearings with filling slots are produced to Normal tolerances. The tolerances are in accordance with ISO 492:2002 and can be found in table 3.1/3.2 on page 27.

Internal clearance

URB single row deep groove ball bearings with filling slots are manufactured with Normal radial internal clearance. The values for radial internal clearance are provided in tab. 1 on pag. 83. They are in accordance with ISO 5753:1991 and are valid for unmounted bearings under zero measuring load.

Misalignment

The conditions concerning misalignment of the outer ring with respect to the inner ring are the same for deep groove ball bearings. However, the filling slots limit the angular misalignment may lead to the balls running over the edges of the filling slot. This will cause increased bearing noise and reduced bearing service life.

Cages

URB deep groove ball bearings with filling slots are fitted with a pressed riveted steel cage, ball centred, no designation suffix (fig. 6).

Minimum load

In order to provide satisfactory operation, deep groove ball bearings with filling slots, like all ball and roller bearings, must always be subjected to a given minimum load, particularly if they are to operate at high speeds or are subjected to high accelerations or rapid changes in the direction of load. Under such conditions, the inertia forces of the balls and cage, and friction in the lubricant, can have a detrimental influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the balls and raceways.

The requisite minimum radial load to be applied to deep groove ball bearings with filling slots can be estimated using

$$F_m = k_r \cdot \frac{nn}{1000} j^{\frac{2}{3}} \cdot \frac{d_m^2}{100}$$

where

F_m = minimum radial load

k_r = minimum load factor

0,04 for bearings in the 2 series

0,05 for bearings in the 3 series

v = oil viscosity at operating temperature, mm²/s

n = rotational speed, r/min

d_m = bearing mean diameter

= 0,5 (d+D), mm

When starting up at low temperatures or when the lubricant is highly viscous, even greater minimum loads may be required. The weight of the components supported by the bearing, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the deep groove ball bearing must be subjected to an additional radial load.

Equivalent dynamic bearing load

$$P = F_r + F_a$$

provided $F_a/F_r \leq 0,6$ and $P \leq 0,5 C_0$.

If the axial load $F_a > 0,6 F_r$, then deep groove ball bearings without filling slots should be used instead.

Equivalent static bearing load

$$P_0 = F_r + 0,5 F_a$$

provided $F_a/F_r \leq 0,6$.

Supplementary designations

The designation suffixes used to identify certain features of URB deep groove ball bearings with filling slots are explained in the following.

- C3** Radial internal clearance greater than Normal
- N** Snap ring groove in the outer ring
- NR** Snap ring groove in the outer ring, with appropriate snap ring
- ZR** Shield of pressed sheet on one side of the bearing
- 2ZR** ZR shield on both sides of the bearing
- ZRNR** Shield of pressed sheet steel on one side of the bearing and snap ring groove in the outer ring with snap ring on the opposite side of the shield
- 2ZRNR** ZR shield on both sides of the bearing and snap ring groove in the outer ring with snap ring

Fig. 1

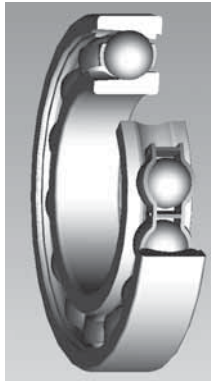


Fig. 2

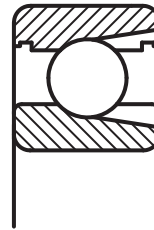


Fig. 3

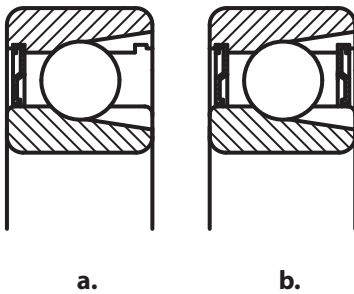


Fig. 4

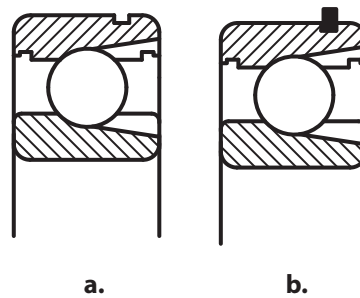


Fig. 5

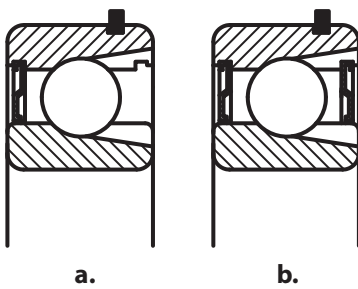
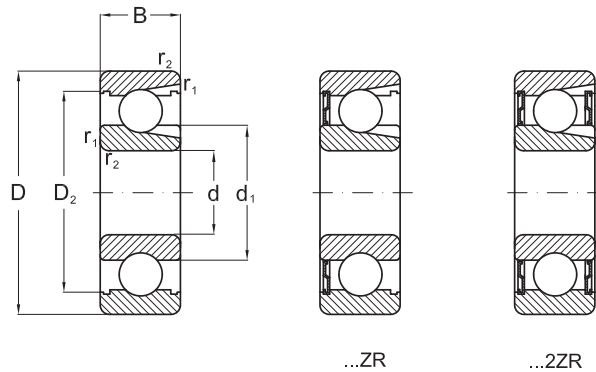


Fig. 6



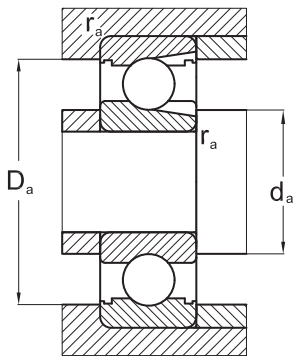
Single Row Deep Groove Ball Bearings with filling slots d 25-85 mm



Dimensions			Basic load ratings dynamic static		Fatigue load limit	Speed ratings		Mass
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed ¹⁾	
mm			kN			min ⁻¹		kg
25	62	17	22,9	15,6	0,67	20000	13000	0,24
30	62	16	22,9	17,3	0,735	20000	12000	0,21
	72	19	29,2	20,8	0,88	18000	11000	0,37
35	72	17	29,7	22,8	0,965	17000	11000	0,31
	80	21	39,1	28,5	1,2	16000	10000	0,48
40	80	18	33,6	26,5	1,12	15000	9500	0,39
	90	23	46,8	36	1,53	14000	9000	0,64
45	85	19	39,6	32,5	1,37	14000	9000	0,44
	100	25	59,4	46,5	1,96	13000	8000	0,88
50	90	20	39,1	34,5	1,46	13000	8000	0,5
	110	27	64,4	52	2,2	11000	7000	1,15
55	100	21	48,4	44	1,86	12000	7500	0,66
	120	29	79,2	67	2,85	10000	6700	1,5
60	110	22	56,1	50	2,12	11000	6700	0,85
	130	31	91,3	78	3,35	9500	6000	1,85
65	120	23	60,5	58,5	2,5	10000	6000	1,05
	140	33	102	90	3,75	9000	5600	2,3
70	125	24	66	65,5	2,75	9500	6000	1,15
	150	35	114	102	4,15	8000	5000	2,75
75	130	25	72,1	72	3	9000	5600	1,25
	160	37	125	116	4,55	7500	4800	3,25
80	140	26	88	85	3,45	8500	5300	1,55
	170	39	138	129	4,9	7000	4500	3,95
85	150	28	96,8	100	3,9	7500	4800	1,95
	180	41	147	146	5,3	6700	4300	4,6

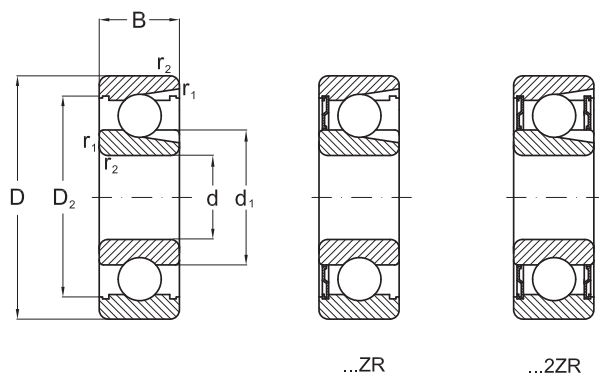
¹⁾ For 2ZR design, limiting speeds are about 80% of the quoted value.

Single Row Deep Groove Ball Bearings with filling slots d 25-85 mm



Dimensions				Designations			Abutment and fillet dimensions		
d	d ₁	D ₂	r _{1,2} min	Bearing open	with shields on		d _a min	D _a max	r _a max
					one side	two sides			
mm									
25	32,8	52,7	1,1	305	305 ZR	305 2ZR	31,5	55,5	1
30	36,2	54,1	1	206	206 ZR	206 2ZR	35	57	1
	43,9	61,9	1,1	306	306 ZR	306 2ZR	36,5	65,5	1
35	41,7	62,7	1,1	207	207 ZR	207 2ZR	41,5	65,5	1
	43,7	69,2	1,5	307	307 ZR	307 2ZR	43	72	1,5
40	48,9	69,8	1,1	208	208 ZR	208 2ZR	46,5	73,8	1
	50,5	77,7	1,5	308	308 ZR	308 2ZR	48	82	1,5
45	52,5	75,2	1,1	209	209 ZR	209 2ZR	51,5	78,5	1
	55,9	86,7	1,5	309	309 ZR	309 2ZR	53	92	1,5
50	57,5	81,7	1,1	210	210 ZR	210 2ZR	56,5	83,5	1
	67,5	95,2	2	310	310 ZR	310 2ZR	61	99	2
55	63,1	89,4	1,5	211	211 ZR	211 2ZR	63	92	1,5
	74	104	2	311	311 ZR	311 2ZR	64	111	2
60	70,1	97	1,5	212	212 ZR	212 2ZR	68	102	1,5
	80,3	113	2,1	312	312 ZR	312 2ZR	71	119	2
65	83,3	106	1,5	213	213 ZR	213 2ZR	73	112	1,5
	86,8	122	2,1	313	313 ZR	313 2ZR	76	129	2
70	87,1	111	1,5	214	214 ZR	214 2ZR	78	117	1,5
	93,2	130	2,1	314	314 ZR	314 2ZR	81	139	2
75	92,1	117	1,5	215	215 ZR	215 2ZR	83	122	1,5
	99,7	139	2,1	315	315 ZR	315 2ZR	86	149	2
80	88,8	127	2	216	216 ZR	216 2ZR	89	131	2
	106	147	2,1	316	316 ZR	316 2ZR	91	159	2
85	97	135	2	217	217 ZR	217 2ZR	96	139	2
	113	156	3	317	317 ZR	317 2ZR	98	167	2,5

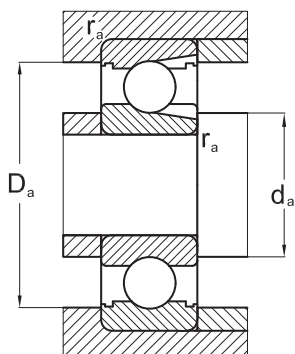
Single Row Deep Groove Ball Bearings with filling slots d 90-100 mm



Dimensions			Basic load ratings dynamic static		Fatigue load limit	Speed ratings		Mass
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed ¹⁾	
mm			kN			min ⁻¹		kg
90	160	30	112	114	4,3	7000	4500	2,35
	190	43	157	160	5,7	6300	4000	5,40
95	170	32	121	122	4,5	6700	4300	2,70
100	180	34	134	140	5	6300	4000	3,45

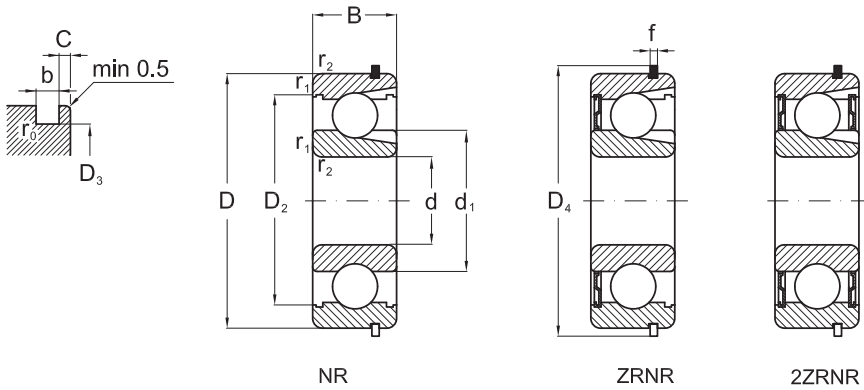
¹⁾ For 2ZR design, limiting speeds are about 80% of the quoted value.

Single Row Deep Groove Ball Bearings with filling slots d 90-100 mm



Dimensions				Designations			Abutment and fillet dimensions		
d	d ₁	D ₂	r _{1,2} min	Bearing open	with shields on		d _a min	D _a max	r _a max
					one side	two sides			
mm									
90	110	143	2	218	218 ZR	218 2ZR	99	151	2
	119	164	3	318	318 ZR	318 2ZR	103	177	2,5
95	117	152	2,1	219	219 ZR	219 2ZR	107	158	2
100	123	160	2,1	220	220Z	220 2ZR	112	168	2

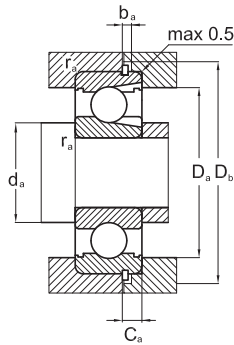
Single Row Deep Groove Ball Bearings with filling slots and snap rings d 25-95 mm



Dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations			Snap ring
			dynamic static						Bearing open	with shields on		
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed ¹⁾					
										one side	two sides	
mm			kN			min ⁻¹		kg	-			
25	62	17	23	16	1	20000	13000	0,24	305 NR	305 ZRNR	305 2ZRNR	SP 62
30	62	16	22,9	17,3	0,735	20000	12000	0,21	206 NR	206 ZRNR	206 2ZRNR	SP 62
	72	19	29,2	20,8	0,88	18000	11000	0,37	306 NR	306 ZRNR	306 2ZRNR	SP 72
35	72	17	29,7	22,8	0,965	17000	11000	0,31	207 NR	207 ZRNR	207 2ZRNR	SP 72
	80	21	39,1	28,5	1,2	16000	10000	0,48	307 NR	307 ZRNR	307 2ZRNR	SP 80
40	80	18	33,6	26,5	1,12	15000	9500	0,39	208 NR	208 ZRNR	208 2ZRNR	SP 80
	90	23	46,8	36	1,53	14000	9000	0,64	308 NR	308 ZRNR	308 2ZRNR	SP 90
45	85	19	39,6	32,5	1,37	14000	9000	0,44	209 NR	209 ZRNR	209 2ZRNR	SP 85
	100	25	59,4	46,5	1,96	13000	8000	0,88	309 NR	309 ZRNR	309 2ZRNR	SP 100
50	90	20	39,1	34,5	1,46	13000	8000	0,50	210 NR	210 ZRNR	210 2ZRNR	SP 90
	110	27	64,4	52	2,2	11000	7000	1,15	310 NR	310 ZRNR	310 2ZRNR	SP 110
55	100	21	48,4	44	1,86	12000	7500	0,66	211 NR	211 ZRNR	211 2ZRNR	SP 100
	120	29	79,2	67	2,85	10000	6700	1,50	311 NR	311 ZRNR	311 2ZRNR	SP 120

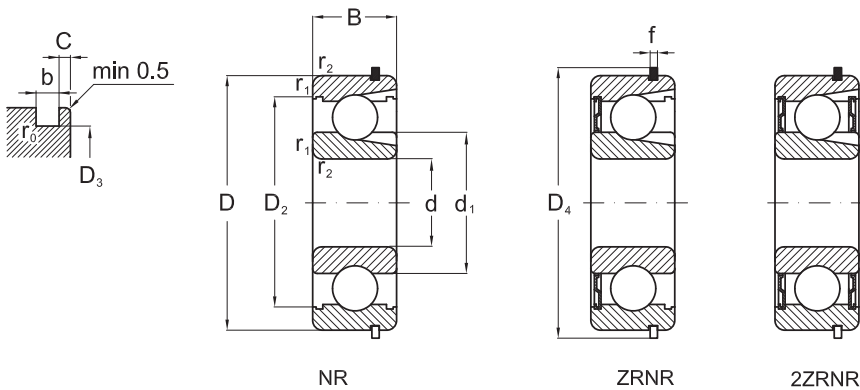
¹⁾ For 2ZR design, limiting speeds are about 80% of the quoted value.

Single Row Deep Groove Ball Bearings with filling slots and snap rings d 25-95 mm



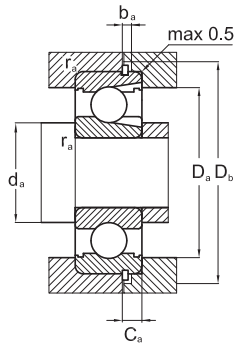
Dimensions								Abutment and fillet dimensions							
d	d ₁	D ₂	D ₃	D ₄	f	b	C	r ₀ max	r _{1,2} min	d ₂ min	D _a max	D _b min	b _a min	C _a max	r _a max
mm								mm							
25	32,8	52,7	59,61	67,7	1,7	1,9	3,28	0,6	1,1	31,5	55,5	69	2,2	4,98	1
30	36,2	54,1	59,61	67,7	1,7	1,9	3,28	0,6	1	35	57	69	2,2	4,98	1
	40,1	61,9	68,81	78,6	1,7	1,9	3,28	0,6	1,1	36,5	65,5	80	2,2	4,98	1
35	41,7	62,7	68,81	78,6	1,7	1,9	3,28	0,6	1,1	41,5	65,5	80	2,2	4,98	1
	43,7	69,2	76,81	86,6	1,7	1,9	3,28	0,6	1,5	43	72	88	2,2	4,98	1,5
40	48,9	69,8	76,81	86,6	1,7	1,9	3,28	0,6	1,1	46,5	73,5	88	2,2	4,98	1
	50,5	77,7	86,79	96,5	2,46	2,7	3,28	0,6	1,5	48	82	98	3	5,74	1,5
45	52,5	75,2	81,81	91,6	1,7	1,9	3,28	0,6	1,1	51,5	78,5	93	2,2	4,98	1
	55,9	86,7	96,8	106,5	2,46	2,7	3,28	0,6	1,5	53	92	108	3	5,74	1,5
50	57,5	81,7	86,79	96,5	2,46	2,7	3,28	0,6	1,1	56,5	83,5	98	3	5,74	1
	62,5	95,2	106,81	116,6	2,46	2,7	3,28	0,6	2	61	99	118	3	5,74	2
55	63,1	89,4	96,8	106,5	2,46	2,7	3,28	0,6	1,5	63	92	108	3	5,74	1,5
	74	104	115,21	129,7	2,82	3,1	4,06	0,6	2	64	111	131	3,5	6,88	2

Single Row Deep Groove Ball Bearings with filling slots and snap rings d 25-95 mm



Dimensions			Basic load ratings			Fatigue load limit	Speed ratings		Mass	Designations			Snap ring
d	D	B	C	C ₀	P _u	Reference speed	Limiting speed ¹⁾		Bearing open	with shields on			
										one side	two sides		
mm			kN				min ⁻¹	kg	-				
60	110	22	56,1	50	2,12	11000	6700	0,85	212 NR	212 ZRNR	212 2ZRNR	SP 110	
	130	31	91,3	78	3,35	9500	6000	1,85	312 NR	312 ZRNR	312 2ZRNR	SP 130	
65	120	23	60,5	58,5	2,5	10000	6000	1,05	213 NR	213 ZRNR	213 2ZRNR	SP 120	
	140	33	102	90	3,75	9000	5600	2,30	313 NR	313 ZRNR	313 2ZRNR	SP 140	
70	125	24	66	65,5	2,75	9500	6000	1,15	214 NR	214 ZRNR	214 2ZRNR	SP 125	
	150	35	114	102	4,15	8000	5000	2,75	314 NR	314 ZRNR	314 2ZRNR	SP 150	
75	130	25	72,1	72	3	9000	5600	1,25	215 NR	215 ZRNR	215 2ZRNR	SP 130	
80	140	26	88	85	3,45	8500	5300	1,55	216 NR	216 ZRNR	216 2ZRNR	SP 140	
85	150	28	96,8	100	3,9	7500	4800	1,95	217 NR	-	-	SP 150	
90	160	30	112	114	4,3	7000	4500	2,35	218 NR	-	-	SP 160	
95	170	32	121	122	4,5	6700	4300	2,70	219 NR	-	-	SP 170	

Single Row Deep Groove Ball Bearings with filling slots and snap rings d 25-95 mm



Dimensions										Abutment and fillet dimensions						
d	d ₁	D ₂	D ₃	D ₄	f	b	C	r ₀ max	r _{1,2} min	d ₂ min	D _a max	D _b min	b _a min	C _a max	r _a max	
mm										mm						
60	70,1	97	106,81	116,6	2,46	2,7	3,28	0,6	1,5	68	102	118	3	5,74	1,5	
	80,3	113	125,22	139,7	2,82	3,1	4,06	0,6	2,1	71	119	141	3,5	6,88	2	
65	83,3	106	115,21	129,7	2,82	3,1	4,06	0,6	1,5	73	112	131	3,5	6,88	1,5	
	86,8	122	135,23	149,7	2,82	3,1	4,9	0,6	2,1	76	129	151	3,5	7,72	2	
70	87,1	111	120,22	134,7	2,82	3,1	4,06	0,6	1,5	78	117	136	3,5	6,88	1,5	
	87,2	130	145,24	159,7	2,82	3,1	4,9	0,6	2,1	81	139	162	3,5	7,72	2	
75	92,1	117	125,22	139,7	2,82	3,1	4,06	0,6	1,5	83	122	141	3,5	6,88	1,5	
80	88,8	127	135,23	149,7	2,82	3,1	4,9	0,6	2	89	131	151	3,5	7,72	2	
85	97	135	145,24	159,7	2,82	3,1	4,9	0,6	2	96	139	162	3,5	7,72	2	
90	110	143	155,22	169,7	2,82	3,1	4,9	0,6	2	99	151	172	3,5	7,72	2	
95	117	152	163,65	182,9	3,1	3,5	5,69	0,6	2,1	107	158	185	4	8,79	2	



Double Row Deep Groove Ball Bearing

Standards, Boundary dimensions

Standard plans	DIN 616
Deep groove ball bearing	DIN 625

General

Double Row Deep groove ball bearings feature higher load ratings when compared to single row bearings.

This two row bearing gives a very rigid arrangement, but they are very sensitive to misalignments.

Tolerances

URB Double Row Deep groove bearings are produced in normal tolerance class (**PN**) as standard.

Internal clearance

URB Double Row Deep groove ball bearings are produced with **normal internal clearance**, (**CN**) as standard. Other internal clearance groups may be produced upon request.

Design variants, Cages

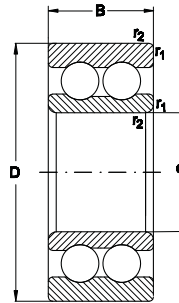
URB Double Row Deep groove ball bearings have the latest design (suffix B) without filling slots.

Thus they are able to support thrust loads equally well in both directions. These bearings are fitted with **polyamide cages**, (suffix **TN**) as standard.

These bearing sizes are also available with **pressed steel cages**.

But, it must be considered that some of these bearings may have filling slots which limit the ability to support thrust loads in the direction of these filling slots.

Double Row Deep Groove Ball Bearings



Dimensions				Basical load ratings		Speed ratings		Designation	Mass
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min ⁻¹			kg
10	30	14	0,6	9,2	5,2	18000	22000	4200 BTN	0,049
12	32	14	0,6	10,6	6,2	17000	20000	4201 BTN	0,053
15	35	14	0,6	11,9	7,5	14000	17000	4202 BTN	0,059
	42	17	1	14,8	9,5	12000	15000	4302 BTN	0,12
17	40	16	0,6	14,8	9,5	12000	15000	4203 BTN	0,090
	47	19	1	19,5	13,5	10000	13000	4303 BTN	0,16
20	47	18	1	17,8	12,5	10000	13000	4204 BTN	0,14
	52	21	1,1	23,4	16	9500	12000	4304 BTN	0,21
25	52	18	1	19	14,5	9000	11000	4205 BTN	0,16
	62	24	1,1	31,9	22,5	8500	10000	4305 BTN	0,34
30	62	20	1	26	20,5	8000	9500	4206 BTN	0,26
	72	27	1,1	41,2	30	7000	8500	4306 BTN	0,50
35	72	23	1,1	35,1	28,5	6700	8000	4207 BTN	0,40
	80	31	1,5	50,5	38	6300	7500	4307 BTN	0,69
40	80	23	1,1	37,05	32,5	6000	7000	4208 BTN	0,50
	90	33	1,5	55,7	45	5600	6700	4308 BTN	0,95

Double Row Deep Groove Ball Bearings

*Abutment and fillet
dimensions see on
page 86*

Dimensions				Basical load ratings		Speed ratings		Designation	Mass
d	D	B	$r_{1,2}$ min.	dyn. C_r	stat. C_{0r}	grease	oil		
mm				kN		min ⁻¹			kg
45	85	23	1,1	39	36	5600	6700	4209 BTN	0,54
	100	36	1,5	68,5	56	5000	6000	4309 BTN	1,25
50	90	23	1,1	40,5	40	5000	6000	4210 BTN	0,58
	110	40	2	81,5	70	4500	5300	4310 BTN	1,70
55	100	25	1,5	45	44	4800	5600	4211 BTN	0,80
	120	43	2	97,5	83	4300	5000	4311 BTN	2,15
60	110	28	1,5	57	55	4500	5300	4212 BTN	1,10
	130	46	2,1	112	98	3800	4500	4312 BTN	2,65
65	120	31	1,5	67,5	67	4000	4800	4213 BTN	1,45
70	125	31	1,5	70	73,5	3600	4300	4214 BTN	1,50
75	130	31	1,5	72,5	80	3400	4000	4215 BTN	1,60
80	140	33	2	80,5	90	3200	3800	4216 BTN	2,00
85	150	36	2	93,6	102	3000	3600	4217 BTN	2,55
90	160	40	2	112	122	2800	3400	4218 BTN	3,20

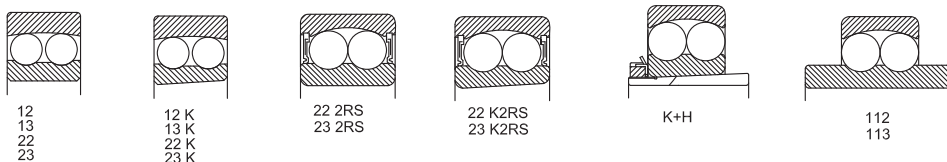
URB



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 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 page 64).

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.

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											
Bore diameter		Designation of clearance group									
d		C2		Normal		C3		C4		C5	
		Bearing radial clearance									
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											
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.

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

$$F_{a \max} = 3 B d,$$

where:

$F_{a \max}$ - maximum permissible axial load, N

B - bearing width, mm

d - bearing bore diameter, mm

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.

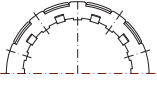
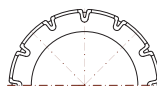
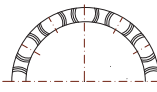
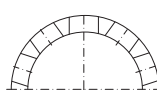
Axial load on bearings with adapter sleeves

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.

Cages

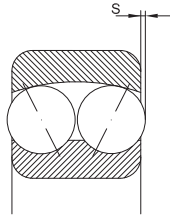
Self-aligning ball bearings are generally fitted with presses cages of sheet. At special request, when bearings operate under fluctuating loads, at high speeds and where large sizes are required, machined brass cages are recommended to be used. Glass fibre reinforced polyamide 6.6 cages are also suitable if the operating temperatures do not exceed +120°C. They have low mass, 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						
Cage	Design bearing	cage	Application	Max. value		Table 4
				$D_m n$		
				oil	grease	
Pressed sheet cage				- General application - Moderate speeds - Sealed bearings series 12, 13, 22, 23	600x10 ³	450x10 ³
Pressed sheet cage				- General application - Moderate speeds - Bearings series 22, 23	600x10 ³	450x10 ³
Polyamide cage TN				- High speeds - Bearings series 12, 13, 22, 23	1000x10 ³	800x10 ³
Machined brass cage M				- High speeds - Bearings: 1220-1222; 1317-1322; 2217-2222; 2317-2320	900x10 ³	700x10 ³

Special characteristics

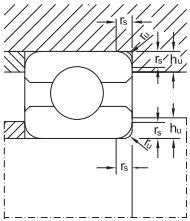
In case of some dimensions of self-aligning ball bearings series 12 and 13, the balls protrude somewhat from the bearing, as shown in the adjacent design and table. This should be considered both by designer and user.



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

Table 6

r_s min.	r_u max.	u 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

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.

Self-aligning ball bearings with adapter sleeves

Abutment dimensions

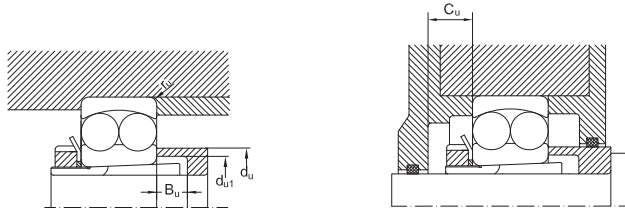
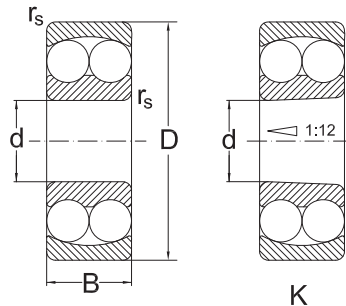


Table 7

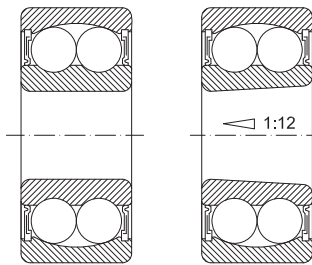
Table 7														
Bore symbol	Shaft diameter	Bearing series												All series
		12K			22K			13K			23K			
		d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	d _{u1} min.	d _u max.	B _u min.	
mm														
04	17	23	27	5	23	27	5	23	30	8	24	28	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				Speed limit		Designation	Mass
d	D	B	r _s min.	C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		-	Kg
5	19	6	0,3	2,55	0,33	1,9	3	0,48	2	30000	36000	135	0,010
6	19	6	0,3	2,5	0,33	1,9	3	0,48	2	30000	36000	126	0,010
7	22	7	0,3	2,65	0,33	1,9	3	0,56	2	30000	36000	127	0,010
8	22	7	0,3	2,65	0,33	1,9	3	0,56	2	30000	36000	108	0,010
9	26	8	0,6	3,8	0,33	1,9	3	0,8	2	26000	32000	129	0,020
10	30	9	0,6	5,5	0,33	1,9	3	1,2	2	24000	30000	1200	0,030
	30	14	0,6	7,2	0,54	1,2	1,8	1,6	1,2	22000	28000	2200	0,040
	35	11	0,6	7,2	0,34	1,9	2,9	1,6	1,9	20000	26000	1300	0,620
12	32	10	0,6	5,6	0,37	1,7	2,6	1,25	1,8	22000	28000	1201	0,040
	32	14	0,6	7,6	0,53	1,2	1,8	1,75	1,2	20000	26000	2201	0,050
	37	12	1	9,4	0,35	1,8	2,8	2,15	1,9	18000	22000	1301	0,060
	37	17	1	9,4	0,54	1,2	1,8	2,3	1,2	17000	20000	2301	0,090
15	35	11	0,6	7,5	0,36	1,8	2,7	1,75	1,9	19000	24000	1202	0,040
	35	14	0,6	7,7	0,5	1,3	2	1,85	1,3	18000	22000	2202	0,060
	42	13	1	9,55	0,35	1,8	2,8	2,3	1,9	17000	20000	1302	0,090
	42	17	1	12,1	0,5	1,3	2	2,9	1,3	15000	18000	2302	0,110
17	40	12	0,6	7,9	0,32	1,9	3	2,05	2	18000	22000	1203	0,070
	40	16	0,6	9,8	0,5	1,3	2	2,4	1,3	17000	20000	2203	0,080
	47	14	1	12,5	0,34	1,8	2,9	3,15	2	14000	17000	1303	0,130
	47	19	1	14,5	0,49	1,3	2	3,6	1,3	13000	16000	2303	0,160
20	47	14	1	9,9	0,28	2,2	3,5	2,65	2,4	15000	18000	1204	0,120
	47	14	1	9,9	0,28	2,2	3,5	2,65	2,4	15000	18000	1204 K	0,120
	47	18	1	12,6	0,28	2,2	3,5	3,3	2,4	14000	17000	2204	0,140
	47	18	1	12,6	0,28	2,2	3,5	3,3	2,4	14000	17000	2204 K	0,140
	52	15	1,1	12,4	0,3	2,1	3,3	3,35	2,2	12000	15000	1304	0,160
	52	15	1,1	12,4	0,3	2,1	3,3	3,35	2,2	12000	15000	1304 K	0,160
	52	21	1,1	18,2	0,52	1,2	1,9	4,7	1,3	11000	14000	2304	0,210
	52	21	1,1	18,2	0,52	1,2	1,9	4,7	1,3	11000	14000	2304 K	0,210
25	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13000	16000	1205	0,140
	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13000	16000	1205 K	0,140
	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13000	16000	1205 M	0,140
	52	18	1	12,5	0,43	1,5	2,3	3,45	1,6	11000	14000	2205	0,160
	52	18	1	12,5	0,43	1,5	2,3	3,45	1,6	11000	14000	2205 K	0,160
	52	18	1	12,2	0,29	2,2	3,4	3,3	2,3	7000		2205 2RS	0,160
	52	18	1	12,2	0,29	2,2	3,4	3,3	2,3	7000		2205 K2RS	0,160
	62	17	1,1	17,8	0,28	2,2	3,5	4,9	2,4	9500	12000	1305	0,260
	62	17	1,1	17,8	0,28	2,2	3,5	4,9	2,4	9500	12000	1305 K	0,260
	62	24	1,1	24,5	0,44	1,4	2,2	6,55	1,5	9500	12000	2305	0,340
	62	24	1,1	24,5	0,44	1,4	2,2	6,55	1,5	9500	12000	2305 K	0,340
	62	24	1,1	17,8	0,28	2,2	3,5	4,9	2,4	6300		2305 2RS	0,330

Self-aligning ball bearings

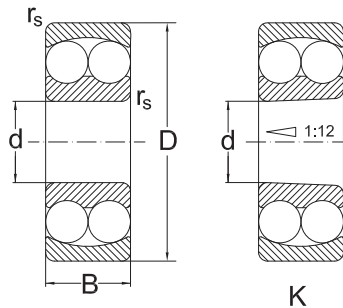


2RS

K2RS

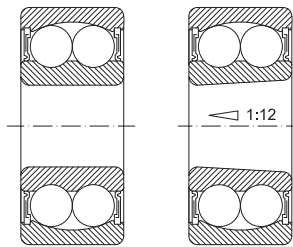
Dimensions				Basic radial load		Factors				Speed limit		Designation	Mass	
d	D	B	r _s min.	C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil			
mm				kN	-			kN	-	min ⁻¹		-	Kg	
30	62	16	1	15,7	0,25	2,5	3,9	4,7	2,7	10000	13000	1206	0,220	
	62	16	1	15,7	0,25	2,5	3,9	4,7	2,7	10000	13000	1206 K	0,220	
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9500	12000	2206	0,260	
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9500	12000	2206 K	0,260	
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9500	12000	2206 M	0,260	
	62	20	1	15,7	0,25	2,5	3,9	4,7	2,7	5300		2206 2RS	0,260	
	62	20	1	15,7	0,25	2,5	3,9	4,7	2,7	5300		2206 K2RS	0,260	
	72	19	1,1	21,4	0,24	2,6	4,1	6,35	2,8	9000	11000	1306	0,380	
	72	19	1,1	21,4	0,24	2,6	4,1	6,35	2,8	9000	11000	1306 K	0,380	
	72	27	1,1	31,4	0,4	1,6	2,5	8,7	1,7	8500	10000	2306	0,500	
	72	27	1,1	31,4	0,4	1,6	2,5	8,7	1,7	8500	10000	2306 K	0,500	
	72	27	1,1	21,4	0,24	2,6	4,1	6,35	2,8	5600		2306 2RS	0,500	
	35	72	17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9000	11000	1207	0,320
		72	17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9000	11000	1207 K	0,320
72		17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9000	11000	1207 M	0,320	
72		23	1,1	21,7	0,37	1,7	2,6	6,7	1,8	8500	10000	2207	0,400	
72		23	1,1	21,7	0,37	1,7	2,6	6,7	1,8	8500	10000	2207K	0,400	
72		23	1,1	15,8	0,23	2,8	4,2	5,15	2,9	5600		2207 RS	0,400	
72		23	1,1	15,8	0,23	2,8	4,2	5,15	2,9	5600		2207 K2RS	0,400	
80		21	1,5	25,1	0,25	2,5	3,9	7,95	2,7	7500	9000	1307	0,510	
80		21	1,5	25,1	0,25	2,5	3,9	7,95	2,7	7500	9000	1307 K	0,510	
80		31	1,5	39,7	0,43	1,5	2,3	12,9	1,6	7000	8500	2307	0,670	
80		31	1,5	39,7	0,43	1,5	2,3	12,9	1,6	7000	8500	2307 K	0,670	
80		31	1,5	25,1	0,25	2,5	3,9	7,95	2,7	4500		2307 2RS	0,670	
40		80	18	1,1	19,2	0,22	2,9	4,5	6,5	3	8500	10000	1208	0,410
		80	18	1,1	19,2	0,22	2,9	4,5	6,5	3	8500	10000	1208 K	0,410
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7500	9000	2208	0,500	
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7500	9000	2208 K	0,500	
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7500	9000	2208 M	0,500	
	80	23	1,1	19,2	0,22	2,9	4,5	6,5	3	4800		2208 2RS	0,500	
	80	23	1,1	19,2	0,22	2,9	4,5	6,5	3	4800		2208 K2RS	0,500	
	90	23	1,5	29,5	0,24	2,6	4,1	9,75	2,8	6700	8000	1308	0,710	
	90	23	1,5	29,5	0,24	2,6	4,1	9,75	2,8	6700	8000	1308 K	0,710	
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6300	7500	2308	0,920	
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6300	7500	2308 K	0,920	
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6300	7500	2308 M	0,920	
	90	33	1,5	29,5	0,24	2,6	4,1	9,75	2,8	4000		2308 2RS	0,920	
	45	85	19	1,1	21,8	0,21	3	4,7	7,4	3,2	7500	9000	1209	0,460
85		19	1,1	21,8	0,21	3	4,7	7,4	3,2	7500	9000	1209 K	0,460	
85		23	1,1	23,3	0,31	2	3,1	8,15	2,1	7000	8500	2209	0,540	

Self-aligning ball bearings



Dimensions				Basic radial load		Factors				Speed limit		Designation	Mass
d	D	B	r _s min.	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	23,3	0,31	2	3,1	8,15	2,1	7000	8500	2209 K	0,540
	85	23	1,1	21,8	0,21	3	4,7	7,4	3,2	4500		2209 2RS	0,540
	85	23	1,1	21,8	0,21	3	4,7	7,4	3,2	4500		2209 K2RS	0,540
	100	25	1,5	37,7	0,24	2,6	4,1	12,9	2,8	6300	7500	1309	0,950
	100	25	1,5	37,7	0,24	2,6	4,1	12,9	2,8	6300	7500	1309 K	0,950
	100	36	1,5	54,1	0,31	2	3,1	16,5	2,1	5600	6700	2309	1,23
	100	36	1,5	54,1	0,31	2	3,1	16,5	2,1	5600	6700	2309 K	1,23
	100	36	1,5	37,7	0,24	2,6	4,1	12,9	2,8	3600		2309 2RS	1,23
50	90	20	1,1	22,9	0,21	3	4,7	8,1	3,2	7000	8500	1210	0,520
	90	20	1,1	22,9	0,21	3	4,7	8,16	3,2	7000	8500	1210 K	0,520
	90	23	1,1	23,3	0,29	2,2	3,4	8,5	2,3	6300	7500	2210	0,590
	90	23	1,1	23,3	0,29	2,2	3,4	8,5	2,3	6300	7500	2210 K	0,590
	90	23	1,1	22,9	0,21	3	4,6	8,1	3,2	4000		2210 2RS	0,590
	90	23	1,1	22,9	0,21	3	4,6	8,1	3,2	4000		2210 K2RS	0,590
	110	27	2	43,4	0,24	2,6	4,1	14,2	2,8	5600	6700	1310	1,21
	110	27	2	43,4	0,24	2,6	4,1	14,2	2,8	5600	6700	1310 K	1,21
	110	40	2	64,4	0,42	1,5	2,3	20	1,6	5300	6300	2310	1,23
	110	40	2	64,4	0,42	1,5	2,3	20	1,6	5300	6300	2310 K	1,23
	110	40	2	43,4	0,24	2,6	4,1	14,2	2,8	3400		2310 2RS	1,64
55	100	21	1,5	26,6	0,2	3,2	4,9	10,1	3,3	6300	7500	1211	0,700
	100	21	1,5	26,6	0,2	3,2	4,1	10,1	3,3	6300	7500	1211 K	0,700
	100	25	1,5	26,5	0,27	2,3	3,6	9,9	2,5	6000	7000	2211	0,810
	100	25	1,5	26,5	0,27	2,3	3,6	9,9	2,5	6000	7000	2211 K	0,810
	120	29	2	51,3	0,23	2,3	4,2	18,1	2,9	5000	6000	1311	1,58
	120	29	2	51,3	0,23	2,8	4,2	18,1	2,9	5000	6000	1311 K	1,58
	120	43	2	75,3	0,41	1,5	2,4	23,8	1,6	4800	5600	2311	2,10
	120	43	2	75,3	0,41	1,5	2,4	23,8	1,6	4800	5600	2311 K	2,10
60	110	22	1,5	30,2	0,19	3,4	5,2	11,6	3,5	5600	6700	1212	0,900
	110	22	1,5	30,2	0,19	3,4	5,2	11,6	3,5	5600	6700	1212 K	0,900
	110	28	1,5	33,8	0,28	2,2	3,5	12,6	2,4	5300	6300	2212	1,10
	110	28	1,5	33,8	0,28	2,2	3,5	12,6	2,4	5300	6300	2212 K	1,10
	130	31	2,1	57,1	0,23	2,8	4,2	20,8	2,9	4500	5300	1312	1,96
	130	31	2,1	57,1	0,23	2,8	4,2	20,8	2,9	4500	5300	1312 K	1,96
	130	46	2,1	87,1	0,41	1,5	2,4	28	1,6	4300	5000	2312	2,60
	130	46	2,1	87,1	0,41	1,5	2,4	28	1,6	4300	5000	2312 K	2,60
65	120	23	1,5	31	0,17	3,7	5,7	12,4	3,9	5300	6300	1213	1,15
	120	23	1,5	31	0,17	3,7	5,7	12,4	3,9	5300	6300	1213 K	1,15
	120	31	1,5	43,6	0,28	2,2	3,5	16,4	2,4	5000	6000	2213	1,45
	120	31	1,5	43,6	0,28	2,2	3,5	16,4	2,4	5000	6000	2213 K	1,45
	140	33	2,1	62	0,23	2,8	4,2	22,9	2,8	4300	5000	1313	2,45

Self-aligning ball bearings

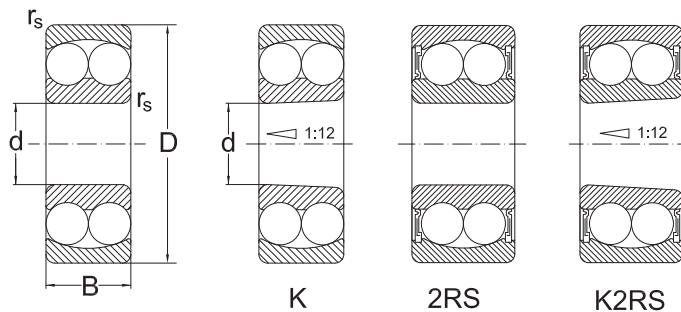


2RS

K2RS

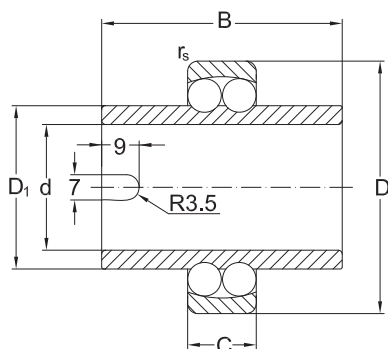
Dimensions				Basic radial load		Factors				Speed limit		Designation	Mass
d	D	B	r _s min.	C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		-	Kg
70	140	33	2,1	62	0,23	2,8	4,2	22,9	2,8	4300	5000	1313 K	2,45
	140	48	2,1	95,6	0,38	1,7	2,6	32,5	1,7	4000	4800	2313	3,25
	140	48	2,1	95,6	0,38	1,7	2,6	32,5	1,7	4000	4800	2313 K	3,25
	125	24	1,5	34,6	0,18	3,5	5,4	13,7	3,7	5000	6000	1214	1,25
	125	24	1,5	34,6	0,18	3,5	5,4	13,7	3,7	5000	6000	1214 K	1,25
	125	31	1,5	44,2	0,27	2,3	3,6	17,1	2,5	4800	5600	2214	1,50
	125	31	1,5	44,2	0,27	2,3	3,6	17,1	2,5	4800	5600	2214 K	1,50
	150	35	2,1	74,1	0,22	2,9	4,5	27,7	3	4000	4800	1314	3,00
	150	35	2,1	74,1	0,22	2,9	4,5	27,7	3	4000	4800	1314 K	3,00
	150	51	2,1	111	0,35	1,8	2,8	31,7	1,9	3600	4300	2314	3,90
150	51	2,1	111	0,35	1,8	2,8	31,7	1,9	3600	4300	2314 K	3,90	
75	130	25	1,5	38,9	0,18	3,5	5,4	15,6	3,7	4800	5600	1215	1,35
	130	25	1,5	38,9	0,18	3,5	5,4	15,6	3,7	4800	5600	1215 K	1,35
	130	31	1,5	44	0,25	2,5	3,9	17,8	2,7	4500	5300	2215	1,60
	130	31	1,5	44	0,25	2,5	3,9	17,8	2,7	4500	5300	2215 K	1,60
	160	37	2,1	79,2	0,22	2,9	4,5	30	3	3600	4300	1315	3,55
	160	37	2,1	79,2	0,22	2,9	4,5	30	3	3600	4300	1315 K	3,55
	160	55	2,1	123	0,38	1,7	2,6	42,8	1,7	3400	4000	2315	4,70
	160	55	2,1	123	0,38	1,7	2,6	42,8	1,7	3400	4000	2315 K	4,70
	160	55	2,1	123	0,38	1,7	2,6	42,8	1,7	3400	4000	2315 KM	4,70
80	140	26	2	39,8	0,16	3,9	6,1	17	4,1	4300	5000	1216	1,65
	140	26	2	39,8	0,16	3,9	6,1	17	4,1	4300	5000	1216 K	1,65
	140	33	2	48,8	0,26	2,4	3,7	19,9	2,5	4000	4800	2216	2,00
	140	33	2	48,8	0,26	2,4	3,7	19,9	2,5	4000	4800	2216 K	2,00
	170	39	2,1	88,4	0,22	2,9	4,5	33	3	3400	4000	1316	4,20
	170	39	2,1	88,4	0,22	2,9	4,5	33	3	3400	4000	1316 K	4,20
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3200	3800	2316	6,10
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3200	3800	2316 K	6,10
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3200	3800	2316 M	6,10
85	150	28	2	48,2	0,17	3,7	5,7	20,8	3,9	4000	4800	1217	2,05
	150	28	2	48,2	0,17	3,7	5,7	20,8	3,9	4000	4800	1217 K	2,05
	150	36	2	58,5	0,25	2,5	3,9	23,8	2,7	3800	4800	2217	2,50
	150	36	2	58,5	0,25	2,5	3,9	23,8	2,7	3800	4500	2217 K	2,50
	180	41	3	97,5	0,22	2,9	4,5	37,9	3	3200	4800	1317	5,00
	180	41	3	97,5	0,22	2,9	4,5	37,9	3	3200	3800	1317 K	5,00
	180	60	3	140	0,37	1,7	2,6	51,5	1,8	3000	3600	2317	7,05
	180	60	3	140	0,37	1,7	2,6	51,5	1,8	3000	3600	2317 K	7,05
90	160	30	2	57	0,17	3,7	5,7	23,1	3,9	3800	4500	1218	2,50
	160	30	2	57	0,17	3,7	5,7	23,1	3,9	3800	4500	1218 K	2,50
	160	40	2	70,2	0,27	2,3	3,6	27,2	2,5	3600	4300	2218	3,40

Self-aligning ball bearings



Dimensions				Basic radial load		Factors				Speed limit		Designation	Mass
d	D	B	r _s min.	C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN	-			kN	-	min ⁻¹		-	Kg
90	160	40	2	70,2	0,27	2,3	3,6	27,2	2,5	3600	4300	2218 K	3,40
	190	43	3	117	0,22	2,9	4,5	44,5	3	3000	3600	1318	5,80
	190	43	3	117	0,22	2,9	4,5	44,5	3	3000	3600	1318 K	5,80
	190	64	3	153	0,38	1,7	2,6	57,7	1,7	2800	3400	2318	8,45
	190	64	3	153	0,38	1,7	2,6	57,7	1,7	2800	3400	2318 K	8,45
95	170	32	2,1	63,7	0,17	3,7	5,7	24,3	3,9	3400	4000	1219	3,10
	170	32	2,1	63,7	0,17	3,7	5,7	24,3	3,9	3400	4000	1219 K	3,10
	200	45	3	133	0,23	2,8	4,2	50,8	2,9	2800	3400	1319	6,70
	200	45	3	133	0,23	2,8	4,2	50,8	2,9	2800	3400	1319 K	6,70
100	180	34	2,1	68,9	0,17	3,7	5,7	29,7	3,9	3200	3800	1220	3,70
	180	34	2,1	68,9	0,17	3,7	5,7	29,7	3,9	3200	3800	1220 K	3,70
	180	46	2,1	97,5	0,24	2,6	4,1	34	2,8	3200	3800	2220	5,0
	180	46	2,1	97,5	0,24	2,6	4,1	34	2,8	3200	3800	2220 K	5,0
	215	47	3	143	0,24	2,6	4,1	57,3	2,8	2600	3200	1320	8,30
	215	47	3	143	0,24	2,6	4,1	57,3	2,8	2600	3200	1320 K	8,30
	215	73	3	193	0,34	1,9	2,9	73,4	2	2400	3000	2320	12,2
215	73	3	193	0,34	1,9	2,9	73,4	2	2400	3000	2320 K	12,5	
110	200	38	2,1	88	0,17	3,7	5,7	35,2	3,9	2800	3400	1222	5,15
	200	38	2,1	88	0,17	3,7	5,7	35,2	3,9	2800	3400	1222 K	5,15
	200	53	2,1	124	0,26	2,4	3,7	48,9	2,5	2800	3400	2222	7,10
	200	53	2,1	124	0,26	2,4	3,7	48,9	2,5	2800	3400	2222 K	7,10
	240	50	3	163	0,22	2,9	4,5	67,5	3	2400	3000	1322	12,0
	240	50	3	163	0,22	2,9	4,5	67,5	3	2400	3000	1322 K	12,0

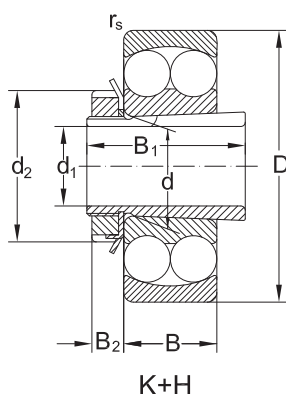
Self-aligning ball bearings with extended inner ring



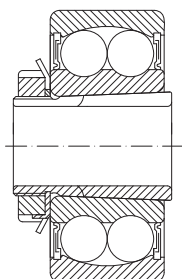
Dimensions						Basical Factors				Speed limit				Designation	Mass
d ¹⁾	D	C	B	D ₁	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease oil			
mm						kN	-			kN	-	min ⁻¹		-	Kg
20	47	14	40	29,2	1	9,9	0,28	2,2	3,5	2,65	2,4	7100	9000	11204	0,180
	52	15	44	31,5	1,1	12,4	0,3	2,1	3,3	3,35	2,2	8000	6300	11304	0,270
25	52	15	44	33,3	1	12,2	0,29	2,2	3,4	3,3	2,3	6300	8000	11205	0,220
	62	17	48	38	1,1	17,8	0,28	2,2	3,5	4,9	2,4	5000	6300	11305	0,410
30	62	16	48	40,1	1	15,7	0,25	2,5	3,9	4,7	2,7	5000	6300	11206	0,350
	72	19	52	45	1,1	21,4	0,24	2,6	4,1	6,35	2,8	4000	5000	11306	0,610
35	72	17	52	47,7	1,1	15,8	0,23	2,8	4,2	5,15	2,9	4000	5000	11207	0,540
	80	21	56	51,7	1,5	25,1	0,25	2,5	3,9	7,95	2,7	3600	4500	11307	0,810
40	80	18	56	54	1,1	19,2	0,22	2,9	4,5	6,5	3	3600	4500	11208	0,720
	90	23	58	57,7	1,5	29,5	0,24	2,6	4,1	9,75	2,8	3200	4000	11308	1,08
45	85	19	58	57,7	1,1	21,8	0,21	3	4,7	7,4	3,2	3600	4500	11209	0,770
	100	25	60	63,9	1,5	37,7	0,24	2,6	4,1	12,8	2,8	2800	3600	11309	1,38
50	90	20	58	62,7	1,1	22,9	0,21	3	4,7	8,1	3,2	3200	4000	11210	0,850
	110	27	62	70,3	2	43,4	0,24	2,6	4,1	14,1	2,8	2500	3200	11310	1,72
55	100	21	60	69,5	1,5	26,6	0,2	3,2	4,9	10,0	3,3	2800	3600	11211	1,13
	110	22	62	78	1,5	30,2	0,19	3,4	5,2	11,6	3,5	2500	3200	11212	1,50

1) Tolerance J7

Self-aligning ball bearings with adapter sleeve



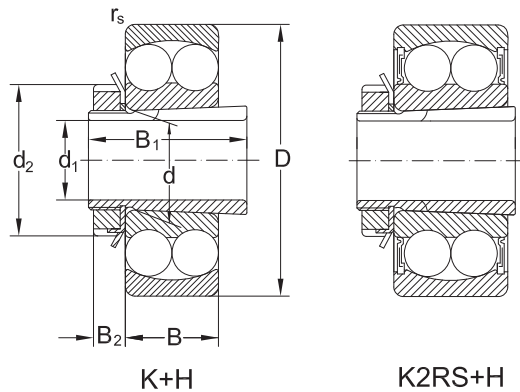
Dimensions								Designation		Mass
d ₁	d	D	B	r _s min.	d ₂	B ₁	B ₂	bearing	adapter sleeve	
mm								-		Kg
17	20	47	14	1	32	24	7	1204 K	H204	0,167
	20	47	18	1	32	28	7	2204 K	H304	0,201
	20	52	15	1,1	32	28	7	1304 K	H304	0,221
	20	52	21	1,1	32	31	7	2304 K	H2304	0,281
20	25	52	15	1	38	26	8	1205 K	H205	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	1,1	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



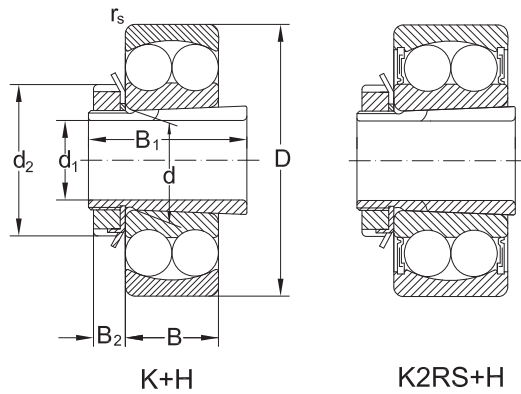
K2RS+H

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	15000	18000
12,6	0,28	2,2	3,5	3,3	2,4	14000	17000
12,4	0,3	2,1	3,3	3,35	2,2	12000	15000
18,2	0,52	1,2	1,9	4,7	1,3	11000	14000
12,2	0,29	2,2	3,4	3,3	2,3	13000	16000
12,5	0,43	1,5	2,3	3,45	1,6	11000	14000
12,2	0,29	2,2	3,4	3,3	2,3	7000	
17,8	0,28	2,2	3,5	4,9	2,4	9500	12000
24,5	0,44	1,4	2,2	6,55	1,5	9500	12000
15,7	0,25	2,5	3,9	4,7	2,7	10000	13000
15,3	0,4	1,6	2,5	4,6	1,7	9500	12000
15,7	0,25	2,5	3,9	4,7	2,7	5300	
21,4	0,24	2,6	4,1	6,35	2,8	9000	11000
31,4	0,4	1,6	2,5	8,7	1,7	8500	10000
15,8	0,23	2,8	4,2	5,15	2,9	9000	11000
21,7	0,37	1,7	2,6	6,7	1,8	8500	10000
15,8	0,23	2,8	4,2	5,15	2,9	5600	
25,1	0,25	2,5	3,9	7,95	2,7	7500	9000
39,7	0,43	1,5	2,3	12,9	1,6	7000	8500
19,2	0,22	2,9	4,5	6,5	3	8500	10000
22,4	0,33	1,9	3	7,4	2	7500	9000
19,2	0,22	2,9	4,5	6,5	3	4800	
29,5	0,24	2,6	4,1	9,75	2,8	6700	8000
44,9	0,39	1,6	2,5	15,1	1,7	6300	7500
21,8	0,21	3	4,7	7,4	3,2	7500	9000
23,3	0,31	2	3,1	8,15	2,1	7000	8500
21,8	0,21	3	4,7	7,4	3,2	4500	
37,7	0,24	2,6	4,1	12,9	2,8	6300	7500
54,1	0,31	2	3,1	16,5	2,1	5600	6700
22,9	0,21	3	4,7	8,16	3,2	7000	8500
23,3	0,29	2,2	3,4	8,5	2,3	6300	7500
22,9	0,21	3	4,6	8,1	3,2	4000	
43,4	0,24	2,6	4,1	14,2	2,8	5600	6700
64,4	0,42	1,5	2,3	20	1,6	5300	6300
26,6	0,2	3,2	4,1	10,1	3,3	6300	7500
26,5	0,27	2,3	3,6	9,9	2,5	6000	7000
51,3	0,23	2,8	4,2	18,1	2,9	5000	6000
75,3	0,41	1,5	2,4	23,8	1,6	4800	5600
30,2	0,19	3,4	5,2	11,6	3,5	5600	6700
33,8	0,28	2,2	3,5	12,6	2,4	5300	6300
57,1	0,23	2,8	4,2	20,8	2,9	4500	5300
87,1	0,41	1,5	2,4	28	1,6	4300	5000
31	0,17	3,7	5,7	12,4	3,9	5300	6300

Self-aligning ball bearings with adapter sleeve



Dimensions								Designation		Mass
d_1	d	D	B	r_s min.	d_2	B_1	B_2	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	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



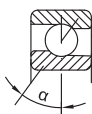
Basic radial load.		Factors			Speed limit		
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil
kN	-			kN	-	min ⁻¹	
43,6	0,28	2,2	3,5	16,4	2,4	5000	6000
62	0,23	2,8	4,2	22,9	2,8	4300	5000
95,6	0,38	1,7	2,6	32,5	1,7	4000	4800
38,9	0,18	3,5	5,4	15,6	3,7	4800	5600
44	0,25	2,5	3,9	17,8	2,7	4500	5300
79,2	0,22	2,9	4,5	30	3	3600	4300
123	0,38	1,7	2,6	42,8	1,7	4300	4000
39,8	0,16	3,9	6,1	17	4,1	4300	5000
48,8	0,26	2,4	3,7	19,9	2,5	4000	4800
88,4	0,22	2,9	4,5	33	3	3400	4000
136	0,34	1,9	2,9	48,5	2	3200	3800
48,8	0,17	3,7	5,7	20,8	3,9	4000	4800
58,5	0,25	2,5	3,9	23,8	2,7	3800	4500
97,5	0,22	2,9	4,5	37,9	3	3200	3800
140	0,37	1,7	2,6	51,5	1,8	3000	3600
57	0,17	3,7	5,7	23,1	3,9	3800	4500
70,2	0,27	2,3	3,6	27,2	2,5	3600	4300
117	0,22	2,9	4,5	44,5	3	3000	3600
153	0,38	1,7	2,6	57,7	1,7	2800	3400
63,7	0,17	3,7	5,7	24,3	3,9	3400	4000
133	0,23	2,8	4,2	50,8	2,9	2800	3400
68,9	0,17	3,7	5,7	29,7	3,9	3200	3800
97,5	0,24	2,6	4,1	34	2,8	2200	3800
143	0,24	2,6	4,1	57,3	2,8	2600	3200
193	0,34	1,9	2,9	73,4	2	2400	3000
88	0,17	3,7	5,7	35,2	3,9	2800	3400
124	0,26	2,4	3,7	48,9	2,5	2800	3400
163	0,22	2,9	4,5	67,5	3	2400	3000



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

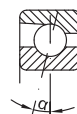
for tool-holders, have phenol resins (textolite) cages or machined brass cages. Those with bore diameters up to $d = 100 \text{ mm}$ are manufactured to tolerance classes P5, P4 and P2 and have a contact angle of 15° (C) and 25° (A) respectively.



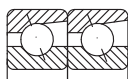
Series 72B, 73B
Contact angle $\alpha = 40^\circ$



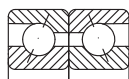
Series 70A, 72A
Contact angle $\alpha = 25^\circ$



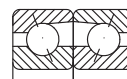
Series 70C, 72C
Contact angle $\alpha = 15^\circ$



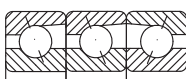
DT arrangement (Tandem)



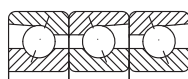
DB arrangement
(Back-to-back)



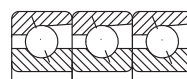
DF arrangement
(Face-to-face)



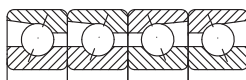
TFT arrangement



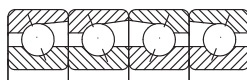
TBT arrangement



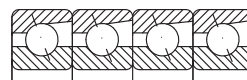
TT arrangement



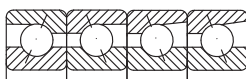
QBC arrangement



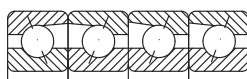
QFC arrangement



QT arrangement



QBT arrangement



QFT arrangement

Suffixes

- A** - bearing with extended outer ring
- A** - 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 in 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 and K_1 , K_e 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_1 and K_e 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 155 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.

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.

Deviation of main dimensions of high accuracy row angular contact bearings									
Deviations in μm								Table 1	
Bore d		Δ _{dmp} / Δ _{Dmp}				Δ _{BS}			
over	up to	low	high	low	high	low	high	low	high
(mm)		P4		UP		P2			
-	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

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 raceway in the outer or in the inner ring are in the same plane.

The contact angle α can be calculated and verified in accordance with the specifications on page 150.

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

Axial clearance - preload

Axial clearance or preload can be obtained only when single row angular contact ball bearings 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																			Table 2	
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.	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	260		
18	30	7	15	18	26	32	40	+4	-4	120	-2	-10	40	480	-8	-16	340	970		
30	50	9	17	22	30	40	48	+4	-4	160	-2	-10	60	630	-8	-16	450	1280		
50	80	11	23	26	38	48	60	+6	-6	380	-3	-15	140	1500	-12	-24	1080	3050		
80	120	14	26	32	44	55	67	+6	-6	410	-3	-15	150	1600	-12	-24	1150	3250		
120	180	17	29	35	47	62	74	+6	-6	540	-3	-15	200	2150	-12	-24	1500	4300		
180	250	21	37	45	61	74	90	+8	-8	940	-4	-20	330	3700	-16	-32	2650	7500		
250	315	26	42	52	68	90	106	+8	-8	1080	-4	-20	380	4250	-16	-32	3000	8600		

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 arrangement, 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 d	Symbol	Axial preload Series 70C			Series 72C			Series 70A			Series 72A				
		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		

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

Table 3 (continued)

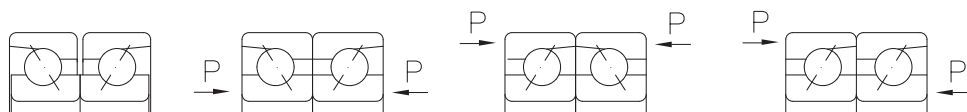
Bore		Axial preload Series 70C			Series 72C			Series 70A			Series 72A		
d	Symbol	L	M	S	L	M	S	L	M	S	L	M	S
mm	-	N											
75	15	200	400	800	310	620	1240	310	620	1240	500	1000	2000
80	16	240	480	960	370	740	1480	390	780	1560	580	1160	2320
85	17	250	500	1000	370	740	1480	400	800	1600	600	1200	2400
90	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.

Before mounting (preload)



After mounting (preload)



Cages

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

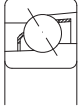
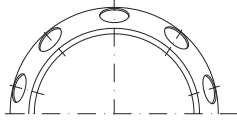
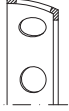
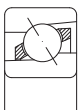
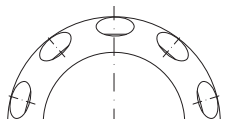
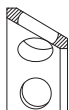
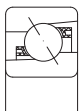
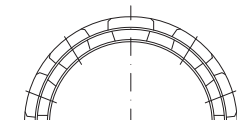
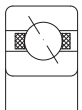
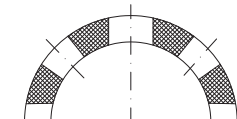
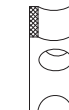
High precision single row angular contact ball bearings series 70C, 72C, 70A and 72A are fitted with textolite cages (textile fibre reinforced phenol resins).

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
mm	-	N			
Pressed sheet cage				- General application - Moderate speeds - Bearings series 72B, 73B	600 x 10 ³ 450 x 10 ³
Machined brass cage M, MA, MB				- General application - High speeds - Bearings: 7231B-7238B 7310B-7338B	1100 x 10 ³ 800 x 10 ³
Polyamide cage TN				- General application - Low friction moment - High speeds	1100 x 10 ³ 900 x 10 ³
Textolite cage T, TA, TB				- High accuracy bearings series: 70C, 72C, 70A, 72A - High speeds - Low vibration level	1200 x 10 ³ 900 x 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:

$$P_r = F_r, \text{ kN}, \quad \text{when } F_a/F_r \leq 1,14,$$

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

For bearings in DB or DF arrangement

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

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

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 bearings 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 $\alpha = 15^\circ(\text{C})$, single or in DT arrangement, the following equations are available:

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

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

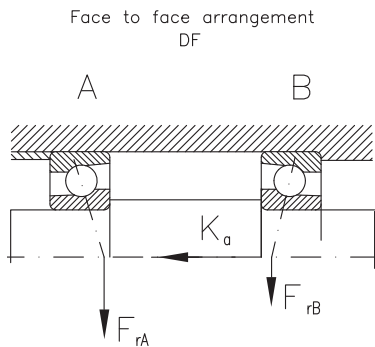
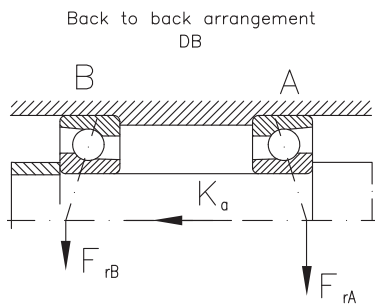
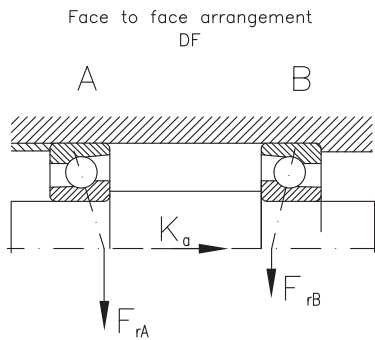
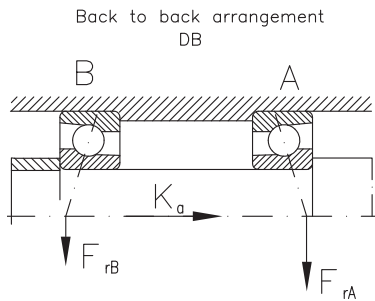
The values of factor Y depend on the values of the ratio $f_0 i F_a/C_{0r}$ and are given in table 6. Factor f_0 can be found in diagram in page 162 as a function of dimensions series and bearing mean diameter. "i" represents the number of bearings or bearings pairs in a bearing join.

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

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

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

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).



Determination of axial loads

Table 5

Loading version	Axial load
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) $F_{rA} < F_{rB}$ $K_a \leq 1,14 (F_{rB} - F_{rA})$	$F_{aB} = F_{aB} - K_a$ $F_{aB} = 1,14 F_{rB}$
2a) $F_{rA} \leq F_{rB}$ $K_a \geq 0$	$F_{aB} = F_{aB} + K_a$ $F_{aB} = 1,14 F_{rB}$
2b) $F_{rA} > F_{rB}$ $K_a \geq 1,14 (F_{rA} - F_{rB})$	$F_{aB} = F_{aB} + K_a$ $F_{aB} = 1,14 F_{rB}$
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 equation are available:

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

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

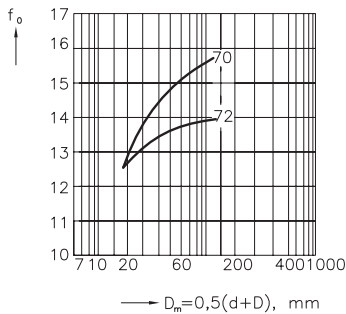
For bearings in DB and DF arrangement, the following equations are available:

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

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

Values for Y_1 and Y_2 are given in table 6.

Values of factors e, Y, Y ₁ and Y ₂				
Table 6				
$\frac{f_0 i F_a}{C_{Or}}$	e	Single and DT	Arrangement DB or DF	
		Y	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:

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

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

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

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

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:

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

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

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

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:

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

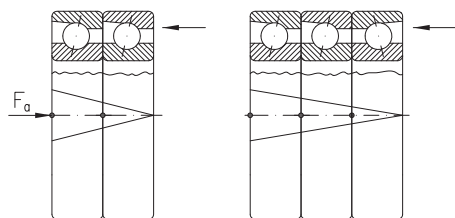
For bearings in DB and DF arrangement, the following equation is available:

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

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 bearings tables is valid for each single bearing. Basic dynamic load of a paired bearings set can be determined according to the specifications on page 20.

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, speed 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 values of the coefficients in table 7.

Speed limit reduction factor				
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

Table 7

Abutment dimensions

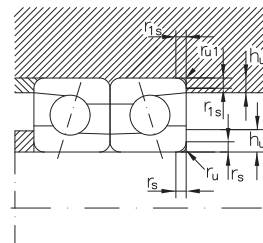
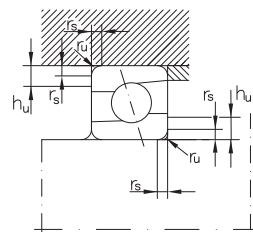
For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum connection radius $r_{u\max}$ should be less than bearing minimum mounting chamfer $r_{1\min}, r_{2\min}$.

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

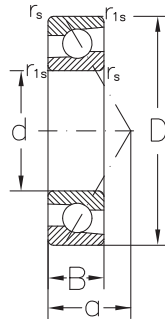
The values of the connection radii and support shoulder height are given in table 8.

Abutment dimensions			
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

Table 8

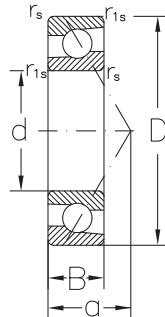


Angular contact ball bearings, single row



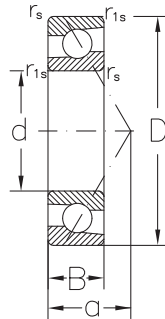
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
10	30	9	0,6	0,3	13	4,95	2,5	19000	28000	7200 B	0,031
12	32	10	0,6	0,3	14	7,4	3,75	17000	24000	72101 B	0,045
15	35	11	0,6	0,3	16	7,45	3,9	16000	22000	7202 B	0,048
	35	11	0,6	0,3	16	7,45	3,9	16000	22000	7202 BP6	0,048
	35	11	0,6	0,3	16	7,45	3,9	16000	22000	7202 BP5	0,048
	42	13	1	0,6	19	12,9	6,5	14000	19000	7302 B	0,090
17	40	12	0,6	0,6	18	11	6,1	14000	19000	7203 B	0,070
	40	12	0,6	0,6	18	11	6,1	14000	19000	7203 BP6	0,070
	40	12	0,6	0,6	18	11	6,1	14000	19000	7203 BP5	0,070
	47	14	1	0,6	21	14,8	8,1	12000	17000	7303 B	0,120
20	47	14	1	0,6	21	14,1	8,4	11000	16000	7204 B	0,110
	47	14	1	0,6	21	14,1	8,4	11000	16000	7204 BP6	0,110
	47	14	1	0,6	21	14,1	8,4	11000	16000	7204 BP5	0,110
	52	15	1,1	0,6	23	17,3	9,7	10000	15000	7304 B	0,150
	52	15	1,1	0,6	23	17,3	9,7	10000	15000	7304 BP6	0,150
25	52	15	1	0,6	24	15,5	10,1	9500	14000	7205 B	0,130
	52	15	1	0,6	24	15,5	10,1	9500	14000	7205 BP6	0,130
	52	15	1	0,6	24	15,5	10,1	9500	14000	7205 BP5	0,130
	62	17	1,1	0,6	27	24,4	14,6	8500	12000	7305 B	0,250
	62	17	1,1	0,6	27	24,4	14,6	8500	12000	7305 BP6	0,250
	62	17	1,1	0,6	27	24,4	14,6	8500	12000	7305 AMA	0,250
30	62	16	1	0,6	27	20,5	13,6	8500	12000	7206 B	0,210
	62	16	1	0,6	27	20,5	13,6	8500	12000	7206 BP6	0,210
	62	16	1	0,6	27	20,5	13,6	8500	12000	7206 BP5	0,210
	62	16	1	0,6	27	20,5	13,6	8500	12000	7206 ATAP2	0,210
	72	19	1,1	0,6	31	29,3	19	7500	10000	7306 B	0,370
	72	19	1,1	0,6	31	29,3	19	7500	10000	7306 BP6	0,370
	72	19	1,1	0,6	31	29,3	19	7500	10000	7306 BP5	0,370
	72	19	1,1	0,6	31	29,3	19	7500	10000	7306 AMA	0,370
35	72	17	1,1	0,6	31	28,5	19,8	7500	10000	7207 B	0,300
	72	17	1,1	0,6	31	28,5	19,8	7500	10000	7207 BP5	0,300
	80	21	1,5	1	35	36,7	24,3	7000	9500	7307 B	0,510
	80	21	1,5	1	35	36,7	24,3	7000	9500	7307 BP5	0,510
40	80	18	1,1	0,6	34	32,1	23	6700	9000	7208 B	0,390
	80	18	1,1	0,6	34	32,1	23	6700	9000	7208 BP6	0,390
	80	18	1,1	0,6	34	32,1	23	6700	9000	7208 BP5	0,390
	90	23	1,5	1	39	44,8	30,3	6300	8500	7308 B	0,670
	90	23	1,5	1	39	44,8	30,3	6300	8500	7308 BP6	0,670
	90	23	1,5	1	39	44,8	30,3	6300	8500	7308 BP5	0,670
45	85	19	1,1	0,6	37	36,1	26,2	6300	8500	7209 B	0,440

Angular contact ball bearings, single row



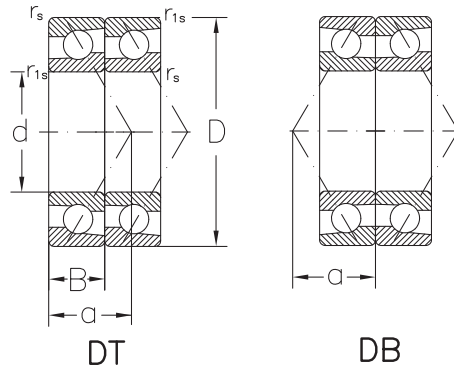
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d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
45	85	19	1,1	0,6	37	36,1	26,2	6300	8500	7209 BP5	0,440
	100	25	1,5	1	43	58,3	40,1	5600	7500	7309 B	0,900
	100	25	1,5	1	43	58,3	40,1	5600	7500	7309 BP6	0,900
	100	25	1,5	1	43	58,3	40,1	5600	7500	7309 BP5	0,900
50	90	20	1,1	0,6	39	37,4	28,6	5600	7500	7210 B	0,490
	90	20	1,1	0,6	39	37,4	28,6	5600	7500	7210 BP6	0,490
	90	20	1,1	0,6	39	37,4	28,6	5600	7500	7210 BP5	0,490
	110	27	2	1	47	68,2	47,9	5000	6700	7310 B	1,15
	110	27	2	1	47	68,2	47,9	5000	6700	7310 BP6	1,15
	110	27	2	1	47	68,2	47,9	5000	6700	7310 BP5	1,15
55	100	21	1,5	1	43	46,2	36,2	5300	7000	7211 B	0,650
	120	29	2	1	52	78,8	56,4	4500	6000	7311 B	1,45
60	110	22	1,5	1	47	56,3	44,7	4800	6300	7212 B	0,840
	110	22	1,5	1	47	56,3	44,7	4800	6300	7212 BP5	0,840
	130	31	2,1	1,1	56	90	65,5	4300	5600	7312 B	1,85
	130	31	2,1	1,1	56	90	65,5	4300	5600	7312 BP5	1,85
65	120	23	1,5	1	50	63,6	52,5	4300	5600	7213 B	1,05
	120	23	1,5	1	50	63,6	52,5	4300	5600	7213 BP6	1,05
	120	23	1,5	1	50	63,6	52,5	4300	5600	7213 BP5	1,05
	140	33	2,1	1,1	60	101	75,3	4000	5300	7313 B	2,25
70	125	24	1,5	1	53	69,1	57,8	4300	5600	7214 B	1,15
	125	24	1,5	1	53	69,1	57,8	4300	5600	7214 B	1,15
	150	35	2,1	1,1	64	114	86	3800	5000	7314 B	2,75
	150	35	2,1	1,1	64	114	86	3800	5000	7314 BP6	2,75
	150	35	2,1	1,1	64	114	86	3800	5000	7314 BP5	2,75
	150	35	2,1	1,1	64	114	86	3800	5000	7314 BTN	2,75
75	130	25	1,5	1	56	74,8	63,2	4000	5300	7215 B	1,30
	130	25	1,5	1	56	74,8	63,2	4000	5300	7215 BP6	1,30
	130	25	1,5	1	56	74,8	63,2	4000	5300	7215 BP5	1,30
	160	37	2,1	1,1	68	125	97,5	3400	4500	7315 B	3,30
	160	37	2,1	1,1	68	125	97,3	3400	4500	7315 BMAP6	3,30
	160	37	2,1	1,1	68	125	97,5	3400	4500	7315 AMA	3,30
80	140	26	2	1	59	80,5	69,3	3800	5000	7216 B	1,55
	170	39	2,1	1,1	72	135	109	3200	4300	7316 B	3,90
	170	39	2,1	1,1	72	135	109	3200	4300	7316 BP6	3,903
	170	39	2,1	1,1	72	135	109	3200	4300	7316 BMAP6	3,903
85	150	28	2	1	64	93,1	81,1	3400	4500	7217 B	1,953
	180	41	3	1,1	76	145	122	3000	4000	7317 B	4,603
	180	41	3	1,1	76	145	122	3000	4000	7317 BP6	4,603
	180	41	3	1,1	76	145	122	3000	4000	7317 BMP6	4,603

Angular contact ball bearings, single row



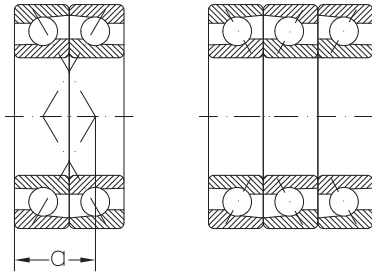
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
90	160	30	2	1	67	107	93,8	3200	4300	7218 B	2,403
	160	30	2	1	67	107	93,8	3200	4300	7218 BMB	2,403
	190	43	3	1,1	80	156	135	2800	3800	7318 B	5,403
95	170	32	2,1	1,1	71	116	101	3000	4000	7219 B	2,903
	200	45	3	1,1	84	168	150	2600	3600	7319 B	6,253
100	180	34	2,1	1,1	76	129	116	2800	3800	7220 B	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	7220 BP6	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	7220 BMA	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	7220 BMAP6	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	7220 BMAP4	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	7220 BMB	3,453
	215	47	3	1,1	90	190	178	2400	3400	7320 B	7,753
	215	47	3	1,1	90	190	178	2400	3400	7320 BP6	7,753
	215	47	3	1,1	90	190	178	2400	3400	7320 BM	7,753
	200	38	2,1	1,1	84	153	145	2400	3400	7222 B	4,803
110	200	38	2,1	1,1	84	153	145	2400	3400	7222 BMB	4,803
	240	50	3	1,1	99	248	229	2000	3000	7322 B	10,53
	240	50	3	1,1	99	248	229	2000	3000	7322 BP5	10,53
	240	50	3	1,1	99	248	229	2000	3000	7322 BM	10,53
	240	50	3	1,1	99	248	229	2000	3000	7322 BP5	10,53
140	250	42	3	1,1	10,3	191	210	1700	2400	7228 B	8,803
	300	62	4	1,5	123	290	334	1700	2400	7328 B	21,63
	300	62	4	1,5	123	290	334	1700	2400	7328 BMBP5	21,63
150	190	24	1,1	0,6	35	60,5	79,2	2200	3000	72830 CMA	3,363
	270	45	3	1,1	111	195	222	2000	2800	7230 BM	11,63
	320	65	4	1,5	131	317	380	1600	2000	7330 BM	26,53
	320	65	4	1,5	131	317	380	1600	2000	7330 BMP5	26,53
160	220	28	2	1	58	110	134	2200	3000	71932 AMAP5	3,263
180	250	33	2	2	33	131	162	2000	2800	71936 AM	5,36
200	250	30	1,5	0,6	45	102	141	3000	5600	72840 CMAP4	3,43

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



Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} 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	14000	20000	7202 BDT	0,096
	35	11	0,6	0,3	16	12	7,8	13000	18000	7202 BDB	0,096
	35	11	0,6	0,3	16	12	7,8	14000	20000	7202 BP6DT	0,096
	35	11	0,6	0,3	16	12	7,8	13000	18000	7202 BP5DB	0,096
17	40	12	0,6	0,6	18	17,8	12,2	13000	17000	7203 BDT	0,140
	40	12	0,6	0,6	18	17,8	12,2	11000	15000	7203 BDB	0,140
	40	12	0,6	0,6	18	17,8	12,2	11000	15000	7203 BDF	0,140
	40	12	0,6	0,6	18	17,8	12,2	11000	15000	7203 BP6DB	0,140
	40	12	0,6	0,6	18	17,8	12,2	11000	15000	7203 BP5DB	0,140
	47	14	1	0,6	21	24	16,2	11000	15000	7303 BDT	0,240
20	47	14	1	0,6	21	22,8	16,8	10000	14000	7204 BDT	0,220
	47	14	1	0,6	21	22,8	16,8	10000	14000	7204 BDB	0,220
	47	14	1	0,6	21	22,8	16,8	9000	13000	7204 BDF	0,220
	47	14	1	0,6	21	22,8	16,8	9000	13000	7204 BP6DB	0,220
	47	14	1	0,6	21	22,8	16,8	9000	13000	7204 BP5DB	0,220
	52	15	1,1	0,6	23	28	19,4	9000	14000	7304 BDT	0,303
	52	15	1,1	0,6	23	28	19,4	8000	12000	7304 BDB	0,303
	52	15	1,1	0,6	23	28	19,4	8000	12000	7304 BDF	0,303
	52	15	1,1	0,6	23	28	19,4	8000	12000	7304 BDF	0,303
25	52	15	1	0,6	24	25,1	20,2	9000	13000	7205 BDT	0,260
	52	15	1	0,6	24	25,1	20,2	7500	11000	7205 BDB	0,260
	52	15	1	0,6	24	25,1	20,2	7500	11000	7205 BDF	0,260
	52	15	1	0,6	24	25,1	20,2	7500	11000	7205 BP6DB	0,260
	52	15	1	0,6	24	25,1	20,2	9000	13000	7205 BP5DT	0,260
	52	15	1	0,6	24	25,1	20,2	7500	11000	7205 BP5DB	0,260
	52	15	1	0,6	24	33,5	30,3	7000	10000	7205 BP5TFT	0,390
	62	17	1,1	0,6	27	39,5	29,2	7500	11000	7305 BDT	0,500
	62	17	1,1	0,6	27	39,5	29,2	6700	9500	7305 BDB	0,500
	62	17	1,1	0,6	27	39,5	29,2	6700	9500	7305 BDF	0,500
	62	17	1,1	0,6	27	39,5	29,2	6700	9500	7305 AMA DF	0,500
	62	16	1	0,6	27	33,2	27,2	7500	11000	7206 BDT	0,420
	62	16	1	0,6	27	33,2	27,2	6700	9500	7206 BDB	0,420
	62	16	1	0,6	27	33,2	27,2	6700	9500	7206 BDF	0,420
30	62	16	1	0,6	27	33,2	27,2	6700	9500	7206 BP6DB	0,420
	62	16	1	0,6	27	33,2	27,2	6700	9500	7206 BP5DB	0,420
	62	16	1	0,6	27	33,2	27,2	6700	9500	7206 BP5DF	0,420
	62	16	1	0,6	27	44,3	40,8	6000	8500	7206 BP5TFT	0,630
	62	16	1	0,6	27	33,2	27,2	7500	11000	7206 ATAP2DT	0,420
	72	19	1,1	0,6	31	47,5	38	6700	9000	7306 BDT	0,740
	72	19	1,1	0,6	31	47,5	38	6000	8000	7306 BDB	0,740
	72	19	1,1	0,6	31	47,5	38	6000	8000	7306 BDF	0,740
	72	19	1,1	0,6	31	63,3	57	5300	7000	7306 BTFT	1,113
	72	19	1,1	0,6	31	77,4	76	5300	7000	7306 BQFC	1,483

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

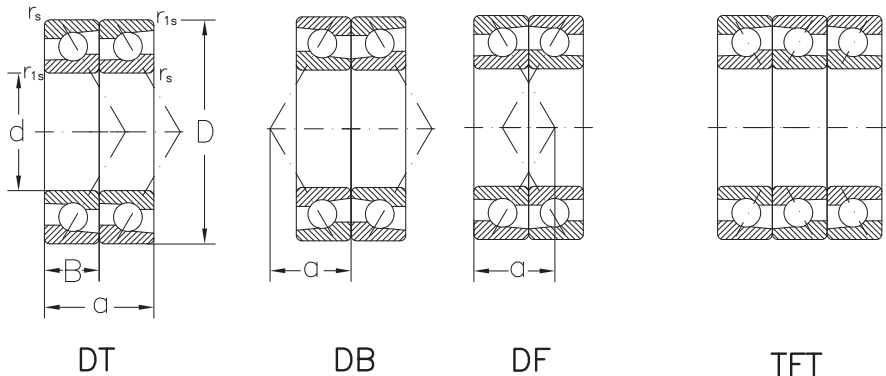


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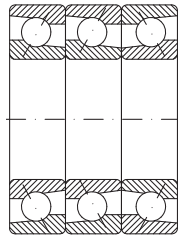
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
30	72	19	1,1	0,6	31	47,5	38	6700	9000	7306 BP5DT	0,740
	72	19	1,1	0,6	31	47,5	38	6700	9000	7306 AMADT	0,740
	72	19	1,1	0,6	31	47,5	38	6700	8000	7306 AMADF	0,740
35	72	17	1,1	0,6	31	46,2	39,6	6700	9000	7207 BDT	0,600
	72	17	1,1	0,6	31	46,2	39,6	6000	8000	7207 BDB	0,600
	72	17	1,1	0,6	31	46,2	39,6	6000	8000	7207 BDF	0,600
	72	17	1,1	0,6	31	46,2	39,6	6700	9000	7207 BP5DT	0,600
	72	17	1,1	0,6	31	46,2	39,6	6000	8000	7207 BP5DB	0,600
	72	17	1,1	0,6	31	61,6	59,4	5300	7000	7207 BP5TBT	0,900
	72	17	1,1	0,6	31	75,2	79,2	5300	7000	7207 BP5QFC	1,203
	80	21	1,5	1	35	59,5	48,6	6300	8500	7307 BDT	1,023
	80	21	1,5	1	35	59,5	48,6	5600	7500	7307 BDB	1,023
	80	21	1,5	1	35	59,5	48,6	5600	7500	7307 BDF	1,023
	80	21	1,5	1	35	59,5	48,6	5600	7500	7307 BP6DB	1,023
40	80	18	1,1	0,6	34	52	46	6000	8000	7208 BDT	0,780
	80	18	1,1	0,6	34	52	46	6030	8100	7208 BDB	0,780
	80	18	1,1	0,6	34	52	46	5300	7000	7208 BDF	0,780
	80	18	1,1	0,6	34	52	46	6000	8000	7208 BP5DT	0,780
	80	18	1,1	0,6	34	52	46	5300	7000	7208 BP5DB	0,780
	90	23	1,5	1	39	72,6	60,6	5600	7500	7308 BDT	1,343
	90	23	1,5	1	39	72,6	60,6	5000	6700	7308 BDB	1,343
	90	23	1,5	1	39	72,6	60,6	5000	6700	7308 BDF	1,343
	90	23	1,5	1	39	96,8	91,8	4500	6000	7308 BTFT	0,670
	90	23	1,5	1	39	118	121	4500	6000	7308 BQFC	2,683
	90	23	1,5	1	39	72,6	60,6	5000	6700	7308 BP6DF	1,343
	90	23	1,5	1	39	72,6	60,6	5000	6700	7308 BP5DB	1,343
	90	23	1,5	1	39	96,8	91,8	4500	6000	7308 BP5TFT	2,013
	90	23	1,5	1	39	118	121	4500	6000	7308 BP5QFC	2,683
45	85	19	1,1	0,6	37	58,5	52,4	5600	7500	7209 BDT	0,880
	85	19	1,1	0,6	37	58,5	52,4	5000	6700	7209 BDB	0,880
	85	19	1,1	0,6	37	58,5	52,4	5000	6700	7209 BDF	0,880
	85	19	1,1	0,6	37	58,5	52,4	5000	6700	7209 BP5DB	0,880
	100	25	1,5	1	43	94,4	80,2	5000	6700	7309 BDT	1,803
	100	25	1,5	1	43	94,4	80,2	4500	6000	7309 BDB	1,803
	100	25	1,5	1	43	94,4	80,2	4480	6000	7309 BDF	1,803
	100	25	1,5	1	43	94,4	80,2	4500	6000	7309 BP6DB	1,803
	100	25	1,5	1	43	94,4	80,2	4500	6000	7309 BP6DF	1,803
50	90	20	1,1	0,6	39	60,6	57,2	5000	6700	7210 BDT	0,980
	90	20	1,1	0,6	39	60,6	57,2	4500	6000	7210 BDF	0,980
	90	20	1,1	0,6	39	60,6	57,2	5000	6700	7210 BP5DT	0,980
	90	20	1,1	0,6	39	60,6	57,2	4500	6000	7210 BP5DB	0,980
	110	27	2	1	47	111	95,8	4500	6000	7310 BDT	2,303

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

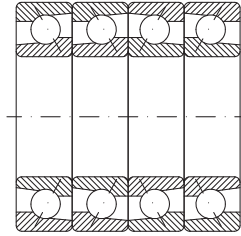


Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
50	110	27	2	1	47	111	95,8	4000	5300	7310 BDB	2,303
	110	27	2	1	47	111	95,8	4000	5300	7310 BDF	2,303
	110	27	2	1	47	205	144	3600	4800	7310 BP5TFT	3,453
	110	27	2	1	47	273	192	3600	4800	7310 BP5QFC	4,603
55	100	21	1,5	1	43	74,8	72,4	4800	6300	7211 BDT	1,303
	100	21	1,5	1	43	74,8	72,4	4300	5600	7211 BDB	1,303
	100	21	1,5	1	43	74,8	72,4	4300	5600	7211 BDF	1,303
	120	29	2	1	51	128	113	4000	5300	7311 BDT	2,903
	120	29	2	1	51	128	113	3600	4800	7311 BDB	2,903
	120	29	2	1	52	128	113	3600	4800	7311 BDF	2,903
60	110	22	1,5	1	47	91,2	89,4	4300	5600	7212 BDT	1,683
	110	22	1,5	1	47	91,2	89,4	3800	5000	7212 BDB	1,683
	110	22	1,5	1	47	91,2	89,4	3800	5000	7212 BDF	1,683
	110	22	1,5	1	47	91,2	89,4	3800	5000	7212 BP5DB	1,683
	130	31	2,1	1,1	55	146	131	3800	5000	7312 BDT	3,703
	130	31	2,1	1,1	55	146	131	3400	4500	7312 BDB	3,703
	130	31	2,1	1,1	55	146	131	3400	4500	7312 BDF	3,703
	130	31	2,1	1,1	55	146	131	3400	4500	7312 BP5DB	3,703
65	120	23	1,5	1	50	103	105	3800	5000	7213 BDT	2,103
	120	23	1,5	1,1	50	103	105	3800	5000	7213 BDB	2,103
	120	23	1,5	1,1	50	103	105	3800	5000	7213 BDF	2,103
	120	23	1,5	1	50	103	105	3400	4500	7213 BP6DB	2,103
	120	23	1,5	1	50	103	105	3400	4500	7213 BP6DF	2,103
	140	33	2,1	1,1	60	164	151	3600	4800	7313 BDT	4,503
	140	33	2,1	1,1	60	164	151	3200	4300	7313 BDB	4,503
	140	33	2,1	1,1	60	164	151	3200	4300	7313 BDF	4,503
70	125	24	1,5	1	53	112	116	3800	5000	7214 BDT	2,303
	125	24	1,5	1	53	112	116	3400	4500	7214 BDB	2,303
	125	24	1,5	1	53	112	116	3400	4500	7214 BDF	2,303
	150	35	2,1	1,1	64	185	172	3400	4500	7314 BDT	5,503
	150	35	2,1	1,1	64	185	172	3000	4000	7314 BDB	5,503
	150	35	2,1	1,1	64	185	172	3000	4000	7314 BDF	5,503
	150	35	2,1	1,1	64	185	172	3400	4500	7314 BP6DT	5,503
	150	35	2,1	1,1	64	185	172	3400	4500	7314 BP5DT	5,503
	150	35	2,1	1,1	64	185	172	3000	4000	7314 BP5DB	5,503
	150	35	2,1	1,1	64	185	172	3000	4000	7314 BP5DB	5,503
75	130	25	1,5	1	56	121	126	3600	4300	7215 BDT	2,603
	130	25	1,5	1	56	121	126	3200	4300	7215 BDB	2,603
	130	25	1,5	1	56	121	126	3200	4300	7215 BDF	2,603
	130	25	1,5	1	56	121	126	3200	4300	7215 BP6DB	2,603
	130	25	1,5	1	56	121	126	3200	4300	7215 BMAP6DB	2,603
	160	37	2,1	1,1	68	203	195	3200	4000	7315 BDT	6,603
	160	37	2,1	1,1	68	203	195	2800	3600	7315 BDB	6,603

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



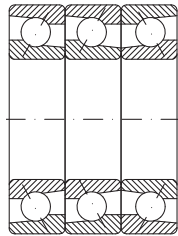
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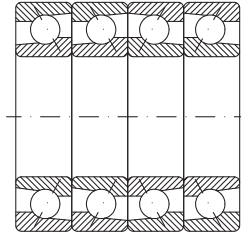
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Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
75	160	37	2,1	1,1	68	203	195	2800	3600	7315 BDF	6,603
	160	37	2,1	1,1	68	203	195	2800	3600	7315 AMADF	6,603
80	110	16	1	1	21	55,1	69,2	4000	5300	71916 CTAP4DT	0,736
	140	26	2	1	59	130	139	3200	4300	7216 BDT	3,103
	140	26	2	1	59	130	139	2800	3800	7216 BDB	3,103
	140	26	2	1	59	130	139	2800	3800	7216 BDF	3,103
	170	39	2,1	1,1	72	219	218	2800	3800	7316 BDT	7,803
	170	39	2,1	1,1	72	219	218	2600	3400	7316 BDB	7,803
	170	39	2,1	1,1	72	219	218	2600	3400	7316 BDF	7,803
	170	39	2,1	1,1	72	292	327	2200	3000	7316 BTBT	11,73
	170	39	2,1	1,1	72	219	218	2800	3800	7316 BP6DT	7,803
	170	39	2,1	1,1	72	292	327	2200	3000	7316 BMAP6TBT	11,73
85	150	28	2	1	64	151	162	3000	4000	7217 BDT	3,903
	150	28	2	1	64	151	162	2800	3600	7217 BDB	3,903
	150	28	2	1	64	151	162	2800	3600	7217 BDF	3,903
	180	41	3	1,1	76	235	244	2800	3600	7317 BDT	9,203
	180	41	3	1,1	76	235	244	2400	3200	7317 BDB	9,203
	180	41	3	1,1	76	235	244	2400	3200	7317 BDF	9,203
90	160	30	2	1	67	173	188	2800	3800	7218 BDT	4,803
	160	30	2	1	67	173	188	2600	3400	7218 BDB	4,803
	160	30	2	1	67	173	188	2600	3400	7218 BDF	4,803
	190	43	3	1,1	80	253	270	2600	3400	7318 BDT	10,83
	190	43	3	1,1	80	253	270	2200	3000	7318 BDB	10,83
	190	43	3	1,1	80	253	270	2200	3000	7318 BDF	10,83
	190	43	3	1,1	80	337	405	2000	2600	7318 BTBT	16,23
95	170	32	2,1	1,1	72	188	202	2800	3600	7219 BDT	5,803
	170	32	2,1	1,1	72	188	202	2400	3200	7219 BDB	5,803
	170	32	2,1	1,1	72	188	202	2400	3200	7219 BDF	5,803
	200	45	3	1,1	84	272	300	2400	3200	7319 BDT	12,53
	200	45	3	1,1	84	272	300	2000	2800	7319 BDB	12,53
	200	45	3	1,1	84	272	300	2000	2800	7319 BDF	12,53
	200	45	3	1,1	84	272	300	2000	2800	7319 BDF	12,53
100	180	34	2,1	1,1	76	208	232	2600	3400	7220 BDT	6,903
	180	34	2,1	1,1	76	208	232	2200	3000	7220 BDB	6,903
	180	34	2,1	1,1	76	208	232	2200	3000	7220 BDF	6,903
	180	34	2,1	1,1	76	208	232	2200	3000	7220 BMADB	6,903
	180	34	2,1	1,1	76	208	232	2200	3000	7220 BMAP6DB	6,903
	180	34	2,1	1,1	76	208	232	2600	2800	7220 BMAP4DT	6,903
	215	47	3	1,1	90	308	356	2200	3000	7320 BDT	15,53
	215	47	3	1,1	90	308	356	1900	2800	7320 BDB	15,53
	215	47	3	1,1	90	308	356	1900	2800	7320 BDF	15,53
	215	47	3	1,1	90	308	356	2200	3000	7320 BP6DT	15,53
	215	47	3	1,1	90	308	356	2200	3000	7320 BP6DT	15,53
	215	47	3	1,1	90	308	356	2200	3000	7320 BP6DT	15,53
	215	47	3	1,1	90	308	356	2200	3000	7320 BP6DT	15,53

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



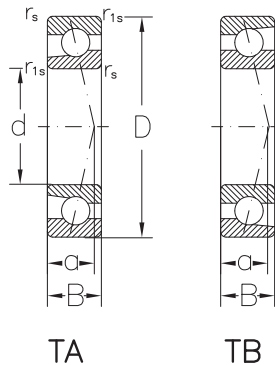
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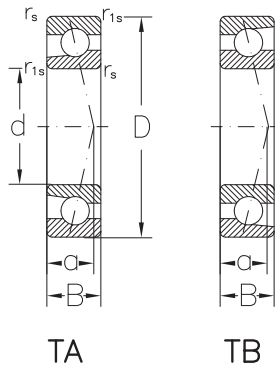
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r_s min.	r_{1s} min.	a	dyn. C_r	stat. C_{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
100	215	47	3	1,1	90	308	356	2200	3000	7320 BMDT	15,53
110	200	38	2,1	1,1	84	248	290	2200	3000	7222 BDT	9,603
	200	38	2,1	1,1	84	248	290	1900	2800	7222 BDB	9,603
	240	50	3	1,1	99	365	458	1800	2800	7322 BDT	21,03
	240	50	3	1,1	99	365	458	1600	2400	7322 BDB	21,03
	240	50	3	1,1	99	536	687	1400	2200	7322 BTBT	31,53
	240	50	3	1,1	99	365	458	1800	2800	7322 BP5DT	21,03
	240	50	3	1,1	99	365	458	1600	2400	7322 BMDF	21,03
140	250	42	3	1,1	103	172	189	1400	1900	7228 BDT	17,63
	300	62	4	1,5	123	470	668	1400	2200	7328 BDT	43,23
	300	62	4	1,5	123	470	668	1200	1900	7328 BDB	43,23
	300	62	4	1,5	123	470	668	1400	2200	7328 BMBP5DT	43,23
150	270	45	3	1,1	111	156	444	2400	3800	7230 BDB	23,23
	270	45	3	1,1	111	156	444	2400	3800	7230 BMDB	23,23
	320	65	4	1,5	131	254	760	1400	1800	7330 BMDF	53,03
	320	65	4	1,5	131	254	760	1400	1800	7330 BMP5DT	53,03
160	220	28	2	1	58	176	268	1600	2400	71932 AMAP5DB	6,523
180	250	33	2	2	33	210	324	1500	2200	71936 AMDB	10,83
200	250	30	1,5	0,6	45	165	282	1400	2000	72840 CMAP4DB	6,863
	250	30	1,5	0,6	45	220	423	1300	1800	72840 CMAP4TBT	10,23

High precision angular contact ball bearings single row



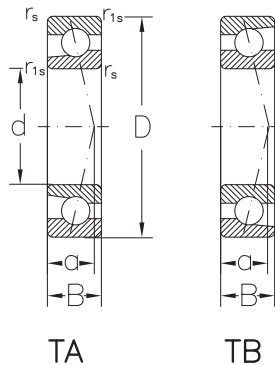
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
10	26	8	0,3	0,1	6	5,3	2,45	56000	90000	7000 CTAP4	0,020
	26	8	0,3	0,1	6	5,3	2,45	56000	90000	7000 CTAP2	0,020
	30	9	0,6	0,3	7	5,8	2,95	50000	80000	7200 CTAP4	0,029
	30	9	0,6	0,3	7	9,4	2,95	50000	80000	7200 CTAP2	0,029
12	28	8	0,3	0,1	7	5,4	2,6	50000	80000	7001 CTAP4	0,023
	28	8	0,3	0,1	7	5,4	2,6	50000	80000	7001 CTAP2	0,023
	32	10	0,6	0,3	10	7,5	3,4	45000	70000	7201 CTAP4	0,030
	32	10	0,6	0,3	10	7,5	3,4	45000	70000	7201 CTAP2	0,030
15	32	9	0,3	0,1	8	6,3	3,4	43000	67000	7002 CTAP4	0,030
	32	9	0,3	0,1	8	6,3	3,4	43000	67000	7002 CTAP2	0,030
	35	11	0,6	0,3	9	8,9	4,5	40000	63000	7202 CTAP4	0,042
	35	11	0,6	0,3	9	8,9	4,5	40000	63000	7202 CTAP2	0,042
	35	11	0,6	0,3	12	8,7	4,4	36000	56000	7202 ATAP4	0,042
	35	11	0,6	0,3	12	8,7	4,4	36000	56000	7202 ATAP2	0,042
17	35	10	0,3	0,1	9	7,2	4,2	38000	60000	7003 CTAP4	0,039
	35	10	0,3	0,1	9	7,2	4,2	38000	60000	7003 CTAP2	0,039
	40	12	0,6	0,3	10	10,9	5,8	36000	56000	7003 CTAP4	0,060
	40	12	0,6	0,3	10	10,9	5,8	36000	56000	7203 CTAP2	0,060
	40	12	0,6	0,3	13	9	5,1	30000	48000	7203 ATAP4	0,060
	40	12	0,6	0,3	13	9	5,1	30000	48000	7203 ATAP2	0,060
20	42	12	0,6	0,3	10	10,5	6,1	32000	50000	7004 CTAP4	0,070
	42	12	0,6	0,3	10	10,5	6,1	32000	50000	7004 CTAP2	0,070
	42	12	0,6	0,3	10	10,5	6,1	32000	50000	7004 CTBP4	0,070
	42	12	0,6	0,3	10	10,5	6,1	32000	50000	7004 CTBP2	0,070
	42	12	0,6	0,3	13	10	5,8	28000	45000	7004 ATAP4	0,070
	42	12	0,6	0,3	13	10	5,8	28000	45000	7004 ATAP2	0,070
	47	14	1	0,6	12	15,6	9	30000	48000	7204 CTAP4	0,100
	47	14	1	0,6	12	15,6	9	30000	48000	7204 CTAP2	0,100
	47	14	1	0,6	12	15,6	9	30000	48000	7204 CTBP4	0,100
	47	14	1	0,6	12	15,6	9	30000	48000	7204 CTBP2	0,100
	47	14	1	0,6	15	14,9	8,6	26000	43000	7204 ATAP4	0,100
	47	14	1	0,6	15	14,9	8,6	26000	43000	7204 ATAP2	0,100
25	47	12	0,6	0,3	11	11,7	7,4	28000	45000	7005 CTAP4	0,080
	47	12	0,6	0,3	11	11,7	7,4	28000	45000	7005 CTAP2	0,080
	47	12	0,6	0,3	11	11,7	7,4	28000	45000	7005 CTBP4	0,080
	47	12	0,6	0,3	11	11,7	7,4	28000	45000	7005 CTBP2	0,080
	47	12	0,6	0,3	15	10,4	6,95	24000	40000	7005 ATAP4	0,080
	47	12	0,6	0,3	15	10,4	6,95	24000	40000	7005 ATAP2	0,080
	52	15	1	0,6	13	16,6	10,3	26000	43000	7205 CTAP4	0,120
	52	15	1	0,6	13	16,6	10,3	26000	43000	7205 CTAP2	0,120
	52	15	1	0,6	13	16,6	10,3	26000	43000	7205 CTBP4	0,120
	52	15	1	0,6	13	16,6	10,3	26000	43000	7205 CTBP2	0,120

High precision angular contact ball bearings single row



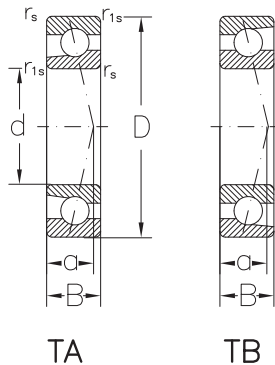
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r_s min.	r_{1s} min.	a	dyn. C_r	stat. C_{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
25	52	15	1	0,6	17	13,7	8,8	22000	38000	7205 ATAP4	0,120
	52	15	1	0,6	17	13,7	8,8	22000	38000	7205 ATAP2	0,120
30	55	13	1	0,3	12	15,1	10,3	24000	40000	7006 CTAP4	0,120
	55	13	1	0,3	12	15,1	10,3	24000	40000	7006 CTAP2	0,120
	55	13	1	0,3	12	15,1	10,3	24000	40000	7006 CTBP4	0,120
	55	13	1	0,3	12	15,1	10,3	24000	40000	7006 CTAB2	0,120
	55	13	1	0,3	17	13,4	9,5	20000	36000	7006 ATAP4	0,120
	55	13	1	0,3	17	13,4	9,5	20000	36000	7006 ATAP2	0,120
	62	16	1	0,6	14	23	14,8	22000	38000	7206 CTAP4	0,190
	62	16	1	0,6	14	23	14,8	22000	38000	7206 CTAP2	0,190
	62	16	1	0,6	14	23	14,8	22000	38000	7206 CTBP4	0,190
	62	16	1	0,6	14	23	14,8	22000	38000	7206 CTBP2	0,190
	62	16	1	0,6	19	22	14,1	19000	34000	7206 ATAP4	0,190
	62	16	1	0,6	19	22	14,1	19000	34000	7206 ATAP2	0,190
35	62	14	1	0,3	14	19,2	13,7	20000	36000	7007 CTAP4	0,160
	62	14	1	0,3	14	19,2	13,7	20000	36000	7007 CTAP2	0,160
	62	14	1	0,3	14	19,2	13,7	20000	36000	7007 CTBP4	0,160
	62	14	1	0,3	14	19,2	13,7	20000	36000	7007 CTBP2	0,160
	62	14	1	0,3	19	18,2	13,1	18000	32000	7007 ATAP4	0,160
	62	14	1	0,3	19	18,2	13,1	18000	32000	7007 ATAP2	0,160
	62	14	1	0,3	19	18,2	13,1	18000	32000	7007 ATBP4	0,160
	72	17	1,1	0,6	16	30,4	20,2	19000	34000	7207 CTAP4	0,270
	72	17	1,1	0,6	16	30,4	20,2	19000	34000	7207 CTAP2	0,270
	72	17	1,1	0,6	16	30,4	20,2	19000	34000	7207 CTBP4	0,270
	72	17	1,1	0,6	16	30,4	20,2	19000	34000	7207 CTAP2	0,270
	72	17	1,1	0,6	21	24,5	17	16000	28000	7207 ATAP4	0,270
	72	17	1,1	0,6	21	24,5	17	16000	28000	7207 ATAP2	0,270
	72	17	1,1	0,6	21	24,5	17	16000	28000	7207 ATBP4	0,270
40	68	15	1	0,3	15	20,6	15,9	19000	34000	7008 CTAP4	0,190
	68	15	1	0,3	15	20,6	15,9	19000	34000	7008 CTAP2	0,190
	68	15	1	0,3	20	19,5	15	16000	28000	7008 ATAP4	0,190
	68	15	1	0,3	20	19,5	15	16000	28000	7008 ATAP2	0,190
	68	15	1	0,3	20	19,5	15	16000	28000	7008 ATBP4	0,190
	80	18	1,1	0,6	17	36,3	25,2	17000	30000	7208 CTAP4	0,350
	80	18	1,1	0,6	17	36,3	25,2	17000	30000	7208 CTAP2	0,350
	80	18	1,1	0,6	17	36,3	25,2	17000	30000	7208 CTBP4	0,350
	80	18	1,1	0,6	17	36,3	25,2	17000	30000	7208 CTBP2	0,350
	80	18	1,1	0,6	23	35,2	24,4	15000	26000	7208 ATAP4	0,350
	80	18	1,1	0,6	23	35,2	24,4	15000	26000	7208 ATAP2	0,350
	80	18	1,1	0,6	23	35,2	24,4	15000	26000	7208 ATBP4	0,350
45	75	16	1	0,3	16	24,4	19,3	16000	28000	7009 CTAP4	0,250
	75	16	1	0,3	16	24,4	19,3	15000	28000	7009 CTAP2	0,250
	75	16	1	0,3	22	22	17,3	15000	26000	7009 ATAP4	0,250

High precision angular contact ball bearings single row



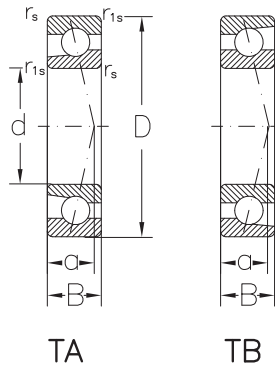
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
45	75	16	1	0,3	22	22	17,3	15000	26000	7009 ATAP2	0,250
	85	19	1,1	0,6	18	40	29	15000	26000	7209 CTAP4	0,400
	85	19	1,1	0,6	18	40	29	15000	26000	7209 CTAP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	7209 ATAP4	0,400
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	7209 ATAP2	0,400
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	7209 ATBP4	0,400
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	7209 ATBP2	0,400
50	80	16	1	0,3	17	25,1	20,7	15000	26000	7010 CTAP4	0,260
	80	16	1	0,3	17	25,1	20,7	15000	26000	7010 CTAP2	0,260
	80	16	1	0,3	23	23,2	20	13000	22000	7010 ATAP4	0,260
	80	16	1	0,3	23	23,2	20	13000	22000	7010 ATAP2	0,260
	90	20	1,1	0,6	20	42,8	31,7	14000	24000	7210 CTAP4	0,450
	90	20	1,1	0,6	20	42,8	31,7	14000	24000	7210 CTAP2	0,450
	90	20	1,1	0,6	27	42	31	12000	20000	7210 ATAP4	0,450
	90	20	1,1	0,6	27	42	31	12000	20000	7210 ATAP2	0,450
	90	20	1,1	0,6	27	42	31	12000	20000	7210 ATBP4	0,450
	90	20	1,1	0,6	27	42	31	12000	20000	7210 ATBP2	0,450
55	90	18	1,1	0,6	19	34,1	28,6	13000	22000	7011 CTAP4	0,390
	90	18	1,1	0,6	19	34,1	28,6	13000	22000	7011 CTAP2	0,390
	90	18	1,1	0,6	19	34,1	28,6	13000	22000	7011 CTBP4	0,390
	90	18	1,1	0,6	26	32,3	27,1	12000	20000	7011 ATAP4	0,390
	90	18	1,1	0,6	26	32,3	27,1	12000	20000	7011 ATAP2	0,390
	100	21	1,5	1	21	53	40	12000	20000	7211 CTAP4	0,600
	100	21	1,5	1	21	53	40	12000	20000	7211 CTAP2	0,600
	100	21	1,5	1	29	50,6	38,3	11000	19000	7211 ATAP4	0,600
	100	21	1,5	1	29	50,6	38,3	11000	19000	7211 ATAP2	0,600
	100	21	1,5	1	29	50,6	38,3	11000	19000	7211 ATBP4	0,600
	100	21	1,5	1	29	50,6	38,3	11000	19000	7211 ATBP2	0,600
60	95	18	1,1	0,6	20	35	30,5	12000	20000	7012 CTAP4	0,420
	95	18	1,1	0,6	20	35	30,5	12000	20000	7012 CTAP2	0,420
	95	18	1,1	0,6	20	35	30,5	12000	20000	7012 CTBP2	0,420
	95	18	1,1	0,6	27	33,2	29,1	11000	19000	7012 ATAP4	0,420
	95	18	1,1	0,6	27	33,2	29,1	11000	19000	7012 ATAP2	0,420
	110	22	1,5	1	23	64,2	49	11000	19000	7212 CTAP4	0,770
	110	22	1,5	1	23	64	49	11000	19000	7212 CTAP2	0,770
	110	22	1,5	1	31	61	47,5	9500	17000	7212 ATAP4	0,770
	110	22	1,5	1	31	61	47,5	9500	17000	7212 ATAP2	0,770
	110	22	1,5	1	31	61	47,5	9500	17000	7212 ATBP4	0,770
	110	22	1,5	1	31	61	47,5	9500	17000	7212 ATBP2	0,770
65	100	18	1,1	0,6	20	36	32,5	12000	20000	7013 CTAP4	0,460
	100	18	1,1	0,6	20	36	32,5	12000	20000	7013 CTAP2	0,460
	100	18	1,1	0,6	28	34	31	10000	18000	7013 AMBP4	0,460

High precision angular contact ball bearings single row



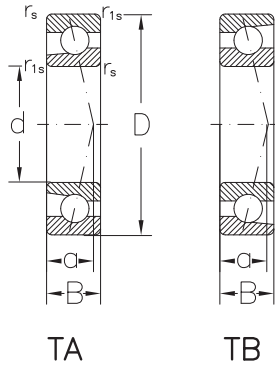
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
65	100	18	1,1	0,6	28	34	31	10000	18000	7013 ATAP4	0,460
	100	18	1,1	0,6	28	34	31	10000	18000	7013 ATAP2	0,460
	100	18	1,1	0,6	28	34	31	10000	18000	7013 ATBP4	0,460
	120	23	1,5	1	24	72	57	10000	18000	7213 CTAP4	0,970
	120	23	1,5	1	24	72	57	10000	18000	7213 CTAP2	0,970
	120	23	1,5	1	33	69,5	54	9000	16000	7213 ATAP4	0,970
	120	23	1,5	1	33	69,5	54	9000	16000	7213 ATAP2	0,970
	120	23	1,5	1	33	69,5	54	9000	16000	7213 ATBP4	0,970
	120	23	1,5	1	33	69,5	54	9000	16000	7213 ATBP2	0,970
70	110	20	1,1	0,6	22	45,3	40,8	10000	18000	7014 CTAP4	0,640
	110	20	1,1	0,6	22	45,3	40,8	10000	18000	7014 CTAP2	0,640
	110	20	1,1	0,6	22	45,3	40,8	10000	18000	7014 CTBP4	0,640
	110	20	1,1	0,6	31	43	34	9000	16000	7014 ATAP4	0,640
	110	20	1,1	0,6	31	43	34	9000	16000	7014 ATAP2	0,640
	125	24	1,5	1	25	76	60,2	95000	17000	7214 CTAP4	1,053
	125	24	1,5	1	25	76	60,2	95000	17000	7214 CTAP2	1,053
	125	24	1,5	1	35	78	57	8500	15000	7214 ATAP4	1,053
	125	24	1,5	1	35	78	57	8500	15000	7214 ATAP2	1,053
	125	24	1,5	1	35	78	57	8500	15000	7214 ATBP4	1,053
	125	24	1,5	1	35	78	57	8500	15000	7214 ATBP2	1,053
75	115	20	1,1	0,6	23	46,5	43,5	10000	18000	7015 CTAP4	0,680
	115	20	1,1	0,6	23	46,5	43,5	10000	18000	7015 CTAP2	0,680
	115	20	1,1	0,6	32	44	41,2	8500	15000	7015 ATAP4	0,680
	115	20	1,1	0,6	32	44	41,2	8500	15000	7015 ATAP2	0,680
	115	20	1,1	0,6	32	44	41,2	8500	15000	7015 ATBP2	0,680
	130	25	1,5	1	26	80	65,5	9000	16000	7215 CTAP4	1,153
	130	25	1,5	1	26	80	65,5	9000	16000	7215 CTAP2	1,153
	130	25	1,5	1	37	73	60,5	8000	14000	7215 ATAP4	1,153
	130	25	1,5	1	37	73	60,5	8000	14000	7215 ATAP2	1,153
	130	25	1,5	1	37	73	60,5	8000	14000	7215 ATBP4	1,153
	130	25	1,5	1	37	73	60,5	8000	14000	7215 ATBP2	1,153
80	125	22	1,1	0,6	25	58,6	55	9000	16000	7016 CTAP4	0,890
	125	22	1,1	0,6	25	58,7	55,2	9000	16000	7016 CTAP2	0,890
	125	22	1,1	0,6	35	56	63	8000	14000	7016 AMAP4	0,890
	125	22	1,1	0,6	35	56,2	63	8000	14000	7016 ATAP4	0,890
	125	22	1,1	0,6	35	56	63	8000	14000	7016 ATAP2	0,890
	140	26	2	1	28	92,6	78	7500	13000	7216 CTAP4	1,403
	140	26	2	1	28	93,2	78	8000	14000	7216 CTAP2	1,403
	140	26	2	1	39	86	73,5	7000	12000	7216 ATAP4	1,403
	140	26	2	1	39	86	73,5	7000	12000	7216 ATAP2	1,403
	140	26	2	1	39	86	73,5	7000	12000	7216 ATBP4	1,403
	140	26	2	1	39	86	73,5	7000	12000	7216 ATBP2	1,403

High precision angular contact ball bearings single row



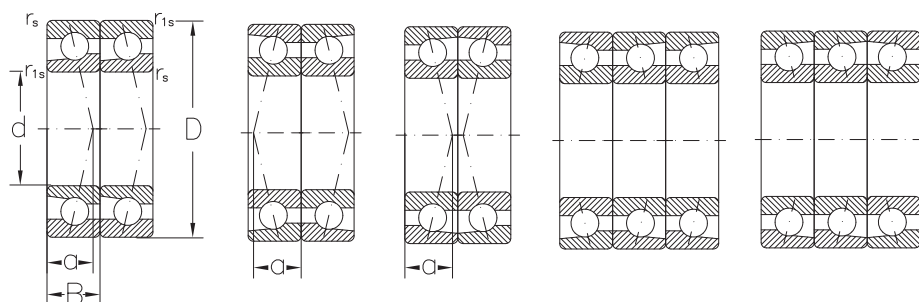
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
85	130	22	1,1	0,6	26	60,2	58,6	8500	15000	7017 CTAP4	0,930
	130	22	1,1	0,6	26	60,2	58,6	8500	15000	7017 CTAP2	0,930
	130	22	1,1	0,6	36	57	56	7500	13000	7017 ATAP4	0,930
	130	22	1,1	0,6	36	57	56	7500	13000	7017 ATAP2	0,930
	150	28	2	1	30	104	90	7500	13000	7217 CTAP4	1,753
	150	28	2	1	30	104	90	7500	13000	7217 CTAP2	1,753
	150	28	2	1	42	98	76,5	6700	11000	7217 ATAP4	1,753
	150	28	2	1	42	98	76,5	6700	11000	7217 ATAP2	1,753
	150	28	2	1	42	98	76,5	6700	11000	7217 ATBP4	1,753
	150	28	2	1	42	98	76,5	6700	11000	7217 ATBP2	1,753
90	140	24	1,5	0,6	28	71,6	69	7000	12000	7018 CTAP4	1,203
	140	24	1,5	0,6	28	71,7	69,1	7500	13000	7018 CTAP2	1,203
	140	24	1,5	0,6	28	71,7	69,1	7500	13000	7018 CTBP4	1,203
	140	24	1,5	0,6	39	68	65,5	6700	11000	7018 ATAP4	1,203
	140	24	1,5	0,6	39	68	65,5	6700	11000	7018 ATAP2	1,203
	160	30	2	1	32	123	105	7000	12000	7218 CTAP4	2,153
	160	30	2	1	32	123	105	7000	12000	7218 CTAP2	2,153
	160	30	2	1	44	117	100	6000	9500	7218 AMAP4	2,153
	160	30	2	1	44	117	100	6000	9500	7218 ATAP4	2,153
	160	30	2	1	44	117	100	6000	9500	7218 ATAP2	2,153
	160	30	2	1	44	117	100	6000	9500	7218 ATBP4	2,153
	160	30	2	1	44	189	100	6000	9500	7218 ATBP2	2,153
95	145	24	1,5	0,6	28	73,4	73,4	8000	14000	7019 CTAP4	1,253
	145	24	1,5	0,6	28	73,4	73,4	8000	14000	7019 CTAP2	1,253
	145	24	1,5	0,6	40	68	66	6300	10000	7019 ATAP4	1,253
	145	24	1,5	0,6	40	68	66	6300	10000	7019 ATAP2	1,253
	170	32	2,1	1,1	34	130	115	6300	10000	7219 CTAP4	2,653
	170	32	2,1	1,1	34	130	115	6300	10000	7219 CTAP2	2,653
	170	32	2,1	1,1	47	126	110	5600	9000	7219 ATAP4	2,653
	170	32	2,1	1,1	47	126	110	5600	9000	7219 ATAP2	2,653
	170	32	2,1	1,1	47	126	110	5600	9000	7219 ATBP4	2,653
	170	32	2,1	1,1	47	126	110	5600	9000	7219 ATBP2	2,653
100	150	24	1,5	0,6	29	75,3	77,2	7000	12000	7020 CTAP4	1,303
	150	24	1,5	0,6	29	75,3	77,2	7000	12000	7020 CTAP2	1,303
	150	24	1,5	0,6	41	71,1	73	6000	9500	7020 AMBP4	1,303
	150	24	1,5	0,6	41	71	73	6000	9500	7020 ATAP2	1,303
	150	24	1,5	0,6	41	71	73	6000	9500	7020 ATAP4	1,303
	180	34	2,1	1,1	36	148	127	6000	9500	7220 CTAP4	3,203
	180	34	2,1	1,1	36	150	127	6000	9500	7220 CTAP2	3,153
	180	34	2,1	1,1	50	142	121	5300	8500	7220 AMAP4	3,153
	180	34	2,1	1,1	50	142	121	5300	8500	7220 ATAP4	3,153
	180	34	2,1	1,1	50	142	121	5300	8500	7220 ATAP2	3,153
	180	34	2,1	1,1	50	142	121	5300	8500	7220 ATBP4	3,153

High precision angular contact ball bearings single row



Dimensions						Basic radial load		Speed limit		Designation	Mass
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	142	121	5300	8000	7220 ATBP2	3,153
105	160	26	2	1	31	87	89	5600	8500	7021 CTAP4	1,663
110	170	28	2	1	47	104	104	5300	8000	7022 ATAP4	3,203
120	180	28	2	2	34	109	111	5000	7500	7024 CTBP4	2,083
	180	28	2	2	49	104	105	5000	7500	7024 AMAP4	2,293
	180	28	2	2	49	104	105	5000	7500	7024 ATAP4	2,293
130	200	33	2	1	39	145	99	6300	8500	7026 CMAP4	3,193
	200	33	2	1	39	145	149	5600	7500	7026 CTAP4	3,193
150	225	35	2,1	1,1	61	159	173	4500	6000	7030 CMAP4	4,323
	225	35	2,1	1,1	61	159	173	4500	6000	7030 CTAP4	4,323
	225	35	2,1	1,1	61	159	173	5000	6700	7030 AMAP4	4,323

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



DT

DB

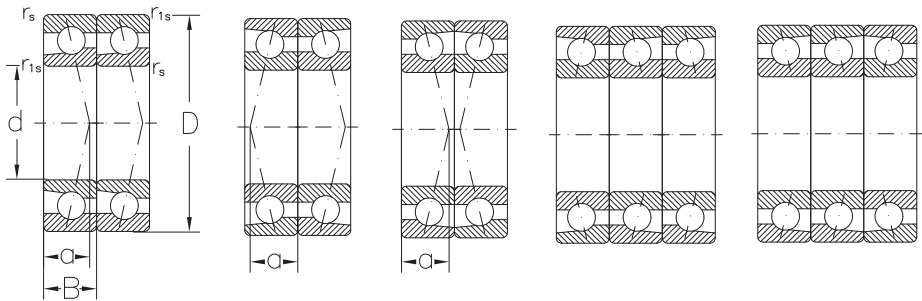
DF

TBT

TFT

Dimensions						Basic radial load		Speed limit		Designation	Mass
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	48000	80000	7000 CTAP4DT	0,040
	26	8	0,3	0,1	6	8,6	4,9	43000	70000	7000 CTAP4DB	0,040
	26	8	0,3	0,1	6	8,6	4,9	43000	70000	7000 CTAP4DF	0,040
	30	9	0,6	0,3	7	9,4	5,9	43000	70000	7200 CTAP4DT	0,058
	30	9	0,6	0,3	7	9,4	5,9	38000	63000	7200 CTAP4DB	0,058
	30	9	0,6	0,3	7	9,4	5,9	38000	63000	7200 CTAP4DF	0,058
12	28	8	0,3	0,1	7	8,75	5,2	43000	70000	7001 CTAP4DT	0,046
	28	8	0,3	0,1	7	8,75	5,2	38000	63000	7001 CTAP4DB	0,046
	28	8	0,3	0,1	7	8,75	5,2	38000	63000	7001 CTAP4DF	0,046
	32	10	0,6	0,3	10	12,2	6,8	38000	63000	7201 ATAP4DT	0,060
	32	10	0,6	0,3	10	12,2	6,8	34000	56000	7201 ATAP4DB	0,060
	32	10	0,6	0,3	10	12,2	6,8	34000	56000	7201 ATAP4DF	0,060
15	32	9	0,3	0,1	8	10,2	6,8	36000	60000	7002 CTAP4DT	0,060
	32	9	0,3	0,1	8	10,2	6,8	32000	53000	7002 CTAP4DB	0,060
	32	9	0,3	0,1	8	10,2	6,8	32000	53000	7002 CTAP4DF	0,060
	32	9	0,3	0,1	8	16,6	13,6	28000	48000	7002 CTAP4QBC	0,120
	32	9	0,3	0,1	8	10,2	6,8	36000	60000	7002 CTAP2DT	0,060
	32	9	0,3	0,1	8	10,2	6,8	36000	60000	7002 CTBP4DT	0,060
	35	11	0,6	0,3	9	14,4	9	34000	56000	7202 CTAP4DT	0,084
	35	11	0,6	0,3	9	14,4	9	30000	50000	7202 CTAP4DB	0,084
	35	11	0,6	0,3	9	14,4	9	30000	50000	7202 CTAP4DF	0,084
	35	11	0,6	0,3	12	14,1	8,8	30000	50000	7202 CTAP4DT	0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	7202 ATAP4DB	0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	7202 ATAP4DF	0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	7202 ATAP2DB	0,084
17	35	10	0,3	0,1	9	11,7	8,4	32000	53000	7003 CTAP4DT	0,078
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	7003 CTAP4DB	0,078
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	7003 CTAP4DF	0,078
	35	10	0,3	0,1	9	15,6	16,8	28000	45000	7003 CTAP4TBT	0,117
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	7003 CTAP2DB	0,078
	40	12	0,6	0,3	10	17,7	11,6	30000	50000	7203 CTAP4DT	0,120
	40	12	0,6	0,3	10	17,7	11,6	28000	45000	7203 CTAP4DB	0,120
	40	12	0,6	0,3	10	17,7	11,6	28000	45000	7203 CTAP4DF	0,120
	40	12	0,6	0,3	13	14,6	10,2	26000	43000	7203 ATAP4DT	0,120
	40	12	0,6	0,3	13	14,6	10,2	22000	38000	7203 ATAP4DB	0,120
	40	12	0,6	0,3	13	14,6	10,2	22000	38000	7203 ATAP4DF	0,120
20	42	12	0,6	0,3	10	17	12,2	28000	45000	7004 CTAP4DT	0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	7004 CTAP4DB	0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	7004 CTAP4DF	0,140
	42	12	0,6	0,3	10	27,7	24,2	22000	36000	7004 CTAP4QBC	0,280

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



DT

DB

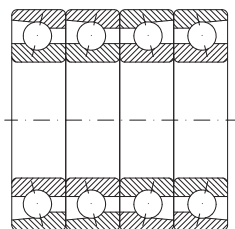
DF

TBT

TFT

Dimensions						Basic radial load		Speed limit		Designation	Mass
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	24000	40000	7004 CTAP2DB	0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	7004 CTBP4DB	0,140
	42	12	0,6	0,3	10	17	12,2	28000	45000	7004 CTBP2DT	0,140
	42	12	0,6	0,3	13	16,2	11,6	24000	40000	7004 ATAP4DT	0,140
	42	12	0,6	0,3	13	16,2	11,6	22000	36000	7004 ATAP4DB	0,140
	42	12	0,6	0,3	13	16,2	11,6	22000	36000	7004 ATAP4DF	0,140
	47	14	1	0,6	12	25,3	18	26000	43000	7204 CTAP4DT	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204 CTAP4DB	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204 CTAP4DF	0,200
	47	14	1	0,6	12	25,3	18	26000	43000	7204 CTBP4DT	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204 CTBP4DB	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204 CTBP4DF	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	7204 CTBP2DF	0,200
	47	14	1	0,6	15	24,2	17,2	22000	38000	7204 ATAP4DT	0,200
	47	14	1	0,6	15	24,2	17,2	20000	34000	7204 ATAP4DB	0,200
	47	14	1	0,6	15	24,2	17,2	20000	34000	7204 ATAP4DF	0,200
25	47	12	0,6	0,3	11	17	14,8	24000	40000	7005 CTAP4DT	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	7005 CTAP4DB	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	7005 CTAP4DF	0,160
	47	12	0,6	0,3	11	19	14,8	24000	40000	7005 CTAP2DT	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	7005 CTAP2DB	0,160
	47	12	0,6	0,3	11	25,3	22,2	20000	34000	7005 CTAP2TBT	0,240
	47	12	0,6	0,3	11	19	14,8	24000	40000	7005 CTBP2DT	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	7005 CTBP2DB	0,160
	47	12	0,6	0,3	15	16,9	13,9	22000	36000	7005 ATAP4DT	0,160
	47	12	0,6	0,3	15	16,9	13,9	19000	32000	7005 ATAP4DB	0,160
	47	12	0,6	0,3	15	16,9	13,9	19000	32000	7005 ATAP4DF	0,160
	52	15	1	0,6	13	26,9	20,6	22000	38000	7205 CTAP4DT	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205 CTAP4DB	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205 CTAP4DF	0,240
	52	15	1	0,6	13	43,8	41,2	18000	30000	7205 CTAP4QBC	0,120
	52	15	1	0,6	13	26,9	20,6	22000	38000	7205 CTAP2DT	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205 CTAP2DB	0,240
	52	15	1	0,6	13	26,9	20,6	22000	38000	7205 CTBP4DT	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205 CTBP4DB	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	7205 CTBP4DF	0,240
25	52	15	1	0,6	13	43,8	41,2	18000	30000	7205 CTBP4QBC	0,480
	52	15	1	0,6	17	22,2	17,6	20000	34000	7205 ATAP4DT	0,240
	52	15	1	0,6	17	22,2	17,6	18000	30000	7205 ATAP4DB	0,240
	52	15	1	0,6	17	22,2	17,6	18000	30000	7205 ATAP4DF	0,240
	52	15	1	0,6	17	29,6	26,4	17000	28000	7205 ATAP4TFT	0,360

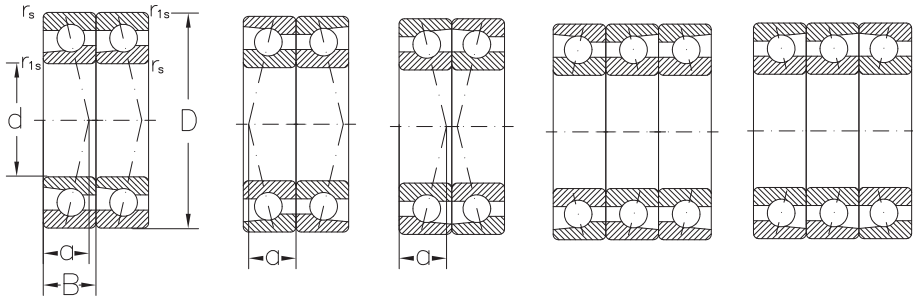
High precision angular contact ball bearings, single row, for paired and stack mounted



QBC

Dimensions						Basic radial load		Speed limit		Designation	Mass
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	22000	36000	7006 CTAP4DT	0,240
	55	13	1	0,3	12	24,5	20,6	19000	32000	7006 CTAP4DB	0,240
	55	13	1	0,3	12	24,5	20,6	19000	32000	7006 CTAP4DF	0,240
	55	13	1	0,3	12	32,6	30,9	18000	30000	7006 CTAP4TBT	0,360
	55	13	1	0,3	12	24,5	20,6	19000	32000	7006 CTAP2DB	0,240
	55	13	1	0,3	12	24,5	20,6	22000	36000	7006 CTBP2DT	0,240
	55	13	1	0,3	17	21,7	19	19000	32000	7006 ATAP4DT	0,240
	55	13	1	0,3	17	21,7	19	17000	28000	7006 ATAP4DB	0,240
	55	13	1	0,3	17	21,7	19	17000	28000	7006 ATAP4DF	0,240
	62	16	1	0,6	14	37,3	29,6	20000	34000	7206 CTAP4DT	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206 CTAP4DB	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206 CTAP4DF	0,380
	62	16	1	0,6	14	49,7	44,4	17000	28000	7206 CTAP4TT	0,570
	62	16	1	0,6	14	49,7	44,4	17000	28000	7206 CTAP4TBT	0,570
	62	16	1	0,6	14	60,7	59,2	16000	26000	7206 CTAP4QFC	0,760
	62	16	1	0,6	14	37,3	29,6	20000	34000	7206 CTAP2DT	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206 CTAP2DB	0,380
	62	16	1	0,6	14	37,3	29,6	20000	34000	7206 BTBP4DT	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206 CTBP4DB	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	7206 CTBP4DF	0,380
	62	16	1	0,6	14	49,7	44,4	17000	28000	7206 CTBP4TT	0,570
	62	16	1	0,6	14	60,7	59,2	16000	26000	7206 CTBP4QFC	0,760
	62	16	1	0,6	19	35,7	28,2	18000	30000	7206 ATAP4DT	0,380
	62	16	1	0,6	19	35,7	28,2	17000	28000	7206 ATP4DB	0,380
	62	16	1	0,6	19	35,7	28,2	17000	28000	7206 ATP4DF	0,380
35	62	14	1	0,3	14	31,1	27,4	19000	32000	7007 CTAP4DT	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	7007 CTAP4DB	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	7007 CTAP4DF	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	7007 CTAP2DB	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	7007 CTBP4DB	0,320
	62	14	1	0,3	14	31,1	27,4	19000	32000	7007 CTBP2DT	0,320
	62	14	1	0,3	19	29,5	26,2	17000	28000	7007 ATAP4DT	0,320
	62	14	1	0,3	19	29,5	26,2	16000	26000	7007 ATAP4DB	0,320
	62	14	1	0,3	19	29,5	26,2	16000	26000	7007 ATAP4DF	0,320
	72	17	1,1	0,6	16	49,3	40,4	18000	30000	7207 CTAP4DT	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	7207 CTAP4DB	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	7207 CTAP4DF	0,540
	72	17	1,1	0,6	16	65,7	60,6	16000	26000	7207 CTAP4TFT	0,810
	72	17	1,1	0,6	16	80,3	80,8	14000	24000	7207 CTAP4QFC	1,083

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



DT

DB

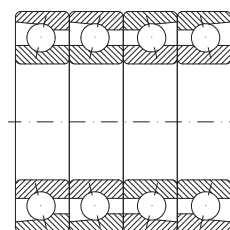
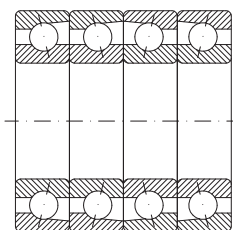
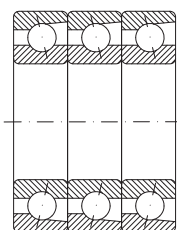
DF

TBT

TFT

Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
35	72	17	1,1	0,6	16	49,3	40,4	18000	30000	7207 CTBP4DT	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	7207 CTBP4DB	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	7207 CTBP4DF	0,540
	72	17	1,1	0,6	21	39,7	34	16000	26000	7207 ATAP4DT	0,540
	72	17	1,1	0,6	21	39,7	34	13000	22000	7207 ATAP4DB	0,540
	72	17	1,1	0,6	21	39,7	34	13000	22000	7207 ATAP4DF	0,540
40	68	15	1	0,3	15	33,4	31,8	18000	30000	7008 CTAP4DT	0,380
	68	15	1	0,3	15	33,4	31,8	17000	28000	7008 CTAP4DB	0,380
	68	15	1	0,3	15	33,4	31,8	17000	28000	7008 CTAP4DF	0,380
	68	15	1	0,3	15	33,4	31,8	18000	30000	7008 CTAP2DT	0,380
	68	15	1	0,3	15	33,4	31,8	17000	28000	7008 CTAP2DB	0,380
	68	15	1	0,3	15	33,4	31,8	18000	30000	7008 CTBP4DT	0,380
	68	15	1	0,3	15	33,4	31,8	17000	28000	7008 CTBP4DB	0,380
	68	15	1	0,3	20	31,6	30	16000	26000	7008 ATAP4DT	0,380
	68	15	1	0,3	20	31,6	30	13000	22000	7008 ATAP4DB	0,380
	68	15	1	0,3	20	31,6	30	13000	22000	7008 ATAP4DF	0,380
	68	15	1	0,3	20	31,6	30	13000	22000	7008 ATBP4DB	0,380
	68	15	1	0,3	15	44,5	47,7	13000	22000	7008 ATBP4TBT	0,570
	80	18	1,1	0,6	17	58,8	50,4	17000	28000	7208 CTAP4DT	0,700
	80	18	1,1	0,6	17	58,8	50,4	14000	24000	7208 CTAP4DB	0,700
	80	18	1,1	0,6	17	58,8	50,4	14000	24000	7208 CTAP4DF	0,700
	80	18	1,1	0,6	17	58,8	50,4	17000	28000	7208 CTBP4DT	0,700
	80	18	1,1	0,6	17	58,8	50,4	14000	24000	7208 CTBP4DB	0,700
	80	18	1,1	0,6	17	58,8	50,4	14000	24000	7208 CTBP4DF	0,700
	80	18	1,1	0,6	17	78,4	75,6	13000	22000	7208 CTBP4TT	1,053
	80	18	1,1	0,6	17	95,8	101	13000	22000	7208 CTBP4QT	1,403
	80	18	1,1	0,6	17	95,8	101	13000	22000	7208 CTBP4QFC	1,403
	80	18	1,1	0,6	23	57	48,8	14000	24000	7208 ATAP4DT	0,700
	80	18	1,1	0,6	23	57	48,8	12000	20000	7208 ATAP4DB	0,700
	80	18	1,1	0,6	23	57	48,8	12000	20000	7208 ATAP4DF	0,700
	80	18	1,1	0,6	23	57	48,8	14000	24000	7208 ATBP4DT	0,700
	80	18	1,1	0,6	23	57	48,8	12000	20000	7208 ATBP4DB	0,700
	80	18	1,1	0,6	17	95,8	101	11000	18000	7208 ATBP4QT	1,403
45	75	16	1	0,3	16	39,5	38,6	16000	26000	7009 CTAP4DT	0,500
	75	16	1	0,3	16	39,5	38,6	13000	22000	7009 CTAP4DB	0,500
	75	16	1	0,3	16	39,5	38,6	13000	22000	7009 CTAP4DF	0,500
	75	16	1	0,3	16	52,7	57,9	13000	22000	7009 CTAP4BT	0,750
	75	16	1	0,3	16	64,5	77,2	12000	20000	7009 CTAP4QBC	1,003
	75	16	1	0,3	16	39,5	38,6	16000	26000	7009 CTAP2DT	0,500
	75	16	1	0,3	16	39,5	38,6	13000	22000	7009 CTAP2DB	0,500

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



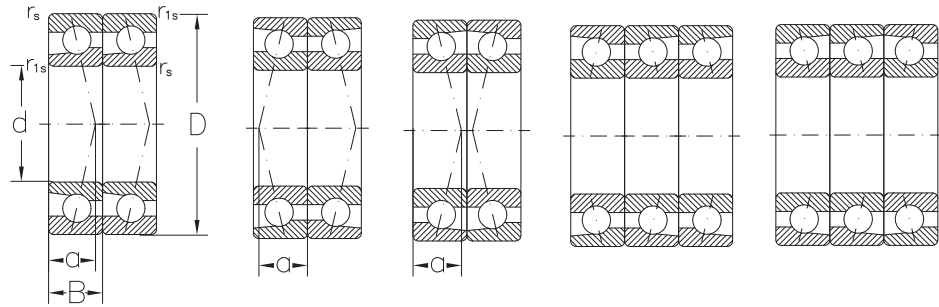
TT

QFC

QBC

Dimensions						Basic radial load		Speed limit		Designation	Mass
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	35,7	34,6	14000	24000	7009 ATAP4DT	0,500
	75	16	1	0,3	22	35,7	34,6	12000	20000	7009 ATAP4DB	0,500
	75	16	1	0,3	22	35,7	34,6	12000	20000	7009 ATAP4DF	0,500
	85	19	1,1	0,6	18	64,8	58	14000	24000	7209 CTAP4DT	0,800
	85	19	1,1	0,6	18	64,8	58	12000	20000	7209 CTAP4DB	0,800
	85	19	1,1	0,6	18	64,8	58	12000	20000	7209 CTAP4DF	0,800
	85	19	1,1	0,6	18	64,8	58	14000	24000	7209 CTAP2DT	0,800
	85	19	1,1	0,6	25	59,6	55	12000	20000	7209 ATAP4DT	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209 ATAP4DB	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209 ATAP4DF	0,800
	85	19	1,1	0,6	18	64,8	58	11000	18000	7209 CTAP2DB	0,800
	85	19	1,1	0,6	25	59,6	55	12000	20000	7209 ATBP4DT	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209 ATBP4DB	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209 ATBP4DF	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209 ATBP4DT	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209 ATBP4DB	0,800
	85	19	1,1	0,6	25	59,6	55	11000	18000	7209 ATBP4DF	0,800
50	80	16	1	0,3	17	40,7	41,4	14000	24000	7010 CTAP4DT	0,520
	80	16	1	0,3	17	40,7	41,4	12000	20000	7010 CTAP4DB	0,520
	80	16	1	0,3	17	40,7	41,4	12000	20000	7010 CTAP4DF	0,520
	80	16	1	0,3	17	66,3	82,8	11000	18000	7010 CTAP4QBC	1,043
	80	16	1	0,3	17	40,7	41,4	14000	24000	7010 CTAP2DT	0,520
	80	16	1	0,3	17	40,7	41,4	12000	20000	7010 CTAP2DB	0,520
	80	16	1	0,3	23	37,6	40	12000	20000	7010 ATAP4DT	0,520
	80	16	1	0,3	23	37,6	40	11000	18000	7010 ATAP4DB	0,520
	80	16	1	0,3	23	37,6	40	11000	18000	7010 ATAP4DF	0,520
	90	20	1,1	0,6	20	69,4	63,4	13000	22000	7210 CTAP4DT	0,900
	90	20	1,1	0,6	20	69,4	63,4	11000	19000	7210 CTAP4DB	0,900
	90	20	1,1	0,6	20	69,4	63,4	11000	19000	7210 CTAP4DF	0,900
	90	20	1,1	0,6	27	68	62	11000	18000	7210 ATAP4DT	0,900
	90	20	1,1	0,6	27	68	62	9500	16000	7210 ATAP4DB	0,900
	90	20	1,1	0,6	27	68	62	9500	16000	7210 ATAP4DF	0,900
	90	20	1,1	0,6	27	68	62	11000	18000	7210 ATBP4DT	0,900
	90	20	1,1	0,6	27	68	62	9500	16000	7210 ATBP4DB	0,900
	90	20	1,1	0,6	27	68	62	9500	16000	7210 ATBP4DF	0,900
	90	20	1,1	0,6	27	68	62	11000	18000	7210 ATAP2DT	0,900
	90	18	1,1	0,6	19	55,3	57,2	12000	20000	7011 CTAP4DT	0,780
	90	18	1,1	0,6	19	55,3	57,2	11000	18000	7011 CTAP4DB	0,780
55	90	18	1,1	0,6	19	55,3	57,2	11000	18000	7011 CTAP4DF	0,780
	90	18	1,1	0,6	19	73,7	85,2	10000	17000	7011 CTAP4TT	1,173
	90	18	1,1	0,6	19	73,7	85,2	10000	17000	7011 CTAP4TBT	1,173
	90	18	1,1	0,6	26	52,3	54,2	11000	18000	7011 ATAP4DT	0,780
	90	18	1,1	0,6	26	52,3	54,2	9500	16000	7011 ATAP4DB	0,780
	90	18	1,1	0,6	26	52,3	54,2	9500	16000	7011 ATAP4DB	0,780

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



DT

DB

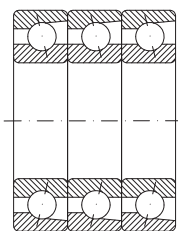
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TBT

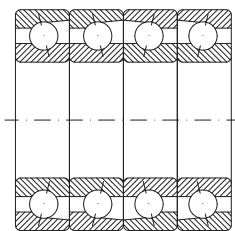
TFT

Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r_s min.	r_{1s} min.	a	dyn. C_r	stat. C_{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
55	90	18	1,1	0,6	26	523	54,2	9500	16000	7011 ATAP4DF	0,780
	100	21	1,5	1	21	85,9	80	11000	18000	7211 CTAP4DT	1,203
	100	21	1,5	1	21	85,9	80	9500	16000	7211 CTAP4DB	1,203
	100	21	1,5	1	21	85,9	80	9500	16000	7211 CTAP4DF	1,203
	100	21	1,5	1	29	82	76,6	10000	17000	7211 ATAP4DT	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211 ATAP4DB	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211 ATAP4DF	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211 ATAP2DB	1,203
	100	21	1,5	1	29	82	76,6	10000	17000	7211 ATBP4DT	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211 ATBP4DB	1,203
	100	21	1,5	1	29	82	76,6	9000	15000	7211 ATBP4DF	1,203
60	95	18	1,1	0,6	20	56,7	61	11000	18000	7012 CTAP4DT	0,840
	95	18	1,1	0,6	20	56,7	61	9500	16000	7012 CTAP4DB	0,840
	95	18	1,1	0,6	20	56,7	61	9500	16000	7012 CTAP4DF	0,840
	95	18	1,1	0,6	20	75,6	91,5	9500	15000	7012 CTAP4TBT	1,263
	95	18	1,1	0,6	20	92,4	122	8500	14000	7012 CTAP4QBC	1,683
	95	18	1,1	0,6	20	56,7	61	9500	16000	7012 CTBP2DB	0,840
	95	18	1,1	0,6	27	53,8	58,2	10000	17000	7012 ATAP4DT	0,840
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	7012 ATAP4DB	0,840
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	7012 ATAP4DF	0,840
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	7012 ATAP2DF	0,840
	110	22	1,5	1	23	104	98	10000	17000	7212 CTAP4DT	1,543
	110	22	1,5	1	23	104	98	9000	15000	7212 CTAP4DB	1,543
	110	22	1,5	1	23	104	98	9000	15000	7212 CTAP4DF	1,543
	110	22	1,5	1	23	138	147	8500	14000	7212 CTAP4TBT	2,313
	110	22	1,5	1	23	104	98	9000	15000	7212 CTAP2DB	1,543
	110	22	1,5	1	31	98,8	95	9000	15000	7212 ATAP4DT	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212 ATAP4DB	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212 ATAP4DF	1,543
	110	22	1,5	1	31	98,8	95	9000	15000	7212 ATBP4DT	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212 ATBP4DB	1,543
	110	22	1,5	1	31	98,8	95	8500	14000	7212 ATBP4DF	1,543
65	100	18	1,1	0,6	20	58,3	65	11000	18000	7013 CTAP4DT	0,920
	100	18	1,1	0,6	20	58,3	65	9500	16000	7013 CTAP4DB	0,920
	100	18	1,1	0,6	20	58,3	65	9500	16000	7013 CTAP4DF	0,920
	100	18	1,1	0,6	20	77,8	97,5	9000	15000	7013 CTAP4TBT	1,383
	100	18	1,1	0,6	20	95	130	8500	14000	7013 CTAP4QBC	1,843
	100	18	1,1	0,6	20	77,8	97,5	9000	15000	7013 CTAP2TBT	1,383
	100	18	1,1	0,6	28	55	62	9500	16000	7013 AMBP4DT	0,920
	100	18	1,1	0,6	28	55	62	8500	14000	7013 ATAP4DB	0,920

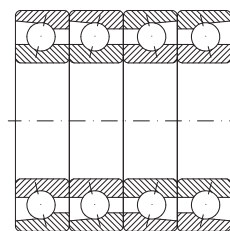
High precision angular contact ball bearings, single row, for paired and stack mounted



TT



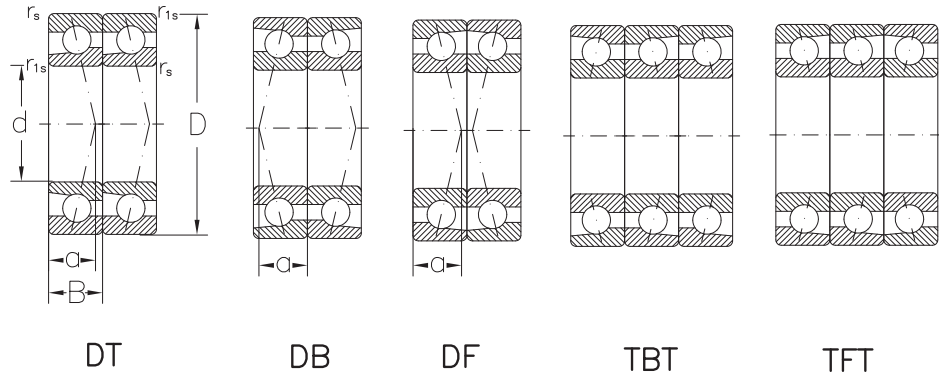
QFC



QBC

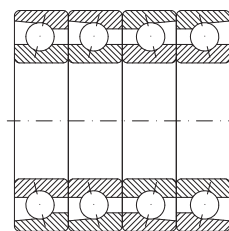
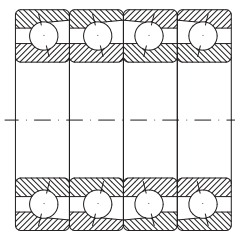
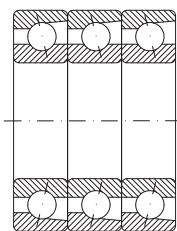
Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
65	100	18	1,1	0,6	28	55	62	8500	14000	7013 ATAP4DF	0,920
	120	23	1,5	1	24	117	114	9500	20000	7213 CTAP4DT	1,943
	120	23	1,5	1	24	117	114	8500	14000	7213 CTAP4DB	1,943
	120	23	1,5	1	24	117	114	8500	14000	7213 CTAP4DF	1,943
	120	23	1,5	1	24	117	114	9500	16000	7213 CTAP2DT	1,943
	120	23	1,5	1	33	113	108	8500	14000	7213 ATAP4DT	1,943
	120	23	1,5	1	33	113	108	8000	13000	7213 ATAP4DB	1,943
	120	23	1,5	1	33	113	108	8000	13000	7213 ATAP4DF	1,943
	120	23	1,5	1	33	113	108	8500	14000	7213 ATBP4DT	1,943
	120	23	1,5	1	33	113	108	8000	13000	7213 ATBP4DB	1,943
	120	23	1,5	1	33	113	108	8000	13000	7213 ATBP4DF	1,943
	120	23	1,5	1	33	113	108	8000	13000	7213 ATBP4DF	1,943
70	110	20	1,1	0,6	22	73,4	81,6	9500	16000	7014 CTAP4DT	1,283
	110	20	1,1	0,6	22	73,4	81,6	8500	14000	7014 CTAP4DB	1,283
	110	20	1,1	0,6	22	73,4	81,6	8500	14000	7014 CTAP4DF	1,283
	110	20	1,1	0,6	31	93	102	8500	14000	7014 CTAP4TBT	1,923
	110	20	1,1	0,6	31	69,7	68	8500	14000	7014 AMBP4DT	1,283
	110	20	1,1	0,6	31	114	136	6700	11000	7014 AMBP4QBC	2,563
	110	20	1,1	0,6	31	69,7	68	8500	14000	7014 ATAP4DT	1,283
	110	20	1,1	0,6	31	69,7	68	8000	12000	7014 ATAP4DB	1,283
	110	20	1,1	0,6	31	69,7	68	8000	13000	7014 ATAP4DF	1,283
	110	20	1,1	0,6	31	93	102	7000	13000	7014 ATAP2TBT	1,923
	125	24	1,5	1	25	123	120	9000	15000	7214 CTAP4DT	2,103
	125	24	1,5	1	25	123	120	8500	14000	7214 CTAP4DB	2,103
	125	24	1,5	1	25	123	120	8500	14000	7214 CTAP4DF	2,103
	125	24	1,5	1	25	123	120	8500	14000	7214 CTAP2DB	2,103
	125	24	1,5	1	35	126	114	8500	14000	7214 ATAP4DT	2,103
	125	24	1,5	1	35	126	114	7000	12000	7214 ATAP4DB	2,103
	125	24	1,5	1	35	126	114	7000	12000	7214 ATAP4DF	2,103
	125	24	1,5	1	35	126	114	8500	14000	7214 ATBP4DT	2,103
	125	24	1,5	1	35	126	114	7000	12000	7214 ATBP4DB	2,103
	125	24	1,5	1	35	126	114	7000	12000	7214 ATBP4DF	2,103
	115	20	1,1	0,6	23	75,4	87	9500	16000	7015 CTAP4DT	1,363
	115	20	1,1	0,6	23	75,4	87	8500	14000	7015 CTAP4DB	1,363
	115	20	1,1	0,6	23	75,4	87	8500	14000	7015 CTAP4DF	1,363
	115	20	1,1	0,6	32	71,3	82,4	7000	12000	7015 AMAP4DB	1,363
	115	20	1,1	0,6	23	100	131	6700	11000	7015 AMAP4TBT	2,043
	115	20	1,1	0,6	32	116	165	6700	11000	7015 AMAP4QBC	2,723
	115	20	1,1	0,6	32	71,3	82,4	8500	14000	7015 ATAP4DT	1,363
	115	20	1,1	0,6	32	71,3	82,4	7000	11000	7015 ATAP4DB	1,363
	115	20	1,1	0,6	32	71,3	82,4	7000	11000	7015 ATAP4DF	1,363

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



Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
75	115	20	1,1	0,6	32	71,3	82,4	7000	12000	7015 ATBP2DB	1,363
	130	25	1,5	1	26	130	131	8500	14000	7215 CTAP4DT	2,303
	130	25	1,5	1	26	130	131	8000	13000	7215 CTAP4DB	2,303
	130	25	1,5	1	26	130	131	8000	13000	7215 CTAP4DF	2,303
	130	25	1,5	1	37	118	121	8000	13000	7215 ATAP4DT	2,303
	130	25	1,5	1	37	118	121	6700	11000	7215 ATAP4DB	2,303
	130	25	1,5	1	37	118	121	6700	11000	7215 ATAP4DF	2,303
	130	25	1,5	1	37	118	121	8000	13000	7215 ATBP4DT	2,303
	130	25	1,5	1	37	118	121	6700	11000	7215 ATBP4DB	2,303
	130	25	1,5	1	37	118	121	6700	11000	7215 ATBP4DF	2,303
80	125	22	1,1	0,6	25	95	110	8500	14000	7016 CTAP4DT	1,783
	125	22	1,1	0,6	25	95	110	8000	13000	7016 CTAP4DB	1,783
	125	22	1,1	0,6	25	95	110	8000	13000	7016 CTAP4DF	1,783
	125	22	1,1	0,6	35	91	126	8000	13000	7016 AMAP4DT	1,783
	125	22	1,1	0,6	35	91	126	6700	11000	7016 AMAP4DB	1,783
	125	22	1,1	0,6	25	155	221	6000	10000	7016 AMAP4QBC	3,563
	125	22	1,1	0,6	35	91	126	8000	13000	7016 ATAP4DT	1,783
	125	22	1,1	0,6	35	91	126	6700	11000	7016 ATAP4DB	1,783
	125	22	1,1	0,6	35	91	126	6700	11000	7016 ATAP4DF	1,783
	140	26	2	1	28	151	156	7000	12000	7216 CTAP4DT	2,803
	140	26	2	1	28	151	156	6000	10000	7216 CTAP4DB	2,803
	140	26	2	1	28	151	156	6000	10000	7216 CTAP4DF	2,803
	140	26	2	1	28	201	234	6000	10000	7216 CTAP4TBT	4,203
	140	26	2	1	28	151	156	7000	12000	7216 CTAP2DT	2,803
	140	26	2	1	28	151	156	6000	10000	7216 CTAP2DB	2,803
	140	26	2	1	28	151	156	6000	10000	7216 CTAP2DF	2,803
	140	26	2	1	28	246	312	5300	9000	7216 CTAP2QBC	5,603
	140	26	2	1	39	139	147	6700	11000	7216 ATAP4DT	2,803
	140	26	2	1	39	139	147	5600	9500	7216 ATAP4DB	2,803
	140	26	2	1	39	139	147	5600	9500	7216 ATAP4DF	2,803
	140	26	2	1	39	139	147	6700	11000	7216 ATBP4DT	2,803
	140	26	2	1	39	139	147	5600	9500	7216 ATBP4DB	2,803
	140	26	2	1	39	139	147	5600	9500	7216 ATBP4DF	2,803
85	130	22	1,1	0,6	26	97,5	117	8500	14000	7017 CTAP4DT	1,863
	130	22	1,1	0,6	26	97,5	117	7000	12000	7017 CTAP4DB	1,863
	130	22	1,1	0,6	26	97,5	117	7000	12000	7017 CTAP4DF	1,863
	130	22	1,1	0,6	36	92	112	7000	12000	7017 ATAP4DT	1,863
	130	22	1,1	0,6	36	92	112	6000	10000	7017 ATAP4DB	1,863
	130	22	1,1	0,6	36	92	112	6000	10000	7017 ATAP4DF	1,863
	150	28	2	1	30	168	180	7000	12000	7217 CTAP4DT	3,503

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



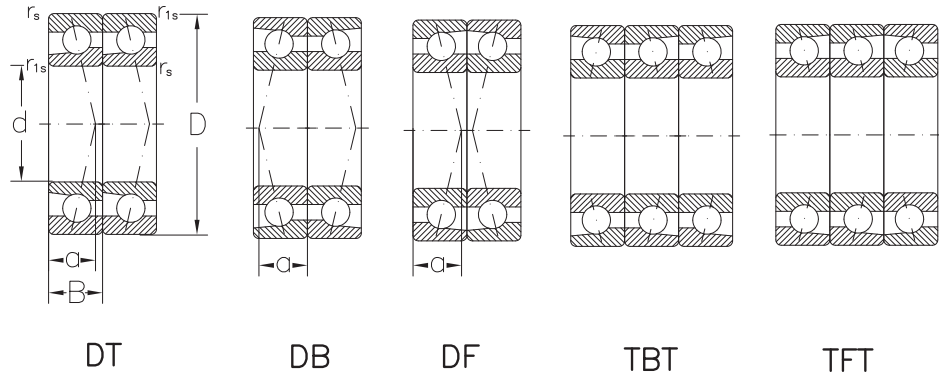
TT

QFC

QBC

Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
85	150	28	2	1	30	168	180	6000	10000	7217 CTAP4DB	3,503
	150	28	2	1	30	168	180	6000	10000	7217 CTAP4DF	3,503
	150	28	2	1	42	159	153	6000	10000	7217 ATAP4DT	3,503
	150	28	2	1	42	159	153	5300	9000	7217 ATAP4DB	3,503
	150	28	2	1	42	159	153	5300	9000	7217 ATAP4DF	3,503
	150	28	2	1	42	159	153	6000	10000	7217 ATBP4DT	3,503
	150	28	2	1	42	159	153	5300	9000	7217 ATBP4DB	3,503
	150	28	2	1	42	159	153	5300	9000	7217 ATBP4DF	3,503
90	140	24	1,5	0,6	28	116	138	7000	12000	7018 CMBP4DT	2,403
	140	24	1,5	0,6	28	116	138	7000	12000	7018 CTAP4DT	2,403
	140	24	1,5	0,6	28	116	138	6000	10000	7018 CTAP4DB	2,403
	140	24	1,5	0,6	28	116	138	6000	10000	7018 CTAP4DF	2,403
	140	24	1,5	0,6	28	155	207	5300	10000	7018 CTAP2TBT	3,603
	140	24	1,5	0,6	39	110	131	6000	10000	7018 AMBP4DT	2,403
	140	24	1,5	0,6	39	147	262	5000	8500	7018 AMBP4TBT	3,603
	140	24	1,5	0,6	39	180	262	4500	7500	7018 AMBP4QT	4,803
	140	24	1,5	0,6	39	110	131	6000	10000	7018 ATAP4DT	2,403
	140	24	1,5	0,6	39	110	131	5300	9000	7018 ATAP4DB	2,403
	140	24	1,5	0,6	39	110	131	5300	9000	7018 ATAP4DF	2,403
	160	30	2	1	32	199	210	6700	11000	7218 CTAP4DT	4,303
	160	30	2	1	32	199	210	5600	9500	7218 CTAP4DB	4,303
	160	30	2	1	32	199	210	5600	9500	7218 CTAP4DF	4,303
	160	30	2	1	44	189	200	5000	8500	7218 AMAP4DT	4,303
	160	30	2	1	44	189	200	4500	7500	7218 AMAP4DB	4,303
	160	30	2	1	44	189	200	4500	7500	7218 AMAP4DF	4,303
	160	30	2	1	44	189	200	5000	8500	7218 ATAP4DT	4,303
	160	30	2	1	44	189	200	4500	7500	7218 ATAP4DB	4,303
	160	30	2	1	44	189	200	4500	7500	7218 ATAP4DF	4,303
	160	30	2	1	44	189	200	5000	8500	7218 ATBP4DT	4,303
	160	30	2	1	44	189	200	4500	7500	7218 ATBP4DB	4,303
	160	30	2	1	44	189	200	4500	7500	7218 ATBP4DF	4,303
95	145	24	1,5	0,6	28	119	147	8000	13000	7019 CTAP4DT	2,503
	145	24	1,5	0,6	28	119	147	6700	11000	7019 CTAP4DB	2,503
	145	24	1,5	0,6	28	119	147	6700	11000	7019 CTAP4DF	2,503
	145	24	1,5	0,6	40	110	132	5300	9000	7019 ATAP4DT	2,503
	145	24	1,5	0,6	40	110	132	4800	8000	7019 ATAP4DB	2,503
	145	24	1,5	0,6	40	110	132	4800	8000	7019 ATAP4DF	2,503
	170	32	21,1	1,1	34	211	230	5300	9000	7219 CTAP4DT	5,303
	170	32	21,1	1,1	34	211	230	4800	8000	7219 CTAP4DB	5,303
	170	32	21,1	1,1	34	211	230	4800	8000	7219 CTAP4DF	5,303

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



Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	r _{1s} min.	a	dyn. C _r	stat. C _{0r}	grease	oil		
mm						kN		min ⁻¹		-	Kg
95	170	32	21,1	1,1	34	211	230	4800	8000	7219 CTAP4DB	5,303
	170	32	21,1	1,1	47	204	220	4800	8000	7219 ATAP4DT	5,303
	170	32	21,1	1,1	47	204	220	4300	7000	7219 ATAP4DB	5,303
	170	32	21,1	1,1	47	204	220	4300	7000	7219 ATAP4DF	5,303
	170	32	21,1	1,1	47	126	220	4800	8000	7219 ATBP4DT	5,303
	170	32	21,1	1,1	47	126	220	4300	7000	7219 ATBP4DB	5,303
	170	32	21,1	1,1	47	126	220	4300	7000	7219 ATBP4DF	5,303
100	150	24	1,5	0,6	29	122	154	6700	11000	7020 CTAP4DT	2,603
	150	24	1,5	0,6	29	122	154	5600	9500	7020 CTAP4DB	2,603
	150	24	1,5	0,6	29	122	154	5600	9500	7020 CTAP4DF	2,603
	150	24	1,5	0,6	41	115	146	5000	8500	7020 AMBP4DT	2,603
	150	24	1,5	0,6	29	163	231	4300	7000	7020 AMBP4TBT	3,903
	150	24	1,5	0,6	41	188	292	4000	6700	7020 AMBP4QBT	5,203
	150	24	1,5	0,6	41	115	146	4500	7500	7020 AMBP4DB	2,603
	150	24	1,5	0,6	41	115	146	5000	8500	7020 AMBP4DT	2,603
	150	24	1,5	0,6	41	115	146	4500	7500	7020 AMBP4DB	2,603
	150	24	1,5	0,6	41	115	146	4500	7500	7020 AMBP4DF	2,603
	180	34	2,1	1,1	36	243	254	5000	8500	7220 CTAP4DT	6,303
	180	34	2,1	1,1	36	243	254	4500	7500	7220 CTAP4DB	6,303
	180	34	2,1	1,1	36	243	254	4500	7500	7220 CTAP4DF	6,303
	180	34	2,1	1,1	36	398	508	4000	6700	7220 CTAP4QBC	12,63
	180	34	2,1	1,1	50	230	243	4500	7500	7220 AMAP4DT	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	7220 AMAP4DB	6,303
	180	34	2,1	1,1	50	230	243	4500	7500	7220 ATAP4DT	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	7220 ATAP4DB	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	7220 ATAP4DF	6,303
	180	34	2,1	1,1	50	230	243	4500	7500	7220 ATBP4DT	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	7220 ATBP4DB	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	7220 ATBP4DF	6,303
105	160	26	2	1	31	143	178	4500	7500	7021 CTAP4DB	3,323
110	170	28	2	1	47	169	208	3800	6300	7022 ATAP4DB	6,403
120	180	28	2	2	49	169	210	3600	6000	7024 AMAP4DB	2,293
130	200	33	2	1	39	313	298	3800	6300	7026 CMAP4TBT	9,573
	200	33	2	1	39	235	298	4000	6700	7026 CTAP4DB	6,383
150	225	35	2,1	1,1	61	258	346	2800	4500	7030 AMAP4DB	8,643



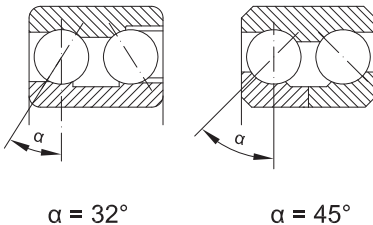
Angular contact ball bearings, double row

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 27.

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:

$$P_r = F_r + 0,73 F_{a_r} \text{ kN, for } F_{a_r}/F_r \leq 0,86$$

$$P_r = 0,62 F_r + 1,17 F_{a_r} \text{ kN, for } F_{a_r}/F_r > 0,86$$

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

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

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

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

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

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

Axial clearance of the double row angular contact ball bearings

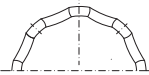
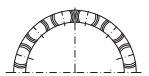
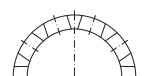
Table 1

Outer diameter d		Series 32 and 33				Series 33D					
		C2		Normal		C3		Normal		C3	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	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

Cages design and some technical data

Table 2

Cage	Design bearing cage	Application	Max. value	
			$D_m n$ oil	grease
Pressed sheet cage		 	- General application - Bearings series 32, 33	450 x 10 ³ 350 x 10 ³
Polyamide cage TN		 	- General application - Bearings series 32, 33	1000 x 10 ³ 800 x 10 ³
Machined brass cage M		 	- General application - Bearings dimensions 3319-3322, 3305D-3318D	800 x 10 ³ 600 x 10 ³

Equivalent static radial load

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

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

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 $\alpha = 40^\circ$:

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

Abutment dimensions

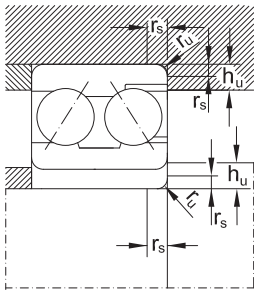
For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum radius $r_{u \text{ max}}$ should be less than bearing minimum mounting chamfer $r_{s \text{ min}}$.

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

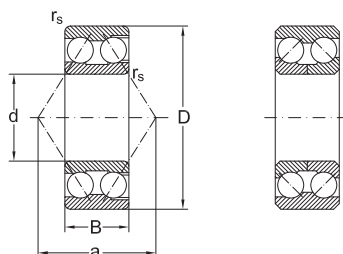
The values of the connexion radii and support shoulder height are given in table 3.

Abutment dimensions		
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

Table 3



Angular contact ball bearings, double row

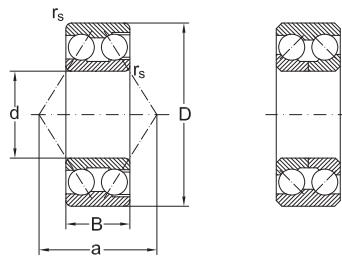


32;33

33D

Dimensions					Basic radial load		Speed limit		Designation	Mass
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	16000	22000	3200	0,050
12	32	15,9	0,6	22	10,6	5,1	15000	20000	3201	0,060
15	35	15,9	0,6	23	11,8	6,1	13000	18000	3202	0,070
	42	19	1	27	16,3	8,7	10000	15000	3302	0,130
17	40	17,5	0,6	27	14,6	7,8	10000	15000	3203	0,100
	47	22,2	1	31	20,8	10,6	9500	14000	3303	0,190
20	47	20,6	1	31	19,6	10,8	9000	13000	3204	0,170
	52	22,2	1,1	34	23,2	12,9	8500	12000	3304	0,230
	52	22,2	1,1	46	24	11	8500	12000	3304 D	0,230
25	52	20,6	1	35	21,2	12,7	8000	11000	3205	0,190
	62	25,4	1,1	40	29,2	17,3	7500	10000	3305	0,370
	62	25,4	1,1	57	30	19	7500	10000	3305 D	0,380
30	62	23,8	1	41	28,1	18,3	7000	9500	3206	0,310
	72	30,2	1,1	47	38	24,5	6300	8500	3306	0,580
	72	30,2	1,1	67	41,5	30	6300	8500	3306 D	0,600
35	72	27	1,1	47	39	25	6000	8000	3207	0,480
	80	34,9	1,5	54	51	30	5600	7500	3307	0,780
	80	34,9	1,5	76	58	38	5600	7500	3307 D	0,780
40	80	30,2	1,1	52	48	31,5	5600	7500	3208	0,650
	90	36,5	1,5	58	62	39	5000	6700	3308	1,05
	90	36,5	1,5	84	70	45	5000	6700	3308 D	1,15
45	85	30,2	1,1	56	49	32,5	5000	6700	3209	0,700
	100	39,7	1,5	64	71	57	4500	6000	3309	1,41
	100	39,7	1,5	93	78	51	4500	6000	3309 D	1,61
50	90	30,2	1,1	59	51	36	4800	6300	3210	0,740
	110	44,4	2	73	85	75	4000	5300	3310	1,90
	110	44,4	2	102	90	72	4000	5300	3310 D	2,05
55	100	33,3	1,5	64	54	55	4300	5600	3211	1,05
	120	49,2	2	80	98	88	3600	4800	3311	2,48
	120	49,2	2	114	104	81,5	3600	4800	3311 D	2,68
60	110	36,5	1,5	71	69,5	72	3800	5000	3212	1,36
	130	54	2,1	86	114	112	3400	4500	3312	3,17
	130	54	2,1	123	116	104	3400	4500	3312 D	3,42
65	120	38,1	1,5	76	73,5	83	3600	4800	3213	1,76
	140	58,7	2,1	94	129	130	3200	4300	3313	4,01
	140	58,7	2,1	132	135	117	3200	4300	3313 D	4,31

Angular contact ball bearings, double row



32;33

33D

Dimensions					Basic radial load		Speed limit		Designation	Mass
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	3200	4300	3214	1,93
	150	63,5	2,1	101	143	146	2800	3800	3314	5,04
70	150	63,5	2,1	142	159	130	2800	3800	3314 D	5,40
75	130	41,3	1,5	84	85	98	3200	4300	3215	2,08
	160	68,3	2,1	107	163	166	2600	3600	3315	6,16
	160	68,3	2,1	140	179	150	2600	3600	3315 D	6,66
80	140	44,4	2	91	95	110	2800	3800	3216	2,64
	170	68,3	2,1	112	176	186	2400	3400	3316	6,93
	170	68,3	2,1	149	192	170	2400	3400	3316 D	7,53
85	150	49,2	2	97	112	132	2600	3600	3217	3,39
	180	73	3	119	190	200	2200	3200	3317	8,30
	180	73	3	155	208	193	2200	3200	3317 D	9,00
90	160	52,4	2	104	125	146	2400	3400	3218	4,14
	190	73	3	125	216	240	2000	3000	3318	9,23
	190	73	3	166	228	216	2000	3000	3318 D	10,0
95	170	55,6	2,1	111	140	163	2200	3200	3219	5,00
	200	77,8	3	133	220	245	1900	2800	3319	11,4
100	180	60,3	2,1	118	160	196	2000	3000	3220	6,10
	215	82,6	3	139	240	280	1800	2600	3320	14,2
110	200	69,8	2,1	132	190	228	1900	2800	3222	8,79
	240	92,1	3	153	280	400	1800	2600	3322	19,0



Four Point Contact Ball Bearings

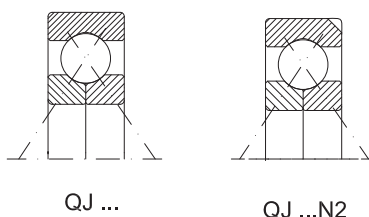
Standards, Boundary dimensions

Standard plans	DIN 616
Single row angular contact ball bearings	
Four point contact ball bearings	DIN 628

General

Four Point Contact Ball Bearings belong to the single row angular contact ball bearings family. But, unlike bearings of the series 7., four point contact bearings are double - acting. This means they are able to support thrust loads in either direction including minor radial loads.

URB Four Point Contact Bearings of the **QJ design** have **split inner rings** to allow the bearing to accept the maximum number of large balls. Due to the split inner rings these bearings are separable. This brings some mounting advantages. Because the bearing outer ring with cage and ball set, and the inner ring halves may be mounted separately.



Design variants

Four Point contact ball bearings are frequently used to accommodate thrust loads only.

To avoid unforeseen radial loading to the bearing they used to be mounted either reduced outside bearing ring diameters or to oversized housing seats.

To prevent the outer ring from rotating with the shaft, for point contact ball bearing outer rings are often produced with locating slots.

For this reason, **URB four point contact bearings** with outer diameters of more than $\phi 160$ mm are produced with two locating slots in their outer ring (suffix **N2**).

Special series of four point contact ball bearings are available on request represented by the series **QJ 10** and four point contact ball bearings with split outer ring (Series **Q**).

Misalignment

Four point contact ball bearings are less suitable to operate with misalignments.

When there are used in combination with a radial bearing as pure thrust bearings, however, they must not be exposed to any misalignment.

Tolerances

URB four point contact ball bearings are produced to normal class tolerance (**PN**) as standard.

Other tolerance classes, such as **P6** or **P5** are available upon request.

Cages

Unless otherwise specified, **URB** - four point contact ball bearings are fitted with machined solid brass cages (suffix **MPA**) as standard.

Also, other cage types and materials are produced to order; Machined style solid cage (Suffix **F**) machined light metal alloy solid cage (Suffix **L**) moulded Polyamide cage (Suffix **TVP**).

Internal clearance

URB four point contact ball bearings are produced to axial clearance group **CN** (Normal) as standard.

URB also produce four point contact ball bearings with enlarged (axial clearance groups **C3** or **C4**) and/or with reduced axial clearance (Clearance group **C2**) on request.

Values for these clearance groups are listed in **table below**.

Internal **axial** clearance groups of **URB Four Point Contact Ball Bearings** (Clearances are in [μm])

Bore diameter [mm]		>	-	18	40	60	80	100	140	180	220
			18	40	60	80	100	140	180	220	260
Clearance group	C2	min	20	30	40	50	60	70	80	100	120
		max	60	70	90	100	120	140	160	180	200
Clearance group (NORMAL)	CN	min	50	60	80	90	100	120	140	160	180
		max	90	110	130	140	160	180	200	220	240
Clearance group	C3	min	80	100	120	130	140	160	180	200	220
		max	120	150	170	180	200	220	240	260	300
Clearance group	C4	min	115	135	155	165	185	205	225	250	275
		max	165	185	205	225	245	265	295	325	355

Special clearance

For applications not covered by the standard clearances groups or where bearings with standard clearances do not achieve optimum perform, **URB** four point contact ball bearings may also be supplied with special internal clearances.

Example:

A80.150 Special axial internal clearance.
Axial clearance of;
80 to 150 microns (μm)

If required, the range of internal clearance values may be grouped to a specific part within a clearance group.

Example:

C2L axial clearance reduced to the **Lower part** of the **C2** clearance group.

Minimum load

Four point contact ball bearings are suitable to operate at high speeds. For optimum contacting behaviours, however, four point contact ball bearings should be mainly exposed to axial acting loads.

An effective function is given, when

$$F_a \geq 1,27 * F_r$$

If this ratio is not attained or achieved high sliding friction may occur in the bearing and thus generate high noise and excessive wear.

To function effectively, four point contact bearings should run under minimum bearing load of approximately **2 per cent** of the dynamic load rating (C_r).

Equivalent dynamic bearing load

In the case of four point contact ball bearings the following formula should be used:

when

$$F_a/F_r \leq 0,95 \text{ then } P = F_r + 0,66 * F_a$$

or, when

$$F_a/F_r > 0,95 \text{ then } P = 0,6 * F_r + 1,07 * F_a$$

Equivalent static bearing load

$$P_0 = F_r + 0,58 * F_a$$

Abutment and fillet dimensions

Four point contact ball bearings are often used to accommodate thrust loads, so they do require optimum support of the bearings rings by the machine components surrounding the bearing.

To gain adequate support the shaft and housing shoulders required a certain minimum height.

The bearing rings, however, must only contact adjacent parts with there side faces.

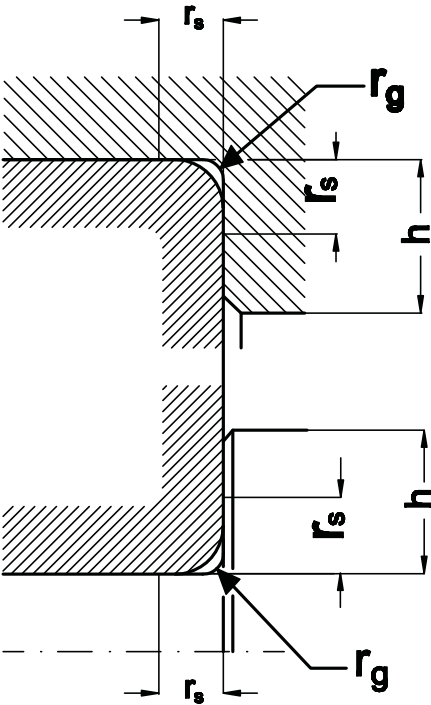
The radii of bearings corners must not touch the corner fillet radii of either the shaft or housing shoulders. Therefore, the largest fillet radius (r_g or r_{g1} , respectively) must always be smaller than the

minimum fillet dimensions of the bearing rings (r_s). Recommendations for the dimensions of adjacent parts listed in **DIN 5418**, the values for the bearing fillet dimensions are stated in the bearing tables.

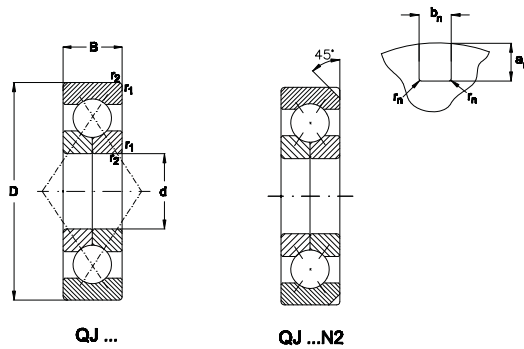
Abutment and fillet dimensions for Four Point contact Ball bearings

All dimensions are in [mm]

$r_{s \text{ min}}$	$r_{g \text{ max}}$	h_{min} Bearing Series QJ 2.. QJ 3..
1,1	1	3,5
1,5	1,5	4,5
2	2	5,5
2,1	2,1	6
3	2,5	7
4	3	8,5
5	4	10



Four Point Contact Ball Bearings



For $D \geq 160$ mm
standard design
with 2 location
slots in outer
ring (N2)

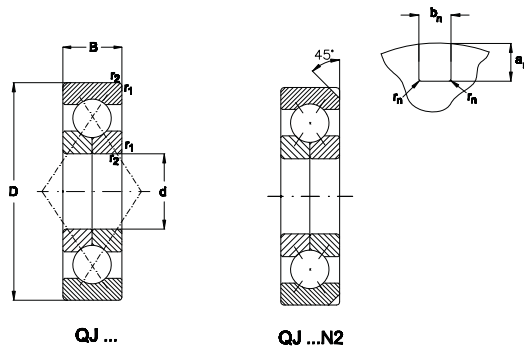
Dimensions								Basical radial load		Speed limit		Designation	Mass
d	D	B	r_1, r_2 min.	a	a_n	b_n	r_n	dyn. C_r	stat. C_{0r}	grease	oil		
mm								kN		min ⁻¹			kg
20	52	15	1,1	26	-	-	-	30	19,6	10000	15000	QJ304	0,18
25	52	15	1	27	-	-	-	25,5	18,6	9500	14000	QJ205	0,17
	62	17	1	31	-	-	-	44	31,5	9500	13500	QJ305	0,25
30	62	16	1	32	-	-	-	36,5	27	8500	12000	QJ206	0,30
	72	19	1,1	36	-	-	-	58,5	43	7500	10000	QJ306	0,37
35	72	17	1,1	38	-	-	-	41,5	35,5	7500	10000	QJ207	0,46
	80	21	1,5	41	-	-	-	62	51	7000	9500	QJ307	0,50
40	80	18	1,1	42	-	-	-	54	45,5	6700	9000	QJ208	0,39
	90	23	1,5	46	-	-	-	86,5	68	6300	8500	QJ308	0,69
45	85	19	1,1	45	-	-	-	64	57	6300	8500	QJ209	0,48
	100	25	1,5	51	-	-	-	102	83	5600	7500	QJ309	0,95
50	90	20	1,1	49	-	-	-	58,5	56	5600	7500	QJ210	0,64
	110	27	2	56	-	-	-	110	91,5	5000	6700	QJ310	1,37
55	100	21	1,5	54	-	-	-	80	75	5300	7000	QJ211	0,68
	120	29	2	61	-	-	-	127	108	4500	6000	QJ311	1,74
60	110	22	1,5	60	-	-	-	91,5	93	4800	6300	QJ212	0,87
	130	31	2,1	67	-	-	-	146	127	4300	5600	QJ312	2,18
65	120	23	1,5	65	-	-	-	104	100	4300	5600	QJ213	1,24
	140	33	2,1	72	-	-	-	163	146	4000	5300	QJ313	2,69
70	125	24	1,5	68	-	-	-	118	132	4300	5600	QJ214	1,39
	150	35	2,1	77	-	-	-	183	166	3600	4800	QJ314	3,25
75	130	25	1,5	72	-	-	-	125	129	4000	5300	QJ215	1,77
	160	37	2,1	82	10,1	8,5	2	212	204	3400	4500	QJ315 N2	3,93
80	140	26	2	77	-	-	-	132	137	3600	4800	QJ216	1,8
	170	39	2,1	88	10,1	8,5	2	220	216	3200	4300	QJ316 N2	4,61

Four Point Contact Ball Bearings

Abutment and fillet
dimensions see on
page 197

Dimensions								Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_{1,2}$ min.	a	a_n	b_n	r_n	dyn. C_r	stat. C_{0r}	grease	oil		
mm								kN		min ⁻¹			kg
85	150	28	2	82	-	-	-	153	160	3400	4500	QJ217	2,25
	180	41	3	93	11,7	10,5	2	245	255	3000	4000	QJ317 N2	5,49
90	160	30	2	88	8,1	6,5	1	173	200	3200	4300	QJ218 N2	2,89
	190	43	3	98	11,7	10,5	2	255	265	2800	3800	QJ318 N2	6,34
95	170	32	2,1	93	8,1	6,5	1	196	228	3000	4000	QJ219 N2	3,37
	200	45	3	103	11,7	10,5	2	285	310	2600	3600	QJ319 N2	7,4
100	180	34	2,1	98	10,1	8,5	2	224	260	2800	3800	QJ220 N2	4,03
	215	47	3	110	11,7	10,5	2	325	365	2400	3400	QJ320 N2	8,98
105	190	36	2,1	103	10,1	8,5	2	232	260	2700	3700	QJ221 N2	6,11
110	200	38	2,1	109	10,1	8,5	2	250	305	2400	3600	QJ222 N2	5,67
	240	50	3	123	11,7	10,5	2	345	416	2000	3000	QJ322 N2	12,2
120	215	40	2,1	117	11,7	10,5	2	285	360	2200	3200	QJ224 N2	6,74
	260	55	3	133	11,7	10,5	2	380	480	1900	2800	QJ324 N2	15,6
130	230	40	3	127	11,7	10,5	2	290	390	1900	2800	QJ226 N2	7,67
	280	58	4	144	12,7	10,5	2	425	570	1800	2600	QJ326 N2	19,2
140	250	42	3	137	11,7	10,5	2	315	415	1800	2600	QJ228 N2	9,69
	300	62	4	154	12,7	10,5	2	475	655	1700	2400	QJ328 N2	23,2
150	270	45	3	147	11,7	10,5	2	345	480	1700	2400	QJ230 N2	12,2
	320	65	4	165	12,7	10,5	2	510	750	1600	2200	QJ330 N2	27,8
160	290	48	3	158	12,7	10,5	2	375	530	1600	2200	QJ232 N2	20
	340	68	4	175	12,7	10,5	2	585	865	1500	2100	QJ332 N2	32,5
170	310	52	4	168	12,7	10,5	2	425	630	1600	2200	QJ234 N2	18,9
	360	72	4	186	12,7	10,5	2	585	915	1400	1900	QJ334 N2	38,4
180	320	52	4	175	12,7	10,5	2	430	670	1500	2000	QJ236 N2	23,1
	380	75	4	196	12,7	10,5	2	680	1080	1300	1800	QJ336 N2	44,9

Four Point Contact Ball Bearings



For $D \geq 160$ mm
standard design
with 2 location
slots in outer
ring (N2)

Dimensions								Basical radial load		Speed limit		Designation	Mass
d	D	B	r_1, r_2 min.	a	a_n	b_n	r_n	dyn. C_r	stat. C_{0r}	grease	oil		
mm								kN		min ⁻¹			kg
190	340	55	4	186	12,7	10,5	2	465	750	1400	1900	QJ238 N2	24
200	360	58	4	196	12,7	10,5	2	510	850	1300	1800	QJ240 N2	33,3
220	400	65	4	217	12,7	10,5	2	630	1120	1250	1700	QJ244 N2	49,3
240	440	72	4	238	15	12,5	2,5	680	1270	1100	1500	QJ248 N2	68,3

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE



URB



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 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 dismantled, 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)

- single row



NU



NJ



NUP



N



RNU

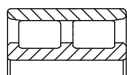


NU+HJ

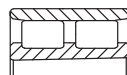


NU+HJ

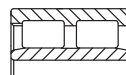
- double row



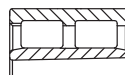
NN30



NN30K



NNU49



NNU49K

- without cage (full complement)



NCF V



NJ VH

Suffixes

- AR** - Grinding addition on the inner ring raceway
- B** - Cylindrical roller bearings with extended inner ring
- C2** - Radial clearance smaller than normal, bearings with interchangeable elements
- C2NA** - Radial clearance smaller than normal, bearings with non-interchangeable elements

- C3** - Radial clearance larger than normal, bearings with interchangeable elements
- C3NA** - Radial clearance larger than normal, bearings with non-interchangeable elements
- D** - Two-pieces inner ring
- E** - Cylindrical roller bearings, E - design (increased basic static and dynamic loads)
- F** - Machined steel or special cast iron cage
- F2** - Constructive modification

K	- Tapered bore bearing
M	- Machined brass cage guided on the rolling elements
M6	- Machined brass cage with integral rivets
MA	- Machined brass cage guided in the outer ring
MA6	- Machined brass cage with integral rivets guided on outer ring
MB	- Machined brass cage guided in 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
W20	- Lubrication holes in the outer ring
W518	- Lubrication holes in the outer and inner ring
W5	- Lubrication groove and holes in both rings
W513	- Lubrication groove and holes in the outer ring and lubrication holes in the inner ring $W513 = W33 + W26$
W7	- Locating holes
W8	- Lubrication groove on the outer ring side surfaces
W9	- Lubrication groove 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	- $W9 + W33$
Z5	- NA radial clearance; changing the bearing elements, the clearance can be obtained from the interchangeable elements.

Single or more rows cylindrical roller bearings

Single or more rows cylindrical roller bearings are manufactured by URB 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 classes 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 88 and 90.

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 259.

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		
Table 1		
Bearings series	Permissible misalignment	
	$P \leq 0,1 C_r$	$P > 0,1 C_r$
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'

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

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.

Radial clearance for single and double row cylindrical roller bearings and needle roller bearings												
With interchangeable elements With cylindrical bore ¹⁾												
Bore diameter		Clearance group symbol										
d	over	up to	C2		Normal		C3		C4		C5	
			min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm		µm										
24	24		0	25	20	45	35	60	50	75	65	90
24	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	1030
900	1000		200	390	390	580	580	770	770	960	960	1150
1000	1120		220	430	430	640	640	850	850	1060	1060	1270
1120	1250		230	470	470	710	710	950	950	1190	1190	1430
1250	1400		270	530	530	790	790	1050	1050	1310	1310	1570
1400	1600		330	610	610	890	890	1170	1170	1450	1450	1730

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.

Tolerances of cylindrical roller bearings are given on pages 27.

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).

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.

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 mass, low coefficient of friction and are noiseless while running.

Cage design and some technical data are given in table 4.

Radial clearance for single and double row cylindrical roller bearings and needle roller bearings													
With non-interchangeable elements With cylindrical bore ¹⁾												Table 3	
Bore diameter		Clearance group symbol											
d		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
120	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	1030
710	800	35	140	145	290	290	435	485	630	630	775	1000	1140
800	900	35	160	160	320	320	480	540	700	700	860	1130	1290
900	1000	35	180	180	360	360	540	600	780	780	960	1270	1440
1000	1120	50	200	200	400	400	600	660	860	860	1060	1380	1560
1120	1250	60	220	220	440	440	660	730	950	950	1170	1520	1720
1250	1400	60	240	240	480	480	720	810	1050	1050	1290	1680	1900
1400	1600	70	270	270	540	540	810	910	1190	1190	1460	1900	2150

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.

Minimum load

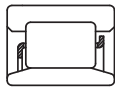
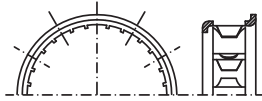
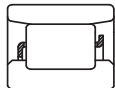
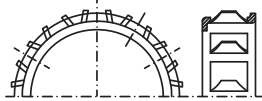
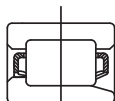
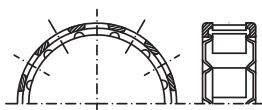
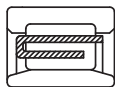
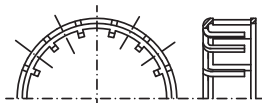
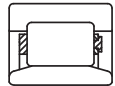
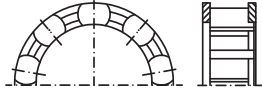
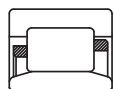
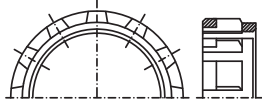
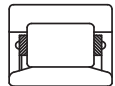
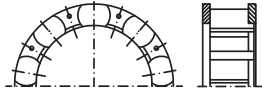
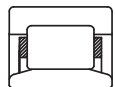
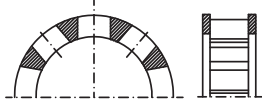
Cylindrical roller bearings must be subjected to a given minimum load, so that a proper operation of these bearings can be guaranteed.

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:

$$F_{rm} = 0,02 C_r \text{ kN}$$

Cage design and some technical data					Table 4	
Cage	Design bearing	Cage	Application	Max. value D_{min} 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			- General application - Low inertia - Provides proper bearing lubrication - Moderate speeds - Bearings N	550×10^3	400×10^3	
Pressed sheet cage			- General application - Low inertia - Provides proper bearing lubrication - Moderate speeds - Bearings construction E type NU, NJ, NUP	550×10^3	400×10^3	
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	
Two piece machined cage with integral rivets M6, MA6			- General application - Heavy loads - Moderate and high speeds	1200×10^3	900×10^3	
Polyamide cage TN			- General application - Low frictional moment - High speeds - Low noise - $T < 120^\circ \text{C}$	1400×10^3	1100×10^3	
Two piece machined riveted cage M, MA, MB			- General application - Heavy loads - Moderate and high speeds - Bearings with $d > 100 \text{ mm}$	1200×10^3	900×10^3	
One piece machined brass cage MPA			- General application - Heavy loads - Provides proper lubrication - High speeds	1400×10^3	1100×10^3	

Equivalent dynamic radial load

For cylindrical roller bearings purely radially loaded which don't locate shafts axially, equivalent dynamic load is:

$$P_r = F_r, \text{ kN}$$

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:

$$P_{or} = F_r, \text{ kN}$$

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_{23} - on page 21.

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.

Factors k_1 and k_2		
Factor	Lubrication	
	oil	grease
Bearings construction E	1,5	1
k_1	0,15	0,1
k_2		
Other bearings	0,5	0,3
k_1	0,05	0,03
k_2		

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 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 subject to a heat treatment of stress relieving which allows bearings to be operated up to a temperature of $+150^{\circ}\text{C}$.

The hardness of rings should not be less 59 HRC.
Small-sized bearings operate normally up to $+120^{\circ}\text{C}$.

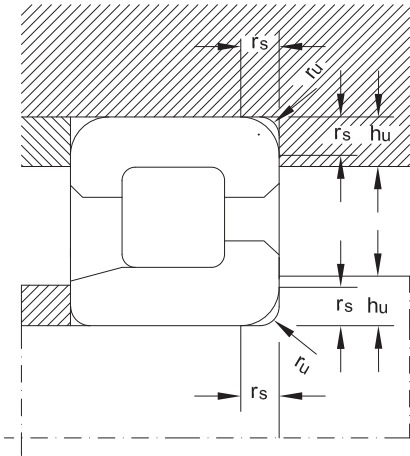
Abutment dimensions

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.

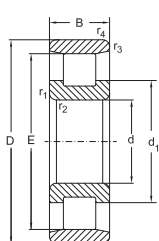
The values of the connection radius and support shoulder height are given in table 6.

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.

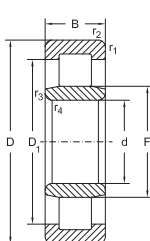


Abutment dimensions				
Table 6				
r_s, r_{1s} min.	r_u max.	h_u min.	Bearing series	
			10, 18, 19, 28, 29, 30, 48, 49, 60	2, 2E, 3, 3E, 4 22, 22E, 23, 23E
mm				
0,3	0,3	1	1,2	
0,6	0,6	1,6	2,1	
1	1	2,3	2,8	
1,1	1	3	3,5	4,5
1,5	1,5	3,5	4,5	5,5
2	2	4,4	5,5	6,5
2,1	2,1	5,1	6	7
3	2,5	6,2	7	8
4	3	7,3	8,5	10
5	4	9	10	12

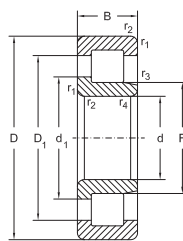
Single Row Cylindrical Roller Bearings



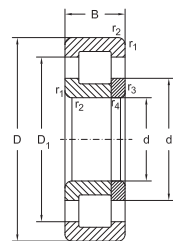
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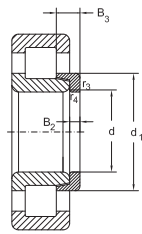
NJ



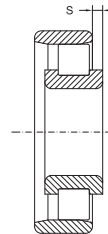
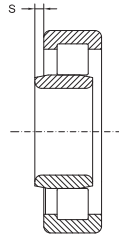
NUP

Dimensions						Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min ⁻¹		
15	35	11	0,6	0,3	1	12,7	10,4	18000	22000	NU202 E
	35	11	0,6	0,3	-	12,7	10,4	18000	22000	NJ202 E
17	40	12	0,6	0,3	1,2	11,8	9,6	15000	18000	N203
	40	12	0,6	0,3	1,2	17,6	14,6	15000	18000	NU203 E
	40	12	0,6	0,3	-	17,6	14,6	15000	18000	NJ203 E
	40	12	0,6	0,3	-	17,6	14,6	15000	18000	NUP203 E
	40	16	0,6	0,3	1,0	24	22	15000	18000	NU2203 E
	40	16	0,6	0,3	-	24	22	15000	18000	NJ2203 E
	40	16	0,6	0,3	-	24	22	15000	18000	NUP2203 E
	47	14	1,1	0,6	1,2	16,2	13	13000	16000	NU303 M
	47	14	1,1	0,6	-	16,2	13	13000	16000	NJ303 M
	47	14	1,1	0,6	-	16,2	13	13000	16000	NUP303 M
20	47	14	1	0,6	1	15,4	12,7	13000	16000	N204
	47	14	1	0,6	1	15,4	12,7	13000	16000	NU204 E
	47	14	1	0,6	-	15,4	12,7	13000	16000	NJ204 E
	47	14	1	0,6	-	15,4	12,7	13000	16000	NUP204 E
	47	18	1	0,6	1,8	32,5	31	13000	16000	NU2204 E
	47	18	1	0,6	-	32,5	31	13000	16000	NJ2204 E
	47	18	1	0,6	-	32,5	31	13000	16000	NUP2204 E
	52	15	1	0,6	1,1	31,5	27	11000	14000	NU304 E
	52	15	1	0,6	-	31,5	27	11000	14000	NJ304 E

Single Row Cylindrical Roller Bearings



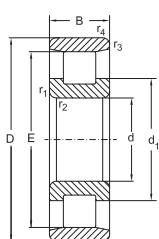
NJ+HJ



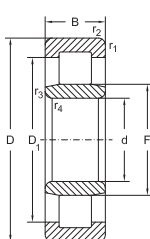
Abutment and fillet
dimensions see on
page 209

Dimensions					Thrust collar			Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
15	-	19,3	-	27,8	-	-	-	0,047	-
	-	19,3	21,8	27,8	2,5	5	HJ202 E	0,047	0,007
17	33,9	-	24,7	-	-	-	-	0,068	-
	-	22,1	-	32	-	-	-	0,068	-
	-	22,1	24,7	32	3	5,5	HJ203 E	0,068	0,009
	-	22,1	24,7	32	-	-	-	0,068	-
	-	22,1	-	32	-	-	-	0,091	-
	-	22,1	24,7	32	3	6	HJ2203 E	0,091	0,01
	-	22,1	24,7	32	-	-	-	0,091	-
	-	25,1	36,8	-	-	-	-	0,120	-
	-	25,1	27,6	36,8	4	6,5	HJ303 E	0,120	0,012
	-	25,1	27,6	36,8	-	-	-	0,120	-
20	40	-	29,9	-	-	-	-	0,132	-
	-	26,5	-	38,8	-	-	-	0,132	-
	-	26,5	29,9	38,8	3	5,5	HJ204 E	0,132	0,011
	-	26,5	29,9	38,8	-	-	-	0,132	-
	-	26,5	-	38,4	-	-	-	0,142	-
	-	26,5	29,9	38,4	3	6,5	HJ2204 E	0,142	0,012
	-	26,5	29,9	38,4	-	-	-	0,142	-
	-	27,5	-	41,8	-	-	-	0,151	-
	-	27,5	31,4	41,8	4	6,5	HJ304 E	0,151	0,017

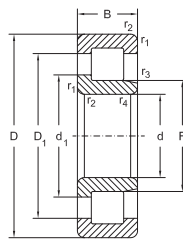
Single Row Cylindrical Roller Bearings



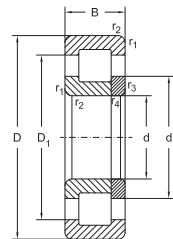
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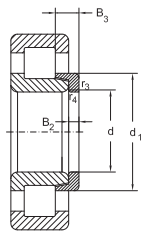
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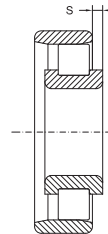
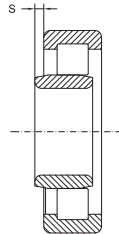
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
20	52	15	1,1	0,6	-	31,5	27	11000	14000	NUP304 E
	52	21	1,1	0,6	2	41,5	39	11000	14000	NU2304 E
	52	21	1,1	0,6	-	41,5	39	11000	14000	NJ2304 E
	52	21	1,1	0,6	-	41,5	39	11000	14000	NUP2304 E
25	52	15	1	0,6	1,3	29	27,5	12000	15000	N205
	52	15	1	0,6	1,3	29	27,5	12000	15000	NU205 E
	52	15	1	0,6	-	29	27,5	12000	15000	NJ205 E
	52	15	1	0,6	-	29	27,5	12000	15000	NUP205 E
	52	18	1	0,6	1,7	34,5	35	12000	15000	NU2205 E
	52	18	1	0,6	-	34,5	35	12000	15000	NJ2205 E
	52	18	1	0,6	-	34,5	35	12000	15000	NUP2205 E
	62	17	1,1	1,1	1,5	41,5	37,5	9500	12000	N305
	62	17	1,1	1,1	1,5	41,5	37,5	9500	12000	NU305 E
	62	17	1,1	1,1	-	41,5	37,5	9500	12000	NJ305 E
	62	17	1,1	1,1	-	41,5	37,5	9500	12000	NUP305 E
	62	24	1,1	1,1	1,9	57	56	9500	12000	NU2305 E
	62	24	1,1	1,1	-	57	56	9500	12000	NJ2305 E
	62	24	1,1	1,1	-	57	56	9500	12000	NUP2305 E
	80	21	1,5	1,5	2,2	50,6	44,4	8500	10000	NU405 M
	80	21	1,5	1,5	-	50,6	44,4	8500	10000	NJ405 M
30	62	16	1	0,6	1,4	39,7	39,7	9500	12000	N206 EM6

Single Row Cylindrical Roller Bearings



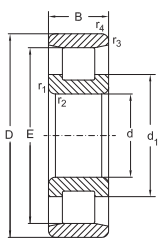
NJ+HJ



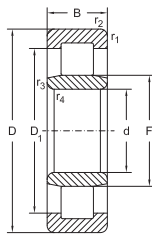
*Abutment and fillet
dimensions see on
page 209*

Dimensions				Thrust collar			Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing Thrust collar
kg								
20	-	27,5	31,4	41,8	-	-	-	0,150 -
	-	27,5	-	41,8	-	-	-	0,210 -
	-	27,5	31,4	41,8	4	7,5	HJ2304 E	0,210 0,019
	-	27,5	31,4	41,8	-	-	-	0,210 -
25	46,5	-	34,9	-	-	-	-	0,140 -
	-	31,5	-	43,3	-	-	-	0,140 -
	-	31,5	34,9	43,3	3	6	HJ205 E	0,140 0,015
	-	31,5	34,9	43,3	-	-	-	0,140 -
	-	31,5	-	43,3	-	-	-	0,160 -
	-	31,5	34,9	43,3	3	6,5	HJ2205 E	0,160 0,015
	-	31,5	34,9	43,3	-	-	-	0,160 -
	54	-	38,3	-	-	-	-	0,245 -
	-	34	-	50,1	-	-	-	0,245 -
	-	34	38,3	50,1	4	7	HJ305 E	0,245 0,025
	-	34	38,3	50,1	-	-	-	0,245 -
	-	34	-	50,1	-	-	-	0,350 -
	-	34	38,3	50,1	4	8	HJ2305 E	0,350 0,027
	-	34	38,3	50,1	-	-	-	0,350 -
	-	38,8	-	58,4	-	-	-	0,625 -
	-	38,8	43,6	58,4	6	10,5	HJ405	0,625 0,057
30	55,5	-	41,4	-	-	-	-	0,210 -

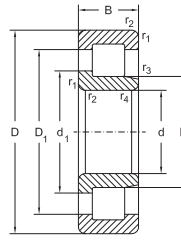
Single Row Cylindrical Roller Bearings



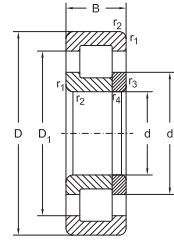
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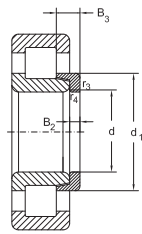
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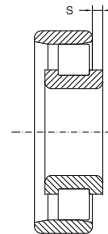
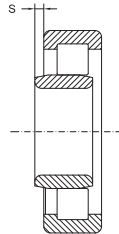
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
30	62	16	1	0,6	1,4	39,7	37,9	9500	12000	NU206 E
	62	16	1	0,6	-	39,7	37,9	9500	12000	NJ206 E
	62	16	1	0,6	-	39,7	37,9	9500	12000	NUP206 E
	62	20	1	0,6	1,6	49	50	9500	12000	NU2206 E
	62	20	1	0,6	-	49	50	9500	12000	NJ2206 E
	62	20	1	0,6	-	49	50	9500	12000	NUP2206 E
	72	19	1,1	1,1	1,9	51	48	8500	10000	N306
	72	19	1,1	1,1	1,9	51	48	8500	10000	NU306 E
	72	19	1,1	1,1	-	51	48	8500	10000	NJ306 E
	72	19	1,1	1,1	-	51	48	8500	10000	NUP306 E
	72	27	1,1	1,1	2,5	73,5	75	8500	10000	NU2306 E
	72	27	1,1	1,1	-	73,5	75	8500	10000	NJ2306 E
	72	27	1,1	1,1	-	73,5	75	8500	10000	NUP2306 E
	90	23	1,5	1,5	2,3	65	57,8	7000	8500	N406 M
	90	23	1,5	1,5	2,3	65	57,8	7000	8500	NU406 M
	90	23	1,5	1,5	-	65	57,8	7000	8500	NJ406 M
	90	23	1,5	1,5	-	65	57,8	7000	8500	NUP406 M
35	62	14	1	0,6	2,6	23,6	24,5	10000	13000	NU1007 M
	72	17	1,1	0,6	1,7	50	50	8500	10000	N207
	72	17	1,1	0,6	1,7	50	50	8500	10000	NU207 E
	72	17	1,1	0,6	-	50	50	8500	10000	NJ207 E
	72	17	1,1	0,6	-	50	50	8500	10000	NUP207 E
	72	23	1,1	0,6	2,9	65	70	8500	10000	NU2207 E

Single Row Cylindrical Roller Bearings



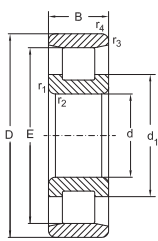
NJ+HJ



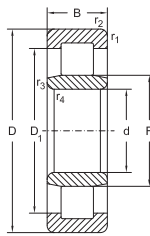
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
30	-	37,5	-	52	-	-	-	0,210	-
	-	37,5	41,4	52	4	7	HJ206 E	0,210	0,025
	-	37,5	41,4	52	-	-	-	0,210	-
	-	37,5	-	52	-	-	-	0,260	-
	-	37,5	41,4	52	4	7,5	HJ2206 E	0,260	0,025
	-	37,5	41,4	52	-	-	-	0,260	-
	62,5	-	45,1	-	-	-	-	0,370	-
	-	40,5	-	58,3	-	-	-	0,370	-
	-	40,5	45,1	58,3	5	8,5	HJ306 E	0,370	0,043
	-	40,5	45,1	58,3	-	-	-	0,370	-
	-	40,5	-	58,3	-	-	-	0,528	-
	-	40,5	45,1	58,3	5	9,5	HJ2306 E	0,528	0,045
	-	40,5	45,1	58,3	-	-	-	0,528	-
	73	-	50,5	-	-	-	-	0,870	-
	-	45	-	67,8	-	-	-	0,870	-
	-	45	50,5	67,8	7	11,5	HJ406	0,870	0,09
	-	45	50,5	67,8	-	-	-	0,870	-
35	-	42	44,5	51,9	4	7,75	HJ1007	0,180	0,02
	64	-	48	-	-	-	-	0,305	-
	-	44	-	60,1	-	-	-	0,305	-
	-	44	48	60,1	4	7	HJ207 E	0,305	0,033
	-	44	48	60,1	-	-	-	0,305	-
	-	44	-	60,1	-	-	-	0,395	-

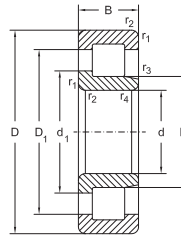
Single Row Cylindrical Roller Bearings



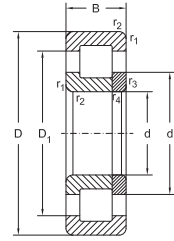
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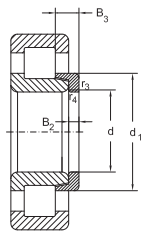
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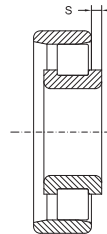
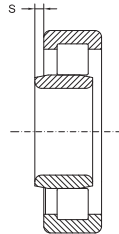
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
35	72	23	1	0,6	2,9	65	70	8500	10000	NJ2207 E
	72	23	1	0,6	-	65	70	8500	10000	NUP2207 E
	80	21	1,1	1,5	0,6	66,7	65,4	7500	9000	N307
	80	21	1,1	1,5	0,6	66,7	65,4	7500	9000	NU307 E
	80	21	1,1	1,5	-	66,7	65,4	7500	9000	NJ307 E
	80	21	1,1	1,5	-	66,7	65,4	7500	9000	NUP307 E
	80	31	1,1	1,5	3	91,5	98	7500	9000	NU2307 E
	80	31	1,1	1,5	-	91,5	98	7500	9000	NJ2307 E
	80	31	1,1	1,5	-	91,5	98	7500	9000	NUP2307 E
	100	25	1,5	1,5	2,6	75	69,5	6300	7500	N407 M
	100	25	1,5	1,5	2,6	75	69,5	6300	7500	NU407 M
	100	25	1,5	1,5	-	75	69,5	6300	7500	NJ407 M
	100	25	1,5	1,5	-	75	69,5	6300	7500	NUP407 M
40	68	15	1	0,6	2,7	26,1	27,3	9500	12000	NJ1008 M
	80	18	1,1	1,1	1,9	53	53	7500	9000	N208
	80	18	1,1	1,1	1,9	53	53	7500	9000	NU208 E
	80	18	1,1	1,1	-	53	53	7500	9000	NJ208 E
	80	18	1,1	1,1	-	53	53	7500	9000	NUP208 E
	80	23	1,1	1,1	2,3	71	75	7500	9000	NU2208 E
	80	23	1,1	1,1	-	71	75	7500	9000	NJ2208 E
	80	23	1,1	1,1	-	71	75	7500	9000	NUP2208 E
	90	23	1,5	1,5	2,5	81,5	78	6300	7500	N308
	90	23	1,5	1,5	2,5	81,5	78	6300	7500	NU308 E

Single Row Cylindrical Roller Bearings



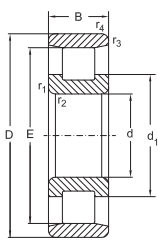
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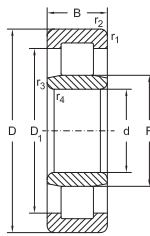
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
35	-	44	48	60,1	4	8,5	HJ2207 E	0,395	0,035
	-	44	48	60,1	-	-	-	0,395	-
	70,2	-	51,2	-	-	-	-	0,485	-
	-	46,2	-	65,7	-	-	-	0,485	-
	-	46,2	51,2	65,7	6	9,5	HJ307 E	0,485	0,062
	-	46,2	51,2	65,7	-	-	-	0,485	-
	-	46,2	-	65,7	-	-	-	0,715	-
	-	46,2	51,2	65,7	6	11	HJ2307 E	0,715	0,065
	-	46,2	51,2	65,7	-	-	-	0,715	-
	83	-	59	-	-	-	-	1,05	-
	-	53	-	77,6	-	-	-	1,05	-
	-	53	59	77,6	8	13	HJ407	1,05	0,13
	-	53	59	77,6	-	-	-	1,05	-
40	-	47	50	57,6	4	8	HJ1008	0,23	0,03
	71,5	-	54,1	-	-	-	-	0,38	-
	-	49,5	-	67,3	-	-	-	0,38	-
	-	49,5	54,1	67,3	5	8,5	HJ208 E	0,38	0,05
	-	49,5	54,1	67,3	-	-	-	0,38	-
	-	49,5	-	67,3	-	-	-	0,49	-
	-	49,5	54,1	67,3	5	9	HJ2208 E	0,49	0,05
	-	49,5	54,1	67,3	-	-	-	0,49	-
	80	-	57,7	-	-	-	-	0,65	-
	-	52	-	74,9	-	-	-	0,65	-

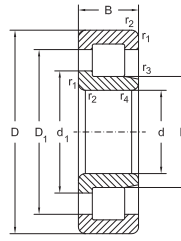
Single Row Cylindrical Roller Bearings



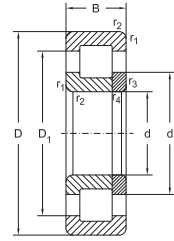
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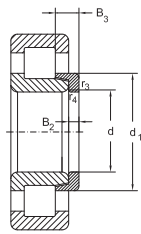
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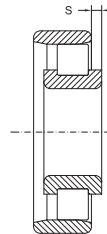
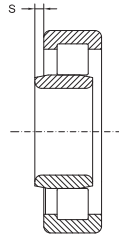
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
40	90	23	1,5	1,5	-	81,5	78	6300	7500	NJ308 E
	90	23	1,5	1,5	-	81,5	78	6300	7500	NUP308 E
	90	33	1,5	1,5	3,5	112	120	6300	7500	NU2308 E
	90	33	1,5	1,5	-	112	120	6300	7500	NJ2308 E
	90	33	1,5	1,5	-	112	120	6300	7500	NUP2308 E
	110	27	2	2	2,6	93	86,5	5500	6800	N408 M
	110	27	2	2	2,6	93	86,5	5500	6800	NU408 M
	110	27	2	2	-	93	86,5	5500	6800	NJ408 M
45	110	27	2	2	-	93	86,5	5500	6800	NUP408 M
	75	16	1	0,6	2,5	32,5	35,5	8500	10000	NU1009 M
	85	19	1,1	1,1	1,9	61	63	7000	8500	N209 E
	85	19	1,1	1,1	1,9	61	63	7000	8500	NU209 E
	85	19	1,1	1,1	-	61	63	7000	8500	NJ209 E
	85	19	1,1	1,1	-	61	63	7000	8500	NUP209 E
	85	23	1,1	1,1	2,3	76	81,6	7000	8500	NU2209 E
	85	23	1,1	1,1	-	76	81,6	7000	8500	NJ2209 E
	85	23	1,1	1,1	-	76	81,6	7000	8500	NUP2209 E
	100	25	1,5	1,5	2,9	98	100	5600	6700	N309 E
	100	25	1,5	1,5	2,9	98	100	5600	6700	NU309 E
	100	25	1,5	1,5	-	98	100	5600	6700	NJ309 E
	100	25	1,5	1,5	-	98	100	5600	6700	NUP309 E
	100	36	1,5	1,5	3,5	137	153	5600	6700	NU2309 E
	100	36	1,5	1,5	-	137	153	5600	6700	NJ2309 E

Single Row Cylindrical Roller Bearings



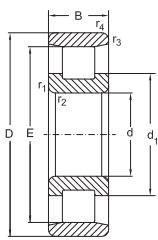
NJ+HJ



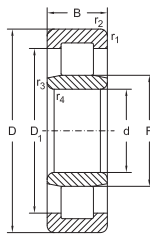
Abutment and fillet
dimensions see on
page 209

Dimensions			Thrust collar					Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
40	-	52	57,7	74,9	7	11	HJ308 E	0,66	0,088
	-	52	57,7	74,9	-	-	-	0,66	-
	-	52	-	74,9	-	-	-	0,95	-
	-	52	57,7	74,9	7	12,5	HJ2308 E	0,95	0,92
	-	52	57,7	74,9	-	-	-	0,95	-
	92	-	64,8	-	-	-	-	1,30	-
	-	58	-	85,8	-	-	-	1,30	-
	-	58	64,8	85,8	8	13	HJ408	1,30	0,15
	-	58	64,8	85,8	-	-	-	1,30	-
45	-	52,5	55,5	63,9	4	8,25	HJ1009	0,29	0,03
	76,5	-	59,1	-	-	-	-	0,5	-
	-	54,5	-	72,4	-	-	-	0,5	-
	-	54,5	59,1	72,4	5	8,5	HJ209 E	0,5	0,05
	-	54,5	59,1	72,4	-	-	-	0,5	-
	-	54,5	-	72,4	-	-	-	0,6	-
	-	54,5	59,1	72,4	5	9	HJ2209 E	0,6	0,057
	-	54,5	59,1	72,4	-	-	-	0,6	-
	88,5	-	64,6	-	-	-	-	1	-
	-	58,5	-	83,1	-	-	-	1	-
	-	58,5	64,6	83,1	7	11,5	HJ309 E	1	0,11
	-	58,5	64,6	83,1	-	-	-	1	-
	-	58,5	-	83,1	-	-	-	1,3	-
	-	58,5	64,6	83,1	7	13	HJ2309 E	1,3	0,12

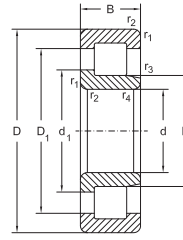
Single Row Cylindrical Roller Bearings



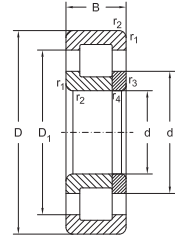
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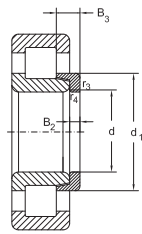
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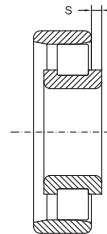
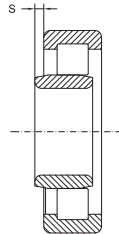
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
45	100	36	1,5	1,5	-	137	153	5600	6700	NUP2309 E
	120	29	2	2	2,9	113	109	5000	6000	N409 M
	120	29	2	2	2,9	113	109	5000	6000	NU409 M
	120	29	2	2	-	113	109	5000	6000	NJ409 M
	120	29	2	2	-	113	109	5000	6000	NUP409 M
50	80	16	1	0,6	2,1	36	41,5	8000	9500	NU1010 M
	90	20	1,1	1,1	2,2	64	68	6700	8000	N210 E
	90	20	1,1	1,1	2,2	64	68	6700	8000	NU210 E
	90	20	1,1	1,1	-	64	68	6700	8000	NJ210 E
	90	20	1,1	1,1	-	64	68	6700	8000	NUP210 E
	90	23	1,1	1,1	2,2	78	88	6700	8000	NU2210 E
	90	23	1,1	1,1	-	78	88	6700	8000	NJ2210 E
	90	23	1,1	1,1	-	78	88	6700	8000	NUP2210 E
	110	27	2	2	3	110	114	5300	6300	N310 E
	110	27	2	2	3	110	114	5300	6300	NU310 E
	110	27	2	2	-	110	114	5300	6300	NJ310 E
	110	27	2	2	-	110	114	5300	6300	NUP310 E
	110	40	2	2	4,2	163	186	5300	6300	NU2310 E
	110	40	2	2	-	163	186	5300	6300	NJ2310 E
	110	40	2	2	-	163	186	5300	6300	NUP2310 E
	130	31	2,1	2,1	3	139	136	4500	5300	N410 M
	130	31	2,1	2,1	3	139	136	4500	5300	NU410 M
	130	31	2,1	2,1	-	139	136	4500	5300	NJ410 M

Single Row Cylindrical Roller Bearings



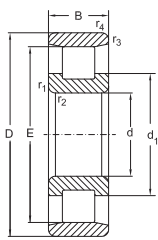
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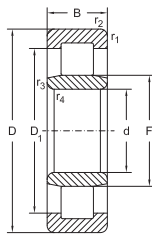
Abutment and fillet dimensions see on page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
45	-	58,5	64,6	83,1	-	-	-	1,3	-
	100,5	-	71,8	-	-	-	-	1,7	-
	-	64,5	-	93,9	-	-	-	1,7	-
	-	64,5	71,8	93,9	8	13,5	HJ409	1,7	0,19
	-	64,5	71,8	93,9	-	-	-	1,7	-
50	-	57,5	60,5	68,9	4	8,25	HJ1010	0,32	0,04
	81,5	-	64,1	-	-	-	-	0,6	-
	-	59,5	-	77,4	-	-	-	0,6	-
	-	59,5	64,1	77,4	5	9	HJ210 E	0,6	0,06
	-	59,5	64,1	77,4	-	-	-	0,6	-
	-	59,5	-	77,4	-	-	-	0,65	-
	-	59,5	64,1	77,4	5	9	HJ2210 E	0,65	0,06
	-	59,5	64,1	77,4	-	-	-	0,65	-
	97	-	71,4	-	-	-	-	1,2	-
	-	65	-	91,4	-	-	-	1,2	-
	-	65	71,4	91,4	8	13	HJ310 E	1,2	0,15
	-	65	71,4	91,4	-	-	-	1,2	-
	-	65	-	91,4	-	-	-	1,9	-
	-	65	71,4	91,4	8	14,5	HJ2310 E	1,9	0,16
	-	65	71,4	91,4	-	-	-	1,9	-
	110,8	-	78,8	-	-	-	-	2,1	-
	-	70,8	-	103,6	-	-	-	2,1	-
	-	70,8	78,8	103,6	9	14,5	HJ410	2,1	0,24

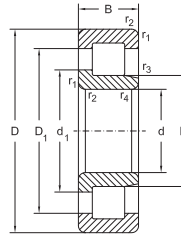
Single Row Cylindrical Roller Bearings



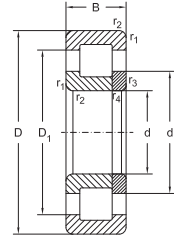
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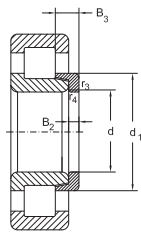
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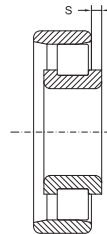
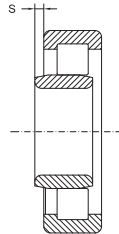
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
50	130	31	2,1	2,1	-	139	136	4500	5300	NUP410 M
55	90	18	1,1	1	2,4	41,5	50	7800	9200	NU1011 M
	100	21	1,5	1,1	1,7	83	95	6300	7500	N211
	100	21	1,5	1,1	1,7	83	95	6300	7500	NU211 E
	100	21	1,5	1,1	-	83	95	6300	7500	NJ211 E
	100	21	1,5	1,1	-	83	95	6300	7500	NUP211 E
	100	25	1,5	1,1	2,2	98	118	6300	7500	NU2211 E
	100	25	1,5	1,1	-	98	118	6300	7500	NJ2211 E
	100	25	1,5	1,1	-	98	118	6300	7500	NUP2211 E
	120	29	2	2	3	134	140	5000	6000	N311
	120	29	2	2	3	134	140	5000	6000	NU311 E
	120	29	2	2	-	134	140	5000	6000	NJ311 E
	120	29	2	2	-	134	140	5000	6000	NUP311 E
	120	43	2	2	4,3	200	228	5000	6000	NU2311 EM
	120	43	2	2	-	200	228	5000	6000	NJ2311 EM
	120	43	2	2	-	200	228	5000	6000	NUP2311 EM
	140	33	2,1	2,1	3,3	140	137	4300	5000	N411 M
	140	33	2,1	2,1	3,3	140	137	4300	5000	NU411 M
	140	33	2,1	2,1	-	140	137	4300	5000	NJ411 M
	140	33	2,1	2,1	-	140	137	4300	5000	NUP411 M
60	95	18	1,1	1	3,3	44	55	6700	8000	NU1012 M
	110	22	1,5	1,5	1,6	95	104	5600	6700	N212 EM
	110	22	1,5	1,5	1,6	95	104	5600	6700	NU212 E

Single Row Cylindrical Roller Bearings



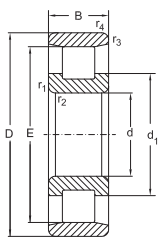
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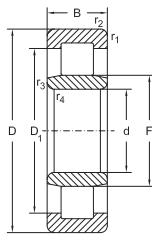
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
50	-	70,8	78,8	103,6	-	-	-	2,2	-
55	-	64,5	67,5	76,7	5	10	HJ1011	0,47	0,05
	90	-	71	-	-	-	-	0,75	-
	-	66	-	85,6	-	-	-	0,75	-
	-	66	71	85,6	6	9,5	HJ211 E	0,75	0,09
	-	66	71	85,6	-	-	-	0,75	-
	-	66	-	85,6	-	-	-	0,9	-
	-	66	71	85,6	6	10	HJ2211 E	0,9	0,09
	-	66	71	85,6	-	-	-	0,9	-
	106,5	-	77,7	-	-	-	-	1,6	-
	-	70,5	-	100,3	-	-	-	1,6	-
	-	70,5	77,7	100,3	9	14	HJ3122 E	1,6	0,2
	-	70,5	77,7	100,3	-	-	-	1,6	-
	-	70,5	-	100,3	-	-	-	2,3	-
	-	70,5	77,7	100,3	9	15,5	HJ2311 E	2,3	0,2
	-	70,5	77,7	100,3	-	-	-	2,3	-
	117,2	-	85,2	-	-	-	-	2,5	-
	-	77,2	-	109,9	-	-	-	2,5	-
-	77,2	85,2	109,9	10	16,5	HJ411	2,5	0,31	
-	77,2	85,2	109,9	-	-	-	2,5	-	
60	-	69,5	72,5	81,7	5	10	HJ1012	0,49	0,06
	100	-	77,7	-	-	-	-	1	-
	-	72	-	95,1	-	-	-	1	-

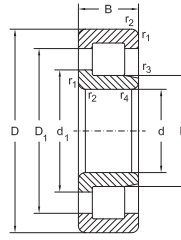
Single Row Cylindrical Roller Bearings



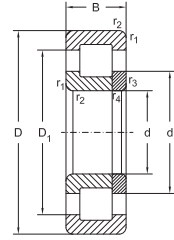
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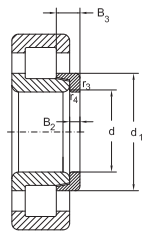
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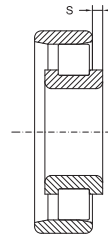
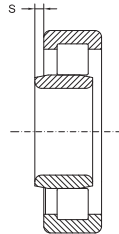
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r ₁ , r ₂ min.	r ₃ , r ₄ min.	s ≈	dyn. C _r	stat. C _{0r}	grease	oil	
mm						kN		min ⁻¹		
60	110	22	1,5	1,5	-	95	104	5600	6700	NJ212 E
	110	22	1,5	1,5	-	95	104	5600	6700	NUP212 E
	110	28	1,5	1,5	2,4	129	153	5300	6300	NU2212 E
	110	28	1,5	1,5	-	129	153	5300	6300	NJ2212 E
	110	28	1,5	1,5	-	129	153	5300	6300	NUP2212 E
	130	31	2,1	2,1	3	150	156	4300	5000	N312
	130	31	2,1	2,1	3	150	156	4300	5000	NU312 E
	130	31	2,1	2,1	-	150	156	4300	5000	NJ312 E
	130	31	2,1	2,1	-	150	156	4300	5000	NUP312 E
	130	46	2,1	2,1	4,2	224	260	4300	5000	NU2312 E
	130	46	2,1	2,1	-	224	260	4300	5000	NJ2312 E
	130	46	2,1	2,1	-	224	260	4300	5000	NUP2312 E
	150	35	2,1	2,1	3,4	179	184	4000	4800	N412 M
	150	35	2,1	2,1	3,4	179	184	4000	4800	NU412 M
	150	35	2,1	2,1	-	179	184	4000	4800	NJ412 M
	150	35	2,1	2,1	-	179	184	4000	4800	NUP412 M
65	100	18	1,1	1	3,3	45	58,5	6600	7800	NU1013 M
	120	23	1,5	1,5	1,4	108	120	5300	6300	N213
	120	23	1,5	1,5	1,4	108	120	5300	6300	NU213 E
	120	23	1,5	1,5	-	108	120	5300	6300	NJ213 E
	120	23	1,5	1,5	-	108	120	5300	6300	NUP213 E
	120	31	1,5	1,5	1,9	150	183	4800	5600	NU2213 EM
	120	31	1,5	1,5	-	150	183	4800	5600	NJ2213 EM

Single Row Cylindrical Roller Bearings



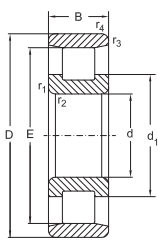
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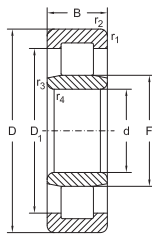
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
60	-	72	77,7	95,1	6	10	HJ212 E	1	0,11
	-	72	77,7	95,1	-	-	-	1	-
	-	72	-	95,1	-	-	-	1,2	-
	-	72	77,7	95,1	6	10	HJ2212 E	1,2	0,11
	-	72	77,7	95,1	-	-	-	1,2	-
	115	-	84,5	-	-	-	-	1,9	-
	-	77	-	108,5	-	-	-	1,9	-
	-	77	84,5	108,5	9	14,5	HJ312 E	1,9	0,24
	-	77	84,5	108,5	-	-	-	1,9	-
	-	77	-	108,5	-	-	-	2,9	-
	-	77	84,5	108,5	9	16	HJ2312 E	2,9	0,24
	-	77	84,5	108,5	-	-	-	2,9	-
	127	-	91,8	-	-	-	-	3,1	-
	-	83	-	118,8	-	-	-	3,1	-
	-	83	91,8	118,8	10	16,5	HJ412	3,1	0,35
	-	83	91,8	118,8	-	-	-	3,1	-
65	-	74,5	77,5	86,7	5	10	HJ1013	0,52	0,07
	108,5	-	84,6	-	-	-	-	1,2	-
	-	78,5	-	103,2	-	-	-	1,2	-
	-	78,5	84,6	103,2	6	10	HJ213 E	1,2	0,13
	-	78,5	84,6	103,2	-	-	-	1,2	-
	-	78,5	-	103,2	-	-	-	1,6	-
	-	78,5	84,6	103,2	6	10,5	HJ2213 E	1,6	0,13

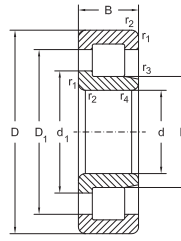
Single Row Cylindrical Roller Bearings



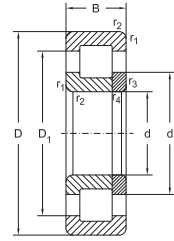
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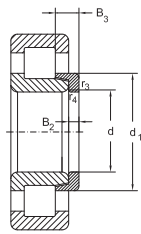
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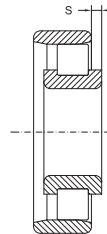
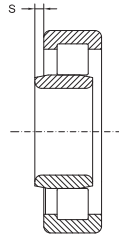
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
65	120	31	1,5	1,5	-	150	183	4800	5600	NUP2213 EM
	140	33	2,1	2,1	1,4	180	190	4300	5000	N313 EM
	140	33	2,1	2,1	1,4	180	190	4300	5000	NU313 E
	140	33	2,1	2,1	-	180	190	4300	5000	NJ313 E
	140	33	2,1	2,1	-	180	190	4300	5000	NUP313 E
	140	48	2,1	2,1	3,9	245	285	4000	4800	NU2313 EM
	140	48	2,1	2,1	-	245	285	4000	4800	NJ2313 EM
	140	48	2,1	2,1	-	245	285	4000	4800	NUP2313 EM
	160	37	2,1	2,1	3,5	195	203	3800	4500	N413 M
	160	37	2,1	2,1	3,5	195	203	3800	4500	NU413 M
	160	37	2,1	2,1	-	195	203	3800	4500	NJ413 M
	160	37	2,1	2,1	-	195	203	3800	4500	NUP413 M
70	110	20	1,1	1	3,3	65	81,5	6000	7000	NU1014 M
	125	24	1,5	1,5	1,1	120	137	5000	6000	N214 EM
	125	24	1,5	1,5	1,1	120	137	5000	6000	NU214 E
	125	24	1,5	1,5	-	120	137	5000	6000	NJ214 E
	125	24	1,5	1,5	-	120	137	5000	6000	NUP214 E
	125	31	1,5	1,5	1,6	156	196	4800	5600	NU2214 E
	125	31	1,5	1,5	-	156	196	4800	5600	NJ2214 E
	125	31	1,5	1,5	-	156	196	4800	5600	NUP2214 E
	150	35	2,1	2,1	1,6	205	222	4000	4800	N314
	150	35	2,1	2,1	1,6	205	222	4000	4800	NU314 E
	150	35	2,1	2,1	-	205	222	4000	4800	NJ314 E
	150	35	2,1	2,1	-	205	222	4000	4800	NUP314 E

Single Row Cylindrical Roller Bearings



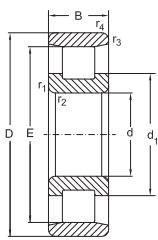
NJ+HJ



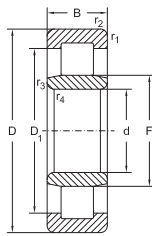
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
65	-	78,5	84,6	103,2	-	-	-	1,6	-
	124,5	-	90,7	-	-	-	-	2,3	-
	-	82,5	-	117,4	-	-	-	2,3	-
	-	82,5	90,7	177,4	10	15,5	HJ313 E	2,3	0,29
	-	82,5	90,7	117,4	-	-	-	2,3	-
	-	82,5	-	117,4	-	-	-	3,3	-
	-	82,5	90,7	117,4	10	18	HJ2313 E	3,3	0,3
	-	82,5	90,7	117,4	-	-	-	3,3	-
	135,3	-	98,5	-	-	-	-	3,8	-
	-	89,3	-	126,9	-	-	-	3,8	-
	-	89,3	98,5	126,9	11	18	HJ413	3,8	0,43
	-	89,3	98,5	126,9	-	-	-	3,8	-
70	-	80	84	95,3	5	10	HJ1014	0,75	0,08
	113,5	-	89,6	-	-	-	-	1,3	-
	-	83,5	-	108,2	-	-	-	1,3	-
	-	83,5	89,6	108,2	7	11	HJ214 E	1,3	0,16
	-	83,5	89,6	108,2	-	-	-	1,3	-
	-	83,5	-	108,2	-	-	-	1,7	-
	-	83,5	89,6	108,2	7	11,5	HJ2214 E	1,7	0,15
	-	83,5	89,6	108,2	-	-	-	1,7	-
	133	-	97,5	-	-	-	-	2,8	-
	-	89	-	125,6	-	-	-	2,8	-
	-	89	97,5	125,6	10	15,5	HJ314 E	2,8	0,34

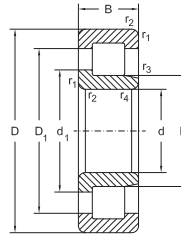
Single Row Cylindrical Roller Bearings



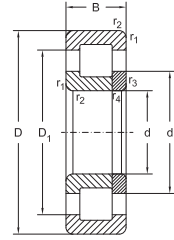
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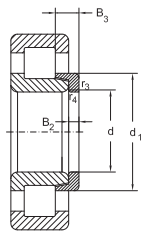
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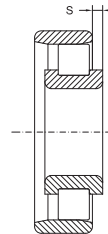
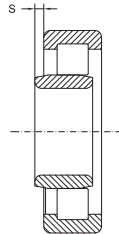
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	$r_{1,2}$ min.	$r_{3,4}$ min.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
70	150	35	2,1	2,1	-	205	222	4000	4800	NUP314 E
	150	51	2,1	2,1	4,6	275	325	3800	4500	NU2314 E
	150	51	2,1	2,1	-	275	325	3800	4500	NJ2314 E
	150	51	2,1	2,1	-	275	325	3800	4500	NUP2314 E
	180	42	3	3	4	240	253	3400	4000	N414 M
	180	42	3	3	4	240	253	3400	4000	NU414 M
	180	42	3	3	-	240	253	3400	4000	NJ414 M
	180	42	3	3	-	240	253	3400	4000	NUP414 M
75	115	20	1,1	1	2,5	65,5	85	5600	6600	NU1015 M
	130	25	1,5	1,5	1,2	132	156	4800	5600	N215 E
	130	25	1,5	1,5	1,2	132	156	4800	5600	NU215 E
	130	25	1,5	1,5	-	132	156	4800	5600	NJ215 E
	130	25	1,5	1,5	-	132	156	4800	5600	NUP215 E
	130	31	1,5	1,5	1,6	163	208	4500	5300	NU2215 EM
	130	31	1,5	1,5	-	163	208	4500	5300	NJ2215 EM
	130	31	1,5	1,5	-	163	208	4500	5300	NUP2215 EM
	160	37	2,1	2,1	1,8	240	265	4000	4800	N315 E
	160	37	2,1	2,1	1,8	240	265	4000	4800	NU315 E
	160	37	2,1	2,1	-	240	265	4000	4800	NJ315 E
	160	37	2,1	2,1	-	240	265	4000	4800	NUP315 E
	160	55	2,1	2,1	4,1	329	395	4000	4800	NU2315 E
	160	55	2,1	2,1	-	329	395	4000	4800	NJ2315 E
	160	55	2,1	2,1	-	329	395	4000	4800	NUP2315 E

Single Row Cylindrical Roller Bearings



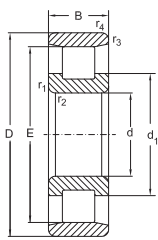
NJ+HJ



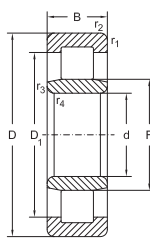
*Abutment and fillet
dimensions see on
page 209*

Dimensions					Thrust collar			Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
70	-	89	97,5	125,6	-	-	-	2,8	-
	-	89	-	125,6	-	-	-	4,0	-
	-	89	97,5	125,6	10	18,5	HJ2314 E	4,0	0,35
	-	89	97,5	125,6	-	-	-	4,0	-
	152	-	110,3	-	-	-	-	5,5	-
	-	100	-	142	-	-	-	5,5	-
	-	100	110,3	142	12	20	HJ414	5,5	0,61
	-	100	110,3	142	-	-	-	5,5	-
75	-	85	89	100,9	5	10	HJ1015	0,75	0,09
	118,5	-	94,5	-	-	-	-	1,25	-
	-	88,5	-	113,2	-	-	-	1,25	-
	-	88,5	94,5	113,2	7	11	HJ215 E	1,25	0,17
	-	88,5	94,5	113,2	-	-	-	1,25	-
	-	88,5	-	113,2	-	-	-	1,6	-
	-	88,5	94,5	113,2	7	11,5	HJ2215 E	1,6	0,17
	-	88,5	94,5	113,2	-	-	-	1,6	-
	143	-	104,3	-	-	-	-	3,4	-
	-	95	-	135	-	-	-	3,4	-
	-	95	104,3	135	11	16,5	HJ315 E	3,4	0,42
	-	95	104,3	135	-	-	-	3,4	-
	-	95	-	135	-	-	-	5,0	-
	-	95	104,3	135	11	19,5	HJ2315 E	5,0	0,43
	-	95	104,3	135	-	-	-	5,0	-

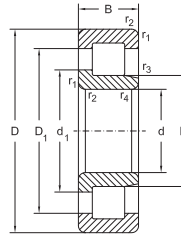
Single Row Cylindrical Roller Bearings



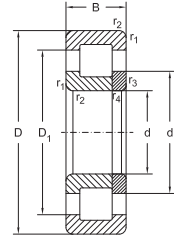
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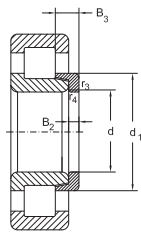
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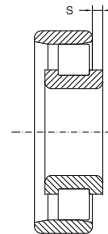
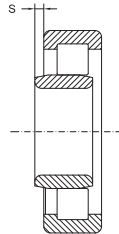
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
75	190	45	3	3	4,5	277	294	4000	4800	N415 M
	190	45	3	3	4,5	277	294	4000	4800	NU415 M
	190	45	3	3	-	277	294	4000	4800	NJ415 M
	190	45	3	3	-	277	294	4000	4800	NUP415 M
80	125	22	1,1	1	3,8	76,5	98	5200	6200	NU1016 M
	140	26	2	2	1,2	140	170	4300	5000	N216 E
	140	26	2	2	1,2	140	170	4300	5000	NU216 E
	140	26	2	2	-	140	170	4300	5000	NJ216 E
	140	26	2	2	-	140	170	4300	5000	NUP216 E
	140	33	2	2	2,5	186	245	4300	5000	NU2216 EM
	140	33	2	2		186	245	4300	5000	NJ2216 EM
	140	33	2	2		186	245	4300	5000	NUP2216 EM
	170	39	2,1	2,1	2,8	255	275	3600	4300	N316
	170	39	2,1	2,1	2,8	255	275	3600	4300	NU316 E
	170	39	2,1	2,1	-	255	275	3600	4300	NJ316 E
	170	39	2,1	2,1	-	255	275	3600	4300	NUP316 E
	170	58	2,1	2,1	3,6	355	425	3600	4300	NU2316 EM
	170	58	2,1	2,1	-	355	425	3600	4300	NJ2316 EM
	170	58	2,1	2,1	-	355	425	3600	4300	NUP2316 EM
	200	48	3	3	4,6	316	339	3000	3600	N416 M
	200	48	3	3	4,6	316	339	3000	3600	NU416 M
	200	48	3	3	-	316	339	3000	3600	NJ416 M
	200	48	3	3	-	316	339	3000	3600	NUP416 M

Single Row Cylindrical Roller Bearings



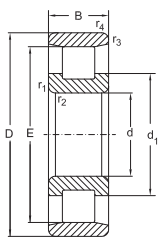
NJ+HJ



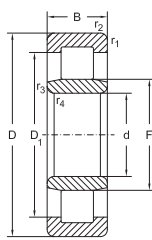
Abutment and fillet
dimensions see on
page 209

Dimensions						Thrust collar		Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
75	160,5	-	116	-	-	-	-	6,45	-
	-	104,5	-	149,8	-	-	-	6,45	-
	-	104,5	116	149,8	13	21,5	HJ415	6,45	0,71
	-	104,5	116	149,8	-	-	-	6,45	-
80	-	91,5	96	109,1	6	11,5	HJ1016	1,03	0,13
	127,3	-	101,7	-	-	-	-	1,54	-
	-	95,3	-	121,6	-	-	-	1,54	-
	-	95,3	101,7	121,6	8	12,5	HJ216 E	1,54	0,22
	-	95,3	101,7	121,6	-	-	-	1,54	-
	-	95,3	-	121,6	-	-	-	2,1	-
	-	95,3	101,7	121,6	8	12,5	HJ2216 E	2,1	0,22
	-	95,3	101,7	121,6	-	-	-	2,1	-
	151	-	110,6	-	-	-	-	3,95	-
	-	101	-	142,7	-	-	-	3,95	-
	-	101	110,6	142,7	11	17	HJ316 E	3,95	0,47
	-	101	110,6	142,7	-	-	-	3,95	-
	-	101	-	142,7	-	-	-	5,9	-
	-	101	110,6	142,7	11	20	HJ2316 E	5,9	0,5
	-	101	110,6	142,7	-	-	-	5,9	-
	170	-	122	-	-	-	-	8,3	-
	-	110	-	158,8	-	-	-	8,3	-
	-	110	122	158,8	13	22	HJ416	8,3	0,79
	-	110	122	158,8	-	-	-	8,3	-

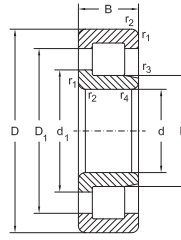
Single Row Cylindrical Roller Bearings



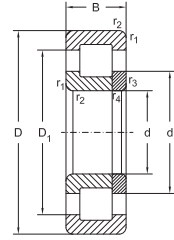
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NU



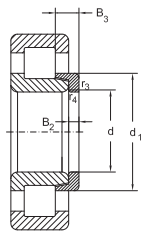
NJ



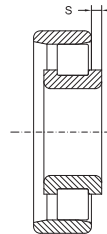
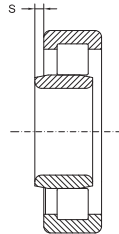
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
85	130	22	1,1	1	4	78	104	4800	5600	NU1017 M
	150	28	2	2	2	165	194	4300	5000	N217
	150	28	2	2	2	165	194	4300	5000	NU217 E
	150	28	2	2	-	165	194	4300	5000	NJ217 E
	150	28	2	2	-	165	194	4300	5000	NUP217 E
	150	36	2	2	2,4	216	275	3800	4500	NU2217 E
	150	36	2	2	-	216	275	3800	4500	NJ2217 E
	150	36	2	2	-	216	275	3800	4500	NUP2217 E
	180	41	3	3	3	288	325	3400	4000	N317 EMB
	180	41	3	3	3	288	325	3400	4000	NU317 E
	180	41	3	3	-	288	325	3400	4000	NJ317 E
	180	41	3	3	-	288	325	3400	4000	NUP317 E
	180	60	3	3	5	365	450	3400	4000	NU2317 EM
	180	60	3	3	-	365	450	3400	4000	NJ2317 EM
	180	60	3	3	-	365	450	3400	4000	NUP2317 EM
	210	52	4	4	5	357	384	2800	3400	N417 M
	210	52	4	4	5	357	384	2800	3400	NU417 M
	210	52	4	4	-	357	384	2800	3400	NJ417 M
	210	52	4	4	-	357	384	2800	3400	NUP417 M
90	140	24	1,5	1,1	4	93	125	4500	5300	NU1018 M
	160	30	2	2	1,4	183	216	3800	4500	N218 M
	160	30	2	2	1,4	183	216	3800	4500	NU218 E
	160	30	2	2	-	183	216	3800	4500	NUP218 E

Single Row Cylindrical Roller Bearings



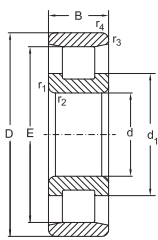
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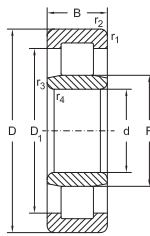
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
85	-	96,5	101	114,1	6	11,5	HJ1017	1,1	0,14
	136,5	-	107,6	-	-	-	-	1,9	-
	-	100,5	-	130,3	-	-	-	1,9	-
	-	100,5	107,6	130,3	8	12,5	HJ217 E	1,9	0,25
	-	100,5	107,6	130,3	-	-	-	1,9	-
	-	100,5	-	130,3	-	-	-	2,6	-
	-	100,5	107,6	130,3	8	13	HJ2217 E	2,6	0,25
	-	100,5	107,6	130,3	-	-	-	2,6	-
	160	-	118	-	-	-	-	5,3	-
	-	108	-	151,3	-	-	-	5,3	-
	-	108	118	151,3	12	18,5	HJ317 E	5,3	0,58
	-	108	118	151,3	-	-	-	5,3	-
	-	108	-	151,3	-	-	-	6,9	-
	-	108	118	151,3	12	22	HJ2317 E	6,9	0,6
	-	108	118	151,3	-	-	-	6,9	-
	177	-	126	-	-	-	-	9,8	-
90	-	103	108	122,1	6	12	HJ1018	1,4	0,17
	145	-	114,5	-	-	-	-	2,4	-
	-	107	-	138,5	-	-	-	2,4	-
	-	107	114,5	138,5	-	-	-	2,4	-

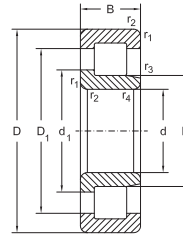
Single Row Cylindrical Roller Bearings



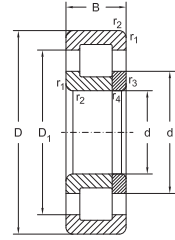
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NU



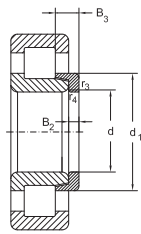
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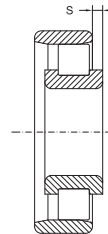
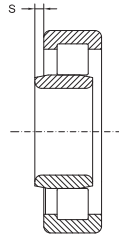
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
90	160	30	2	2	-	183	216	3800	4500	NJ218 E
	160	40	2	2	3,5	240	315	3200	3800	NU2218 E
	160	40	2	2	-	240	315	3200	3800	NJ2218 E
	160	40	2	2	-	240	315	3200	3800	NUP2218 E
	190	43	3	3	3	315	345	3200	3800	N318 EMB
	190	43	3	3	3	315	345	3200	3800	NU318 E
	190	43	3	3	-	315	345	3200	3800	NJ318 E
	190	43	3	3	-	315	345	3200	3800	NUP318 E
	190	64	3	3	6	430	530	3000	3600	NU2318 E
	190	64	3	3	-	430	530	3000	3600	NJ2318 E
	190	64	3	3	-	430	530	3000	3600	NUP2318 E
	225	54	4	4	5	393	427	2800	3400	N418 M
	225	54	4	4	5	393	427	2800	3400	NU418 M
	225	54	4	4	-	393	427	2800	3400	NJ418 M
	225	54	4	4	-	393	427	2800	3400	NUP418 M
95	145	24	1,5	1,1	4,1	96,5	129	4400	5200	NU1019 M
	170	32	2,1	2,1	1,4	220	265	3800	4500	N219
	170	32	2,1	2,1	1,4	220	265	3800	4500	NU219 EM
	170	32	2,1	2,1	-	220	265	3800	4500	NJ219 EM
	170	32	2,1	2,1	-	220	265	3800	4500	NUP219 EM
	170	43	2,1	2,1	3,5	285	375	3200	3800	NU2219 EM
	170	43	2,1	2,1	-	285	375	3200	3800	NJ2219 EM
	170	43	2,1	2,1	-	285	375	3200	3800	NUP2219 EM

Single Row Cylindrical Roller Bearings



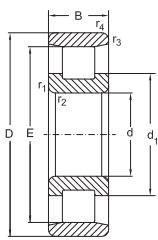
NJ+HJ



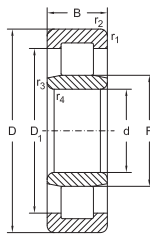
*Abutment and fillet
dimensions see on
page 209*

Dimensions				Thrust collar			Mass		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
90	-	107	114,5	138,5	9	14	HJ218 E	2,7	0,33
	-	107	-	138,5	-	-	-	3,2	-
	-	107	114,5	138,5	9	15	HJ2218 E	3,2	0,32
	-	107	114,5	138,5	-	-	-	3,2	-
	169,5	-	124	-	-	-	-	5,4	-
	-	113,5	-	160,2	-	-	-	5,4	-
	-	113,5	124	160,2	12	18,5	HJ318 E	5,4	0,63
	-	113,5	124	160,2	-	-	-	5,4	-
	-	113,5	-	160,2	-	-	-	8,1	-
	-	113,5	124	160,2	12	22	HJ2318 E	8,1	0,68
	-	113,5	124	160,2	-	-	-	8,1	-
	191,5	-	137	-	-	-	-	11,5	-
	-	123,5	-	178,8	-	-	-	11,5	-
	-	123,5	137	178,8	14	24	HJ418	11,5	1,1
	-	123,5	137	178,8	-	-	-	11,5	-
95	-	108	113	127,1	6	12	HJ1019	1,45	0,18
	154,5	-	120,7	-	-	-	-	2,8	-
	-	112,5	-	147,4	-	-	-	2,8	-
	-	112,5	120,7	147,4	9	14	HJ219 E	2,8	0,35
	-	112,5	120,7	147,4	-	-	-	2,8	-
	-	112,5	-	147,4	-	-	-	3,8	-
	-	112,5	120,7	147,4	9	15,5	HJ2219 E	3,8	0,37
	-	112,5	120,7	147,4	-	-	-	3,8	-

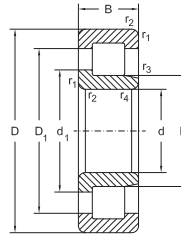
Single Row Cylindrical Roller Bearings



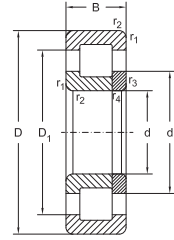
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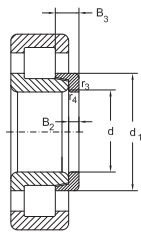
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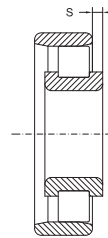
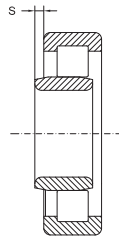
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	$r_{1,2}$ min.	$r_{3,4}$ min.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
95	200	45	3	3	3,5	335	380	3000	3600	N319
	200	45	3	3	3,5	335	380	3000	3600	NU319 EM
	200	45	3	3	-	335	380	3000	3600	NJ319 EM
	200	45	3	3	-	335	380	3000	3600	NUP319 EM
	200	67	3	3	7,2	455	585	2800	3400	NU2319 M
	200	67	3	3	-	455	585	2800	3400	NJ2319 M
	200	67	3	3	-	455	585	2800	3400	NUP2319 M
	240	55	4	4	5,2	415	465	2400	3000	N419 M
	240	55	4	4	5,2	415	465	2400	3000	NU419 M
	240	55	4	4	-	415	465	2400	3000	NJ419 M
	240	55	4	4	-	415	465	2400	3000	NUP419 M
100	150	24	1,5	1,1	4,3	98	134	4300	5000	NU1020 M
	180	34	2,1	2,1	1,4	250	305	3200	3800	N220 E
	180	34	2,1	2,1	1,4	250	305	3200	3800	NU220 E
	180	34	2,1	2,1	-	250	305	3200	3800	NJ220 E
	180	34	2,1	2,1	-	250	305	3200	3800	NUP220 E
	180	46	2,1	2,1	3	335	440	3000	3800	NU2220 E
	180	46	2,1	2,1	-	335	440	3000	3600	NJ2220 E
	180	46	2,1	2,1	-	335	440	3000	3600	NUP2220 E
	215	47	3	3	3,5	380	425	3000	3600	N320 E
	215	47	3	3	3,5	380	425	3000	3600	NU320 E
	215	47	3	3	-	380	425	3000	3600	NJ320 E
	215	47	3	3	-	380	425	3000	3600	NUP320 E

Single Row Cylindrical Roller Bearings



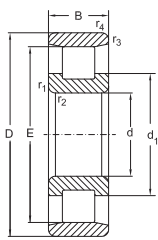
NJ+HJ



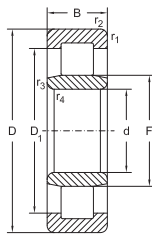
Abutment and fillet dimensions see on page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
95	117,5	-	132,2	-	-	-	-	6,3	-
	-	121,5	-	168,2	-	-	-	6,3	-
	-	121,5	132,2	168,2	13	20,5	HJ319 E	6,3	0,8
	-	121,5	132,2	168,2	-	-	-	6,3	-
	-	121,5	-	168,2	-	-	-	9,3	-
	-	121,5	132,2	168,2	13	24,5	HJ2319 E	9,3	0,83
	-	121,5	132,2	168,2	-	-	-	9,3	-
	201,5	-	147	-	-	-	-	13,8	-
	-	133,5	-	188,8	-	-	-	13,8	-
	-	133,5	147	188,8	15	25,5	HJ419	13,8	1,3
	-	133,5	147	188,8	-	-	-	13,8	-
100	-	113	118	132,1	6	12	HJ1020	1,5	0,18
	163	-	127,3	-	-	-	-	3,44	-
	-	119	-	155,5	-	-	-	3,44	-
	-	119	127,3	155,5	10	15	HJ220 E	3,44	0,44
	-	119	127,3	155,5	-	-	-	3,44	-
	-	119	-	155,5	-	-	-	5,5	-
	-	119	127,3	155,5	10	16	HJ2220 E	5,5	0,45
	-	119	127,3	155,5	-	-	-	5,5	-
	191,5	-	139,6	-	-	-	-	7,7	-
	-	127,5	-	181	-	-	-	7,7	-
	-	127,5	139,6	181	13	20,5	HJ320 E	7,7	0,9
	-	127,5	139,6	181	-	-	-	7,7	-

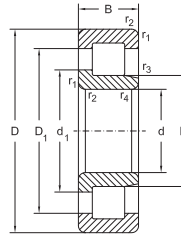
Single Row Cylindrical Roller Bearings



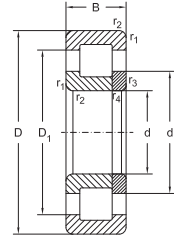
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NU



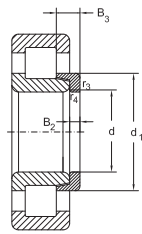
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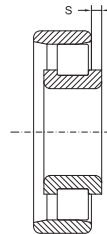
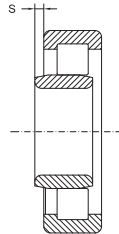
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
100	215	73	3	3	6,1	570	720	2600	3200	NU2320 E
	215	73	3	3	-	570	720	2600	3200	NJ2320 E
	215	73	3	3	-	570	720	2600	3200	NUP2320 E
	250	58	4	4	5,7	440	490	2400	3000	N420 M
	250	58	4	4	5,7	440	490	2400	3000	NU420 M
	250	58	4	4	-	440	490	2400	3000	NJ420 M
	250	58	4	4	-	440	490	2400	3000	NUP420 M
105	160	26	2	1,1	4,5	112	153	3800	4500	NU1021 M
	190	36	2,1	2,1	1,4	260	320	3000	3600	N221 E
	190	36	2,1	2,1	1,4	260	320	3000	3600	NU221 E
	190	36	2,1	2,1	-	260	320	3000	3600	NJ221 E
	190	36	2,1	2,1	-	260	320	3000	3600	NUP221 E
	225	49	3	3	3,4	335	380	2600	3200	N321 E
	225	49	3	3	3,4	335	380	2600	3200	NU321 E
	225	49	3	3	-	335	380	2600	3200	NJ321 E
	225	49	3	3	-	335	380	2600	3200	NUP321 E
	260	60	4	4	5,7	490	540	2200	2800	NU421 M
	260	60	4	4	-	490	540	2200	2800	NJ421 M
	260	60	4	4	-	490	540	2200	2800	NUP421 M
110	170	28	2	1,1	4,5	140	190	3600	4500	NU1022 M
	200	38	2,1	2,1	1,4	290	365	3000	3600	N222 E
	200	38	2,1	2,1	1,4	290	365	3000	3600	NU222 E
	200	38	2,1	2,1	-	290	365	3000	3600	NJ222 E

Single Row Cylindrical Roller Bearings



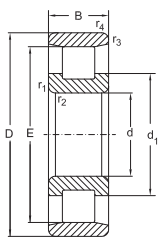
NJ+HJ



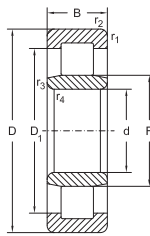
Abutment and fillet dimensions see on page 209

Dimensions					Thrust collar			Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
100	-	127,5	-	181	-	-	-	12	-
	-	127,5	139,6	181	13	23,5	HJ2320 E	12	0,95
	-	127,5	139,6	181	-	-	-	12	-
	211	-	153,5	-	-	-	-	15,8	-
	-	139	-	197	-	-	-	15,8	-
	-	139	153,5	197	16	27	HJ420	15,8	1,6
	-	139	153,5	197	-	-	-	15,8	-
105	-	119,5	124,5	140,3	7	13,5	HJ1021	1,9	0,24
	171,5	-	134,7	-	-	-	-	4,1	-
	-	125,5	-	163	-	-	-	4,1	-
	-	125,5	134,7	163	10	16	HJ221 E	4,1	0,52
	-	125,5	134,7	163	-	-	-	4,1	-
	195	-	147	-	-	-	-	9,1	-
	-	135	-	183,8	-	-	-	9,1	-
	-	135	147	183,8	13	20,5	HJ321 E	9,1	1
	-	135	147	183,8	-	-	-	9,1	-
	-	144,5	-	206	-	-	-	17,5	-
	-	144,5	159,5	206	16	27	HJ421	17,5	1,7
	-	144,5	159,5	206	-	-	-	17,5	-
110	-	125	131	149	7	13,5	HJ1022	2,4	0,27
	180,5	-	141,6	-	-	-	-	4,9	-
	-	132,5	-	172,4	-	-	-	4,9	-
	-	132,5	141,6	172,4	11	17	HJ222 E	4,9	0,62

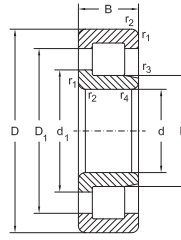
Single Row Cylindrical Roller Bearings



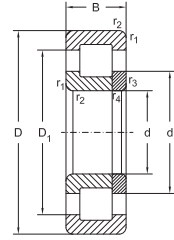
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NU



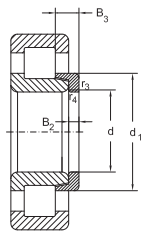
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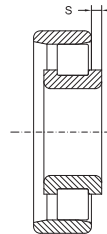
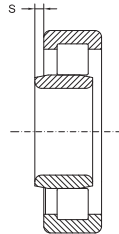
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
110	200	38	2,1	2,1	-	290	365	3000	3600	NUP222 E
	200	53	2,1	2,1	4	380	520	2800	3400	NU2222 E
	200	53	2,1	2,1	-	380	520	2800	3400	NJ2222 E
	200	53	2,1	2,1	-	380	520	2800	3400	NUP2222 E
	240	50	3	3	4	443	513	2400	3000	N322 E
	240	50	3	3	4	443	513	2400	3000	NU322 E
	240	50	3	3	-	443	513	2400	3000	NJ322 E
	240	50	3	3	-	443	513	2400	3000	NUP322 E
	240	80	3	3	7,2	630	800	2200	2800	NU2322 E
	240	80	3	3	-	630	800	2200	2800	NJ2322 E
	240	80	3	3	-	630	800	2200	2800	NUP2322 E
	280	65	4	4	6,2	583	672	2200	2800	NU422 M
	280	65	4	4	-	583	672	2200	2800	NJ422 M
	280	65	4	4	-	583	672	2200	2800	NUP422 M
120	180	28	2	1	3,2	150	208	3400	4000	NU1024 M
	215	40	2,1	2,1	3,5	335	415	2600	3200	N224 E
	215	40	2,1	2,1	3,5	335	415	2600	3200	NU224 E
	215	40	2,1	2,1	-	335	415	2600	3200	NJ224 E
	215	40	2,1	2,1	-	335	415	2600	3200	NUP224 E
	215	58	2,1	2,1	5	450	610	2600	3200	NU2224 E
	215	58	2,1	2,1	-	450	610	2600	3200	NJ2224 E
	215	58	2,1	2,1	-	450	610	2600	3200	NUP2224 E
	260	55	3	3	4,5	520	600	2200	2800	N324 E

Single Row Cylindrical Roller Bearings



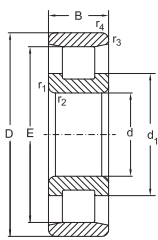
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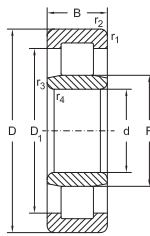
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar			Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing Thrust collar
kg								
110	-	132,5	141,6	172,4	-	-	-	4,9 -
	-	132,5	-	172,4	-	-	-	6,7 -
	-	132,5	141,6	172,4	11	19,5	HJ2222 E	6,7 0,65
	-	132,5	141,6	172,4	-	-	-	6,7 -
	211	-	155,9	-	-	-	-	10,5 -
	-	143	-	199,9	-	-	-	10,5 -
	-	143	155,9	199,9	14	22	HJ322 E	10,5 1,2
	-	143	155,9	199,9	-	-	-	10,5 -
	-	143	-	199,9	-	-	-	17,0 -
	-	143	155,9	199,9	14	26,5	HJ2322 E	17,0 1,3
	-	143	155,9	199,9	-	-	-	17,0 -
	-	155	-	219,5	-	-	-	20,8 -
	-	155	171	219,5	17	29,5	HJ422	20,8 2,1
	-	155	171	219,5	-	-	-	20,8 -
120	-	135	141	158,8	7	13,5	HJ1024	2,6 0,3
	195,5	-	153,5	-	-	-	-	5,7 -
	-	143,5	-	186,9	-	-	-	5,7 -
	-	143,5	153,5	186,9	11	17	HJ224 E	5,7 0,72
	-	143,5	153,5	186,9	-	-	-	5,7 -
	-	143,5	-	186,9	-	-	-	8,3 -
	-	143,5	153,5	186,9	11	20	HJ2224 E	8,3 0,75
	-	143,5	153,5	186,9	-	-	-	8,3 -
	230	-	168,7	-	-	-	-	15,2 -

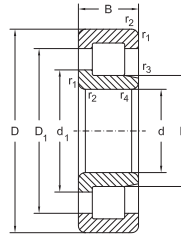
Single Row Cylindrical Roller Bearings



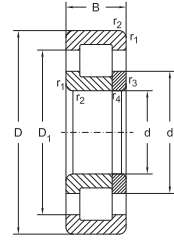
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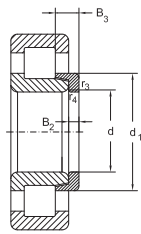
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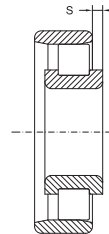
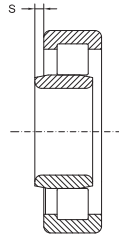
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	$r_{1,2}$ min.	$r_{3,4}$ min.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
120	260	55	3	3	4,5	520	600	2200	2800	NU324 E
	260	55	3	3	-	520	600	2200	2800	NJ324 E
	260	55	3	3	-	520	600	2200	2800	NUP324 E
	260	86	3	3	7,2	780	1020	2000	2600	NU2324 EM
	260	86	3	3	-	780	1020	2000	2600	NJ2324 EM
	260	86	3	3	-	780	1020	2000	2600	NUP2324 EM
	310	72	5	5	6,9	670	780	1800	2200	NU424 M
	310	72	5	5	-	670	780	1800	2200	NJ424 M
130	200	33	2	1	5,5	180	250	3000	3600	NU1026 M
	230	40	3	3	3,6	360	450	2400	3000	N226 E
	230	40	3	3	3,6	360	450	2400	3000	NU226 E
	230	40	3	3	-	360	450	2400	3000	NJ226 E
	230	40	3	3	-	360	450	2400	3000	NUP226 E
	230	64	3	3	6	530	735	2400	3000	NU2226 E
	230	64	3	3	-	530	735	2400	3000	NJ2226 E
	230	64	3	3	-	530	735	2400	3000	NUP2226 E
	280	58	4	4	4,5	570	670	2000	2600	N326 E
	280	58	4	4	4,5	570	670	2000	2600	NU326 E
	280	58	4	4	-	570	670	2000	2600	NJ326 E
	280	58	4	4	-	570	670	2000	2600	NUP326 E
	280	93	4	4	8,1	915	1220	1900	2400	NU2326 EM
	280	93	4	4	-	915	1220	1900	2400	NJ2326 EM
	280	93	4	4	-	915	1220	1900	2400	NUP2326 EM

Single Row Cylindrical Roller Bearings



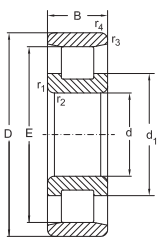
NJ+HJ



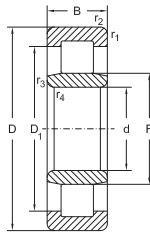
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
									kg
120	-	154	-	217,3	-	-	-	13,4	-
	-	154	168,7	217,3	14	22,5	HJ324 E	13,4	1,4
	-	154	168,7	217,3	-	-	-	13,4	-
	-	154	-	217,3	-	-	-	23,5	-
	-	154	168,7	217,3	14	26	HJ2324 E	23,5	1,5
	-	154	168,7	217,3	-	-	-	23,5	-
	-	170	-	242,5	-	-	-	30,5	-
	-	170	188	242,5	17	30,5	HJ424	30,5	2,7
130	-	148	155	175	8	16	HJ1026	3,9	0,45
	209,5	-	164,2	-	-	-	-	6,5	-
	-	153,5	-	200,2	-	-	-	6,5	-
	-	153,5	164,2	200,2	11	17	HJ226 E	6,5	0,8
	-	153,5	164,2	200,2	-	-	-	6,5	-
	-	153,5	182,3	200,2	-	-	-	10,5	-
	-	153,5	-	200,2	11	21	HJ2226 E	10,5	0,85
	-	153,5	182,3	200,2	-	-	-	10,5	-
	247	-	182,3	-	-	-	-	16,5	-
	-	167	-	233,8	-	-	-	16,5	-
	-	167	182,3	233,8	14	23	HJ326 E	16,5	1,7
	-	167	182,3	233,8	-	-	-	16,5	-
	-	167	-	233,8	-	-	-	29,6	-
	-	167	182,3	233,8	14	28	HJ2326 E	29,6	1,8
	-	167	182,3	233,8	-	-	-	29,6	-

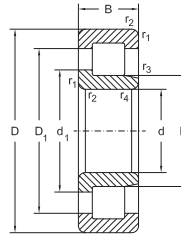
Single Row Cylindrical Roller Bearings



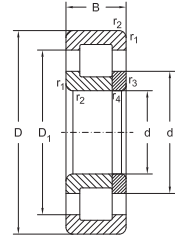
N



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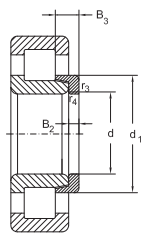
NJ



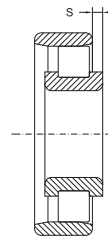
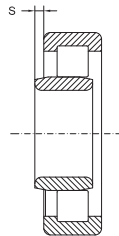
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
130	340	78	6	5	6,5	790	960	1800	2200	NU426 M
	340	78	6	5	-	790	960	1800	2200	NJ426 M
140	210	33	2	1,1	3,8	183	265	2800	3400	NU1028 M
	250	42	3	3	3,7	390	510	2400	3000	N228 EM
	250	42	3	3	3,7	390	510	2400	3000	NU228 EM
	250	42	3	3	-	390	510	2400	3000	NJ228 EM
	250	42	3	3	-	390	510	2400	3000	NUP228 EM
	250	68	3	3	7	570	830	2200	2800	NU2228 EM
	250	68	3	3	-	570	830	2200	2800	NJ2228 EM
	250	68	3	3	-	570	830	2200	2800	NUP2228 EM
	300	62	4	4	5,2	670	800	1900	2400	N328 E
	300	62	4	4	5,2	670	800	1900	2400	NU328 E
	300	62	4	4	-	670	800	1900	2400	NJ328 E
	300	62	4	4	-	670	800	1900	2400	NUP328 E
	300	102	4	4	9,2	1130	1589	1800	2200	NU2328 EM
	300	102	4	4	-	1130	1589	1800	2200	NJ2328 EM
	300	102	4	4	-	1130	1589	1800	2200	NUP2328 EM
	360	82	6	5	7	850	1020	1600	1900	NU428 M
	360	82	6	5	-	850	1020	1600	1900	NJ428 M
150	225	35	2,1	1,5	4,2	208	310	2600	3200	NU1030 M
	270	45	3	3	4	440	585	2200	2800	N230 EM
	270	45	3	3	4	440	585	2200	2800	NU230 EM
	270	45	3	3	-	440	585	2200	2800	NJ230 EM

Single Row Cylindrical Roller Bearings



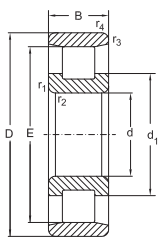
NJ+HJ



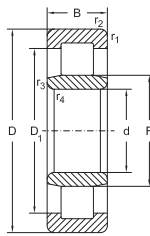
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar			Mass		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
130	-	185	-	265	-	-	-	42,6	-
	-	185	205	265	18	32	HJ426	42,6	3,4
140	-	158	165	185	8	16	HJ1028	4,1	0,48
	225	-	180	-	-	-	-	9,5	-
	-	169	-	215,3	-	-	-	9,5	-
	-	169	180	215,3	11	18	HJ228 E	9,5	1
	-	169	180	215,3	-	-	-	9,5	-
	-	169	-	215,3	-	-	-	15,5	-
	-	169	180	215,3	11	23	HJ2228 E	15,5	1,1
	-	169	180	215,3	-	-	-	15,5	-
	264	-	195,5	-	-	-	-	22,5	-
	-	180	-	250,3	-	-	-	22,5	-
	-	180	195,5	250,3	15	25	HJ328 E	22,5	2
	-	180	195,5	250,3	-	-	-	22,5	-
	-	180	-	250,3	-	-	-	37,2	-
	-	180	195,5	250,3	15	31	HJ2328 E	37,2	2,2
	-	180	195,5	250,3	-	-	-	37,2	-
	-	198	-	281	-	-	-	49,5	-
	-	198	219	281	18	33	HJ428	49,5	3,9
150	-	169,5	176,5	198,1	9	18	HJ1030	5	0,6
	242	-	193,7	-	-	-	-	11,8	-
	-	182	-	231,8	-	-	-	11,8	-
	-	182	193,7	231,8	12	19,5	HJ230 E	11,8	1,3

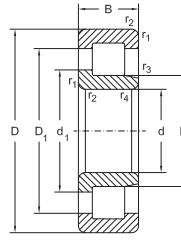
Single Row Cylindrical Roller Bearings



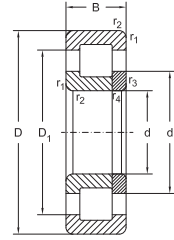
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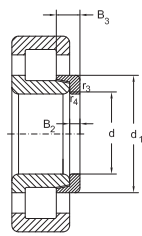
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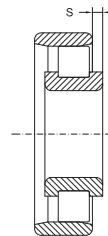
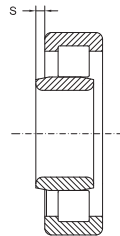
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	$r_{1,2}$ min.	$r_{3,4}$ min.	s $\approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
150	270	45	3	3	-	440	585	2200	2800	NUP230 EM
	270	73	3	3	7,3	655	980	2000	2600	NU2230 EM
	270	73	3	3	-	655	980	2000	2600	NJ2230 EM
	270	73	3	3	-	655	980	2000	2600	NUP2230 EM
	320	65	4	4	5,5	800	1000	1800	2200	N330 EM
	320	65	4	4	5,5	800	1000	1800	2200	NU330 EM
	320	65	4	4	-	800	1000	1800	2200	NJ330 EM
	320	65	4	4	-	800	1000	1800	2200	NUP330 EM
	320	108	4	4	9,8	1160	1600	1700	2000	NU2330 EM
	320	108	4	4	-	1160	1600	1700	2000	NJ2330 EM
	320	108	4	4	-	1160	1600	1700	2000	NUP2330 EM
	380	85	6	5	7,5	898	1145	1500	1800	NU430 M
	380	85	6	5	-	898	1145	1500	1800	NJ430 M
160	240	38	2,1	1,5	4,3	245	355	2400	3000	NU1032 M
	290	48	3	3	4,1	500	670	2000	2600	N232 EM
	290	48	3	3	4,1	500	670	2000	2600	NU232 EM
	290	48	3	3	-	500	670	2000	2600	NJ232 EM
	290	48	3	3	-	500	670	2000	2600	NUP232 EM
	290	80	3	3	7,3	800	1180	1900	2400	NU2232 EM
	290	80	3	3	-	800	1180	1900	2400	NJ2232 EM
	290	80	3	3	-	800	1180	1900	2400	NUP2232 EM
	340	68	4	4	5,5	865	1060	1600	1900	N332 EM
	340	68	4	4	5,5	865	1060	1600	1900	NU332 EM

Single Row Cylindrical Roller Bearings



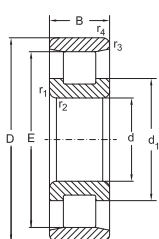
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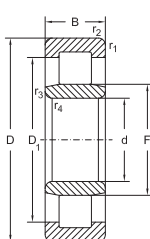
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar				Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
150	-	182	193,7	231,8	-	-	-	11,8	-
	-	182	-	231,8	-	-	-	19,5	-
	-	182	193,7	231,8	12	24,5	HJ2230 E	19,5	1,4
	-	182	193,7	231,8	-	-	-	19,5	-
	283	-	210,1	-	-	-	-	27,5	-
	-	193	-	268,4	-	-	-	27,5	-
	-	193	210,1	268,4	15	25	HJ330 E	27,5	2,4
	-	193	210,1	268,4	-	-	-	27,5	-
	-	193	-	268,4	-	-	-	44,8	-
	-	193	210,1	268,4	15	31,5	HJ2330 E	44,8	2,5
	-	193	210,1	268,4	-	-	-	44,8	-
	-	213	-	296	-	-	-	48	-
	-	213	234	296	20	36,5	HJ430	48	4,9
160	-	180	188	211,7	10	19	HJ1032	6,2	0,75
	259	-	207,4	-	-	-	-	14,6	-
	-	195	-	248,2	-	-	-	14,6	-
	-	195	207,4	248,2	12	20	HJ232 E	14,6	1,5
	-	195	207,4	248,2	-	-	-	14,6	-
	-	193	-	249,7	-	-	-	24,5	-
	-	193	206,1	249,7	12	24,5	HJ2232 E	24,5	1,6
	-	193	206,1	249,7	-	-	-	24,5	-
	300	-	222,2	-	-	-	-	32,3	-
	-	204	-	284,6	-	-	-	32,3	-

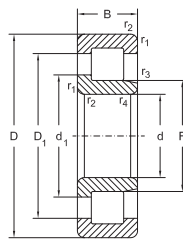
Single Row Cylindrical Roller Bearings



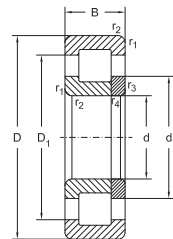
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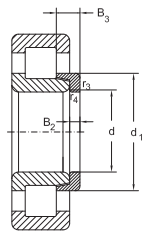
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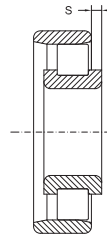
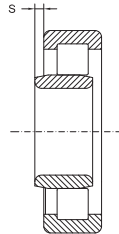
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
160	340	68	4	4	-	918	1148	1600	1900	NJ332 EM
	340	68	4	4	-	865	1060	1600	1900	NUP332 EM
	340	114	4	4	10	1320	1830	1600	1900	NU2332 EM
	340	114	4	4	-	1320	1830	1600	1900	NJ2332 EM
	340	114	4	4	-	1320	1830	1600	1900	NUP2332 EM
170	260	42	2,1	2,1	6,9	300	430	2200	2800	NU1034 M
	310	52	4	4	4,3	618	828	1800	2200	NU234 EM6
	310	52	4	4	-	618	828	1800	2200	NJ234 EM6
	310	52	4	4	-	618	828	1800	2200	NUP234 EM6
	310	86	4	4	7,2	950	1400	1700	2000	NU2234 EM
	310	86	4	4	-	950	1400	1700	2000	NJ2234 EM
	310	86	4	4	-	950	1400	1700	2000	NUP2234 EM
	360	72	4	4	7	800	1020	1600	1900	N334 EM
	360	72	4	4	7	928	1150	1600	1900	NU334 EM
	360	72	4	4	-	928	1150	1600	1900	NJ334 EM
	360	72	4	4	-	928	1150	1600	1900	NUP334 EM
	360	120	4	4	13	1220	1760	1500	1800	NU2334 M
	360	120	4	4	-	1220	1760	1500	1800	NJ2334 M
	360	120	4	4	-	1220	1760	1500	1800	NUP2334 M
180	280	46	2,1	2,1	7	360	520	2200	2800	NU1036 M
	320	52	4	4	4,5	610	830	1800	2200	N236 EM
	320	52	4	4	4,5	610	830	1800	2200	NU236 EM

Single Row Cylindrical Roller Bearings



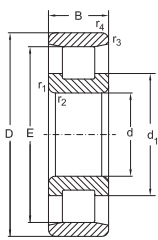
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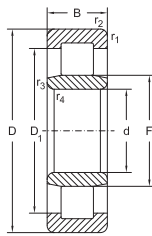
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar			Mass		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
160	-	204	222,2	284,6	15	25	HJ332 E	32,1	2,7
	-	204	222,2	284,6	-	-	-	32,1	-
	-	204	-	284,6	-	-	-	53,5	-
	-	204	222,2	284,6	15	32	HJ2332 E	53,5	2,9
	-	204	222,2	284,6	-	-	-	53,5	-
170	-	193	200,9	227,7	11	21	HJ1034	8,4	1
	-	207	-	267,1	-	-	-	18,2	-
	-	207	220,8	267,1	12	20	HJ234 E	18,2	1,7
	-	207	220,8	267,1	-	-	-	18,2	-
	-	205	-	268,5	-	-	-	29,8	-
	-	205	219,6	268,5	12	24	HJ2234 E	29,8	1,8
	-	205	219,6	268,5	-	-	-	29,8	-
	310	-	238	-	-	-	-	38	-
	-	220	-	292,5	-	-	-	38	-
	-	220	238	292,5	16	29,5	HJ334 E	38	3,3
	-	220	238	292,5	-	-	-	38	-
	-	220	-	292,5	-	-	-	63,5	-
	-	220	238	292,5	16	38,5	HJ2334	63,5	3,7
	-	220	238	292,5	-	-	-	63,5	-
180	-	205	214,1	244,7	12	22,5	HJ1036	10,9	1,3
	289	-	230,2	-	-	-	-	18,9	-
	-	217	-	277,2	-	-	-	18,9	-

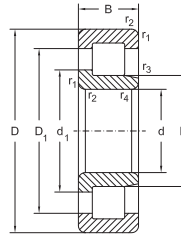
Single Row Cylindrical Roller Bearings



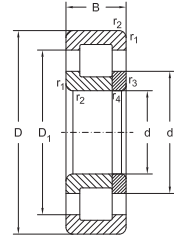
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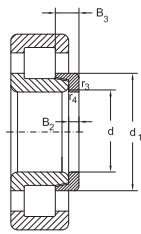
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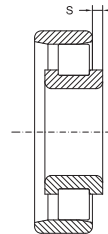
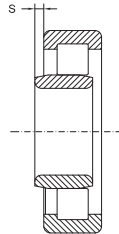
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
180	320	52	4	4	-	610	830	1800	2200	NJ236 EM
	320	52	4	4	-	610	830	1800	2200	NUP236 EM
	320	86	4	4	7,2	1000	1500	1700	2000	NU2236 EM
	320	86	4	4	-	1000	1500	1700	2000	NJ2236 EM
	320	86	4	4	-	1000	1500	1700	2000	NUP2236 EM
	380	75	4	4	6,9	900	1160	1500	1800	N336 M
	380	75	4	4	6,9	900	1160	1500	1800	NU336 M
	380	75	4	4	-	900	1160	1500	1800	NJ336 M
	380	75	4	4	-	900	1160	1500	1800	NUP336 M
	380	126	4	4	13	1370	2000	1400	1700	NU2336 M
	380	126	4	4	-	1370	2000	1400	1700	NJ2336 M
	380	126	4	4	-	1370	2000	1400	1700	NUP2336 M
190	290	46	2,1	2,1	5	365	550	2000	2600	NU1038 M
	340	55	4	4	4,7	680	930	1700	2000	N238 EM
	340	55	4	4	4,7	680	930	1700	2000	NU238 EM
	340	55	4	4	-	680	930	1700	2000	NJ238 EM
	340	55	4	4	-	680	930	1700	2000	NUP238 EM
	340	92	4	4	8	1100	1660	1600	1900	NU2238 EM
	340	92	4	4	-	1100	1660	1600	1900	NJ2238 M
	400	78	5	5	7,1	965	1250	1400	1700	NU338 EM
	400	78	5	5	-	965	1250	1400	1700	NJ338 EM
	400	132	5	5	13,5	1500	2200	1400	1700	NU2338 EM6
	400	132	5	5	-	1500	2200	1400	1700	NJ2338 EM6

Single Row Cylindrical Roller Bearings



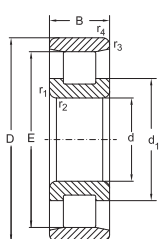
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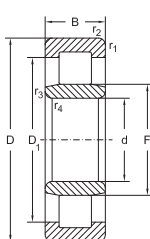
*Abutment and fillet
dimensions see on
page 209*

Dimensions				Thrust collar			Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing Thrust collar
kg								
180	-	217	230,2	277,2	12	20	HJ236 E	19 1,8
	-	217	230,2	277,2	-	-	-	19 -
	-	215	-	278,6	-	-	-	31,2 -
	-	215	229,6	278,6	12	24	HJ2236 E	31,2 1,9
	-	215	229,6	278,6	-	-	-	31,2 -
	328	-	252	-	-	-	-	44 -
	-	232	-	308,5	-	-	-	44 -
	-	232	252	308,5	17	30,5	HJ336	44 3,9
	-	232	252	308,5	-	-	-	44 -
	-	232	-	308,5	-	-	-	74 -
	-	232	252	308,5	17	40	HJ2336	74 4,9
	-	232	252	308,5	-	-	-	74 -
190	-	215	225	254,5	12	22,5	HJ1038	11,4 1,4
	306	-	244,6	-	-	-	-	22,8 -
	-	230	-	293,6	-	-	-	22,8 -
	-	230	244,6	293,6	13	21,5	HJ238 E	22,8 2,2
	-	230	244,6	293,6	-	-	-	22,8 -
	-	228	-	295	-	-	-	37,9 -
	-	228	243,3	295	13	26,5	HJ2238 E	37,9 2,4
	-	245	-	324,3	-	-	-	50,5 -
	-	245	265	324,3	18	31	HJ338	50,5 4,5
	-	245	-	324,3	-	-	-	88,5 -
	-	245	265	324,3	18	36,5	HJ2338 E	88,5 5

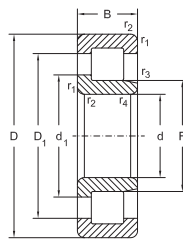
Single Row Cylindrical Roller Bearings



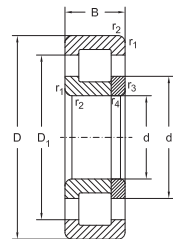
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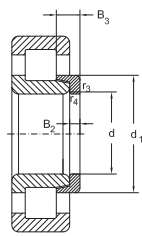
NJ



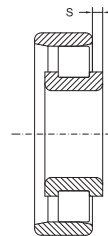
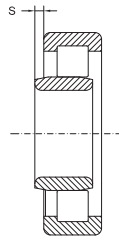
NUP

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
190	400	132	5	5	-	1500	2200	1400	1700	NUP2338 EM6
200	310	51	2,1	2,1	8,3	400	600	2000	2600	NU1040 M
	360	58	4	4	5	750	1040	1600	1900	N240 EM
	360	58	4	4	5	750	1040	1600	1900	NU240 EM
	360	58	4	4	-	750	1040	1600	1900	NJ240 EM
	360	58	4	4	-	750	1040	1600	1900	NUP240 EM
	360	98	4	4	8,1	1220	1860	1500	1800	NU2240 EM
	360	98	4	4	-	1220	1860	1500	1800	NJ2240 EM
	420	80	5	5	7,5	965	1250	1400	1700	NU340 M
	420	80	5	5	-	965	1250	1400	1700	NJ340 M
	420	138	5	5	15	1740	2685	1300	1600	NU2340 M
	420	138	5	5	-	1740	2685	1300	1600	NJ2340 M
220	340	56	3	3	6,2	650	1047	1700	2000	NU1044 M
	400	65	4	4	6	778	1113	1500	1800	NU244 M
	400	65	4	4	-	778	1113	1500	1800	NJ244 M
	400	65	4	4	-	778	1113	1500	1800	NUP244 M
	400	108	4	4	11,8	1370	2310	1400	1700	NU2244 M
	400	108	4	4	-	1160	1870	1400	1700	NJ2244 M
	460	88	5	5	8	1230	1650	1300	1600	NU344 M
	460	145	5	5	10	1760	2600	1200	1500	NU2344 E
240	360	56	3	3	8,5	695	1168	1600	1900	NU1048 M
	440	72	4	4	7	936	1339	1400	1700	NU248 M
	440	72	4	4	-	936	1339	1400	1700	NJ248 M

Single Row Cylindrical Roller Bearings



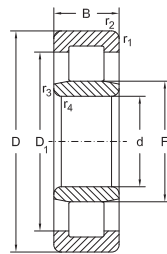
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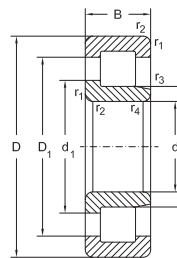
Abutment and fillet
dimensions see on
page 209

Dimensions				Thrust collar			Mass		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
190	-	245	265	324,3	-	-	-	85,8	-
200	-	229	239,5	270,1	13	25,5	HJ1040	14,8	1,7
	323	-	258,2	-	-	-	-	26,9	-
	-	243	-	310,1	-	-	-	26,9	-
	-	243	258,2	310,1	14	23	HJ240 E	26,9	2,6
	-	243	258,2	310,1	-	-	-	26,9	-
	-	241	-	311,5	-	-	-	45,7	-
	-	241	256,9	311,5	14	28	HJ2240 E	45,7	3
	-	260	-	339,3	-	-	-	57,5	-
	-	260	280	339,3	18	33	HJ340	57,5	5,2
	-	260	-	339,3	-	-	-	99	-
	-	260	280	339,3	18	44,5	HJ2340	99	5,5
220	-	250	262	297,3	14	27	HJ1044	19,3	2,2
	-	270	-	334,3	-	-	-	38,1	-
	-	270	285,5	334,3	15	27,5	HJ244	38,1	3,6
	-	270	285,5	334,3	-	-	-	38,1	-
	-	270	-	334,3	-	-	-	63,5	-
	-	270	285,5	334,3	15	36,5	HJ2244	63,5	3,6
	-	284	-	373,3	-	-	-	75,5	-
	-	284	-	373,3	-	-	-	124	-
240	-	270	282	317,3	14	27	HJ1048	20,7	2,4
	-	295	-	367,3	-	-	-	51,5	-
	-	295	313	367,3	16	29,5	HJ248	51,5	4,65

Single Row Cylindrical Roller Bearings



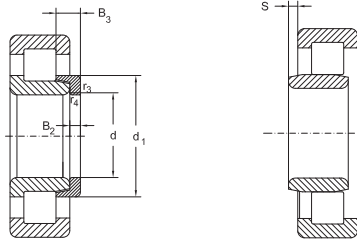
NU



NJ

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
240	440	120	4	4	12,8	1430	2320	1300	1600	NU2248 M
	500	95	5	5	8.9	1400	1930	1200	1500	NU348 M
	500	155	5	5	17	2080	3150	1100	1400	NU2348 M
260	400	65	4	4	10,5	660	1039	1500	1800	NU1052 M
	480	80	5	5	5	1140	1630	1200	1500	NU252 M
	480	80	5	5	-	1140	1630	1200	1500	NJ252 M
	480	130	5	5	12,8	1760	2900	1100	1400	NU2252 M
	540	102	6	6	9,4	1600	2200	1100	1400	NU352 M
	540	165	6	6	18	2320	3550	1000	1300	NU2352 M
280	420	65	4	4	10,5	680	1100	1400	1700	NU1056 M
	500	80	5	5	7,5	1120	1660	1200	1500	NU256 M
	500	80	5	5	-	1120	1660	1200	1500	NJ256 M
	500	130	5	5	12,8	1760	2900	1100	1400	NU2256 M
	580	108	6	6	22	1800	2500	1000	1300	NU356 M
300	460	74	4	4	12	900	1430	1300	1600	NU1060 M
	540	85	5	5	7,2	1400	2040	1100	1400	NU260 M
	540	85	5	5	-	1400	2040	1100	1400	NJ260 M
	540	140	5	5	14	2080	3400	1000	1300	NU2260 M
	620	109	7,5	7,5	9,5	2080	3000	900	1100	NU360 M
320	480	74	4	4	11,5	915	1500	1200	1500	NU1064 M
	580	92	5	5	8,3	1600	2360	1000	1300	NU264 M
	580	92	5	5	-	1600	2360	1000	1300	NJ264 M

Single Row Cylindrical Roller Bearings

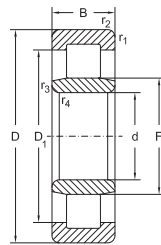


NJ+HJ

*Abutment and fillet
dimensions see on
page 209*

Dimensions				Thrust collar			Mass	
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing Thrust collar
kg								
240	-	295	-	367,3	-	-	-	85,9 -
	-	310	-	405,3	-	-	-	96,2 -
	-	310	-	405,3	-	-	-	157 -
260	-	296	309,6	349,7	16	31,5	HJ1052	30,8 3,3
	-	320	-	399,3	-	-	-	68,3 -
	-	320	340	399,3	18	33	HJ252	68,3 6,2
	-	320	-	399,3	-	-	-	112 -
	-	336	-	437,3	-	-	-	120 -
	-	336	-	437,3	-	-	-	195 -
280	-	316	329,6	369,7	16	31,5	HJ1056	32,8 3,7
	-	340	-	419,3	-	-	-	71,8 -
	-	340	360	419,3	18	33	HJ256	71,8 6,5
	-	340	-	419,3	-	-	-	117 -
	-	362	-	469,3	-	-	-	147 -
300	-	340	356	403,6	19	36	HJ1060	46,3 5,4
	-	364	-	453,3	-	-	-	89,9 -
	-	364	387	453,3	20	34,5	HJ260	89,9 8,4
	-	364	-	453,3	-	-	-	148 -
	-	388	-	506,7	-	-	-	168 -
320	-	360	376	423,1	19	36	HJ1064	48,7 5,5
	-	390	-	485,3	-	-	-	113 -
	-	390	415	485,3	21	37	HJ260	113 10,2

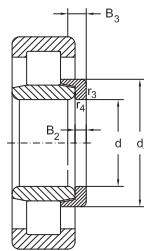
Single Row Cylindrical Roller Bearings



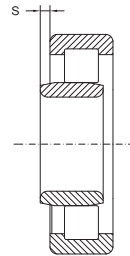
NU

d	Dimensions					Basical radial load		Speed limit		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	$s \approx$	dyn. C_r	stat. C_{0r}	grease	oil	
mm						kN		min^{-1}		
340	520	82	5	5	12,5	1120	1830	1200	1400	NU1068 M
360	540	82	5	5	12,5	1145	1900	1200	1400	NU1072 M
380	560	82	5	5	12,5	1180	2000	1000	1300	NU1076 M
400	600	90	5	5	13,5	1370	2320	950	1200	NU1080 M
420	620	90	5	5	15	1400	2450	900	1100	NU1084 M
440	650	94	6	6	9,8	1560	2750	850	1000	NU1088 M
460	680	100	6	6	10,5	1660	3000	850	1000	NU1092 M
480	650	78	5	5	6,8	1140	2240	900	1100	NU1996 M
	700	100	5	5	15,9	1140	2240	900	1100	NU1096 M
500	670	78	5	5	6,8	1140	2240	850	1000	NU19/500 M
	720	100	6	6	10,5	1760	3200	800	950	NU10/500 M
560	750	85	5	5	7,5	1430	2900	750	900	NU19/560 M
	820	115	6	6	12,3	2700	5100	630	750	NU10/560 M
600	870	118	6	6	13,9	2750	5050	580	480	NU10/600 M
630	850	100	6	6	8,5	1830	3750	670	800	NU19/630 M
710	950	106	6	6	9,3	2080	4400	600	700	NU19/710 M

Single Row Cylindrical Roller Bearings



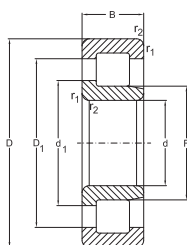
NU+HJ



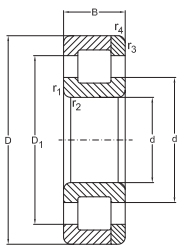
Abutment and fillet
dimensions see on
page 209

Dimensions			Thrust collar				Mass		
d	E	F	d ₁ ≈	D ₁ ≈	B ₂	B ₃	Designation	Bearing	Thrust collar
kg									
340	-	385	403	456	21	39,5	HJ1068	65	7,1
360	-	405	423	476,4	21	39,5	HJ1072	68,2	7,6
380	-	425	-	496,7	-	-	-	71,2	-
400	-	450	-	529,5	-	-	-	92,5	-
420	-	470	-	549,5	-	-	-	96,2	-
440	-	493	-	575,7	-	-	-	110	-
460	-	516	-	601,5	-	-	-	129	-
480	-	525	-	587	-	-	-	77,5	-
	-	525	-	587	-	-	-	128	-
500	-	545	-	606,8	-	-	-	80,4	-
	-	556	-	641,7	-	-	-	139	-
560	-	610	-	679,8	-	-	-	110	-
	-	626	-	713	-	-	-	215	-
600	-	667	-	779	-	-	-	240	-
630	-	688	-	768,5	-	-	-	169	-
710	-	774	-	860,6	-	-	-	219	-

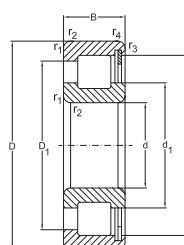
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



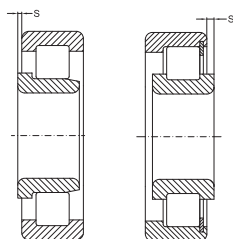
NC



NCF

d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
20	37	11	0,3	0,3	16	18,5	NC2904 V
	37	11	0,3	0,3	16	18,5	NCF2904 V
	42	16	0,6	0,3	33	39,7	NC3004 V
	42	16	0,6	0,3	33	39,7	NCF3004 V
25	42	11	0,3	0,3	18	22,5	NC2905 V
	42	11	0,3	0,3	18	22,5	NCF2905 V
	47	16	0,6	0,3	37,4	46,9	NC3005 V
	47	16	0,6	0,3	37,4	46,9	NCF3005 V
	62	24	1,1	-	68,2	82,8	NJ2305 VH
30	47	11	0,3	0,3	19,8	26	NC2906 V
	47	11	0,3	0,3	19,8	26	NCF2906 V
	55	19	1	0,4	49	63	NC3006 V
	55	19	1	0,4	49	63	NCF3006 V
	72	27	1	-	84	102	NJ2306 VH
35	55	13	0,6	0,3	31	40,5	NC2907 V
	55	13	0,6	0,3	31	40,5	NCF2907 V
	62	20	1	0,4	55	71,5	NC3007 V
	62	20	1	0,4	55	71,5	NCF3007 V
	80	31	1,5	-	108	124	NJ2307 VH
40	62	14	0,6	0,3	34	46,5	NC2908 V
	62	14	0,6	0,3	34	46,5	NCF2908 V
	68	21	1	0,4	66	87,4	NC3008 V

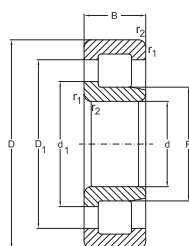
Single Row Full Complement Cylindrical Roller Bearings



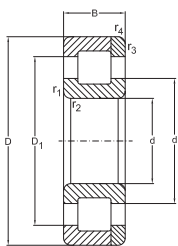
Abutment and fillet
dimensions see on
page 209

Dimensions					Speed Ratings		Mass	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	26,3	30,3	-	4800	9000	0,06	NC2904 V
32,3	-	26,3	30,3	0,5	4800	9000	0,05	NCF2904 V
-	-	27,5	34,5	-	4500	8400	0,12	NC3004 V
37,5	-	27,5	34,5	0,5	4500	8400	0,11	NCF3004 V
-	-	31,4	35,4	-	4000	7500	0,07	NC2905 V
37,45	-	31,4	35,4	0,5	4000	7500	0,06	NCF2905 V
-	-	36,3	49	-	3600	7000	0,13	NC3005 V
42,7	-	36,3	49	0,5	3600	7000	0,12	NCF3005 VH
-	31,71	36,3	49	1,7	3000	5300	0,40	NJ2305 V
-	-	36,5	40,5	-	3600	6700	0,08	NC2906 V
42,5	-	36,5	40,5	0,5	3600	6700	0,07	NCF2906 V
-	-	38,4	46,8	-	3200	5600	0,22	NC3006 V
49,6	-	38,4	46,8	0,8	3200	5600	0,20	NCF3006 V
-	38,34	43,3	56,5	1,8	1900	4000	0,56	NJ2306 VH
-	-	42,4	47,4	-	3000	5600	0,14	NC2907 V
49,9	-	42,4	47,4	0,5	3000	5600	0,12	NCF2907 V
-	-	43,6	52,6	-	2800	5300	0,27	NC3007 V
55,52	-	43,6	52,6	1	2800	5300	0,25	NCF3007 V
-	44,74	50,3	65,8	2	1600	3400	0,73	NJ2307 VH
-	-	48,3	53,9	-	2600	5000	0,16	NC2908 V
56,6	-	48,3	53,9	0,5	2600	5000	0,15	NCF2908 V
-	-	49,1	58,7	-	2400	4500	0,32	NC3008 V

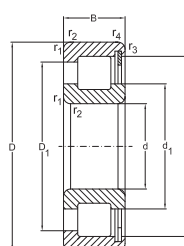
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



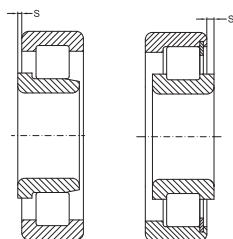
NC



NCF

d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
40	68	21	1	0,4	65	86	NCF3008 V
	90	33	1,5	-	145	184	NJ2308 VH
45	68	14	0,6	0,3	37	52	NC2909 V
	68	14	0,6	0,3	37	52	NCF2909 V
	75	23	1	0,4	81	110	NC3009 V
	75	23	1	0,4	81	110	NCF3009 V
	100	36	1,5	-	170	220	NJ2309 VH
50	72	14	0,6	0,3	39	56	NC2910 V
	72	14	0,6	0,3	39	56	NCF2910 V
	80	23	1	0,4	86	120	NC3010 V
	80	23	1	0,4	86	120	NCF3010 V
	110	40	2	-	198	250	NJ2310 VH
55	80	16	1	0,6	42	60	NC2911 V
	80	16	1	0,6	42	60	NCF2911 V
	90	26	1,1	0,6	105	152	NC3011 V
	90	26	1,1	0,6	105	152	NCF3011 V
	120	43	2	-	230	260	NJ2311 VH
60	85	16	1	0,6	52	78	NC2912 V
	85	16	1	0,6	52	78	NCF2912 V
	95	26	1,1	0,6	110	160	NC3012 V
	95	26	1,1	0,6	110	160	NCF3012 V
	130	46	2,1	-	260	352	NJ2312 VH

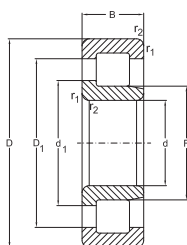
Single Row Full Complement Cylindrical Roller Bearings



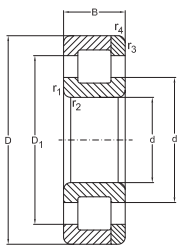
Abutment and fillet
dimensions see on
page 209

Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d ₁ ≈	D ₁ ≈	s ≈	n _{g grease}	n _{g oil}	Bearing	
					[min ⁻¹]		[kg]	
61,8	-	49	58,6	1	2400	4500	0,30	NCF3008 V
-	51,1	57,5	76	2,4	1400	3000	1,00	NJ2308 VH
-	-	53,6	59,2	-	2200	4500	0,20	NC2909 V
61,9	-	53,6	59,2	0,5	2200	4500	0,18	NCF2909 V
-	-	55	65	-	2000	4300	0,42	NC3009 V
68,5	-	55	65	1	2000	4300	0,40	NCF3009 V
-	56,13	62,5	81,8	2,4	1300	2800	1,35	NJ2309 VH
-	-	58,7	64,4	-	1900	4000	0,21	NC2910 V
67,1	-	58,7	64,4	0,5	1900	4000	0,18	NCF2910 V
-	-	58	68,8	-	1900	4000	0,45	NC3010 V
72,33	-	58	68,8	1	1900	4000	0,43	NCF3010 V
-	60,7	68,3	90,3	2,6	1600	3200	1,85	NJ2310 VH
-	-	64,2	70,2	-	1800	3800	0,30	NC2911 V
73,2	-	64,2	70,2	0,5	1800	3800	0,27	NCF2911 V
-	-	67,5	79,5	-	1600	3400	0,66	NC3011 V
83,7	-	67,5	79,5	1,2	1600	3400	0,63	NCF3011 V
-	67,1	75,5	98,6	2,6	1000	2200	2,30	NJ2311 VH
-	-	69,5	76,1	-	1600	3400	0,30	NC2912 V
79,3	-	69,5	76,1	0,5	1600	3400	0,28	NCF2912 V
-	-	70,9	82,9	-	1600	3200	0,71	NC3012 V
86,9	-	70,9	82,9	1,2	1600	3200	0,68	NCF3012 V
-	73,68	82,1	106	3	950	2000	2,83	NJ2312 VH

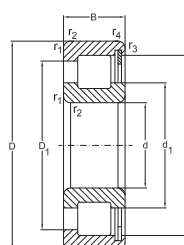
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



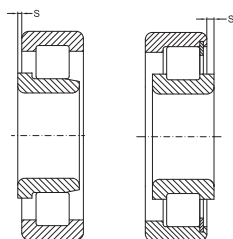
NC



NCF

d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
65	90	16	1	0,6	53,5	80	NC2913 V
	90	16	1	0,6	53,5	80	NCF2913 V
	100	26	1,1	0,6	117	175	NC3013 V
	100	26	1,1	0,6	117	175	NCF3013 V
	140	48	2,1	-	302	358	NJ2313 VH
70	100	19	1	0,6	77	118	NC2914 V
	100	19	1	0,6	77	118	NCF2914 V
	110	30	1,1	0,6	145	215	NC3014 V
	110	30	1,1	0,6	145	215	NCF3014 V
	150	51	2,1	-	335	455	NJ2314 VH
75	105	19	1	0,6	79,5	124	NC2915 V
	105	19	1	0,6	79,5	124	NCF2915 V
	115	30	1,1	0,6	154	224	NC3015 V
	115	30	1,1	0,6	154	224	NCF3015 V
	160	55	2,1	-	390	550	NJ2315 VH
80	110	19	1	0,6	81	128	NC2916 V
	110	19	1	0,6	81	128	NCF2916 V
	125	34	1,1	0,6	194	285	NC3016 V
	125	34	1,1	0,6	194	285	NCF3016 V
	170	58	2,1	-	455	550	NJ2316 VH
85	120	22	1,1	1	105	168	NC2917 V
	120	22	1,1	1	105	168	NCF2917 V
	130	34	1,1	0,6	195	295	NC3017 V

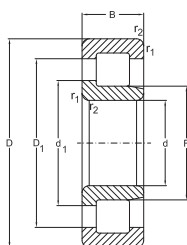
Single Row Full Complement Cylindrical Roller Bearings



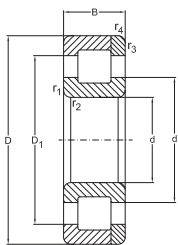
Abutment and fillet
dimensions see on
page 209

Dimensions					Speed Ratings		Mass	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	73,7	80,3	-	1600	3400	0,33	NC2913 V
83,5	-	73,7	80,3	0,5	1600	3400	0,30	NCF2913 V
-	-	77,1	87,1	-	1400	3000	0,75	NC3013 V
93,1	-	77,1	87,1	1,2	1400	3000	0,72	NCF3013 V
-	80,71	89,4	117	3	900	1900	3,48	NJ2313 VH
-	-	80,5	88,5	-	1400	3000	0,52	NC2914 V
92,5	-	80,5	88,5	0,75	1400	3000	0,48	NCF2914 V
-	-	82,6	97,2	-	1300	2800	1,10	NC3014 V
102,1	-	82,6	97,2	1,5	1300	2800	1,05	NCF3014 V
-	84,22	93,8	121	3	850	1800	4,40	NJ2314 VH
-	-	85,6	93,6	-	1300	2800	0,55	NC2915 V
97,6	-	85,6	93,6	0,75	1300	2800	0,50	NCF2915 V
-	-	87	102	-	1200	2600	1,15	NC3015 V
106,5	-	87	102	1,5	1200	2600	1,10	NCF3015 V
-	91,25	100,8	132,5	3	750	1600	5,18	NJ2315 VH
-	-	90,7	98,7	-	1200	2600	0,57	NC2916 V
102,7	-	90,7	98,7	0,75	1200	2600	0,53	NCF2916 V
-	-	94,8	112	-	1100	2400	1,56	NC3016 V
117,2	-	94,8	112	1,8	1100	2400	1,50	NCF3016 V
-	98,3	109	141	4	700	1500	6,40	NJ2316 VH
-	-	99,1	109	-	1100	2400	0,79	NC2917 V
112,5	-	99,1	109	0,75	1100	2400	0,78	NCF2917 V
-	-	99,2	116	-	1100	2400	1,60	NC3017 V

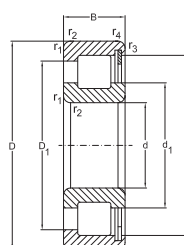
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



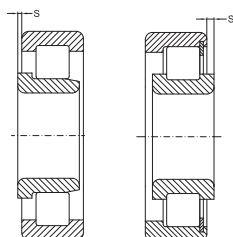
NC



NCF

d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
85	130	34	1,1	0,6	195	295	NCF3017 V
	180	60	3	-	482	695	NJ2317 VH
90	125	22	1,1	1	105	172	NC2918 V
	125	22	1,1	1	105	172	NCF2918 V
	140	37	1,5	1	227	348	NC3018 V
	140	37	1,5	1	227	348	NCF3018 V
	190	64	3	-	520	790	NJ2318 VH
95	130	22	1,1	1	108	180	NC2919 V
	130	22	1,1	1	108	180	NCF2919 V
	145	37	1,5	1	230	360	NC3019 V
	145	37	1,5	1	230	360	NCF3019 V
100	140	24	1,1	1	132	220	NC2920 V
	140	24	1,1	1	132	220	NCF2920 V
	150	37	1,5	1	242	375	NC3020 V
	150	37	1,5	1	242	375	NCF3020 V
	215	73	3	-	704	1030	NJ2320 VH
110	150	24	1,1	1	140	243	NC2922 V
	150	24	1,1	1	140	243	NCF2922 V
	170	45	2	1	325	510	NC3022 V
	170	45	2	1	325	510	NCF3022 V
	240	80	3	-	830	1060	NJ2322 VH
120	165	27	1,1	1	172	287	NC2924 V
	165	27	1,1	1	172	287	NCF2924 V

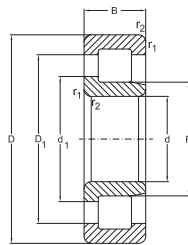
Single Row Full Complement Cylindrical Roller Bearings



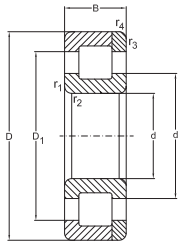
Abutment and fillet
dimensions see on
page 209

Dimensions					Speed Ratings		Mass	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
121,6	-	99,2	116	1,8	1100	2200	1,55	NCF3017 V
-	107,02	117,4	151,5	4	900	1800	7,3	NJ2317 VH
-	-	102	111	-	1100	2400	0,9	NC2918 V
115,6	-	102	111	0,75	1100	2400	0,82	NCF2918 V
-	-	106,2	125	-	1000	2200	2,12	NC3018 V
130,3	-	106,2	125	2	1000	2200	2,05	NCF3018 V
-	108,8	121	156	4	670	1400	8,75	NJ2318 VH
-	-	107	117	-	1000	2200	0,94	NC2919 V
120,4	-	107	117	0,75	1000	2200	0,86	NCF2919 V
-	-	111	129	2	950	2000	2,28	NC3019 V
135,1	-	111	129	4,5	950	2000	2,15	NCF3019 V
-	-	114	124	-	1000	2200	1,25	NC2920 V
129	-	114	124	0,75	1000	2200	1,15	NCF2920 V
-	-	116	134	-	950	2000	2,29	NC3020 V
139,9	-	116	134	2	950	2000	2,20	NCF3020 V
-	122,8	136	176	4,5	600	1200	13,00	NJ2320 VH
-	-	126	137	-	900	1900	1,35	NC2922 V
141,3	-	126	137	0,75	900	1900	1,25	NCF2922 V
-	-	129	150	-	900	1800	3,79	NC3022 V
157	-	129	150	3	900	1800	3,65	NCF3022 V
-	134,3	151	198	5	700	1400	17,80	NJ2322 VH
-	-	136	149	-	850	1800	1,88	NC2924 V
154,3	-	136	149	0,75	850	1800	1,70	NCF2924 V

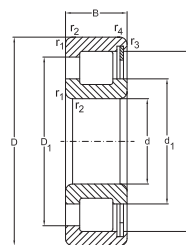
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



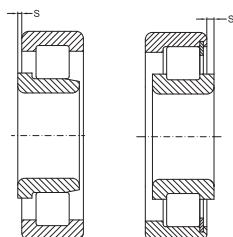
NC



NCF

d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
120	180	46	2	1	340	550	NC3024 V
	180	46	2	1	340	550	NCF3024 V
	260	86	3	-	920	1300	NJ2324 VH
130	180	30	1,5	1,1	205	350	NC2926 V
	180	30	1,5	1,1	205	350	NCF2926 V
	200	52	2	1	415	620	NC3026 V
	200	52	2	1	415	620	NCF3026 V
	280	93	4	-	1080	1660	NJ2326 VH
140	190	30	1,5	1,1	220	375	NC2928 V
	190	30	1,5	1,1	220	375	NCF2928 V
	210	53	2	1	440	680	NC3028 V
	210	53	2	1	440	680	NCF3028 V
	300	102	4	-	1250	1910	NJ2328 VH
150	190	20	1	1,1	108	185	NC1830 V
	190	20	1	1,1	108	185	NCF1830 V
	210	36	2	1,1	286	497	NC2930 V
	210	36	2	1,1	286	497	NCF2930 V
	225	56	2,1	1,1	530	880	NC3030 V
	225	56	2,1	1,1	530	880	NCF3030 V
	320	108	4	-	1450	2240	NJ2330 VH
160	200	20	1,1	1,1	112	199	NC1832 V
	200	20	1,1	1,1	112	199	NCF1832 V
	220	36	2	1,1	297	524	NC2932 V

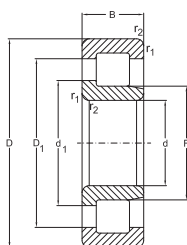
Single Row Full Complement Cylindrical Roller Bearings



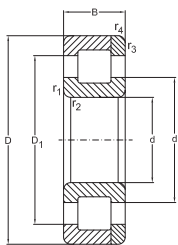
Abutment and fillet
dimensions see on
page 209

Dimensions					Speed Ratings		Mass	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	139	160,5	-	800	1700	4,10	NC3024 V
167,9	-	139	160,5	3,5	800	1700	3,95	NCF3024 V
-	147,7	164	211	5,5	530	1000	22,30	NJ2324 VH
-	-	147	161	-	750	1600	2,50	NC2926 V
167,1	-	147	161	0,75	750	1600	2,30	NCF2926 V
-	-	148,6	175	-	700	1500	6,00	NC3026 V
186,5	-	148,6	175	3,5	700	1500	5,80	NCF3026 V
-	157,95	174,1	229,6	6	500	950	28	NJ2326 VH
-	-	159	173	-	700	1500	2,59	NC2928 V
180	-	159	173	0,75	700	1500	2,40	NCF2928 V
-	-	162,7	189,1	-	670	1400	6,21	NC3028 V
198,2	-	162,7	189,1	3,5	670	1400	6,10	NCF3028 V
-	168,5	184,7	245,3	6,5	450	850	35,5	NJ2328 VH
-	-	163	176	1,5	700	1500	1,54	NC1830 V
159,5	-	163	176	1,5	700	1500	1,30	NCF1830 V
-	-	171	188	-	670	1400	4	NC2930 V
195,5	-	171	188	0,8	670	1400	3,85	NCF2930 V
-	-	174	203	-	630	1300	7,72	NC3030 V
211,7	-	174	203	3,5	630	1300	7,50	NCF3030 V
-	182,5	203	261	6,5	430	800	42,5	NJ2330 VH
-	-	173	185	1,5	670	1400	1,60	NC1832 V
169	-	173	185	1,5	670	1400	1,45	NCF1832 V
-	-	181	198	-	630	1300	4	NC2932 V

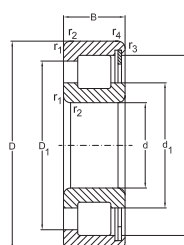
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



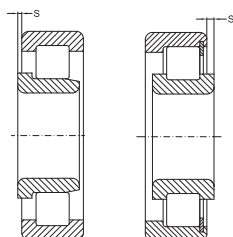
NC



NCF

d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
160	220	36	2	1,1	297	524	NCF2932 V
	240	60	2,1	1,1	580	970	NC3032 V
	240	60	2,1	1,1	580	970	NCF3032 V
	340	114	4	-	1630	2550	NJ2332 VH
170	215	22	1,1	1,1	142	245	NC1834 V
	215	22	1,1	1,1	142	245	NCF1834 V
	230	36	2	1,1	308	552	NC2934 V
	230	36	2	1,1	308	552	NCF2934 V
	260	67	2,1	1,1	728	1230	NC3034 V
	260	67	2,1	1,1	728	1230	NCF3034 V
	360	120	3	-	1760	2400	NJ2334 VH
180	225	22	1,1	1,1	147	275	NC1836 V
	225	22	1,1	1,1	147	275	NCF1836 V
	250	42	2	1,1	391	690	NC2936 V
	250	42	2	1,1	391	690	NCF2936 V
	280	74	2,1	2,1	820	1400	NC3036 V
	280	74	2,1	2,1	820	1400	NCF3036 V
	300	126	3	-	1900	2700	NJ2336 VH
190	240	24	1,5	1,5	172	320	NC1838 V
	240	24	1,5	1,5	172	320	NCF1838 V
	260	42	2	1,1	440	782	NC2938 V
	260	42	2	1,1	440	782	NCF2938 V
	290	75	2,1	2,1	850	1450	NC3038 V

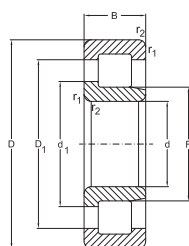
Single Row Full Complement Cylindrical Roller Bearings



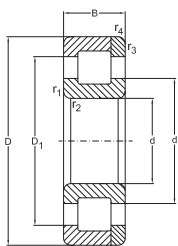
Abutment and fillet
dimensions see on
page 209

Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d ₁ ≈	D ₁ ≈	s ≈	ng _{grease}	ng _{oil}	Bearing	
					[min ⁻¹]		[kg]	
205,7	-	181	198	0,8	630	1300	4,05	NCF2932 V
-	-	184,8	214,8	-	600	1100	9,26	NC3032 V
225,1	-	184,8	214,8	4	600	1100	9,10	NCF3032 V
-	196,55	216,7	286	7	400	750	48,80	NJ2332 VH
-	-	185	200	1,5	630	1300	2	NC1834 V
204,5	-	185	200	1,5	630	1300	1,85	NCF1834 V
-	-	192	208	-	600	1200	4,50	NC2934 V
216	-	192	208	0,8	600	1200	4,25	NCF2934 V
-	-	198	232	-	560	1000	13,70	NC3034 V
243,2	-	198	232	4	560	1000	12,50	NCF3034 V
-	203,56	224,5	296,4	7	450	800	59,20	NJ2334 VH
-	-	196	211	1,5	600	1200	2,20	NC1836 V
215,2	-	196	211	1,5	600	1200	1,95	NCF1836 V
-	-	203	223	-	560	1100	6,40	NC2936 V
232	-	203	223	1	560	1100	6,25	NCF2936 V
-	-	212	249	-	560	1100	17,10	NC3036 V
260,5	-	212	249	5	560	1100	16,50	NCF3036 V
-	221,74	242,6	314,6	9	400	700	69,60	NJ2336 VH
-	-	208	224	1,8	560	1100	2,70	NC1838 V
229	-	208	224	1,8	560	1100	2,45	NCF1838 V
-	-	212	236	-	560	1100	6,80	NC2938 V
244	-	212	236	1	560	1100	6,55	NCF2938 V
-	-	222	258	-	530	1000	17,9	NC3038 V

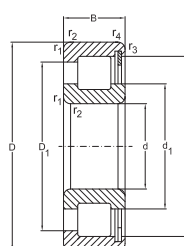
Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



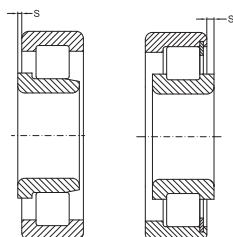
NC



NCF

d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
190	290	75	2,1	2,1	800	1290	NCF3038 V
	400	132	4	-	2080	2900	NJ2338 VH
200	250	24	1,5	1,5	176	335	NC1840 V
	250	24	1,5	1,5	176	335	NCF1840 V
	280	48	2,1	1,5	528	938	NC2940 V
	280	48	2,1	1,5	528	938	NCF2940 V
	310	82	2,1	2,1	990	1750	NC3040 V
	310	82	2,1	2,1	990	1750	NCF3040 V
	420	138	5	-	2290	3680	NJ2340 VH
220	270	24	1,5	1,5	183	350	NC1844 V
	270	24	1,5	1,5	183	350	NCF1844 V
	300	48	2,1	1,5	550	1030	NC2944 V
	300	48	2,1	1,5	550	1030	NCF2944 V
	340	90	3	3	1190	2100	NC3044 V
	340	90	3	3	1190	2100	NCF3044 V
240	300	28	2	2	260	510	NC1848 V
	300	28	2	2	260	510	NCF1848 V
	320	48	2,1	1,5	583	1120	NC2948 V
	320	48	2,1	1,5	583	1120	NCF2948 V
	360	92	3	3	1250	2240	NC3048 V
	360	92	3	3	1250	2240	NCF3048 V
260	320	28	2	2	270	550	NC1852 V
	320	28	2	2	270	550	NCF1852 V

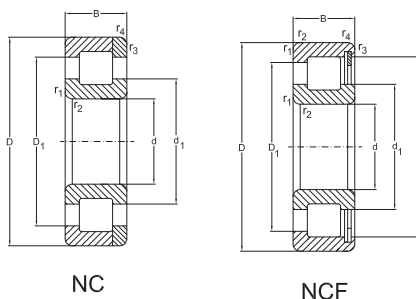
Single Row Full Complement Cylindrical Roller Bearings



Abutment and fillet
dimensions see on
page 209

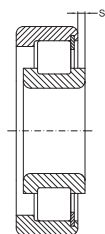
Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d ₁ ≈	D ₁ ≈	s ≈	ng _{grease}	ng _{oil}	Bearing	
					[min ⁻¹]		[kg]	
270	-	222	258	6	530	1000	17,00	NCF3038 V
-	224,6	247,6	327	7	400	700	80,00	NJ2338 VH
-	-	216	233	1,8	560	1100	3	NC1840 V
237,5	-	216	233	1,8	560	1100	2,60	NCF1840 V
-	-	227	253	-	530	1000	9,50	NC2940 V
262	-	227	253	3	530	1000	9,15	NCF2940 V
-	-	227	276	-	450	800	23,00	NC3040 V
287,75	-	227	276	6,5	450	800	22,50	NCF3040 V
-	238,65	263,2	347,5	9	320	600	91,60	NJ2340 VH
-	-	237	253	1,8	530	1000	3,35	NC1844 V
258	-	237	253	1,8	530	1000	2,85	NCF1844 V
-	-	248	274	-	480	900	10,90	NC2944 V
283	-	248	274	2,5	480	900	9,90	NCF2944 V
-	-	254,7	297,9	-	430	850	30,50	NC3044 V
312,7	-	254,7	297,9	7	430	850	29,50	NCF3044 V
-	-	261	281	1,8	480	900	5,30	NC1848 V
287	-	261	281	1,8	480	900	4,40	NCF1848 V
-	-	261	296	-	450	850	12,00	NC2948 V
303	-	261	296	2,5	450	850	11,00	NCF2948 V
-	-	278	322	-	430	800	33,00	NC3048 V
335,6	-	278	322	7	430	800	32,00	NCF3048 V
-	-	281	301	1,8	430	800	5,55	NC1852 V
307,2	-	281	301	1,8	430	800	4,75	NCF1852 V

Single Row Full Complement Cylindrical Roller Bearings



d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
260	360	60	2,1	1,5	737	1410	NC2952 V
	360	60	2,1	1,5	737	1410	NCF2952 V
	400	104	4	4	1600	2920	NC3052 V
	400	104	4	4	1600	2920	NCF3052 V
280	350	33	2	2	330	650	NC1856 V
	350	33	2	2	330	650	NCF1856 V
	380	60	2,1	1,5	897	1710	NC2956 V
	380	60	2,1	1,5	897	1710	NCF2956 V
	420	106	4	4	1650	3100	NC3056 V
	420	106	4	4	1650	3100	NCF3056 V
300	380	38	2,1	2,1	418	850	NC1860 V
	380	38	2,1	2,1	418	850	NCF1860 V
	420	72	3	3	1120	2170	NC2960 V
	420	72	3	3	1120	2170	NCF2960 V
320	400	38	2,1	2,1	440	852	NC1864 V
	400	38	2,1	2,1	440	852	NCF1864 V
	440	72	3	3	1140	2300	NC2964 V
	440	72	3	3	1140	2300	NCF2964 V
340	420	38	2,1	2,1	446	900	NC1868 V
	420	38	2,1	2,1	446	900	NCF1868 V
	460	72	3	3	1190	2430	NC2968 V
	460	72	3	3	1190	2430	NCF2968 V

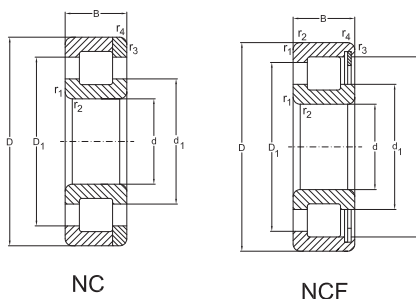
Single Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet
dimensions see on
page 209*

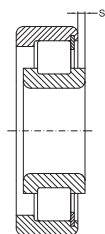
Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d ₁ ≈	D ₁ ≈	s ≈	n _{g grease}	n _{g oil}	Bearing	
					[min ⁻¹]		[kg]	
-	-	294	321	-	400	750	19,30	NC2952 V
333,7	-	294	321	5	400	750	18,50	NCF2952 V
-	-	304,1	358,1	-	380	700	47,50	NC3052 V
373,5	-	304,1	358,1	8	380	700	46,50	NCF3052 V
-	-	305	327	2,5	400	750	8,00	NC1856 V
334	-	305	327	2,5	400	750	7,10	NCF1856 V
-	-	305	346	-	380	700	21,10	NC2956 V
362,7	-	319	346	4	380	700	20,00	NCF2956 V
-	-	324	375	-	320	560	52,5	NC3056 V
391	-	324	375	9	320	560	50	NCF3056 V
-	-	329	355	3	360	670	11,50	NC1860 V
363	-	329	355	3	360	670	10,00	NCF1860 V
-	-	342	375	-	340	630	32,30	NC2960 V
390,5	-	342	375	5	340	630	31,50	NCF2960 V
-	-	349	375	3	340	630	11,30	NC1864 V
383	-	349	375	3	340	630	10,50	NCF1864 V
-	-	363	395	-	320	600	34,00	NC2964 V
411	-	363	395	5	320	600	33,00	NCF2964 V
-	-	369	395	3	320	600	12,80	NC1868 V
403	-	369	395	3	320	600	11,00	NCF1868 V
-	-	383	415	-	300	560	36,00	NC2968 V
431	-	383	415	3	300	560	35,00	NCF2968

Single Row Full Complement Cylindrical Roller Bearings



Dimensions					Basical radial load		Designation
d	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
360	440	38	2,1	2,1	452	950	NC1872 V
	440	38	2,1	2,1	452	950	NCF1872 V
	480	72	3	3	1230	2580	NC2972 V
	480	72	3	3	1230	2580	NCF2972 V
380	480	46	2,1	2,1	627	1230	NC1876 V
	480	46	2,1	2,1	627	1230	NCF1876 V
	520	82	4	4	1570	3000	NC2976 V
	520	82	4	4	1570	3000	NCF2976 V
400	500	46	2,1	2,1	627	1280	NC1880 V
	500	46	2,1	2,1	627	1280	NCF1880 V
	540	82	4	4	1650	3420	NC2980 V
	540	82	4	4	1650	3420	NCF2980 V
420	520	46	2,1	2,1	660	1340	NC1884 V
	520	46	2,1	2,1	660	1340	NCF1884 V
	520	60	2,1	2,1	945,6	2329	NCF2884 V
	560	82	4	4	1650	3500	NC2984 V
	560	82	4	4	1650	3500	NCF2984 V
440	540	46	2,1	2,1	670	1405	NC1888 V
	540	46	2,1	2,1	670	1405	NCF1888 V
	600	95	4	4	2010	4270	NC2988 V
	600	95	4	4	2010	4270	NCF2988 V
460	580	56	3	3	913	1850	NC1892 V
	580	56	3	3	913	1850	NCF1892 V

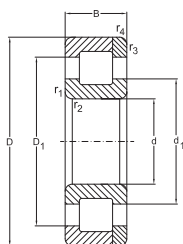
Single Row Full Complement Cylindrical Roller Bearings



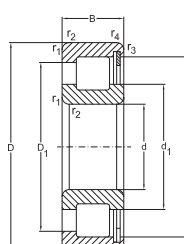
*Abutment and fillet
dimensions see on
page 209*

Dimensions					Speed Ratings		Mass	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	389	415	3	300	560	12,40	NC1872 V
423,3	-	389	415	3	300	560	12,00	NCF1872 V
-	-	403	436	-	280	530	36,80	NC2972 V
451,5	-	403	436	5	280	530	36,50	NCF2972 V
-	-	416	448	3,5	280	530	19,90	NC1876 V
458	-	416	448	3,5	280	530	19,50	NCF1876 V
-	-	427	473	-	260	500	53,50	NC2976 V
488	-	427	473	5	260	500	52,50	NCF2976 V
-	-	433	465	3,5	260	500	21,20	NC1880 V
475	-	433	465	3,5	260	500	20,50	NCF1880 V
-	-	450	496	-	240	480	55	NC2980 V
511	-	450	496	5	240	480	54,50	NCF2980 V
-	-	457	489	3,5	240	480	21,60	NC1884 V
499	-	447	488	3,5	240	480	21,00	NCF1884 V
499	-	447	488,6	3	240	457,4	28,00	NCF2884 V
-	-	463	509	-	220	450	57,70	NC2984 V
524	-	463	509	5	220	450	57,00	NCF2984 V
-	-	474	506	3,5	220	450	22,60	NC1888 V
516	-	474	506	3,5	220	450	22,00	NCF1888 V
-	-	502	545	-	200	430	81,10	NC2988 V
565,5	-	502	545	6	200	430	80,50	NCF2988 V
-	-	501	541	5	200	430	34,80	NC1892 V
533	-	501	541	5	200	430	34,00	NCF1892 V

Single Row Full Complement Cylindrical Roller Bearings



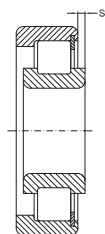
NC



NCF

d	Dimensions				Basical radial load		Designation
	D	B	r_1, r_2 min.	r_3, r_4 min.	dyn. C_r	stat. C_{0r}	
mm					kN		
460	620	95	4	4	2050	4420	NC2992 V
	620	95	4	4	2050	4420	NCF2992 V
480	600	56	3	3	935	1920	NCF1896 V
	650	100	5	5	2290	4950	NCF2996 V
500	620	56	3	3	952	2120	NCF18/500 V
	670	100	5	5	2380	5240	NCF29/500 V
530	650	56	3	3	990	2110	NCF18/530 V
560	680	56	3	3	1020	2230	NCF18/560 V
600	730	60	3	3	1050	2350	NCF18/600 V
630	780	69	4	4	1250	2800	NCF18/630 V
670	820	69	4	4	1300	3000	NCF18/670 V
710	870	74	4	4	1540	3550	NCF18/710 V
750	920	78	5	5	1760	4030	NCF18/750 V

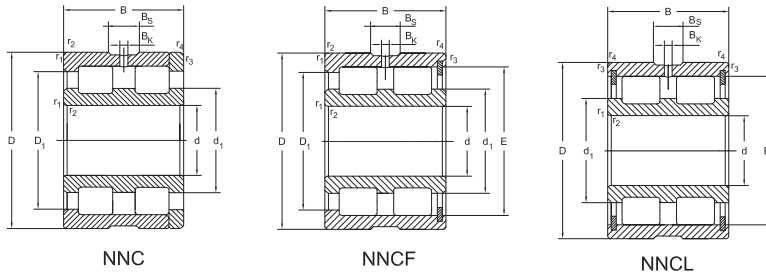
Single Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet
dimensions see on
page 209*

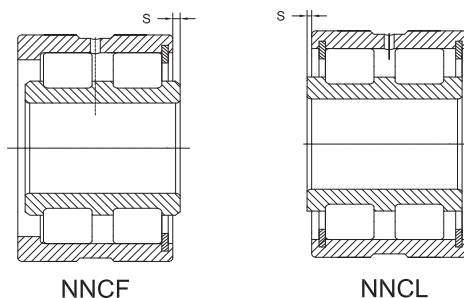
Dimensions					Speed Ratings		Mass	Designation
E	F	d ₁	D ₁	s	ng _{grease}	ng _{oil}	Bearing	
≈	≈	≈	≈	≈	[min ⁻¹]		[kg]	
-	-	516	558	-	190	400	83,90	NC2992 V
579	-	516	558	6	190	400	83,50	NCF2992 V
573,5	-	522	561	5	190	400	35,50	NCF1896 V
606	-	538	584	-	180	380	98,00	NCF2996 V
594	-	542	582	5	180	380	36,50	NCF18/500 V
634,5	-	567	612	7	170	360	100,00	NCF29/500 V
624,5	-	573	612	5	170	360	38,50	NCF18/530 V
655	-	603	643	5	160	340	40,50	NCF18/560 V
696	-	644	684	7	150	320	51,50	NCF18/600 V
739	-	681	725	8	140	300	72,50	NCF18/630 V
783	-	725	769	8	130	280	76,50	NCF18/670 V
831	-	767	815	8	120	260	92,50	NCF18/710 V
880	-	811	863	8	110	240	110,00	NCF18/750 V

Double Row Full Complement Cylindrical Roller Bearings



d	Dimensions			Basic radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
25	47	30	0,6	55	76,4	3800	7000	NNCF5005 V
30	55	34	1	73,7	105	3200	6000	NNCF5006 V
35	62	36	1	88	131	2800	5300	NNCF5007 V
40	68	38	1	105	159	2400	4800	NNCF5008 V
45	75	40	1	128	195	2000	4300	NNCF5009 V
50	80	40	1	132	206	1900	4000	NNCF5010 V
55	90	46	1,1	176	294	1600	3400	NNCF5011 V
60	85	25	1	76,5	134	1700	3400	NNC4912 V
	85	25	1	76,5	134	1700	3400	NNCF4912 V
	85	25	1	76,5	134	1700	3400	NNCL4912 V
	95	46	1,1	183	305	1600	3400	NNCF5012 V
65	100	46	1,1	194	331	1400	3000	NNCF5013 V
70	100	30	1	103	188	1400	3000	NNC4914 V
	100	30	1	103	188	1400	3000	NNCF4914 V
	100	30	1	103	188	1400	3000	NNCL4914 V
	110	54	1,1	220	361	1300	2800	NNCF5014 V
80	110	30	1	110	210	1200	2600	NNC4916 V
	110	30	1	110	210	1200	2600	NNCF4916 V

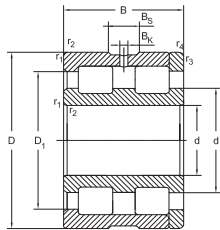
Double Row Full Complement Cylindrical Roller Bearings



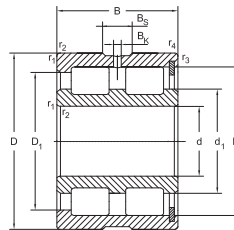
*Abutment and fillet
dimensions see on
page 209*

Dimensions							Mass
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
[kg]							
25	42,7	33,1	40,3	4,5	3	1	0,23
30	49,8	38,6	47	4,5	3	1	0,35
35	55,7	43,7	52,7	4,5	3	1	0,46
40	61,9	49,1	58,7	4,5	3	1	0,56
45	69,8	55,4	66,2	4,5	3	1	0,70
50	72,9	58,5	69,3	4,5	3	1	0,75
55	83,7	67,6	79,7	4,5	3,5	1	1,15
60	-	69,5	76,5	4,5	3,5	-	0,48
	78,9	69,5	76,5	4,5	3,5	1	0,46
	78,9	69,5	76,5	4,5	3,5	1	0,46
	86,9	70,9	82,9	4,5	3,5	1	1,25
65	93,3	77,3	89,3	4,5	3,5	1	1,30
70	-	82	89	4,5	3,5	-	0,8
	92,3	82	89	4,5	3,5	1	0,79
	92,3	82	89	4,5	3,5	1	0,79
	101	81,8	96,2	5	3,5	1,1	1,85
80	-	90,5	98	5	3,5	-	0,9
	101,2	90,5	98	5	3,5	1	0,88

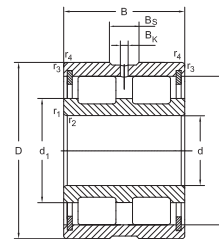
Double Row Full Complement Cylindrical Roller Bearings



NNC



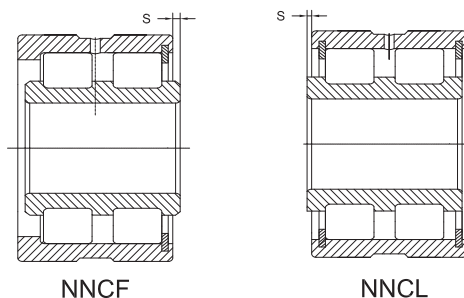
NNCF



NNCL

Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
80	110	30	1	110	210	1200	2600	NNCL4916 V
	125	60	1,1	286	469	1100	2400	NNCF5016 V
90	125	35	1,1	146	292	1100	2300	NNC4918 V
	125	35	1,1	146	292	1100	2300	NNCF4918 V
	125	35	1,1	146	292	1100	2300	NNCL4918 V
	140	67	1,5	369	635	1000	2200	NNCF5018 V
100	140	40	1,1	190	390	950	2000	NNC4920 V
	140	40	1,1	190	390	950	2000	NNCF4920 V
	140	40	1,1	190	390	950	2000	NNCL4920 V
	150	67	1,5	391	690	950	2000	NNCF5020 V
110	150	40	1,1	197	420	900	1900	NNC4922 V
	150	40	1,1	197	420	900	1900	NNCF4922 V
	150	40	1,1	197	420	900	1900	NNCL4922 V
	170	80	2	528	957	850	1800	NNCF5022 V
120	165	45	1,1	220	465	800	1700	NNC4924 V
	165	45	1,1	220	465	800	1700	NNCF4924 V
	165	45	1,1	220	465	800	1700	NNCL4924 V
	180	80	2	561	1050	800	1700	NNCF5024 V
130	180	50	1,5	255	540	750	1600	NNC4926 V

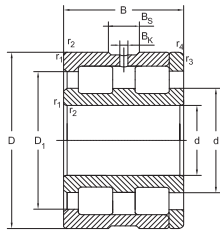
Double Row Full Complement Cylindrical Roller Bearings



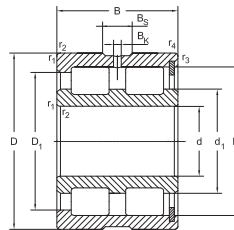
*Abutment and fillet
dimensions see on
page 209*

Dimensions							Mass
d	E	d ₁ ≈	D ₁ ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
80	101,2	90,5	98	5	3,5	1	0,88
	117,2	94,8	112	5	3,5	2,5	2,60
90	-	103,5	111,5	5	3,5	-	1,4
	115,5	103,5	111,5	5	3,5	1,5	1,37
	115,5	103,5	111,5	5	3,5	1,5	1,37
	130,3	106	125	5	3,5	2,5	3,75
100	-	116,5	125,5	5	3,5	-	2,1
	130	116,5	125,5	5	3,5	2	2,0
	130	116,5	125,5	5	3,5	2	2,0
	140	116	134	6	3,5	2,5	4,05
110	-	125	134	6	3,5	-	2,3
	138,6	125	134	6	3,5	2	2,2
	138,6	125	134	6	3,5	2	2,2
	157	128	150	6	3,5	2,5	6,60
120	-	139	149	6	3,5	-	3,2
	154	139	149	6	3,5	3	3,0
	154	139	149	6	3,5	3	3,0
	168	139	161	6	3,5	2,5	7,10
130	-	149,5	160,5	6	3,5	-	4,2

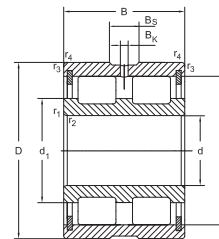
Double Row Full Complement Cylindrical Roller Bearings



NNC



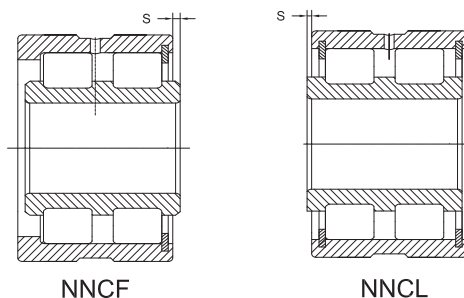
NNCF



NNCL

d	Dimensions			Basical radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_{grease}	n_{oil}	
mm				kN		[min ⁻¹]		
130	180	50	1,5	255	540	750	1600	NNCF4926 V
	180	50	1,5	255	540	750	1600	NNCL4926 V
	200	95	2	704	1380	700	1500	NNCF5026 V
140	190	50	1,5	265	576	700	1500	NNC4928 V
	190	50	1,5	265	576	700	1500	NNCF4928 V
	190	50	1,5	265	576	700	1500	NNCL4928 V
	210	95	2	737	1500	670	1400	NNCF5028 V
150	190	40	1,1	230	560	720	1500	NNC4830 V
	190	40	1,1	230	560	720	1500	NNCF4830 V
	190	40	1,1	230	560	720	1500	NNCL4830 V
	210	60	2	383	843	680	1400	NNC4930 V
	210	60	2	383	843	680	1400	NNCF4930 V
	210	60	2	383	843	680	1400	NNCL4930 V
	225	100	2,1	842	1680	630	1300	NNCF5030 V
160	200	40	1,1	238	600	680	1400	NNC4832 V
	200	40	1,1	238	600	680	1400	NNCF4832 V
	200	40	1,1	238	600	680	1400	NNCL4832 V
	220	60	2	399	906	650	1300	NNC4932 V
	220	60	2	399	906	650	1300	NNCF4932 V
	220	60	2	399	906	650	1300	NNCL4932 V

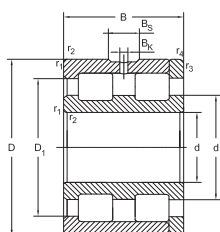
Double Row Full Complement Cylindrical Roller Bearings



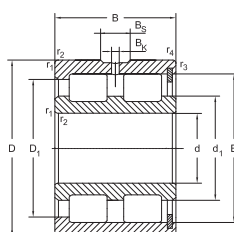
*Abutment and fillet
dimensions see on
page 209*

Dimensions							Mass
d	E	d _i ≈	D _i ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
130	166	149,5	160,5	6	3,5	4	4,0
	166	149,5	160,5	6	3,5	4	4,0
	183,5	153	176	6	3,5	2,5	11,0
140	-	160	171	6	3,5	-	4,4
	176,4	160	171	6	3,5	4	4,2
	176,4	160	171	6	3,5	4	4,2
	195,5	165	188	7	4	3	11,5
150	-	165	174	7	4	-	3
	178,7	165	174	7	4	2	2,8
	178,7	165	-	7	4	2	2,8
	-	172,5	185,5	7	4	-	7
	192	172,5	185,5	7	4	4	6,8
	192	172,5	185,5	7	4	4	6,8
	209	175	201	7	4	3	14
160	-	176,5	185,5	7	4	-	3,2
	190,1	176,5	185,5	7	4	2	3,0
	190,1	176,5	-	7	4	2	3,0
	-	184,5	197,5	7	4	-	7,2
	203,9	184,5	197,5	7	4	4	7,1
	203,9	184,5	197,5	7	4	4	7,1

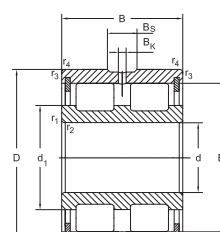
Double Row Full Complement Cylindrical Roller Bearings



NNC



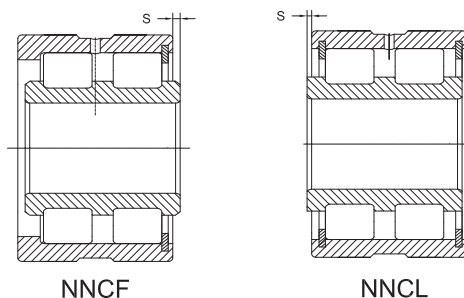
NNCF



NNCL

d	Dimensions			Basical radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_{grease}	n_{oil}	
mm				kN		[min ⁻¹]		
160	240	109	2,1	1010	1950	600	1200	NNCF5032 V
170	215	45	1,1	258	631	640	1300	NNC4834 V
	215	45	1,1	258	631	640	1300	NNCF4834 V
	215	45	1,1	258	631	640	1300	NNCL4834 V
	230	60	2	408	950	600	1200	NNC4934 V
	230	60	2	408	950	600	1200	NNCF4934 V
	230	60	2	408	950	600	1200	NNCL4934 V
	260	122	2,1	1140	2170	560	1100	NNCF5034 V
180	225	45	1,1	266	664	610	1200	NNC4836 V
	225	45	1,1	266	664	610	1200	NNCF4836 V
	225	45	1,1	266	664	610	1200	NNCL4836 V
	250	69	2	547	1220	570	1100	NNC4936 V
	250	69	2	547	1220	570	1100	NNCF4936 V
	250	69	2	547	1220	570	1100	NNCL4936 V
	280	136	2,1	1320	2580	560	1100	NNCF5036 V
190	240	50	1,5	305	760	560	1150	NNC4838 V
	240	50	1,5	305	760	560	1150	NNCF4838 V
	240	50	1,5	305	760	560	1150	NNCL4838 V
	260	69	2	562	1290	550	1100	NNC4938 V
	260	69	2	562	1290	550	1100	NNCF4938 V

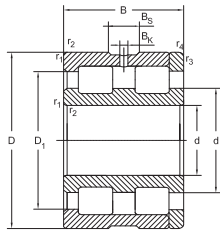
Double Row Full Complement Cylindrical Roller Bearings



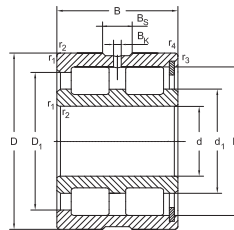
Abutment and fillet
dimensions see on
page 209

Dimensions							Mass
d	E	d _i ≈	D _i ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
160	225	185	215	7	4	3	17
170	-	187,5	196,5	7	4	-	4,2
	201,7	187,5	196,5	7	4	3	4,0
	201,7	187,5	-	7	4	3	4,0
	-	192,5	205,5	7	4	-	7,6
	212,2	192,5	205,5	7	4	4	7,5
	212,2	192,5	205,5	7	4	4	7,5
	243	198	232	7	4	5	23,0
180	-	196	207	7	4	-	4,5
	211,3	196	207	7	4	3	4,2
	211,3	196	-	7	4	3	4,2
	-	207	223	7	4	-	11
	231,1	207	223	7	4	4	10,8
	231,1	207	223	7	4	4	10,8
	260,5	212	249	8	4	6	30,5
190	-	209	220	7	4	-	5,8
	225,4	209	220	7	4	4	5,5
	225,4	209	-	7	4	4	5,5
	-	217,5	233	7	4	-	11,5
	241,3	217,5	233	7	4	4	11,3

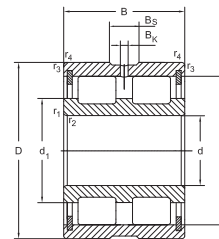
Double Row Full Complement Cylindrical Roller Bearings



NNC



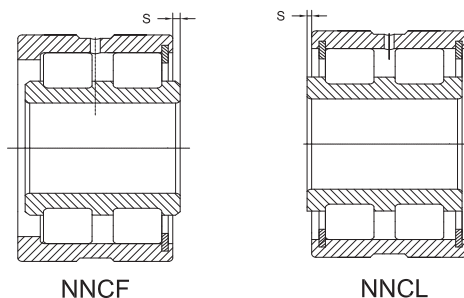
NNCF



NNCL

d	Dimensions			Basical radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
190	260	69	2	562	1290	550	1100	NNCL4938 V
	290	136	2,1	1380	2690	530	1000	NNCF5038 V
200	250	50	1,5	315	799	550	1100	NNC4840 V
	250	50	1,5	315	799	550	1100	NNCF4840 V
	250	50	1,5	315	799	550	1100	NNCL4840 V
	280	80	2,1	661	1495	530	1000	NNC4940 V
	280	80	2,1	661	1495	530	1000	NNCF4940 V
	280	80	2,1	661	1495	530	1000	NNCL4940 V
	310	150	2,1	1570	3130	500	950	NNCF5040 V
220	270	50	1,5	330	878	500	1000	NNC4844 V
	270	50	1,5	330	878	500	1000	NNCF4844 V
	270	50	1,5	330	878	500	1000	NNCL4844 V
	300	80	2,1	690	1610	500	950	NNC4944 V
	300	80	2,1	690	1610	500	950	NNCF4944 V
	300	80	2,1	690	1610	500	950	NNCL4944 V
	340	160	3	1870	3680	450	850	NNCF5044 V
240	300	60	2	497	1292	480	900	NNC4848 V
	300	60	2	497	1292	480	900	NNCF4848 V
	300	60	2	497	1292	480	900	NNCL4848 V
	320	80	2,1	725	1762	450	850	NNC4948 V

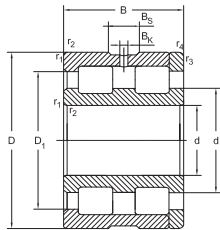
Double Row Full Complement Cylindrical Roller Bearings



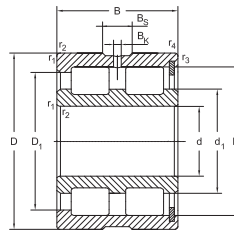
Abutment and fillet
dimensions see on
page 209

Dimensions							Mass
d	E	d _i ≈	D _i ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
190	241,3	217,5	233	7	4	4	11,3
	270	222	258	8	4	6	31,5
200	-	219,5	230	7	4	-	6
	235,9	219,5	230	7	4	4	5,8
	235,9	219,5	-	7	4	4	5,8
	-	233	251	8	4	-	16
	260	233	251	8	4	5	15,9
	260	233	251	8	4	5	15,9
	288	236	276	8	4	7	41,0
220	-	240,5	251,5	7	4	-	6,5
	256,9	240,5	251,5	7	4	4	6,3
	256,9	240,5	-	7	4	4	6,3
	-	250	268	8	4	-	17,5
	277,2	250	268	8	4	5	17,2
	277,2	250	268	8	4	5	17,2
	315,5	255	300	8	4	7	52,5
240	-	261,5	275,5	8	4	-	10,3
	282,4	261,5	275,5	8	4	4	10,0
	282,4	261,5	-	8	4	4	10,0
	-	273	291	8	4	-	18,7

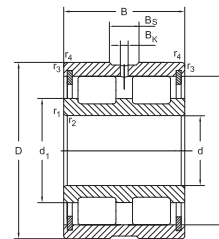
Double Row Full Complement Cylindrical Roller Bearings



NNC



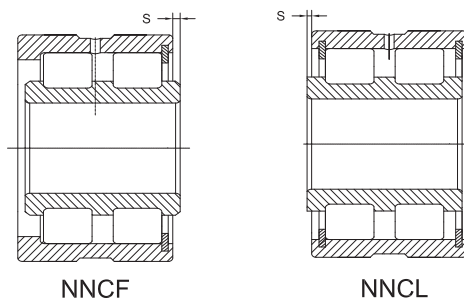
NNCF



NNCL

Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN			$[\text{min}^{-1}]$	
240	320	80	2,1	725	1762	450	850	NNCF4948 V
	320	80	2,1	725	1762	450	850	NNCL4948 V
	360	160	3	1980	4050	450	800	NNCF5048 V
260	320	60	2	521	1406	430	820	NNC4852 V
	320	60	2	521	1406	430	820	NNCF4852 V
	320	60	2	521	1406	430	820	NNCL4852 V
	360	100	2,1	1070	2520	400	750	NNC4952 V
	360	100	2,1	1070	2520	400	750	NNCF4952 V
	360	100	2,1	1070	2520	400	750	NNCL4952 V
	400	190	4	2640	5340	380	700	NNCF5052 V
280	350	69	2	680	1853	400	750	NNC4856 V
	350	69	2	680	1853	400	750	NNCF4856 V
	350	69	2	680	1853	400	750	NNCL4856 V
	380	100	2,1	1120	2710	380	700	NNC4956 V
	380	100	2,1	1120	2710	380	700	NNCF4956 V
	380	100	2,1	1120	2710	380	700	NNCL4956 V
	420	190	4	2700	5610	360	670	NNCF5056 V
300	380	80	2,1	801	2146	380	700	NNC4860 V
	380	80	2,1	801	2146	380	700	NNCF4860 V
	380	80	2,1	801	2146	380	700	NNCL4860 V

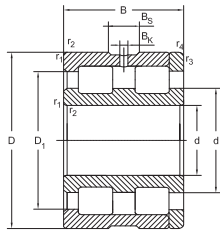
Double Row Full Complement Cylindrical Roller Bearings



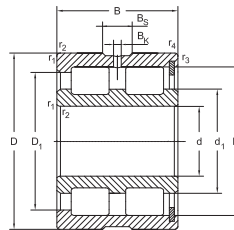
*Abutment and fillet
dimensions see on
page 209*

Dimensions							Mass
d	E	d _i ≈	D _i ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
240	300,1	273	291	8	4	5	18,5
	300,1	273	291	8	4	5	18,5
	335,6	278	322	9,4	5	7	56,0
260	-	283,5	297,5	8	4	-	11,1
	304,7	283,5	297,5	8	4	4	10,8
	304,7	283,5	-	8	4	4	10,8
	-	297	320	9,4	5	-	33,1
	331,5	297	320	9,4	5	6	32,2
	331,5	297	320	9,4	5	6	32,2
	373,5	304	357	9,4	5	7	85,5
280	-	309	325	8	4	-	16,1
	332,9	309	325	8	4	4	15,8
	332,9	309	-	8	4	4	15,8
	-	319	342	9,4	5	-	34,5
	353,5	319	342	9,4	5	6	34,2
	353,5	319	342	9,4	5	6	34,2
	389	320	372	9,4	5	7	90,5
300	-	330,5	348,5	9,4	5	-	22,9
	357,4	330,5	348,5	9,4	5	6	22,5
	357,4	330,5	-	9,4	5	6	22,5

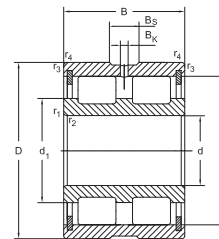
Double Row Full Complement Cylindrical Roller Bearings



NNC



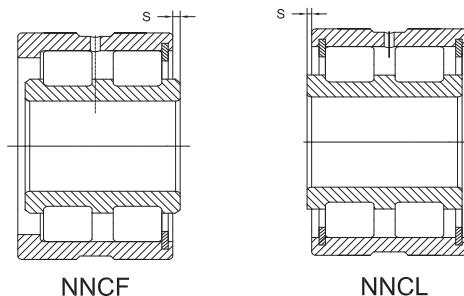
NNCF



NNCL

Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN		[min ⁻¹]		
300	420	118	3	1560	3630	340	650	NNC4960 V
	420	118	3	1560	3630	340	650	NNCF4960 V
	420	118	3	1560	3630	340	650	NNCL4960 V
	460	218	4	3410	7180	320	600	NNCF5060 V
320	400	80	2,1	832	2300	340	640	NNC4864 V
	400	80	2,1	832	2300	340	640	NNCF4864 V
	400	80	2,1	832	2300	340	640	NNCL4864 V
	440	118	3	1600	3835	320	600	NNC4964 V
	440	118	3	1600	3835	320	600	NNCF4964 V
	440	118	3	1600	3835	320	600	NNCL4964 V
	480	218	4	3470	7450	300	560	NNCF5064 V
340	420	80	2,1	850	2415	320	600	NNC4868 V
	420	80	2,1	850	2415	320	600	NNCF4868 V
	420	80	2,1	850	2415	320	600	NNCL4868 V
	460	118	3	1640	4035	300	560	NNC4968 V
	460	118	3	1640	4035	300	560	NNCF4968 V
	460	118	3	1640	4035	300	560	NNCL4968 V
	520	243	5	4180	9200	280	530	NNCF5068 V
360	440	80	2,1	880	2570	300	560	NNC4872 V
	440	80	2,1	880	2570	300	560	NNCF4872 V

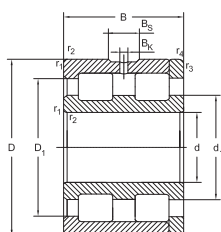
Double Row Full Complement Cylindrical Roller Bearings



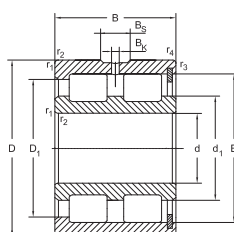
*Abutment and fillet
dimensions see on
page 209*

Dimensions							Mass
d	E	d _i ≈	D _i ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
300	-	346,5	375,5	9,4	5	-	53
	390,2	346,5	375,5	9,4	5	6	52,8
	390,2	346,5	375,5	9,4	5	6	52,8
	432	355	413	9,4	5	9	130
320	-	353,5	371,5	9,4	5	-	24
	380,3	353,5	371,5	9,4	5	6	23,8
	380,3	353,5	-	9,4	5	6	23,8
	-	353,5	399	9,4	5	-	56
	409	353,5	399	9,4	5	6	55,2
	409	353,5	399	9,4	5	6	55,2
	447,5	370	429	9,4	5	9	135
340	-	370,5	388,5	9,4	5	-	25,5
	397,4	370,5	388,5	9,4	5	6	25,2
	397,4	370,5	-	9,4	5	6	25,2
	-	383,5	412,5	9,4	5	-	60,5
	427,1	383,5	412,5	9,4	5	6	58,8
	427,1	383,5	412,5	9,4	5	6	58,8
	486	399	465	9,4	5	11	185
360	-	393	411	9,4	5	-	27
	420,2	393	411	9,4	5	6	26,5

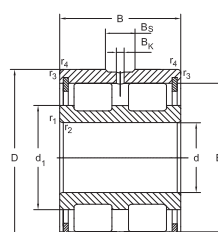
Double Row Full Complement Cylindrical Roller Bearings



NNC



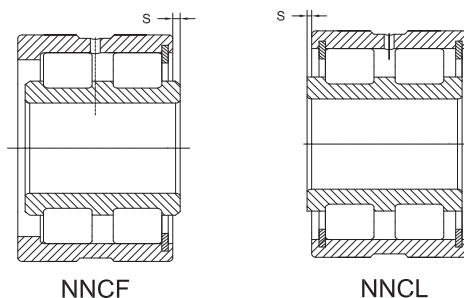
NNCF



NNCL

Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN			$[\text{min}^{-1}]$	
360	440	80	2,1	880	2570	300	560	NNCL4872 V
	480	118	2,5	1690	4240	300	550	NNC4972 V
	480	118	2,5	1690	4240	300	550	NNCF4972 V
	540	243	5	4290	9570	260	500	NNCF5072 V
380	480	100	2,1	1293	3618	280	530	NNC4876 V
	480	100	2,1	1293	3618	280	530	NNCF4876 V
	480	100	2,1	1293	3618	280	530	NNCL4876 V
	520	140	4	2124	5460	260	500	NNC4976 V
	520	140	4	2124	5460	260	500	NNCF4976 V
	520	140	4	2124	5460	260	500	NNCL4976 V
	560	243	5	4400	9940	240	480	NNCF5076 V
400	500	100	2,1	1311	3748	270	500	NNC4880 V
	500	100	2,1	1311	3748	270	500	NNCF4880 V
	500	100	2,1	1311	3748	270	500	NNCL4880 V
	540	140	4	2185	5730	240	480	NNC4980 V
	540	140	4	2185	5730	240	480	NNCF4980 V
	540	140	4	2185	5730	240	480	NNCL4980 V
	600	272	5	5500	12300	220	450	NNCF5080 V
420	520	100	2,1	1353	3942	250	470	NNC4884 V

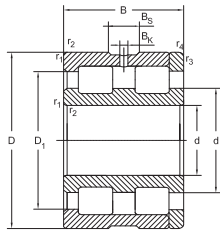
Double Row Full Complement Cylindrical Roller Bearings



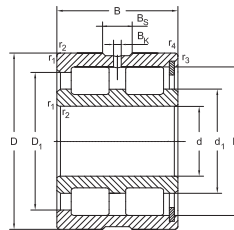
*Abutment and fillet
dimensions see on
page 209*

Dimensions							Mass
d	E	d _i ≈	D _i ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
360	420,2	393	-	9,4	5	6	26,5
	-	399	436,5	9,4	5	-	61
	446	399	436,5	9,4	5	6	60,5
	504	417	483	9,4	5	11	195
380	-	421,5	444,5	9,4	5	-	45
	456,0	421,5	444,5	9,4	5	6	44,6
	456,0	421,5	-	9,4	5	6	44,6
	-	433,5	465,5	9,4	5	-	93
	481,5	433,5	465,5	9,4	5	7	92,4
	481,5	433,5	465,5	9,4	5	7	92,4
	532	435	511	9,4	5	11	200
400	-	436	459	9,4	5	-	47
	470,3	436	459	9,4	5	6	46,8
	470,3	436	-	9,4	5	6	46,8
	-	454	486	9,4	5	-	97,5
	502	454	486	9,4	5	7	96,5
	502	454	486	9,4	5	7	96,5
	560	464	536	9,4	5	11	270
420	-	458	481	9,4	5	-	49,2

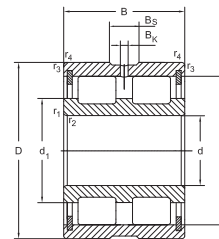
Double Row Full Complement Cylindrical Roller Bearings



NNC



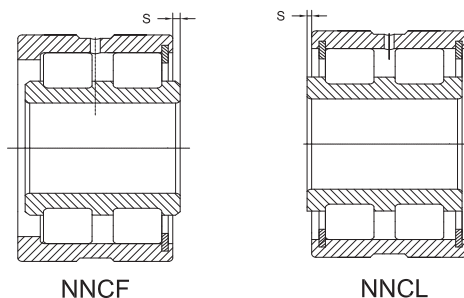
NNCF



NNCL

d	Dimensions			Basical radial load		Speed Ratings		Designation
	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	ng grease	ng oil	
mm				kN		[min ⁻¹]		
420	520	100	2,1	1353	3942	250	470	NNCF4884 V
	520	100	2,1	1353	3942	250	470	NNCL4884 V
	560	140	4	2235	6000	220	450	NNC4984 V
	560	140	4	2235	6000	220	450	NNCF4984 V
	560	140	4	2235	6000	220	450	NNCL4984 V
	620	272	5	5610	12800	200	430	NNCF5084 V
440	540	100	2,1	1387	4136	240	450	NNC4888 V
	540	100	2,1	1387	4136	240	450	NNCF4888 V
	540	100	2,1	1387	4136	240	450	NNCL4888 V
	600	160	4	2990	7570	200	430	NNC4988 V
	600	160	4	2990	7570	200	430	NNCF4988 V
	600	160	4	2990	7570	200	430	NNCL4988 V
	650	280	6	6160	14100	190	400	NNCF5088 V
460	580	118	3	1560	4614	230	420	NNC4892 V
	580	118	3	1560	4614	230	420	NNCF4892 V
	580	118	3	1560	4614	230	420	NNCL4892 V
	620	160	4	3020	7770	190	400	NNC4992 V
	620	160	4	3020	7770	190	400	NNCF4992 V
	620	160	4	3020	7770	190	400	NNCL4992 V
	680	130	6	6440	14700	180	380	NNCF5092 V

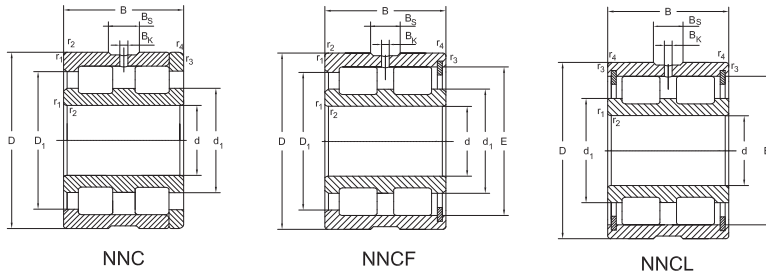
Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet
dimensions see on
page 209*

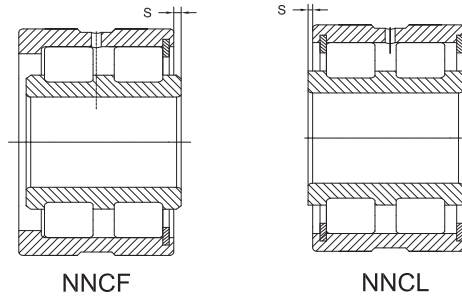
Dimensions							Mass
d	E	d _i ≈	D _i ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
420	492,5	458	481	9,4	5	6	48,8
	492,5	458	-	9,4	5	6	48,8
	-	470,5	512	9,4	5	-	100
	522,5	470,5	512	9,4	5	7	99,0
	522,5	470,5	512	9,4	5	7	99,0
	579	483	555	9,4	5	11	280
440	-	480	503	9,4	5	-	51,5
	541,6	480	503	9,4	5	6	50,9
	514,6	480	-	9,4	5	6	50,9
	-	503,5	543,5	9,4	5	-	140
	563,5	503,5	543,5	9,4	5	7	138
	563,5	503,5	543,5	9,4	5	7	138
	608	507	583	9,4	5	11	320
460	-	506	531	9,4	5	-	77,5
	543,3	506	531	9,4	5	7	76,9
	543,3	506	-	9,4	5	7	76,9
	-	512	564	9,4	5	-	145
	577	512	564	9,4	5	7	141
	577	512	564	9,4	5	7	141
	638	527	609	9,4	5	14	365

Double Row Full Complement Cylindrical Roller Bearings



Dimensions				Basical radial load		Speed Ratings		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	n_g grease	n_g oil	
mm				kN			$[\text{min}^{-1}]$	
480	600	118	3	1597	4838	210	400	NNC4896 V
	600	118	3	1597	4838	210	400	NNCF4896 V
	600	118	3	1597	4838	210	400	NNCL4896 V
	650	170	5	3270	8420	180	360	NNC4996 V
	650	170	5	3270	8420	180	360	NNCF4996 V
	650	170	5	3270	8420	180	360	NNCL4996 V
	700	300	6	6710	15300	170	360	NNCF5096 V
500	620	118	3	1625	4987	200	380	NNC48/500 V
	620	118	3	1625	4987	200	380	NNCF48/500 V
	620	118	3	1625	4987	200	380	NNCL48/500 V
	670	170	5	3350	8850	170	360	NNC49/500 V
	670	170	5	3350	8850	170	360	NNCF49/500 V
	670	170	5	3350	8850	170	360	NNCL49/500 V
	720	300	6	6820	15900	170	360	NNCF50/500 V
530	650	118	3	5285	5285	180	340	NNC48/530 V
	650	118	3	2285	5285	180	340	NNCF48/530 V
	650	118	3	5285	5285	180	340	NNCL48/530 V
	710	180	4	10100	10100	160	340	NNC49/530 V
	710	180	4	10100	10100	160	340	NNCF49/530 V
	710	180	4	10100	10100	160	340	NNCL49/530 V

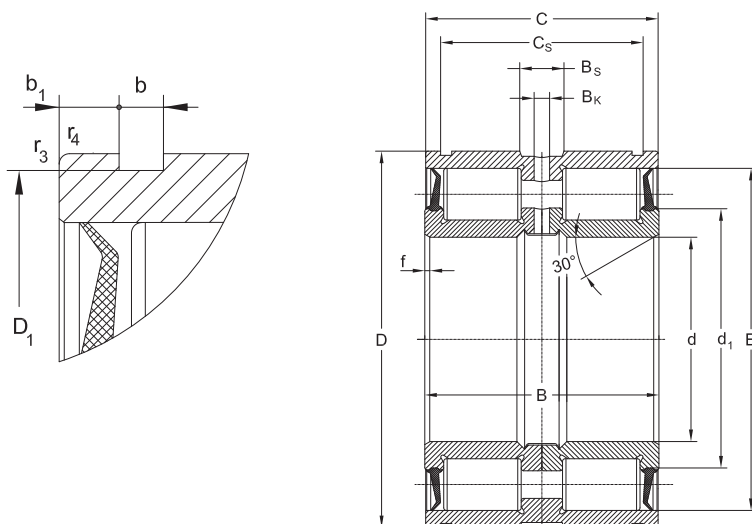
Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet
dimensions see on
page 209*

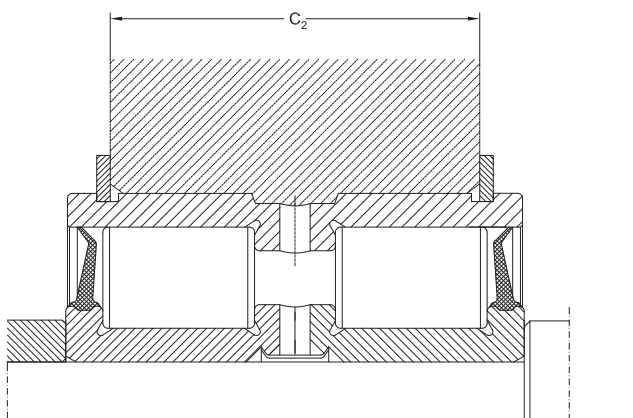
Dimensions							Mass
d	E	d _i ≈	D _i ≈	B _s ≈	B _k	s ≈	Bearing
							[kg]
480	-	530	555	9,4	5	-	80
	567,3	530	555	9,4	5	7	89,8
	567,3	530	-	9,4	5	7	89,8
	-	537	592	9,4	5	-	170
	605,5	537	592	9,4	5	8	166
	605,5	537	592	9,4	5	8	166
	657	548	630	9,4	5	14	380
500	-	547	571	9,4	5	-	82,5
	583,5	547	571	9,4	5	7	83,0
	583,5	547	-	9,4	5	7	83,0
	-	568,5	610,5	9,4	5	-	179
	631,5	568,5	610,5	9,4	5	8	175
	631,5	568,5	610,5	9,4	5	8	175
	678	569	651	9,4	5	14	390
530	-	577,5	602,5	9,4	5	-	87,5
	615	577,5	602,5	9,4	5	6	87,2
	615	577,5	-	9,4	5	6	87,2
	-	588	648	9,4	5	-	208
	663	588	648	9,4	5	8	205
	663	588	648	9,4	5	8	205

Sealed Double Row Full Complement Cylindrical Roller Bearings



Dimensions						Basical radial load		Speed Ratings	Designation
d	D	B	C	C _s	r ₃ , r ₄ min.	dyn. C _r	stat. C _{0r}		
mm						kN		[min ⁻¹]	
25	47	30	29	24,7	0,3	44,5	65,3	3000	NNF5005 2LSV
30	55	34	33	28,2	0,3	48,5	70	2600	NNF5006 2LSV
35	62	36	35	30,2	0,3	66	95,8	2200	NNF5007 2LSV
40	68	38	37	32,2	0,6	79	121	2000	NNF5008 2LSV
45	75	40	39	34,2	0,6	95,1	150	1800	NNF5009 2LSV
50	80	40	39	34,2	0,6	101	162	1700	NNF5010 2LSV
55	90	46	45	40,2	0,6	119	195	1500	NNF5011 2LSV
60	95	46	45	40,2	0,6	123	210	1400	NNF5012 2LSV
65	100	46	45	40,2	0,6	128	224	1300	NNF5013 2LSV
70	110	54	53	48,2	0,6	190	337	1200	NNF5014 2LSV
80	125	60	59	54,2	0,6	233	420	1000	NNF5016 2LSV
90	140	67	66	59,2	0,6	297	552	900	NNF5018 2LSV
100	150	67	66	59,2	0,6	314	580	850	NNF5020 2LSV
110	170	80	79	70,2	0,6	380	699	750	NNF5022 2LSV

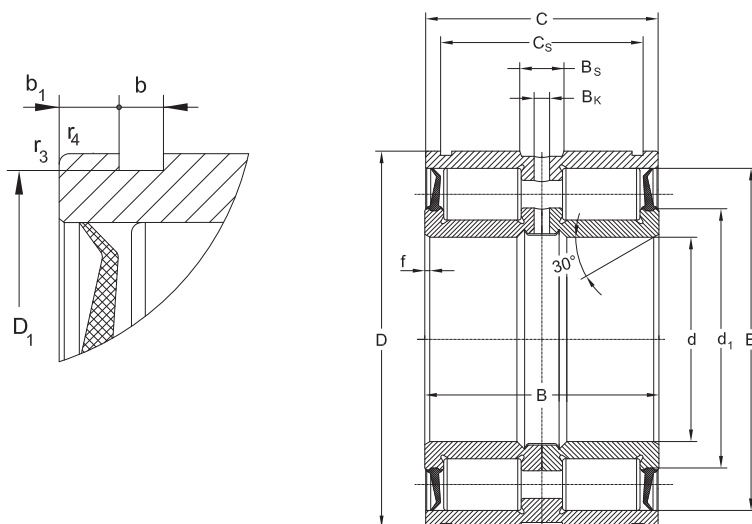
Sealed Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet
dimensions see on
page 209*

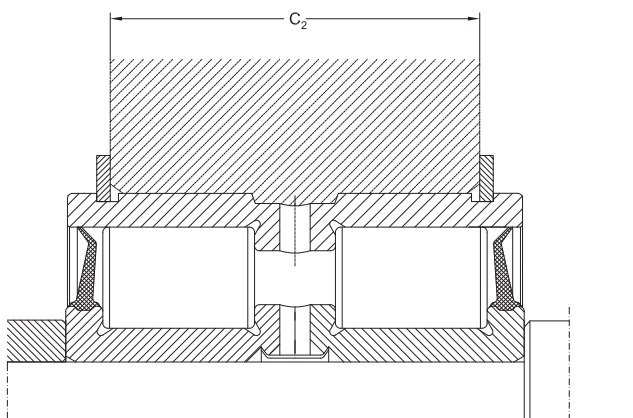
Dimensions										Mass	
d	d ₁ ≈	D ₁ ≈	E	b	b ₁	B _s ≈	B _k	f	C ₂ ± 0,1	Adequate snap ring according to DIN 471	Bearing
											[kg]
25	33	44,8	40,4	1,8	2,15	4,5	3	0,5	21	47x1,75	0,23
30	39	52,8	47,9	2,1	2,4	4,5	3	0,5	24	55x2	0,35
35	45	59,8	54,5	2,1	2,4	4,5	3	0,5	26	62x2	0,45
40	50,5	65,8	61	2,7	2,4	4,5	3	0,8	27	68x2,5	0,53
45	56,4	72,8	67,7	2,7	2,4	4,5	3	0,8	29	75x2,5	0,68
50	61,2	77,8	72,5	2,7	2,4	4,5	3	0,8	29	80x2,5	0,73
55	68	87,4	80	3,2	2,4	4,5	3,5	1	34	90x3	1,10
60	73	92,5	85	3,2	2,4	4,5	3,5	1	34	95x3	1,20
65	78	97,4	90	3,2	2,4	4,5	3,5	1	34	100x3	1,30
70	85	107,1	100	4,2	2,4	5	3,5	1	40	110x4	1,85
80	97	122,1	113,5	4,2	2,4	5	3,5	1,5	46	125x4	2,70
90	109	137	127,5	4,2	3,4	5	3,5	1,5	51	140x4	3,80
100	118	147	138	4,2	3,4	6	3,5	1,5	51	150x4	4,05
110	132	167	154,5	4,2	4,4	6	3,5	1,8	62	170x4	6,45

Sealed Double Row Full Complement Cylindrical Roller Bearings



Dimensions						Basical radial load		Speed Ratings	Designation
d	D	B	C	C _s	r ₃ , r ₄ min.	dyn. C _r	stat. C _{0r}		
mm						kN		[min ⁻¹]	
120	180	80	79	71,2	0,6	402	745	700	NNF5024 2LSV
130	200	95	94	83,2	0,6	572	1050	630	NNF5026 2LSV
140	210	95	94	83,2	0,6	594	1140	600	NNF5028 2LSV
150	225	100	99	87,2	0,6	693	1310	560	NNF5030 2LSV
160	240	109	108	95,2	0,6	721	1410	500	NNF5032 2LSV
170	260	122	121	107,2	0,6	935	1800	480	NNF5034 2LSV
180	280	136	135	118,2	0,6	1080	2130	450	NNF5036 2LSV
190	290	136	135	118,2	0,6	1100	2210	430	NNF5038 2LSV
200	310	150	149	128,2	0,6	1340	2870	400	NNF5040 2LSV
220	340	160	159	138,2	1	1510	3130	360	NNF5044 2LSV
240	360	160	159	138,2	1	1570	3310	340	NNF5048 2LSV

Sealed Double Row Full Complement Cylindrical Roller Bearings

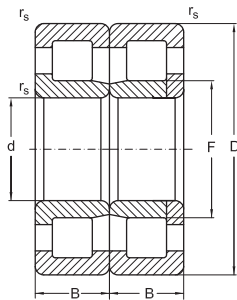


*Abutment and fillet
dimensions see on
page 209*

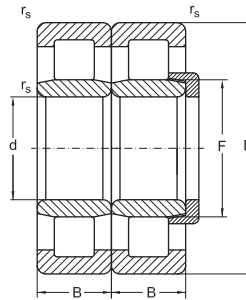
Dimensions										Mass	
d	d ₁ ≈	D ₁ ≈	E	b	b ₁	B _s ≈	B _k	f	C ₂ ± 0,1	Adequate snap ring according to DIN 471	Bearing
											[kg]
120	141	176	164	4,2	3,9	6	3,5	1,8	63	180x4	6,90
130	155	196	183,5	4,2	5,4	7	4	1,8	75	200x4	10,5
140	167	206	195,5	5,2	5,4	7	4	1,8	73	210x5	11
150	177	221	209,2	5,2	5,9	7	4	2	77	225x5	13,5
160	191	236	222,6	5,2	6,4	7	4	2	85	240x5	16,5
170	203	254	239	5,2	6,9	7	4	2	97	260x5	22,5
180	220	274	259	5,2	8,4	8	4	2	108	280x5	30
190	228	284	267,3	5,2	8,4	8	4	2	108	290x5	31,5
200	245	304	284	6,3	10,4	8	4	2	116	310x6	42
220	264	334	308,5	6,3	10,4	8	6	2	126	340x6	53,5
240	283	354	327,5	6,3	10,4	9,4	6	2	126	360x6	57,5

Cylindrical roller bearings, double row and three row

Non-standardized



NJ+NJP
WJ+WJP



WJ+WUJ

Dimensions					Basical radial load		Speed limit	Mass	Designation
d	D	B	r_s	F	dyn. C_r	stat. C_{0r}	Grease		
mm					kN				
85	170	60	3	105	578	862	2800	14,5	NJ+NJP85/170 MAP63
110	215	73	3	135,5	773	1188	2600	25,0	WJ+WJP110/215 M
	215	73	3	135,5	773	1188	2600	26,0	WJ+WUJ110/215 M
120	240	80	3	150	946	1484	2400	34,7	WJ+WJP120/240 M
	240	80	3	150	946	1484	2400	34,7	WJ+WUJ120/240 M
130	240	80	3	157	951	1620	2200	35,6	WJ+WJP130/240 M
	250	80	3	160	1028	1660	2200	37,5	WJ+WJP130/250 F
	250	80	3	160	1028	1660	2200	37,7	WJ+WJP130/250 M
	250	80	3	158	1028	1660	2200	37,8	WJ+WJP130/250 MPA
	260	86	3	164	1212	1932	2000	44,4	WJ+WJP130/260 M
140	300	102	4	180	1554	2460	1800	71,6	WJ+WJP140/300 M
	300	102	4	180	1554	2460	1800	71,6	WJ+WUJ140/300 M
160	320	102	4	200	1630	2676	1500	81,6	WJ+WJP160/320 FC4

Cylindrical roller bearings, single row

Non-standardized

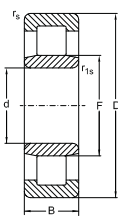


fig. 1

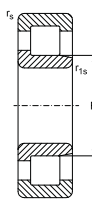


fig. 2

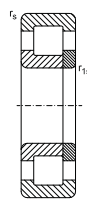


fig. 3

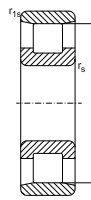


fig. 4

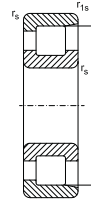


fig. 5

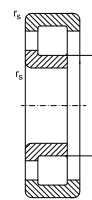


fig. 6



fig. 7

Dimensions						Fig. Basic radial load		Speed limit		Mass	Designation	
d	D	B	r _s	r _{1s} min	E, F	C _r	stat. C _{0r}	Grease Oil				
mm						kN						
20	47	14	1	0,6	40	5	15,2	12,5	15000	18000	0,110	NF204
	52	15	1,1	0,6	44,5	5	21,1	17,1	12000	15000	0,152	NF304 M
25	62	17	1,1	1,1	34	2	41,2	37	10000	13000	0,243	NJ305 EC3VB133
30	67	16	0,6	1	38,5	3	23,4	21,5	10000	12500	0,296	NUP5806
	67	16	0,6	1	38,5	3	23,4	21,5	10000	12500	0,296	NUP5806 NA
	72	19	1,1	1,1	62	4	38,7	35,2	8500	10000	0,346	N306 F2
32	72	19	1,5	1,1	62	4	38,3	34,8	8000	9500	0,346	N30/32
	72	19	1,5	1,5	61,8	5	55,5	56,8	8000	9500	0,370	NF5306 NV
35	80	21	1,5	1,1	68,2	5	47,3	44,1	7700	8700	0,485	NF307
40	80	18	1,1	1,1	70	5	43,7	42,9	8000	9500	0,380	NF208
	90	23	1,5	1,5	77,5	5	56,2	53,8	7000	8500	0,660	NF308
45	85	19	1,1	1,1	75	5	46	46,9	7500	9000	0,445	NF209 M
	100	25	1,5	1,5	86,5	5	72	70	6000	7000	0,895	NF309
	100	25	1,5	1,5	58,5	6	72	70	6000	7000	0,870	NUPJ309
	100	25	1,5	1,5	58,5	6	96,9	97,7	6000	7000	0,895	NUPJ309 E
	100	25	1,5	1,5	58,5	13	96,9	97,7	6000	7000	0,895	NUPJ309 ENMAZS
	100	36	2	1,5	86,5	5	103	110	6000	7000	1,29	NF2309 M
50	90	20	1,1	1,1	80,4	5	48,2	51	6700	8000	0,490	NF210
	90	20	1,1	1,1	80,4	5	48,2	51	6700	8000	0,490	NF210 M
	90	20	1,1	1,1	59,5	6	63,7	68,3	6700	8000	0,490	NUPJ210 EMA
	90	23	0,5	0,5	57,8	3	91,1	98,4	2500	3200	0,632	NUP2210
	110	44,5	2	2	62	3	124	163	5300	6300	2,28	NUP5410 MA
	110	27	2	2	95	5	86,9	86,2	8500	6500	1,14	NF310
55	100	21	1,5	1,1	88,5	5	57,9	62,5	6300	7500	0,665	NF211
	100	21	1,5	1,1	88,5	5	57,9	62,5	6300	7500	0,665	NF211 M
	110	22	2,5	2,5	72	2	93,4	102	5000	6000	0,922	NJ5111 E
	120	29	2	2	70,5	6	109	109	5000	6000	1,47	NUPJ311
	120	29	2	2	70,5	6	138	150	4500	5600	1,52	NUPJ311 E
	120	29	2	2	70,5	13	138	150	4500	5600	1,47	NUPJ311 ENMA
	120	29	2	2	104,5	5	109	109	5000	6000	1,47	NF311
	120	29	2	2	104,5	5	109	109	5000	6000	1,65	NF311 M
57.15	114,30	28	1,5	1,5	99,6	5	84,5	88,7	5000	6000	1,45	NF5211 MB

Cylindrical roller bearings, single row

Non-standardized

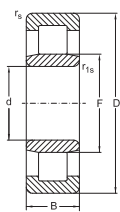


fig. 1

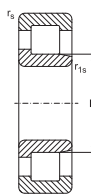


fig. 2

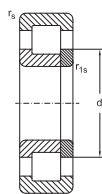


fig. 3

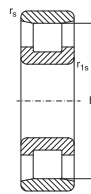


fig. 4

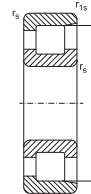


fig. 5

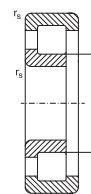


fig. 6

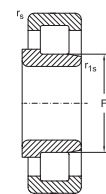


fig. 7

Dimensions						Fig. Basic radial load		Speed limit		Mass	Designation	
d	D	B	r _s	r _{1s} min	E, F	C _r	stat. C _{0r}	Grease Oil				
mm						kN						
60	110	22	1,5	1,5	100	2	93,4	101	5600	6700	0,825	NJ212 E/X
65	120	23	1,5	1,5	105,6	5	80,5	89,7	5300	6300	1,05	NF213
70	125	24	1,5	1,5	83,5	3	118	136	5000	6000	1,17	NUP2214 EW7
	150	35	2,1	2,1	89	13	203	220	4000	4800	2,80	NUPJ314 EN
	150	35	2,1	2,1	89	13	203	220	4000	4800	2,80	NUPJ314 ENMA
	150	35	2,1	2,1	89	13	203	220	4000	4800	2,80	NUPJ314 ENMAZS
	150	35	2,1	2,1	89	6	203	220	4000	4800	2,73	NUPJ314 EMA
	240	80	3	3	143	7	664	863	3200	4000	22,94	CR0136.14
75	130	25	1,5	1,5	116,5	5	92,5	106	4800	5600	1,28	NF215
80	140	26	2	2	125,3	5	106	122	4300	5000	1,54	NF216
	140	26	2	2	125,3	8	106	122	4300	5000	1,54	NP216
	140	26	2	2	127,3	8	139	166	4300	5000	1,54	NP216 EM
	140	26	2	2	127,3	6	139	166	4300	5000	1,51	NUPJ216 E
90	160	30	2	2	143	5	149	174	3800	4500	2,36	NF218
	190	43	3	3	165	5	237	261	3200	3800	5,42	NF318
	190	43	2,1	2,1	115	6	237	261	3200	3800	5,38	NUPJ318 M

Cylindrical roller bearings, single row

Non-standardized

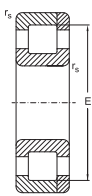


fig. 8

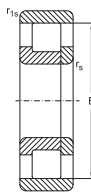


fig. 9

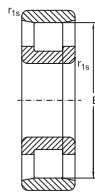


fig. 10



fig. 11

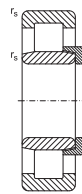


fig. 12

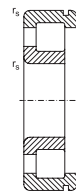


fig. 13

Dimensions						Fig. Basic radial load		Speed limit		Mass	Designation	
d	D	B	r _s	r _{1s} min	E, F	dyn. C _r	stat. C _{0r}	Grease Oil				
mm						kN						
95,25	133,35	19,05	1,5	1,1	123	4	60,9	83,7	3600	4300	0,85	N5319 MBP5
99,5	180	46	2,1	2,1	120	2	270	360	3000	3600	5,32	NJ2220 MF2
100	215	47	3	3	185,5	9	309	354	3000	3600	8,525	NP320 M
	215	73	3	3	127,5	1	570	717	2600	3200	12,0	NU2320 EMW33
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	NU2320 MAW33
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	NU2320 MW33
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	NU2320 W33
	215	73	3	3	127,5	12	568	714	2600	3200	12,0	NUJ2320 EM
	215	47	3	3	185,5	10	308	352	2800	2400	8,67	NT5220 MNA
112	170	38	2	1	127	1	181	264	3000	3600	3,15	NU5120
130	165	22	2	1	155,5	6	78,1	146	3300	4100	1,21	N5126 MB
	200	33	1	1	148	1	163	221	3000	3600	3,91	2002826 LM
	165	22	2	1	155,5	6	78,1	146	3300	4100	1,2	NU1026 M

Cylindrical roller bearings, single row

Non-standardized

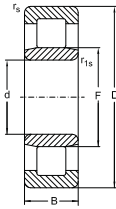


fig. 1



fig. 2

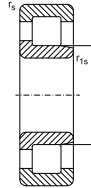


fig. 3



fig. 4

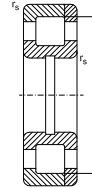


fig. 5

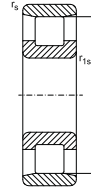


fig. 6

Dimensions						Fig. Basic radial load			Speed limit		Mass	Designation
d	D	B	r _s	r _{1s} min	E, F	dyn. C _r	stat. C _{0r}	Grease	Oil			
mm						kN						
150	225	45	2,1	1,5	168,5	1	338	527	2200	2600	6,49	NU2030 EMC3ZS
	240	25	1,5	1,5	216	6	169	259	2200	2600	4,31	NG160 M
165,1	279,4	39,687	2	1,5	188,1	3	424	516	2200	2800	10,9	65RIT292
180	280	31	1,5	1,5	250,1	6	258	401	1800	2200	7,71	NG180 M
	320	52	4	4	282	8	516	717	1800	2200	18,8	NF236 M
190	290	60	2,1	2,1	214	1	616	561	1700	2000	14,8	NU2038 EMC3ZS
220	340	56	3	3	250	3	650	1047	1300	1600	19,3	NJ1044 B/M/R204
240	400	65	4	4	270	16	778	1113	1400	1700	41,6	NUJ244 M
	319,975	48	2	1,5	300	6	405	736	1500	1800	10,7	N5248 MBP5NA
	320	48	2 ¹⁾	2	261	1	361	684	1500	1800	11,2	NU2948 MAP63
285,75	387,35	69,85	2,5	2,5	368	6	748	1533	1500	1700	24,7	491457 M
300	380	48	1,5	2,1	321	2	479	988	1400	1600	14,3	NJ2860 EMA
305	460	65	5	5	422	7	884	1418	1400	1700	38,775	N10/305 NA
381	508	63,5	4	4	406,5	3	951	1688	900	1100	37,0	NJ5176 MW33

Cylindrical roller bearings, single row

Non-standardized

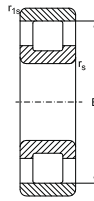


fig. 7

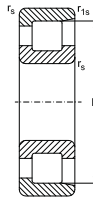


fig. 8

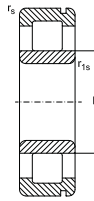


fig. 9

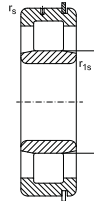


fig. 10

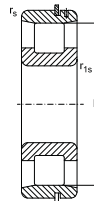


fig. 11

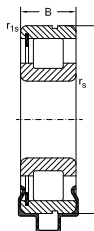


fig. 12

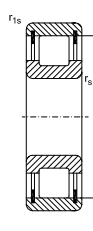


fig. 13

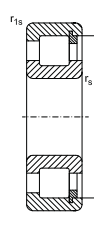


fig. 14

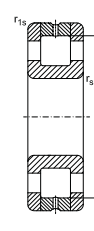


fig. 15

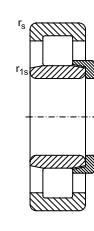


fig. 16

Dimensions					Fig. Basic radial load		Speed limit		Mass	Designation		
d	D	B	r _s	r _{1s} min	E, F	C _r	stat. C _{0r}	Grease Oil				
mm						kN						
25	62	17	1,1	1,1	53	13	39,3	37,5	3800	4500	0,277	N2R305 V
	67	15	0,6	0,6	31,5	10	29,3	27,7	10400	13000	0,317	NU5305 ENR
	67	15	1	0,6	53,5	11	23,4	21,5	10400	13000	0,267	N5805 NR
	67	15	1	0,6	53,5	11	23,4	21,5	10400	13000	0,267	N5805 NRC3NA
30	62	24	1	1	54	13	44,2	47	8000	10000	0,320	N2R5706
	67	16	1	0,6	53,5	11	23,4	21,5	10000	12500	0,274	N5806 NRP6
	67	15	1	0,6	53,5	11	23,4	21,5	10000	12500	0,270	N5806 NRP6F2
	67	16	1	0,6	53,5	11	23,4	21,5	10000	12500	0,274	N5806 NRP6NA
	80	21	1	1	67,8	13	73,9	84,5	3000	3600	0,578	N2R5206 V
	62	19	1	1	54,5	13	51,4	57,7	3700	4700	0,266	N2R5906 V
32	72	19	2	1,5	61,8	12	55,5	56,8	8000	9500	0,370	NF5306 NV
34,991	72	20,638	1,6	4	62,471	14	67,6	77,6	7000	8500	0,40	482307 V
35	72	23	0,6	1,6	64,7	13	68,7	75,7	7000	8500	0,32	N2R2207 V
	72	27	1	1	62,5	13	63,7	72,5	7000	8500	0,524	N2R5207
	80	23	1,5	0,6	49,5	9	58	61	6300	8000	0,613	NUC5107 NM
40	80	18	1,4	1	71,5	13	61	62,6	2800	3400	0,403	N2R5108 V
	90	23	1	1	78	13	71,8	70,3	5600	7000	0,743	N2R308
	90	23	1,6	1,6	77,663	13	72	71,4	5600	7000	0,72	482208
45	85	19	1	1	74,2	13	59,7	66,1	2600	3000	0,484	N2R209 V
	85	23	1,1	1,1	74,2	13	80	96,5	2400	2800	0,60	N2R2209 V
	100	25	1,6	1,6	88,25	13	110	111	2200	2600	0,94	N2R309 V
50	80	15	1	1	72,5	13	41,5	51,2	2800	3500	0,267	N2R5510 V
55	140	57	2	2	117,2	15	175	392	1400	2000	4,80	N2P5611 MBW33
65	140	33	3	1,5	121,3	13	152	163	3000	4300	2,43	N2R5613 VC4
	140	33	3	1,5	121,3	14	197	231	1400	2000	2,59	NFR5113 VC4
70	150	35	2,1	2,1	129,3	13	173	188	3400	4000	2,95	N2R314

Cylindrical roller bearings, single row

Non-standardized

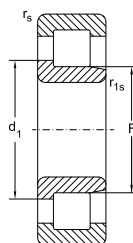


fig. 2

Dimensions					Basical radial load		Speed limit		Designation
d	D	B	r _s	r _{1s} min	dyn. C _r	stat. C _{0r}	Grease	Oil	
mm					kN				
100	180	60,3	2,1	2,1	414	631	1200	1500	NJ5220 VC3
	180	60,3	2,1	2,1	414	631	1200	1500	NJ5220 VH
	215	73	3		655	830	800	1600	NJ2320 VH
	125	13	1	0,6	33,6	55,3	4400	5500	NJ1820 VH
110	240	80	3		830	1060	700	1400	NJ2322 VH
120	260	86	3		950	1220	630	1200	NJ2324 VH
130	230	64	3	3	591	853	600	1200	NJ130X230X64 V
	280	93	4		1100	1430	560	1000	
140	300	102	4		1250	1630	530	950	NJ2328 VH
150	320	108	4		1500	2000	500	900	NJ2330 VH
160	340	114	4		1630	2200	450	800	NJ2332 VH
170	360	120	4		1760	2400	450	800	NJ2334 VH
180	380	126	4		1900	2700	400	700	NJ2336 VH
190	400	132	5		2080	2900	400	700	NJ2338 VH
200	420	138	5		2320	3250	380	670	NJ2340 VH

Dimensions			Fig.				Mass
d	E	F		D ₁	d ₁	s	
mm				kN			
100	160,6	120,6	2	150	129	0,75	6,684
	160,6	120,6	2	150	129	4	6,684
	187,3	119,3	2	173,7	131,5		13,0
		106,5	2				0,382
110	171,35	133,35	2	194,2	147		17,8
120	231,4	147,4	2	214	162,5		22,3
130		152	2	196,8	163,2		11,11
	247,95	157,95	2	229,9	174,1		27,9
140	264,46	168,46	2	245,3	184,7		34,9
150	286,5	182,5	2	265,7	201,2		41,6
160	308,55	196,55	2	286	216,7		48,8
170	319,56	203,56	2	296,4	224,5		59,2
180	337,74	221,74	2	314,6	242,6		69,6
190	352,62	224,6	2	327	247,6		80,0
200	374,66	238,65	2	347,5	263,2		91,6

Cylindrical roller bearings, single row

Non-standardized

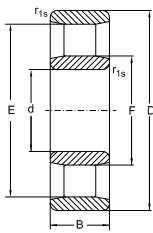


fig. 1

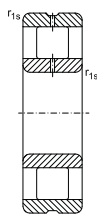


fig. 2

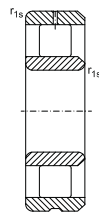


fig. 3

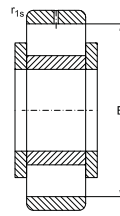


fig. 4

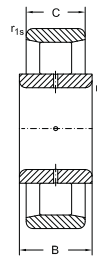


fig. 5

Dimensions								Fig. Basic radial load dyn. stat.		Speed limit		Mass	Designation	
d	D	B	C	r _s	r _{1s} min	E	F	C _r	C _{0r}	Grease Oil				
mm								kN						
50,8	110	45,3	44,5	2	1,5	95,5	65,5	5	164	195	4300	5600	2,23	NUNB5210 MW44
58	96	51,6	43,6	1,5	1,5	86	68	4	160	146	4300	6000	1,30	NUN5212
	96	51,6	43,6		0,3		68	4	159	264	6400	8000	1,378	NUN5212 FC3
	96	51,6	43,6	1,3	1,3	86	68	5	160	146	4300	6000	1,38	NUNB5212 FC3
65	120	52,4		1,5	0,6	104,8	79,7	1	203	298	3600	4800	2,60	NUN5613
70	125	60,3		1,5	0,6	109,6	84,1	1	229	353	3400	4500	3,10	NUN5114
80	140	46		2	0,6	122,3	93,7	1	208	297	3000	4000	2,98	NUN5216
	140	66,6		2	2	123,8	95,2	1	329	541	3000	4000	4,44	NUN5716 F2
85	150	49,2		2	2	133,4	101,6	1	272	359	2800	3800	3,82	NUN3217 W20
95	170	55,6		3	2,1	151,1	113,5	1	363	536	2600	3400	5,16	NUN2R3219 F2
	170	55,6		3	2,1	151,1	113,5	1	363	536	2600	3400	5,67	NUN3219 W20F2
101,6	139	76,2		2	1,5	139,6	114,2	1	358	685	2800	3800	4,74	NUN5320 W33F2
152,4	209,55	53,975		1,25	2,5	165	165	3	345	626	2600	3300	5,700	B6460
180	310	149						1	1512	2670	2000	2500	51,95	NUN5136 M
285,75	387,35	69,85			2,5		318	2	743	1534	1400	1800	23,933	49137
345	406	28			1,5		362	1	215	486	1300	1600	7,215	NUN5169 M

Cylindrical roller bearings, single row

Combined roller thrust ball bearings

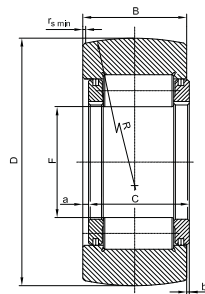


fig. 1

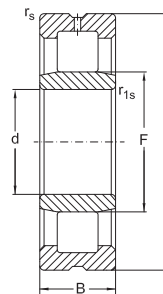


fig. 2

Dimensions							Fig. Basic radial load dyn. C _r	Mass stat. C _{0r}	Designation		
d	D	D ₁	B	r _s	r _{1s} min	E, F					
mm										kN	
20	52		21	1,1	0,3	25,77	2	49,7	45,3	0,21	ZRL2443
190	170		60	1	6	80,03	1	219,2	292,4	7,8	482916 VHS0

Cylindrical roller bearings, single row

Non-standardized

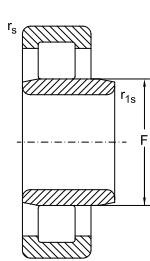


fig. 7

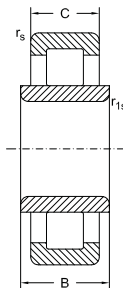


fig. 8

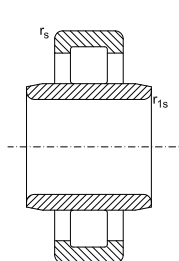


fig. 9

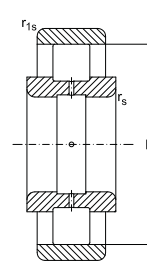


fig. 10

Dimensions							Fig. Basic radial load		Speed limit		Mass	Designation	
d	D	B	C	r _s	r _{1s}	E,F	dyn.	stat.					
					min		C _r	C _{0r}	Grease	Oil			
mm							kN						
20	47	18	14	1	0,6	26,5	8	25,7	22,6	15000	18000	0,112	NUB204 E
25	52	18	15	1	0,6	31,5	8	29,3	27,7	12000	15000	0,140	NUB205 E
	62	24	17	1,1	1,1	34	8	41,2	37	10000	13000	0,243	NUB305 E
30	62	20	16	1	0,6	37,5	8	39,7	37,9	10000	13000	0,24	NUB206 E
40	80	23	18	1,1	1,1	49,5	8	53,1	52,1	8000	9500	0,47	NUB208 E
	80	23	18	1,1	1,1	49,5	8	53,1	52,1	8000	9500	0,47	NUB208 EK
45	85	23	19	1,1	1,1	54,5	8	61,7	64,6	7500	9000	0,46	NUB209 E
50	90	23	20	1,1	1,1	59,5	8	63,7	68,3	6700	8000	0,52	NUB210 E
	90	40	20	2	1,5	60,4	8	47,8	50,4	6000	7000	0,641	NUB5110 NA
50,8	110	45,3	44,5	2	2	65,5	10	164	195	5600	6700	2,11	NB5210 S3W44
60	110	28	22	1,5	1,5	72	8	94	102,3	5600	6700	0,93	NUB212 E
65	120	31	23	1,5	1,5	78,5	8	108	119	5300	6300	1,18	NUB213 E
	120	48	23	1,5	1,5	79,6	8	105	115	4800	5600	1,39	NUB5313 NA
	140	49	33	2,1	2,1	83,5	8	134	137	4000	4800	2,52	NUB5213 NA
	140	66	33	2	2	83,5	9	135	139	4800	6000	2,82	NUB5413 NA
75	130	31	25	1,5	1,5	88,5	8	130	156	4800	5600	1,39	NUB215 E
	160	55	37	2,1	2,1	95	8	239	261	3800	4600	3,7	NUB315 E
85	150	54	28	2	2	101,8	8	121	141	4300	5000	1,89	NUB217
	150	36	28	2	2	100,5	8	164	194	4300	5000	1,89	NUB217 E
170	310	76	52	4	4	208	8	499	677	1300	1800	21,4	NUB234 MAC3F2
	310	116	86	4	4	208	8	784	1141	1700	2000	31,9	NUB2234 MC3

Split cylindrical roller bearings, single row

Non-standardized

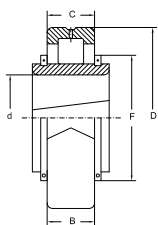


fig. 1

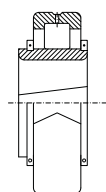


fig. 2

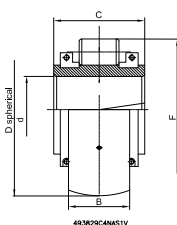


fig. 3

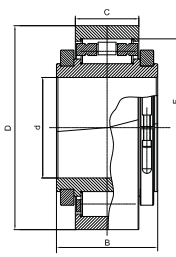


fig. 4

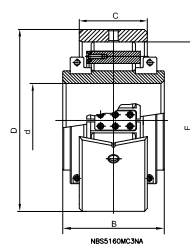


fig. 5

Dimensions					Fig.	Basical radial load		Speed limit	Mass	Designation
d	D	B	C	F		dyn. C_r	stat. C_{0r}			
mm						kN		Grease		
127	254	114,3	63,5	193	1	570	745	850	22,3	NBS5125 MA
130	222,25	98,5	54	180	4	367	503	2400	12,3	NBS5126 M
145	250	80	117,5	225	3	665	1402		18,9	493829 VC4NAS1
220	393,757	156	90,5	324,2	2	1156	1680	530	73,6	NBS5144 MA
300	438	143	74,5	388	5	850	1549	1200	58,7	NBS5160 MC3NA

URB



URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE





Double Row Cylindrical Roller Bearings

Standards, Boundary dimensions

Standard plans DIN 616
Double row cylindrical roller bearings,
DIN 5412 / part 4

General

Double Row Cylindrical Roller Bearings of series NN30.. and NNU 49 are separable radial bearings.

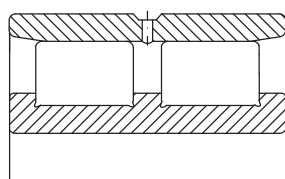
They are frequently used as non - locating bearings arrangements of working spindles for machine tools. Therefore, these bearings are often used in high precision tolerance class, frequently in combination with reduced internal clearance. These bearings also feature high radial load capacity and are satisfactory for high speed applications, providing a very stiff and rigid bearing arrangement. They are also commonly used with tapered bores, namely suffix K, (i.e. taper 1:12).

Design variants of Double Row Cylindrical Roller Bearings

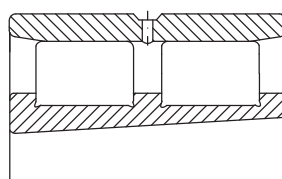
Double Row Cylindrical Roller Bearings of series NN 30.. and NNU 49.. are produced and available either with or without tapered bores, as standard (see also Abb, 1).

Bearings of series NN 30.. comprise of a plain outer ring and an inner ring with three integral shoulders to guide the two separate rows of rollers around the raceway. These bearings series are produced with lubrication facilities in their outer ring, such as a circumferential lubrication groove and holes as standard, namely suffix W33.

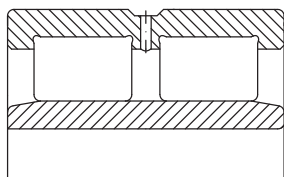
Unlike the NN30.. series the double row cylindrical roller bearings of the NNU 49.. series feature opposite internal design characteristics, (i.e. outer ring with 3 integral shoulders around the raceway and a plain inner ring). These bearing series also feature lubrication facilities in their outer ring as standard, also namely, suffix W33.



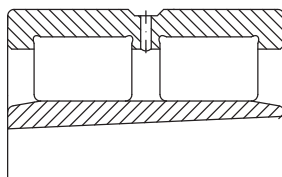
NN30..W33



NN30..K..W33



NNU49..W33



NNU49..K..W33

Cylindrical roller bearings of series BB30.. and NNU49.. allow for compensation of length changes within the bearings itself. In this way they are ideal non-locating bearings.

Both bearing rings may be mounted with heavy interference fit to shaft and housing.

Misalignment

Double Row Cylindrical Roller bearings are not able to accomodate misalignments.

Tolerances

Double Row Cilindrical Roller Bearings of series NN 30.. and NNU 49.. are frequently used as spindle bearings.

Consequently, they are also available with closer tolerance classes, such as P4 or SP, as standard.

On request these bearings are also be produced to other tolerance classes.

Detailed tolerance values, for URB double row cylindrical roller bearings and URB double row cylindrical roller bearings in spindle bearing design, tolerance class SP, are listed in the table shown in the chapter "Bearing tolerances" page 32.

Cages

URB Double Row Cylindrical Roller Bearings of the series NN 30.. and NNU 49.. are produced with roller riding solid brass cages as standard.

Internal clearance

URB Double Row Cylindrical Roller Bearings are produced with normal internal clearance (clearance group CN, historically designated C0) as standard. Other internal radial clearances are produced upon order request.

NOTE:

URB Double Row Cylindrical Roller Bearings of series NN 30.. and NNU 49.. produced to high precision design are frequently used with reduced internal radial clearance (clearance group C1).

As these bearings are produced to very closed tolerances, under no circumstances should

components be mixed or exchanged with other bearing parts.

The value of internal clearance groups of URB Cylindrical Roller Bearings are listed in the tables on page 205.

These Values conform, as far as they are standardised, and conform to DIN 620/part 4 and ISO 5753-1991, respectively.

Minimum load

The minimum load applied to fast rotating double row cylindrical roller bearings should be higher than 4 % of its dynamic load rating C_r .

Equivalent Dynamic bearing load

Since double Row Cylindrical Roller Bearings of series NN 30.. and NNU 49.. are non - locating bearings, they are not able to accomodate any thrust loads.

$$P = F_r$$

Equivalent static bearing load

For Single and Double row cylindrical roller bearings:

$$P_0 = F_r$$

Mounting

When handling High Precision double row cylindrical roller bearings particular attention must be paid to the relevant instructions of fitting and mounting of these bearings.

When double row cylindrical roller bearings, with tapered inner bores, are mounted the effect on the running clearance can be adjusted to obtain a specific clearance or preload.

As these bearing types are separable under no circumstances should either components or assembled bearings be mixed or exchanged with other bearing parts.

Abutment and fillet dimensions for Double row cylindrical roller bearings

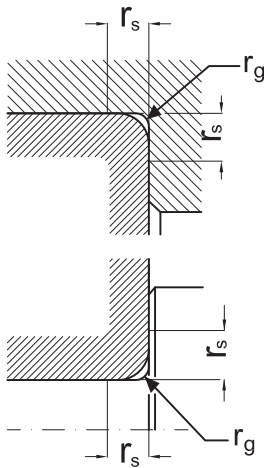
The bearing rings must only contact adjacent parts with their side faces. The bearing corners must not touch the corner fillet radii or either the shaft or housing corners.

Therefore, the largest fillet radius (r_g) must be smaller than the minimum fillet dimension of the bearings rings (r_s) as listed in the bearing tables, also see next page.

Recommendations for the dimensions of adjacent parts are listed in **DIN 5418**.

Abutment and fillet dimensions for Double Row Cylindrical Roller Bearings

Dimensions are in [mm]



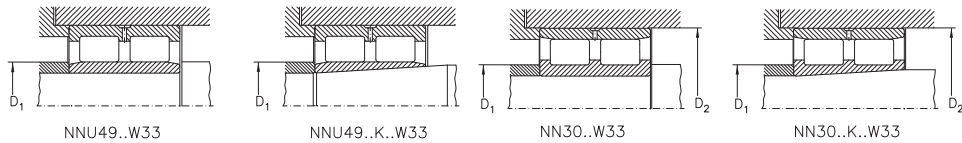
URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE



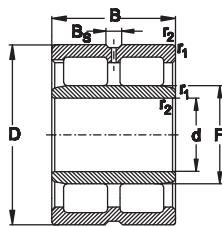
Abutment and fillet dimension for Double row Cylindrical Roller Bearings

All dimensions are in [mm]

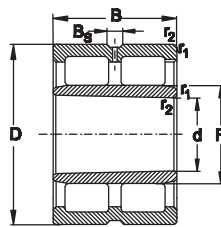


Shaft diameter d mm	for Bearings series				
	NNU 49, NNU 49 K		NN 30, NN 30 K		
	Type	D ₁ max	Type	D ₁ min	D ₂ min max
30	-	-	NN3006	35	49 50
35	-	-	NN3007	40	56 57
40	-	-	NN3008	45	62 63
45	-	-	NN3009	50	69 70
50	-	-	NN3010	55	74 75
55	-	-	NN3011	61	82 84
60	-	-	NN3012	66	87 89
65	-	-	NN3013	71	92 94
70	-	-	NN3014	76	102 104
75	-	-	NN3015	81	107 109
80	-	-	NN3016	86	115 119
85	-	-	NN3017	91	120 124
90	-	-	NN3018	98	129 133
95	-	-	NN3019	103	134 137
100	NNU4920	112	NN3020	108	139 142
105	NNU4921	117	NN3021	114	148 151
110	NNU4922	122	NN3022	119	157 161
120	NNU4924	133	NN3024	129	167 171
130	NNU4926	145	NN3026	139	184 191
140	NNU4928	155	NN3028	149	194 201
150	NNU4930	167	NN3030	160	208 215
160	NNU4932	177	NN3032	170	222 230
170	NNU4934	187	NN3034	180	239 250
180	NNU4936	200	NN3036	190	258 270
190	NNU4938	210	NN3038	200	268 280
200	NNU4940	223	NN3040	210	285 300
220	NNU4944	243	NN3044	232	313 328
240	NNU4948	263	NN3048	252	334 348
260	NNU4952	289	NN3052	275	368 385
280	NNU4956	309	NN3056	295	388 405
300	NNU4960	335	NN3060	315	422 445
320	NNU4964	335	NN3064	335	442 465

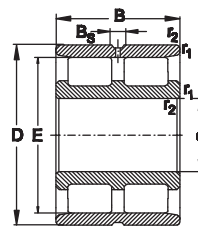
Double Row Cylindrical Roller Bearings



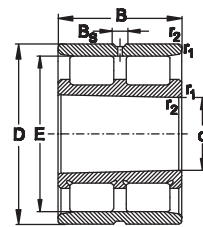
NNU49...W33



NNU49...K...W33



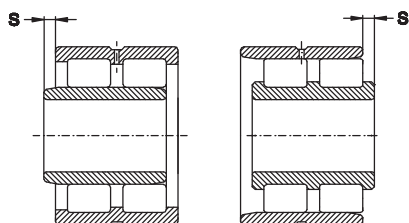
NN30...W33



NN30...K...W33

Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min ⁻¹		
30	55	19	1	29	34	16000	19000	NN3006 MW33
	55	19	1	29	34	16000	19000	NN3006 KMW33
35	62	20	1	39,3	50	14000	17000	NN3007 MW33
	62	20	1	39,3	50	14000	17000	NN3007 KMW33
40	68	21	1	45	58,5	12000	15000	NN3008 MW33
	68	21	1	45	58,5	12000	15000	NN3008 KMW33
45	75	23	1	54	72	11000	14000	NN3009 MW33
	75	23	1	54	72	11000	14000	NN3009 KMW33
50	80	23	1	57	80	10000	13000	NN3010 MW33
	80	23	1	57	80	10000	13000	NN3010 KMW33
55	90	26	1,1	72	100	9000	11000	NN3011 MW33
	90	26	1,1	72	100	9000	11000	NN3011 KMW33
60	95	26	1,1	75	110	8500	10000	NN3012 MW33
	95	26	1,1	75	110	8500	10000	NN3012 KMW33
65	100	26	1,1	76,5	118	8000	9500	NN3013 MW33
	100	26	1,1	76,5	118	8000	9500	NN3013 KMW33
70	110	30	1,1	98	151	7000	8500	NN3014 MW33
	110	30	1,1	98	151	7000	8500	NN3014 KMW33
75	115	30	1,1	100	156	6700	8000	NN3015 MW33

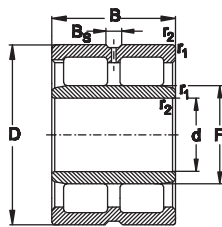
Double Row Cylindrical Roller Bearings



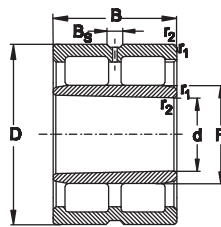
*Abutment and fillet dimensions
see on page 321*

Bearing dimensions					Mass
d	E	F	B _s	s	
mm					[kg]
30	48,5	-	4,8	1,4	0,12
	48,5	-	4,8	1,4	0,12
35	55	-	4,8	1,4	0,26
	55	-	4,8	1,4	0,26
40	61	-	4,8	1,4	0,32
	61	-	4,8	1,4	0,32
45	67,5	-	4,8	1,7	0,41
	67,5	-	4,8	1,7	0,41
50	72,5	-	4,8	1,7	0,43
	72,5	-	4,8	1,7	0,43
55	81	-	4,8	1,9	0,65
	81	-	4,8	1,9	0,65
60	86,1	-	4,8	1,9	0,67
	86,1	-	4,8	1,9	0,67
65	91	-	4,8	1,9	0,74
	91	-	4,8	1,9	0,74
70	100	-	6,5	2,3	1,1
	100	-	6,5	2,3	1,1
75	105	-	6,5	2,3	1,1

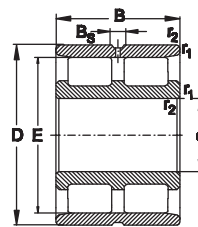
Double Row Cylindrical Roller Bearings



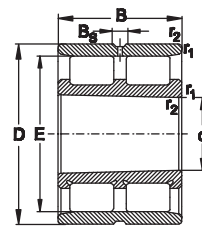
NNU49...W33



NNU49...K...W33



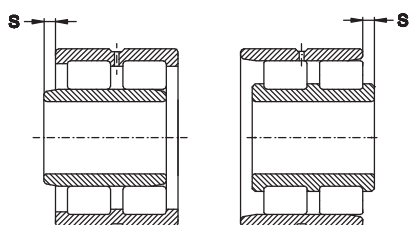
NN30...W33



NN30...K...W33

Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min ⁻¹		
75	115	30	1,1	100	156	6700	8000	NN3015 KMW33
80	125	34	1,1	120	186	6300	7500	NN3016 MW33
	125	34	1,1	120	186	6300	7500	NN3016 KMW33
85	130	34	1,1	125	200	6000	7000	NN3017 MW33
	130	34	1,1	125	200	6000	7000	NN3017 KMW33
90	140	37	1,5	141	224	5600	6700	NN3018 MW33
	140	37	1,5	141	224	5600	6700	NN3018 KMW33
95	145	37	1,5	146	236	5300	6300	NN3019 MW33
	145	37	1,5	146	236	5300	6300	NN3019 KMW33
100	140	40	1,1	129	255	5300	6300	NNU4920 MW33
	140	40	1,1	129	255	5300	6300	NNU4920 KMW33
	150	37	1,5	152	264	5300	6300	NN3020 MW33
	150	37	1,5	152	264	5300	6300	NN3020 KMW33
105	145	40	1,1	129	260	5300	6300	NNU4921 MW33
	145	40	1,1	129	260	5300	6300	NNU4921 KMW33
	160	41	2	192	310	4800	5600	NN3021 MW33
	160	41	2	192	310	4800	5600	NN3021 KMW33
110	150	40	1,1	132	270	5000	6000	NNU4922 MW33
	150	40	1,1	132	270	5000	6000	NNU4922 KMW33

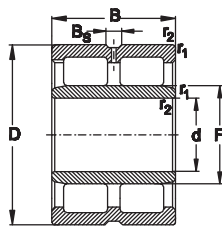
Double Row Cylindrical Roller Bearings



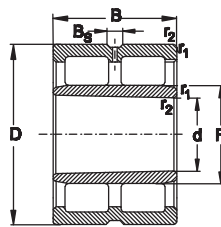
*Abutment and fillet dimensions
see on page 321*

Bearing dimensions					Mass
d	E	F	B _s	s	
mm					[kg]
75	105	-	6,5	2,3	1,1
80	113	-	6,5	2,5	1,6
	113	-	6,5	2,5	1,6
85	118	-	6,5	2,5	1,6
	118	-	6,5	2,5	1,6
90	127	-	6,5	2,5	2,1
	127	-	6,5	2,5	2,1
95	132	-	6,5	2,5	2,3
	132	-	6,5	2,5	2,3
100	-	113	6,5	2	1,9
	-	113	6,5	2	1,9
	137	-	6,5	2,5	2,2
	137	-	6,5	2,5	2,2
105	-	118	6,5	1,5	2
	-	118	6,5	1,5	2
	146	-	6,5	2,6	3
	146	-	6,5	2,6	3
110	-	123	6,5	1,5	2,1
	-	123	6,5	1,5	2,1

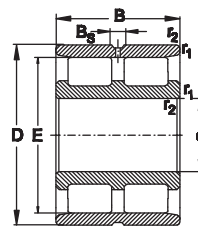
Double Row Cylindrical Roller Bearings



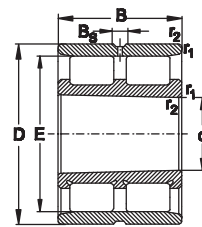
NNU49...W33



NNU49...K...W33



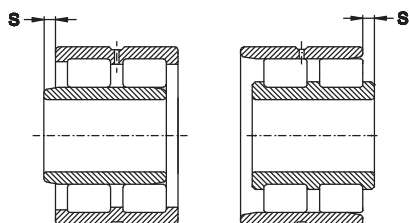
NN30...W33



NN30...K...W33

Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}		
110	170	45	2	226	365	4500	5300	NN3022 MW33
	170	45	2	226	365	4500	5300	NN3022 KMW33
120	165	45	1,1	176	340	4500	5300	NNU4924 MW33
	165	45	1,1	176	340	4500	5300	NNU4924 KMW33
	180	46	2	235	405	4300	5000	NN3024 MW33
	180	46	2	235	405	4300	5000	NN3024 KMW33
130	180	50	1,5	193	390	4000	4800	NNU4926 MW33
	180	50	1,5	193	390	4000	4800	NNU4926 KMW33
	200	52	2	294	510	3800	4500	NN3026 MW33
	200	52	2	294	510	3800	4500	NN3026 KMW33
140	190	50	1,5	190	400	3800	4500	NNU4928 MW33
	190	50	1,5	190	400	3800	4500	NNU4928 KMW33
	210	53	2	305	520	3600	4300	NN3028 MW33
	210	53	2	305	520	3600	4300	NN3028 KMW33
150	210	60	2	326	655	3600	4300	NNU4930 MW33
	210	60	2	326	655	3600	4300	NNU4930 KMW33
	225	56	2	339	600	3400	4000	NN3030 MW33
	225	56	2	339	600	3400	4000	NN3030 KMW33
160	220	60	2	335	680	3400	4000	NNU4932 MW33
	220	60	2	335	680	3400	4000	NNU4932 KMW33

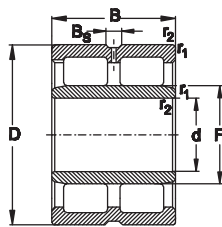
Double Row Cylindrical Roller Bearings



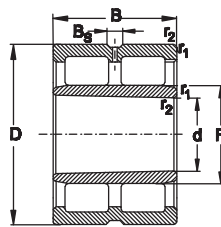
Abutment and fillet dimensions
see on page 321

Bearing dimensions					Mass
d	E	F	B _s	s	
mm					[kg]
110	155	-	6,5	2,8	3,8
	155	-	6,5	2,8	3,8
120	-	134,5	6,5	1,5	2,76
	-	134,5	6,5	1,5	2,76
	165	-	6,5	3,1	4,1
	165	-	6,5	3,1	4,1
130	-	146	6,5	2	3,79
	-	146	6,5	2	3,79
	182	-	9,5	3,35	6,1
	182	-	9,5	3,35	6,1
140	-	156	6,5	2	4,11
	-	156	6,5	2	4,11
	192	-	9,5	3,35	6,5
	192	-	9,5	3,35	6,5
150	-	168,5	6,5	2,3	6,2
	-	168,5	6,5	2,3	6,2
	206	-	9,5	3,7	7,9
	206	-	9,5	3,7	7,9
160	-	178,5	6,5	2,3	6,55
	-	178,5	6,5	2,3	6,55

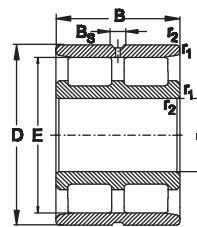
Double Row Cylindrical Roller Bearings



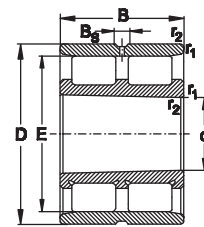
NNU49...W33



NNU49...K...W33



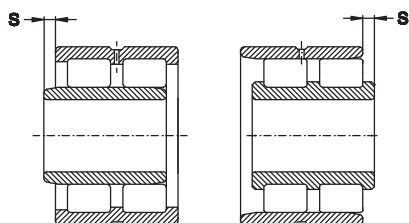
NN30...W33



NN30...K...W33

Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}		
160	240	60	2,1	388	670	3200	3800	NN3032 MW33
	240	60	2,1	388	670	3200	3800	NN3032 KMW33
170	230	60	2	340	720	3200	3800	NNU4934 MW33
	230	60	2	340	720	3200	3800	NNU4934 KMW33
	260	67	2,1	458	810	3000	3600	NN3034 MW33
	260	67	2,1	458	810	3000	3600	NN3034 KMW33
180	250	69	2	405	877	3000	3600	NNU4936 MW33
	250	69	2	405	877	3000	3600	NNU4936 KMW33
	280	74	2,1	576	1080	2800	3400	NN3036 MW33
	280	74	2,1	576	1080	2800	3400	NN3036 KMW33
190	260	69	2	412	910	2800	3400	NNU4938 MW33
	260	69	2	412	910	2800	3400	NNU4938 KMW33
	290	75	2,1	614	1088	2600	3200	NN3038 MW33
	290	75	2,1	614	1088	2600	3200	NN3038 KMW33
200	280	80	2,1	490	1040	2600	3200	NNU4940 MW33
	280	80	2,1	490	1040	2600	3200	NNU4940 KMW33
	310	82	2,1	715	1271	2400	3000	NN3040 MW33
	310	82	2,1	715	1271	2400	3000	NN3040 KMW33
220	300	80	2,1	535	1321	2400	3000	NNU4944 MW33
	300	80	2,1	535	1321	2400	3000	NNU4944 KMW33

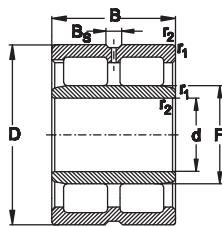
Double Row Cylindrical Roller Bearings



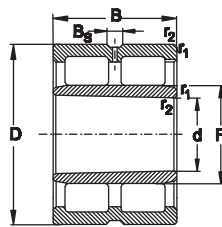
Abutment and fillet dimensions
see on page 321

Bearing dimensions					Mass
d	E	F	B _s	s	
mm					[kg]
160	219	-	9,5	4,2	9,6
	219	-	9,5	4,2	9,6
170	-	188,5	6,5	2,3	6,85
	-	188,5	6,5	2,3	6,85
	236	-	9,5	4,5	13
	236	-	9,5	4,5	13
180	-	202	9,5	2,6	10,2
	-	202	9,5	2,6	10,2
	255	-	12,2	4,8	17
	255	-	12,2	4,8	17
190	-	212	9,5	2,6	10,6
	-	212	9,5	2,6	10,6
	265	-	12,2	4,8	18
	265	-	12,2	4,8	18
200	-	225	12,2	3,4	14,9
	-	225	12,2	3,4	14,9
	282	-	12,2	5,3	23
	282	-	12,2	5,3	23
220	-	245	12,2	3,4	16,2
	-	245	12,2	3,4	16,2

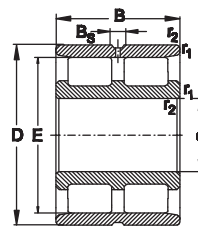
Double Row Cylindrical Roller Bearings



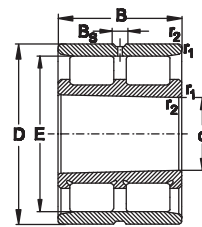
NNU49...W33



NNU49...K...W33



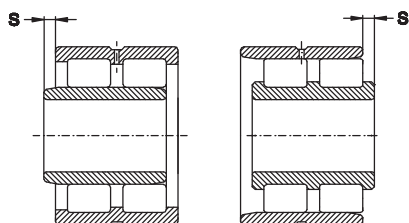
NN30...W33



NN30...K...W33

Dimensions				Basical radial load		Speed limit		Designation
d	D	B	r_1, r_2 min.	dyn. C_r	stat. C_{0r}	grease	oil	
mm				kN		min^{-1}		
220	340	90	3	890	1591	2200	2800	NN3044 MW33
	340	90	3	890	1591	2200	2800	NN3044 KMW33
240	320	80	2,1	556	1300	2200	2800	NNU4948 MW33
	320	80	2,1	556	1300	2200	2800	NNU4948 KMW33
	360	92	3	850	1560	2000	2600	NN3048 MW33
	360	92	3	850	1560	2000	2600	NN3048 KMW33
260	360	100	2,1	750	1700	2000	2600	NNU4952 MW33
	360	100	2,1	750	1700	2000	2600	NNU4952 KMW33
	400	104	4	1060	2000	1900	2400	NN3052 MW33
	400	104	4	1060	2000	1900	2400	NN3052 KMW33
280	380	100	2,1	765	1800	1900	2400	NNU4956 MW33
	380	100	2,1	765	1800	1900	2400	NNU4956 KMW33
	420	106	4	1080	2080	1800	2200	NN3056 MW33
	420	106	4	1080	2080	1800	2200	NN3056 KMW33
300	420	118	3	1188	2943	1700	2000	NNU4960 MW33
	420	118	3	1188	2943	1700	2000	NNU4960 KMW33
	460	118	4	1270	2400	1600	1900	NN3060 MW33
	460	118	4	1270	2400	1600	1900	NN3060 KMW33
320	440	118	3	1060	2550	1600	1900	NNU4964 KMW33
	480	121	4	1320	2600	1600	1900	NN3064 MW33

Double Row Cylindrical Roller Bearings



Abutment and fillet dimensions
see on page 321

Bearing dimensions					Mass
d	E	F	B _s	s	
mm					[kg]
220	310	-	15	4,5	33
	310	-	15	4,5	33
240	-	265	12	3,4	17,4
	-	265	12	3,4	17,4
	330	-	15	6	36
	330	-	15	6	36
260	-	292	15	4	30,2
	-	292	15	4	30,2
	364	-	15	6,5	48
	364	-	15	6,5	48
280	-	312	15	4	32,2
	-	312	15	4	32,2
	384	-	15	6,75	52
	384	-	15	6,75	52
300	-	339	17,7	5	50
	-	339	17,7	5	50
	418	-	17,7	7,45	72
	418	-	17,7	7,45	72
320	-	359	17,7	5	52,7
	438	-	17,7	7,95	77

Cylindrical Roller Bearings, double row

Non-standardized

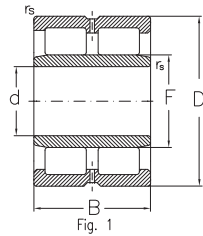


Fig. 1

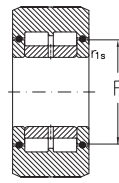


Fig. 2

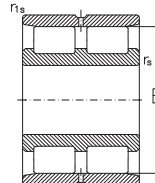


Fig. 3

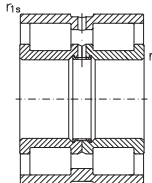


Fig. 4

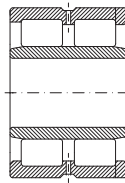


Fig. 5

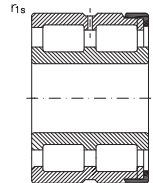


Fig. 6

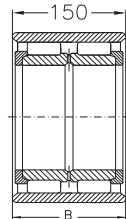


Fig. 7

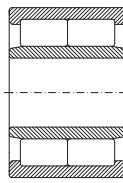


Fig. 8

Dimensions					Fig. Basic radial load		Speed limit		Mass	Designation		
d	D	B	r _s	r _{1s} min	E, F	dyn. C _r	stat. C _{0r}	Grease Oil				
mm						kN						
30	62	24	1	0,6	38	8	47,5	48,8	2400	3000	0,364	2NNU5106 M
40	68	37	0,8	0,6	61	4	79	116	3200	4000	0,525	NNF5008 VS3
	68	38	0,8	0,6	61	4	79	116	3200	4000	0,535	NNF5008 VS3A1
52	110	125		1	72	13	218	303	1900	2300	3,99	480911
90	125	35	1,1		115,5	6	148	301	1600	2000	1,343	NNC4918 VW33
120	190	80	1,1	1,1	137	1	417	701	2400	3000	8,30	NNU5124 M
130	180	50	1,5	1,5	165,4	5	252	526	900	1300	3,90	NNP4926 VW33
	180	50	1,5	1,5	165,4	5	252	526	900	1300	3,90	NNP4926 VW1
135	220	145	2	2	192	7	611	1360	2200	2600	21,2	2NUNJ5127 MC3
	220	150		1	194	7	650	1363	2700	3400	23,014	LII-68853
150	300	120		4	182	2	984	1645	800	1000	45,285	NNU5130 VW44C3
169,5	280	105	4	4	197	8	800	2000	1700	2000	27,3	2NNU5134 MNAC5
	280	105	3		197	1	955	1680	2200	2700	27,327	NNU5134 MNA
	280	105	3		197	1	955	1680	2200	2700	27,327	NNU5134 MNAC5
170	230	60	2	1,5	215	3	423	944	1800	2200	7,51	NN5234 C3
177,8	258,175	196,469	4	5	198,5	1	1258	2650	1700	2000	35,5	NNU5136 MC190W5
180	280	135	0,6	3,5	260,22	13	1350	2543	300		30,1	NNF5036 V
220	300	80	2,1	2,1	276,5	4	665	1592	450	800	17	NNC4944 VW33
260	320	60	2	2	304,7	6	500	1402	400	700	10,7	NNC4852 VW33

Cylindrical roller bearings, double row and three row

Non-standardized

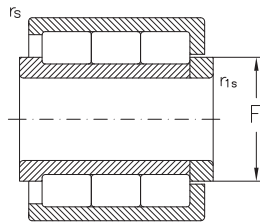


Fig. 9

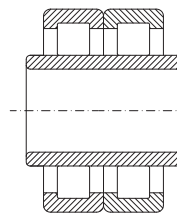


Fig. 10

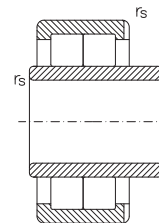


Fig. 11

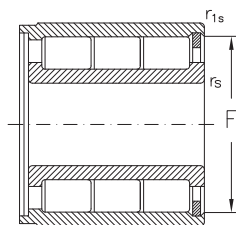


Fig. 12

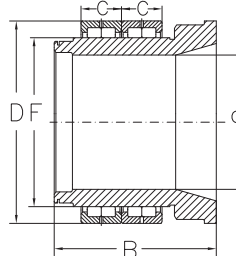


Fig. 13

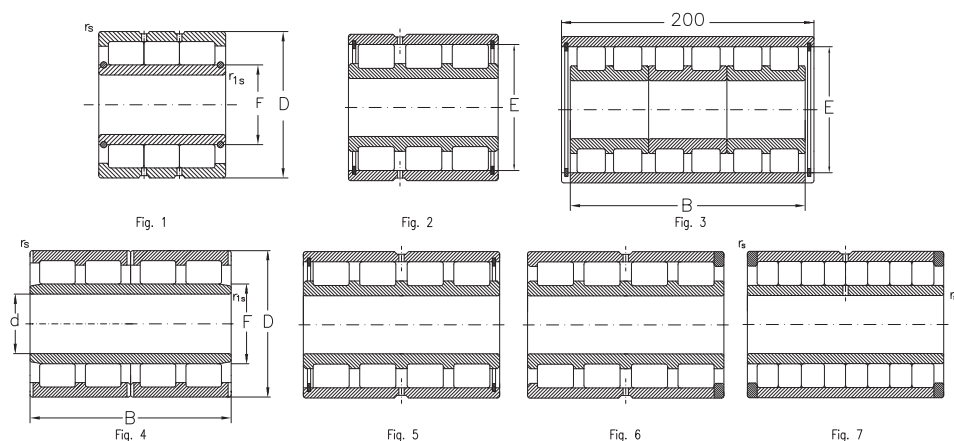
Dimensions							Fig. Basic radial load		Speed limit		Mass	Designation	
d	D	B	C	r _s	r _{1s} min	E,F	dyn. C _r	stat. C _{0r}	Grease	Oil			
							kN						
65,019	110	140		1,5	1	86,9	13	208	474	5700	7200	4,121	CR0113.13 V
105	190	80	75	1,5	1,5	124	9	367	1020	850	1200	10,9	3NNUPB5121 VC4
120	215	130	98	2,1	2,1	143,5	10	584	905	1000	2600	16,6	2NUB5224 MAP54S1
130	182	81,5		2	2	170,4	12	495	1083	1200	1500	6,020	3NN5226 VP5
205	310	110	66	2,1	2,1	240	11	500	1610	560	800	26,2	NNUB5141 VC3
260	400	247	145	5	5	296	11	1675	3300	950	1300	83,5	NNUB5252 MC3W8

URB



Cylindrical roller bearings, three row and four row

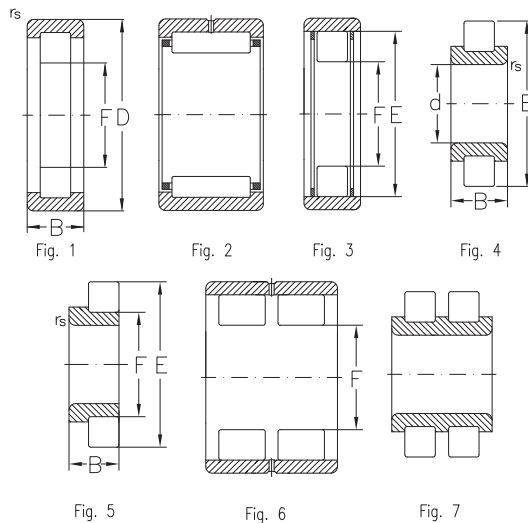
Non-standardized



Dimensions						Fig. Basic radial load		Speed limit	Mass	Designation		
d	D	B	r _s	r _{1s} min	E, F	dyn. C _r	stat. C _{0r}	Grease Oil				
mm						kN						
80	125	80	1,1		94,5	7	353	833	1700	2100	4,094	NNU6016 VC3
90	125	68	1,5	1,5	115	5	856	596	1500	1900	2,66	4NN5118 VW33
140	215	100	3	3	160,1	1	751	1576	2200	2600	13,7	3NNU5128 V
160	230	168	1,5	1,5	179	4	300	539	2400	3000	23,570	4NNU5232 PMC3
	230	168	1,5	1,5	179	4	300	539	2400	3000	23,6	4NNU5232 PMW8
	240	130	2	2	180	4	739	1473	1900	2200	22,0	4NNU5132 PFC3W8
170	230	180	2	2	215	3	995	2832	750	900	22	3NN5234 VC3
180	260	168	2,1	2,1	202	4	1105	2563	1700	2000	29,5	4NNU5136 PFC3W8
	260	168	2,1	2,1	202	4	1105	2563	1700	2000	29,75	4NNU5136 PMC3W8
190	260	101	2	2	240,5	2	771	1924	750	900	16,2	3NN5138 VW33C3
	270	200	2,1	2,1	212	4	1330	3296	1600	2000	36,3	4NNU5138 PMW8
200	280	152	2,1	2,1	259,2	5	1190	3015	700	850	32,5	4NN5240 VW33C3
	280	152	2,1	2,1	259,2	6	1190	3015	700	850	32,5	4NNP5240 VW33C3
	290	192	2,1	2,1	226	4	1205	2761	1500	1800	44,0	4NNU5140 PFC3W8
230	330	206	2,1	2,1	260	4	1625	4014	1300	1600	63,0	4NNU5146 PFC3W8
	330	206	2,1	2,1	260	4	1625	4014	1300	1600	63,0	4NNU5146 PMC4
260	370	220	3	3	292	4	2018	5241	300	500	77,8	4NNU5152 M

Cylindrical roller bearings without inner ring

Non-standardized

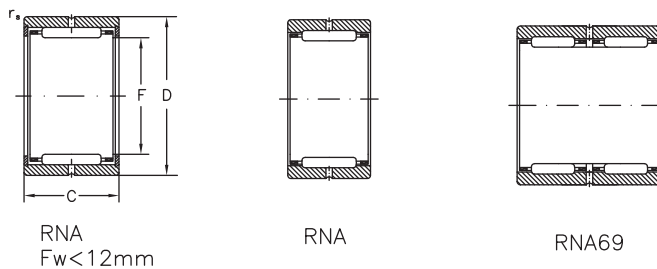


Dimensions						Fig. Basic radial load		Speed limit		Mass	Designation
d	D	B	r _s	r _{1s}	E, F min	dyn. C _r	stat. C _{0r}	Grease	Oil		
mm						kN					
19,05	31,75	25,4	0,3			2	28	11000	18000	0,079	RNA193225 A
	52	15	0,7	25		3	28,6	7000	14000	0,212	RNU2R304 F2
22		22,5	1	0,3	38,75	7	34	3000	6000	0,107	RNN5204 V
	37	30	0,3			2	36	9500	16000	0,098	RNA6904
25	41,275	31,8	0,6	28		1	48	2300	5600	0,165	RNU5105 V
	41,28	31,75	0,3			2	44	8000	1300	0,134	RNA294132
30		26	0,6	60		4	77,4	5000	10000	0,361	RN5506 M
40		35,5	2,5	0,5	62	7	101	1700	3400	0,334	RNN5408 V
50		40	2,5	1	75,25	7	134	2900	3600	0,620	RNN5110 V
	100	21	1		66,92	1	70,4	3500	7000	0,554	RNU5311
	100	33,33	1,5		66,95	1	99,2	3500	7000	0,912	RNU5411 M
	100	33,33	1		66,95	3	99,2	3500	7000	0,818	RNU2R5411
60		28,53	2	0,3	127	5	177	2400	4800	1,86	RNUPJ5112 M
	102	61	1,5		60	1	234	2300	2900	2,189	RNU5212 V
	120	38,1	1		80,48	3	140	2600	5300	1,32	RNU2R5513
	120	38,1	1		80,48	1	140	2600	5300	1,53	RNU5513 MA
	140	44,45	2		95,36	1	136	2400	4500	2,25	RNU5116 M
	170	55,56	2		113,6	1	327	1900	3800	4,51	RNU5119 M
	215	76,2	2		145,23	1	569	1500	3000	9,66	RNU5124 M
	317,55	220	1		228,6	6	1655	1000	2000	56,0	R2NUN4246 MW7

Needle roller bearings

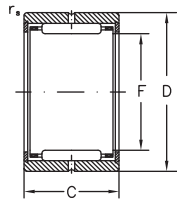


Needle roller bearings without inner ring



Dimensions				Basic radial load		Speed limit		Designation	Mass
F _w	D	C	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹		-	Kg
8	15	12	0,3	3,7	3,95	19000	32000	RNA081512	0,008
	15	16	0,3	4,95	5,65	19000	32000	RNA081516	0,012
9	16	12	0,3	4,3	4,8	18000	30000	RNA091612	0,010
	16	16	0,3	5,6	6,9	18000	30000	RNA091616	0,013
10	17	12	0,3	4,5	5,35	17000	28000	RNA101712	0,011
	17	16	0,3	5,8	6,5	17000	28000	RNA101716	0,014
12	18	15	0,3	5,6	7,75	16000	26000	RNA121815 TN	0,012
	19	12	0,3	4,65	5,8	16000	26000	RNA121912	0,013
	19	16	0,3	6,15	8,1	16000	26000	RNA121916	0,017
	22	12	0,3	5,3	6,65	16000	26000	RNA122212	0,021

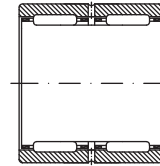
Needle roller bearings without inner ring



RNA
Fw < 12mm



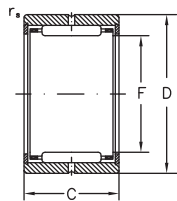
RNA



RNA69

Dimensions				Basic radial load		Speed limit		Designation	Mass
F _w	D	C	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹		-	Kg
14	22	13	0,3	8,25	9,1	15000	24000	RNA4900	0,017
	22	16	0,3	9,8	11,3	15000	24000	RNA142216	0,021
	22	20	0,3	11,8	15,4	15000	24000	RNA142220	0,028
16	24	13	0,3	9,1	10,6	15000	24000	RNA4901	0,018
	24	22	0,3	14,8	20,2	15000	24000	RNA6901	0,032
18	28	15	0,3	9,5	11,9	14000	22000	RNA182815	0,036
20	28	13	0,3	10,4	13,2	13000	20000	RNA4902	0,022
	28	23	0,3	16,8	24,5	13000	20000	RNA6902	0,040
22	30	13	0,3	10,7	13,9	11000	18000	RNA4903	0,023
	30	23	0,3	18,2	27,8	11000	18000	RNA6903	0,043
25	37	17	0,3	20	24,4	9500	16000	RNA4904	0,053
	37	30	0,3	33	47,6	9500	16000	RNA6904	0,101
30	40	20	0,3	21	33	8000	13000	RNA304020	0,065
	42	17	0,3	22,2	28,3	8000	13000	RNA4905	0,068
	42	30	0,3	40,1	60,1	8000	13000	RNA6905	0,155
35	45	20	0,3	24,2	38,5	7000	11000	RNA354520	0,074
	47	17	0,3	23,7	32,1	7000	11000	RNA4906	0,140
	47	30	0,3	43,1	49,3	7000	11000	RNA6906	0,131
38	48	20	0,3	24,3	41,4	7000	11000	RNA384820	0,080
42	55	20	0,6	29,8	45,5	6300	9500	RNA4907	0,109
	55	36	0,6	52,7	95	6300	9500	RNA6907	0,214
45	55	30	0,3	40,2	86,9	6000	9000	RNA455530	0,137
48	62	22	0,6	38,7	60,9	5600	8500	RNA4908	0,147
	62	40	0,6	63,8	116	5600	8500	RNA6908	0,266
50	62	22	1	35,5	60,3	5300	8000	RNA506222	0,153
	62	25	0,6	36,3	76	5300	8000	RNA506225	0,157
	62	35	0,6	49,4	114	5300	8000	RNA506235	0,209
52	68	22	0,6	46,4	73,9	5000	7500	RNA4909	0,197
	68	40	0,6	64,5	123	5000	7500	RNA6909	0,283
55	68	25	0,6	38,5	82,2	5000	7500	RNA556825 TN	0,181
58	72	22	0,6	45	73,5	4800	7000	RNA4910	0,167
	72	40	0,6	67,3	136	4800	7000	RNA6910	0,335
60	72	25	0,6	40,2	87	4500	6700	RNA607225 TN	0,160
	72	35	0,6	55,7	130	4500	6700	RNA607235	0,224

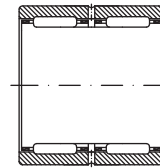
Needle roller bearings without inner ring



RNA
Fw < 12mm



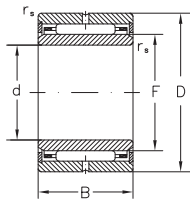
RNA



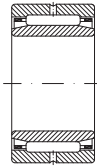
RNA69

Dimensions				Basic radial load		Speed limit		Designation	Mass
F _w	D	C	r _s min.	dyn. C _r	stat. C _{0r}	grease	oil		
mm				kN		min ⁻¹		-	Kg
63	80	25	0,6	59,3	101	4500	6700	RNA4911	0,278
	80	45	0,6	83,8	173	4500	6700	RNA6911	0,477
68	85	25	1	62	109	4000	6000	RNA4912	0,296
	85	45	1	89,1	175	4000	6000	RNA6912	0,493
72	90	25	1	58,3	110	3800	5600	RNA4913	0,318
	90	45	1	91,3	193	3800	5600	RNA6913	0,545
80	95	25	1	53,4	115	3400	5000	RNA809525	0,312
	100	30	1	76,5	148	3400	5000	RNA4914 TN	0,485
	100	54	1	125	254	3400	5000	RNA6914	0,545
85	105	30	1	80,6	158	3200	4800	RNA4915	0,504
	105	54	1	127	270	3200	4800	RNA6915	0,965
90	110	30	1	84,9	169	3000	4500	RNA4916	0,520
	110	54	1	144	316	3000	4500	RNA6916	0,973
95	115	26	1	74,3	137	2800	4300	RNA95/26	0,523
100	120	35	1,1	98,8	222	2600	4000	RNA4917	0,672
	120	63	1,1	143	378	2600	4000	RNA6917	1,24
105	125	35	1,1	110	222	2400	3800	RNA4918	0,712
	125	63	1,1	144	400	2400	3800	RNA6918	1,36
110	130	30	1,1	99,6	210	2200	3600	RNA110/30	0,629
	130	35	1,1	105	244	2200	3600	RNA4919	0,729
	130	63	1,1	149	411	2200	3600	RNA6919	1,48
115	140	40	1,1	124	267	2200	3600	RNA4920	1,17
120	140	30	1	102	222	2000	3400	RNA4822	0,729
125	150	40	1,1	127	283	2000	3400	RNA4922	1,25
130	150	30	1	86,8	228	1800	3000	RNA4824	0,730
135	165	45	1,1	170	385	1800	3000	RNA4924	1,93
145	165	35	1,1	122	316	1700	2800	RNA4826	1,02
150	180	50	1,5	188	421	1700	2800	RNA4926	2,25
155	175	35	1,1	128	323	1600	2600	RNA4828	1,21
	180	32	1,5	116	258	1600	2600	RNA155/32	1,22
160	190	50	1,5	190	484	1600	2600	RNA4928	2,50
	165	190	40	150	386	1500	2400	RNA4830	1,68

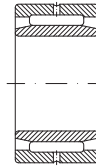
Needle roller bearings



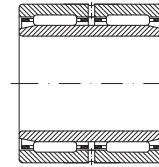
NA
d < 9 mm



NA



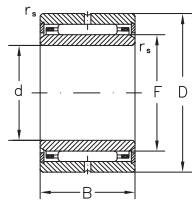
NAV



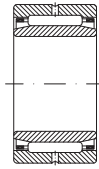
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Dimensions					Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	F _w	dyn. C _r	stat. C _{0r}	grease	oil		
mm					kN		min ⁻¹		-	Kg
5	15	12	0,3	8	3,7	3,95	19000	32000	NA051512	0,013
	15	16	0,3	8	4,95	5,65	19000	32000	NA051516	0,016
6	16	12	0,3	9	4,3	4,8	18000	30000	NA061612	0,014
	16	16	0,3	9	5,6	6,9	18000	30000	NA061616	0,018
7	17	12	0,3	10	4,5	5,35	17000	28000	NA071712	0,015
	17	16	0,3	10	5,8	6,5	17000	28000	NA071716	0,020
9	19	12	0,3	12	4,65	5,8	16000	26000	NA091912	0,018
	19	16	0,3	12	6,15	8,1	16000	26000	NA091916	0,023
10	22	13	0,3	14	8,25	9,1	15000	24000	NA4900	0,024
	22	16	0,3	14	9,8	11,3	15000	24000	NA102216	0,031
	22	20	0,3	14	11,8	15,4	15000	24000	NA102220	0,038
12	24	13	0,3	16	9,1	10,6	15000	24000	NA4901	0,027
	24	22	0,3	16	14,8	20,2	15000	24000	NA6901	0,048
15	28	13	0,3	20	10,4	13,2	13000	20000	NA4902	0,035
	28	23	0,3	20	16,8	24,5	13000	20000	NA6902	0,065
17	30	13	0,3	22	10,7	13,9	11000	18000	NA4903	0,039
	30	23	0,3	22	18,2	27,8	11000	18000	NA6903	0,074
20	37	17	0,3	25	20,6	24,4	9500	16000	NA4904	0,077
	37	30	0,3	25	33	47,6	9500	16000	NA6904	0,143
25	42	17	0,3	30	22,2	28,3	8000	13000	NA4905	0,096
	42	17	0,3	30	30	42,8	3000	6000	NA4905 V	0,100
	42	30	0,3	30	40,1	60,1	8000	13000	NA6905	0,170
30	45	20	0,3	35	24,2	38,5	7000	11000	NA304520	0,117
	47	17	0,3	35	23,7	32,1	7000	11000	NA4906	0,107
	47	30	0,3	35	43,1	69,3	7000	11000	NA6906	0,202
35	55	20	0,6	42	29,8	45,5	6300	9500	NA4907	0,174
	55	36	0,6	42	52,7	95	6300	9500	NA6907	0,330
40	55	30	0,3	45	40,2	86,9	6000	9000	NA405530	0,221
	62	22	0,6	48	38,7	60,9	5600	8500	NA4908	0,239
	62	22	0,6	48	55	97,1	2000	4000	NA4908 V	0,266
	62	40	0,6	48	63,8	116	5600	8500	NA6908	0,450
	65	22	1	50	40,7	66,9	5600	8500	NA406522	0,290
45	62	25	0,6	50	36,3	76	5300	8000	NA456225	0,235
	62	35	0,6	50	49,4	114	5300	8000	NA456235	0,330
	62	22	0,6	52	46,4	73,9	5000	7500	NA4909	0,285
	68	40	0,6	52	64,5	123	5000	7500	NA6909	0,515
50	68	25	0,6	55	38,5	82,2	5000	7500	NA506825 TN	0,268
	72	22	0,6	58	45	73,5	4800	7000	NA4910	0,280
	72	40	0,6	58	67,3	136	4800	7000	NA6910	0,545

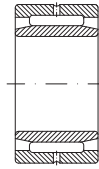
Needle roller bearings



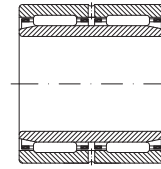
NA
d < 9 mm



NA



NAV



NA69

Dimensions					Basic radial load		Speed limit		Designation	Mass
d	D	B	r _s min.	F _w	dyn. C _r	stat. C _{0r}	grease	oil		
mm					kN		min ⁻¹		-	Kg
55	72	25	0,6	60	40,2	87	4500	6700	NA557225 TN	0,283
	72	35	0,6	60	55,7	130	4500	6700	NA557235	0,380
	80	25	1	63	59,3	101	4500	6700	NA4911	0,423
55	80	25	1	63	80,3	151	1500	3000	NA4911 V	0,448
	80	45	1	63	83,3	173	4500	6700	NA6911	0,795
60	85	25	1	68	62	109	4000	6000	NA4912	0,454
	85	25	1	68	83,4	163	1400	2800	NA4912 V	0,480
	85	45	1	68	89,1	175	4000	6000	NA6912	0,836
65	90	25	1	72	58,3	110	3800	5600	NA4913	0,472
	90	45	1	72	91,3	193	3800	5600	NA6913	0,881
70	95	25	1	80	53,4	115	3400	5000	NA709525	0,538
	100	30	1	80	76,5	148	3400	5000	NA4914 TN	0,725
	100	30	1	80	103	231	1200	2700	NA4914 V	0,774
	100	54	1	80	125	254	3400	5000	NA6914	1,39
75	105	30	1	85	80,6	80,6	3200	4800	NA4915	0,796
	105	54	1	85	127	127	3200	4800	NA6915	1,51
80	110	30	1	90	84,9	84,9	3000	4500	NA4916	0,870
	110	54	1	90	144	144	3000	4500	NA6916	1,48
85	115	26	1	95	74,3	74,3	2800	4300	NA85/26	0,830
	120	35	1,1	100	98,8	98,8	2600	4000	NA4917	1,28
	120	63	1,1	100	143	143	2600	4000	NA6917	2,33
	130	45	1,1	104	121	121	900	1800	NA4617 V	2,57
90	125	35	1,1	105	110	110	2400	3800	NA4918	1,34
	125	63	1,1	105	144	144	2400	3800	NA6918	2,47
95	130	35	1,1	110	105	105	2200	3600	NA4919	1,39
	130	63	1,1	110	149	149	2200	3600	NA6919	2,63
100	130	30	1,1	110	99,6	99,6	2200	3600	NA100/30	1,00
	140	40	1,1	115	174	124	2200	3600	NA4920	1,93
110	140	30	1	120	102	102	2000	3400	NA4822	1,15
	150	40	1,1	125	127	127	2000	3400	NA4922	2,09
120	150	30	1	130	86,8	86,8	1800	3000	NA4824	1,23
	165	45	1,1	135	170	170	1800	3000	NA4924	2,95
130	165	35	1,1	145	122	122	1700	2800	NA4826	1,90
	180	50	1,5	150	188	188	1700	2800	NA4926	3,98
140	175	35	1,1	155	128	128	1600	2600	NA4828	1,99
	180	32	1,5	155	116	116	1600	2600	NA140/32	2,05
	190	50	1,5	160	190	190	1600	2600	NA4928	4,32
150	190	40	1,1	165	150	150	1500	2400	NA4830	2,85



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 roller

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.

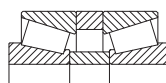
Basic types and constructive versions:

- single row

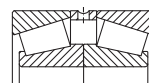


R

- paired

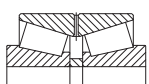


DB

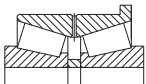


DF

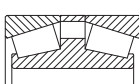
- double row



DB



DBR



DF

Suffixes

A	- increased basic load
A...	- axial clearance of bearing set
B	- enlarged contact angle
DB	- set of two bearings mounted in back-to-back arrangement (O)
DF	- set of two bearings mounted in face-to-face arrangement (X)
DF	- bearings with double row of rollers in face-to-face arrangement (X)
F	- machined cage of hardened steel or special cast iron
F2	- constructive modifications
J	- pressed cage of not hardened steel sheet
K	- tapered bore 1:12

M	- machined brass cage
P6X	- tolerance class with smaller values than normal
P5	- tolerance class with smaller values than P6X
P4	- tolerance class with smaller values than P5
P2	- tolerance class with smaller values than P4
R	- rib on the outer ring
S0	- operating temperature up to +150°C
S1	- operating temperature up to +200°C
T...	- bearing set width
TN	- polyamide cage
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 ring 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 bearing

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 application, 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, 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 dimension:

- metric dimension (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		
Bearings series	Load magnitude	Permissible misalignment
329, 320, 302, 322, 303, 313	$F_r/C_{0r} < 0,1$	2'
	$F_r/C_{0r} > 0,1$	4'
323, 34	$F_r/C_{0r} < 0,1$	1'30"
	$F_r/C_{0r} > 0,1$	3'
35, 36 seturi DB, DF	$F_r/C_{0r} < 0,1$	1'
	$F_r/C_{0r} > 0,1$	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 the page 34 for tapered roller bearings, both with metric and inch dimensions. Tolerances for mounting chamfer are given in tables on page 43.

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 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 dimension ISO 355.

Bearing series 329, 302, 322, 303 and 323 have a contact angle 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 90° and 30°.

Radial clearance of double tapered roller bearings

Table 2

Radial clearance of double tapered roller bearings														Table 2
Bore diameter		Radial clearance symbol												
d over	up to	C1		C2		Normal		C3		C4		C5		
		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	1100	
800	900	0	160	160	330	330	500	500	670	670	920	920	1240	

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.

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 mass, are noiseless in operation and have low coefficient of friction.

Design 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:

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

$$P_r = 0,4 F_r + Y F_a, \text{ kN, when } F_a/F_r > e$$

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:

$$P_{0r} = F_r, \text{ kN, when } F_a/F_r \leq 1/2 Y_0$$

$$P_{0r} = 0,5 F_r + Y_0 F_a, \text{ kN, when } F_a/F_r > 1/2 Y_0$$

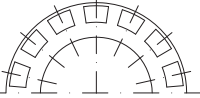
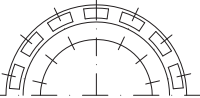
- for paired double or four row tapered roller bearings:

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

F_a is calculated as in case of equivalent dynamic radial load. The values of Y_0 are given in bearing tables.

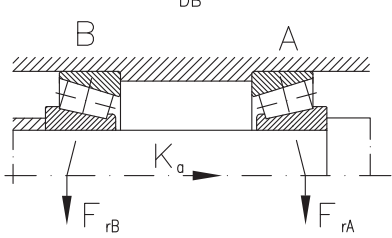
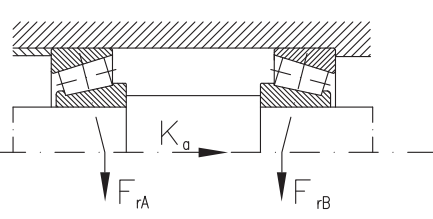
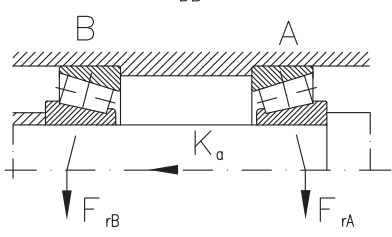
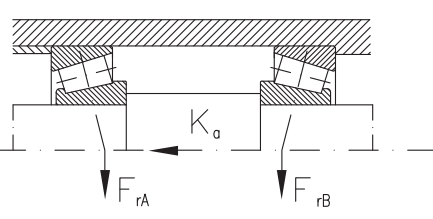
Abutment dimensions

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. 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.

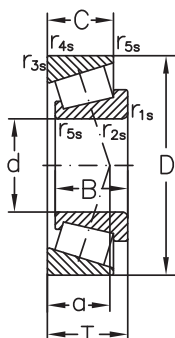
Cage design and some technical data				
Cage	Design bearing	Cage	Application	Max. value
				D_m n
				oil grease
Pressed sheet cage			- General application - Small and medium sized bearings $d \leq 250 \text{ mm}$	350x10 ³ 245x10 ³
Machined brass cage M			- General application - Median and large sized bearings $d > 150 \text{ mm}$	450x10 ³ 315x10 ³

Calculating relations for axial loadings F_a

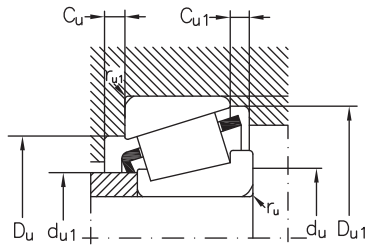
Table 4

	Loading versions	Axial load
Back to back DB 	1a) $\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$ $F_{aA} = \frac{0,5 F_{rA}}{Y_A}$ $K_a \leq 0$ $F_{aB} = F_{aA} + K_a$	
Face to face DF 	1b) $\frac{F_{rA}}{Y_A} \geq \frac{F_{rB}}{Y_B}$ $F_{aA} = \frac{0,5 F_{rA}}{Y_A}$ $K_a \geq 0,5 \frac{F_{rB}}{Y_B} - \frac{F_{rA}}{Y_A}$ $F_{aB} = F_{aA} + K_a$ 1c) $\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$ $F_{aA} = F_{aB} - K_a$ $K_a \geq 0,5 \frac{F_{rB}}{Y_B} - \frac{F_{rA}}{Y_A}$ $F_{aB} = \frac{0,5 F_{rB}}{Y_B}$	
Back to back DB 	2a) $\frac{F_{rA}}{Y_A} \neq \frac{F_{rB}}{Y_B}$ $F_{aA} = F_{aB} + K_a$ $K_a \leq 0$ $F_{aB} = \frac{0,5 F_{rB}}{Y_B}$	
Face to face DF 	2b) $\frac{F_{rA}}{Y_A} \geq \frac{F_{rB}}{Y_B}$ $F_{aA} = F_{aB} + K_a$ $K_a \geq 0,5 \frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}$ $F_{aB} = \frac{0,5 F_{rB}}{Y_B}$ 2c) $\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$ $F_{aA} = \frac{0,5 F_{rA}}{Y_A}$ $K_a \geq 0,5 \frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}$ $F_{aB} = F_{aA} - K_a$	

Tapered roller bearings, single row

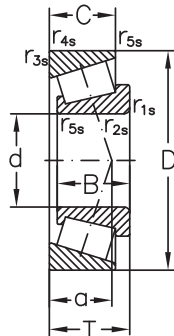


Dimensions									Designation	ISO series	Basic radial load. Factors				
d	D	B	C	T	$r_{1s,2s}$ min.	$r_{3s,4s}$ min.	r_5 min.	a			dyn. Cr	e	Y	stat C_{0r}	Y_0
mm									-		kN	-		kN	-
15	42	13	11	14,25	1	1	0,3	9	30302 A	2FB	21,5	0,28	2,1	19,8	1,1
17	40	12	11	13,25	1	1	0,3	10	30203 A	2DB	18,3	0,35	1,7	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	321,1	
	52	21	18	22,25	1,5	1,5	0,6	14	32304 A	2FD	42,5	0,3	2	471,1	
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	371	
	62	17	15	18,25	1,5	1,5	0,6	13	30305 A	2FB	43	0,3	2	431,1	
	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	0,37	1,9	51,8	1,1
	72	19	14	20,75	1,5	1,5	0,6	22	31306 A	7FB	46,5	0,31	0,7	49,5	0,4
	72	27	23	28,75	1,5	1,5	0,6	18	32306 A	2FD	75,8	0,83	1,9	82,7	1,1
35	62	18	14	18	1	1	0,3	15	32007 XA	4CC	35,9	0,31	1,3	52,4	0,7
	72	17	15	18,25	1,5	1,5	0,6	15	30207 A	3DB	50,5	0,46	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	1,5	0,6	16	30307 A	2FB	71,2	0,37	1,9	72,5	1,1
	80	21	15	22,75	2	1,5	0,6	25	31307 A	7FB	58,1	0,31	0,7	640,4	
	80	31	25	32,75	2	1,5	0,6	20	32307 A	2FE	95,3	0,83	1,9	106	1,1
40	68	19	14,5	19	1	1	0,3	15	32008 XA	3CD	48,8	0,31	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	1,5	0,6	19	30308 A	2FB	83,9	0,37	1,7	91,3	0,9
	90	23	17	25,25	2	1,5	0,6	28	31308 A	7FB	74,6	0,83	0,7	60,8	0,4
	90	33	27	35,25	2	1,5	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	1,5	0,6	21	30309 A	2FB	106	0,35	1,7	118	0,9
	100	25	18	27,25	2	1,5	0,6	31	31309 A	7FB	88,9	0,83	0,7	97,1	0,4
	100	36	30	38,25	2	1,5	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

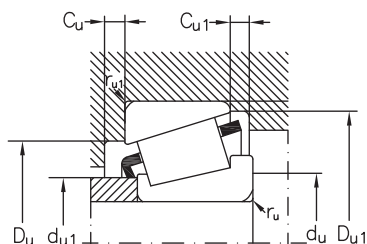


Speed limit		Mass	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		Kg									
9000	13000	0,090	22	21	36	36	38	2	3	1	1
9000	13000	0,074	23	23	34	34	37	2	2	1	1
8500	12000	0,130	25	23	40	41	42	2	3	1	1
8000	11000	0,170	24	23	39	41	43	3	4	1	1
8500	12000	0,097	25	25	36	37	39	3	3	0,6	0,6
8000	11000	0,120	27	26	40	41	43	2	3	1	1
8000	11000	0,170	28	27	44	45	47	2	3	1,5	1,5
7500	10000	0,221	27	27	43	45	47	3	4	1,5	1,5
8000	11000	0,113	30	30	40	42	44	3	3,5	0,6	0,6
7500	10000	0,150	31	31	44	46	48	2	3	1	1
7500	10000	0,182	31	31	44	46	48	3	4	1	1
6700	9000	0,250	34	32	54	55	57	2	3	1,5	1,5
5600	7500	0,255	34	32	47	55	59	3	5	1,5	1,5
6000	8000	0,360	33	32	53	55	57	3	5	1,5	1,5
6700	9000	0,017	35	36	48	49	52	3	4	1	1
6300	8500	0,220	35	36	53	56	57	2	3	1	1
6300	8500	0,280	37	36	52	56	59	3	4	1	1
5600	7500	0,380	37	37	62	65	66	3	4,5	1,5	1,5
5000	6700	0,390	40	37	55	65	68	3	6,5	1,5	1,5
5300	7000	0,550	40	37	59	65	66	4	5,5	1,5	1,5
6000	8000	0,220	39	41	54	56	59	4	4	1	1
5300	7000	0,320	40	42	62	65	67	3	3	1,5	1,5
5300	7000	0,420	44	42	61	65	67	3	5,5	1,5	1,5
5000	6700	0,520	43	44	70	71	74	3	4,5	2	1,5
4500	6000	0,520	45	44	62	71	76	4	7,5	2	1,5
4800	6300	0,730	44	44	66	71	74	4	7,5	2	1,5
5300	7000	0,270	44	46	60	62	65	4	4,5	1	1
4800	6300	0,420	46	47	69	73	74	3	3,5	1,5	1,5
4800	6300	0,510	49	47	68	73	75	3	5,5	1,5	1,5
4500	6000	0,700	48	49	77	81	82	3	5	2	1,5
4000	5300	0,685	52	49	71	81	86	4	8	2	1,5
4000	5300	0,993	51	49	73	81	82	4	8	2	1,5
4800	6300	0,330	50	51	67	69	72	4	4,5	1	1
4500	6000	0,470	51	52	74	78	80	3	4,5	1,5	1,5
4500	6000	0,560	54	52	73	78	80	3	5,5	1,5	1,5
4000	5300	0,920	53	54	86	91	92	3	5	2	1,5
3400	4500	0,915	59	54	79	91	95	4	9	2	1,5
3600	4800	1,25	56	54	82	91	93	4	8	2	1,5
4500	6000	0,360	56	56	72	74	77	4	4,5	1	1

Tapered roller bearings, single row

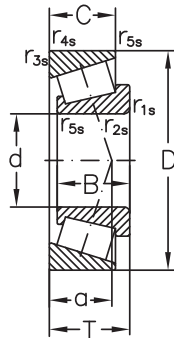


Dimensions								Designation		ISO series	Basic radial load. Factors				
d	D	B	C	T	$r_{1s,2s}$ min.	$r_{3s,4s}$ min.	r_5 min.	a	r		dyn. Cr	e	Y	stat C_{0r}	Y_0
mm										-	kN	-		kN	-
50	90	20	17	21,75	1,5	1,5	0,6	19	30210 A	3DB	69,7	0,43	1,4	81,3	0,8
	90	23	19	24,75	1,5	1,5	0,6	21	32210 A	3DC	79,1	0,43	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
	170	39	27	42,5	3	2,5	1	52	31316 A	7GB	222	0,83	0,7	275	0,4

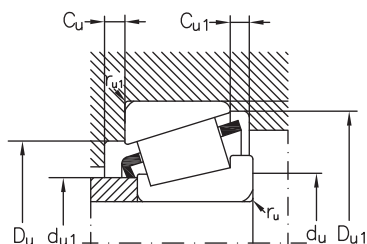


Speed limit		Mass	Mounting dimensions									
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.	
min ⁻¹		Kg										
4300	5600	0,530	58	57	79	83	85	3	4,5	1,5	1,5	
4300	5600	0,600	58	57	78	83	85	3	5,5	1,5	1,5	
3600	4800	1,19	65	60	95	100	102	4	6	2,5	2	
3200	4300	1,16	62	60	87	100	104	4	10	2,5	2	
3200	4300	1,83	62	60	90	100	102	5	9	2,5	2	
4000	5300	0,540	63	62	81	83	86	4	5,5	1,5	1,5	
3800	5000	0,690	64	64	88	91	94	4	4,5	1,5	1,5	
3800	5000	0,820	63	64	87	91	95	4	5,5	1,5	1,5	
3200	4300	1,53	71	65	104	110	111	4	6,5	2	2	
2800	3800	1,49	68	65	94	110	113	4	10,5	2	2	
3000	4000	2,21	68	65	99	110	111	5	10,5	2	2	
3800	5000	0,580	67	67	85	88	91	4	5,5	1,5	1,5	
3400	4500	0,860	70	69	96	101	103	4	4,5	2	1,5	
3400	4500	1,10	69	69	95	101	104	4	5,5	2	1,5	
3000	4000	1,90	77	72	112	118	120	5	7,5	3	2,5	
2600	3600	1,83	73	72	103	118	123	5	11,5	3	2,5	
2600	3600	2,80	74	72	107	118	120	6	11,5	3	2,5	
3400	4500	0,620	72	72	90	93	97	4	5,5	1,5	1,5	
3000	4000	1,10	77	74	106	111	113	4	4,5	2	1,5	
3000	4000	1,48	76	74	104	111	115	4	5,5	2	1,5	
2600	3600	2,30	83	77	122	128	130	5	8	3	2,5	
2200	3200	2,25	79	77	111	128	132	5	13	3	2,5	
2400	3400	3,49	80	77	117	128	130	6	12	3	2,5	
3200	4300	0,830	78	77	98	103	105	5	6	1,5	1,5	
3000	4000	1,22	81	79	110	116	118	4	5	2	1,5	
2800	3800	1,56	80	79	108	116	119	4	6	2	1,5	
2400	3400	3,00	89	82	130	138	140	5	8	3	2,5	
2000	3000	2,82	84	82	118	138	141	5	13	3	2,5	
2200	3200	4,10	86	82	125	138	140	6	12	3	2,5	
3000	4000	0,880	83	82	103	108	110	5	6	1,5	1,5	
2800	3800	1,33	86	84	115	121	124	4	5	2	1,5	
2600	3600	2,62	85	84	115	121	124	4	6	2	1,5	
2600	3600	3,40	95	87	139	148	149	5	9	3	2,5	
1900	2800	3,50	91	87	127	148	151	6	14	3	2,5	
2000	3000	5,00	91	87	133	148	149	7	13	3	2,5	
2600	3600	1,24	89	87	112	117	120	6	7	1,5	1,5	
2400	3400	1,59	91	90	124	130	132	4	6	2,5	2	
2400	3400	2,00	90	90	122	130	134	5	7	2,5	2	
2000	3000	4,00	102	92	148	158	159	5	9,5	3	2,5	
1900	2800	4,07	97	92	134	158	159	6	15,5	3	2,5	

Tapered roller bearings, single row

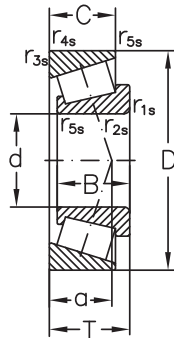


Dimensions									Designation	ISO series	Basic radial load. Factors				
d	D	B	C	T	$r_{1s,2s}$ min.	$r_{3s,4s}$ min.	r_5 min.	a			dyn. Cr	e	Y	stat C_{0r}	Y_0
mm									-		kN	-		kN	-
80	170	58	48	61,5	3	2,5	1	41	32316 A	2GD	383	0,35	1,7	503	0,9
85	130	29	22	29	1,5	1,5	0,6	28	32017 XA	4CC	136	0,44	1,4	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
	145	32	24	32	2	1,5	0,6	31	32019 XA	4CC	163	0,44	1,4	257	0,8
95	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
	150	32	24	32	2	1,5	0,6	32	32020 XA	4CC	171	0,46	1,3	277	0,7
100	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	2	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
110	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
	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
120	215	40	34	43,5	3	2,5	1	43	30224 A	4FB	340	0,43	1,4	459	0,8
	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
	200	45	34	45	2,5	2	0,6	42	32026 XA	4EC	315	0,43	1,4	526	0,8
130	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

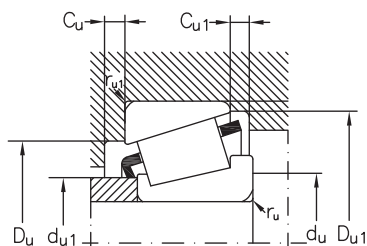


Speed limit		Mass	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		Kg									
1900	2800	5,90	98	92	142	158	159	7	13,5	3	2,5
2400	3400	1,30	94	92	117	122	125	6	7	1,5	1,5
2200	3200	2,00	97	95	132	140	141	5	6,5	2,5	2
2200	3200	2,50	96	95	130	140	142	5	8,5	2,5	2
1900	2800	4,70	107	99	156	166	167	6	10,5	4	3
1800	2600	5,08	103	99	143	166	169	6	16,5	4	3
1800	2600	6,85	103	99	150	166	167	8	14,5	4	3
2200	3200	1,70	100	99	125	131	134	6	8	2	1,5
2200	3000	2,49	103	100	140	150	150	5	6,5	2,5	2
2000	3000	3,30	102	100	138	150	152	5	8,5	2,5	2
1700	2400	5,50	113	104	165	176	176	6	10,5	4	3
1700	2400	5,92	109	104	151	176	179	6	16,5	4	3
1700	2400	8,21	108	104	157	176	177	8	14,5	4	3
2200	3200	1,80	105	104	130	136	140	6	8	2	1,5
1900	2800	2,96	110	107	149	158	159	5	7,5	3	2,5
1900	2800	4,00	108	107	145	158	161	5	8,5	3	2,5
1800	2600	6,70	118	109	172	186	184	6	11,5	4	3
1700	2400	6,95	114	109	157	186	187	6	17,5	4	3
1700	2400	11,0	115	109	166	186	186	8	16,5	4	3
2000	3000	1,85	109	109	134	141	144	6	8	2	1,5
1900	2800	3,54	116	112	157	168	168	5	8	3	2,5
1800	2600	4,76	114	112	154	168	171	5	10	3	2,5
1700	2400	7,90	127	114	184	201	197	6	12,5	4	3
1600	2200	14,0	123	114	177	201	200	8	17,5	4	3
1900	2800	2,42	116	115	143	150	154	6	9	2,5	2
1800	2600	4,26	122	117	165	178	177	6	9	3	2,5
1800	2600	5,90	120	117	161	178	180	5	10	3	2,5
1500	2000	14,5	128	119	185	211	209	9	18,5	4	3
1800	2600	3,06	122	120	152	160	163	7	9	2,5	2
1700	2400	5,00	129	122	174	188	187	6	9	3	2,5
1700	2400	6,90	126	122	170	188	190	6	10	3	2,5
1600	2200	12,5	141	124	206	226	220	8	12,5	4	3
1400	1900	16,4	137	124	198	226	222	9	19,5	4	3
1700	2400	3,25	131	130	161	170	173	7	9	2,5	2
1600	2200	6,01	140	132	187	203	201	6	9,5	3	2,5
1600	2200	8,59	136	132	181	203	204	7	11,5	3	2,5
1500	2000	13,6	152	134	221	246	237	10	13,5	4	3
1300	1800	24,5	148	134	213	246	239	9	21,5	4	3
1600	2200	4,93	144	140	178	190	192	8	11	2,5	2
1500	2000	7,60	152	144	203	216	217	7	9,5	4	3
1500	2000	10,7	146	144	193	216	219	7	13,5	4	3

Tapered roller bearings, single row

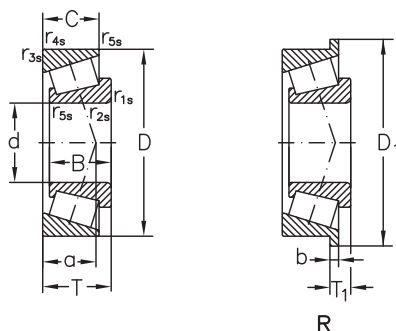


Dimensions									Designation	ISO series	Basic radial load. Factors				
d	D	B	C	T	$r_{1s,2s}$ min.	$r_{3s,4s}$ min.	r_5 min.	a			dyn. Cr	e	Y	stat C_{0r}	Y_0
mm									-		kN	-		kN	-
130	280	58	49	63,75	5	4	1,5	51	30326 A	2GB	640	0,35	1,7	820	0,9
	280	66	44	72	5	4	1,5	87	31326 XA	7GB	597	0,83	0,7	761	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	1080	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	1400	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	1377	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	1037	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	1571	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	1077	0,8
	340	92	75	97	5	4	1,5	81	32238 A	4GD	1080	0,43	1,4	1860	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	1356	0,8
	310	70	53	70	3	2,5	1	66	T32040 X	4FD	716	0,43	1,4	1356	0,8
	310	70	53	70	3	2,5	1	66	T32040 XP5	4FD	716	0,43	1,4	1356	0,8
	360	98	82	104	5	4	1,5	83	32240 A	3GD	1220	0,4	1,5	2020	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	1537	0,8

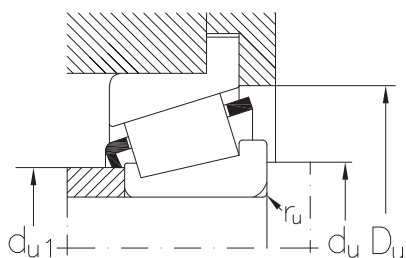


Speed limit		Mass	Mounting dimensions								
grease	oil		d _{u1} max.	d _u min.	D _u min.	max.	D _{u1} min.	C _u min.	C _{u1} min.	r _u max.	r _{u1} max.
min ⁻¹		Kg									
1300	1800	19,5	164	148	239	262	255	8	14,5	5	4
1200	1700	18,6	157	148	218	262	261	9	28	5	4
1100	1600	27,6	160	148	230	262	260	10	20,5	5	4
1600	2200	5,23	153	150	187	200	202	8	11	2,5	2
1400	1900	8,50	163	154	219	236	234	9	9,5	4	3
1400	1900	13,9	159	154	210	236	238	8	13,5	4	3
1200	1700	23,9	169	158	235	282	280	9	30	5	4
1500	2000	6,35	164	162	200	213	216	8	12	3	2,5
1300	1800	10,7	175	164	234	256	250	9	11	4	3
1200	1700	17,9	171	164	226	256	254	8	17	4	3
1300	1800	7,75	175	172	213	228	231	8	13	3	2,5
1100	1600	13,6	189	174	252	276	269	9	12	4	3
1100	1600	25,5	183	174	242	276	274	10	17	4	3
1400	1900	4,50	183	180	213	220	222	7	8	2,5	2
1200	1700	10,5	187	182	230	248	249	10	14	3	2,5
1000	1500	19,0	203	188	269	292	288	8	14	5	4
1000	1500	29,3	196	188	259	292	294	10	20	5	4
1200	1700	6,65	193	190	225	240	241	8	11	2,5	2
1100	1600	14,5	199	192	247	268	267	10	16	3	2,5
1000	1500	20,0	211	198	278	302	297	9	14	5	4
950	1400	27,4	204	198	267	302	303	10	20	5	4
1100	1600	7,00	204	200	235	249	251	8	11	2,5	2
1000	1500	15,0	209	202	257	278	279	10	16	3	2,5
900	1300	39,5	216	207	286	322	323	10	22	5	4
1000	1500	9,50	216	212	257	268	271	9	12	3	2,5
950	1400	19,5	221	212	273	298	297	11	17	3	2,5
950	1400	19,5	221	212	273	298	297	11	17	3	2,5
950	1400	19,5	221	212	273	298	297	11	17	3	2,5
900	1300	33,0	226	217	302	342	340	11	22	5	4
950	1400	11,2	234	232	275	288	290	9	12	3	2,5
900	1300	25,5	243	234	300	326	326	12	19	4	3

Tapered roller bearings with flanged outer ring

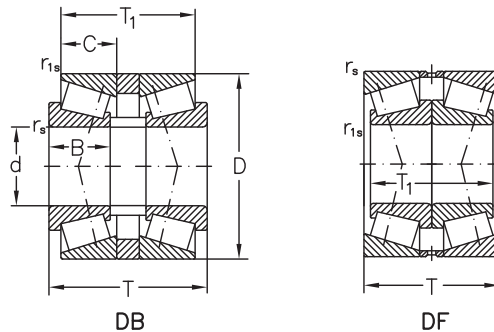


Dimensions										Designation	ISO series
d	D	B	C	T	r_{1s}, r_{2s} min.	r_{3s}, r_{4s} min.	D_1	b	a		
mm										-	
20	47	14	12	6,25	1	1	51	3	11	30204 AR	2DB
25	52	15	13	6,25	1	1	57	3,5	12	30205 AR	3CC
30	62	16	14	6,75	1	1	67	3,5	14	30206 AR	3DB
	62	20	17	8,25	1	1	67	4	15	32206 AR	3DC
	72	19	16	8,75	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

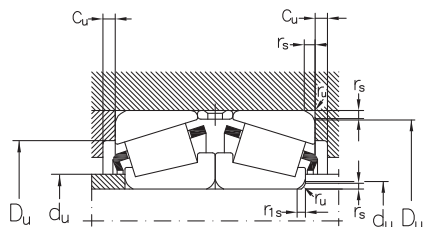
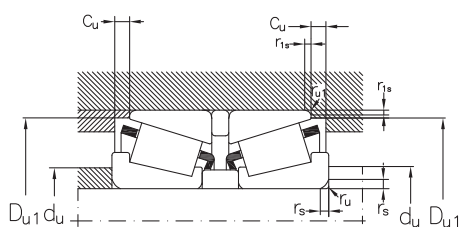


Basic radial load. Factors					Speed limit		Mass	Mounting dimensions			
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil		d _{u1} max.	d _u min.	D _u min.	r _u max.
kN	-		kN	-	min ⁻¹		Kg				
26	0,35	1,7	29	0,9	8000	11000	0,127	27	26	43	1
29,5	0,37	1,6	36	0,9	7500	10000	0,161	31	31	48	1
38	0,37	1,6	48	0,9	6300	8500	0,233	37	36	57	1
47,5	0,37	1,6	65	0,9	6300	8500	0,290	37	36	59	1
53	0,31	1,9	65	1,1	5600	7500	0,398	39	37	66	1,5
72,3	0,31	1,9	97	1,1	5600	7000	0,577	40	37	66	1,5
49,4	0,37	1,6	58	0,9	5300	7000	0,338	44	42	67	1,5
61,6	0,37	1,6	80	0,9	5300	7000	0,422	43	42	67	1,5
68,2	0,31	1,9	83	1,1	5000	6700	0,543	45	44	74	2
88,2	0,31	1,9	120	1,1	4800	6300	0,760	44	44	74	2
58,5	0,37	1,6	70	0,9	4800	6300	0,440	49	47	74	1,5
71	0,37	1,6	95	0,9	4800	6300	0,533	48	47	75	1,5
81	0,35	1,7	105	0,9	4500	6000	0,725	52	49	82	2
110	0,35	1,7	156	0,9	4000	5300	1,027	50	49	82	2
63	0,4	1,5	83	0,8	4500	6000	0,491	54	52	80	1,5
75	0,4	1,5	103	0,8	4500	6000	0,584	53	52	80	1,5
101	0,35	1,7	130	0,9	4000	5300	0,958	59	54	92	2
132	0,35	1,7	188	0,9	3600	4800	1,30	56	54	93	2
70,5	0,43	1,4	95	0,8	4300	5600	0,552	58	57	85	1,5
76,5	0,43	1,4	106	0,8	4300	5600	0,625	58	57	85	1,5
120	0,35	1,7	156	0,9	3600	4800	1,23	65	60	102	2,5
165	0,35	1,7	239	0,9	3200	4300	1,89	62	60	102	2,5
84,5	0,4	1,5	112	0,8	3800	5000	0,724	64	64	94	1,5
99	0,4	1,5	138	0,8	3800	5000	0,858	63	64	95	1,5
187	0,35	1,7	276	0,9	3000	4000	2,29	68	65	111	2
91,5	0,4	1,5	122	0,8	3400	4500	0,897	70	69	103	2
120	0,4	1,5	170	0,8	3400	4500	1,14	69	69	104	2
216	0,35	1,7	318	0,9	2600	3600	1,92	74	72	120	3
110	0,4	1,5	147	0,8	3000	4000	1,14	77	74	113	2
142	0,4	1,5	206	0,8	3000	4000	1,54	76	74	115	2
120	0,43	1,4	163	0,8	3000	4000	1,27	81	79	118	2
150	0,43	1,4	220	0,8	2800	3800	1,62	80	79	119	2

Tapered roller bearings, single row, paired mounted



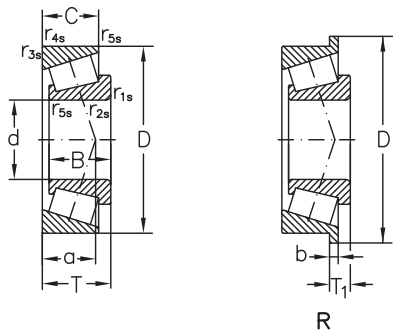
Dimensions								Designation	Speed limit		Mass
d	D	B	C	T	T ₁	r _s min.	r _{1s} min.		grease	oil	
mm								-	min ⁻¹		Kg
45	85	21	19	57,5	46	1,5	0,6	32209 AP2F2DBT57,5	3600	4800	1,28
	85	23	19	55	43,5	1,5	0,6	32209 AP4DBT55	3600	4800	1,26
55	100	22,52	21	69,5	57,66	2	0,6	32211 AP2F2DBT69,5	3000	4000	2,06
	100	25	21	69,5	58	2	0,6	32211 AUPDBT69,5	3000	4000	1,15
70	110	25	19	58	46	1,5	0,5	32014 XADBT58	2600	3400	1,87
80	125	29	22	70	56	1,5	0,6	32016 XADBT70	2000	2800	3,08
90	140	32	24	75	59	2	0,6	32018 XADBT75	1800	2600	3,95
100	180	46	39	140	120	3	0,8	32220 AS1DBT140	1400	2000	12,6
110	200	52,5	46	112	105	0,6	2,5	32222 ADFT112	1400	1900	7,77
	240	50	42	109	100	1	3	30322 ADFT1109	1300	1800	12,6
120	215	58	50	123	116	0,6	2	32224 ADFT123	1300	1800	18,7
	260	55	46	119	110	1	3	30324 ADFT119	1200	1600	29,8
	260	86	69	181	172	1	3	32324 ADFT181	1000	1400	46,2
130	200	45	34	90	90	0,6	2	32026 XAP5S0DFT90	1300	1800	10,6
	230	64	54	135,5	128	1	3	32226 ADFT135,5	1200	1600	23,1
	280	66	45	144	132	2	4	31326 ADFT144	950	1400	40,5
140	250	68	58	163,5	136	3	1	32228 ADBT164	1100	1500	30,9
170	310	86	71	202	162	5	1,5	32234 AMDBT202	800	1200	64,1
	310	86	71	202	162	5	1,5	32234 AMP5DBT202	800	1200	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	-						
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	1160	1,6	126	170	188	6	2,5	1
780	0,35	1,9	2,8	1180	1,8	141	206	226	8	3	1
720	0,43	1,6	2,3	1310	1,6	136	181	203	7	2,5	1
920	0,35	1,9	2,8	1420	1,8	152	221	246	10	3	1
1290	0,35	1,9	2,8	2210	1,8	148	213	246	9	3	1
510	0,43	1,6	2,3	1050	1,6	144	178	190	8	2	0,6
890	0,43	1,6	2,3	1670	1,6	146	193	216	7	3	1
970	0,83	0,8	1,2	1520	0,8	157	218	262	9	4	1,5
980	0,43	1,6	2,3	1810	1,6	154	238		13,5	4	1
1440	0,43	1,6	2,3	2750	1,6	188	294		20	5	1,5
1440	0,43	1,6	2,3	2750	1,6	188	294		20	5	1,5

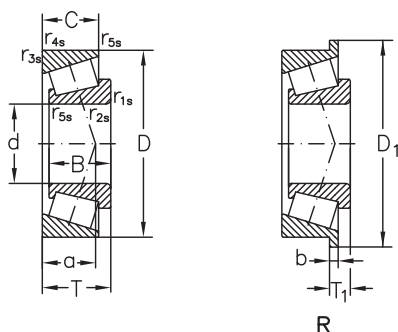
Tapered roller bearings, single row

inch dimensions



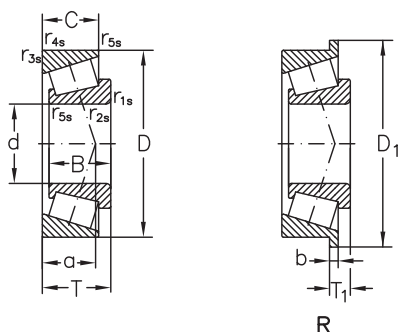
Dimensions										Designation
d	D	B	C	T	r_{1s}, r_{2s} min.	r_{3s}, r_{4s} min.	D_1	b	a	
mm										-
11,112	34,988	10,988	8,73	10,998	1,3	1,3		9		A4044/A4138
12,7	34,988	10,988	8,73	10,998	1,3	1,3		9		A4050/4138
14,989	34,988	10,988	8,73	10,998	0,8	1,3		9		A4059/4138
17,462	39,878	14,605	10,668	13,843	1,3	1,3		9		LM11749/LM11710
19,05	45,237	16,637	12,065	15,494	1,3	1,3		10		LM11949/LM11910
	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
21,986	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
26,988	50,292	14,732	10,668	14,224	3,5	1,3		11		L44649/L44610
29	50,292	14,732	10,668	14,224	3,5	1,3		11		L45449/L45410
31,75	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
	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
	59,974	16,764	11,938	15,875	*	1,3		13		L68149/L68111
38	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.



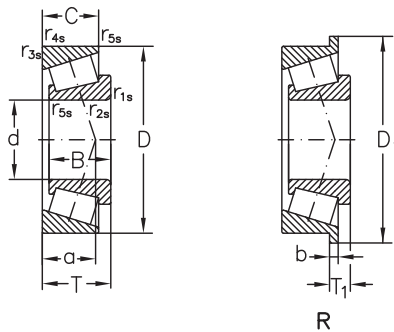
Basic radial load. Factors					Speed limit		Mass
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil	
kN	-		kN	-	min ⁻¹		Kg
12,0	0,45	1,3	11,85	0,7	11000	15000	0,055
12,0	0,45	1,3	11,85	0,7	10000	15000	0,058
12,0	0,45	1,3	11,85	0,7	10000	14000	0,063
19,8	0,29	2,1	21,1	1,2	8500	12000	0,081
25,5	0,30	2,0	25,104	1,1	7500	11000	0,123
31,1	0,27	2,3	33,1	1,2	7000	10000	0,160
34,1	0,28	2,2	38	1,2	7000	10000	0,160
25,2	0,31	2,0	27,7	1,1	7500	10000	0,122
25,2	0,31	2,0	27,7	1,1	7000	10000	0,123
23,7	0,4	1,5	27,5	0,8	6300	9000	0,140
23,7	0,4	1,5	27,5	0,8	6300	9500	0,115
23,4	0,37	1,6	25,913	0,9	6300	9000	0,125
23,4	0,37	1,6	25,913	0,9	6300	9000	0,115
24,1	0,37	1,6	32,2	0,9	6300	9000	0,115
31,1	0,41	1,5	35,912	0,8	5300	7500	0,180
43,9	0,35	1,7	49,708	0,9	5300	7500	0,228
42,9	0,38	1,6	50,696	0,9	4800	7000	0,248
66,5	0,55	1,1	86,61	0,6	4500	6700	0,487
72,5	0,55	1,1	97,9	0,6	4500	6300	0,570
30,1	0,42	1,4	38,841	0,8	5300	7500	0,170
30,1	0,42	1,4	38,841	0,8	5300	7500	0,180
32,9	0,42	1,4	43,8	0,8	4800	7000	0,221
38,4	0,33	1,8	48,72	1,0	4800	6700	0,227
79,3	0,36	1,6	103	0,9	4300	6000	0,550

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Basic radial load. Factors					Speed limit		Mass
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil	
kN	-		kN	-	min ⁻¹		Kg
57,5	0,33	1,8	72,0	1,0	4300	6300	0,460
48,6	0,40	1,5	64,3	0,8	4300	6000	0,320
47,0	0,32	1,9	68,9	1,0	4300	6000	0,300
75,7	0,33	1,8	95,1	1,0	3800	5600	0,554
96,8	0,33	1,8	127,0	1,0	3600	5000	0,970
97,8	0,34	1,8	134	1,0	3000	4500	1,10
48,5	0,31	2,0	66,4	1,1	4000	6000	0,300
70	0,33	1,8	95,2	1,0	3800	5300	0,550
70	0,33	1,8	95,2	1,0	3800	5300	0,580
68,3	0,35	1,7	97	1,0	3800	5300	0,600
98,0	0,34	1,8	128	1,0	3400	5000	0,905
74,3	0,32	1,9	87,26	1,0	3400	5000	0,554
65,2	0,31	2,0	86,2	1,1	3600	5300	0,411
71	0,38	1,6	103	0,9	3400	4800	0,690
102	0,33	1,8	135	1,0	3400	4800	0,860
101	0,40	1,5	147	0,8	3400	4800	0,850
143	0,74	0,8	162	0,4	2800	4000	2,10
97,8	0,34	1,8	134	1,0	3000	4500	1,10
109	0,34	1,8	139	1,0	3000	4300	1,22
130	0,34	1,8	196	1,0	2800	4000	1,03
161	0,50	1,2	226	0,7	2600	3800	2,16
42,3	0,78	0,8	56,8	0,4	3000	4500	0,400
31,2	0,40	1,5	46,0	0,8	3200	4500	0,250
116	0,40	1,5	174	0,8	2800	4000	1,26
116	0,40	1,5	174	0,8	2800	4000	1,24
116	0,40	1,5	174	0,8	2800	4000	1,24
130	0,34	1,8	196	1,0	2800	4000	1,22
133	0,38	1,6	167	0,9	2600	3800	1,44
189	0,34	1,8	248	1,0	2600	3800	2,03
92,0	0,44	1,4	138	0,7	2800	4000	0,900
113	0,40	1,5	172	0,8	2800	4000	1,20
189	0,34	1,8	248	1,0	2600	3800	1,92

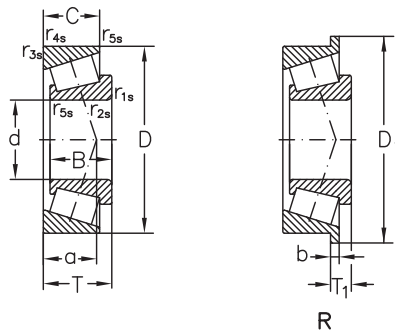
364



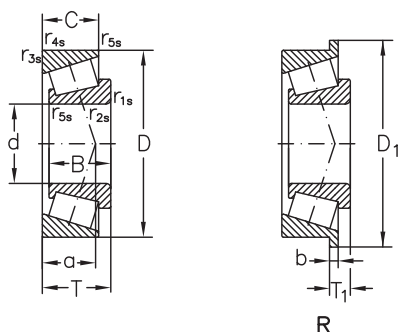
Basic radial load. Factors					Speed limit		Mass
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil	
kN	-		kN	-	min ⁻¹		Kg
161	0,36	1,7	226	0,9	2400	3600	1,64
219	0,48	1,2	296	0,7	2400	3400	2,91
161	0,36	1,7	226	0,9	2400	3400	2,68
213	0,41	1,5	307	0,8	2200	3200	3,31
184	0,40	1,5	239	0,8	2200	3200	2,35
327	0,40	1,5	448	0,8	2000	3000	5,37
84,91	0,45	1,3	117	0,7	2400	3600	0,836
168	0,40	1,5	247	0,8	2200	3200	2,13
201	0,41	1,5	286	0,8	2200	3000	3,73
272	0,34	1,8	358	1,0	2000	2800	4,70
135	0,45	1,3	203	0,7	2200	3200	1,34
213	0,41	1,5	307	0,8	2200	3000	2,60
235	0,40	1,5	338	0,8	2000	3000	2,80
395	0,34	1,8	526	1,0	1800	2600	8,85
220	0,33	1,8	386	1,0	2000	3000	2,59
140	0,48	1,3	213	0,7	2200	3000	1,52
174	0,44	1,4	268	0,7	2000	2800	2,59
305	0,37	1,6	416	0,9	1900	2600	4,79
136	0,49	1,2	416	0,7	2000	2800	1,72
204	0,44	1,4	313	0,7	2000	2800	2,64
136	0,49	1,2	210	0,7	2000	2800	1,74
142	0,47	1,3	195	0,7	1900	2800	2,47
321	0,39	1,6	462	0,9	1700	2400	5,50
557	0,33	1,8	783	1,0	1600	2200	11,1

Tapered roller bearings, single row

inch dimensions

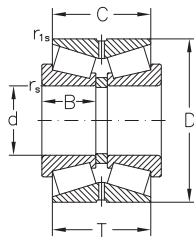


Dimensions								Designation		
d	D	B	C	T	r_{1s}, r_{2s} min.	r_{3s}, r_{4s} min.	D_1	b	a	
mm										-
120,65	174,625	36,512	27,783	35,72	3,5	1,5				M224749/M224710
	206,375	47,625	34,925	47,625	3,5	3,5				795/792
127	215,9	47,625	34,925	47,625	3,5	3,3				74500/74850
130	234,95	63,5	49,213	63,5	6	3,3				95512/95925
133,35	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		74525/74850 R
136,525	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		74525/74850 R
139,7	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		74550/74850 R
	215,9	47,625	34,925	47,625	3,5	3,3				74550/74850
	215,9	47,625	34,925	47,625	3,5	3,3				74550/74850
158,75	225,425	39,688	33,338	13,495	3,5	3,3	230,881	5,558		46780/46720 R
	225,425	39,688	33,338	41,275	3,5	3,3				46780/46720
180	250	45	37	47	3	3				JM736149/JM36110
196,85	254	27,783	21,433	28,575	1,5	1,5				L540049/L540010
203,2	261,142	27,783	21,433	28,575	1,5	1,5				LL641149/LL641110
209,55	282,575	46,038	36,512	46,038	3,5	3,3				67989/67920
	317,5	63,5	46,038	63,5	4,3	3,3				93825/93125
234,95	327,025	52,388	36,512	52,388	6,4	3,3				8575/8520
241,3	327,025	52,388	36,512	25,4	6,4	3,3	336,448	9,525		8578/8520 R

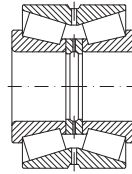


Basic radial load. Factors					Speed limit		Mass
dyn. Cr	e	Y	stat C _{0r}	Y ₀	grease	oil	
kN	-		kN	-	min ⁻¹		Kg
220	0,33	1,8	375	1,0	1700	2400	2,70
308	0,49	1,2	523	0,7	1400	2000	6,97
507	0,36	1,6	784	0,9	1300	1900	11,3
313	0,49	1,2	528	0,7	1400	2000	6,78
313	0,49	1,2	528	0,7	1400	2000	6,53
310	0,49	1,2	531	0,7	1400	2000	6,17
310	0,49	1,2	531	0,7	1400	2000	6,08
310	0,49	1,2	531	0,7	1400	2000	6,08
305	0,38	1,6	541	0,9	1300	1800	5,40
305	0,38	1,6	541	0,9	1300	1800	5,35
334	0,48	1,3	703	0,7	1100	1600	7,85
170	0,39	1,5	334	0,9	1100	1600	3,32
174	0,41	1,5	353	0,8	1100	1500	3,56
331	0,51	1,2	661	0,6	1000	1400	8,84
651	0,52	1,2	1098	0,6	950	1300	18,5
468	0,41	1,5	934	0,8	850	1200	12,3
468	0,41	1,5	934	0,8	850	1200	11,9

Tapered roller bearings, double row

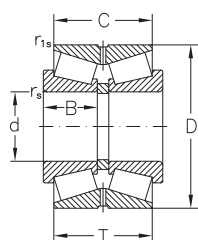


$d < 220$

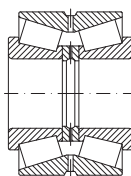


$d > 220$

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



$d < 220$



$d > 220$

Basic radial load. Factors						Speed limit		Mass
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	1288	1,8	950	1400	17,0
1154	0,29	2,3	3,5	2352	2,3	850	1200	29,9
1268	0,37	1,0	2,7	2526	1,8	800	1100	39,3
1469	0,34	2,0	2,9	3032	1,9	750	1000	50,1

Tapered roller bearings, double row

Inch dimensions

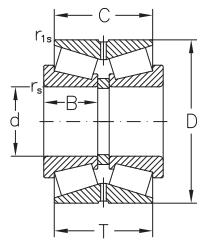


Fig. 1

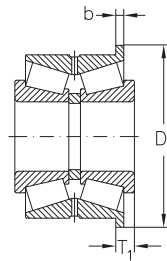


Fig. 2

Dimensions						Designation	
d	D	B	C	T	r_1 min.	r_{1s} min.	
mm						-	
69,85	114,287	25,4	46,038	58,738	1,5	0,8	29675/29622 DC
	120	29,007	53,975	65,09	3,5	0,8	482/472 D
73,025	114,287	25,4	46,038	58,738	3,5	0,8	29685/29622 D
82,55	136,525	29,769	53,975	69,85	3,5	0,8	495/493 D
85,725	136,525	29,769	53,975	69,85	3,5	0,8	497/493 DC
92,075	149,225	28,971	52,387	66,672	3,5	0,8	42362/42587 D
107,95	158,75	21,4	39,688	53,978	3,5	0,8	37425/37626 D
	159,987	34,925	58,738	74,89	3,6	0,8	LM4522546/LM522510 DC
114,3	190,5	49,2	80,962	106,362	3,5	1,5	71450/7175 D
115	190,5	50	82,6	108	3,5	1	181115/181190 XG
127	196,85	46	85,725	101,6	3,5	0,8	67388/67322 D
136,525	190,5	39,7	73,025	85,725	3,5	0,8	48393/48320 D
	215,9	51	92	110	2,5	1	200136X/200215 XH¹⁾
152,4	222,25	46,8	76,2	100,01	3,5	0,8	M231649/M23160 D
	222,25	46,8	76,2	100,01	3,5	0,8	M231649/M23160 D
203,2	282,575	46,038	82,55	101,6	3,5	0,8	67983/67920 DC

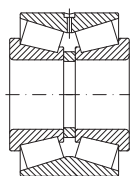


Fig. 3

Basic radial load. Factors						Speed limit		Mass	Fig.
dyn. Cr	e	Y ₁	Y ₂	stat C _{0r}	Y ₀	grease	oil		
kN	-			kN	-	min ⁻¹		Kg	
180	0,49	1,4	2,1	295	1,4	2400	3000	2,05	3
255	0,38	1,8	2,6	415	1,7	2200	2800	2,45	1
180	0,49	1,4	2,1	295	1,4	2400	2800	1,91	1
255	0,44	1,5	2,3	450	1,5	2000	2400	3,84	1
255	0,44	1,5	2,3	450	1,5	1900	2400	3,72	3
275	0,49	1,4	2,1	510	1,4	1800	2200	4,37	1
170	0,61	1,1	1,7	335	1,1	1600	2000	3,26	1
280	0,40	1,7	2,5	630	1,6	1600	2000	4,97	3
530	0,42	1,6	2,4	980	1,6	1400	1800	10,8	1
435	0,26	2,6	3,8	750	2,5	1400	1800	10,1	1
540	0,34	2,0	2,9	1130	1,9	1300	1700	10,6	1
395	0,33	2,1	3,1	940	2,0	1300	1700	6,88	1
540	0,25	2,7	4,1	960	2,7	1200	1500	12,2	2
540	0,33	2,0	3,0	1190	2,0	1200	1400	11,7	1
540	0,33	2,0	3,0	1190	2,0	1200	1400	11,7	1
600	0,51	1,3	2,0	1410	1,3	900	1100	17,8	1

URB



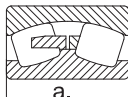
Spherical roller bearings

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.

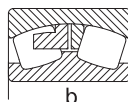
MB design

These bearings have a central fixed rib and machined cages guided on the inner ring rib.



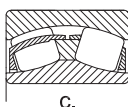
MA design

These bearings have a central fixed rib and machined cages guided on the outer ring rib.



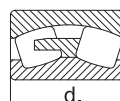
C design

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 an one-piece machined brass cage. They also have symmetrical rollers with larger dimensions so that the load carrying capacity increases. This design is available for medium and large-sized bearings



Other constructive versions are shown below:

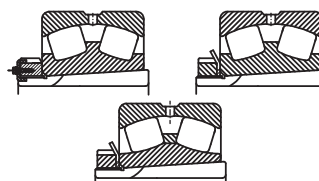
Cylindrical bore, lubrication groove and holes in the outer ring



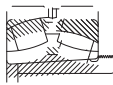
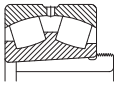
Tapered bore, lubrication groove and holes in the outer ring
(taper 1:12, 1:30)



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
- 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
- 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 chapter Bearing tolerance, page 27).

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 SR ISO 5753 and are given in tables 1 and 2.

Dimensions

The main dimensions of spherical roller bearings are in accordance with ISO 15 and national standard SR 3918 respectively.

The dimensions of the adapter sleeves are in accordance with national standard SR ISO 2982-1.

Radial clearance of spherical roller bearings with cylindrical bore

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
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
400	450	140	240	240	370	370	500	500	660	660	820
450	500	140	260	260	410	410	550	550	720	720	900
500	560	150	280	280	440	440	600	600	780	780	1000
560	630	170	310	310	480	480	650	650	850	850	1100
630	710	190	350	350	530	530	700	700	920	920	1190
710	800	210	390	390	580	580	770	770	1010	1010	1300

Radial clearance of spherical roller bearings with tapered bore

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
18	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
400	450	230	330	330	440	440	570	570	720	720	910
450	500	260	370	370	490	490	630	630	790	790	1000
500	560	290	410	410	540	540	680	680	870	870	1100
560	630	320	460	460	600	600	760	760	980	980	1230
630	710	350	510	510	670	670	850	850	1090	1090	1360
710	800	390	570	570	750	750	960	960	1220	1220	1500

The dimensions of the safety washers are in accordance with national standard SR ISO 2982-2.

The dimensions of the bearings nuts are in accordance with national standard SR ISO 2982-2.

The dimensions of the withdrawal sleeves are in accordance with national standard SR ISO 2982-1 and pages 893-894.

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.

Cages

Small and medium size spherical roller bearing 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.

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

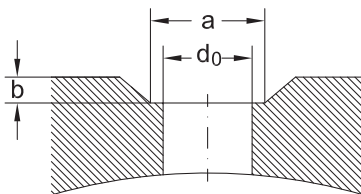
Cage design and some technical data

Table 4

Cage	Design		Application	Max. value	
	bearing	cage		$D_m n$ oil	grease
Pressed sheet cage				- General application - C design - Moderate speeds - Bearings with $d \leq 200\text{mm}$	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 $d > 40\text{mm}$	350×10^3 265×10^3
Machined brass cage, CA design				- General application - Bearings with $d > 200\text{mm}$	350×10^3 265×10^3

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.



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

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

$$P_r = 67 F_r + Y_2 F_a, \text{ kN, for } F_a/F_r > e$$

The values of the factors depending on the bearing type can be found in bearing tables.

Dimensions of lubrication grooves and holes

of Table 5

Series 23900				Series 23000				Series 24000			
Outer diameter range	Dimensions			Outer diameter range	Dimensions			Outer diameter range	Dimensions		
	d0	a	b		d0	a	b		d0	a	b
mm	mm			mm	mm			mm	mm		
250... 360	4,5	7,2	1,5	170... 210	4,5	7,2	1,5	... 180	4,5	7,2	1,5
380... 420	4,5	7,2	2	225... 260	6	9,6	2	200... 225	6	9,6	2
440... 480	6	9,6	3	280... 310	7,5	12,1	2,5	240... 260	7,5	12,1	2,5
520... 540	7,5	12,1	3	310... 460	9	14,5	3	280... 480	9	14,5	3
560... 650	9	14,5	3	480... 980	12	19,7	3	520... 560	9	14,5	3
670... 1000	12	19,7	3,5					600... 980	12	19,7	3,5

Series 23100				Series 24100				Series 22200			
Outer diameter range	Dimensions			Outer diameter range	Dimensions			Outer diameter range	Dimensions		
	d0	a	b		d0	a	b		d0	a	b
mm	mm			mm	mm			mm	mm		
165... 200	4,5	7,2	1,5	180... 210	3	4,9	1	72... 100	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	2	215... 250	6	9,6	2
440... 980	12	19,7	3	420... 500	7,5	12,1	2,5	270... 290	7,5	12,1	2,5
				540... 620	9	14,5	3	310... 400	9	14,5	3
				650... 980	12	19,7	3,5	440... 580	12	19,7	3,5

Series 23200				Series 22300				Series 21300			
Outer diameter range	Dimensions			Outer diameter range	Dimensions			Outer diameter range	Dimensions		
	d0	a	b		d0	a	b		d0	a	b
mm	mm			mm	mm			mm	mm		
... 160	3	4,9	1	90... 120	3	4,9	1	... 80	3	4,2	0,8
180... 200	4,5	7,2	1,5	130... 180	4,5	7,2	1,5	90... 180	3	4,9	1
215... 250	6	9,6	2	190... 215	6	9,6	2	190... 215	4,5	7,2	1,5
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				
400... 980	12	19,7	3,5	380... 580	12	19,7	3,5				

Number of lubrication holes - all series

Bore diameter range, mm	50... 240	260... 440	460... 950
Number of lubrication holes	3	4	6

Equivalent static radial load

$P_{0r}=F_r+Y_0F_a, \text{ kN}$

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 $r_{u \text{ max}}$ should be less than bearing minimum mounting chamfer $r_{s \text{ min}}$.

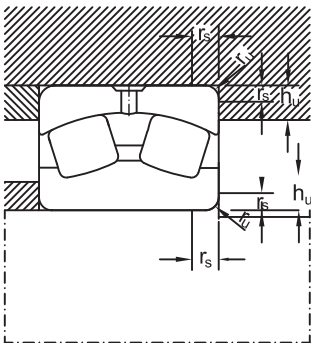
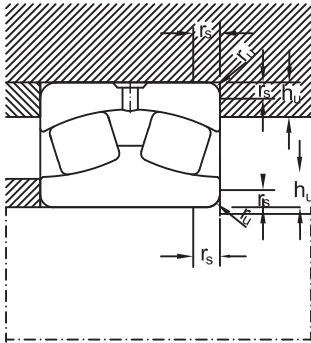
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

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

of Table 6

$r_{s \text{ min}}$	$r_{u \text{ max}}$	$h_{u \text{ min}}$ 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

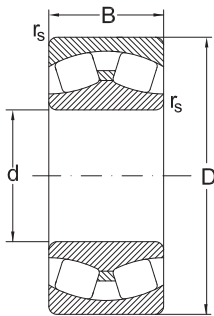


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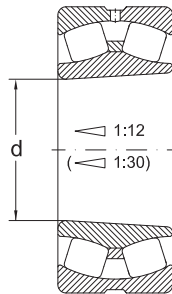
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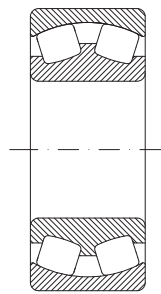
Spherical Roller Bearings SR 3918



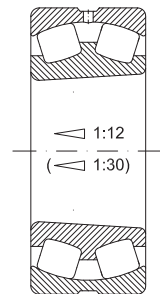
C



CK/K30W33



MB



MBK/K30W33

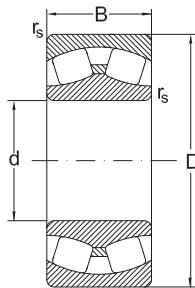
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
35	80	21	1,5	66	0,28	2,4	3,6	65
	80	21	1,5	66	0,28	2,4	3,6	65
40	80	23	1,1	88	0,31	2,2	3,2	98
	80	23	1,1	88	0,31	2,2	3,2	98
	80	23	1,1	88	0,31	2,2	3,2	98
	80	23	1,1	78	0,31	2,2	3,2	87
	80	23	1,1	78	0,31	2,2	3,2	87
	80	23	1,1	78	0,31	2,2	3,2	87
	80	23	1,1	78	0,31	2,2	3,2	87
	80	23	1,1	78	0,31	2,2	3,2	87
	90	23	1,5	99	0,26	2,6	3,9	120
	90	23	1,5	99	0,26	2,6	3,9	120
	90	23	1,5	83	0,26	2,6	3,8	101
	90	33	1,5	140	0,4	1,6	2,5	145
	90	33	1,5	140	0,4	1,6	2,5	145
	90	33	1,5	140	0,4	2,6	2,5	145
	90	33	1,5	140	0,4	2,5	2,5	145
	90	33	1,5	140	0,4	1,6	2,5	145
	90	33	1,5	140	0,4	1,6	2,5	145
	90	33	1,5	140	0,4	1,6	2,5	145
	90	33	1,5	125	0,4	1,7	2,5	135
	90	33	1,5	125	0,4	1,7	2,5	135
	90	33	1,5	125	0,4	1,7	2,5	135
	90	33	1,5	125	0,4	1,7	2,5	135
45	85	23	1,1	93	0,26	2,6	3,8	105
	85	23	1,1	93	0,26	2,6	3,4	105
	85	23	1,1	93	0,26	2,6	3,4	105

Spherical Roller Bearings SR 3918

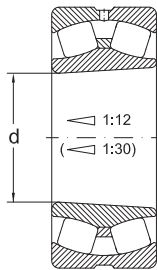
Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
35	2,4	5000	6400	21307 MBKW33	0,56
	2,4	5000	6400	21307 MBW33	0,56
40	2,1	4800	6300	22208 C	0,54
	2,1	4800	6300	22208 CK	0,54
	2,1	4800	6300	22208 CKW33	0,52
	2,1	4400	5800	22208 MAC4F80W33	0,654
	2,1	4400	5800	22208 MB	0,57
	2,1	4400	5800	22208 MBK	0,57
	2,1	4400	5800	22208 MBKW33	0,56
	2,1	4400	5800	22208 MBW33	0,56
	2,6	4500	6000	21308 C	0,710
	2,6	4500	6000	21308 CK	0,700
	2,5	4900	6500	21308 CKW33	0,700
	1,6	4300	5600	22308 C	0,97
	1,6	4300	5600	22308 CK	0,95
	1,6	4300	5600	22308 CKW33	0,93
	1,6	4300	5600	22308 CW33	0,96
	1,6	4300	5600	22308 CY	0,98
	1,6	4300	5600	22308 CYK	0,95
	1,6	4300	5600	22308 CYKW33	0,94
	1,6	4300	5600	22308 CYW33	0,972
	1,6	3800	5000	22309 MAK4F80W33	1,42
	1,6	3800	5000	22308 MBK	1
	1,6	3800	5000	22308 MBKW33	0,99
	1,6	3800	5000	22308 MB	1,02
	1,6	3800	5000	22308 MBW33	1,05
45	2,5	4500	6000	22209 C	0,64
	2,5	4500	6000	22209 CK	0,62
	2,5	4500	6000	22209 CKW33	0,62

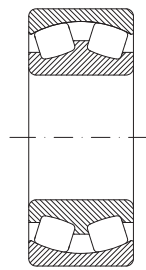
Spherical Roller Bearings SR 3918



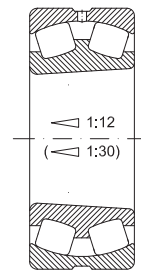
C



CK/K30W33



MB



MBK/K30W33

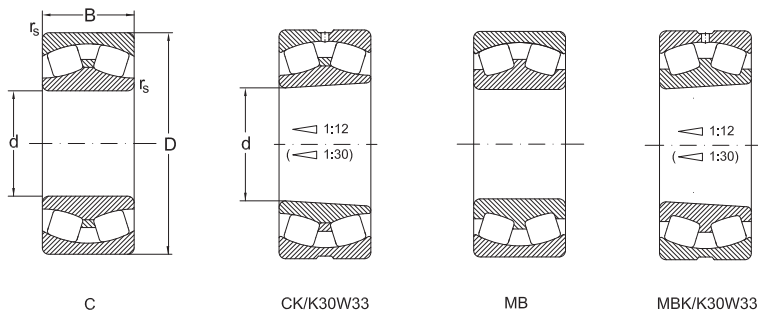
Dimensions			Basical radial load					
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
45	85	23	1,1	93	0,26	2,6	2,4	105
	85	23	1,1	77	0,28	2,4	3,5	87,5
	85	23	1,1	77	0,28	2,4	3,5	87,5
	85	23	1,1	77	0,28	2,4	3,5	87,5
	85	23	1,1	77	0,28	2,4	3,5	87,5
	100	25	1,5	120	0,26	2,6	3,9	135
	100	25	1,5	120	0,26	2,6	3,9	135
	100	25	1,5	120	0,26	2,6	3,9	135
	100	25	1,5	105	0,28	2,4	3,6	107
	100	36	1,5	165	0,35	1,9	2,9	190
	100	36	1,5	165	0,35	1,9	2,9	190
	100	36	1,5	165	0,4	1,9	2,9	190
	100	36	1,5	165	0,4	1,9	2,9	190
	100	36	1,5	150	0,4	1,7	2,5	175
	100	36	1,5	150	0,4	1,7	2,5	175
	100	36	1,5	150	0,4	1,7	2,5	175
	100	36	1,5	150	0,4	1,7	2,5	175
50	90	23	1,1	100	0,24	2,9	4,2	120
	90	23	1,1	100	0,24	2,9	4,2	120
	90	23	1,1	100	0,24	2,9	4,2	120
	90	23	1,1	100	0,24	2,9	4,2	120
	90	23	1,1	78	0,26	2,6	3,8	91,3
	90	23	1,1	78	0,26	2,6	3,8	91,3
	90	23	1,1	78	0,26	2,6	3,8	91,3
	90	23	1,1	78	0,26	2,6	3,8	91,3
	110	27	2	120	0,24	2,8	4,1	130
	110	27	2	120	0,24	2,8	4,1	130
	110	27	2	120	0,24	2,8	4,1	130
	110	40	2	190	0,38	1,8	2,7	220

Spherical Roller Bearings SR 3918

Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
45	2,5	4500	6000	22209 CW33	0,71
	2,3	4100	5500	22209 MBK	0,72
	2,3	4100	5500	22209 MBKW33	0,72
	2,3	4100	5500	22209 MB	0,72
	2,3	4100	5500	22209 MBW33	0,77
	2,6	4000	5300	21309 C	0,71
	2,6	4000	5300	21309 CK	0,54
	2,6	4000	5300	21309 CKW33	0,74
	2,3	3600	4800	21309 MB	0,77
	1,9	3800	5000	22309 C	1,38
	1,9	3800	5000	22309 CK	1,35
	1,9	3800	5000	22309 CKW33	1,38
	1,9	3800	5000	22309 CW33	1,38
	1,6	3400	4500	22309 MBK	1,36
	1,6	3400	4500	22309 MBKW33	1,36
	1,6	3400	4500	22309 MB	1,37
	1,6	3400	4500	22309 MBW33	1,36
50	2,7	4000	5300	22210 C	0,7
	2,7	4000	5300	22210 CK	0,69
	2,7	4000	5300	22210 CKW33	0,69
	2,7	4000	5300	22210 CW33	0,7
	2,5	3600	4800	22210 MBK	0,77
	2,5	3600	4800	22210 MBKW33	0,76
	2,5	3600	4800	22210 MB	0,77
	2,5	3600	4800	22210 MBW33	0,76
	2,7	3600	4800	21310 C	1,25
	2,7	3600	4800	21310 CK	1,20
	2,7	3600	4800	21310 CKW33	1,20
	1,7	3400	4500	22310 C	1,81

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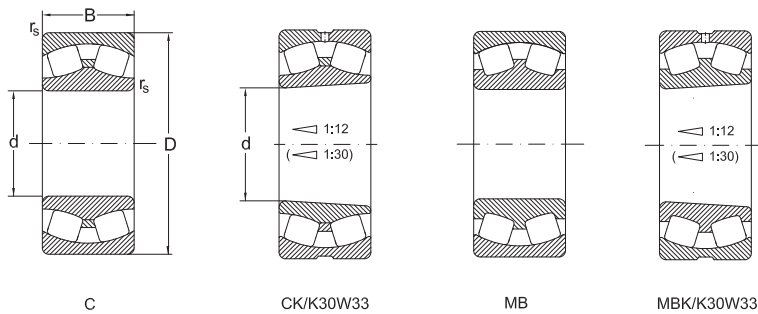
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
50	110	40	2	190	0,38	1,8	2,7	220
	110	40	2	190	0,4	1,8	2,7	220
	110	40	2	190	0,4	1,8	2,7	220
	110	40	2	190	0,4	1,8	2,7	220
	110	40	2	190	0,4	1,8	2,7	220
	110	40	2	190	0,4	1,8	2,7	220
	110	40	2	190	0,4	1,8	2,7	220
	110	40	2	177	0,4	1,7	2,5	202
	110	40	2	177	0,4	1,7	2,5	202
	110	40	2	177	0,4	1,7	2,5	202
	110	40	2	177	0,4	1,7	2,5	202
	110	40	2	177	0,4	1,7	2,5	202
55	100	25	1,5	120	0,27	2,7	4,1	140
	100	25	1,5	120	0,27	2,7	4,1	140
	100	25	1,5	120	0,27	2,7	4,1	140
	100	25	1,5	120	0,27	2,7	4,1	140
	100	25	1,5	94	0,26	2,6	3,9	107
	100	25	1,5	94	0,26	2,6	3,9	107
	100	25	1,5	94	0,26	2,6	3,9	107
	100	25	1,5	94	0,26	2,6	3,9	107
	120	29	2	135	0,24	2,8	4,1	155
	120	29	2	135	0,24	2,8	4,1	155
	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	230	0,4	1,7	2,5	265

Spherical Roller Bearings SR 3918

*Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
50	1,7	3400	4500	22310 CK	1,77
	1,7	3400	4500	22310 CKW33	1,76
	1,7	3400	4500	22310 CW33	1,81
	1,7	3400	4500	22310 CY	1,82
	1,7	3400	4500	22310 CYK	1,81
	1,7	3400	4500	22310 CYKW33	1,77
	1,7	3400	4500	22310 CYW33	1,81
	1,6	3000	4000	22310 MBK	1,85
	1,6	3000	4000	22310 MBKW33	1,83
	1,6	3000	4000	22310 MAC4F80W33	1,83
	1,6	3000	4000	22310 MB	1,85
	1,6	3000	4000	22310 MBW33	1,84
55	2,7	3800	5000	22211 C	0,91
	2,7	3800	5000	22211 CK	0,9
	2,7	3800	5000	22211 CKW33	0,8
	2,7	3800	5000	22211 CW33	0,89
	2,5	3600	4600	22211 MBK	0,89
	2,5	3600	4600	22211 MBKW33	0,88
	2,5	3600	4600	22211 MB	0,91
	2,5	3600	4600	22211 MBW33	0,89
	2,7	3200	4300	21311 C	1,65
	2,7	3200	4300	21311 CK	1,60
	1,6	3000	4000	22311 C	2,32
	1,6	3000	4000	22311 CK	2,27
	1,6	3000	4000	22311 CKW33	2,25
	1,6	3000	4000	22311 CW33	2,32
	1,6	3000	4000	22311 CY	2,34
	1,6	3000	4000	22311 CYK	2,28

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
55	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	230	0,4	1,7	2,5	265
	120	43	2	220	0,4	1,7	2,5	255
	120	43	2	220	0,4	1,7	2,5	255
	120	43	2	220	0,4	1,7	2,5	255
	120	43	2	220	0,4	1,7	2,5	255
	120	43	2	220	0,4	1,7	2,5	255
	120	43	2	220	0,4	1,7	2,5	255
	120	43	2	220	0,4	1,7	2,5	255
	120	43	2	220	0,4	1,7	2,5	255
60	110	28	1,5	145	0,27	2,7	4	175
	110	28	1,5	145	0,27	2,7	4	175
	110	28	1,5	145	0,27	2,7	4	175
	110	28	1,5	117,8	0,27	2,6	3,8	140,3
	110	28	1,5	117,8	0,27	2,6	3,8	140,3
	110	28	1,5	117,8	0,27	2,6	3,8	140,3
	110	28	1,5	117,8	0,27	2,6	3,8	140,3
	130	31	2,1	150	0,24	2,9	4,3	180
	130	31	2,1	150	0,24	2,9	4,3	180
	130	46	2,1	270	0,4	1,7	2,5	320
	130	46	2,1	270	0,4	1,7	2,5	320
	130	46	2,1	270	0,4	1,7	2,5	320
	130	46	2,1	270	0,4	1,7	2,5	320
	130	46	2,1	270	0,4	1,7	2,5	320
	130	46	2,1	270	0,4	1,7	2,5	320
	130	46	2,1	270	0,4	1,7	2,5	320
	130	46	2,1	270	0,4	1,7	2,5	320
	130	46	2,1	260	0,4	1,7	2,5	310
	130	46	2,1	260	0,4	1,7	2,5	310

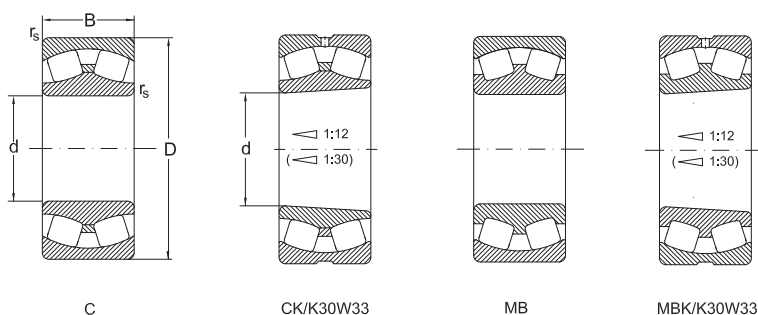
Spherical Roller Bearings

SR 3918

Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
55	1,6	3000	4000	22311 CYKW33	2,26
	1,6	3000	4000	22311 CYW33	2,32
	1,6	2800	3600	22311 MBK	2,1
	1,6	2800	3600	22311 MAKW33	2,44
	1,6	2800	3600	22311 MA	2,49
	1,6	2800	3600	22311 MAC4F80W33	2,42
	1,6	2800	3600	22311 MAC4W502	2,44
	1,6	2800	3600	22311 MAW502	2,44
	1,6	2800	3600	22311 MB	2,43
	1,6	2800	3600	22311 MBW33	2,42
60	2,7	3400	4500	22212 C	1,32
	2,7	3400	4500	22212 CK	1,29
	2,7	3400	4500	22212 CKW33	1,25
	2,5	3200	4100	22212 MBK	1,19
	2,5	3200	4100	22212 MBKW33	1,17
	2,5	3200	4100	22212 MB	1,17
	2,5	3200	4100	22212 MBW33	1,2
	2,8	3000	4000	21312 C	1,95
	2,8	3000	4000	21312 CK	1,90
	1,7	2800	3800	22312 C	2,91
	1,7	2800	3800	22312 CK	2,84
	1,7	2800	3800	22312 CKW33	2,8
	1,7	2800	3800	22312 CW33	2,87
	1,7	2800	3800	22312 CY	2,93
	1,7	2800	3800	22312 CYK	2,86
	1,7	2800	3800	22312 CYKW33	2,82
	1,7	2800	3800	22312 CYW33	2,89
	1,7	2600	3400	22312 MBK	3,04
	1,7	2600	3400	22312 MBKW33	3

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
60	130	46	2,1	260	0,4	1,7	2,5	310
	130	46	2,1	260	0,4	1,7	2,5	310
	130	46	2,1	260	0,4	1,7	2,5	310
	130	31	2,1	151	0,24	2,9	4,3	152
65	120	31	1,5	180	0,28	2,4	3,6	220
	120	31	1,5	180	0,28	2,4	3,6	220
	120	31	1,5	180	0,28	2,4	3,6	220
	120	31	1,5	180	0,28	2,4	3,6	220
	120	31	1,5	165	0,28	2,4	3,6	200
	120	31	1,5	165	0,28	2,4	3,6	200
	120	31	1,5	165	0,28	2,4	3,6	200
	120	31	1,5	165	0,28	2,4	3,6	200
	140	33	2,1	220	0,24	2,8	4,2	290
	140	33	2,1	220	0,24	2,8	4,2	290
	140	48	2,1	305	0,39	1,7	2,6	360
	140	48	2,1	305	0,39	1,7	2,6	360
	140	48	2,1	305	0,39	1,7	2,6	360
	140	48	2,1	305	0,39	1,7	2,6	360
	140	48	2,1	305	0,39	1,7	2,6	360
	140	48	2,1	305	0,39	1,7	2,6	360
	140	48	2,1	280	0,39	1,7	2,6	360
	140	48	2,1	280	0,39	1,7	2,6	330
	140	48	2,1	280				330
	140	48	2,1	280	0,39	1,7	2,6	330
	140	48	2,1	280	0,39	1,7	2,6	330
	140	48	2,1	280	0,39	1,7	2,6	330
	140	48	2,1	280	0,39	1,7	2,6	330
	140	48	1,5	280	0,38	1,8	2,6	330

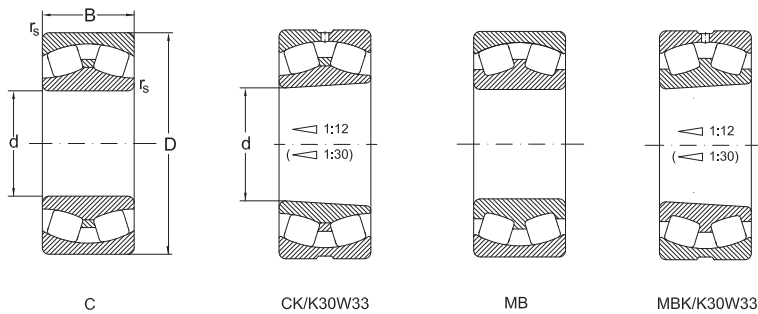
Spherical Roller Bearings

SR 3918

Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
60	1,7	2600	3400	22312 MAC4F80W33	3,07
	1,7	2600	3400	22312 MB	3,04
	1,7	2600	3400	22312 MBW33	3
	2,8	2800	3800	21312 MBK	2,13
65	2,4	3000	4000	22213 C	1,73
	2,4	3000	4000	22213 CK	1,51
	2,4	3000	4000	22213 CKW33	1,65
	2,4	3000	4000	22213 CW33	1,68
	2,4	2800	3600	22213 MBK	1,59
	2,4	2800	3600	22213 MBKW33	1,57
	2,4	2800	3600	22213 MB	1,62
	2,4	2800	3600	22213 MBW33	1,6
	2,8	2800	3800	21313 C	2,45
	2,8	2800	3800	21313 CK	2,40
	1,7	2800	3600	22313 C	3,57
	1,7	2800	3600	22313 CK	3,44
	1,7	2800	3600	22313 CKW33	3,49
	1,7	2800	3600	22313 CW33	3,51
	1,7	2800	3600	22313 CY	3,54
	1,7	2800	3600	22313 CYK	3,44
	1,7	2800	3600	22313 CYKW33	3,43
	1,7	2800	3600	22313 CYW33	3,53
	1,7	2400	3200	22313 MBK	3,71
	1,7	2400	3200	22313 MBKW33	3,71
	1,7	2400	3200	22313 MA	3,56
	1,7	2400	3200	22313 MAC4F80W33	3,77
	1,7	2400	3200	22313 MAC4W502	3,51
	1,7	2400	3200	22313 MAW502	3,51
	1,7	2400	3200	22313 MB	3,51

Spherical Roller Bearings SR 3918



Dimensions				Basical radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN				
65	140	48	1,5	280	0,39	1,7	2,6	330
70	125	31	1,5	180	0,26	2,6	3,9	225
	125	31	1,5	180	0,26	2,6	3,9	225
	125	31	1,5	180	0,26	2,6	3,9	225
	125	31	1,5	180	0,26	2,6	3,9	225
	150	35	2,1	190	0,26	2,6	4	197
	150	35	2,1	190	0,26	2,6	4	197
	150	35	2,1	190	0,26	2,6	4	197
	150	51	2,1	375	0,38	1,9	2,9	455
	150	51	2,1	375	0,38	1,9	2,9	455
	150	51	2,1	375	0,38	1,9	2,9	455
	150	51	2,1	375	0,38	1,9	2,9	455
	150	51	2,1	340	0,37	1,8	2,7	420
	150	51	2,1	340	0,37	1,8	2,7	420
	150	51	2,1	340	0,37	1,8	2,7	420
	150	51	2,1	340	0,37	1,8	2,7	420
	150	51	2,1	340	0,37	1,8	2,7	420
75	130	31	1,5	190	0,23	2,9	4,4	250
	130	31	1,5	190	0,23	2,9	4,4	250
	130	31	1,5	190	0,24	2,9	4,4	250
	130	31	1,5	190	0,24	2,9	4,4	250
	130	31	1,5	175	0,24	2,8	4,1	230
	130	31	1,5	175	0,24	2,8	4,1	230
	130	31	1,5	175	0,24	2,8	4,1	230
	130	31	1,5	175	0,24	2,8	4,1	230
	160	55	2,1	380	0,34	2,9		131
	160	37	2,1	280	0,23	2,9		360
	160	37	2,1	280	0,23	2,9		360

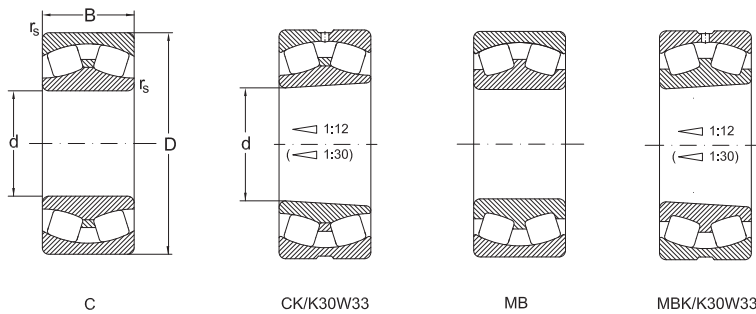
Spherical Roller Bearings

SR 3918

Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
65	1,7	2400	3200	22313 MBW33	3,7
70	2,6	2800	3800	22214 C	1,82
	2,6	2800	3800	22214 CK	1,82
	2,6	2800	3800	22214 CKW33	1,8
	2,6	2800	3800	22214 CW33	1,82
	2,6	2600	3400	21314 MBKW33	3,12
	2,6	2600	3400	21314 MB	3,2
	2,6	2600	3400	21314 MBW33	3,16
	1,9	2400	3200	22314 C	4,32
	1,9	2400	3200	22314 CK	4,32
	1,9	2400	3200	22314 CKW33	4,21
	1,9	2400	3200	22314 CW33	4,3
	1,7	2200	2800	22314 MBK	4,43
	1,7	2200	2800	22314 MBKW33	4,42
	1,7	2200	2800	22314 MAC4F80W33	4,58
	1,8	2200	2800	22314 MB	4,31
	1,7	2200	2800	22314 MBW33	4,61
	1,7	2200	2800	22314 MBW7	1,90
75	2,9	2800	3800	22215 C	1,91
	2,9	2800	3800	22215 CK	1,88
	2,9	2800	3800	22215 CW33	1,86
	2,9	2800	3800	22215 CKW33	1,86
	2,7	2600	3400	22215 MBK	1,75
	2,7	2600	3400	22215 MBKW33	1,73
	2,7	2600	3400	22215 MB	1,79
	2,7	2600	3400	22215 MBW33	1,77
	2,9	2400	3000	22315 MBKW33	1,73
	2,9	2400	3200	21315 CW33	3,50
	2,9	2400	3200	21315 CKW33	5,28

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
75	160	55	2,1	415	0,38	1,8	2,6	520
	160	55	2,1	415	0,38	1,8	2,6	520
	160	55	2,1	415	0,38	1,8	2,6	520
	160	55	2,1	415	0,38	1,8	2,6	520
	160	55	2,1	380	0,34	1,9	2,9	475
	160	55	2,1	380	0,34	1,9	2,9	475
	160	55	2,1	380	0,34	1,9	2,9	475
	160	55	2,1	380	0,34	1,9	2,9	475
	160	55	2,1	380	0,34	1,9	2,9	475
80	140	33	2	210	0,25	2,6	4	275
	140	33	2	210	0,25	2,6	4	275
	140	33	2	210	0,25	2,6	4	275
	140	33	2	210	0,25	2,6	4	275
	140	33	2	210	0,25	2,6	4	275
	140	33	2	210	0,25	2,6	4	275
	140	33	2	210	0,25	2,6	4	275
	140	33	2	210	0,25	2,6	4	275
	140	33	2	210	0,25	2,6	4	275
	140	33	2	195	0,24	2,8	4,1	250
	140	33	2	195	0,24	2,8	4,1	250
	140	33	2	195	0,24	2,8	4,1	250
	140	33	2	195	0,24	2,8	4,1	250
	140	33	2	195	0,24	2,8	4,1	250
	170	39	2,1	310	0,23	2,9	4,2	400
	170	39	2,1	310	0,23	2,9	4,2	400
	170	58	2,1	450	0,35	1,9	2,9	550
	170	58	2,1	450	0,35	1,9	2,9	550
	170	58	2,1	450	0,35	1,9	2,9	550
	170	58	2,1	450	0,35	1,9	2,9	550
	170	58	2,1	410	0,25	2,6	4	500
	170	58	2,1	410	0,25	2,6	4	500

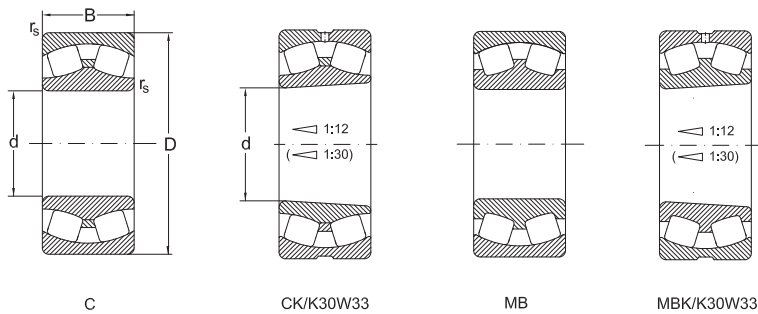
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
75	1,7	2200	3000	22315 C	5,28
	1,7	2200	3000	22315 CW33	5,26
	1,7	2200	3000	22315 CK	5,16
	1,7	2200	3000	22315 CKW33	5,14
	1,9	1900	2600	22315 MBK	5,14
	1,9	1900	2600	22315 MBKW33	5,12
	1,9	1900	2600	22315 MAC4F80W33	5,57
	1,9	1900	2600	22315 MB	5,26
	1,9	1900	2600	22315 MBW33	5,24
80	2,6	2600	3400	22216 C	2,12
	2,6	2600	3400	22216 CW33	2,1
	2,6	2600	3400	22216 CK	2,07
	2,6	2600	3400	22216 CKW33	2,05
	2,6	2600	3400	22216 CY	2,13
	2,6	2600	3400	22216 CYK	2,13
	2,6	2600	3400	22216 CYKW33	2,06
	2,6	2600	3400	22216 CYW33	2,11
	2,7	2400	3200	22216 MBK	2,09
	2,7	2400	3200	22216 MBKW33	2,07
	2,7	2400	3200	22216 MB	2,07
	2,7	2200	3000	22216 MBW33	2,1
	2,8	2200	3000	21316 CW33	4,26
	2,8	2200	3000	21316 CKW33	4,20
	1,8	2000	2600	22316 C	6,29
	1,8	2000	2600	22316 CK	6,14
	1,8	2000	2600	22316 CKW33	6,12
	1,8	2000	2600	22316 CW33	6,27
	2,6	1800	2400	22316 MAC4F80W33	6,95
	2,6	1800	2400	22316 MBK	6,11

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
80	170	58	2,1	410	0,25	2,6	4	500
	170	58	2,1	410	0,25	2,6	4	500
	170	58	2,1	410	0,25	2,6	4	500
85	150	36	2	250	0,26	2,6	3,9	325
	150	36	2	250	0,26	2,6	3,9	325
	150	36	2	250	0,26	2,6	3,9	325
	150	36	2	250	0,26	2,6	3,9	325
	150	36	2	230	0,25	2,7	4	295
	150	36	2	230	0,25	2,7	4	295
	150	36	2	230	0,25	2,7	4	295
	150	36	2	230	0,25	2,7	4	295
	150	36	2	230	0,25	2,7	4	295
	150	36	2	230	0,25	2,7	4	295
	180	41	3	233,4	0,22	3	4,5	244
	180	41	3	350	0,22	3	4,5	450
	180	41	3	350	0,22	3	4,5	450
	180	60	3	500	0,33	2	3	620
	180	60	3	500	0,33	2	3	620
	180	60	3	500	0,33	2	3	620
	180	60	3	407	0,22	3	4,5	507
	180	60	3	460	0,37	1,8	2,7	570
	180	60	3	460	0,37	1,8	2,7	570
	180	60	3	460	0,37	1,8	2,7	570
	180	60	3	460	0,37	1,8	2,7	570
	180	60	3	460	0,37	1,8	2,7	570
	180	60	3	407	0,22	3	4,5	507
	180	60	3	460	0,37	1,8	2,7	570

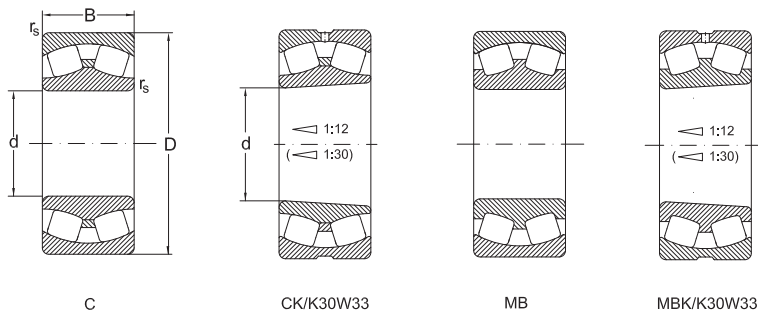
Spherical Roller Bearings

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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
80	2,6	1800	2400	22316 MB	6,25
	2,6	1800	2400	22316 MBW33	6,23
	2,6	1800	2400	22316 MBKW33	6,09
85	2,6	2400	3200	22217 C	2,57
	2,6	2400	3200	22217 CK	2,52
	2,6	2400	3200	22217 CW33	2,56
	2,6	2400	3200	22217 CKW33	2,50
	2,6	2200	2800	22217 MB	2,76
	2,6	2200	2800	22217 MBK	2,7
	2,6	2200	2800	22217 MBKW33	2,69
	2,6	2200	2800	22217 MBW7	2,76
	2,6	2200	2800	22217 MBW33	2,75
	2,9	2100	2600	21317 MBKW33	5,78
	2,9	2200	2800	21317 C	5,10
	2,9	2200	2800	21317 CK	5,00
	2	1800	2400	22317 C	7,68
	2	1800	2400	22317 CK	7,52
	2	1800	2400	22317 CKW33	7,47
	2,9	2200	2800	22317 CA	7,64
	1,8	1800	2400	22317 MBW33	7,27
	1,8	1700	2200	22317 MBK	7,07
	1,8	1700	2200	22317 MAC4F80W33	7,88
	1,8	1700	2200	22317 MB	7,23
	1,8	1700	2200	22317 MBW20	7,23
	1,9	2200	2800	22317 CA	7,64
	1,8	1700	2200	22317 MBKW33	7,01

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
90	160	40	2	305	0,27	2,5	3,8	410
	160	40	2	305	0,27	2,5	3,8	410
	160	40	2	305	0,27	2,5	3,8	410
	160	40	2	305	0,27	2,5	3,8	410
	160	40	2	305	0,27	2,5	3,8	410
	160	40	2	305	0,27	2,5	3,8	410
	160	40	2	305	0,27	2,5	3,8	410
	160	40	2	305	0,27	2,5	3,8	410
	160	40	2	280	0,26	2,6	3,8	375
	160	40	2	280	0,26	2,6	3,8	375
	160	40	2	280	0,26	2,6	3,8	375
	160	40	2	280	0,26	2,6	3,8	375
	160	52,4	2	340	0,34	2	3	485
	160	52,4	2	340	0,34	2	3	485
	160	52,4	2	340	0,34	2	3	485
	160	52,4	2	340	0,34	2	3	485
	190	43	3	385	0,22	3	4,5	510
	190	43	3	385	0,22	3	4,5	510
	190	64	3	570	0,36	1,9	2,8	730
	190	64	3	570	0,36	1,9	2,8	730
	190	64	3	570	0,36	1,9	2,8	730
	190	64	3	570	0,36	1,9	2,8	730
	190	64	3	570	0,36	1,9	2,8	730
	190	64	3	570	0,36	1,9	2,8	730
	190	64	3	570	0,36	1,9	2,8	730
	190	64	3	570	0,36	1,9	2,8	730
	190	64	3	530	0,37	1,8	2,7	670
	190	64	3	530	0,37	1,8	2,7	670
	190	64	3	530	0,37	1,8	2,7	670

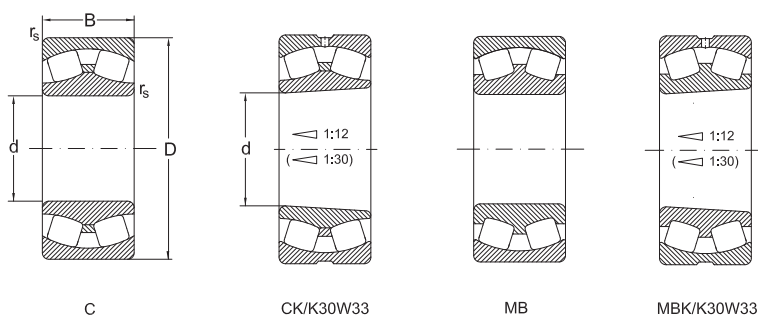
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
90	2,5	2200	3000	22218 C	3,40
	2,5	2200	3000	22218 CW33	3,38
	2,5	2200	3000	22218 CK	3,33
	2,5	2200	3000	22218 CKW33	3,31
	2,5	2200	3000	22218 CY	3,41
	2,5	2200	3000	22218 CYK	3,34
	2,5	2200	3000	22218 CYKW33	3,33
	2,5	2200	3000	22218 CYW33	3,39
	2,5	2200	2800	22218 MBK	3,47
	2,5	2200	2800	22218 MBKW33	3,46
	2,5	2200	2800	22218 MBW33	3,46
	2,5	2200	2800	22218 MB	3,57
	2	1500	2000	23218 MBKW33	4,23
	2	1500	2000	23218 MB	4,37
	2	1500	2000	23218 MBK	4,25
	2	1500	2000	23218 MBW33	4,35
	2,9	2200	2800	21318 C	5,80
	2,9	2200	2800	21318 CK	5,70
	1,8	1800	2400	22318 C	8,52
	1,8	1800	2400	22318 CK	8,68
	1,8	1800	2400	22318 CW33	8,60
	1,8	1800	2400	22318 CKW33	8,50
	1,8	1800	2400	22318 CY	8,73
	1,8	1800	2400	22318 CYK	8,55
	1,8	1800	2400	22318 CYKW33	8,53
	1,8	1800	2400	22318 CYW33	8,71
	1,8	1700	2200	22318 MBK	8,5
	1,8	1700	2200	22318 MBKW33	8,49
	1,8	1700	2200	22318 MA	9,21

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
90	190	64	3	530	0,37	1,8	2,7	670
	190	64	3	530	0,37	1,8	2,7	670
	190	64	3	530	0,37	1,8	2,7	670
95	170	43	2,1	340	0,24	2,8	4,2	450
	170	43	2,1	340	0,24	2,8	4,2	450
	170	43	2,1	340	0,24	2,8	4,2	450
	170	43	2,1	340	0,24	2,8	4,2	450
	170	43	2,1	340	0,24	2,8	4,2	450
	170	43	2,1	310	0,26	2,6	3,8	415
	170	43	2,1	310	0,26	2,6	3,8	415
	170	43	2,1	310	0,26	2,6	3,8	415
	170	43	2,1	310	0,26	2,6	3,8	415
	170	43	2,1	310	0,26	2,6	3,8	415
	200	45	3	420	0,22	3	4,5	580
	200	45	3	385	0,22	3,1	4,6	530
	200	45	3	385	0,22	3,1	4,6	530
	200	67	3	620	0,35	1,9	2,9	800
	200	67	3	620	0,35	1,9	2,9	800
	200	67	3	620	0,35	1,9	2,9	800
	200	67	3	620	0,35	1,9	2,9	800
	200	67	3	620	0,35	1,9	2,9	800
	200	67	3	570	0,35	1,9	2,7	740
	200	67	3	570	0,38	1,8	2,7	740
	200	67	3	570	0,38	1,8	2,7	740
	200	67	3	570	0,38	1,8	2,7	740
	200	67	3	570	0,38	1,8	2,7	740
	200	67	3	570	0,38	1,8	2,7	740
100	165	52	2	347	0,28	2,4	3,5	534

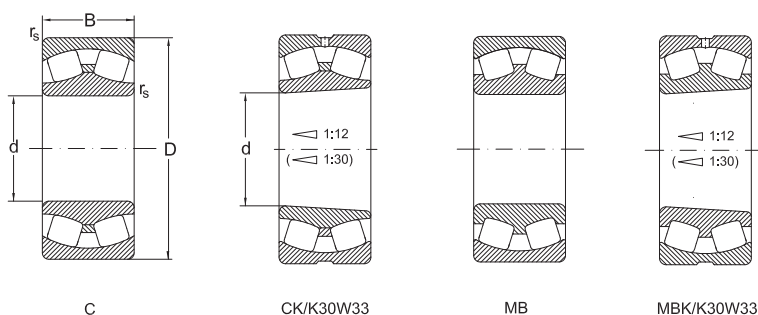
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
90	1,8	1700	2200	22318 MAC4F80W33	9,2
	1,8	1700	2200	22318 MB	8,69
95	1,8	1700	2200	22318 MBW33	8,68
	2,8	2200	2800	22219 C	4,26
	2,8	2200	2800	22219 CK	4,17
	2,8	2200	2800	22219 CKW33	4,15
	2,8	2200	2800	22219 CW25	4,24
	2,8	2200	2800	22219 CW33	4,24
	2,5	2000	2600	22219 MBK	4,3
	2,5	2000	2600	22219 MBKW33	4,28
	2,5	2000	2600	22219 MB	4,32
	2,5	2000	2600	22219 MBW25	4,32
	2,5	2600	2600	22319 MBW33	4,28
	3	2600	2600	21319 CA	7,43
	3	2400	2400	21319 MB	7,38
	3	2400	2400	21319 MBK	7,28
	1,8	2200	2200	22319 C	8,83
	1,8	2200	2200	22319 CK	8,61
	1,8	2200	2200	22319 CKW33	8,5
	1,8	2200	2200	22319 CW25	8,71
	1,8	2200	2200	22319 CW33	8,72
	1,7	2000	2000	22319 MBK	9,88
	1,7	2000	2000	22319 MAC4F80W33	10,7
	1,7	2000	2000	22319 MB	10,1
	1,7	2000	2000	22319 MBW25	9,97
	1,7	2000	2000	22319 MBW33	9,97
	1,7	2000	2000	22319 MBKW33	9,97
100	2,3	2200	3000	23120 CW33	5

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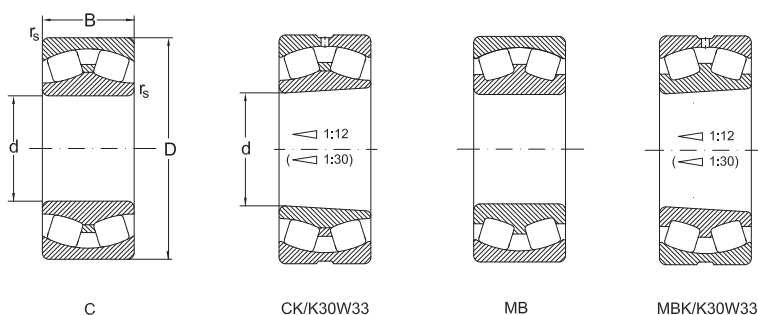
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
100	165	52	2	355	0,31	2,2	3,2	540
	165	52	2	355	0,31	2,2	3,2	540
	165	52	2	355	0,31	2,2	3,2	540
	165	52	2	355	0,31	2,2	3,2	540
	180	46	2,1	375	0,24	2,8	4,2	500
	180	46	2,1	375	0,24	2,8	4,2	500
	180	46	2,1	375	0,24	2,8	4,2	500
	180	46	2,1	375	0,24	2,8	4,2	500
	180	46	2,1	340	0,27	2,5	3,7	455
	180	46	2,1	340	0,27	2,5	3,7	455
	180	46	2,1	340	0,27	2,5	3,7	455
	180	46	2,1	340	0,27	2,5	3,7	455
	180	60,3	2,1	495	0,33	2	3	720
	180	60,3	2,1	495	0,33	2	3	720
	180	60,3	2,1	495	0,33	2	3	720
	180	60,3	2,1	495	0,33	2	3	720
	180	60,3	2,1	455	0,33	2	3	660
	180	60,3	2,1	455	0,33	2	3	660
	180	60,3	2,1	455	0,33	2	3	660
	180	60,3	2,1	455	0,33	2	3	660
	180	60,3	2,1	455	0,33	2	3	660
	180	60,3	2,1	455	0,33	2	3	660
	215	47	3	460	0,22	3,1	4,7	640
	215	47	3	371	0,24	2,8	4,2	410
	215	47	3	425	0,22	3,1	4,7	580
	215	73	3	730	0,35	1,9	2,9	960
	215	73	3	730	0,35	1,9	2,9	960
	215	73	3	730	0,35	1,9	2,9	960

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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
100	2,1	2000	2600	23120 MBKW33	4,53
	2,1	2000	2600	23120 MB	4,7
	2,1	2000	2600	23120 MBK	4,57
	2,1	2000	2600	23120 MBW33	4,66
	2,8	2200	2800	22220 C	5,24
	2,8	2200	2800	22220 CK	5,13
	2,8	2200	2800	22220 CKW33	5,09
	2,8	2200	2800	22220 CW33	5,24
	2,4	2000	2600	22220 MBK	5,24
	2,4	2000	2600	22220 MB	5,35
	2,4	2000	2600	22220 MBW33	5,31
	2,4	2000	2600	22220 MBKW33	5,2
	2	1700	2200	23220 C	7,34
	2	1700	2200	23220 CK	7,19
	2	1700	2200	23220 CKW33	7,13
	2	1700	2200	23220 CW33	7,28
	2	1500	2000	23220 MA	7,04
	2	1500	2000	23220 MAK	6,85
	2	1500	2000	23220 MAW33	7,03
	2	1500	2000	23220 MAKW33	6,84
	2	1500	2000	23220 MBK	6,80
	2	1500	2000	23220 MB	6,99
	2	1500	2000	23220 MBW33	6,98
	3,1	1800	2400	21320 CA	9,07
	2,8	1700	2200	21320 MB	8,96
	3,1	1700	2200	21320 MBK	8,84
	1,9	1500	2000	22320 C	12,95
	1,9	1500	2000	22320 CK	12,67
	1,9	1500	2000	22320 CW33	12,83

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
100	215	73	3	730	0,35	1,9	2,9	960
	215	73	3	730	0,35	1,9	2,9	960
	215	73	3	670	0,37	1,8	2,9	880
	215	73	3	670	0,37	1,8	2,9	880
	215	73	3	670	0,37	1,8	2,9	880
	215	73	3	670	0,37	1,8	2,9	880
	215	73	3	670	0,37	1,8	2,7	880
	215	73	3	670	0,37	1,8	2,7	880
110	170	45	2	295	0,24	2,8	4,2	485
	170	45	2	295	0,24	2,8	4,2	485
	170	45	2	295	0,24	2,8	4,2	485
	170	45	2	295	0,24	2,8	4,2	485
	180	56	2	450	0,3	2,3	3,4	700
	180	56	2	410	0,3	2,3	3,3	640
	180	56	2	410	0,3	2,3	3,3	640
	180	56	2	410	0,3	2,3	3,3	640
	180	56	2	410	0,3	2,3	3,3	640
	180	69	2	466	0,39	1,7	2,6	771
	180	69	2	466	0,39	1,7	2,6	771
	180	69	2	466	0,39	1,7	2,6	771
	180	69	2	466	0,39	1,7	2,6	771
	200	53	2,1	590	0,25	2,7	4	770
	200	53	2,1	590	0,25	2,7	4	770
	200	53	2,1	590	0,25	2,7	4	770
	200	53	2,1	590	0,25	2,7	4	770
	200	53	2,1	540	0,28	2,4	3,5	700
	200	53	2,1	540	0,28	2,4	3,5	700
	200	53	2,1	540	0,28	2,4	3,5	700
	200	53	2,1	540	0,28	2,4	3,5	700

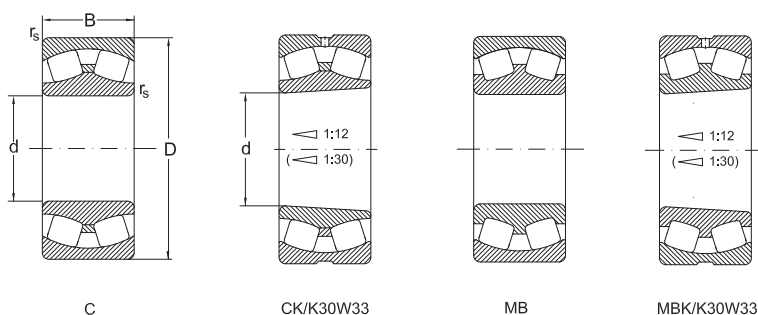
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
100	1,9	1500	2000	22320 CKW33	12,55
	1,9	1500	2000	22320 CYW33	12,83
	1,7	1400	1800	22320 MBK	13,21
	1,7	1400	1800	22320 MBKW33	13,09
	1,7	1400	1800	22320 MA	13,89
	1,7	1400	1800	22320 MAC4F80W33	13,78
	1,7	1400	1800	22320 MB	13,49
	1,7	1400	1800	22320 MBW33	13,37
110	2,7	2000	2600	23022 MBK	3,58
	2,7	2000	2600	23022 MBKW33	3,56
	2,7	2000	2600	23022 MB	3,8
	2,7	2000	2600	23022 MBW33	3,56
	2,2	2000	2600	23122 C	6,26
	2,2	1800	2400	23122 MBK	5,18
	2,2	1800	2400	23122 MB	5,29
	2,2	1800	2400	23122 MBW33	5,19
	2,2	1800	2400	23122 MBKW33	5,07
	1,7	1200	1600	24122 CA	6,82
	1,7	1200	1600	24122 CAW33	6,9
	1,7	1200	1600	24122 CAK30	6,9
	1,7	1200	1600	24122 CAK30W33	6,80
	2,5	1800	2400	22222 C	7,45
	2,5	1800	2400	22222 CK	7,45
	2,5	1800	2400	22222 CKW33	7,45
	2,5	1800	2400	22222 CW33	7,45
	2,3	1700	2200	22222 MBK	7,58
	2,3	1700	2200	22222 MB	7,10
	2,3	1700	2200	22222 MBW33	7
	2,3	1700	2200	22222 MBKW33	7,1

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
110	200	69,8	2,1	620	0,33	2	3	920
	200	69,8	2,1	570	0,37	1,8	2,7	840
	200	69,8	2,1	570	0,37	1,8	2,7	840
	200	69,8	2,1	570	0,37	1,8	2,7	840
	200	69,8	2,1	570	0,37	1,8	2,7	840
	200	69,8	2,1	570	0,37	1,8	2,7	840
	240	50	3	510	0,21	3,2	4,8	690
	240	50	3	510	0,21	3,2	4,8	690
	240	80	3	870	0,34	1,2	2,3	1160
	240	80	3	870	0,34	1,2	2,3	1160
	240	80	3	870	0,34	1,2	2,3	1160
	240	80	3	870	0,34	1,2	2,3	1160
	240	80	3	870	0,34	2	3	1160
	240	80	3	870	0,34	2	3	1160
	240	80	3	800	0,37	1,8	2,7	1060
	240	80	3	800	0,37	1,8	2,7	1060
	240	80	3	800	0,37	1,8	2,7	1060
	240	80	3	800	0,37	1,8	2,7	1060
	240	80	3	800	0,37	1,8	2,7	1060
	240	80	3	800	0,37	1,8	2,7	1060
120	180	46	2	365	0,22	3	4,6	610
	180	46	2	365	0,22	3	4,6	610
	180	46	2	365	0,22	3	4,6	610
	180	46	2	365	0,22	3	4,6	610
	180	46	2	335	0,24	2,8	4,2	560
	180	46	2	335	0,24	2,8	4,2	560
	180	46	2	335	0,24	2,8	4,2	560
	180	46	2	335	0,24	2,8	4,2	560

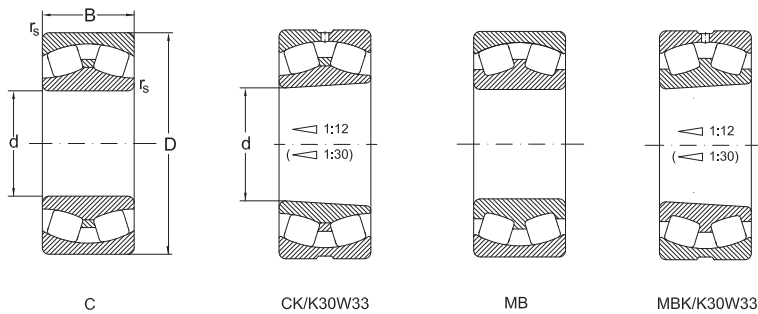
Spherical Roller Bearings

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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
110	2	1400	1800	23222 C	10,75
	1,8	1200	1600	23222 MBK	9,40
	1,8	1200	1600	23222 MB	9,70
	1,8	1200	1600	23222 MBW20	9,40
	1,8	1200	1600	23222 MBW33	9,70
	1,8	1200	1600	23222 MBKW33	9,50
	3,2	1500	2000	21322 MB	12,0
	3,2	1500	2000	21322 MBK	11,7
	1,2	1400	1900	22322 C	18,0
	1,2	1400	1900	22322 CW33	18,0
	1,2	1400	1900	22322 CK	17,5
	1,2	1400	1900	22322 CKW33	17,5
	2	1400	1900	22322 CY	17,5
	2	1400	1900	22322 CYK	17,5
	1,8	1300	1700	22322 MBK	18,7
	1,8	1300	1700	22322 MBKW33	18,7
	1,8	1300	1700	22322 MB	17,7
	1,8	1300	1700	22322 MBW33	18,7
	1,8	1300	1700	22322 MA	18,4
	1,8	1300	1700	22322 MAC4F80W33	18,7
	1,8	1300	1700	22322 MAW33	18,7
120	2,8	2000	2600	23024 C	4,31
	2,8	2000	2600	23024 CK	4,11
	2,8	2000	2600	23024 CKW33	4,09
	2,8	2000	2600	23024 CW33	4,22
	2,8	1800	2400	23024 MBK	4,19
	2,8	1800	2400	23024 MB	4,19
	2,8	1800	2400	23024 MBW33	4,14
	2,8	1800	2400	23024 MBKW33	3,87

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
120	180	60	2	450	0,32	2,1	3,1	800
	180	60	2	450	0,32	2,1	3,1	800
	180	60	2	410	0,32	2,1	3,1	740
	180	60	2	410	0,32	2,1	3,1	740
	180	60	2	410	0,32	2,1	3,1	740
	200	62	2	495	0,31	2,2	3,3	770
	200	62	2	495	0,31	2,2	3,3	770
	200	62	2	495	0,31	2,2	3,3	770
	200	62	2	495	0,31	2,2	3,3	770
	200	80	2	630	0,4	1,7	2,5	1050
	200	80	2	630	0,4	1,7	2,5	1050
	200	80	2	630	0,4	1,7	2,5	1050
	215	58	2,1	590	0,27	2,6	3,8	800
	215	58	2,1	590	0,27	2,6	3,8	800
	215	58	2,1	560	0,27	2,6	3,8	800
	215	58	2,1	560	0,27	2,6	3,8	800
	215	58	2,1	510	0,29	2,3	3,5	740
	215	58	2,1	510	0,29	2,3	3,5	740
	215	58	2,1	540	0,29	2,3	3,5	740
	215	58	2,1	510	0,29	2,3	3,5	740
	215	76	2,1	730	0,35	1,9	2,9	1120
	215	76	2,1	670	0,37	1,8	2,7	1020
	215	76	2,1	670	0,37	1,8	2,7	1020
	215	76	2,1	670	0,37	1,8	2,7	1020
	215	76	2,1	670	0,37	1,8	2,7	1020
	260	86	3	1010	0,35	1,9	2,9	1340
	260	86	3	1010	0,35	1,9	2,9	1340
	260	86	3	1010	0,35	1,9	2,9	1340
	260	86	3	1010	0,35	1,9	2,9	1340

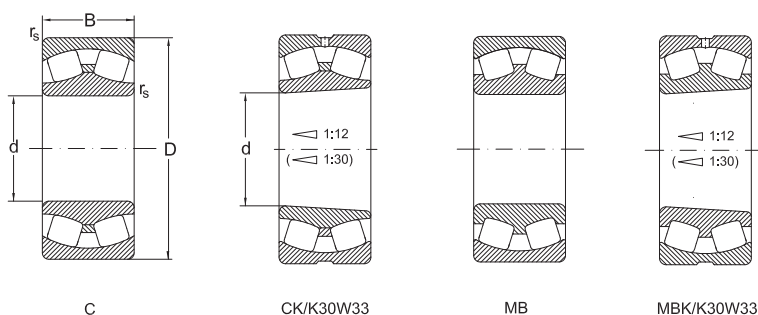
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Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
120	2	1500	2000	24024 CAW33	5,40
	2	1500	2000	24024 CAK30W33	5,30
	2	1400	1800	24024 MBK30W33	5,1
	2	1400	1800	24024 MB	5,12
	2	1400	1800	24024 MBW33	5,1
	2,2	1700	2200	23124 MBK	7,9
	2,2	1700	2200	23124 MB	8,19
	2,2	1700	2200	23124 MBW33	8,13
	2,2	1700	2200	23124 MBKW33	7,84
	1,6	1000	1300	24124 MB	10,22
	1,6	1000	1300	24124 MBW33	10,2
	1,6	1000	1300	24124 MBK30W33	10,04
	2,5	1700	2200	22224 C	8,9
	2,5	1700	2200	22224 CK	8,70
	2,5	1700	2200	22224 CW33	8,8
	2,5	1700	2200	22224 CKW33	8,60
	2,3	1500	2000	22224 MBK	9,53
	2,3	1500	2000	22224 MBKW33	9,09
	2,3	1500	2000	22224 MB	9,04
	2,3	1500	2000	22224 MBW33	9,73
	1,8	1300	1700	23224 C	13,1
	1,8	1100	1500	23224 MBK	11,84
	1,8	1100	1500	23224 MB	12,8
	1,8	1100	1500	23224 MBW33	11,73
	1,8	1100	1500	23224 MBKW33	11,73
	1,8	1300	1700	22324 C	23,76
	1,8	1300	1700	22324 CK	23,29
	1,8	1300	1700	22324 CKW33	23,05
	1,8	1300	1700	22324 CW33	23,52

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
120	260	86	3	930	0,36	1,8	2,7	1230
	260	86	3	930	0,36	1,8	2,7	1230
	260	86	3	930	0,36	1,8	2,7	1230
	260	86	3	930	0,36	1,8	2,7	1230
	260	86	3	930	0,36	1,8	2,7	1230
	260	86	3	930	0,36	1,8	2,7	1230
130	200	52	2	450	0,23	2,9	4,4	730
	200	52	2	450	0,23	2,9	4,4	730
	200	52	2	450	0,23	2,9	4,4	730
	200	52	2	450	0,23	2,9	4,4	730
	200	52	2	410	0,23	2,9	4,4	670
	200	52	2	410	0,23	2,9	4,4	670
	200	52	2	410	0,23	2,9	4,4	670
	200	52	2	410	0,23	2,9	4,4	670
	200	69	2	530	0,34	2	3	900
	200	69	2	530	0,34	2	3	900
	200	69	2	530	0,34	2	3	900
	210	64	2	590	0,28	2,4	3,6	940
	210	64	2	540	0,3	2,3	3,3	860
	210	64	2	540	0,3	2,3	3,3	860
	210	64	2	540	0,3	2,3	3,3	860
	210	64	2	540	0,3	2,3	3,3	860
	210	80	2	650	0,37	1,8	2,7	1100
	210	80	2	650	0,37	1,8	2,7	1100
	210	80	2	650	0,37	1,8	2,7	1100
	230	64	3	660	0,29	2,3	3,5	960
	230	64	3	660	0,29	2,3	3,5	960
	230	64	3	660	0,29	2,3	3,5	960
	230	64	3	660	0,29	2,3	3,5	960

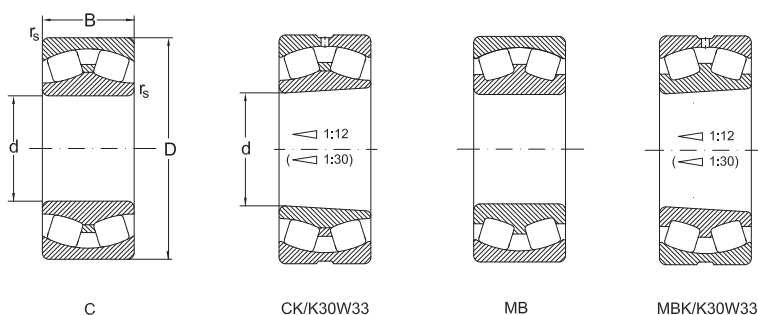
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Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
120	1,8	1100	1500	22324 MAK4F80W33	23,93
	1,8	1100	1500	22324 MBK	22,93
	1,8	1100	1500	22324 MAC4F80W33	23,93
	1,8	1100	1500	22324 MB	23,39
	1,8	1100	1500	22324 MBW33	23,18
	1,8	1100	1500	22324 MBKW33	22,71
130	2,8	1800	2400	23026 C	4,59
	2,8	1800	2400	23026 CK	5,99
	2,8	1800	2400	23026 CKW33	5,94
	2,8	1800	2400	23026 CW33	6,09
	2,8	1700	2200	23026 MBK	5,61
	2,8	1700	2200	23026 MB	5,78
	2,8	1700	2200	23026 MBW33	5,73
	2,8	1700	2200	23026 MBKW33	5,56
	1,9	1200	1600	24026 MB	7,98
	1,9	1200	1600	24026 MBW33	7,79
	1,9	1200	1600	24026 MBK30W33	7,78
	2,5	1700	2200	23126 C	9,70
	2,2	1500	2000	23126 MBK	8,36
	2,2	1500	2000	23126 MB	8,66
	2,2	1500	2000	23126 MBW33	8,62
	2,2	1500	2000	23126 MBKW33	8,32
	1,8	900	1200	24126 MB	11,09
	1,8	900	1200	24126 MBW33	11,06
	1,8	900	1200	24126 MBK30W33	11,09
	2,3	1700	2200	22226 C	11,14
	2,3	1700	2200	22226 CW33	10,01
	2,3	1700	2200	22226 CK	10,87
	2,3	1700	2200	22226 CKW33	10,7

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
130	230	64	3	660	0,29	2,3	3,5	960
	230	64	3	660	0,29	2,3	3,5	960
	230	64	3	660	0,29	2,3	3,5	960
	230	64	3	600	0,29	2,3	3,4	880
	230	64	3	600	0,29	2,3	3,4	880
	230	64	3	600	0,29	2,3	3,4	880
	230	64	3	600	0,29	2,3	3,4	880
	230	80	3	830	0,33	2	3	1270
	230	80	3	760	0,35	1,9	2,8	1170
	230	80	3	760	0,35	1,9	2,8	1170
	230	80	3	760	0,35	1,9	2,8	1170
	230	80	3	760	0,35	1,9	2,8	1170
	280	93	4	1170	0,35	1,9	2,9	1580
	280	93	4	1170	0,35	1,9	2,9	1580
	280	93	4	1170	0,35	1,9	2,9	1580
	280	93	4	1170	0,35	1,9	2,9	1580
	280	93	4	1170	0,35	1,9	2,9	1580
	280	93	4	1080	0,37	1,8	2,7	1450
	280	93	4	1080	0,37	1,8	2,7	1450
	280	93	4	1080	0,37	1,8	2,7	1450
	280	93	4	1080	0,37	1,8	2,7	1450
140	210	53	2	475	0,22	3	4,6	820
	210	53	2	475	0,22	3	4,6	820
	210	53	2	475	0,22	3	4,6	820
	210	53	2	475	0,22	3	4,6	820
	210	53	2	435	0,22	3	4,6	750
	210	53	2	435	0,22	3	4,6	750
	210	53	2	435	0,22	3	4,6	750

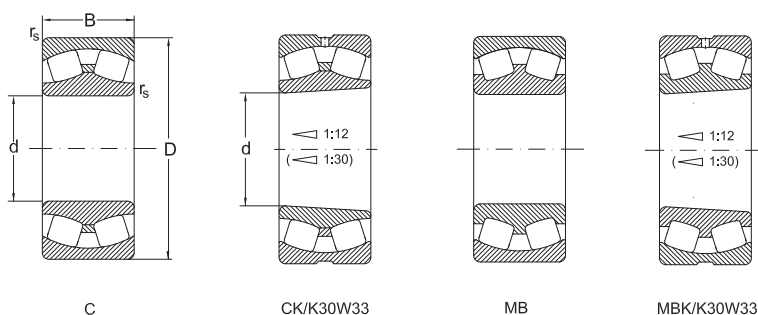
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
130	2,3	1700	2200	22226 CY	11,19
	2,3	1700	2200	22226 CYK	10,92
	2,3	1700	2200	22226 CYW33	11,06
	2,2	1500	2000	22226 MBK	11,32
	2,2	1500	2000	22226 MBKW33	11,2
	2,2	1500	2000	22226 MBW33	11,47
	2,2	1500	2000	22226 MBK	11,32
	2	1300	1700	23226 C	15,86
	1,9	1100	1500	23226 MBK	14,52
	1,9	1100	1500	23226 MB	14,97
	1,9	1100	1500	23226 MBW33	14,95
	1,9	1100	1500	23226 MBKW33	14,5
	1,8	1200	1600	22326 C	34,2
	1,8	1200	1600	22326 CK	28,65
	1,8	1200	1600	22326 CKW33	28,33
	1,8	1200	1600	22326 CW33	28,82
	1,8	1200	1600	22326 CYW502	28,97
	1,8	1100	1400	22326 MBK	28,77
	1,8	1100	1400	22326 MAC4F80W33	29,48
	1,8	1100	1400	22326 MB	28,59
	1,8	1100	1400	22326 MBW33	28,25
	1,8	1100	1400	22326 MBKW33	27,65
140	2,8	1700	2200	23028 C	7,20
	2,8	1700	2200	23028 CK	7,03
	2,8	1700	2200	23028 CKW33	6,96
	2,8	1700	2200	23028 CW33	7,13
	2,8	1500	2000	23028 MBK	6,07
	2,8	1500	2000	23028 MB	6,18
	2,8	1500	2000	23028 MBW33	6,08

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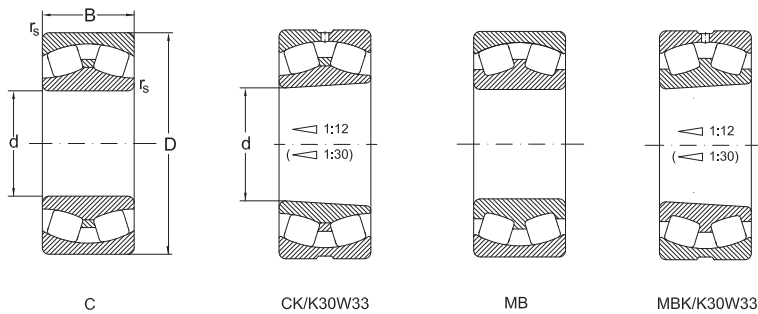
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
140	210	53	2	435	0,22	3	4,6	750
	210	69	2	550	0,32	2,1	3,1	990
	210	69	2	550	0,32	2,1	3,1	990
	225	68	2,1	660	0,28	2,4	3,6	1080
	225	68	2,1	600	0,3	2,3	3,3	990
	225	68	2,1	600	0,3	2,3	3,3	990
	225	68	2,1	600	0,3	2,3	3,3	990
	225	68	2,1	600	0,3	2,3	3,3	990
	225	85	2,1	740	0,37	1,8	2,7	1280
	225	85	2,1	740	0,37	1,8	2,7	1280
	225	85	2,1	740	0,37	1,8	2,7	1280
	250	68	3	730	0,26	2,6	3,9	1080
	250	68	3	730	0,26	2,6	3,9	1080
	250	68	3	730	0,26	2,6	3,9	1080
	250	68	3	730	0,26	2,6	3,9	1080
	250	68	3	670	0,29	2,3	3,5	990
	250	68	3	670	0,29	2,3	3,5	990
	250	68	3	670	0,29	2,3	3,5	990
	250	68	3	670	0,29	2,3	3,5	990
	250	68	3	670	0,29	2,3	3,5	990
	250	88	3	960	0,33	2	3	1500
	250	88	3	880	0,37	1,8	2,7	1380
	250	88	3	880	0,37	1,8	2,7	1380
	250	88	3	880	0,37	1,8	2,7	1380
	250	88	3	880	0,37	1,8	2,7	1380
	300	102	4	1360	0,35	1,9	2,9	1870
	300	102	4	1360	0,35	1,9	2,9	1870
	300	102	4	1360	0,35	1,9	2,9	1870

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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
140	2,8	1500	2000	23028 MBKW33	5,98
	2,1	1100	1500	24028 MBW33	9,07
	2,1	1100	1500	24028 MBK30W33	8,66
	2,5	1500	2000	23128 C	11,8
	2,2	1400	1800	23128 MBK	10,38
	2,2	1400	1800	23128 MB	10,72
	2,2	1400	1800	23128 MBW33	10,69
	2,2	1400	1800	23128 MBKW33	10,36
	1,8	850	1100	24128 MB	13,27
	1,8	850	1100	24128 MBW33	13,2
	1,8	850	1100	24128 MBK30W33	13,19
	2,5	1400	1900	22228 C	14,4
	2,5	1400	1900	22228 CK	14,09
	2,5	1400	1900	22228 CKW33	13,97
	2,5	1400	1900	22228 CW33	14,27
	2,3	1300	1700	22228 MBK	14,2
	2,3	1300	1700	22228 MBKW33	13,97
	2,3	1300	1700	22228 MB	14,5
	2,3	1300	1700	22228 MBW33	14,27
	2,3	1300	1700	22228 MBKW33	13,97
	2	1100	1400	23228 C	20,86
	1,8	1000	1300	23228 MBK	18,72
	1,8	1000	1300	23228 MB	19,32
	1,8	1000	1300	23228 MBW33	19,19
	1,8	1000	1300	23228 MBKW33	18,59
	1,8	1100	1400	22328 C	45,7
	1,8	1100	1400	22328 CK	36,34
	1,8	1100	1400	22328 CKW33	36,13

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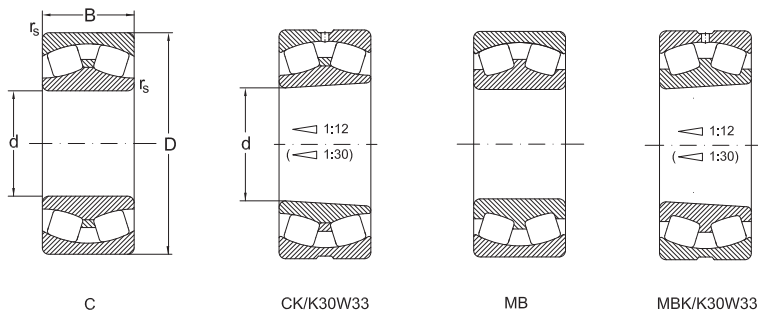
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
140	300	102	4	1360	0,35	1,19	2,9	1870
	300	102	4	1240	0,38	1,7	2,6	1720
	300	102	4	1240	0,38	1,7	2,6	1720
	300	102	4	1240	0,38	1,7	2,6	1720
	300	102	4	1240	0,38	1,7	2,6	1720
	300	102	4	1240	0,38	1,7	2,6	1720
	300	118	4	1200	0,43	1,6	2,3	1700
150	225	56	2,1	520	0,22	3	4,6	900
	225	56	2,1	520	0,22	3	4,6	900
	225	56	2,1	520	0,22	3	4,6	900
	225	56	2,1	520	0,22	3	4,6	900
	225	56	2,1	480	0,22	3	4,6	830
	225	56	2,1	480	0,22	3	4,6	830
	225	56	2,1	480	0,22	3	4,6	830
	225	56	2,1	480	0,22	3	4,6	830
	225	75	2,1	620	0,33	2,1	3,1	1140
	225	75	2,1	620	0,33	2,1	3,1	1140
	225	75	2,1	620	0,33	2,1	3,1	1140
	225	75	2,1	620	0,33	2,1	3,1	1140
	250	100	2,1	1080	0,37	1,8	2,7	1840
	250	100	2,1	1080	0,4	1,7	2,5	1840
	250	100	2,1	1080	0,4	1,7	2,5	1840
	250	100	2,1	1080	0,4	1,7	2,5	1840
	250	100	2,1	818	0,4	2,1	2,5	1357
	250	80	2,1	800	0,32	2,1	3,2	1320
	250	80	2,1	800	0,32	2,1	3,2	1320
	250	80	2,1	800	0,32	2,1	3,2	1320

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Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
140	1,8	1100	1400	22328 CW33	36,79
	1,7	1000	1300	22328 MBK	34,57
	1,7	1000	1300	22328 MAC4F80W33	37,5
	1,7	1000	1300	22328 MB	35,37
	1,7	1000	1300	22328 MBW33	35,17
	1,7	1000	1300	22328 MBKW33	34,37
	1,5	1100	1500	23328 MAC4F80W33	42,23
150	2,8	1500	2000	23030 C	8,57
	2,8	1500	2000	23030 CK	8,4
	2,8	1500	2000	23030 CKW33	8,32
	2,8	1500	2000	23030 CW33	8,51
	2,8	1400	1800	23030 MBK	8,05
	2,8	1400	1800	23030 MB	8,15
	2,8	1400	1800	23030 MBW33	8,11
	2,8	1400	1800	23030 MBKW33	8,05
	2	1100	1400	24030 MBK30	10,1
	2	1100	1400	24030 MB	10,25
	2	1100	1400	24030 MBW33	10,14
	2	1100	1400	24030 MBK30W33	9,97
	1,8	850	1100	24130 C	19,4
	1,6	850	1100	24130 CA	19,66
	1,6	850	1100	24130 CAK30	18,9
	1,6	850	1100	24130 CAW33	19,5
	1,6	850	1100	24130 CAK30W33	18,76
	1,6	750	1000	24130 MBW33	19,97
	2,1	1300	1700	23130 MBK	16
	2,1	1300	1700	23130 MB	16,37
	2,1	1300	1700	23130 MBW33	16,3

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Dimensions				Basical radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN				
150	250	80	2,1	800	0,32	2,1	3,2	1320
	270	73	3	880	0,26	2,6	3,9	1300
	270	73	3	880	0,26	2,6	3,9	1300
	270	73	3	880	0,26	2,6	3,9	1300
	270	73	3	880	0,26	2,6	3,9	1300
	270	73	3	810	0,29	2,3	3,5	1190
	270	73	3	810	0,29	2,3	3,5	1190
	270	73	3	810	0,29	2,3	3,5	1190
	270	73	3	810	0,29	2,3	3,5	1190
	270	96	3	1030	0,38	1,8	2,7	1610
	270	96	3	1030	0,38	1,8	2,7	1610
	270	96	3	1030	0,38	1,8	2,7	1610
	270	96	3	1030	0,38	1,8	2,7	1610
	320	108	4	1520	0,35	1,9	2,9	2110
	320	108	4	1520	0,35	1,9	2,9	2110
	320	108	4	1520	0,35	1,9	2,9	2110
	320	108	4	1520	0,35	1,9	2,9	2110
	320	108	4	1400	0,38	1,7	2,6	1940
	320	108	4	1400	0,38	1,7	2,6	1940
	320	108	4	1400	0,38	1,7	2,6	1940
160	240	60	2,1	610	0,22	3	4,6	1060
	240	60	2,1	610	0,22	3	4,6	1060
	240	60	2,1	610	0,22	3	4,6	1060
	240	60	2,1	610	0,22	3	4,6	1060
	240	60	2,1	560	0,22	3	4,6	970

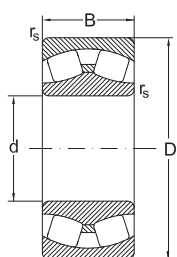
Spherical Roller Bearings

SR 3918

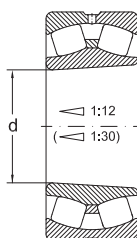
Abutment and fillet
dimensions see on
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
150	2,1	1300	1700	23130 MBKW33	16,0
	2,5	1400	1800	22230 C	18,81
	2,5	1400	1800	22230 CK	18,43
	2,5	1400	1800	22230 CKW33	18,2
	2,5	1400	1800	22230 CW33	18,59
	2,3	1200	1600	22230 MBK	19,3
	2,3	1200	1600	22230 MB	17,79
	2,3	1200	1600	22230 MBW33	18,0
	2,3	1200	1600	22230 MBKW33	17,95
	1,7	1000	1300	23230 MBK	24,13
	1,7	1000	1300	23230 MB	24,58
	1,7	1000	1300	23230 MBW33	24,39
	1,7	1000	1300	23230 MBKW33	24,0
	1,8	1100	1400	22330 C	44,62
	1,8	1100	1400	22330 CK	43,87
	1,8	1100	1400	22330 CKW33	43,47
	1,8	1100	1400	22330 CW33	44,6
	1,7	1000	1300	22330 MAK4F80W33	44,3
	1,7	1000	1300	22330 MBK	41,35
	1,7	1000	1300	22330 MAC4F80W33	44,4
	1,7	1000	1300	22330 MB	42,25
	1,7	1000	1300	22330 MBW33	41,85
	1,7	1000	1300	22330 MBKW33	40,95
160	2,8	1400	1900	23032 C	9,97
	2,8	1400	1900	23032 CK	9,71
	2,8	1400	1900	23032 CKW33	9,56
	2,8	1400	1900	23032 CW33	9,79
	2,8	1300	1700	23032 MBK	10,45

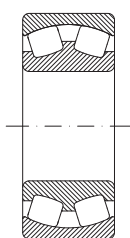
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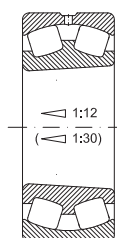
C



CK/K30W33



MB



MBK/K30W33

Dimensions				Basical radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN				
160	240	60	2,1	560	0,22	3	4,6	970
	240	60	2,1	560	0,22	3	4,6	970
	240	60	2,1	560	0,22	3	4,6	970
	240	60	2,1	720	0,32	2,1	3,1	1320
	240	80	2,1	720	0,32	2,1	3,1	1320
	240	80	2,1	720	0,32	2,1	3,1	1320
	270	109	2,1	1250	0,39	1,7	2,5	2110
	270	109	2,1	1250	0,39	1,7	2,5	2110
	270	109	2,1	1250	0,39	1,7	2,5	1776
	270	109	2,1	1250	0,39	1,7	2,5	2110
	270	109	2,1	1250	0,39	1,7	2,5	2110
	270	109	2,1	1250	0,39	1,7	2,5	2110
	270	109	2,1	940	0,41	1,6	2,4	1558
	270	86	2,1	1010	0,3	2,3	3,4	1640
	270	86	2,1	930	0,32	2,1	3,2	1510
	270	86	2,1	930	0,32	2,1	3,2	1510
	270	86	2,1	930	0,32	2,1	3,2	1510
	270	86	2,1	930	0,32	2,1	3,2	1510
	290	104	3	1180	0,38	1,8	2,7	1830
	290	104	3	1180	0,38	1,8	2,7	1830
	290	104	3	1180	0,38	1,8	2,7	1830
	290	104	3	1180	0,38	1,8	2,7	1830
	290	80	3	1040	0,26	2,6	3,9	1550
	290	80	3	1040	0,26	2,6	3,9	1550
	290	80	3	1040	0,26	2,6	3,9	1550
	290	80	3	950	0,29	2,3	3,4	1420
	290	80	3	950	0,29	2,3	3,4	1420

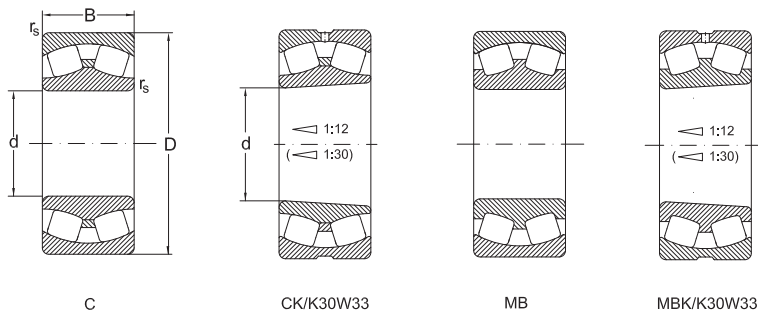
Spherical Roller Bearings

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Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
160	2,8	1300	1700	23032 MB	10,61
	2,8	1300	1700	23032 MBW33	10,49
	2,8	1300	1700	23032 MBKW33	10,33
	2	1000	1300	24032 MB	14,79
	2	1000	1300	24032 MBW33	14,61
	2	1000	1300	24032 MBK30W33	14,42
	1,6	850	1100	24132 C	25,04
	1,6	850	1100	24132 CW33	24,96
	1,6	850	1100	24132 CK30	24,8
	1,6	850	1100	24132 CK30W33	24,76
	1,6	850	1100	24132 CYK30W33	24,85
	1,6	850	1100	24132 CYW33	25,05
	1,6	750	1100	24132 MBW33	25,38
	2,2	1400	1800	23132 C	22,9
	2,1	1200	1600	23132 MBK	20,9
	2,1	1200	1600	23132 MB	20,95
	2,1	1200	1600	23132 MBW33	20,81
	2,1	1200	1600	23132 MBKW33	20,1
	1,7	900	1200	23232 MBK	31,56
	1,7	900	1200	23232 MB	31,7
	1,7	900	1200	23232 MBW33	31,7
	1,7	900	1200	23232 MBKW33	31,1
	2,5	1300	1700	23232 C	24,9
	2,5	1300	1700	22232 CK	23,31
	2,5	1300	1700	22232 CKW33	24,6
	2,5	1300	1700	22232 CW33	23,6
	2,3	1100	1500	22232 MBK	22,27
	2,3	1100	1500	22232 MB	23,3

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Dimensions				Basical radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN				
160	290	80	3	950	0,29	2,3	3,4	1420
	290	80	3	950	0,29	2,3	3,4	1420
	340	114	4	1660	0,35	1,9	2,9	2350
	340	114	4	1660	0,35	1,9	2,9	2350
	340	114	4	1660	0,35	1,9	2,9	2350
	340	114	4	1660	0,35	1,9	2,9	2350
	340	114	4	1520	0,37	1,8	2,7	2160
	340	114	4	1520	0,37	1,8	2,7	2160
	340	114	4	1520	0,37	1,8	2,7	2160
	340	114	4	1520	0,37	1,8	2,7	2160
	340	114	4	1520	0,37	1,8	2,7	2160
	340	114	4	1520	0,37	1,8	2,7	2160
	340	114	4	1520	0,37	1,8	2,7	2160
	340	114	4	1520	0,37	1,8	2,7	2160
	340	136	4	1540	0,44	1,5	2,3	2200
170	260	67	2,1	750	0,23	2,9	4,4	1270
	260	67	2,1	750	0,23	2,9	4,4	1270
	260	67	2,1	750	0,23	2,9	4,4	1270
	260	67	2,1	750	0,23	2,9	4,4	1270
	260	67	2,1	680	0,23	2,9	4,4	1170
	260	67	2,1	680	0,23	2,9	4,4	1170
	260	67	2,1	680	0,23	2,9	4,4	1170
	260	67	2,1	680	0,23	2,9	4,4	1170
	260	90	2,1	880	0,34	2	3	1610
	260	90	2,1	880	0,34	2	3	1610
	260	90	2,1	880	0,34	2	3	1610
	260	90	2,1	880	0,34	2	3	1610
	280	109	2,1	1280	0,37	1,8	2,7	2230

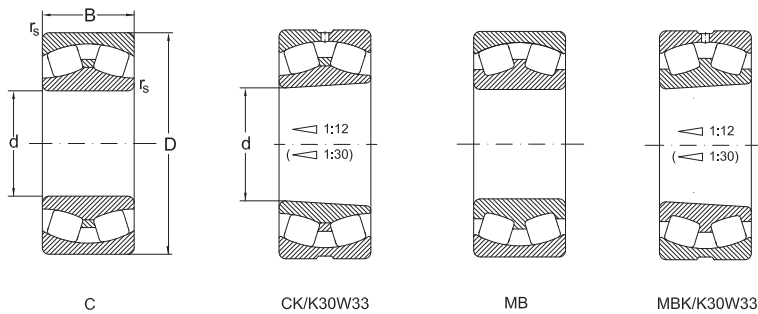
Spherical Roller Bearings

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Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
160	2,3	1100	1500	22232 MBW33	22,53
	2,3	1100	1500	22232 MBKW33	22,03
	1,8	1000	1300	22332 C	52,6
	1,8	1000	1300	22332 CK	52,16
	1,8	1000	1300	22332 CKW33	51,74
	1,8	1000	1300	22332 CW33	52,7
	1,8	900	1200	22332 MBK	49,16
	1,8	900	1200	22332 MAC4F80W33	50,08
	1,8	900	1200	22332 MAC4W502	50,08
	1,8	900	1200	22332 MAW33	50,08
	1,8	900	1200	22332 MAW502	50,0
	1,8	900	1200	22332 MB	50,26
	1,8	900	1200	22332 MBW33	49,84
	1,8	900	1200	22332 MBKW33	48,74
	1,5	1000	1400	23332 MAC4F80W33	61,85
170	2,8	1400	1800	23034 C	14,23
	2,8	1400	1800	23034 CK	13,95
	2,8	1400	1800	23034 CKW33	13,78
	2,8	1400	1800	23034 CW33	14,2
	2,8	1200	1600	23034 MBK	14,3
	2,8	1200	1600	23034 MB	14,32
	2,8	1200	1600	23034 MBW33	14,18
	2,8	1200	1600	23034 MBKW33	14,08
	2	1000	1300	24034 MBK30	17,3
	2	1000	1300	24034 MB	17,57
	2	1000	1300	24034 MBW33	17,5
	2	1000	1300	24034 MBK30W33	17,2
	1,8	750	1000	24134 C	27,3

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Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
170	280	109	2,1	1280	0,39	1,7	2,6	2230
	280	109	2,1	1280	0,39	1,7	2,6	2230
	280	109	2,1	1280	0,39	1,7	2,6	2230
	280	109	2,1	1280	0,39	1,7	2,6	2230
	280	109	2,1	1029	0,37	1,8	2,7	1672
	280	109	2,1	1029	0,37	1,8	2,7	1672
	280	88	2,1	1280	0,37	1,8	2,7	2230
	280	88	2,1	990	0,31	2,2	3,2	1650
	280	88	2,1	990	0,31	2,2	3,2	1650
	280	88	2,1	990	0,31	2,2	3,2	1650
	280	88	2,1	990	0,31	2,2	3,2	1650
	310	110	4	1460	0,35	1,9	2,9	2320
	310	110	4	1460	0,35	1,9	2,9	2320
	310	110	4	1460	0,35	1,9	2,9	2320
	310	110	4	1460	0,35	1,9	2,9	2320
	310	110	4	1460	0,35	1,9	2,9	2320
	310	110	4	1460	0,35	1,9	2,9	2320
	310	110	4	1460	0,35	1,9	2,9	2320
	310	110	4	1460	0,35	1,9	2,9	2320
	310	110	4	1340	0,36	1,9	2,8	2120
	310	110	4	1340	0,36	1,9	2,8	2120
	310	86	4	1170	0,27	2,5	3,7	1750
	310	86	4	1170	0,27	2,5	3,7	1750
	310	86	4	1170	0,27	2,5	3,7	1750
	310	86	4	1170	0,27	2,5	3,7	1750
	310	86	4	1080	0,3	2,3	3,4	1610
	310	86	4	1080	0,3	2,3	3,4	1610
	310	86	4	1080	0,3	2,3	3,4	1610

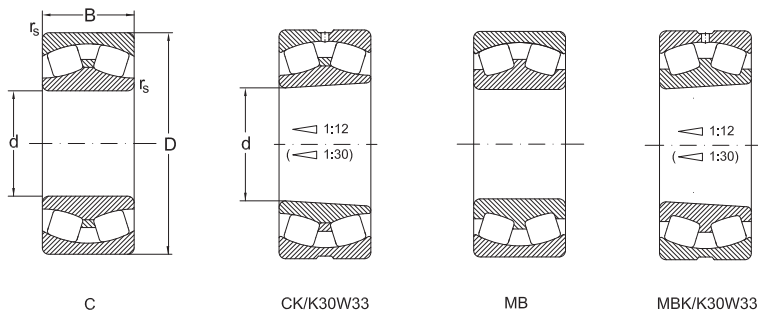
Spherical Roller Bearings

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Abutment and fillet
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d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
170	1,7	750	1000	24134 CA	27,46
	1,7	750	1000	24134 CAW33	27,41
	1,7	750	1000	24134 CAK30	27,41
	1,7	750	1000	24134 CAK30W33	27,3
	1,8	650	800	24134 MBK30W33	27,94
	1,8	650	800	24134 MBW33	28,4
	1,8	1300	1700	23134 C	27,3
	2,1	1100	1500	23134 MBK	21,4
	2,1	1100	1500	23134 MB	21,46
	2,1	1100	1500	23134 MBW33	21,41
	2,1	1100	1500	23134 MBKW33	21,31
	1,8	900	1200	23234 C	35,82
	1,8	900	1200	23234 CA	37,47
	1,8	900	1200	23234 CAK	36,38
	1,8	900	1200	23234 CAKW33	36,41
	1,8	900	1200	23234 CAW33	37,17
	1,8	900	1200	23234 CK	34,75
	1,8	900	1200	23234 CKW33	34,55
	1,8	900	1200	23234 CW33	35,67
	1,8	850	1100	23234 MBW33	37,8
	1,8	850	1100	23234 MBKW33	35,68
	2,5	1200	1600	22234 C	31,7
	2,5	1200	1600	22234 CK	31,7
	2,5	1200	1600	22234 CKW33	31,28
	2,5	1200	1600	22234 CW33	31,29
	2,2	1300	1100	22234 MBK	27,89
	2,2	1100	1400	22234 MB	28,5
	2,2	1100	1400	22234 MBW33	28,2

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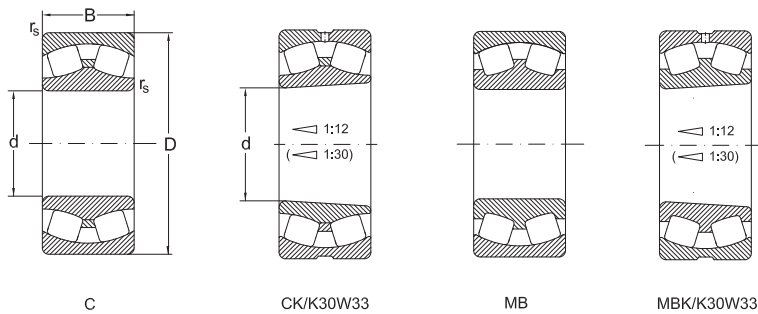
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
170	310	86	4	1080	0,3	2,3	3,4	1610
	360	120	4	1850	0,33	2	3	2590
	360	120	4	1850	0,33	2	3	2590
	360	12	4	1850	0,33	2	3	2590
	360	120	4	1850	0,33	2	3	2590
	360	120	4	1690	0,37	1,8	2,7	2380
	360	120	4	1690	0,37	1,8	2,7	2380
	360	120	4	1690	0,37	1,8	2,7	2380
	360	120	4	1690	0,37	1,8	2,7	2380
	360	120	4	1690	0,37	1,8	2,7	2380
180	250	52	2	454	0,2	3,5	5,2	830
	280	100	2,1	1030	0,36	1,9	2,8	1900
	280	100	2,1	1030	0,36	1,9	2,8	1900
	280	100	2,1	1030	0,36	1,9	2,8	1900
	280	74	2,1	870	0,24	2,8	4,2	1500
	280	74	2,1	870	0,24	2,8	4,2	1500
	280	74	2,1	870	0,24	2,8	4,2	1500
	280	74	2,1	870	0,24	2,8	4,2	1500
	280	74	2,1	800	0,24	2,8	4,2	1380
	280	74	2,1	800	0,24	2,8	4,2	1380
	280	74	2,1	800	0,24	2,8	4,2	1380
	280	74	2,1	800	0,24	2,8	4,2	1380
	300	118	3	1460	0,4	1,7	2,5	2590
	300	118	3	1460	0,4	1,7	2,5	2590
	300	118	3	1460	0,4	1,7	2,5	2590
	300	118	3	1460	0,4	1,7	2,5	2590
	300	118	3	1460	0,4	1,7	2,5	2590
	300	118	3	1460	0,4	1,7	2,5	2590

Spherical Roller Bearings SR 3918

Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
170	2,2	1100	1400	22234 MBKW33	27,51
	2	900	1200	22334 C	65,3
	2	900	1200	22334 CK	63,99
	2	900	1200	22334 CKW33	63,59
	2	900	1200	22334 CW33	64,88
	1,8	850	1100	22334 MBK	57,53
	1,8	850	1100	22334 MAC4F80W33	60,01
	1,8	850	1100	22334 MB	58,83
	1,8	850	1100	22334 MBW33	58,41
	1,8	850	1100	22334 MBKW33	60,2
180	3,4	1300	1700	23936 MBW33	7,79
	1,9	900	1200	24036 MB	22,9
	1,9	900	1200	24036 MBW33	22,79
	1,9	900	1200	24036 MBK30W33	22,42
	2,8	1300	1700	23036 C	18,76
	2,8	1300	1700	23036 CK	18,36
	2,8	1300	1700	23036 CKW33	18,13
	2,8	1300	1700	23036 CW33	18,53
	2,8	1100	1500	23036 MBK	17,5
	2,8	1100	1500	23036 MB	17,26
	2,8	1100	1500	23036 MBW33	17,03
	2,8	1100	1500	23036 MBKW33	17,0
	1,6	700	950	24136 C	33,52
	1,6	700	950	24136 CAK30W33	33,0
	1,6	700	950	24136 CAW33	33,0
	1,6	700	950	24136 CW33	33,42
	1,6	700	950	24136 CK30	33,32
	1,6	700	950	24136 CK30W33	33,2

Spherical Roller Bearings SR 3918



Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN				
180	300	118	3	1460	0,4	1,7	2,5	2590
	300	96	3	1260	0,3	2,3	3,4	2110
	300	96	3	1260	0,3	2,3	3,4	2110
	300	96	3	1260	0,3	2,3	3,4	2110
	300	96	3	1160	0,32	2,1	3,1	1940
	300	96	3	1160	0,32	2,1	3,1	1940
	300	96	3	1160	0,32	2,1	3,1	1940
	300	96	3	1160	0,32	2,1	3,1	1940
	300	118	3	1193	0,4	1,7	2,5	1962
	320	86	4	791	0,25	2,7	4	1395
	320	112	4	1420	0,36	1,9	2,8	2330
	320	112	4	1420	0,36	1,9	2,8	2330
	320	112	4	1420	0,36	1,9	2,8	2330
	320	86	4	1210	0,26	2,6	3,9	1870
	320	86	4	1210	0,26	2,6	3,9	1870
	320	86	4	1210	0,26	2,6	3,9	1870
	320	86	4	1210	0,26	2,6	3,9	1870
	320	86	4	1110	0,29	2,3	3,5	1720
	320	86	4	1110	0,29	2,3	3,5	1720
	320	86	4	1110	0,29	2,3	3,5	1720
	320	86	4	1110	0,29	2,3	3,5	1720
	380	126	4	1900	0,37	1,8	2,7	2700
	380	126	4	1900	0,37	1,8	2,7	2700
	380	126	4	1900	0,37	1,8	2,7	2700
	380	126	4	1900	0,37	1,8	2,7	2700
	380	126	4	1900	0,37	1,8	2,7	2700

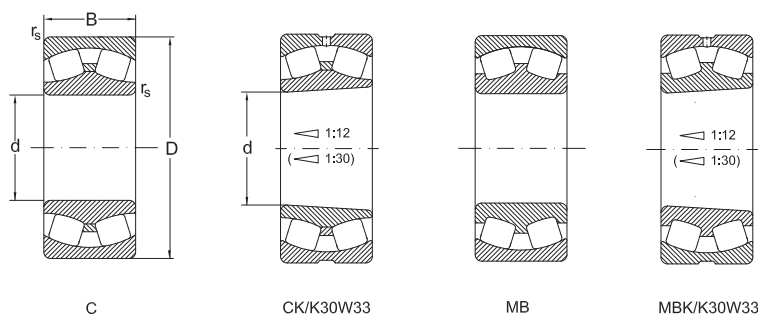
Spherical Roller Bearings

SR 3918

Abutment and fillet
dimensions see on
page 378

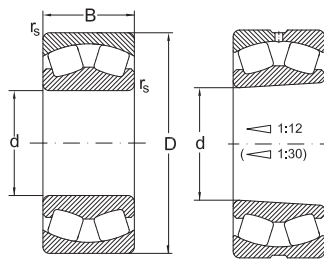
d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		[min ⁻¹]	[min ⁻¹]		
180	1,6	700	950	24136 CYW33	33,0
	2,2	1200	1600	23136 C	30,6
	2,2	1200	1600	23136 CKW33	29,38
	2,2	1200	1600	23136 CW33	30,25
	2,1	1100	1400	23136 MBK	28,34
	2,1	1100	1400	23136 MB	28,4
	2,1	1100	1400	23136 MBW33	28,09
	2,1	1100	1400	23136 MBKW33	28,0
	1,6	600	750	24136 MBK30W33	33,32
	2,7	1200	1600	22236 CKC3W33	32,11
	1,8	750	1000	23236 MBK	38,5
	1,8	750	1000	23236 MBW33	39,81
	1,8	750	1000	23236 MBKW33	40,1
	2,5	1100	1500	22236 C	33,13
	2,5	1100	1500	22236 CK	32,58
	2,5	1100	1500	22236 CKW33	32,11
	2,5	1100	1500	22236 CW33	32,66
	2,3	1100	1400	22236 MBK	28,99
	2,3	1100	1400	22236 MB	29,69
	2,3	1100	1400	22236 MBW33	29,54
	2,3	1100	1400	22236 MBKW33	28,84
	1,8	850	1100	22336 MBK	67,18
	1,8	850	1100	22336 MAC4F80W33	71,8
	1,8	850	1100	22336 MB	68,68
	1,8	850	1100	22336 MBW33	71,8
	1,8	850	1100	22336 MBKW33	71,8

Spherical Roller Bearings



d	Dimensions			Basical radial load				stat. C_{0r}
	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	
mm				kN		min^{-1}	min^{-1}	
190	260	52	2	465	0.18	3.7	5.5	900
	260	52	2	465	0.18	3.7	5.5	900
	290	75	2.1	915	0.23	3	4.4	1530
	290	75	2.1	915	0.23	3	4.4	1530
	290	100	2.1	1080	0.34	2	3	1980
	290	100	2.1	1080	0.34	2	3	1980
	320	104	3	1320	0.33	2	3	2290
	320	104	3	1320	0.33	2	3	2290
	320	128	3	1330	0.37	1.8	2.7	2320
	320	128	3	1330	0.37	1.8	2.7	2320
	320	128	3	1540	0.37	1.8	2.7	2750
	320	128	3	1540	0.37	1.8	2.7	2750
	340	92	4	1200	0.26	2.6	3.9	1830
	340	92	4	1200	0.26	2.6	3.9	1830
	340	120	4	1750	0.35	1.9	2.9	2880
	340	120	4	1750	0.35	1.9	2.9	2880
	400	132	5	1860	0.37	1.8	2.7	2500
	400	132	5	1860	0.37	1.8	2.7	2500
200	280	60	2.1	525	0.2	3.4	5.1	1020
	280	60	2.1	525	0.2	3.4	5.1	1020
	310	82	2.1	1060	0.23	2.9	4.3	1760
	310	82	2.1	1060	0.23	2.9	4.3	1760
	310	109	2.1	1140	0.35	1.9	2.9	2280

Spherical Roller Bearings



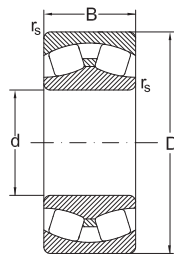
CA

CAK/K30W33

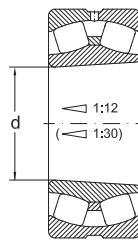
Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
190	3.6	1100	1500	23938 M	8.46
	3.6	1100	1500	23938 MBK	8.46
	2.9	1300	1700	23038 C	16.08
	2.9	1300	1700	23038 CK	16.08
	2	850	1100	24038 MB	24.5
	2	850	1100	24038 MBK30	24.5
	2	1100	1400	23138 MB	35.6
	2	1100	1400	23138 MBK	35.6
	1.8	670	900	24138 CAW33	41.4
	1.8	670	900	24138 CAK30W33	41.4
	1.8	670	900	24138 MBW33	41.4
	1.8	670	900	24138 MBK30W33	41.4
	2.5	1100	1400	22238 C	37.2
	2.5	1100	1400	22238 CK	37.2
	1.8	850	1100	23238 C	52.4
	1.8	850	1100	23238 CK	52.4
	1.8	750	1000	22238 M	81.2
	1.8	750	1000	22238 MBK	81.2
200	3.3	1100	1400	23940 MB	11.5
	3.3	1100	1400	23940 MBK	11.5
	2.8	1300	1700	23040 C	21.5
	2.8	1300	1700	23040 CK	21.5
	1.9	850	1100	24040 MB	30.5

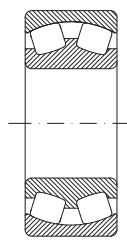
Spherical Roller Bearings



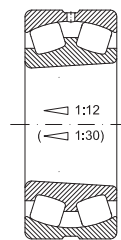
C



CK/K30W33



MB



MBK/K30W33

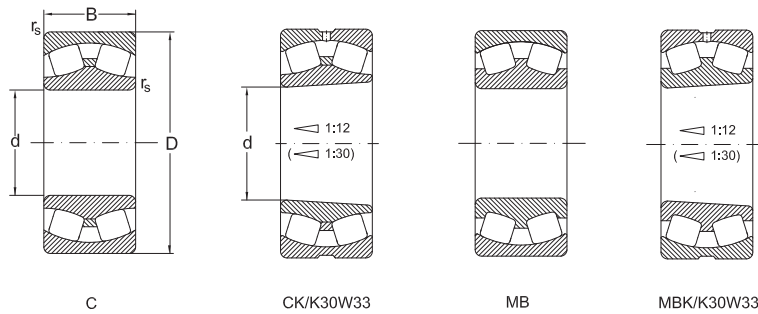
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN		min^{-1}	min^{-1}	
200	310	109	2.1	1140	0.35	1.9	2.9	2280
	340	112	3	1370	0.35	1.9	2.9	2460
	340	112	3	1370	0.35	1.9	2.9	2460
	340	140	3	1700	0.35	2	2.9	3000
	340	140	3	1700	0.35	2	2.9	3000
	360	98	4	1250	0.29	2.3	3.9	2020
	360	98	4	1250	0.29	2.3	3.9	2020
	360	128	4	1620	0.35	1.9	2.9	2590
	360	128	4	1620	0.35	1.9	2.9	2590
	420	138	5	1910	0.36	1.8	2.8	2750
	420	138	5	1910	0.36	1.8	2.8	2750
220	300	60	2.1	625	0.18	3.8	5.6	1344
	300	60	2.1	625	0.18	3.8	5.6	1344
	340	90	3	1100	0.26	2.6	3.8	2000
	340	90	3	1100	0.26	2.6	3.8	2000
	340	118	3	1400	0.34	2	2.9	2700
	340	118	3	1400	0.34	2	2.9	2700
	340	140	4	1900	0.41	1.6	2.4	3450
	340	140	4	1900	0.41	1.6	2.4	3450
	370	120	4	1515	0.3	2.3	3.4	2509
	370	120	4	1515	0.3	2.3	3.4	2509
	400	108	4	1545	0.29	2.3	3.4	2300
	400	108	4	1545	0.29	2.3	3.4	2300
	400	144	4	2065	0.35	1.9	2.9	3380

Spherical Roller Bearings

Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
200	1.9	850	1100	24040 MBK	30.5
	1.9	1100	1400	23140 MB	43.5
	1.9	1100	1400	23140 MBK	43.5
	1.9	800	1000	24140 C	52.5
	1.9	800	1000	24140 CK30	52.5
	2.3	1100	1400	22240 C	44.4
	2.3	1100	1400	22240 CK	44.4
	1.8	750	1000	23240 C	58.4
	1.8	750	1000	23240 CK	58.4
	1.8	670	900	22340 M	91.8
	1.8	670	900	22340 MBK	91.8
220	3.7	1100	1500	23944 MB	13
	3.7	1100	1500	23944 MBK	13
	2.5	900	1200	23044 MB	31
	2.5	900	1200	23044 MBK	31
	1.9	750	1000	24044 MB	39.5
	1.9	750	1000	24044 MBK30	39.5
	1.6	700	900	24144 MB	65.5
	1.6	700	900	24144 MBK30	65.5
	2.2	1000	1300	23144 MBK	52
	2.2	1000	1300	23144 MB	52
	2.3	900	1200	22244 C	61.4
	2.3	900	1200	22244 CK	61.4
	1.8	670	900	23244 C	79.5

Spherical Roller Bearings



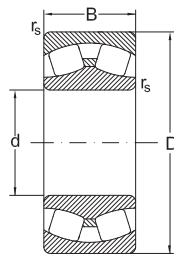
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN		min^{-1}	min^{-1}	
220	400	144	4	2065	0.35	1.9	2.9	3380
	460	145	5	2380	0.36	1.8	2.8	3407
	460	145	5	2380	0.36	1.8	2.8	3407
240	320	60	2.1	600	0.17	4.1	6	1170
	320	60	2.1	600	0.17	4.1	6	1170
	360	92	3	1160	0.25	2.7	4.1	2200
	360	92	3	1160	0.25	2.7	4.1	2200
	360	118	3	1460	0.32	2.1	3.1	2841
	360	118	3	1460	0.32	2.1	3.1	2841
	400	160	4	1780	0.41	1.7	2.5	3109
	400	160	4	1780	0.41	1.7	2.5	3109
	400	128	4	1705	0.3	2.3	3.4	2863
	400	128	4	1705	0.3	2.3	3.4	2863
	440	120	4	1845	0.29	2.3	3.4	2763
	440	120	4	1845	0.29	2.3	3.4	2763
	440	160	4	2530	0.35	1.9	2.9	4600
	440	160	4	2530	0.35	1.9	2.9	4600
	500	155	5	2650	0.31	2.2	3.3	4000
	500	155	5	2650	0.31	2.2	3.3	4000
260	360	75	2.1	845	0.19	3.5	5.3	1604
	360	75	2.1	845	0.19	3.5	5.3	1604
	400	104	4	1500	0.26	2.6	3.9	2800
	400	104	4	1500	0.26	2.6	3.9	2800

Spherical Roller Bearings

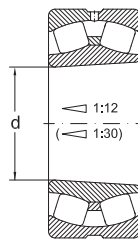
Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
220	1.8	670	900	23244 CK	79.5
	1.8	700	950	22344 C	120
	1.8	700	950	22344 CK	120
240	4	1000	1300	23948 MBK	14
	4	1000	1300	23948 MB	14
	2.7	800	1000	23048 MBK	33.9
	2.7	800	1000	23048 MB	33.9
	2.1	750	1000	24048 MBK30	42.5
	2.1	750	1000	24048 MB	42.5
	1.6	530	700	24148 MB	79.5
	1.6	530	700	24148 MBK30	79.5
	2.2	900	1200	23148 MBK	66
	2.2	900	1200	23148 MB	66
	2.3	850	1100	22248 C	83.2
	2.3	850	1100	22248 CK	83.2
	1.8	630	850	23248 C	109
	1.8	630	850	23248 CK	109
	2.2	560	750	22348 M	151
	2.2	560	750	22348 MBK	151
	3.5	850	1100	23952 MBK	24
260	3.5	850	1100	23952 MB	24
	2.6	750	950	23052 MBK	49
	2.6	750	950	23052 MB	49

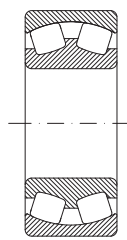
Spherical Roller Bearings



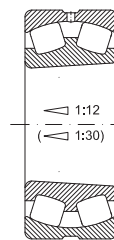
C



CK/K30W33



MB



MBK/K30W33

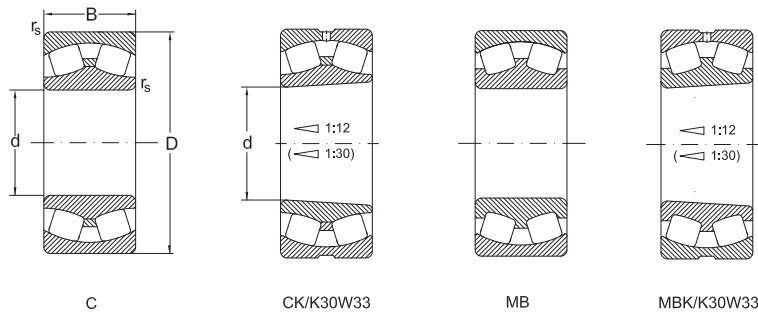
Dimensions				Basic radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN		min ⁻¹	min ⁻¹	
260	400	140	4	1775	0.35	1.9	2.9	3494
	400	140	4	1775	0.35	1.9	2.9	3494
	440	180	4	2500	0.42	1.6	2.4	5100
	440	180	4	2500	0.42	1.6	2.4	5100
	440	144	4	2153	0.31	2.2	3.3	3673
	440	144	4	2153	0.31	2.2	3.3	3673
	480	130	5	2190	0.29	2.3	3.4	3300
	480	130	5	2190	0.29	2.3	3.4	3300
	540	165	6	3125	0.36	1.8	2.8	4560
	540	165	6	3125	0.36	1.8	2.8	4560
280	380	75	2.1	950	0.18	3.8	5.6	2000
	380	75	2.1	950	0.18	3.8	5.6	2000
	420	106	4	1560	0.25	2.7	4.1	3000
	420	106	4	1560	0.25	2.7	4.1	3000
	420	140	4	2000	0.33	2	3	4000
	420	140	4	2000	0.33	2	3	4000
	460	146	5	2295	0.3	2.3	3.4	4050
	460	146	5	2295	0.3	2.3	3.4	4050
	460	180	5	2635	0.39	1.7	2.5	4848
	460	180	5	2635	0.39	1.7	2.5	4848
	500	130	5	2330	0.29	2.3	3.4	3600
	500	130	5	2330	0.29	2.3	3.4	3600
	500	176	5	2806	0.35	1.9	2.9	4645
	500	176	5	2806	0.35	1.9	2.9	4645

Spherical Roller Bearings

Abutment and fillet
dimensions see on
page 378

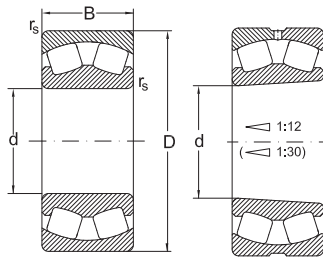
d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
260	1.9	600	800	24052 MBK30	66
	1.9	600	800	24052 MB	66
	1.6	480	630	24152 MB	110
	1.6	480	630	24152 MBK30	110
	2.2	850	1100	23152 MBK	92.5
	2.2	850	1100	23152 MB	92.5
	2.3	750	1000	22252 MB	107
	2.3	750	1000	22252 MBK	107
	1.8	600	800	22352 C	187
	1.8	600	800	22352 CK	187
280	3.7	900	1200	23956 MBK	26
	3.7	900	1200	23956 MB	26
	2.7	700	900	23056 MBK	52.5
	2.7	700	900	23056 MB	52.5
	2	560	750	24056 MBK30	68.5
	2	560	750	24056 MB	68.5
	2.2	750	1000	23156 MBK	98.5
	2.2	750	1000	23156 MB	98.5
	1.7	400	530	24156 MB	118
	1.7	400	530	24156 MBK30	118
	2.3	700	950	22256 MB	113
	2.3	700	950	22256 MBK	113
	1.8	480	630	23256 MB	153
	1.8	480	630	23256 MBK	153

Spherical Roller Bearings



Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN		min^{-1}	min^{-1}	
280	580	175	6	3530	0.36	1.8	2.8	5208
	580	175	6	3530	0.36	1.8	2.8	5208
300	420	90	3	1175	0.2	3.4	5.1	2261
	420	90	3	1175	0.2	3.4	5.1	2261
	460	118	4	1960	0.25	2.7	4	3650
	460	118	4	1960	0.25	2.7	4	3650
	460	160	4	2385	0.35	2	2.9	4702
	460	160	4	2385	0.35	2	2.9	4702
	500	160	5	2385	0.3	2.3	3.4	4485
	500	160	5	2385	0.3	2.3	3.4	4485
	500	200	5	3213	0.4	1.7	2.5	6011
	500	200	5	3213	0.4	1.7	2.5	6011
	540	140	5	2655	0.29	2.3	3.4	4230
	540	140	5	2655	0.29	2.3	3.4	4230
320	440	90	3	1215	0.19	3.6	5.4	2409
	440	90	3	1215	0.19	3.6	5.4	2409
	480	121	4	2040	0.25	2.7	4.1	4000
	480	121	4	2040	0.25	2.7	4.1	4000
	480	160	4	2500	0.33	2.1	3.1	5240
	480	160	4	2500	0.33	2.1	3.1	5240
	540	176	5	3115	0.34	2	3	6000
	540	176	5	3115	0.34	2	3	6000
	540	218	5	3750	0.41	1.7	2.5	7300
	540	218	5	3750	0.41	1.7	2.5	7300

Spherical Roller Bearings



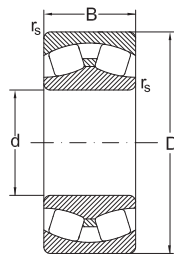
CA

CAK/K30W33

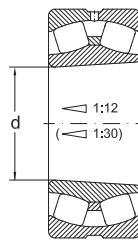
Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
280	1.8	560	750	22356 C	235
	1.8	560	750	22356 CK	235
300	3.3	750	1000	23960 MBK	40
	3.3	750	1000	23960 MB	40
	2.6	630	800	23060 MBK	73.6
	2.6	630	800	23060 MB	73.6
	1.9	560	759	24060 MBK30	97
	1.9	560	759	24060 MB	97
	2.2	700	950	23160 MBK	129
	2.2	700	950	23160 MB	129
	1.6	430	560	24160 MB	159
	1.6	430	560	24160 MBK30	159
	2.3	670	900	22260 CAKW33	142
	2.3	670	900	22260 CAW33	142
320	3.5	670	900	23964 MBK	42
	3.5	670	900	23964 MB	42
	2.7	600	750	23064 MBK	79.5
	2.7	600	750	23064 MB	79.5
	2	530	700	24064 MBK30	106
	2	530	700	24064 MB	106
	1.9	530	670	23164 MB	165
	1.9	530	670	23164 MBK	165
	1.6	400	530	24164 MB	215

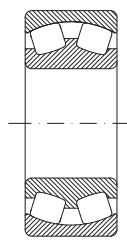
Spherical Roller Bearings



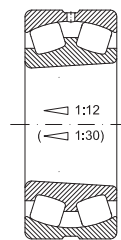
C



CK/K30W33



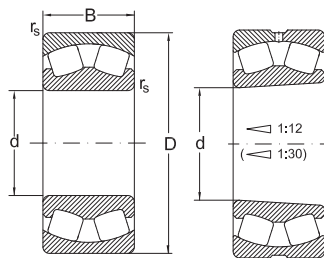
MB



MBK/K30W33

Dimensions				Basical radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN		min ⁻¹	min ⁻¹	
320	540	218	5	3750	0.41	1.7	2.5	7300
	580	150	5	2997	0.29	2.5	3.7	4740
	580	150	5	2997	0.29	2.5	3.7	4740
	580	208	5	4130	0.35	1.9	2.9	7026
	580	208	5	4130	0.35	1.9	2.9	7026
340	440	90	3	1306	0.189	3.8	5.7	2691
	440	90	3	1306	0.189	3.8	5.7	2691
	520	133	5	2360	0.25	2.7	4	4500
	520	133	5	2360	0.25	2.7	4	4500
	520	180	5	2912	0.34	2	2.9	5961
	520	180	5	2912	0.34	2	2.9	5961
	580	190	5	3605	0.31	2.2	3.2	6409
	580	190	5	3605	0.31	2.2	3.2	6409
	580	243	5	4400	0.43	1.6	2.3	8500
	580	243	5	4400	0.43	1.6	2.3	8500
360	480	90	3	1030	0.17	4.1	6	3200
	480	90	3	1030	0.17	4.1	6	3200
	540	134	5	2450	0.25	2.7	4.1	4800
	540	134	5	2450	0.25	2.7	4.1	4800
	540	180	5	3150	0.33	2.1	3.1	6530
	540	180	5	3150	0.33	2.1	3.1	6530
	600	192	5	3740	0.33	2.3	3.4	7010
	600	192	5	3740	0.33	2.3	3.4	7010

Spherical Roller Bearings



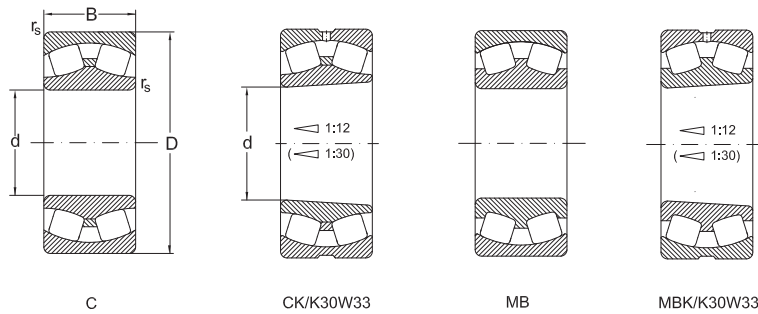
CA

CAK/K30W33

Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
320	1.6	400	530	24164 MBK30	215
	2.5	630	580	22264 CAKW33	180
	2.5	630	580	22264 CAW33	180
	1.8	430	560	23264 MB	247
	1.8	430	560	23264 MBK	247
340	3.8	630	850	23968 MBK	45
	3.8	630	850	23698 MB	45
	2.6	560	700	23068 MBK	105
	2.6	560	700	23068 MB	105
	1.9	480	600	24068 CAW33	143
	1.9	480	600	24068 CAK30W33	143
	2.2	630	850	23168 MBK	212
	2.2	630	850	23168 MB	212
	1.5	450	560	24168 MB	266
	1.5	450	560	24168 MBK30	266
360	4	560	700	23972 MBK	47
	4	560	700	23972 MB	47
	2.7	530	670	23072 MBK	111
	2.7	530	670	23072 MB	111
	2	480	630	24072 MBK30	145
	2	480	630	24072 MB	145
	2.2	600	800	23172 MBK	220
	2.2	600	800	23172 MB	220

Spherical Roller Bearings



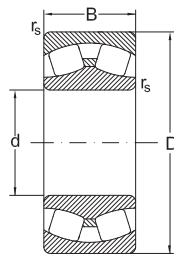
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN		min^{-1}	min^{-1}	
360	600	243	5	4500	0.41	1.6	2.4	9000
	600	243	5	4500	0.41	1.6	2.4	9000
	650	232	6	4880	0.35	1.9	2.9	8490
	650	232	6	4880	0.35	1.9	2.9	8490
380	520	106	4	1785	0.19	3.6	5.3	4000
	520	106	4	1785	0.19	3.6	5.3	4000
	560	135	5	2550	0.25	2.8	4.2	5300
	560	135	5	2550	0.25	2.8	4.2	5300
	560	180	5	3150	0.31	2.2	3.2	6710
	560	180	5	3150	0.31	2.2	3.2	6710
	620	194	5	3740	0.3	2.3	3.4	7540
	620	194	5	3740	0.3	2.3	3.4	7540
	620	243	5	4650	0.39	1.7	2.5	9500
	620	243	5	4650	0.39	1.7	2.5	9500
	680	240	6	5050	0.35	1.9	2.9	9660
	680	240	6	5050	0.35	1.9	2.9	9660
400	540	106	4	1850	0.18	3.7	5.5	3990
	540	106	4	1850	0.18	3.7	5.5	3990
	600	148	5	3050	0.24	2.8	4.1	6200
	600	148	5	3050	0.24	2.8	4.1	6200
	600	200	5	3610	0.33	2.1	3.1	7545
	600	200	5	3610	0.33	2.1	3.1	7545
	650	200	6	4100	0.28	2.4	3.6	7730
	650	200	6	4100	0.28	2.4	3.6	7730

Spherical Roller Bearings

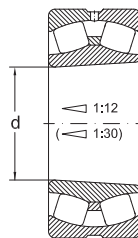
Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
360	1.6	430	530	24172 MB	278
	1.6	430	530	24172 MBK30	278
	1.8	430	560	23272 MB	344
	1.8	430	560	23272 MBK	344
380	3.5	630	850	23976 MBK	70
	3.5	630	850	23976 MB	70
	2.8	500	630	23076 MBK	117
	2.8	500	630	23076 MB	117
	2.1	450	600	24076 MBK30	152
	2.1	450	600	24076 MB	152
	2.2	560	750	23176 MBK	240
	2.2	560	750	23176 MB	240
	1.7	400	500	24176 MB	290
	1.7	400	500	24176 MBK30	290
	1.8	400	530	23276 MB	375
	1.8	400	530	23276 MBK	375
400	3.6	600	800	23980 MB	72
	3.6	600	800	23980 MBK	72
	2.7	450	560	23080 MBK	152
	2.7	450	560	23080 MB	152
	2	430	460	24080 MB	205
	2	430	460	24080 MBK30	205
	2.5	530	700	23180 MBK	265

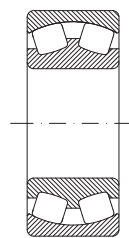
Spherical Roller Bearings



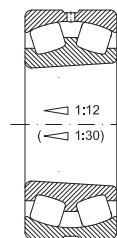
C



CK/K30W33



MB



MBK/K30W33

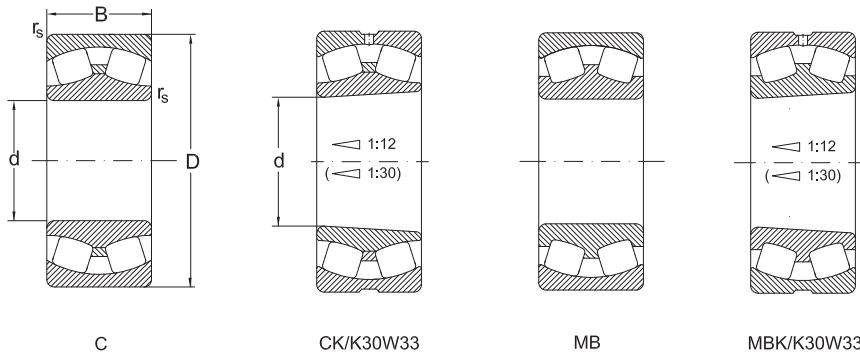
Dimensions				Basical radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN		min ⁻¹	min ⁻¹	
400	650	200	6	4100	0.28	2.4	3.6	7730
	650	250	6	5100	0.39	1.7	2.6	10400
	650	250	6	5100	0.39	1.7	2.6	10400
	720	256	6	5950	0.35	1.9	2.9	10807
	720	256	6	5950	0.35	1.9	2.9	10807
420	560	106	4	1960	0.18	3.8	5.7	4130
	560	106	4	1960	0.18	3.8	5.7	4130
	620	150	5	3150	0.24	2.8	4.2	6550
	620	150	5	3150	0.24	2.8	4.2	6550
	620	200	5	4000	0.32	2.1	3.2	8800
	620	200	5	4000	0.32	2.1	3.2	8800
	700	224	6	4600	0.33	2	3	9000
	700	224	6	4600	0.33	2	3	9000
	700	224	6	6200	0.33	2	3	12700
	700	224	6	6200	0.33	2	3	12700
	760	272	7.5	6575	0.35	1.9	2.9	11717
	760	272	7.5	6575	0.35	1.9	2.9	11717
440	600	118	4	2100	0.18	3.7	5.5	4690
	600	118	4	2100	0.18	3.7	5.5	4690
	650	157	6	3400	0.24	2.8	4.2	7100
	650	157	6	3400	0.24	2.8	4.2	7100
	650	212	6	4300	0.32	2.1	3.2	9650
	650	212	6	4300	0.32	2.1	3.2	9650

Spherical Roller Bearings

Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
400	2.5	530	700	23180 MB	265
	1.7	380	480	24180 MB	326
	1.7	380	480	24180 MBK30	326
	1.8	380	500	23280 MB	450
	1.8	380	500	23280 MBK	450
420	3.8	600	800	23984 MBK	75
	3.8	600	800	23984 MB	75
	2.8	450	560	23084 MBK	160
	2.8	450	560	23084 MB	160
	2.1	380	480	24084 MBK30	214
	2.1	380	480	24084 MB	214
	2	500	670	23184 C	363
	2	500	670	23184 CK	363
	2	400	500	24184 MB	443
	2	400	500	24184 MBK30	443
	1.8	360	480	23284 MB	540
	1.8	360	480	23284 MBK	540
440	3.6	560	750	23988 MBK	102
	3.6	560	750	23988 MB	102
	2.8	430	530	23088 MBK	184
	2.8	430	530	23088 MB	184
	2.1	360	450	24088 MBK30	249
	2.1	360	450	24088 MB	249

Spherical Roller Bearings



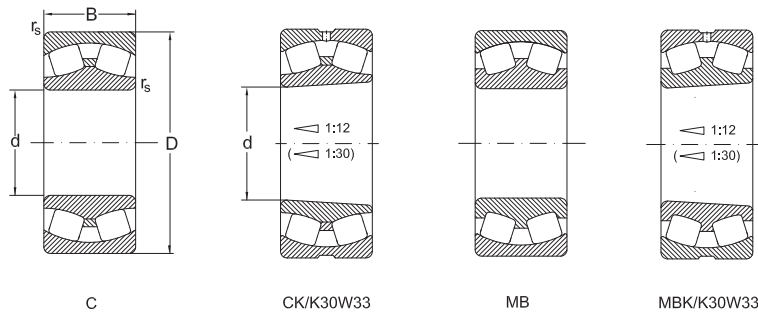
Dimensions				Basic radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN		min^{-1}	min^{-1}	
440	720	226	6	5250	0.3	2.3	3.4	10000
	720	226	6	5250	0.3	2.3	3.4	10000
	720	280	6	6400	0.38	1.8	2.6	13200
	720	280	6	6400	0.38	1.8	2.6	13200
	790	280	7.5	7100	0.35	1.9	2.9	13400
	790	280	7.5	7100	0.35	1.9	2.9	13400
460	620	118	4	2305	0.18	3.8	5.7	5036
	620	118	4	2305	0.18	3.8	5.7	5036
	680	163	6	3650	0.24	2.8	4.2	7650
	680	163	6	3650	0.24	2.8	4.2	7650
	680	218	6	4370	0.31	2.2	3.2	9570
	680	218	6	4370	0.31	2.2	3.2	9570
	760	240	7.5	5760	0.3	2.3	3.4	11025
	760	240	7.5	5760	0.3	2.3	3.4	11025
	760	300	7.5	7500	0.39	1.7	2.6	15600
	760	300	7.5	7500	0.39	1.7	2.6	15600
	830	296	7.5	7560	0.35	1.9	2.9	13970
	830	296	7.5	7560	0.35	1.9	2.9	13970
480	650	128	5	2525	0.18	3.8	5.6	5500
	650	128	5	2525	0.18	3.8	5.6	5500
	700	165	6	3800	0.23	2.9	4.3	8150
	700	165	6	3800	0.23	2.9	4.3	8150
	700	218	6	4900	0.3	2.3	3.3	11200

Spherical Roller Bearings

Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
440	2.2	500	670	23188 C	360
	2.2	500	670	23188 CK	360
	1.7	340	430	24188 MB	454
	1.7	340	430	24188 MBK30	454
	1.8	360	480	23288 MB	595
	1.8	360	480	23288 MBK	595
460	3.8	530	700	23992 MBK	105
	3.8	530	700	23992 MB	105
	2.8	400	500	23092 MBK	210
	2.8	400	500	23092 MB	210
	2.1	380	500	24092 MBK30	280
	2.1	380	500	24092 MB	280
	2.2	480	630	23192 C	441
	2.2	480	630	23192 CK	441
	1.7	320	400	24192 MB	578
	1.7	320	400	24192 MBK30	578
	1.9	340	450	23292 MB	695
	1.9	340	450	23292 MBK	695
480	3.7	450	600	23996 MB	128
	3.7	450	600	23996 MBK	128
	2.8	380	480	23096 MBK	220
	2.8	380	480	23096 MB	220
	2.2	340	430	24096 MBK30	288

Spherical Roller Bearings



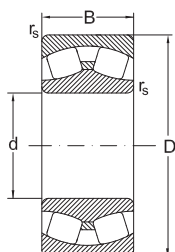
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN		min^{-1}	min^{-1}	
480	700	218	6	4900	0.3	2.3	3.3	11200
	790	248	7.5	5800	0.3	2.3	3.4	11800
	790	248	7.5	5800	0.3	2.3	3.4	11800
	790	308	7.5	8000	0.39	1.8	2.6	16600
	790	308	7.5	8000	0.39	1.8	2.6	16600
	870	310	7.5	8800	0.37	1.8	2.7	17000
	870	310	7.5	8800	0.37	1.8	2.7	17000
500	670	128	5	2500	0.17	3.9	5.8	6090
	670	128	5	2500	0.17	3.9	5.8	6090
	720	167	6	3900	0.22	3	4.5	8500
	720	167	6	3900	0.22	3	4.5	8500
	720	218	6	4900	0.29	2.3	3.5	11200
	720	218	6	4900	0.29	2.3	3.5	11200
	830	264	7.5	6550	0.3	2.3	3.4	13200
	830	264	7.5	6550	0.3	2.3	3.4	13200
	830	325	7.5	8650	0.39	1.7	2.6	18300
	830	325	7.5	8650	0.39	1.7	2.6	18300
	920	336	7.5	9650	0.38	1.8	2.7	18300
	920	336	7.5	9650	0.38	1.8	2.7	18300
530	710	136	5	2980	0.18	3.8	5.7	6755
	710	136	5	2980	0.18	3.8	5.7	6755
	780	185	6	4400	0.22	3	4.5	9500
	780	185	6	4400	0.22	3	4.5	9500

Spherical Roller Bearings

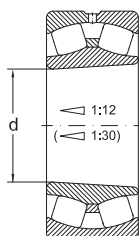
Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
480	2.2	340	430	24096 MB	288
	2.2	450	600	23196 C	485
	2.2	450	600	23196 CK	485
	1.7	320	400	24196 MB	639
	1.7	320	400	24196 MBK30	639
	1.8	340	430	23296 MB	835
	1.8	340	430	23296 MBK	835
500	3.8	480	630	239/500 MBK	130
	3.8	480	630	239/500 MB	130
	2.9	380	480	230/500 MBK	229
	2.9	380	480	230/500 MB	229
	2.3	320	400	240/500 MBK30	297
	2.3	320	400	240/500 MB	297
	2.2	430	560	231/500 MBK	580
	2.2	430	560	231/500 MB	580
	1.7	300	380	241/500 MB	753
	1.7	300	380	241/500 MBK30	753
	1.7	320	400	232/500 MB	1010
	1.7	320	400	232/500 MBK	1010
530	3.8	450	600	239/530 MB	150
	3.8	450	600	239/530 MBK	150
	3	340	430	230/530 MB	310
	3	340	430	230/530 MBK	310

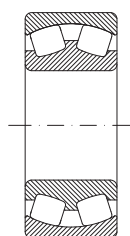
Spherical Roller Bearings



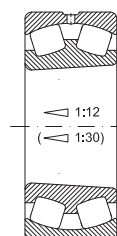
C



CK/K30W33



MB



MBK/K30W33

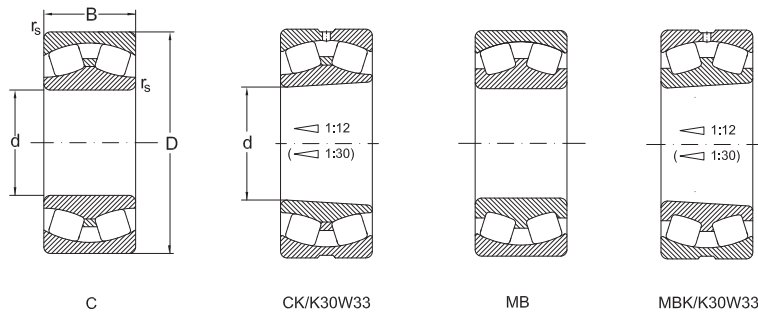
Dimensions				Basic radial load				
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}
mm				kN		min ⁻¹	min ⁻¹	
530	780	250	6	5640	0.31	2.2	3.2	12800
	780	250	6	5640	0.31	2.2	3.2	12800
	870	335	7.5	9500	0.38	1.8	2.6	20000
	870	335	7.5	9500	0.38	1.8	2.6	20000
	870	272	7.5	7625	0.3	2.3	3.4	15000
	870	272	7.5	7625	0.3	2.3	3.4	15000
560	750	140	5	3100	0.17	4	5.9	7650
	750	140	5	3100	0.17	4	5.9	7650
	820	195	6	5100	0.23	2.9	4.4	11000
	820	195	6	5100	0.23	2.9	4.4	11000
	820	258	6	6400	0.31	2.2	3.3	14600
	820	258	6	6400	0.31	2.2	3.3	14600
	920	280	7.5	8294	0.3	2.3	3.4	16295
	920	280	7.5	8294	0.3	2.3	3.4	16295
	920	355	7.5	10600	0.38	1.8	2.6	22400
	920	355	7.5	10600	0.38	1.8	2.6	22400
600	800	150	5	3450	0.17	4	5.9	8650
	800	150	5	3450	0.17	4	5.9	8650
	870	200	6	5700	0.22	3.1	4.6	12500
	870	200	6	5700	0.22	3.1	4.6	12500
	870	272	6	7100	0.31	2.2	3.3	16600
	870	272	6	7100	0.31	2.2	3.3	16600
	980	300	7.5	9000	0.31	1.8	2.7	19300

Spherical Roller Bearings

Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
530	2.1	340	450	240/530 MB	410
	2.1	340	450	240/530 MBK30	410
	1.7	280	360	241/530 MB	838
	1.7	280	360	241/530 MBK30	838
	2.2	400	530	231/530 MBK	645
	2.2	400	530	231/530 MB	645
560	3.9	340	430	239/560 MBK	183
	3.9	340	430	239/560 MB	183
	2.9	320	400	230/560 MBK	358
	2.9	320	400	230/560 MB	358
	2.2	280	360	240/560 MBK30	469
	2.2	280	360	240/560 MB	469
	2.2	380	500	231/560 MBK	740
	2.2	380	500	231/560 MB	740
	1.7	260	340	241/560 MB	979
	1.7	260	340	241/560 MBK30	979
600	3.9	320	400	239/600 MBK	221
	3.9	320	400	239/600 MB	221
	3	300	380	230/600 MBK	406
	3	300	380	230/600 MB	406
	2.2	260	340	240/600 MBK30	550
	2.2	260	340	240/600 MB	550
	2.2	280	360	231/600 MB	933

Spherical Roller Bearings



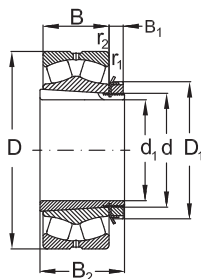
Dimensions				Basical radial load				
d	D	B	r_s min.	dyn. C_r	e	Y_1	Y_2	stat. C_{0r}
mm				kN		min^{-1}	min^{-1}	
600	980	300	7.5	9000	0.31	1.8	2.7	19300
	980	375	7.5	11600	0.38	1.8	2.7	26000
	980	375	7.5	11600	0.38	1.8	2.7	26000
630	850	165	6	4290	0.18	3.8	5.7	9910
	850	165	6	4290	0.18	3.8	5.7	9910
	920	212	7.5	6300	0.31	2.2	3.3	14000
	920	212	7.5	6300	0.31	2.2	3.3	14000
	920	290	7.5	8000	0.31	2.2	3.3	19000
	920	290	7.5	8000	0.31	2.2	3.3	19000
670	900	170	6	4300	0.17	4	5.9	10600
	900	170	6	4300	0.17	4	5.9	10600
	980	230	7.5	7200	0.22	3	4.5	16000
	980	230	7.5	7200	0.22	3	4.5	16000
	980	308	7.5	9000	0.31	2.2	3.3	21600
	980	308	7.5	9000	0.31	2.2	3.3	21600
710	950	180	6	4800	0.18	3.8	5.7	12000
	950	180	6	4800	0.18	3.8	5.7	12000
750	1000	185	6	5200	0.17	4	5.9	12900
	1000	185	6	5200	0.17	4	5.9	12900

Spherical Roller Bearings

Abutment and fillet
dimensions see on
page 378

d	Y ₀	Speed limit		Designation	Mass
		grease	oil		
mm		min ⁻¹	min ⁻¹		[kg]
600	2.2	280	360	231/600 MBK	933
	1.8	240	320	241/600 MB	1180
	1.8	240	320	241/600 MBK30	1180
630	3.7	380	500	239/630 MBK	280
	3.7	380	500	239/630 MB	280
	2.2	260	340	230/630 MBK	661
	2.2	260	340	230/630 MB	661
	2.2	260	340	240/630 MBK30	661
	2.2	260	340	240/630 MB	661
670	3.9	280	360	239/670 MBK	326
	3.9	280	360	239/670 MB	326
	2.9	260	340	230/670 MBK	602
	2.9	260	340	230/670 MB	602
	2.2	240	320	240/670 MBK30	802
	2.2	240	320	240/670 MB	802
710	3.8	260	340	239/710 MBK	386
	3.8	260	340	239/710 MB	386
750	3.9	260	340	239/750 MBK	437
	3.9	260	340	239/750 MB	437

Spherical Roller Bearings with Adapter Sleeve



Shaft Φd_1	Dimensions					Designation		Basical radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve		dyn. C_r	stat. C_{0r}	grease	oil
mm								kN		min^{-1}	min^{-1}
20	25	52	18	1	22205 CK	H305		43	46	7500	10000
25	30	62	20	1	22206 CK	H306		59	62	6300	8500
30	35	72	23	1,1	22207 CK	H307		81	88	5300	7000
	35	80	21	1,5	22307 CK	H307		71	73,5	5300	6700
35	40	80	23	1,1	22208 CK	H308		88	98	4800	6300
	40	90	23	1,5	21308 CK	H308		99	120	4500	6000
	40	90	33	1,5	22308 CK	H2308		140	145	4300	5600
40	45	85	23	1,1	22209 CK	H309		93	105	4500	6000
	45	100	25	1,5	21309 CK	H309		120	135	4000	5300
	45	100	36	1,5	22309 CK	H2309		165	190	3800	5000
45	50	90	23	1,1	22210 CK	H310		100	120	4000	5300
	50	110	27	2	21310 CK	H310		120	130	3600	4800
	50	110	40	2	22310 CK	H2310		190	220	3400	4500
50	55	100	25	1,5	22211 CK	H311		120	140	3800	5000
	55	120	29	2	21311 CK	H311		135	155	3200	4300
	55	120	43	2	22311 CK	H2311		230	265	3000	4000
55	60	110	28	1,5	22212 CK	H312		145	175	3400	4500
	60	130	31	2,1	21312 CK	H312		150	180	3000	4000

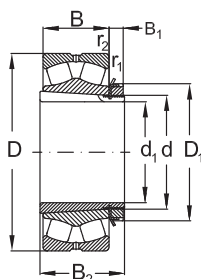
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for spherical roller bearings see on page 378

Recommendations for the dimensioning of supporting rings see on page 377

Shaft Φd_1	Dimensions				Calculation factor			Mass	
	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Adapter Sleeve
mm					kN				[kg]
20	9	29	38	0,35	1,9	2,9	1,8	0,18	0,071
25	9	31	45	0,36	1,9	2,8	1,9	0,38	0,095
30	10	35	52	0,36	1,9	2,8	1,9	0,41	0,14
	10	35	52	0,26	2,6	3,8	2,5	0,50	0,14
35	11	36	58	0,31	2,2	3,2	2,1	0,49	0,17
	11	36	58	0,26	2,6	3,9	2,6	0,70	0,17
	11	46	58	0,40	1,6	2,5	2	1,10	0,22
40	12	39	65	0,30	2,3	3,4	2,2	0,54	0,23
	12	39	65	0,26	2,6	3,9	2,6	0,95	0,23
	12	50	65	0,40	1,7	2,5	1,6	1,36	0,27
45	13	42	70	0,26	2,6	3,4	2,5	0,61	0,27
	13	42	70	0,24	2,8	4,1	2,7	1,25	0,27
	13	55	70	0,40	1,7	2,5	1,6	1,82	0,34
50	14	45	75	0,27	2,5	3,9	2,5	0,80	0,32
	14	45	75	0,24	2,8	4,1	2,7	1,65	0,32
	14	59	75	0,40	1,7	2,5	1,6	2,31	0,39
55	14	47	80	0,27	2,5	3,8	2,4	1,06	0,36
	14	47	80	0,24	2,9	4,3	2,8	1,95	0,36

Spherical Roller Bearings with Adapter Sleeve



Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
	mm							kN		min ⁻¹	min ⁻¹
55	60	130	46	2,1		22312 CK	H2312	270	320	2800	3800
60	65	120	31	1,5		22213 CK	H313	180	220	3000	4000
	65	140	33	2,1		21313 CK	H313	196	228	2800	3800
	65	140	48	2,1		22313 CK	H2313	305	360	2800	3600
	70	125	31	1,5		22214 CK	H314	180	225	2800	3800
	70	150	35	2,1		21314 CK	H314	250	310	2600	3400
	70	150	51	2,1		22314 CK	H2314	325	375	2400	3200
65	75	130	31	1,5		22215 CK	H315	190	250	2800	3800
	75	160	37	2,1		21315 CK	H315	280	360	2400	3200
	75	160	55	2,1		22315 CK	H2315	375	440	2200	3000
70	80	140	33	2		22216 CK	H316	210	275	2600	3400
	80	170	39	2,1		21316 CK	H316	275	340	2200	3000
	80	170	58	2,1		22316 CK	H2316	410	500	1800	2400
75	85	150	36	2		22217 CK	H317	250	325	2400	3200
	85	180	41	3		21317 CK	H317	350	450	2200	2800
	85	180	60	3		22317 CK	H2317	500	620	1800	2400
80	90	160	40	2		22218 CK	H318	305	410	2200	3000
	90	160	52	2		23218 CK	H2318	340	485	1500	2000
	90	190	43	3		21318 CK	H318	335	415	2200	2800

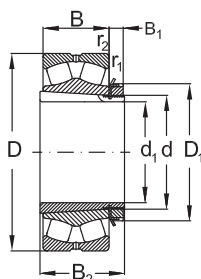
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for spherical roller bearings see on page 378

Recommendations for the dimensioning of supporting rings see on page 377

Shaft	Dimensions				Calculation factor			Mass	
	Φd_1	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing Adapter Sleeve
	mm					kN			[kg]
55	14	62	80	0,4	1,7	2,5	1,7	2,93	0,45
60	15	50	85	0,28	2,4	3,7	2,4	1,4	0,42
	15	50	85	0,24	2,8	4,2	2,8	2,45	0,42
	15	65	85	0,39	1,7	2,6	1,7	3,54	0,52
	15	52	92	0,26	2,6	3,6	2,6	1,52	0,67
	15	52	92	0,23	2,9	4,4	2,9	3,10	0,67
	15	68	92	0,38	1,8	2,6	1,7	4,19	0,88
65	16	55	98	0,24	2,8	3,9	2,7	1,61	0,78
	16	55	98	0,23	2,9	4,4	2,9	3,55	0,78
	16	73	98	0,38	1,9	2,6	1,7	5,21	1,10
70	18	59	105	0,25	2,6	4,1	2,6	1,97	0,95
	18	59	105	0,23	2,9	4,4	2,9	4,25	0,95
	18	78	105	0,35	1,9	0,9	1,8	6,20	1,20
75	19	63	110	0,216	2,6	4	0,6	2,47	1,10
	19	63	110	0,22	3	4,5	2,9	5,10	1,10
	19	82	110	0,33	2	3	2	7,10	1,35
80	19	65	120	0,27	2,5	3,9	2,5	3,18	1,30
	19	86	120	0,34	2	3	2	4,6	1,60
	19	65	120	0,22	3	4,5	2,9	5,8	1,30

Spherical Roller Bearings with Adapter Sleeve



Shaft Φd_1	Dimensions				Designation		Basical radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
80	90	190	64	3	22318 CK	H2318	510	620	1800	2400
85	95	170	43	2,1	22219 CK	H319	340	450	2200	2800
	95	200	45	3	21319 CK	H319	360	450	2000	2600
	95	200	67	3	22319 CK	H2319	580	700	1700	2200
90	100	165	52	2	23120 MBK	H3120	355	540	2000	3000
	100	180	46	2,1	22220 CK	H320	375	500	2200	2800
	100	180	60,3	2,1	23220 CK	H2320	495	720	1700	2200
	100	215	73	3	22320 CK	H2320	730	960	1500	2000
100	110	170	45	2	23022 CK	H322	335	510	2200	3000
	110	180	56	2	23122 MBK	H3122	410	640	1800	2400
	110	200	53	2,1	22222 CK	H322	455	585	2000	2800
	110	200	69,8	2,1	23222 CK	H2322	620	850	1400	1800
	110	240	80	3	22322 MBK	H2322	800	1060	1400	1900
110	120	180	46	2	23024 CK	H3024	360	570	2200	3000
	120	200	62	2	23124 MBK	H3124	495	770	1700	2200
	120	215	58	2,1	22224 CK	H 3124	560	800	1700	2200
	120	215	76	2,1	23224 CK	H 2324	730	1120	1300	1700
	120	260	86	3	22324 MBK	H 2324	900	1400	1300	1700
115	130	200	52	2	23026 CK	H 3026	455	720	1900	2600

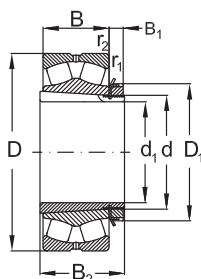
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for spherical roller bearings see on page 378

Recommendations for the dimensioning of supporting rings see on page 377

Shaft	Dimensions				Calculation factor			Mass	
	Φd_1	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing Adapter Sleeve
	mm					kN			[kg]
80	19	86	120	0,36	1,9	2,8	1,8	8,44	1,60
85	20	68	125	0,24	2,8	3,8	2,8	3,86	1,40
	20	68	125	0,22	3	4,5	3	7,43	1,40
	20	90	125	0,35	1,9	2,9	1,8	9,77	1,80
90	21	76	130	0,31	2,2	3,2	2,1	4,50	1,80
	21	71	130	0,24	2,8	4,2	2,8	4,69	1,60
	21	97	130	0,33	2	3	2	7,34	2,00
	21	97	130	0,33	2	3	2	12,60	2,00
100	21	77	145	0,23	2,9	4,3	2,8	3,54	2,05
	21	81	145	0,30	2,3	3,3	2,2	5,50	2,10
	21	77	145	0,25	2,7	4,2	2,5	6,70	2,05
	21	105	145	0,33	2	3	2	10,80	2,75
	21	105	145	0,37	1,8	2,7	1,8	17,50	2,75
110	22	72	145	0,22	3	4,5	3	3,86	1,80
	22	88	155	0,31	2,2	3,3	2,2	7,60	2,50
	22	88	155	0,29	2,3	4	2,3	8,44	2,50
	22	112	155	0,35	1,9	2,9	1,8	13,10	3,00
	22	112	155	0,36	1,8	2,7	1,8	21,90	3,00
115	23	80	155	0,23	2,9	4,4	2,9	5,61	2,80

Spherical Roller Bearings with Adapter Sleeve



Shaft Φd_1	Dimensions				Designation		Basical radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
115	130	210	64	2	23126 MBK	H3126	540	860	1500	2000
	130	230	64	3	22226 CK	H3126	660	960	1700	2200
	130	230	80	3	23226 CK	H2326	830	1270	1300	1700
	130	280	93	4	22326 MBK	H2326	1040	1340	1200	1600
125	140	210	53	2	23028 CK	H3028	480	780	1900	2600
	140	225	68	2,1	23128 MBK	H3128	600	990	1400	1800
	140	250	68	3	22228 CK	H3128	730	1080	1400	1900
	140	250	88	3	23228 CK	H2328	915	1370	1250	1400
	140	300	102	4	22328 MBK	H2328	1220	1600	1100	1400
135	150	225	56	2,1	23030 CK	H3030	530	865	1800	2400
	150	250	80	2,1	23130 MBK	H3130	800	1320	1300	1700
	150	270	73	3	22230 CK	H3130	880	1300	1400	1800
	150	270	96	3	23230 CK	H2330	1030	1610	1000	1300
	150	320	108	4	22330 MBK	H2330	1370	1830	1100	1500
140	160	240	60	2,1	23032 CK	H3032	600	1000	1600	2000
	160	270	86	2,1	23132 MBK	H3132	930	1510	1200	1600
	160	290	80	3	22232 CK	H3132	965	1370	1300	1700
	160	290	104	3	23232 CK	H2332	1180	1830	1200	1600
	160	340	114	4	22332 MBK	H2332	1430	1900	1000	1300

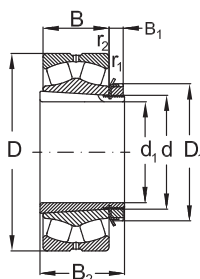
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for spherical roller bearings see on page 378

Recommendations for the dimensioning of supporting rings see on page 377

Shaft	Dimensions				Calculation factor			Mass	
	Φd_1	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing Adapter Sleeve
	mm				kN				[kg]
115	23	92	165	0,3	2,3	3,3	2,2	8,50	3,45
	23	92	165	0,29	2,3	3,5	2,3	10,50	3,45
	23	121	165	0,33	2	3	2	15,80	4,45
	23	121	165	0,37	1,8	2,7	1,8	27,10	4,45
125	24	82	165	0,22	3,1	4,6	3	6,04	3,05
	24	97	180	0,30	2,3	3,3	2,2	10,50	4,10
	24	97	180	0,26	2,6	3,5	2,5	13,40	4,10
	24	131	180	0,33	2	3	2	20,80	5,40
	24	131	180	0,38	1,7	2,6	1,7	34,10	5,40
135	26	87	180	0,22	3,1	4,6	3	7,33	3,75
	26	111	195	0,32	2,1	3,2	2,1	16,30	5,25
	26	111	195	0,26	2,6	3,9	2,5	16,90	5,25
	26	139	195	0,38	1,8	2,7	1,7	24,50	6,40
	26	139	195	0,38	1,7	2,6	1,7	40,90	6,40
140	28	93	190	0,22	3,1	4,6	3	8,90	5,10
	28	119	210	0,32	2,1	3,2	2,1	20,50	7,25
	28	119	210	0,26	2,6	3,9	2,5	21,70	7,25
	28	147	210	0,38	1,8	2,7	1,7	31,70	8,80
	28	147	210	0,37	1,8	2,7	1,8	51,10	8,80

Spherical Roller Bearings with Adapter Sleeve



Shaft	Dimensions				Designation		Basic radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease oil
	mm							kN		min^{-1} min^{-1}
150	170	260	67	2,1		23034 CK	H3034	735	1200	1500 1900
	170	280	88	2,1		23134 MBK	H3134	990	1650	1100 1500
	170	310	86	4		22234 CK	H3134	1170	1750	1200 1600
	170	310	110	4		23234 CK	H2334	1370	2120	900 1200
	170	360	120	4		22334 MBK	H2334	1600	2120	900 1200
160	180	280	74	2,1		23036 CK	H3036	865	1430	1400 1800
	180	300	96	3		23136 CK	H3136	1160	1940	1100 1400
	180	320	86	4		22236 CK	H3136	1210	1870	1100 1500
	180	320	112	4		23236 CK	H2336	1420	2330	1000 1400
	180	380	126	4		22336 MBK	H2336	1760	2360	850 1100
170	190	290	75	2,1		23038 CK	H3038	915	1530	1300 1700
	190	320	104	3		23138 MBK	H3138	1320	2290	1100 1400
	190	340	92	4		22238 CK	H3138	1200	1830	1100 1400
	190	340	120	4		23238 CK	H2338	1750	2880	850 1100
	190	400	132	5		22338 MBK	H2338	1860	2500	750 1000
180	200	310	82	2,1		23040 CK	H3040	1060	1760	1300 1700
	200	340	112	3		23140 MBK	H3140	1370	2460	1100 1400
	200	360	98	4		22240 CK	H3140	1250	2020	1100 1400
	200	360	128	4		23240 CK	H2340	1620	2590	750 1000
	200	420	138	5		22340 MBK	H2340	1910	2750	670 900

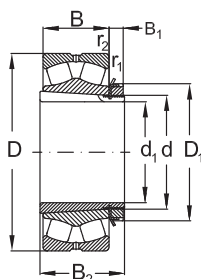
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for
spherical roller bearings see on page 378

Recommendations for the dimensioning of
supporting rings see on page 377

Shaft	Dimensions				Calculation factor			Mass	
	Φd_1	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing Adapter Sleeve
	mm					kN			[kg]
150	29	101	200	0,23	3	4,4	2,9	12,10	5,80
	29	122	220	0,31	2,2	3,2	2,1	22	8,10
	29	122	220	0,27	2,5	3,9	2,5	26,20	8,10
	29	154	220	0,35	1,9	2,9	1,8	35,70	9,90
	29	154	220	0,37	1,8	2,7	1,8	59,70	9,90
160	30	109	210	0,23	2,9	4,3	2,8	15,80	6,70
	30	131	230	0,32	2,1	3,1	2,1	28,40	9,15
	30	131	230	0,26	2,6	3,7	2,5	27,50	9,15
	30	161	230	0,36	1,9	2,8	1,8	40,80	11,0
	30	161	230	0,37	1,8	2,7	1,8	69,40	11,0
170	31	112	220	0,23	3	4,4	2,9	16,08	7,25
	31	141	240	0,33	2	3	2	35,60	10,5
	31	141	240	0,26	2,6	3,9	2,5	37,20	10,5
	31	169	240	0,35	1,9	2,9	1,8	52,40	12,0
	31	169	240	0,37	1,8	2,7	1,8	81,20	12,0
180	32	120	240	0,23	2,9	4,3	2,8	21,50	8,90
	32	150	250	0,35	1,9	2,9	1,9	43,50	12,0
	32	150	250	0,29	2,3	3,9	2,3	44,40	12,0
	32	176	250	0,35	1,9	2,9	1,8	58,40	13,5
	32	176	250	0,36	1,8	2,8	1,8	91,80	13,5

Spherical Roller Bearings with Adapter Sleeve



Shaft Φd_1	Dimensions				Designation		Basic radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
200	220	340	90	3	23044 MBK	OH3044 H	1100	2000	900	1200
	220	370	120	4	23144 MBK	OH3144 H	1515	2509	1000	1300
	220	400	108	4	22244 CK	OH3144 H	1545	2300	900	1200
	220	400	144	4	23244 CK	OH2344 H	2065	3380	670	900
	220	460	145	5	22344 CK	OH2344 H	2380	3407	700	950
220	240	360	92	3	23048 MBK	OH3048 H	1160	2200	800	1000
	240	400	128	4	23148 MBK	OH3148 H	1705	2863	900	1200
	240	440	120	4	22248 CK	OH3148 H	1845	2763	850	1100
	240	440	160	4	23248 CK	OH2348 H	2530	4600	630	850
	240	500	155	5	22348 MBK	OH2348 H	2650	4000	560	750
240	260	400	104	4	23052 MBK	OH3052 H	1500	2800	750	950
	260	440	144	4	23152 MBK	OH3152	2153	3673	700	850
	260	480	130	5	22252 MBK	OH3152 H	2190	3300	750	1000
	260	540	165	6	22352 CK	OH2352 H	3125	4560	600	800
260	280	420	106	4	23056 MBK	OH3056 H	1560	3000	700	900
	280	460	146	5	23156 MBK	OH3156 H	2295	4050	750	1000
	280	500	130	5	22256 MBK	OH3156 H	2330	3600	700	950
	280	500	176	5	23256 MBK	OH2356 H	2806	4645	480	630
	280	580	175	6	22356 CK	OH2356 H	3530	5208	560	750

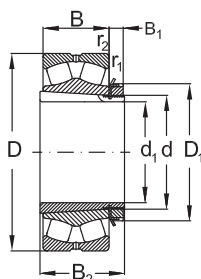
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for spherical roller bearings see on page 378

Recommendations for the dimensioning of supporting rings see on page 377

Shaft	Dimensions				Calculation factor			Mass	
	Φd_1	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing Adapter Sleeve
	mm					kN			[kg]
200	30	126	260	0,26	2,6	3,8	2,5	31	9,90
	35	161	280	0,3	2,3	3,4	2,2	52	15,0
	35	161	280	0,29	2,3	3,4	2,3	61,40	15,0
	35	186	280	0,35	1,9	2,9	1,8	79,50	17,0
	35	186	280	0,36	1,8	2,8	1,8	120	17,0
220	34	133	290	0,25	2,7	4,1	2,7	33,90	12,0
	37	172	300	0,3	2,3	3,4	2,2	66	16,0
	37	172	300	0,29	2,3	3,4	2,3	83,20	16,0
	37	199	300	0,35	1,9	2,9	1,8	109	19,0
	37	199	300	0,31	2,2	3,3	2,2	151	19,0
240	34	145	310	0,26	2,6	3,9	2,6	49	13,5
	38	190	330	0,31	2,2	3,3	2,2	92,50	21,0
	38	190	330	0,29	2,3	3,4	2,3	107	21,0
	38	211	330	0,36	1,8	2,8	1,8	187	21,0
260	38	152	330	0,25	2,7	4,1	2,7	52,50	16,0
	39	195	350	0,3	2,3	3,4	2,2	98,50	23,0
	39	195	350	0,29	2,3	3,4	2,3	113	23,0
	39	224	350	0,35	1,9	2,9	1,8	153	27,0
	39	224	350	0,36	1,8	2,8	1,8	235	27,0

Spherical Roller Bearings with Adapter Sleeve



Shaft	Dimensions				Designation		Basic radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	Adapter Sleeve	dyn. C_r	stat. C_{0r}	grease oil
	mm							kN		min^{-1} min^{-1}
280	300	460	118	4		23060 MBK	OH3060 H	1960	3650	630 800
	300	500	160	5		23160 MBK	OH3160 H	2635	4485	700 950
	300	540	140	5		22260 CAK	OH3160 H	2670	4176	670 900
300	320	480	121	4		23064 MBK	OH3064 H	2040	4000	600 750
	320	540	176	5		23164 MBK	OH3164 H	3115	6000	530 670
	320	580	150	5		22264 CAK	OH3164 H	3150	5100	630 580
	320	580	208	5		23264 MBK	OH3264 H	4130	7026	430 560
320	340	520	133	5		23068 MBK	OH3068 H	2360	4500	560 700
	340	580	190	5		23168 MBK	OH3168 H	3605	6409	630 850
340	360	540	134	5		23072 MBK	OH3072 H	2450	4800	530 670
	360	600	192	5		23172 MBK	OH3172 H	3740	7010	600 800
	360	650	232	6		23272 MBK	OH3272 H	4880	8490	430 560
360	380	560	135	5		23076 MBK	OH3076 H	2550	5300	500 630
	380	620	194	5		23176 MBK	OH3176 H	3740	7540	560 750
	380	680	240	6		23276 MBK	OH3276 H	5050	9660	400 530
380	400	600	148	5		23080 MBK	OH3080 H	3050	6200	450 560
	400	650	200	6		23180 MBK	OH3180 H	4100	7730	530 700
	400	720	256	6		23280 MBK	OH3280 H	5950	10807	380 500
400	420	620	150	5		23084 MBK	OH3084 H	3150	6550	450 560

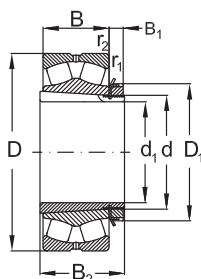
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for spherical roller bearings see on page 378

Recommendations for the dimensioning of supporting rings see on page 377

Shaft Φd_1	Dimensions				Calculation factor			Mass	
	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Adapter Sleeve
mm					kN				[kg]
280	42	168	360	0,25	2,7	4	2,6	73,60	20,5
	40	208	380	0,3	2,3	3,4	2,2	129	29,0
	40	208	380	0,29	2,3	3,4	2,3	142	29,0
300	42	171	380	0,25	2,7	4,1	2,7	79,50	22,0
	42	226	400	0,34	2	3	1,9	172	32,0
	42	226	400	0,29	2,5	3,7	2,5	180	32,0
	42	258	400	0,35	1,9	2,9	1,8	247	35,0
320	45	187	400	0,25	2,7	4	2,6	105	27,0
	55	254	440	0,31	2,2	3,2	2,2	212	50,0
340	45	188	420	0,25	2,7	4,1	2,7	111	29,0
	58	259	460	0,33	2,3	3,4	2,2	220	56,0
	58	299	460	0,35	1,9	2,9	1,8	344	60,5
360	48	193	450	0,25	2,8	4,2	2,8	117	35,5
	60	264	490	0,3	2,3	3,4	2,2	240	61,5
	60	310	490	0,35	1,9	2,9	1,8	375	69,5
380	52	210	470	0,24	2,8	4,1	2,7	152	40,0
	62	272	520	0,28	2,4	3,6	2,5	265	73,0
	62	328	520	0,35	1,9	2,9	1,8	450	87,0
400	52	212	490	0,24	2,8	4,2	2,8	160	47,0

Spherical Roller Bearings with Adapter Sleeve



Shaft Φd ₁	Dimensions				Designation		Basical radial load		Speed limit	
	d	D	B	r ₁ , r ₂ min.	Bearing	Adapter Sleeve	dyn. C _r	stat. C _{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
400	420	700	224	6	23184 CK	OH3184 H	4600	9000	500	670
	420	760	272	7,5	23284 MBK	OH3284 H	6575	11717	360	480
410	440	650	157	6	23088 MBK	OH3088 H	3400	7100	430	530
	440	720	226	6	23188 CK	OH3188 H	5250	10000	500	670
	440	790	280	7,5	23288 MBK	OH3288 H	7100	13400	360	480
430	460	680	163	6	23092 MBK	OH3092 H	3650	7650	400	500
	460	760	240	7,5	23192 CK	OH3192 H	5760	11025	480	630
	460	830	296	7,5	23292 MBK	OH3292 H	7560	13970	340	450
450	480	700	165	6	23096 MBK	OH3096 H	3800	8150	380	480
	480	790	248	7,5	23196 CK	OH3196 H	5800	11800	450	600
	480	870	310	7,5	23296 MBK	OH3296 H	8800	17000	340	430
470	500	670	128	5	239/500 MBK	H39/500	2500	6090	480	630
	500	720	167	6	230/500 MBK	OH30/500 H	3900	8500	380	480
	500	830	264	7,5	231/500 MBK	OH31/500 H	6550	13200	430	560
	500	920	336	7,5	232/500 MBK	OH32/500 H	9650	18300	320	400
500	530	710	136	5	239/530 MBK	H39/530	2980	6755	450	600
	530	780	185	6	230/530 MBK	OH30/530 H	4400	9500	340	430
530	560	750	140	5	239/560 MBK	OH39/560 H	3100	7650	340	430
	560	820	195	6	230/560 MBK	OH30/560 H	5100	11000	320	400

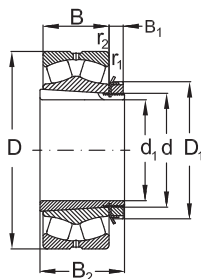
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for spherical roller bearings see on page 378

Recommendations for the dimensioning of supporting rings see on page 377

Shaft Φd_1	Dimensions				Calculation factor			Mass	
	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Adapter Sleeve
mm					kN				[kg]
400	70	304	540	0,33	2	3	2	363	80,0
	70	352	540	0,35	1,9	2,9	1,8	540	96,0
410	60	228	520	0,24	2,8	4,2	2,8	184	65,0
	70	307	560	0,3	2,3	3,4	2,2	380	95,0
	70	361	560	0,35	1,9	2,9	1,8	595	117
430	60	234	540	0,24	2,8	4,2	2,8	210	71,0
	75	326	580	0,3	2,3	3,4	2,2	441	119
	75	382	580	0,35	1,9	2,9	1,9	715	134
450	60	237	560	0,23	2,9	4,3	2,8	220	75,0
	75	335	620	0,3	2,3	3,4	2,2	485	135
	75	397	620	0,37	1,8	2,7	1,8	835	153
470	68	208	580	0,17	3,9	5,8	3,8	130	74,3
	68	247	580	0,22	3	4,5	2,9	229	82,0
	80	356	630	0,3	2,3	3,4	2,2	580	145
	80	428	630	0,38	1,8	2,7	1,7	1010	170
500	68	216	630	0,18	3,8	5,7	3,8	150	87,9
	68	265	630	0,22	3	4,5	3	310	105
530	75	227	650	0,17	4	5,9	3,9	183	95
	75	282	650	0,23	2,9	4,4	2,9	358	112

Spherical Roller Bearings with Adapter Sleeve



Shaft	Dimensions					Designation Adapter Sleeve	Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing	dyn. C_r	stat. C_{0r}	grease	oil
	mm						kN		min ⁻¹	min ⁻¹
560	600	800	150	5		239/600 MBK OH39/600 H	3450	8650	320	400
	600	870	200	6		230/600 MBK OH30/600 H	5700	12500	300	380
600	630	850	165	6		239/630 MBK OH39/630 H	4290	9910	380	500
	630	920	212	7,5		230/630 MBK OH30/630 H	6300	14000	260	340
630	670	900	170	6		239/670 MBK OH39/670 H	4300	10600	280	360
	670	980	230	7,5		230/670 MBK OH30/670 H	7200	16000	260	340
670	710	950	180	6		239/710 MBK OH39/710 H	4800	12000	260	340
710	750	1000	185	6		239/750 MBK OH39/750 H	5200	12900	260	340

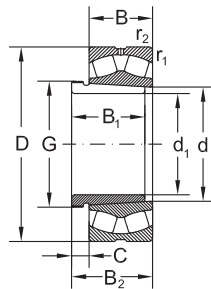
Spherical Roller Bearings with Adapter Sleeve

Abutment and fillet dimensions for spherical roller bearings see on page 378

Recommendations for the dimensioning of supporting rings see on page 377

Shaft	Dimensions				Calculation factor			Mass	
	Φd_1	B_1	B_2	D_1	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing Adapter Sleeve
mm					kN				[kg]
560	75	239	700	0,17	4	5,9	3,9	221	127
	75	289	700	0,22	3,1	4,6	3	406	147
600	75	254	730	0,18	3,8	5,7	3,7	280	124
	75	301	730	0,22	3	4,5	2,9	520	138
630	80	264	780	0,17	4	5,9	3,9	326	162
	80	324	780	0,22	3	4,5	2,9	602	190
670	90	286	830	0,18	3,8	5,7	3,8	386	183
	90	342	830	0,22	3,1	4,6	3	638	228
710	90	291	870	0,17	4	5,9	3,9	437	211
750	90	303	920	0,17	4,1	6	4	506	259
	90	366	920	0,22	3,1	4,6	3	906	302

Spherical Roller Bearings with Withdrawal Sleeve



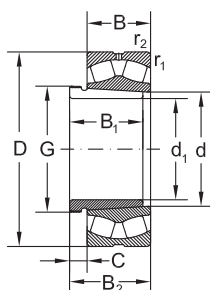
Shaft	Dimensions				Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
35	40	80	23	1,1		22208 CK AH308	88	98	6000	7500
	40	90	23	1,5		21308 CK AH308	91,5	100	4500	5600
	40	90	23	1,5		22308 CK AH2308	129	143	4300	5300
40	45	85	23	1,1		22209 CK AH309	93	105	5600	7000
	45	100	25	1,5		21309 CK AH309	108	120	4000	5300
	45	100	36	1,5		22309 CK AH2309	156	176	3800	4800
45	50	90	23	1,1		22210 CK AHX310	98	114	4000	5300
	50	110	27	2		21310 CK AHX310	120	130	3600	4800
	50	110	40	2		22310 CK AHX2310	190	216	3400	4300
50	55	100	25	1,5		22211 CK AHX311	120	140	3800	5000
	55	120	29	2		21311 CK AHX311	135	155	3200	4300
	55	120	43	2		22311 CK AHX2311	224	255	3000	4000
55	60	110	28	1,5		22212 CK AHX312	145	175	3400	4500
	60	130	31	2,1		21312 CK AHX312	150	180	3000	4000
	60	130	46	2,1		22312 CK AHX2312	260	300	2800	3600
60	65	120	31	1,5		22213 CK AH313	170	204	3000	4000
	65	140	33	2,1		21313 CK AH313	196	228	2800	3800
	65	140	48	2,1		22313 CK AH2313	290	355	2600	3400

Spherical Roller Bearings with Withdrawal Sleeve

Abutment and fillet dimensions for
spherical roller bearings see on page 378

Shaft Φd_1	Dimensions					Calculation factor			Mass	
	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Withdrawal Sleeve
mm										[kg]
35	29	32	6	M 45x1,5	0,28	2,4	3,6	2,3	0,58	0,09
	29	32	6	M 45x1,5	0,26	2,6	3,9	2,6	0,80	0,09
	40	43	7	M 45x1,5	0,36	1,9	2,8	1,8	1,10	0,13
40	31	34	6	M 50x1,5	0,26	2,6	3,9	2,6	0,65	0,12
	31	34	6	M 50x1,5	0,26	2,6	3,9	2,6	1,06	0,12
	44	47	7	M 50x1,5	0,36	1,9	2,8	1,9	1,4	0,13
45	35	38	7	M 55x2	0,24	2,8	4,2	2,8	0,72	0,13
	35	38	7	M 55x2	0,24	2,8	4,1	2,7	1,35	0,13
	50	53	9	M 55x2	0,36	1,9	2,8	1,8	1,96	0,19
50	37	40	7	M 60x2	0,23	2,9	4,4	2,9	0,96	0,16
	37	40	7	M 60x2	0,24	2,8	4,1	2,7	1,71	0,16
	54	57	10	M 60x2	0,36	1,9	2,8	1,8	2,47	0,26
55	40	43	8	M 65x2	0,24	2,8	4,2	2,8	1,25	0,19
	40	43	8	M 65x2	0,24	2,9	4,3	2,8	2,12	0,19
	58	61	11	M 65x2	0,35	1,9	2,8	1,9	3,09	0,30
60	42	45	8	M 75x2	0,24	2,8	4,2	2,8	1,6	0,25
	42	45	8	M 75x2	0,24	2,8	4,2	2,8	2,67	0,25
	61	64	12	M 75x2	0,34	2	3	2	3,8	0,25

Spherical Roller Bearings with Withdrawal Sleeve



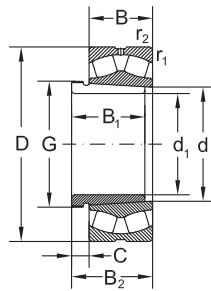
Shaft	Dimensions				Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
	mm						kN		min ⁻¹	min ⁻¹
65	70	125	31	1,5		22214 CK AH314	179	225	3600	4500
	70	150	35	2,1		21314 CK AH314	207	360	2600	3400
	70	150	51	2,1		22314 CK AHX2314	325	375	2200	3000
70	75	130	31	1,5		22215 CK AH315	183	236	2800	3800
	75	160	37	2,1		21315 CK AH315	250	305	2400	3200
	75	160	55	2,1		22315 CK AHX2315	375	440	2200	3000
75	80	140	33	2		22216 CK AH316	208	260	2600	3400
	80	170	39	2,1		21316 CK AH316	275	340	2200	3000
	80	170	58	2,1		22316 CK AHX2316	410	500	1800	2400
80	85	150	36	2		22217 CK AHX317	250	325	2400	3200
	85	180	41	3		21317 CK AHX317	305	375	2200	2800
	85	180	60	3		22317 CK AHX2317	455	540	1800	2400
85	90	160	40	2		22218 CK AHX318	285	360	2200	3000
	90	160	52,4	2		23218 CK AHX2318	340	485	2200	3000
	90	190	43	3		21318 CK AHX318	335	415	2200	2800
	90	190	64	3		22318 CK AH2318	510	620	1800	2400
90	95	170	43	2,1		22219 CK AHX319	315	400	2200	2800
	95	200	45	3		21319 CK AHX319	360	450	2000	2600

Spherical Roller Bearings with Withdrawal Sleeve

Abutment and fillet dimensions for
spherical roller bearings see on page 378

Shaft	Dimensions					Calculation factor			Mass	
	Φd_1	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Withdrawal Bearing Sleeve
	mm									[kg]
65	43	47	8	M 80x2	0,23	2,9	4,4	2,9	1,8	0,28
	43	47	8	M 80x2	0,23	2,9	4,4	2,9	3,23	0,28
	64	68	12	M 80x2	0,34	2	3	2	4,53	0,46
70	45	49	8	M 85x2	0,22	3,1	4,6	3	1,92	0,31
	45	49	8	M 85x2	0,23	2,9	4,4	2,9	3,86	0,31
	68	72	12	M 85x2	0,34	2	3	1,9	5,52	0,53
75	48	52	8	M 90x2	0,22	3,1	4,7	3,1	2,34	0,37
	48	52	8	M 90x2	0,23	2,9	4,4	2,9	4,6	0,37
	71	75	12	M 90x2	0,34	2	3	1,9	6,53	0,60
80	52	56	9	M 95x2	0,22	3	4,5	3	2,9	0,43
	52	56	9	M 95x2	0,22	3	4,5	2,9	5,33	0,43
	74	78	13	M 95x2	0,33	2	3	2	7,48	0,65
85	53	57	9	M 100x2	0,23	2,9	4,3	2,8	3,64	0,46
	63	67	10	M 100x2	0,31	2,2	3,3	2,2	4,85	0,57
	53	57	9	M 100x2	0,22	3	4,5	2,9	6,2	0,46
	79	83	14	M 100x2	0,33	2	3	2	8,83	0,76
90	57	61	10	M 105x2	0,24	2,9	4,3	2,8	4,39	0,54
	57	61	10	M 105x2	0,22	3	4,5	3	7,16	0,54

Spherical Roller Bearings with Withdrawal Sleeve



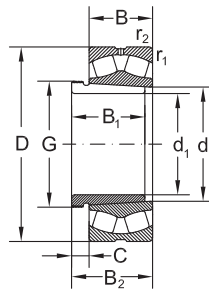
Shaft Φd_1	Dimensions				Designation		Basical radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min^{-1}	min^{-1}
90	95	200	67	3	22319 CK	AHX2319	580	700	1700	2200
95	100	165	52	2	23120 MBK	AHX3120	355	540	2000	3000
	100	180	46	2,1	22220 CK	AHX320	360	465	2200	2800
	100	180	60,3	2,1	23220 CK	AHX2320	465	655	1700	2200
	100	215	73	3	22320 CK	AHX2320	655	815	1500	2000
105	110	180	56	2	23122 MBK	AHX3122	410	640	1800	2400
	110	180	69	2	24122 CK30	AH24122	520	880	1200	1600
	110	200	53	2,1	22222 CK	AHX3122	455	585	2000	2800
	110	200	69,8	2,1	23222 CK	AHX3222	620	850	1400	1800
	110	240	80	3	22322 MBK	AHX2322	800	1060	1400	1900
115	120	180	46	2	23024 CK	AHX3024	360	570	2200	3000
	120	180	60	2	24024 CK30	AH24024	455	800	1500	2000
	120	200	62	2	23124 MBK	AHX3124	495	770	1700	2200
	120	200	80	2	24124 CK30	AH24124	630	1050	1000	1300
	120	215	58	2,1	22224 CK	AHX3124	540	720	1700	2200
	120	215	76	2,1	23224 CK	AHX3224	680	1000	1300	1700
	120	260	86	3	22324 MBK	AHX2324	900	1400	1300	1700
125	130	200	52	2	23026 CK	AHX3026	455	720	1900	2600
	130	200	69	2	24026 CK30	AH24026	530	900	1200	1600

Spherical Roller Bearings with Withdrawal Sleeve

Abutment and fillet dimensions for
spherical roller bearings see on page 378

Shaft Φd_1	Dimensions					Calculation factor			Mass	
	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Withdrawal Sleeve
mm										[kg]
90	85	89	16	M 105x2	0,33	2	3	2	10,2	0,90
95	64	68	11	M 110x2	0,28	2,4	3,5	2,3	4,87	0,66
	59	63	10	M 110x2	0,24	2,8	4,2	2,8	5,27	0,58
	73	77	11	M 110x2	0,31	2,2	3,3	2,1	7,06	0,76
	90	94	16	M 110x2	0,34	2	3	2	13	1,00
105	68	72	11	M 120x2	0,28	2,4	3,6	2,3	6,07	0,76
	82	91	13	M 115x2	0,35	1,9	2,9	1,9	7,65	0,73
	68	72	11	M 120x2	0,25	2,7	4	2,7	7,46	0,76
	82	86	11	M 120x2	0,33	2,1	3,1	2	10,1	0,88
	98	102	16	M 125x2	0,33	2,1	3,1	2	18,4	1,35
115	60	64	13	M 130x2	0,22	3	4,5	3	4,61	0,75
	73	82	13	M 125x2	0,29	2,3	3,4	2,3	5,85	0,65
	75	79	12	M 130x2	0,28	2,4	3,6	2,3	8,33	0,94
	93	102	13	M 130x2	0,37	1,8	2,7	1,8	11	1,00
	75	79	12	M 125x2	0,25	2,7	4	2,7	9,39	0,94
	90	94	13	M 135x2	0,33	2	3	2	12,5	1,11
	105	109	17	M 135x2	0,33	2,1	3,1	2	22,6	1,65
125	67	71	14	M 140x2	0,23	2,9	4,4	2,9	6,54	0,93
	83	93	14	M 135x2	0,31	2,2	3,3	2,2	8,56	0,84

Spherical Roller Bearings with Withdrawal Sleeve



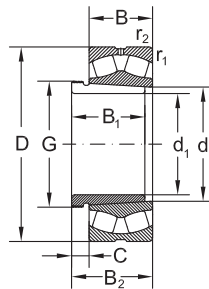
Shaft Φd_1	Dimensions				Designation		Basical radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min^{-1}	min^{-1}
125	130	210	64	2	23126 MBK	AHX3126	540	860	1500	2000
	130	210	80	2	24126 CK30	AH24126	650	1100	900	1200
	130	230	64	3	22226 CK	AHX3126	630	880	1700	2200
	130	230	80	3	23226 CK	AHX3226	765	1140	1300	1700
	130	280	93	4	22326 MBK	AHX2326	1040	1340	1200	1600
135	140	210	53	2	23028 CK	AHX3028	480	780	1900	2600
	140	210	69	2	24028 CK30	AH24028	550	990	1100	1500
	140	225	68	2,1	23128 MBK	AHX3128	600	990	1400	1800
	140	225	85	2,1	24128 CK30	AH24128	740	1380	1100	1500
	140	250	68	3	22228 CK	AHX3128	730	1080	1400	1900
	140	250	88	3	23228 CK	AHX3228	915	1370	1100	1400
	140	300	102	4	22328 MBK	AHX2328	1220	1600	1100	1400
145	150	225	56	2,1	23030 CK	AHX3030	530	865	1800	2400
	150	225	75	2,1	24030 CK30	AH24030	620	1140	1300	1700
	150	250	80	2,1	23130 MBK	AHX3130	800	1320	1300	1700
	150	250	100	2,1	24130 CK30	AH24130	915	1560	1100	1500
	150	270	73	3	22230 CK	AHX3130	850	1200	1400	1800
	150	270	96	3	23230 CK	AHX3230	1030	1610	1000	1300
	150	320	108	4	22330 MBK	AHX2330	1370	1830	1100	1500

Spherical Roller Bearings with Withdrawal Sleeve

Abutment and fillet dimensions for
spherical roller bearings see on page 378

Shaft Φd_1	Dimensions					Calculation factor			Mass	
	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Withdrawal Sleeve
mm										[kg]
125	78	82	12	M 140X2	0,28	2,4	3,6	2,4	9,19	1,10
	94	104	14	M 140X2	0,34	2	2,9	1,9	11,7	1,11
	78	82	12	M 140X2	0,26	2,6	3,9	2,6	11,6	1,10
	98	102	15	M 145X2	0,33	2,1	3,1	2	15	1,55
	115	119	19	M 145X2	0,33	2,1	3,1	2	28	2,00
135	68	73	14	M 150X2	0,22	3,1	4,6	3	7,05	1,00
	83	93	14	M 145X2	0,29	2,3	3,5	2,3	9,06	0,95
	83	88	14	M 150X2	0,27	2,5	3,7	2,4	11,1	1,30
	99	109	14	M 150X2	0,34	2	2,9	1,9	14,1	1,30
	83	88	14	M 150X2	0,25	2,7	4	2,6	14,7	1,30
	104	109	15	M 155X3	0,33	2	3	2	19,5	1,85
	125	130	20	M 155X2	0,34	2	3	2	35,1	2,35
145	72	77	15	M 160X3	0,22	3,1	4,6	3	8,48	1,15
	90	101	15	M 155X3	0,29	2,3	3,5	2,3	11,2	1,05
	96	101	15	M 165X3	0,29	2,3	3,5	2,3	16,8	1,80
	115	126	15	M 160X3	0,4	1,7	2,5	1,6	21,5	1,55
	96	101	15	M 165X3	0,25	2,7	3,4	2,6	18,7	1,80
	114	119	17	M 165X3	0,33	2	3	2	25	2,20
	135	140	24	M 165X3	0,33	2	3	2	42,1	2,80

Spherical Roller Bearings with Withdrawal Sleeve



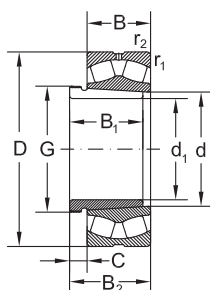
Shaft	Dimensions				Designation		Basical radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
	mm						kN		min ⁻¹	min ⁻¹
150	160	240	60	2,1		23032 CK AH3032	600	1000	1600	2000
	160	240	80	2,1		24032 CK30 AH24032	720	1320	1000	1300
	160	270	86	2,1		23132 MBK AH3132	930	1510	1200	1600
	160	270	109	2,1		24132 CK30 AH24132	1060	1800	1000	1400
	160	290	80	3		22232 CK AH3132	965	1370	1300	1700
	160	290	104	3		23232 CK AH3232	1180	1830	1200	1600
	160	340	114	4		22332 MBK AH2332	1430	1900	1000	1300
160	170	260	67	2,1		23034 CK AH3034	735	1200	1500	1900
	170	260	90	2,1		24034 MBK30 AH24034	850	1560	1000	1300
	170	280	88	2,1		23134 MBK AH3134	990	1650	1100	1500
	170	280	109	2,1		24134 CK30 AH24134	1060	1830	750	1000
	170	310	86	4		22234 CK AH334	1100	1530	1200	1600
	170	310	110	4		23234 CK AH2334	1370	2120	1100	1500
	170	360	120	4		22334 MBK AH2334	1600	2120	900	1200
170	180	280	74	2,1		23036 CK AH3036	865	1430	1400	1800
	180	280	100	2,1		24036 MBK30 AH24036	1000	1830	900	1200
	180	300	96	3		23136 CK AH3136	1160	1930	1100	1400
	180	300	118	3		24136 CK30 AH24136	1250	2200	700	950
	180	320	86	4		22236 CK AH2236	1010	1560	1100	1500

Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for
spherical roller bearings see on page 378*

Shaft Φd_1	Dimensions					Calculation factor			Mass	
	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Withdrawal Sleeve
mm									[kg]	
150	77	82	16	M 170X3	0,22	3,1	4,6	3	11	2,05
	95	106	15	M 170X3	0,29	2,3	3,4	2,3	14,6	2,30
	103	108	16	M 180X3	0,29	2,3	3,5	2,3	22	2,87
	124	135	15	M 170X3	0,41	1,7	2,5	1,6	28,4	3,05
	103	108	16	M 180X3	0,26	2,6	3,9	2,6	24,6	2,87
	124	130	20	M 180X3	0,34	2	3	2	33,9	4,00
	140	146	24	M 180X3	0,37	1,8	2,7	1,8	55,8	4,72
160	85	90	17	M 180X3	0,23	3	4,4	2,9	14,5	2,40
	106	117	16	M 180X3	0,34	2	3	2	20,6	2,70
	104	109	16	M 190X3	0,28	2,4	3,5	2,3	23,6	3,04
	125	136	16	M 180X3	0,39	1,7	2,6	1,7	29,6	3,25
	104	109	16	M 190X3	0,26	2,6	3,9	2,5	29,2	3,04
	134	140	24	M 190X3	0,33	2	3	2	39,7	4,80
	146	152	24	M 190X3	0,37	1,8	2,7	1,8	65	5,25
170	92	98	17	M 190X3	0,23	2,9	4,3	2,8	18,6	2,80
	116	127	16	M 190X3	0,36	1,9	2,8	1,9	26,5	3,20
	116	122	19	M 200X3	0,29	2,3	3,5	2,3	29,7	3,76
	134	145	16	M 190X3	0,4	1,7	2,5	1,6	37,5	3,68
	105	110	17	M 200X3	0,26	2,6	3,9	2,5	37,5	5,25

Spherical Roller Bearings with Withdrawal Sleeve



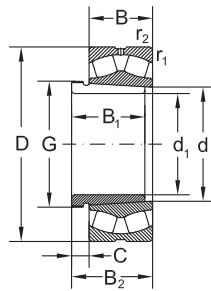
Shaft Φd_1	Dimensions				Designation		Basic radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
170	180	320	112	4	23236 CK	AH3236	1420	2320	1100	1500
	180	380	126	4	22336 MBK	AH2336	1760	2360	850	1100
180	190	290	75	2,1	23038 CK	AH3038	915	1530	1300	1700
	190	290	100	2,1	24038 MBK30	AH24038	1040	1960	850	1100
	190	320	104	3	23138 MBK	AH3138	1320	2200	1100	1400
	190	320	128	3	24138 CK30	AH24138	1400	2500	670	900
	190	340	92	4	22238 CK	AH2238	1200	1830	1100	1400
	190	340	120	4	23238 CK	AH3238	1750	2880	850	1100
	190	400	132	5	22338 MBK	AH2338	1860	2500	750	1000
190	200	310	82	2,1	23040 CK	AH3040	1060	1760	1300	1700
	200	310	109	2,1	24040 K30	AH24040	1140	2280	850	1100
	200	340	112	3	23140 MBK	AH3140	1320	2280	900	1400
	200	340	140	3	24140 CK30	AH24140	1700	3000	800	1000
	200	360	98	4	22240 CK	AH2240	1250	1930	1100	1400
	200	360	128	4	23240 CK	AH3240	1620	2590	750	1000
	200	420	138	5	22340 MBK	AH2340	1910	2750	670	900
200	220	340	90	3	23044 MBK	AH3044	1100	2000	900	1200
	220	340	118	3	24044 K30	AH24044	1370	2600	750	950
	220	370	150	4	24144 K30	AH24144	1800	3300	700	900

Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for
spherical roller bearings see on page 378*

Shaft Φd_1	Dimensions					Calculation factor			Mass	
	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Withdrawal Sleeve
mm										[kg]
170	140	146	25	M 200x3	0,33	2,1	3,1	2	42,6	5,32
	154	160	26	M 200x3	0,37	1,8	2,7	1,8	75,2	5,83
180	96	102	18	Tr 205x4	0,23	3	4,4	2,9	20,1	3,32
	118	131	18	M 200x3	0,34	2	3	2	28	3,55
	125	131	20	Tr 210x4	0,3	2,3	3,4	2,2	37,5	4,90
	146	159	18	M 200x3	0,41	1,7	2,5	1,6	46,2	4,28
	112	117	18	Tr 210x4	0,26	2,6	3,9	2,5	35,5	4,25
	145	152	25	Tr 210x4	0,36	1,9	2,8	1,8	53,9	5,90
	160	167	26	Tr 210x4	0,37	1,8	2,7	1,8	87,8	6,63
190	102	108	19	Tr 215x4	0,23	2,9	4,3	2,8	25,3	3,85
	127	140	18	Tr 210x4	0,35	1,9	2,9	1,9	35,2	4,00
	134	140	21	Tr 220x4	0,35	2	2,9	1,9	48,2	5,49
	158	171	18	Tr 210x4	0,42	1,6	2,4	1,6	57,6	5,05
	118	223	19	Tr 220x4	0,26	2,6	3,9	2,5	42,5	4,70
	153	160	24	Tr 220x4	0,37	1,8	2,7	1,8	64,3	6,60
	170	177	30	Tr 220x4	0,36	1,9	2,8	1,8	99,3	7,60
200	111	117	20	Tr 235x4	0,26	2,6	3,8	2,5	38,4	7,40
	138	152	20	Tr 230x4	0,34	2	2,9	1,9	49	8,20
	170	164	20	Tr 230x4	0,41	1,6	2,4	1,6	75,5	10,00

Spherical Roller Bearings with Withdrawal Sleeve



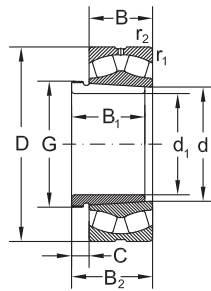
Shaft	Dimensions				Designation		Basic radial load		Speed limit	
	Φd_1	d	D	B	r_1, r_2 min.	Bearing Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
	mm						kN		min ⁻¹	min ⁻¹
200	220	370	120	4		23144 MBK AH3144	1515	2509	800	1000
	220	400	108	4		22244 CK AH3144	1520	2300	900	1200
	220	400	144	4		23244 CK AH2344	2040	3380	670	900
	220	460	145	5		22344 CK AH2344	2320	3350	700	900
220	240	360	92	3		23048 MBK AH3048	1160	2200	800	1000
	240	360	118	3		24048 K30 AH24048	1460	2841	700	900
	240	400	160	4		24148 K30 AH24148	1780	3109	530	700
	240	400	128	4		23148 MBK AH3148	1705	2863	750	950
	240	440	120	4		22248 CK AH3148	1845	2763	850	1100
	240	440	160	4		23248 CK AH2348	2450	4250	630	850
	240	500	155	5		22348 MBK AH2348	2650	3900	560	750
240	260	400	104	4		23052 MBK AH3052	1500	2800	750	950
	260	400	140	4		24052 K30 AH24052	1775	3494	600	800
	260	440	180	4		24152 K30 AH24152	2500	5000	480	630
	260	440	144	4		23152 MBK AH3152	2153	3673	670	850
	260	480	130	5		22252 MBK AH2252	2190	3300	750	1000
	260	540	165	6		22352 CK AH2352	3000	4400	600	750
260	280	420	106	4		23056 MBK AH3056	1560	3000	700	900
	280	420	140	4		24056 K30 AH24056	2000	4000	560	750

Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for
spherical roller bearings see on page 378*

Shaft	Dimensions					Calculation factor			Mass	
	Φd_1	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Withdrawal Bearing Sleeve
mm										[kg]
200	145	151	23	Tr 240x4	0,33	2	3	2	64,8	10,4
	145	151	23	Tr 240x4	0,27	2,5	3,7	2,5	59	9,30
	181	189	30	Tr 240x4	0,37	1,8	2,7	1,8	95	13,5
	181	189	30	Tr 240x4	0,35	2	2,9	1,9	133	13,5
220	116	123	21	Tr 260x4	0,25	2,7	4,1	2,7	42,7	8,75
	138	153	20	Tr 250x4	0,32	2,1	3,1	2,1	52,6	9
	180	195	20	Tr 260x4	0,41	1,7	2,5	1,6	93,1	12,5
	154	161	25	Tr 260x4	0,33	2,1	3,1	2	78,4	12,00
	154	161	25	Tr 260x4	0,27	2,5	3,7	2,5	82,5	12,00
	189	197	30	Tr 260x4	0,37	1,8	2,7	1,8	125	15,5
	189	197	30	Tr 260x4	0,35	2	2,9	1,9	169	15,5
240	128	135	23	Tr 280x4	0,26	2,6	3,9	2,6	59,7	10,7
	162	178	22	Tr 270x4	0,35	1,9	2,9	1,9	77,8	11,8
	202	218	22	Tr 280x4	0,42	1,6	2,4	1,6	129	15,4
	172	179	26	Tr 290x4	0,33	2	3	2	109	16,00
	155	179	26	Tr 290x4	0,27	2,5	3,7	2,5	105	12,5
	205	213	30	Tr 290x4	0,34	2	3	2	205	19,6
260	131	139	24	Tr 300x4	0,25	2,7	4,1	2,7	64,5	12
	162	179	22	Tr 290x4	0,33	2	3	2	83,1	12,8

Spherical Roller Bearings with Withdrawal Sleeve



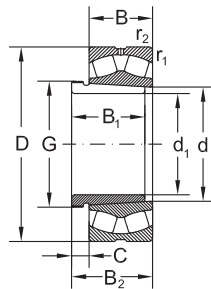
Shaft Φd_1	Dimensions				Designation		Basical radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
260	280	460	146	5	23156 MBK	AH3156	2295	4050	630	800
	280	460	180	5	24156 K30	AH24156	2635	4848	400	530
	280	500	176	5	23256 MBK	AH2356	2806	4645	480	630
	280	580	175	6	22356 CK	AH2356	3530	5208	530	670
280	300	460	118	4	23060 MBK	AH3060	1960	3650	630	800
	300	460	160	4	24060 K30	AH24060	2385	4702	560	700
	300	500	160	5	23160 MBK	AH3160	2635	4485	600	750
	300	500	200	5	24160 K30	AH24160	3213	6011	430	560
300	320	480	121	4	23064 MBK	AH3064	2040	4000	600	750
	320	480	160	4	24064 K30	AH24064	2500	5240	530	670
	320	540	176	5	23164 MBK	AH3164	3115	6000	530	670
	320	540	218	5	24164 K30	AH24164	3750	7300	400	530
	320	580	208	5	23264 MBK	AH3264	3900	6950	430	560
320	340	520	133	5	23068 MBK	AH3068	2360	4500	560	700
	340	520	180	5	24068 K30	AH24068	3100	6550	480	600
	340	580	190	5	23168 MBK	AH3168	3605	6409	500	630
	340	580	243	5	24168 K30	AH24168	4400	8500	450	560
340	360	540	134	5	23072 MBK	AH3072	2450	4800	530	670
	360	540	180	5	24072 K30	AH24072	3110	6530	480	630

Spherical Roller Bearings with Withdrawal Sleeve

Abutment and fillet dimensions for
spherical roller bearings see on page 378

Shaft	Dimensions					Calculation factor			Mass	
	Φd_1	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing Withdrawal Sleeve
	mm									[kg]
260	175	183	28	Tr 310x5	0,32	2,1	3,2	2,1	117	17,5
	202	219	22	Tr 300x4	0,39	1,7	2,5	1,7	134	16,3
	212	220	30	Tr 310x5	0,33	1,9	2,8	1,8	174	21,6
	212	220	30	Tr 310x5	0,33	2	3	2	254	21,6
280	145	153	26	Tr 320x5	0,25	2,7	4	2,6	88	14,4
	184	202	24	Tr 310x5	0,35	2	2,9	1,9	116	15,5
	192	200	30	Tr 330x5	0,33	2,1	3,1	2	151	20,8
	224	242	24	Tr 320x5	0,4	1,7	2,5	1,6	179	19,5
300	149	157	27	Tr 345x5	0,25	2,7	4,1	2,7	96	16
	184	202	24	Tr 330x5	0,33	2,1	3,1	2	123	16,6
	209	217	31	Tr 350x5	0,34	2	2,9	1,9	196	24,5
	242	260	24	Tr 340x5	0,41	1,7	2,5	1,6	225	21,4
	246	254	36	Tr 350x5	0,37	1,8	2,7	1,8	278	30,6
320	162	171	28	Tr 365x5	0,25	2,7	4	2,6	125	19,5
	206	225	26	Tr 360x5	0,34	2	2,9	1,9	165	21,7
	225	234	33	Tr 370x5	0,34	2	2,9	1,9	245	29
	269	288	26	Tr 360x5	0,43	1,6	2,3	1,5	293	27,1
340	167	176	30	Tr 385x5	0,25	2,7	4,1	2,7	132	21
	206	226	26	Tr 380x5	0,31	2,7	3,3	2,2	140	20,0

Spherical Roller Bearings with Withdrawal Sleeve



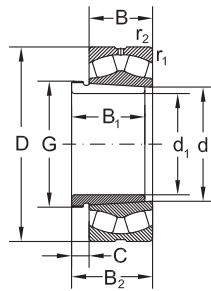
Shaft Φd_1	Dimensions				Designation		Basical radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
340	360	600	192	5	23172 MBK	AH3172	3740	7010	480	600
	360	600	243	5	24172 K30	AH24172	4500	9000	430	530
	360	650	232	6	23272 MBK	AH3272	4880	8490	430	560
360	380	560	135	5	23076 MBK	AH3076	2550	5300	500	630
	380	560	180	5	24076 K30	AH24076	3150	6710	450	600
	380	620	194	5	23176 MBK	AH3176	3740	7540	450	560
	380	620	243	5	24176 K30	AH24176	4650	9500	400	500
	380	680	240	6	23276 MBK	AH3276	5050	9660	400	530
380	400	600	148	5	23080 MBK	AH3080	3050	6200	450	560
	400	600	200	5	24080 CAK30	AH24080	3610	7545	430	460
	400	650	200	6	23180 MBK	AH3180	4100	7730	430	530
	400	650	250	6	24180 K30	AH24180	5100	10400	380	480
	400	720	256	6	23280 MBK	AH3280	5700	10800	380	500
400	420	620	150	5	23084 MBK	AH3084	3150	6550	450	560
	420	620	200	5	24084 K30	AH24084	3740	8800	380	480
	420	700	224	6	23184 CK	AH3184	4600	9000	400	500
	420	700	280	6	24184 K30	AH24184	6100	12500	360	450
	420	760	272	7,5	23284 MBK	AH3284	6550	11717	360	480

Spherical Roller Bearings with Withdrawal Sleeve

Abutment and fillet dimensions for
spherical roller bearings see on page 378

Shaft Φd_1	Dimensions					Calculation factor			Mass	
	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Withdrawal Sleeve
mm										[kg]
340	229	238	35	Tr 400x5	0,33	2,1	3,1	2	261	33
	269	289	26	Tr 380x5	0,41	1,6	2,4	1,6	308	29,6
	274	283	40	Tr 400x5	0,38	1,8	2,7	1,7	389	41,5
360	170	180	31	Tr 410x5	0,24	2,8	4,2	2,8	140	23,5
	208	228	28	Tr 400x5	0,3	2,3	3,4	2,2	145	23,5
	232	242	36	Tr 420x5	0,32	2,1	3,2	2,1	278	36,0
	271	291	28	Tr 400x5	0,39	1,7	2,5	1,7	321	31,0
	284	294	42	Tr 420x5	0,37	1,8	2,7	1,8	436	45,5
380	183	193	33	Tr 430x5	0,24	2,8	4,1	2,7	179	27,0
	228	248	28	Tr 420x5	0,3	2,3	3,4	2,2	200	27,0
	240	250	38	Tr 440x5	0,31	2,2	3,2	2,1	310	39,0
	278	298	28	Tr 420x5	0,39	1,7	2,6	1,7	360	35,0
	302	312	44	Tr 440x5	0,38	1,8	2,7	1,7	517	51,5
400	186	196	34	Tr 450x5	0,24	2,8	4,2	2,8	189	29,0
	230	252	30	Tr 440x5	0,3	2,3	3,4	2,2	205	29,0
	266	276	40	Tr 460x5	0,33	2	3	2	409	46,0
	310	332	30	Tr 440x5	0,4	1,7	2,5	1,6	483	40,3
	321	331	46	Tr 460x5	0,38	1,8	2,6	1,7	612	58,9

Spherical Roller Bearings with Withdrawal Sleeve



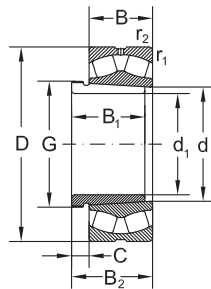
Shaft Φd_1	Dimensions				Designation		Basic radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
420	440	650	157	6	23088 MBK	AHX3088	3400	7100	430	530
	440	650	212	6	24088 K30	AHX24088	4080	8800	360	450
	440	720	226	6	23188 CK	AHX3188	5000	10000	400	500
	440	720	280	6	24188 K30	AHX24188	6400	13200	340	430
	440	790	280	7,5	23288 MBK	AHX3288	7100	13400	360	450
440	460	680	163	6	23092 MBK	AHX3092	3650	7650	400	500
	460	760	240	7,5	23192 CK	AHX3192	5760	11025	360	450
	460	760	300	7,5	24192 K30	AH24192	7250	14600	280	380
	460	830	296	7,5	23292 MBK	AHX3292	7560	13970	340	430
460	480	700	165	6	23096 MBK	AHX3096	3800	8150	380	480
	480	790	248	7,5	23196 CK	AHX3196	5800	11800	360	450
	480	790	308	7,5	24196 K30	AH24196	7250	15000	280	360
	480	870	310	7,5	23296 MBK	AHX3296	8800	17000	340	430
480	500	670	128	5	239/500 MBK	AH39/500	2500	6090	380	480
	500	720	167	6	230/500 MBK	AHX30/500	3900	8500	380	480
	500	830	264	7,5	231/500 MBK	AHX31/500	6550	13200	340	430
	500	830	325	7,5	241/500 K30	AH241/500	8630	17000	268	340
	500	920	336	7,5	232/500 MBK	AHX32/500	9650	18300	320	400
500	530	710	136	5	239/530 MBK	AH39/530	2850	6755	360	450

Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for
spherical roller bearings see on page 378*

Shaft Φd_1	Dimensions					Calculation factor			Mass	
	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing	Withdrawal Sleeve
mm										[kg]
420	194	205	35	Tr 470x5	0,24	2,8	4,2	2,8	216	32
	242	264	30	Tr 460x5	0,3	2,3	3,4	2,2	240	32
	270	281	42	Tr 480x5	0,32	2,1	3,1	2,1	429	49,8
	310	332	30	Tr 460x5	0,38	1,8	2,6	1,7	496	42,5
	330	341	48	Tr 480x5	0,37	1,8	2,7	1,8	671	63,8
440	202	213	37	Tr 490x5	0,24	2,8	4,2	2,8	245	35,2
	285	296	43	Tr 510x6	0,32	2,1	3,2	2,1	510	57,9
	332	355	32	Tr 480x6	0,37	1,8	2,7	1,8	550	50
	349	360	50	Tr 510x6	0,37	1,8	2,7	1,8	795	74,5
460	205	217	38	Tr 520x6	0,23	2,9	4,3	2,8	259	39,2
	295	307	45	Tr 530x6	0,32	2,1	3,2	2,1	567	63,1
	340	363	32	Tr 500x6	0,37	1,8	2,7	1,8	595	51,5
	364	376	52	Tr 530x6	0,37	1,8	2,7	1,8	914	82,1
480	162	172	32	Tr 520x6	0,17	3,9	5,8	3,8	161	28
	209	221	40	Tr 540x6	0,22	3	4,5	2,9	272	42,5
	313	325	47	Tr 550x6	0,32	2,1	3,1	2,1	670	70,9
	360	383	35	Tr 530x6	0,37	1,8	2,7	1,8	735	57,0
	393	405	54	Tr 550x6	0,38	1,8	2,7	1,7	1105	94,6
500	175	185	37	Tr 550x6	0,18	3,9	5,7	3,8	202	43,4

Spherical Roller Bearings with Withdrawal Sleeve



Shaft Φd_1	Dimensions				Designation		Basical radial load		Speed limit	
	d	D	B	r_1, r_2 min.	Bearing	Withdrawal Sleeve	dyn. C_r	stat. C_{0r}	grease	oil
mm							kN		min ⁻¹	min ⁻¹
500	530	780	185	6	230/530 MBK	AH30/530	4400	9500	340	430
	530	870	335	7,5	241/530 K30	AH241/530	8650	18400	240	320
530	560	750	140	5	239/560 MBK	AH39/560	3100	7350	340	430
	560	820	195	6	230/560 MBK	AH30/560	5100	11000	320	400
	560	920	355	7,5	241/560 K30	AH241/560	10500	21600	120	160
560	600	800	150	5	239/600 MBK	AH39/600	3450	8650	320	400
	600	870	200	6	230/600 MBK	AH30/600	5700	12500	300	380
	600	980	375	7,5	241/600 K30	AH241/600	10700	22800	220	280
600	630	580	165	6	239/630 MBK	AH39/630	4050	9800	300	380
	630	920	212	7,5	230/630 MBK	AH30/630	6300	14000	260	340
630	670	900	170	6	239/670 MBK	AH39/670	4300	10600	280	360
	670	980	230	7,5	230/670 MBK	AH30/670	7200	16000	260	340
670	710	950	180	6	239/710 MBK	AH39/710	4800	12000	260	340
710	750	1000	185	6	239/750 MBK	AH39/750	5200	12900	260	340

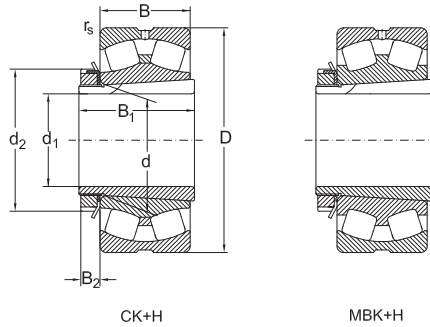
Spherical Roller Bearings with Withdrawal Sleeve

Abutment and fillet dimensions for
spherical roller bearings see on page 378

Shaft	Dimensions					Calculation factor			Mass	
	Φd_1	B_1	B_2	C	G	e	$F_a/F_r \leq e$ Y_1	$F_a/F_r > e$ Y_2	Y_0	Bearing Withdrawal Sleeve
	mm									[kg]
500	230	242	45	Tr 560x6	0,22	3	4,5	3	372	61,9
	370	394	35	Tr 550x6	0,37	1,8	2,7	1,8	820	86
530	180	190	37	Tr 580x6	0,17	4	5,9	3,9	230	47,4
	240	252	45	Tr 590x6	0,23	2,9	4,4	2,9	427	68,6
	393	417	38	Tr 580x6	0,35	1,9	2,9	1,8	970	97
560	192	202	38	Tr 625x6	0,17	4	5,9	3,9	277	56,1
	245	259	45	Tr 630x6	0,22	3,1	4,6	3	481	75,4
	413	439	38	Tr 630x6	0,35	1,9	2,9	1,8	1180	120
600	210	232	40	Tr 655x6	0,18	3,8	5,7	3,7	344	62,8
	258	272	46	Tr 670x6	0,22	3	4,5	2,9	576	87,7
630	216	228	41	Tr 695x6	0,17	4	5,9	3,9	412	85,5
	280	294	50	Tr 710x7	0,22	3	4,5	2,9	726	124
670	228	240	43	Tr 740x7	0,18	3,8	5,7	3,8	488	102
710	234	246	44	Tr 780x7	0,17	4	5,9	3,9	548	111

Spherical Roller Bearings with withdrawal sleeve

SR 3918



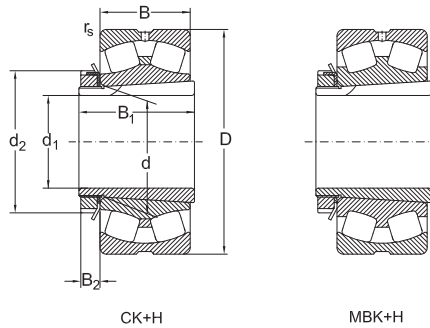
Dimensions								Designation	Withdrawal sleeve
d_1	d	D	B	r_s min.	d_2	B_1	B_2	Bearing	
mm									
35	40	80	23	1,1	58	36	10	22208 CK	H308
	40	90	23	1,5	58	36	10	21308 CK	H308
	40	90	33	1,5	58	46	10	22308 CK	H2308
40	45	85	23	1,1	65	39	11	22209 CK	H309
	45	100	25	1,5	65	39	11	21309 CK	H309
	45	100	36	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	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

Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit				Mass
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil	
kN	-	-	-	kN	-	min ⁻¹	min ⁻¹	kg
88	0,31	2,2	3,2	98	2,1	4800	6300	0,699
99	0,26	2,6	3,9	120	2,6	4500	6000	0,889
140	0,4	1,6	2,5	145	1,6	4300	5600	1,22
93	0,3	2,3	3,4	105	2,2	4500	6000	0,798
120	0,26	2,6	3,9	135	2,6	4000	5300	1,19
165	0,4	1,7	2,5	190	1,6	3800	5000	1,58
100	0,26	2,6	3,9	120	2,5	4000	5300	0,903
120	0,24	2,8	4,1	130	2,7	3600	4800	1,50
190	0,4	1,7	2,5	220	1,6	3400	4500	2,16
120	0,27	2,5	3,8	140	2,5	3800	5000	1,15
135	0,24	2,8	4,1	155	2,7	3200	4300	1,95
230	0,4	1,7	2,5	265	1,6	3000	4000	2,72
145	1,27	2,5	3,7	175	2,4	3400	4500	1,49
150	0,24	2,9	4,3	180	2,8	3000	4000	2,29
270	0,4	1,7	2,5	320	1,7	2800	3800	3,33
180	0,28	2,4	3,6	220	2,4	3000	4000	1,86
220	0,24	2,8	4,2	290	2,8	2800	3800	2,86
305	0,39	1,7	2,6	360	1,7	2800	3600	4,01
180	0,26	2,6	3,9	225	2,6	2800	3800	2,22
375	0,38	1,8	2,6	455	1,7	2400	3200	5,20
190	0,24	2,8	4,1	250	2,7	2800	3800	2,43
280	0,23	2,9	4,4	360	2,9	2400	3200	4,33
415	0,38	1,8	2,6	520	1,7	2200	3000	6,20
210	0,25	2,6	4	275	2,6	2600	3400	3,08
310	0,23	2,9	4,4	400	2,9	2200	3000	5,23
410	0,25	2,6	4	500	2,6	1800	2400	7,38
250	0,26	2,6	3,9	325	2,6	2400	3200	3,68
350	0,22	3	4,5	450	2,9	2200	2800	6,18
460	0,37	1,8	2,7	570	1,8	1700	2200	8,65
305	0,27	2,5	3,8	410	2,5	2200	3000	4,57
340	0,34	2	3	485	2	1500	2000	6,19
385	0,22	3	4,5	510	2,9	2200	2800	7,07

Spherical Roller Bearings with withdrawal sleeve

SR 3918



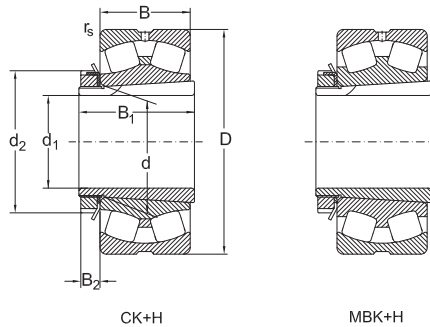
Dimensions								Designation	Withdrawal sleeve
d ₁	d	D	B	r _s min.	d ₂	B ₁	B ₂	Bearing	
mm									
80	90	190	64	3	120	86	18	22318 CKW33	H2318
85	95	170	43	2,1	125	68	19	22219 MBKW33	H319
	95	200	45	3	125	68	19	21319 MBK	H319
	95	200	67	3	125	90	19	22319 MBKW33	H2319
90	100	180	46	2,1	130	71	20	22220 MBKW33	H320
	100	180	60,3	2,1	130	97	20	23220 MAKW33	H2320
	100	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	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	120	180	46	2	145	72	22	23024 MBK33	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
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
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
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

Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit				Mass
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil	
kN	-	-	-	kN	-	min ⁻¹	min ⁻¹	kg
570	0,36	1,9	2,8	730	1,8	1800	2400	10,2
310	0,26	2,6	3,8	415	2,5	2000	2600	5,56
385	0,22	3,1	4,6	530	3	1800	2400	8,56
570	0,38	1,8	2,7	740	1,7	1500	2000	11,9
340	0,27	2,5	3,7	455	2,4	2000	2600	6,49
455	0,33	2	3	660	2	1500	2000	8,65
425	0,22	3,1	4,7	580	3,1	1700	2200	9,99
730	0,37	1,8	2,7	960	1,7	1500	2000	15,2
410	0,3	2,3	3,3	640	2,2	1800	2400	7,75
540	0,28	2,4	3,5	700	2,3	1700	2200	9,18
570	0,33	2	3	840	2	1200	1600	12,2
510	0,21	3,2	4,8	690	3,2	1500	2000	13,9
870	0,37	1,8	2,7	1160	1,8	1400	1900	20,2
335	0,24	2,8	4,2	560	2,8	1800	2400	6,03
495	0,31	2,2	3,3	770	2,2	1700	2200	10,2
560	0,29	2,3	3,5	800	2,3	1700	2200	11,2
670	0,37	1,8	2,7	1020	1,8	1100	1500	15,0
930	0,36	1,8	2,7	1230	1,8	1100	1500	25,0
410	0,23	2,9	4,4	670	2,8	1700	2200	8,85
540	0,3	2,3	3,3	860	2,2	1500	2000	12,0
660	0,29	2,3	3,5	960	2,3	1700	2200	17,5
760	0,33	2	3	1170	2	1100	1500	18,4
1080	0,37	1,8	2,7	1450	1,8	1100	1400	32,9
435	0,22	3	4,6	750	2,8	1500	2000	9,16
600	0,3	2,3	3,3	990	2,2	1400	1800	14,5
670	0,29	2,3	3,5	990	2,3	1300	1700	18,1
880	0,37	1,8	2,7	1380	1,8	1000	1300	23,8
1240	0,38	1,7	2,6	1720	1,7	1000	1300	39,7
480	0,22	3	4,6	830	2,8	1400	1800	11,7
800	0,32	2,1	3,2	1320	2,1	1300	1700	21,5
810	0,29	2,3	3,5	1190	2,3	1200	1600	23,2
1030	0,38	1,8	2,7	1610	1,7	1000	1300	30,6

Spherical Roller Bearings with withdrawal sleeve

SR 3918



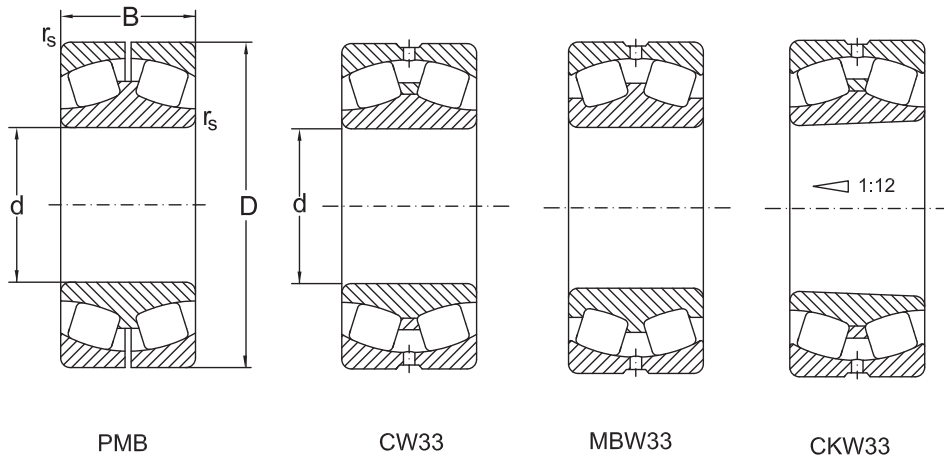
Dimensions								Designation Bearing	Withdrawal sleeve
d ₁	d	D	B	r _s min.	d ₂	B ₁	B ₂		
mm									
135	150	320	108	4	195	139	26	22330 MBKW33	H2330
140	160	240	60	2,1	190	93	28	23032 MBKW33	H3032
	160	270	86	2,1	210	119	28	23132 MBKW33	H3132
	160	290	104	3	210	147	28	23232 MBKW33	H2332
	160	290	80	3	210	119	28	22232 MBKW33	H3132
	160	340	114	4	210	147	28	22332 MBKW33	H2332
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	H3138
	180	320	112	4	230	161	30	23236 MBKW33	H2336
	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 CKW33	H2340
200	220	340	90	3	260	126	30	23044 MBKW33	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

Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit				Mass
dyn. C_r	e	Y_1	Y_2	stat. C_{0r}	Y_0	grease	oil	
kN	-	-	-	kN	-	min ⁻¹	min ⁻¹	kg
1400	0,38	1,7	2,6	1940	1,7	1000	1300	49,7
560	0,22	3	4,6	970	2,8	1300	1700	14,7
930	0,32	2,1	3,2	1510	2,1	1200	1600	27,8
1180	0,38	1,8	2,7	1830	1,7	900	1200	40,2
950	0,29	2,3	3,4	1420	2,3	1100	1500	30,6
1520	0,37	1,8	2,7	2160	1,8	900	1200	59,1
680	0,23	2,9	4,4	1170	2,8	1200	1600	19,3
990	0,31	2,2	3,2	1650	2,1	1100	1500	30,4
1340	0,36	1,9	2,8	2120	1,8	850	1100	47,4
1080	0,3	2,3	3,4	1610	2,2	1100	1400	36,8
1690	0,37	1,8	2,7	2380	1,8	850	1100	70,4
800	0,24	2,8	4,2	1380	2,8	1100	1500	23,8
1160	0,32	2,1	3,1	1940	2,1	1100	1400	37,5
1420	0,36	1,9	2,8	2330	1,8	750	1000	51,4
1110	0,29	2,3	3,5	1720	2,3	1100	1400	38,9
1900	0,37	1,8	2,7	2700	1,8	850	1100	79,5
830	0,26	2,6	3,9	1470	2,6	1100	1400	25,5
1320	0,33	2	3	2290	2	1100	1400	45,8
1610	0,36	1,9	2,8	2640	1,8	750	1000	60,7
1220	0,29	2,3	3,4	1870	2,3	1000	1300	48,0
2060	0,37	1,8	2,7	2920	1,8	750	1000	95,6
880	0,24	2,8	4,2	1560	2,8	1100	1500	32,69
1370	0,35	1,9	2,9	2460	1,9	1100	1400	55,6
1620	0,35	1,9	2,9	2590	1,8	750	1000	72,4
1250	0,29	2,3	3,4	2020	2,3	1100	1400	57,1
1910	0,36	1,8	2,8	2750	1,8	670	900	108,9
1155	0,24	2,8	4,2	2053	2,8	1100	1400	40,8
1025	0,24	2,8	4,2	1730	2,8	1000	1300	41,8
1455	0,3	2,3	3,4	2380	2,2	900	1200	69,2
1485	0,29	2,3	3,4	2483	2,3	850	1100	77,7
1850	0,35	1,9	2,9	2899	1,8	600	800	99,2

Spherical Roller Bearings

Non-standardized



Dimensions				Basical radial load						Speed limit		Designation	Mass
d	D	B	r _s min.	dyn. C _r	e	Y ₁	Y ₂	stat. C _{0r}	Y ₀	grease	oil		
mm				kN						min ⁻¹		min ⁻¹	
100	162	62	3	312				479		1400	1700	25120 MB	5,44
130	220	73	2	500	0,31	2,2	3,3	995	2,2	1100	1400	25326 C	11,4
	240	80	3	572	0,33	2	3	1104	2	1100	1400	25126 MBK	15,3
131,796	220	73	2	470	0,31	2,2	3,3	1020	2,2	1100	1400	25226 C	11,2
	220	73	2	470	0,31	2,2	3,3	1020	2,2	1100	1400	25226 CW33	11,2
	220	73	2	470				1020		1100	1400	25226 CY	11,2
140	240	80	3	482	0,26	2,6	3,9	1030	2,5	950	1300	28228 PMB	19,9
	260	86	3	663	0,26	2,6	3,9	1288	2,5	950	1300	25128 MBK	19,9
144,475	250	80	2	625	0,33	2	3	1310	2	900	1200	25129 C	16,5
169	310	110	3	1228				1970		1200	1400	25134 C	36,3

Spherical Roller Bearings

Non-standardized

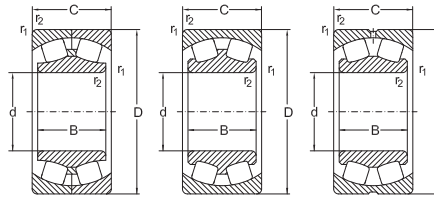


Fig. 4

Fig. 5

Fig. 6

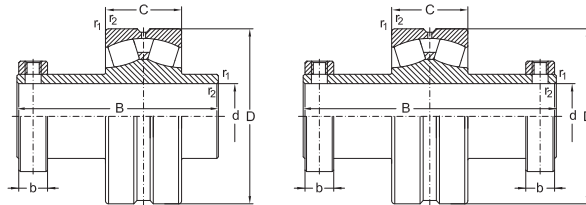


Fig. 7

Fig. 8

Dimensions							Basical radial load		Designation	Mass
d	D	B	B ₁	r _s min.	r _{1s} min.	b	Fig.	dyn. C _a	stat. C _{0a}	
mm										
38,1	80	23	69,85	1,1	15,88	7	88	98	SB1000 1-1/2	0,93
42,877	85	23	73	1	15,9	7	131,5	188	SB1000 1-11/16	1,16
49,21	90	23	73	1,1	15,88	7	100	120	SB1000 1-15/16	1,23
61,93	120	31	85,75	1,5	22,3	7	158	195	SB1000 2-7/16	2,95
74,61	130	31	92,075	1,5	22,2	7	190	250	SB1000 2-15/16	3,22
87,31	160	40	102,4	2	22,23	7	305	410	SB1000 3-7/16	5,74
100,035	180	46	116	2,1	25,4	7	536	905	SB1000 3-15/16	8,31
112,71	200	53	155,58	2,1	25,4	8	590	770	SB1000 4-7/16 VSB	11,8
125,41	230	64	168,28	3	25,4	8	660	1700	SB1000 4-15/16 VSB	18
100	165	65	52	2		5	309	459	26120 MB	5,08
100	180	82	69	2,1		4	436	627	26220 CP	9,36
110	180	82	69	2		6	449	741	26122 CAW33	7,53



Thrust Ball Bearings

Standards, Boundary dimensions

Standard plans	DIN 616
Thrust ball bearings single direction	DIN 711
Thrust ball bearings double direction	DIN 715
Seating washers	DIN 711

General

Thrust Ball Bearings are separable axial bearings that are produced in both single and double direction acting design.

To assist in simple effective mounting or dismounting the bearing washers, seatings, and cage and ball assemblies, may be individually mounted in their arrangement location.

Thrust ball bearings may accommodate comparatively high axial loads but they must not be exposed to any radial forces.

Due to their specific kinematic behavior, thrust ball bearings are only suitable for low to medium operating speeds.

Furthermore, they require minimum axial loads for their optimum function.

Since thrust ball bearings do not compensate any misalignment, they are also frequently used in conjunction with sphered housing washers and seating washers.

Design variants (see drawing on right page)

Thrust ball bearings are produced in both, single direction and double direction design. The most important design variants are shown on the opposite page.

Single direction thrust ball bearings consist of a **shaft washer**, a **housing washer** and a **ball and cage thrust assembly**, (see figure a, b and c).

These bearings are able to accommodate axial loads in one direction only.

Single direction thrust ball bearings of series **511**, **512**, **513** and **514** have plain housing washers, (see figure a).

For applications where some misalignment may occur, single direction thrust ball bearings of the series **532**, **533** and **534** are also available with sphered housing washers, figure b.

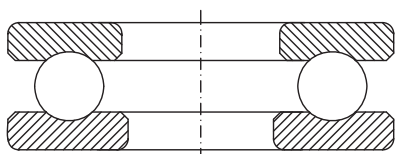
These bearings may be applied either direct to sphered shaped bearings seats or, they may be used together with **seating washers** of series **U2**, **U3** or **U4** (see figure c).

Unlike single direction thrust ball bearing types, **double direction thrust ball bearings** are suitable to guide the shaft in both directions (see figure d, e and f).

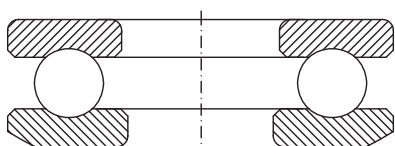
These bearings consist of two washers, **two ball and cage thrust assemblies** with one common **shaft washer** located centrally in between.

Double direction thrust ball bearings are also available in both designs, with **flat housing washers** (series **522**, **523** and **524**, see figure d) and with **sphered housing washers** (series **542**, **543** and **544**, see figure e).

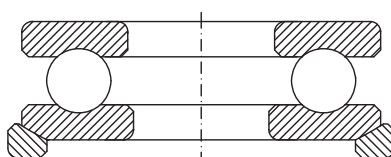
For compensation of possible aligning errors the double direction thrust ball bearings may be used in conjunction with Seating Washers (series **U2**, **U3** and **U4**, see figure f).



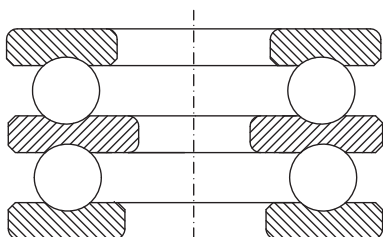
a



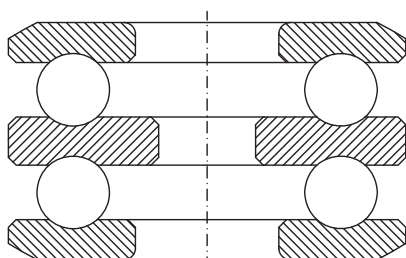
b



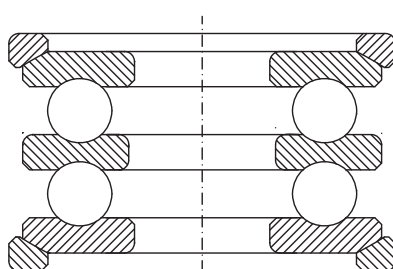
c



d



e



f

Misalignment

All thrust ball bearing types with flat housing washers do not allow any misalignment.

The contacting surfaces of both shaft and housing seats must be parallel. Misalignments can only be accommodated by using Thrust Ball bearings with **sphered housing washers**.

Cages

URB thrust ball bearings are normally fitted with pressed steel cages as standard.

For larger thrust ball bearings solid brass cages, (suffix **M**), or solid steel cages, suffix **F**), are fitted as standard.

Tolerances

URB thrust ball bearings are produced to normal class tolerance class (**PN**) as standard.

For applications of higher dimensional and geometrical accuracy these bearings are produced to precision tolerance class (e.g. **P6**) on order request.

For detailed values of the tolerance classes see chapter **Bearing tolerances** (see page 40).

Minimum load:

Thrust ball bearings require a certain minimum axial load to ensure a satisfactory operating function.

To prevent excessive sliding friction, the minimum axial load applied should be greater than **4%** of the axial bearing dynamic load rating **Ca**.

Where such a minimum axial load is not possible, the load must be increased by effective measures, (i.e. preloading the bearing) using pressure washers or springs.

Equivalent dynamic bearing load

Thrust ball bearings are pure axial bearings, their are not able to accommodate any radial loads, therefore:

$$P=F_a$$

Equivalent static bearing load

For thrust ball bearings:

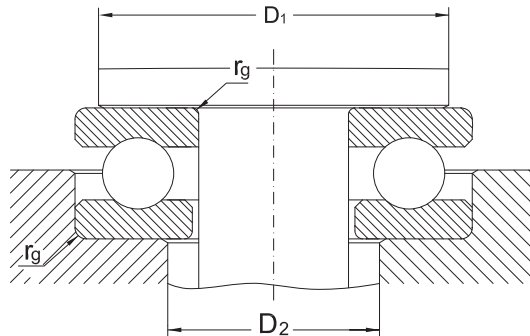
$$P_0=F_a$$

Abutment and Fillet dimensions for thrust ball bearings

The bearing washer must contact adjacent parts with their face sides only. The radii of bearing corners must not touch the shoulder fillet radii of the shaft or housing shoulders.

Therefore, the largest fillet radius (r_g) must be smaller than the minimum fillet dimension of the bearing rings (r_f) as listed in the bearing tables.

Abutment and Fillet dimensions for Thrust Ball bearings of series 511, 512, 513 and 514 [mm]

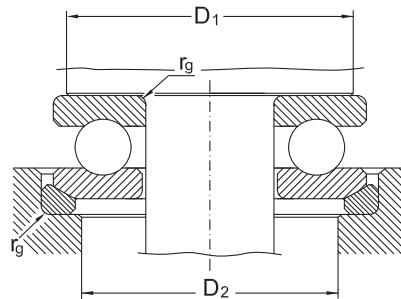
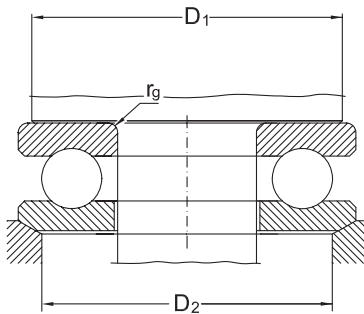


Shaft Φd_1	Bore reference number	Bearing Series											
		511			512			513			514		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm													
10	00	18	16	0,3	20	16	0,6	-	-	-	-	-	-
12	01	20	18	0,3	22	18	0,6	-	-	-	-	-	-
15	02	23	20	0,3	25	22	0,6	-	-	-	-	-	-
17	03	25	22	0,3	28	24	0,6	-	-	-	-	-	-
20	04	29	26	0,3	32	28	0,6	-	-	-	-	-	-
25	05	35	32	0,6	38	34	0,6	41	36	1	46	39	1
30	06	40	37	0,6	43	39	0,6	48	42	1	54	46	1
35	07	45	42	0,6	51	46	1	55	48	1	62	53	1
40	08	52	48	0,6	57	51	1	63	55	1	70	60	1
45	09	57	53	0,6	62	56	1	69	61	1	78	67	1
50	10	62	58	0,6	67	61	1	77	68	1	86	74	1,5
55	11	69	64	0,6	76	69	1	85	75	1	94	81	1,5
60	12	75	70	1	81	74	1	90	80	1	102	88	1,5
65	13	80	75	1	86	79	1	95	85	1	110	95	2
70	14	85	80	1	91	84	1	103	92	1	118	102	2
75	15	90	85	1	96	89	1	111	99	1,5	126	109	2
80	16	95	90	1	101	94	1	116	104	1,5	134	116	2,1
85	17	100	95	1	109	101	1	124	111	1,5	142	123	2,1
90	18	108	102	1	117	108	1	129	116	1,5	150	130	2,1
100	20	121	114	1	130	120	1	142	128	1,5	166	144	2,5
110	22	131	124	1	140	130	1	158	142	2	182	158	2,5
120	24	141	134	1	150	140	1	174	156	2,1	198	172	3
130	26	154	146	1	166	154	1	187	168	2,1	214	186	3
140	28	164	156	1	176	164	1	200	180	2,1	224	196	3
150	30	174	166	1	189	176	1	210	190	2,1	240	210	3

Abutment and Fillet dimensions for Thrust Ball bearings of series 511, 512 and 513 [mm]

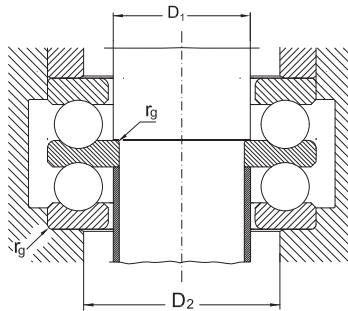
Shaft Φd_1	Bore reference number	Bearing Series								
		511			512			513		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm										
160	32	184	176	1	199	186	1,5	226	204	2,5
170	34	197	188	1	212	198	1,5	236	214	2,5
180	36	207	198	1	222	208	1,5	252	228	2,5
190	38	220	210	1	238	222	2	268	242	3
200	40	230	220	1	248	232	2	284	256	3
220	44	250	240	1	268	252	2	-	-	-
240	48	276	264	1,5	300	280	2,1	-	-	-
260	52	296	284	1,5	320	300	2,1	-	-	-
280	56	322	308	1,5	340	320	2,1	-	-	-
300	60	348	332	2	372	348	2,5	-	-	-
320	64	368	352	2	392	368	2,5	-	-	-
340	68	388	372	2	412	388	2,5	-	-	-
360	72	408	392	2	444	416	3	-	-	-
380	76	428	412	2	-	-	-	-	-	-
400	80	448	432	2	-	-	-	-	-	-
420	84	468	452	2	-	-	-	-	-	-
440	88	500	480	2,1	-	-	-	-	-	-
460	92	520	500	2,1	-	-	-	-	-	-
480	96	540	520	2,1	-	-	-	-	-	-
500	/500	560	540	2,1	-	-	-	-	-	-
530	/530	596	574	2,5	-	-	-	-	-	-
560	/560	626	604	2,5	-	-	-	-	-	-

Abutment and Fillet dimensions for Thrust Ball bearings of series 532, 533, and 534 [mm]



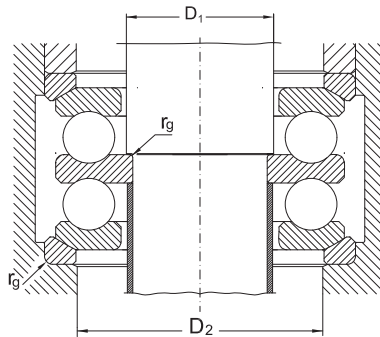
Shaft Φd_1	Bore reference number	Bearing Series								
		532			533			534		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm										
10	00	20	18	0,6	-	-	-	-	-	-
12	01	22	20	0,6	-	-	-	-	-	-
15	02	25	24	0,6	-	-	-	-	-	-
17	03	28	26	0,6	-	-	-	-	-	-
20	04	32	30	0,6	-	-	-	-	-	-
25	05	38	36	0,6	41	38	1	46	42	1
30	06	43	42	0,6	48	45	1	54	50	1
35	07	51	48	1	55	52	1	62	58	1
40	08	57	55	1	63	60	1	70	65	1
45	09	62	60	1	69	65	1	78	72	1
50	10	67	62	1	77	72	1	86	80	1,5
55	11	76	72	1	85	80	1	94	88	1,5
60	12	81	78	1	90	85	1	102	95	1,5
65	13	86	82	1	95	90	1	110	100	2
70	14	91	88	1	103	98	1	118	110	2
75	15	96	92	1	111	105	1,5	126	115	2
80	16	101	98	1	116	110	1,5	134	125	2,1
85	17	109	105	1	124	115	1,5	142	130	2,1
90	18	117	110	1	129	120	1,5	150	140	2,1
100	20	130	125	1	142	135	1,5	166	155	2,5
110	22	140	135	1	158	150	2	182	170	2,5
120	24	150	145	1	174	165	2	195	185	3
130	26	166	160	1,5	187	177	2,1	214	200	3
140	28	176	170	1,5	200	190	2,1	-	-	-
150	30	189	180	1,5	210	200	2,1	-	-	-
160	32	199	190	1,5	-	-	-	-	-	-
170	34	212	200	1,5	-	-	-	-	-	-
180	36	222	210	1,5	-	-	-	-	-	-
190	38	238	230	1,5	-	-	-	-	-	-

Abutment and Fillet dimensions for Thrust Ball bearings of series 522, 523 and 524 [mm]



Shaft Φd_1	Bore reference number	Bearing Series												
		522				523				524				
		D ₁ min	D ₂ min	r _g max	r _{g1} max	D ₁ min	D ₂ min	r _g max	r _{g1} max	Shaft	D ₁ min	D ₂ min	r _g max	r _{g1} max
mm														
10	02	15	22	0,6	0,3	-	-	-	-	-	-	-	-	-
15	04	20	28	0,6	0,3	-	-	-	-	-	-	-	-	-
20	05	25	34	0,6	0,3	25	36	1	0,3	15	25	39	1	0,6
25	06	30	39	0,6	0,3	30	42	1	0,3	20	30	46	1	0,6
30	07	35	46	1	0,3	35	48	1	0,3	25	35	53	1	0,6
30	08	40	51	1	0,6	40	55	1	0,6	30	40	60	1	0,6
35	09	45	56	1	0,6	45	61	1	0,6	35	45	67	1	0,6
40	10	50	61	1	0,6	50	68	1	0,6	40	50	74	1,5	0,6
45	11	55	69	1	0,6	55	75	1	0,6	45	55	81	1,5	0,6
50	12	60	74	1	0,6	60	80	1	0,6	50	60	88	1,5	0,6
55	13	65	79	1	0,6	65	85	1	0,6	50	65	95	2	1
55	14	70	84	1	1	70	92	1	1	55	70	102	2	1
60	15	75	89	1	1	75	99	1,5	1	60	75	109	2	1
65	16	80	94	1	1	80	104	1,5	1	65	80	116	2,1	1
70	17	85	101	1	1	85	111	1,5	1	65	85	123	2,1	1
75	18	90	108	1	1	90	116	1,5	1	70	90	130	2,1	1
85	20	100	120	1	1	100	128	1,5	1	80	100	144	2,5	1
95	22	110	130	1	1	110	142	2	1	-	-	-	-	-
100	24	120	140	1	1	120	156	2,1	1	-	-	-	-	-
110	26	130	154	1,5	1	130	168	2,1	1	-	-	-	-	-
120	28	140	164	1,5	1	140	180	2,1	1	-	-	-	-	-
130	30	150	176	1,5	1	150	190	2,1	1	-	-	-	-	-
140	32	160	186	1,5	1	-	-	-	-	-	-	-	-	-
150	34	170	198	1,5	1	-	-	-	-	-	-	-	-	-

Abutment and Fillet dimensions for Thrust Ball bearings of series 542, 543 and 544 [mm]



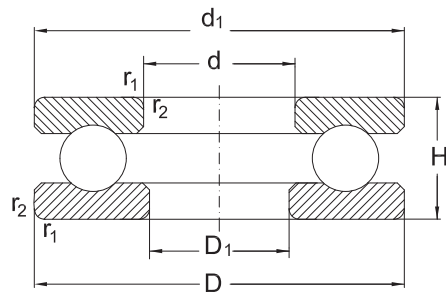
Shaft Φd_1	Bore reference number	Bearing Series												
		542				543				Shaft	544			
		D ₁ min	D ₂ min	r _g max	r _{g1} max	D ₁ min	D ₂ min	r _g max	r _{g1} max		D ₁ min	D ₂ min	r _g max	r _{g1} max
mm														
10	02	15	24	0,6	0,3	-	-	-	-	-	-	-	-	-
15	04	20	30	0,6	0,3	-	-	-	-	-	-	-	-	-
20	05	25	36	0,6	0,3	25	38	1	0,3	15	25	42	1	0,6
25	06	30	42	0,6	0,3	30	45	1	0,3	20	30	50	1	0,6
30	07	35	48	1	0,3	35	52	1	0,3	25	35	58	1	0,6
30	08	40	55	1	0,6	40	60	1	0,6	30	40	65	1	0,6
35	09	45	60	1	0,6	45	65	1	0,6	35	45	72	1	0,6
40	10	50	62	1	0,6	50	72	1	0,6	40	50	80	1,5	0,6
45	11	55	72	1	0,6	55	80	1	0,6	45	55	88	1,5	0,6
50	12	60	78	1	0,6	60	85	1	0,6	50	60	95	1,5	0,6
55	13	65	82	1	0,6	65	90	1	0,6	50	65	100	2	1
55	14	70	88	1	1	70	98	1	1	55	70	110	2	1
60	15	75	92	1	1	75	105	1,5	1	60	75	115	2	1
65	16	80	98	1	1	80	110	1,5	1	65	80	125	2,1	1
70	17	85	105	1	1	85	115	1,5	1	65	85	130	2,1	1
75	18	90	110	1	1	90	120	1,5	1	70	90	140	2,1	1
85	20	100	125	1	1	100	135	1,5	1	80	100	155	2,5	1
95	22	110	135	1	1	110	150	2	1	-	-	-	-	-
100	24	120	145	1	1	120	165	2,1	1	-	-	-	-	-
110	26	130	160	1,5	1	-	-	-	-	-	-	-	-	-

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE



Thrust Ball bearings, single direction



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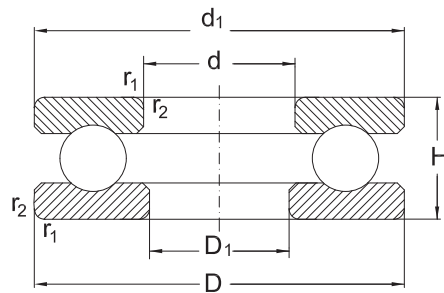
Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN		min ⁻¹	
10	24	9	0,3	51100	10	14	7000	9500
	26	11	0,6	51200	12,7	17,1	6000	8000
12	26	9	0,3	51101	10,4	15,4	6700	9000
	28	11	0,6	51201	13,2	19	6000	8000
15	28	9	0,3	51102	10,5	16,8	6300	8500
	32	11	0,6	51202	16,6	25	5000	6700
17	30	9	0,3	51103	10,8	18,2	6300	8500
	35	12	0,6	51203	17,3	27,5	5000	6700
20	35	10	0,3	51104	14,9	26,6	5300	7000
	40	14	0,6	51204	22,4	37,7	4300	5600
25	42	11	0,6	51105	15,6	30,4	4800	6300
	47	15	0,6	51205	28	50,5	3800	5000
	52	18	1	51305	35,4	61,5	3150	4200
	60	24	1	51405	56	90	2600	3600
30	47	11	0,6	51106	18,6	39,9	4300	5600
	52	16	0,6	51206	28,1	54,3	3600	4800
	60	21	1	51306	42,2	78,7	2900	3900
	70	28	1	51406	72	125	2200	3200
35	52	12	0,6	51107	19,1	44,4	4000	5300

Thrust Ball bearings, single direction

*Abutment and fillet
dimensions see on
page 510*

Shaft		Dimensions		Mass
d	d ₁	D ₁	Bearing	
mm			[kg]	
10	24	11	0,02	
	26	12	0,03	
12	26	13	0,02	
	28	14	0,03	
15	28	16	0,02	
	32	17	0,05	
17	30	18	0,03	
	35	19	0,05	
20	35	21	0,04	
	40	22	0,08	
25	42	26	0,06	
	47	27	0,12	
	52	27	0,17	
	60	27	0,36	
30	47	32	0,07	
	52	32	0,13	
	60	32	0,26	
	70	32	0,58	
35	52	37	0,09	

Thrust Ball bearings, single direction



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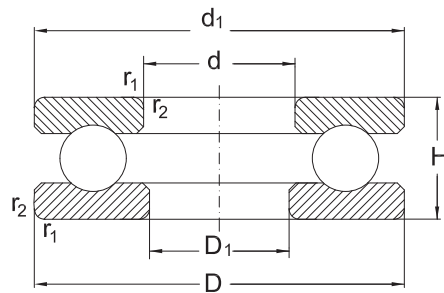
Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
35	62	18	1	51207	38,8	78,2	3000	4000
	68	24	1	51307	55,4	105	2600	3600
	80	32	1,1	51407	86,5	156	2000	3000
40	60	13	0,6	51108	26,8	62,9	3400	4500
	68	19	1	51208	46,9	98,3	2800	3800
	78	26	1	51308	68,4	135	2200	3200
	90	36	1,1	51408	112	204	1700	2400
45	65	14	0,6	51109	27,2	69,2	3400	4500
	73	20	1	51209	49,3	112	2600	3600
	85	28	1	51309	78,9	164	2000	3000
	100	39	1,1	51409	140	262	1600	2200
50	70	14	0,6	51110	28,1	75,5	3200	4300
	78	22	1	51210	56,3	129	2400	3400
	95	31	1,1	51310	95,3	202	1900	2800
	110	43	1,5	51410	156	310	1500	2000
55	78	16	0,6	51111	31,1	81,5	2800	3800
	90	25	1	51211	68,8	159	2200	3200
	105	35	1,1	51311	118	246	1700	2400
	120	48	1,5	51411	180	360	1300	1800

Thrust Ball bearings, single direction

*Abutment and fillet
dimensions see on
page 510*

Shaft		Dimensions		Mass
d	d ₁	D ₁	Bearing	
mm			[kg]	
35	62	37	0,22	
	68	37	0,38	
	80	37	0,96	
40	60	42	0,13	
	68	42	0,28	
	78	42	0,53	
	90	42	1,17	
45	65	47	0,15	
	73	47	0,30	
	85	47	0,61	
	100	47	1,60	
50	70	52	0,17	
	78	52	0,37	
	95	52	0,94	
	110	52	2,18	
55	78	57	0,25	
	90	57	0,59	
	105	57	1,30	
	120	57	2,91	

Thrust Ball bearings, single direction



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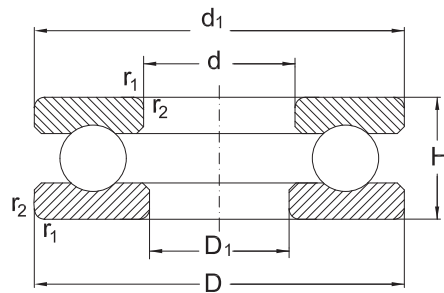
Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
60	85	17	1	51112	37,9	98,6	2600	3600
	95	26	1	51212	70,4	169	2000	3000
	110	35	1,1	51312	123	267	1600	2200
	130	51	1,5	51412 FP	200	400	1200	1700
65	90	18	1	51113	39,2	108	2400	3400
	100	27	1	51213	78,5	191	2000	3000
	115	36	1,1	51313	127	287	1600	2200
	140	56	2	51413 FP	216	450	1100	1600
70	95	18	1	51114	39,3	113	2400	3400
	105	27	1	51214	72,8	189	1900	2800
	125	40	1,1	51314	153	341	1400	1900
	150	60	2	51414 FP	236	500	1100	1600
75	100	19	1	51115	47,2	140	2200	3200
	110	27	1	51215	73,7	199	1900	2800
	135	44	1,5	51315	184	426	1300	1800
	160	65	2	51415 FP	250	560	1000	1500
80	105	19	1	51116	48,5	145	2200	3200
	115	28	1	51216	76,1	209	1800	2600
	140	44	1,5	51316	181	426	1300	1800
	170	68	2,1	51416 FP	270	620	950	1400

Thrust Ball bearings, single direction

*Abutment and fillet
dimensions see on
page 510*

Shaft		Dimensions		Mass
d	d ₁	D ₁	Bearing	
mm			[kg]	
60	85	62	0,33	
	95	62	0,65	
	110	62	1,37	
	130	62	3,70	
65	90	67	0,36	
	100	67	0,74	
	115	67	1,49	
	140	68	4,67	
70	95	72	0,39	
	105	72	0,78	
	125	72	1,91	
	150	73	5,72	
75	100	77	0,52	
	110	77	0,83	
	135	77	2,61	
	160	78	7,06	
80	105	82	0,56	
	115	82	0,91	
	140	82	2,71	
	170	83	8,23	

Thrust Ball bearings, single direction



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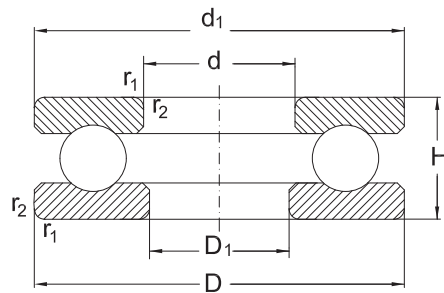
Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
85	110	19	1	51117	48	151	2200	3200
	125	31	1	51217	98	264	1600	2200
	150	49	1,5	51317	290	716	1200	1700
	180	72	2,1	51417 FP	290	680	900	1300
90	120	22	1	51118	62,3	190	1900	2800
	135	35	1,1	51218	127	338	1500	2000
	155	50	1,5	51318	196	465	1200	1700
	190	77	2,1	51418 FP	305	750	850	1200
100	135	25	1	51120	85	270	1600	2200
	150	38	1,1	51220	149	402	1400	1900
	170	55	1,5	51320	247	628	1100	1600
	210	85	3	51420 FP	365	965	750	1000
110	145	25	1	51122	86,5	290	1600	2200
	160	38	1,1	51222	156	447	1300	1800
	190	63	2	51322	319	869	950	1400
	230	95	3	51422 FP	415	1140	700	950
120	155	25	1	51124	90	310	1500	2000
	170	39	1,1	51224	170	509	1200	1700
	210	70	2,1	51324	325	915	850	1200
	250	102	4	51424 FP	425	1220	670	900

Thrust Ball bearings, single direction

*Abutment and fillet
dimensions see on
page 510*

Shaft		Dimensions		Mass
d	d ₁	D ₁	Bearing	
mm				[kg]
85	110	87	0,60	
	125	88	1,22	
	150	88	3,53	
	177	88	9,79	
90	120	92	0,88	
	135	93	1,68	
	155	93	3,57	
	187	93	11,60	
100	135	102	1,30	
	150	103	2,22	
	170	103	4,95	
	205	103	15,40	
110	145	112	1,45	
	160	113	2,41	
	187	113	7,70	
	225	113	20,80	
120	155	122	1,59	
	170	123	2,67	
	205	123	10,70	
	245	123	26,50	

Thrust Ball bearings, single direction



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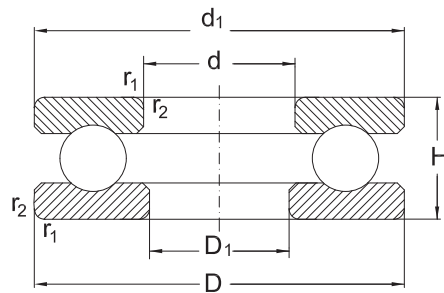
Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
130	170	30	1	51126	117	392	1300	1800
	190	45	1,5	51226	183	540	1100	1600
	225	75	2,1	51326 MP	360	1060	800	1100
	270	110	4	51426 FP	520	1600	600	800
140	180	31	1	51128	112	400	1300	1800
	200	46	1,5	51228	190	570	1000	1500
	240	80	2,1	51328 MP	400	1220	750	1000
150	190	31	1	51130 FP	110	400	1200	1700
	215	50	1,5	51230 MP	236	735	950	1400
	250	80	2,1	51330 MP	405	1290	700	950
	300	120	4	51430 FP	560	1800	560	750
160	200	31	1	51132 FP	112	430	1200	1700
	225	51	1,5	51232 MP	245	780	950	1400
	270	87	3	51332 M	479	1582	670	900
170	215	34	1,1	51134 FP	132	500	1100	1600
	240	55	1,5	51234 MP	285	930	850	1200
	280	87	3	51334 M	496	1704	670	900
180	225	34	1,1	51136 FP	134	530	1000	1500
	250	56	1,5	51236 MP	290	1000	850	1200
	300	95	3	51336 M	546	1956	600	800

Thrust Ball bearings, single direction

*Abutment and fillet
dimensions see on
page 510*

Shaft		Dimensions		Mass
d	d ₁	D ₁	Bearing	
mm				[kg]
130	170	132	2,37	
	187	133	3,99	
	220	134	13,00	
	265	134	32,80	
140	178	142	2,59	
	197	143	4,33	
	235	144	15,70	
150	188	152	2,26	
	212	153	6,09	
	245	154	16,40	
	295	154	43,10	
160	198	162	2,39	
	222	163	6,56	
	265	164	21,30	
170	213	172	3,08	
	237	173	8,12	
	275	174	22,50	
180	222	183	3,17	
	245	183	8,70	
	295	184	28,3	

Thrust Ball bearings, single direction



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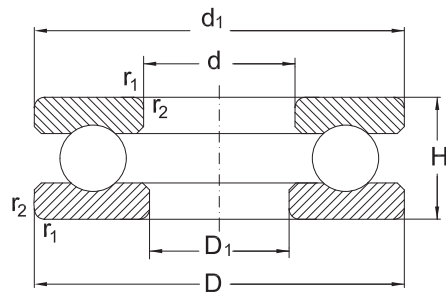
Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
190	240	37	1,1	51138 FP	170	655	950	1400
	270	62	2	51238 MP	335	1160	750	1000
	320	105	4	51338 M	600	2200	560	750
200	250	37	1,1	51140 FP	170	655	950	1400
	280	62	2	51240 MP	340	1220	750	1000
	340	110	4	51340 M	656	2414	530	700
220	270	37	1,1	51144 FP	176	735	850	1200
	300	63	2	51244 MP	355	1340	700	950
240	300	45	1,5	51148 FP	232	965	750	1000
	340	78	2,1	51248 MP	465	1860	600	800
260	320	45	1,5	51152 FP	236	1020	750	1000
	360	79	2,1	51252 MP	475	2000	560	750
280	350	53	1,5	51156 FP	315	1340	670	900
	380	80	2,1	51256 MP	490	2160	560	750
300	380	62	2	51160 FP	365	1600	600	800
	420	95	3	51260 MP	610	2750	480	630
320	400	63	2	51164 FP	375	1700	560	750
	440	95	3	51264 MP	620	2900	480	630
340	420	64	2	51168 FP	380	1800	560	750
	460	96	3	51268 M	640	3150	450	600

Thrust Ball bearings, single direction

*Abutment and fillet
dimensions see on
page 510*

Shaft		Dimensions		Mass
d	d ₁	D ₁	Bearing	
mm				[kg]
190	237	193	4,08	
	265	194	11,70	
	315	195	35,70	
200	245	203	4,26	
	275	204	12,00	
	335	205	44,30	
220	265	223	4,64	
	295	224	13,20	
240	297	243	7,69	
	335	244	23,00	
260	317	263	8,25	
	355	264	25,20	
280	347	283	12,50	
	375	284	26,70	
300	376	304	17,70	
	415	304	42,30	
320	396	324	19,10	
	435	325	44,20	
340	416	344	20,50	
	455	345	47,00	

Thrust Ball bearings, single direction



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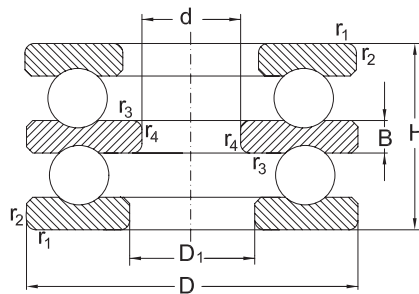
Shaft		Dimension		Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN	min ⁻¹		
360	440	65	2	51172 MP	405	2000	530	700
	500	110	4	51272 M	765	3900	400	530
380	460	65	2	51176 MP	430	2240	500	670
400	480	65	2	51180 MP	440	2320	500	670
420	500	65	2	51184 MP	440	2450	480	630
460	560	80	2,1	51192 MP	530	3100	430	560
500	600	80	2,1	511/500 MP	550	3350	400	530
530	640	85	3	511/530 MP	620	3900	360	480
560	670	85	3	511/560 MP	630	4150	300	380

Thrust Ball bearings, single direction

*Abutment and fillet
dimensions see on
page 510*

Shaft		Dimensions		Mass
d	d ₁	D ₁	Bearing	
mm				[kg]
360	436	364	21,50	
	495	365	69,50	
380	456	384	22,40	
400	476	404	23,50	
420	495	424	24,40	
460	555	464	42,00	
500	595	505	44,90	
530	635	535	54,80	
560	665	565	58,00	

Thrust Ball bearings, double direction



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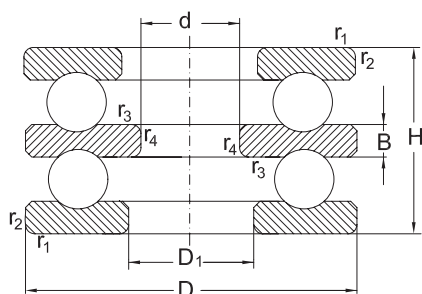
Shaft		Dimension			Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm						kN	min ⁻¹		
10	32	22	0,6	0,3	52202	16,6	25	5000	6700
15	40	26	0,6	0,3	52204	22,4	37,7	4300	5600
	60	45	1	0,6	52205	56	90	2600	3600
20	47	28	0,6	0,3	52205	28	50,4	3800	5000
	52	34	1	0,3	52305	35,7	61,4	3200	4300
	70	52	1	0,6	52406	72	125	2200	3200
25	52	29	0,6	0,3	52206	28,1	54,3	3600	4800
	60	38	1	0,3	52306	42,8	78,7	3000	4000
	80	59	1,1	0,6	52407	86,5	156	2000	3000
30	62	34	1	0,3	52207	40,7	83,8	3000	4000
	68	36	1	0,6	52208	46,9	98,3	2800	3800
	68	44	1	0,3	52307	55,5	105	2600	3600
	78	49	1	0,6	52308	69,3	135	2200	3200
	90	65	1,1	0,6	52408	112	204	1700	2400
35	73	37	1	0,6	52209	47,7	105	2600	3600
	85	52	1	0,6	52309	80,8	163	2000	3000
	100	72	1,1	0,6	52409	129	245	1600	2200
40	78	39	1	0,6	52210	50	111	2400	3400
	95	58	1,1	0,6	52310	91,6	186	1900	2800
	110	78	1,5	0,6	52410	156	310	1500	200

Thrust Ball bearings, double direction

*Abutment and fillet
dimensions see on
page 514*

Shaft		Dimensions		Mass
d	D ₁	B	Bearing	
mm			[kg]	
10	17	5	0,08	
	22	6	0,15	
15	27	11	0,59	
	27	7	0,22	
20	27	8	0,32	
	32	12	0,92	
25	32	7	0,25	
	32	9	0,47	
30	37	14	1,35	
	37	8	0,41	
35	42	9	0,55	
	37	10	0,68	
40	42	12	1,01	
	42	15	1,92	
35	47	9	0,60	
	47	12	1,25	
40	47	17	2,55	
	52	9	0,71	
40	52	14	1,77	
	52	18	3,43	

Thrust Ball bearings, double direction



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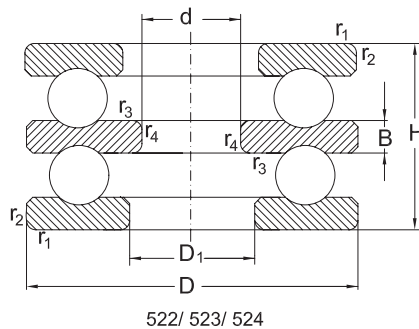
Shaft		Dimension			Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm						kN	min ⁻¹		
45	90	45	1	0,6	52211	69,4	159	2200	3200
	105	64	1,1	0,6	52311	119	246	1700	2400
	120	87	1,5	0,6	52411	180	360	1300	1800
50	95	46	1	0,6	52212	73,6	179	2000	3000
	110	64	1,1	0,6	52312	124	267	1600	2200
	130	93	1,5	0,6	52412	200	400	1200	1700
	140	101	2	1	52413	216	450	1100	1600
55	100	47	1	0,6	52213	74,8	189	2000	3000
	105	47	1	1	52214	73,6	189	1900	2800
	115	65	1,1	0,6	52313	106	220	1600	2200
	125	72	1,1	1	52314	148	339	1400	1900
	150	107	2	1	52414	236	500	1100	1600
60	110	47	1	1	52215	77,4	209	1900	2800
	135	79	1,5	1	52315	171	396	1300	1800
	160	115	2	1	52415	250	560	1000	1500
65	115	48	1	1	52216	78,5	218	1800	2600
	140	79	1,5	1	52316	176	424	1300	1800
	170	120	2	1	52416	270	620	950	1400
	180	128	2,1	1,1	52417	290	680	900	1300
70	125	55	1	1	52217	92,3	251	1600	2200

Thrust Ball bearings, double direction

*Abutment and fillet
dimensions see on
page 514*

Shaft		Dimensions		Mass
d	D ₁	B	Bearing	
mm			[kg]	
45	57	10	1,10	
	57	15	2,38	
	57	20	4,52	
50	62	10	1,21	
	62	15	2,53	
	62	21	5,72	
	68	23	7,18	
55	67	10	1,34	
	72	10	1,47	
	67	15	2,73	
	72	16	3,66	
	73	24	8,76	
60	77	10	1,57	
	77	18	4,80	
	78	26	10,80	
65	82	10	1,72	
	82	18	4,94	
	83	27	12,70	
	88	29	15,10	
70	88	12	2,39	

Thrust Ball bearings, double direction



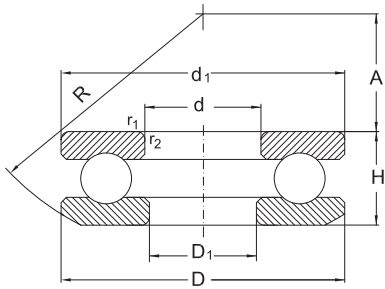
Shaft		Dimension			Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm						kN	min ⁻¹		
70	150	87	1,5	1	52317	190	425	1200	1700
	190	135	2,1	1,1	52418	305	750	850	1200
75	135	62	1,1	1	52218	120	326	1500	200
	155	88	1,5	1	52318	196	465	1200	1700
80	210	150	3	1,1	52420	365	965	750	1000
85	150	67	1,1	1	52220	147	410	1400	1900
	170	97	1,5	1	52320	236	596	1100	1600
95	160	67	1,1	1	52222	148	431	1300	1800
	190	110	2	1	52322 MP	275	720	950	1400
100	170	68	1,1	1,1	52224	154	472	1200	1700
	210	123	2,1	1,1	52324 MP	325	915	850	1200
110	190	80	1,5	1,1	52226	203	622	1100	1600
	225	130	2,1	1,1	52326 MP	360	1060	800	1100
120	200	81	1,5	1,1	52228	190	570	1000	1500
	240	140	2,1	1,1	52328 MP	400	1220	750	1000
130	215	89	1,5	1,1	52230 MP	236	735	950	1400
140	225	90	1,5	1,1	52232 MP	245	780	950	1400
150	240	97	1,5	1,1	52234 MP	285	930	850	1200

Thrust Ball bearings, double direction

*Abutment and fillet
dimensions see on
page 514*

Shaft		Dimensions		Mass
d	D ₁	B		Bearing
mm				[kg]
70	88	19		6,35
	88	30		17,80
75	93	14		3,22
	93	19		6,80
80	103	33		23,80
85	103	15		4,21
	103	21		8,94
95	113	15		4,63
	113	24		13,90
100	123	15		5,23
	123	27		19,40
110	133	18		7,99
	134	30		23,40
120	143	18		8,66
	144	31		28,20
130	153	20		11,40
140	163	20		12,10
150	173	21		14,90

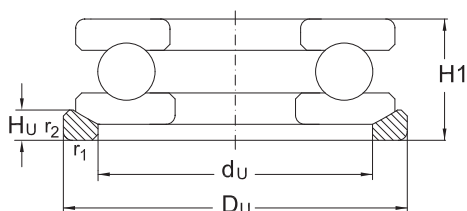
Thrust Ball bearings, single direction, with Sphered Housing Washer



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Dimension				Designation		Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease	oil
mm						kN		min ⁻¹	
10	26	11,6	0,6	53200	U200	12,7	17	6000	8000
12	28	11,4	0,6	53201	U201	13,2	19	6000	8000
15	32	13,3	0,6	53202	U202	16,6	25	5000	6700
17	35	13,2	0,6	53203	U203	17,3	27,5	5000	6700
20	40	14,7	0,6	53204	U204	22,4	37,5	4300	5600
25	47	16,7	0,6	53205	U205	28	50	3800	5000
	52	19,8	1	53305	U305	34,5	55	3200	4300
	60	26,4	1	53405	U405	56	90	2600	3600
30	52	17,8	0,6	53206	U206	29,2	58,2	3600	4800
	60	22,6	1	53306	U306	38	65,5	3000	4000
	70	30,1	1	53406	U406	72	125	2200	3200
35	62	19,9	1	53207	U207	35,5	67	3000	4000
	68	25,6	1	53307	U307	50	88	2600	3600
	80	34	1,1	53407	U407	86,5	156	2000	3000
40	68	20,3	1	53208	U208	46,5	98	2800	3800
	78	28,5	1	53308	U308	68	135	2200	3200
	90	38,2	1,1	53408	U408	112	204	1700	2400

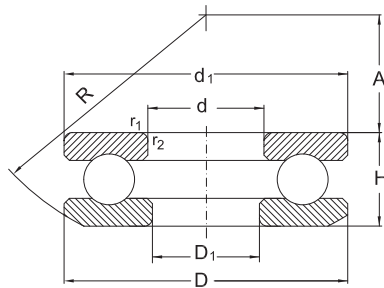
Thrust Ball bearings, single direction, with Sphered Housing Washer



Abutment and fillet
dimensions see on
page 512

Dimensions									Mass	
d	D ₁	d ₁	R	A	d _u	D _u	H _u	H ₁	Bearing	Seating Washer
mm									[kg]	
10	12	26	22	8,5	18	28	3,5	13	0,03	0,01
12	14	28	25	11,5	20	30	3,5	13	0,03	0,012
15	17	32	28	12	24	35	4	15	0,05	0,014
17	19	35	32	16	26	38	4	15	0,06	0,015
20	22	40	36	18	30	42	5	17	0,08	0,02
25	27	47	40	19	36	50	5,5	19	0,12	0,032
	27	52	45	21	38	55	6	22	0,18	0,044
	27	60	50	19	42	62	8	29	0,41	0,072
30	32	52	45	22	42	55	5,5	20	0,16	0,038
	32	60	50	22	45	62	7	25	0,27	0,056
	32	70	56	20	50	75	9	33	0,63	0,13
35	37	62	50	24	48	65	7	22	0,22	0,057
	37	68	56	24	52	72	7,5	28	0,38	0,084
	37	80	64	23	58	85	10	37	0,92	0,17
40	42	68	56	28,5	55	72	7	23	0,27	0,07
	42	78	64	28	60	82	8,5	31	0,55	0,12
	42	90	72	26	65	95	12	42	1,30	0,25

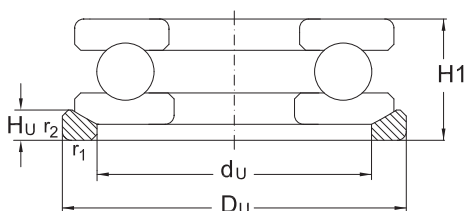
Thrust Ball bearings, single direction, with Sphered Housing Washer



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Dimension				Designation		Basical radial load		Speed limit	
d	D	H	r_1, r_2 min.	Bearing	Seating Washer	dyn. C_a	stat. C_{0a}	grease	oil
mm						kN		min ⁻¹	
45	73	21,3	1	53209	U209	39	80	2600	3600
	85	30,1	1	53309	U309	75	140	2000	3000
	100	42,4	1,1	53409	U409	129	245	1600	2200
50	78	23,5	1	53210	U210	50	106	2400	3400
	95	34,3	1,1	53310	U310	88	173	1900	2800
	110	45,6	1,5	53410	U410	156	310	1500	2000
55	90	27,3	1	53211	U211	61	134	2200	3200
	105	39,3	1,1	53311	U311	102	208	1700	2400
	120	50,5	1,5	53411	U411	180	360	1300	1800
60	95	28	1	53212	U212	62	140	2000	3000
	110	38,3	1,1	53312	U312	102	208	1600	2200
	130	54	1,5	53412 FP	U412	200	400	1200	1700
65	100	28,7	1	53213	U213	64	150	2000	3000
	115	39,4	1,1	53313	U313	106	220	1600	2200
	140	60,2	2	53413 FP	U413	216	450	1100	1600
70	105	28,8	1	53214	U214	71	179	1900	2800
	125	44,2	1,1	53314	U314	137	300	1400	1900
	150	63,6	2	53414 FP	U414	236	500	1100	1600

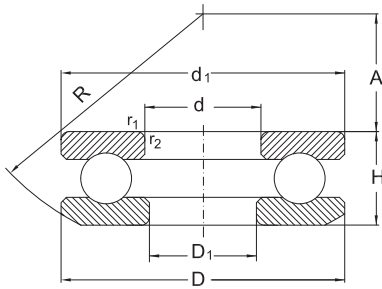
Thrust Ball bearings, single direction, with Sphered Housing Washer



Abutment and fillet
dimensions see on
page 512

Dimensions									Mass	
d	D ₁	d ₁	R	A	d _U	D _U	H _U	H ₁	Bearing	Seating Washer
mm									[kg]	
45	47	73	56	26	60	78	7,5	24	0,30	0,087
	47	85	64	25	65	90	10	33	0,66	0,17
	47	100	80	29	72	105	12,5	46	1,77	0,32
50	52	78	64	32,5	62	82	7,5	26	0,37	0,098
	52	95	72	28	72	100	11	37	0,97	0,23
	52	110	90	35	80	115	14	50	2,33	0,41
55	57	90	72	35	72	95	9	30	0,60	0,152
	57	105	80	30	80	110	11,5	42	1,38	0,28
	57	120	90	28	88	125	15,5	55	3,08	0,53
60	62	95	72	32,5	78	100	9	31	0,66	0,16
	62	110	90	41	85	115	11,5	42	1,41	0,31
	62	130	100	34	95	135	16	58	3,94	0,71
65	67	100	80	40	82	105	9	32	0,73	0,18
	67	115	90	38,5	90	120	12,5	43	1,53	0,34
	68	140	112	40	100	145	17,5	65	5,05	0,81
70	72	105	80	38	88	110	9	32	0,78	0,185
	72	125	100	43	98	130	13	48	2,10	0,41
	73	150	112	34	110	155	19,5	69	6,09	0,99

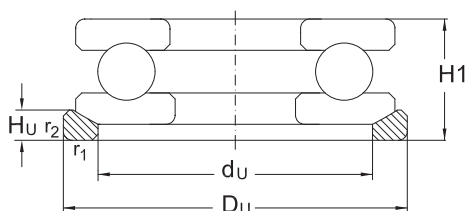
Thrust Ball bearings, single direction, with Sphered Housing Washer



532/ 533/ 534

Dimension				Designation		Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease	oil
mm						kN		min ⁻¹	
75	110	28,3	1	53215	U215	67	170	1900	2800
	135	48,1	1,5	53315	U315	163	360	1300	1800
	160	69	2	53415 FP	U415	250	560	1000	1500
80	115	29,5	1	53216	U216	75	190	1800	2600
	140	47,6	1,5	53316	U316	160	360	1300	1800
	170	72,2	2,1	53416 FP	U416	270	620	950	1400
85	125	33,1	1	53217	U217	98	250	1600	2200
	150	53,1	1,5	53317	U317	190	425	1200	1700
	180	77	2,1	53417 FP	U417	290	680	900	1300
90	135	38,5	1,1	53218	U218	120	300	1500	2000
	155	54,6	1,5	53318	U318	196	465	1200	1700
	190	81,2	2,1	53418 FP	U418	305	750	850	1300
100	150	40,9	1,1	53220	U220	122	320	1400	1900
	170	59,2	1,5	53320	U320	232	560	1100	1600
	210	90	3	53420 FP	U420	565	965	750	1000
110	160	40,2	1,1	53222	U222	129	360	1300	1800
	190	67,2	2	53322	U322	275	720	950	1400
	230	99,7	3	53422 FP	U422	415	1140	700	950

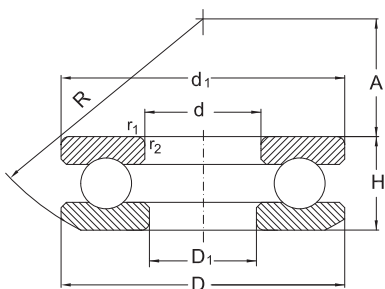
Thrust Ball bearings, single direction, with Sphered Housing Washer



Abutment and fillet
dimensions see on
page 512

Dimensions									Mass	
d	D ₁	d ₁	R	A	d _U	D _U	H _U	H ₁	Bearing	Seating Washer
mm									[kg]	
75	77	110	90	49	92	115	9,5	32	0,81	0,21
	77	135	100	37	105	140	15	52	2,67	0,55
	78	160	125	42	115	165	21	75	7,54	1,23
80	82	115	90	46	98	120	10	33	0,90	0,22
	82	140	112	50	110	145	15	52	2,77	0,57
	83	170	125	36	125	175	22	78	8,93	1,38
85	88	125	100	52	105	130	11	37	1,22	0,29
	88	150	112	43	115	155	17,5	58	3,53	0,81
	88	177	140	47	130	185	23	83	10,60	1,64
90	93	135	100	45	110	140	13,5	42	1,70	0,42
	93	155	112	40	120	160	18	59	3,83	0,84
	93	187	140	40	140	195	25,5	88	12,30	1,9
100	103	150	112	52	125	155	14	45	2,22	0,5
	103	170	125	46	135	175	18	64	4,98	0,95
	103	205	160	50	155	220	27	98	16,40	2,9
110	113	160	125	65	135	165	14	45	2,37	0,56
	113	187	140	51	150	195	20,5	72	7,83	1,28
	113	225	180	59	170	240	29	109	22,00	3,7

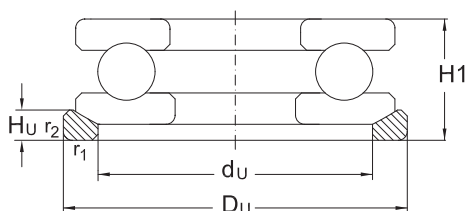
Thrust Ball bearings, single direction, with Sphered Housing Washer



532/ 533/ 534

Dimension				Designation		Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease	oil
mm						kN		min ⁻¹	
120	170	40,8	1,1	53224	U224	140	400	1200	1700
	210	74,1	2,1	53324 MP	U324	325	915	850	1200
	250	107,3	4	53424 FP	U424	425	1220	670	900
130	190	47,9	1,5	53226	U226	183	540	1100	1600
	225	80,3	2,1	53326 MP	U326	360	1060	800	1100
	270	115,2	4	53426 FP	U426	520	1600	600	800
140	200	48,6	1,5	53228	U228	190	570	1000	1500
	240	84,9	2,1	53328 MP	U328	400	1220	750	1000
150	215	53,3	1,5	53230 MP	U230	236	735	950	1400
	250	83,7	2,1	53330 MP	U330	405	1290	700	950
160	225	54,7	1,5	53232 MP	U232	245	780	950	1400
170	240	58,7	1,5	53234 MP	U234	285	930	850	1200
180	250	58,2	1,5	53236 MP	U236	290	1000	700	1100
190	270	65,7	2	53238 MP	U238	335	1160	600	1000

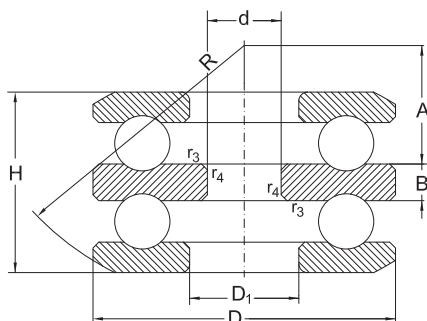
Thrust Ball bearings, single direction, with Sphered Housing Washer



Abutment and fillet
dimensions see on
page 512

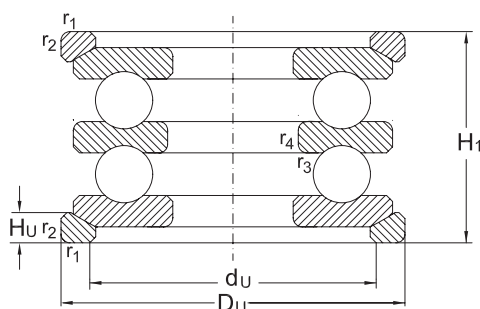
Dimensions									Mass	
d	D ₁	d ₁	R	A	d _u	D _u	H _u	H ₁	Bearing	Seating Washer
mm									[kg]	
120	123	170	125	61	145	175	15	46	2,57	0,65
	123	205	160	63	165	220	22	80	10,60	2
	123	245	200	70	185	260	32	118	28,10	4,7
130	133	187	140	67	160	195	17	53	3,93	0,9
	134	220	160	53	177	235	26	86	12,90	2,5
	134	265	200	58	200	280	38	128	34,60	6,4
140	143	197	160	87	170	210	17	55	4,27	1,22
	144	235	180	68	190	250	26	92	15,60	2,9
150	153	212	160	79	180	225	20,5	60	5,81	1,69
	154	245	200	89,5	200	260	26	92	16,10	3,1
160	163	222	160	74	190	235	21	61	6,44	1,81
170	173	237	180	91	200	250	21,5	65	7,91	2,14
180	183	245	200	112	210	260	21,5	66	8,19	1,06
190	195	265	200	98	230	280	23	73	11,50	2,6

Thrust Ball bearings, double direction, with Sphered Housing Washer



Shaft		Dimension			Designation		Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease	oil
mm							kN		min ⁻¹	
10	32	24,6	0,6	0,3	54202	U202	16,6	25	5000	6700
	60	49,7	1	0,6	54405	U405	56	90	2600	3600
20	47	31,4	0,6	0,3	54205	U205	28	50	3800	5000
	52	37,6	1	0,3	54305	U305	34,5	55	3200	4300
	70	56,2	1	0,6	54406	U406	72	125	2200	3200
25	52	32,6	0,6	0,3	54206	U206	25,5	47,5	3600	4800
	60	41,3	1	0,3	54306	U306	38	65,5	3000	4000
	80	63,1	1,1	0,6	54407	U407	86,5	156	2000	3000
30	62	37,8	1	0,3	54207	U207	35,5	67	3000	4000
	68	38,6	1	0,6	54208	U208	46,5	98	2800	3800
	68	47,2	1	0,3	54307	U307	50	88	2600	3600
	78	54,1	1	0,6	54308	U308	61	112	2200	3200
	90	69,5	1,1	0,6	54408	U408	112	204	1700	2400
35	73	39,6	1	0,6	54209	U209	39	80	2600	3600
	85	56,3	1	0,6	54309	U309	75	140	2000	3000
	100	78,9	1,1	0,6	54409	U409	129	245	1600	2200
40	78	42	1	0,6	54210	U210	50	106	2400	3400

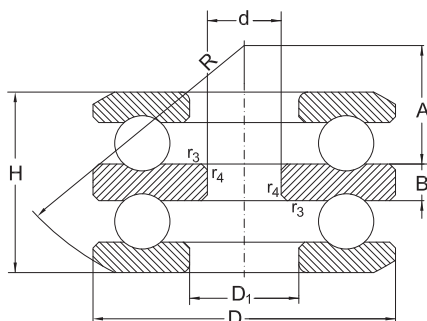
Thrust Ball bearings, double direction, with Sphered Housing Washer



Abutment and fillet
dimensions see on
page 514

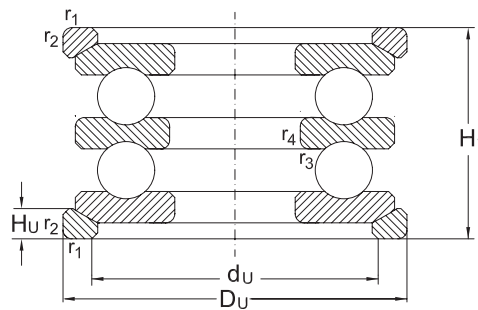
Dimensions									Mass	
d	D ₁	B	R	A	d _U	D _U	H _U	H ₁	Bearing	Seating Washer
mm									[kg]	
10	17	5	28	10,5	24	35	4	28	0,09	0,01
15	22	6	36	16	30	42	5	32	0,15	0,02
	27	11	50	15	42	62	8	55	0,50	0,07
20	27	7	40	16,5	36	50	5,5	36	0,23	0,03
	27	8	45	18	38	55	6	42	0,32	0,04
	32	12	56	16	50	75	9	62	0,73	0,13
25	32	7	45	20	42	55	5,5	37	0,27	0,04
	32	9	50	19,5	45	62	7	46	0,47	0,06
	37	14	64	18,5	58	85	10	69	1,08	0,17
30	37	8	50	21	48	65	7	42	0,42	0,06
	42	9	56	25	55	72	7	44	0,56	0,07
	37	10	56	21	52	72	7,5	52	0,68	0,08
	42	12	64	23,5	60	82	8,5	59	1,06	0,12
	42	15	72	22	65	95	12	77	1,51	0,25
35	47	9	56	23	60	78	7,5	45	0,60	0,09
	47	12	64	21	65	90	10	62	1,24	0,17
	47	17	80	23,5	72	105	12,5	86	2,08	0,32
40	52	9	64	30,5	62	82	7,5	47	0,70	0,10

Thrust Ball bearings, double direction, with Sphered Housing Washer



Shaft d	Dimension				Designation		Basical radial load		Speed limit	
	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease	oil
mm							kN		min ⁻¹	
40	95	64,7	1,1	0,6	54310	U310	88	173	1900	2800
	110	83,2	1,5	0,6	54410	U410	156	310	1500	2000
45	90	49,6	1	0,6	54211	U211	61	134	2200	3200
	105	72,6	1,1	0,6	54311	U311	102	208	1700	2400
	120	92	1,5	0,6	54411	U411	180	360	1300	1800
50	95	50	1	0,6	54212	U212	62	140	2000	3000
	110	70,7	1,1	0,6	54312	U312	102	208	1600	2200
	130	99	1,5	0,6	54412	U412	200	400	1200	1700
	140	109,4	2	1	54413	U413	216	450	1100	1600
55	100	50,4	1	0,6	54213	U213	64	150	2000	3000
	105	50,6	1	1	54214	U214	65,5	160	1900	2800
	115	71,9	1,1	0,6	54313	U313	106	220	1600	2200
	125	80,3	1,1	1	54314	U314	137	300	1400	1900
	150	114,1	2	1	54414	U414	236	500	1100	1600
60	110	49,6	1	1	54215	U215	67	170	1900	2800
	135	87,2	1,5	1	54315	U315	163	360	1300	1800
	160	123	2	1	54415	U415	250	560	1000	1500
65	115	51	1	1	54216	U216	75	190	1800	2600

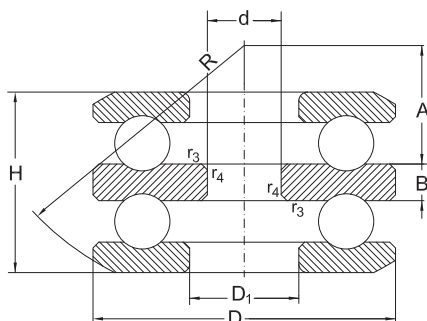
Thrust Ball bearings, double direction, with Sphered Housing Washer



Abutment and fillet
dimensions see on
page 514

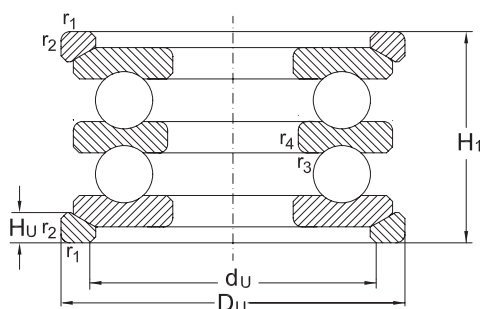
Dimensions									Mass	
d	D ₁	B	R	A	d _U	D _U	H _U	H ₁	Bearing	Seating Washer
mm									[kg]	
40	52	14	72	23	72	100	11	70	1,83	0,23
	52	18	90	30	80	115	14	92	2,68	0,41
45	57	10	72	32,5	72	95	9	55	1,13	0,15
	57	15	80	25,5	80	110	11,5	78	2,54	0,28
	57	20	90	22,5	88	125	15,5	101	3,49	0,53
50	62	10	72	30,5	78	100	9	56	1,22	0,16
	62	15	90	36,5	85	115	11,5	78	2,62	0,31
	62	21	100	28	95	135	16	107	4,41	0,71
	68	23	112	34	100	145	17,5	119	5,67	0,81
55	67	10	80	38,5	82	105	9	57	1,33	0,18
	72	10	80	36,5	88	110	9	57	1,47	0,19
	67	15	90	34,5	90	120	12,5	79	2,82	0,34
	72	16	100	39	98	130	13	88	3,87	0,41
	73	24	112	28,5	110	155	19,5	125	6,77	0,99
60	77	10	90	47,5	92	115	9,5	57	1,54	0,21
	77	18	100	32,5	105	140	15	95	4,92	0,55
	78	26	125	36,5	115	165	21	135	8,33	1,23
65	82	10	90	45	98	120	10	58	1,70	0,22

Thrust Ball bearings, double direction, with Sphered Housing Washer



Shaft d	Dimension				Designation		Basical radial load		Speed limit	
	D	H	r ₁ , r ₂ min.	r ₃ , r ₄ min.	Bearing	Seating Washer	dyn. C _a	stat. C _{0a}	grease	oil
mm							kN		min ⁻¹	
65	140	86,1	1,5	1	54316	U316	160	360	1300	1800
	170	128,5	2,1	1	54416	U416	270	620	950	1400
	180	138	2,1	1,1	54417	U417	290	680	900	1300
70	125	59,2	1	1	54217	U217	98	250	1600	2200
	150	95,2	1,5	1	54317	U317	190	425	1200	1700
	190	143,5	2,1	1,1	54418	U418	305	750	850	1200
75	135	69	1,1	1	54218	U218	120	300	1500	2000
	155	97,1	1,5	1	54318	U318	196	465	1200	1700
80	210	159,9	3	1,1	54420	U420	365	965	750	1000
85	150	72,8	1,1	1	54220	U220	122	320	1400	1900
	170	105,4	1,5	1	54320	U320	132	560	1100	1600
95	160	71,4	1,1	1	54222	U222	129	360	1300	1800
	190	118,4	2	1	54322 MP	U322	275	720	950	1400
100	170	71,6	1,1	1,1	54224	U224	140	400	1200	1700
	210	131,2	2,1	1,1	54324 MP	U324	325	915	850	1200
110	190	85,8	1,5	1,1	54226	U226	183	540	1100	1600

Thrust Ball bearings, double direction, with Sphered Housing Washer



Abutment and fillet
dimensions see on
page 514

Dimensions									Mass	
d	D ₁	B	R	A	d _U	D _U	H _U	H ₁	Bearing	Seating Washer
mm									[kg]	
65	82	18	112	45,5	110	145	15	95	5,05	0,57
	83	27	125	30,5	125	175	22	140	9,76	1,38
	88	29	140	40,5	130	185	23	150	8,64	1,64
70	88	12	100	49,5	105	130	11	67	2,39	0,29
	88	19	112	39	115	155	17,5	105	6,36	0,81
	93	30	140	34,5	140	195	25,2	157	13,60	1,90
75	93	14	100	42	110	140	13,5	76	3,27	0,42
	93	19	112	36,5	120	160	18	106	6,86	0,84
80	103	33	160	43,5	155	220	27	176	18,20	2,90
85	103	15	112	49	125	155	14	81	4,23	0,50
	103	21	125	42	135	175	18	115	8,99	0,95
95	113	15	125	62	135	165	14	81	4,57	0,56
	113	24	140	55	150	195	20,5	128	12,10	1,28
100	123	15	125	58,5	145	175	15	82	5,05	0,65
	123	27	160	58	165	220	22	143	19,10	2,00
110	133	18	140	63	160	195	17	96	7,78	0,90



Cylindrical Roller Thrust Bearings

Cylindrical Roller Thrust Bearings

Standards, Boundary dimensions	
Standard plans	DIN 616
Cylindrical roller thrust bearings	DIN 722

General

Cylindrical Roller Thrust Bearings series **811** and **812** are single direction acting separable axial bearings.

Cylindrical roller thrust bearings are insensitive to shock loading and feature much higher load carrying capacity compared to thrust ball bearings. They accommodate very high axial loads but no radial forces. They provide a very rigid bearing assembly for high thrust loading with less space requirement.

Cylindrical roller thrust bearings are of simple design, they consist of a **shaft washer (WS)**, a **housing washer (GS)**, and a **cylindrical roller**

and cage thrust assembly (K), see Abb. 1.

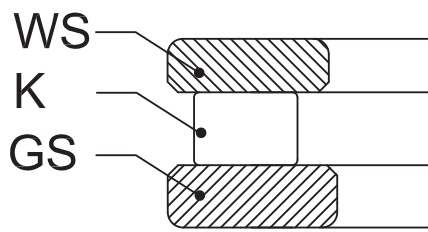
With all cylindrical roller thrust bearings, increased sliding friction can occur at the end of the cylindrical rollers.

In order to minimise this negative effect, **URB cylindrical roller thrust bearings with wider sectional widths** are produced using several short rollers in each cage pockets instead of using individual longer rollers.

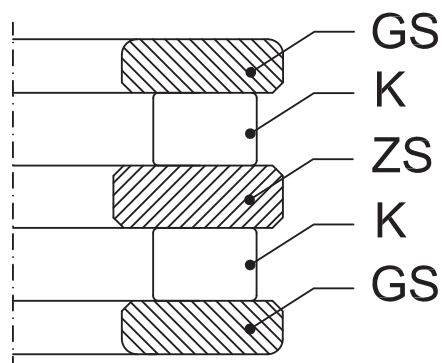
Due to their specific kinematic behaviour, cylindrical roller thrust bearings are only suitable for low speed applications only. Furthermore, they require minimal axial loads for their optimum function.

Design variants

URB cylindrical roller thrust bearings are produced in single direction design only as standard (see Abb. 1a)



a



b

Double direction acting cylindrical roller thrust bearings are built using a combination of the components from single direction acting cylindrical roller thrust bearings together with **intermediate washers ZS**, (see Abb. 1 b).

Such intermediate washers are part of URB supplementary product range and are available on request.

For application designs with space restrictions the cylindrical roller and cage thrust assemblies may be used without washers providing the contact faces of adjacent machine parts are machined as bearing raceways, (e.g. hardened and ground, etc).

The components of cylindrical roller thrust bearing are frequently used either separately or in conjunction with other components in several applications (e.g. to build needle roller thrust assemblies) therefore, they are available as loose parts.

Misalignment

All cylindrical roller thrust bearing type do not allow any misalignment.

The contacting surfaces of both shaft and housing seats must be parallel.

Cages

Small URB cylindrical roller thrust bearings are fitted with shaft - centred polyamide cages as standard. Polyamide cages are suitable for operating temperatures up to **+120°C**.

Large cylindrical roller thrust bearings are produced with either solid brass cages (suffix **MP**), or with solid steel cages, (suffix **FP**).

Tolerances

URB cylindrical roller thrust bearings are produced to normal class tolerance (**PN**) as standard.

For applications of higher accuracy these bearings are produced to precision tolerance class (e.g. **P6**) on order request.

For detailed values of the tolerance classes see chapter "**Bearing tolerances**" (see page 40).

Minimum load:

All cylindrical roller thrust bearing require a certain minimum axial load to ensure a satisfactory operating function.

To prevent excessive sliding friction, the minimum axial load applied should be greater than **5%** of the axial bearing dynamic load rating **C_a**.

Where such a minimum axial load is not possible the load must be increased by effective measures, (i.e. preloading the bearing) using pressure washers or springs.

Equivalent dynamic bearing load

Cylindrical roller thrust bearings are pure axial bearings, they are not able to accommodate any radial loads, therefore:

$$P = F_a$$

Equivalent static bearing load

For cylindrical roller thrust bearings:

$$P_0 = F_a$$

Design of adjacent machine parts

When **cylindrical roller and cage thrust assemblies** are used without washers adjacent machine parts must be designed and machined as bearing raceways (e.g. hardened and ground etc).

The maximum permissible axial runout of the adjacent surfaces acting as raceway must also meet the requirements of the respective washers.

For detailed information see chapter "**Design of bearing location**", on page 45.

The bore diameters of **URB cylindrical roller and cage thrust assemblies** have tolerances according to ISO Tolerance field (**E11**), whilst the tolerance of their outer diameters lies in the tolerance field (**a13**).

Cylindrical roller and cage thrust assemblies require an effective guidance when operating at higher speeds.

To avoid excessive wear, at higher speeds, the guiding surface must be ground.

Bearing seats for cylindrical roller thrust bearings

For the design of cylindrical roller thrust bearing seats the following of tolerance fields have proven to be satisfactory in practice:

Centred at	Tolerance field	
	Shaft	Housing
Cylindrical roller and cage thrust assembly	h8	H9
Shaft washer	h6	-
Housing washer	-	H7

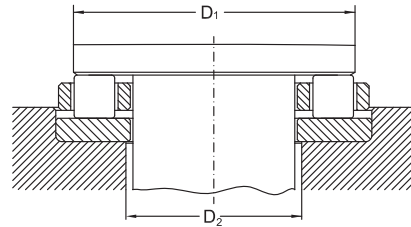
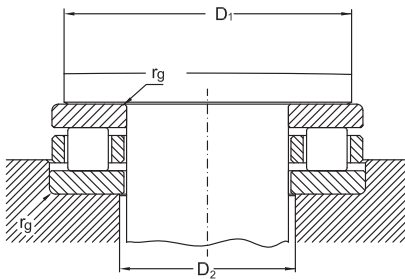
Abutment and Fillet dimensions for cylindrical roller thrust bearings

In case of cylindrical roller thrust bearings, an effective support of the bearing washers over the total width of their raceways by adjacent machine parts is necessary.

The bearing washer must contact adjacent parts with their side face only. The fillet radii of bearing corners must not touch the shoulder fillet radii of the shaft or housing shoulders.

Therefore, the largest fillet radius (r_g) must be smaller than the minimum fillet dimension of the bearing rings (r_s) as listed in the following tables.

Abutment and Fillet dimensions for cylindrical roller thrust bearings, series 811 and 812 [mm]

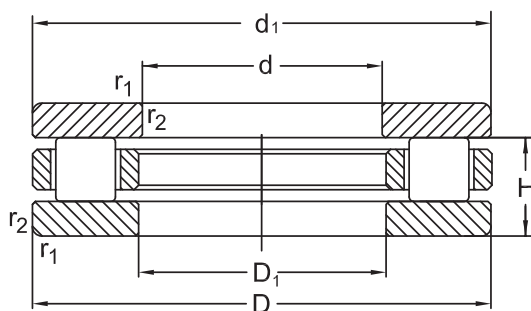


Shaft Φd	Bore reference number	Bearing Series					
		811			812		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm							
15	02	25	18	0,3	-	-	-
17	03	27	20	0,3	-	-	-
20	04	32	23	0,3	-	-	-
25	05	39	28	0,6	-	-	-
30	06	44	33	0,6	49	33	0,6
35	07	49	38	0,6	56	41	1
40	08	56	44	0,6	63	45	1
45	09	61	49	0,6	68	50	1
50	10	66	54	0,6	73	55	1
55	11	73	60	0,6	84	61	1
60	12	80	65	1	89	66	1
65	13	85	70	1	94	71	1
70	14	90	75	1	99	76	1
75	15	95	80	1	104	81	1
80	16	100	85	1	109	86	1
85	17	105	90	1	117	93	1
90	18	114	96	1	127	98	1
100	20	129	106	1	140	110	1
110	22	139	116	1	150	120	1
120	24	149	126	1	160	130	1
130	26	162	138	1	179	141	1,5
140	28	172	148	1	189	151	1,5
150	30	182	158	1	204	161	1,5

Abutment and Fillet dimensions for cylindrical roller thrust bearings, series 811 and 812 [mm]

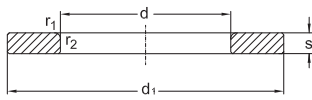
Shaft Φd	Bore reference number	Bearing Series					
		811			812		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm							
160	32	192	168	1	214	171	1,5
170	34	207	178	1	227	183	1,5
180	36	217	188	1	237	193	1,5
190	38	230	200	1	256	204	2
200	40	240	210	1	266	214	2
220	44	260	230	1	286	234	2
240	48	288	252	1,5	322	258	2,1
260	52	308	272	1,5	342	278	2,1
280	56	337	293	1,5	362	298	2,1
300	60	365	315	2	398	322	2,5
320	64	385	335	2	418	342	2,5
340	68	405	355	2	438	362	2,5
360	72	425	375	2	475	385	3
380	76	445	395	2	495	405	3
400	80	465	415	2	515	425	3
420	84	485	435	2	552	448	4
440	88	522	458	2,1	572	468	4
460	92	542	478	2,1	592	488	4
480	96	562	498	2,1	621	509	4
500	/500	582	518	2,1	641	529	4
530	/530	619	551	2,5	680	560	4
560	/560	649	581	2,5	715	595	4
600	/600	689	621	2,5	764	636	4

Cylindrical Roller Thrust Bearings

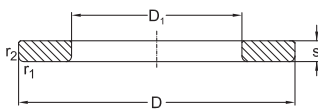


Dimension				Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN		min ⁻¹	min ⁻¹
30	47	11	0,6	81106	28	83	2600	6700
	52	16	0,6	81206	50	132	2400	6300
35	52	12	0,6	81107	30	93	2200	6000
	62	18	1	81207	54	156	1900	5300
40	60	13	0,6	81108	42,5	137	1900	5300
	68	19	1	81208	76,5	220	1700	4800
45	65	14	0,6	81109	45	150	1700	4800
	73	20	1	81209	83	255	1600	4500
50	70	14	0,6	81110	42,5	143	1500	4300
	78	22	1	81210	88	285	1400	4000
55	78	16	0,6	81111	52	193	1400	4000
	90	25	1	81211	122	390	1200	3600
60	85	17	1	81112	73,5	265	1200	3600
	95	26	1	81212	114	335	1100	3400
65	90	18	1	81113	76,5	285	1100	3400
	100	27	1	81213	118	390	950	3000
70	95	18	1	81114	71	265	1000	3200
	105	27	1	81214	122	440	950	3000
75	100	19	1	81115	75	285	950	3000
	110	27	1	81215	125	440	900	2800
80	105	19	1	81116	76,5	300	900	2800
	115	28	1	81216	129	455	850	2600

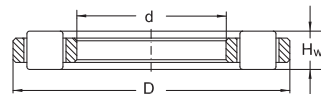
Cylindrical Roller Thrust Bearings



WS 8...



GS 8...

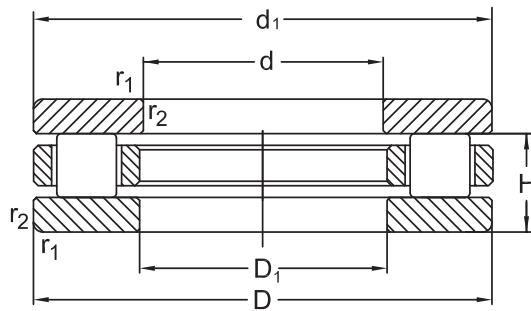


K 8...

Abutment and fillet
dimensions see on
page 554

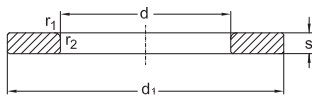
Dimensions				Designation of Bearing Components			Mass
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							[kg]
30	47	32	3	K81106	WS81106	GS81106	0,06
	52	32	4,25	K81206	WS81206	GS81206	0,13
35	52	37	3,5	K81107	WS81107	GS81107	0,08
	62	37	5,25	K81207	WS81207	GS81207	0,23
40	60	42	3,5	K81108	WS81108	GS81108	0,12
	68	42	5	K81208	WS81208	GS81208	0,27
45	65	47	4	K81109	WS81109	GS81109	0,14
	73	47	5,5	K81209	WS81209	GS81209	0,31
50	70	52	4	K81110	WS81110	GS81110	0,16
	78	52	6,5	K81210	WS81210	GS81210	0,38
55	78	57	5	K81111	WS81111	GS81111	0,23
	90	57	7	K81211	WS81211	GS81211	0,60
60	85	62	4,75	K81112	WS81112	GS81112	0,28
	95	62	7,5	K81212	WS81212	GS81212	0,74
65	90	67	5,25	K81113	WS81113	GS81113	0,33
	100	67	8	K81213	WS81213	GS81213	0,82
70	95	72	5,25	K81114	WS81114	GS81114	0,36
	105	72	8	K81214	WS81214	GS81214	0,87
75	100	77	5,75	K81115	WS81115	GS81115	0,43
	110	77	8	K81215	WS81215	GS81215	0,92
80	105	82	5,75	K81116	WS81116	GS81116	0,46
	115	82	8,5	K81216	WS81216	GS81216	1,02

Cylindrical Roller Thrust Bearings

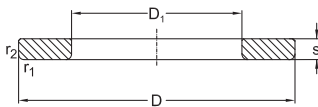


Dimension				Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN		min ⁻¹	min ⁻¹
85	110	19	1	81117	76,5	310	850	2600
	125	31	1	81217	153	550	800	2400
90	120	22	1	81118	104	415	800	2400
	135	35	1,1	81218	190	670	800	2400
100	135	25	1	81120	146	585	750	2200
	150	38	1,1	81220	224	815	700	2000
110	145	25	1	81122	160	655	700	2000
	160	38	1,1	81222	232	865	670	1900
120	155	25	1	81124	160	680	670	1900
	170	39	1,1	81224	245	950	630	1800
130	170	30	1	81126	186	780	600	1700
	190	45	1,5	81226	365	1400	560	1600
140	180	31	1	81128	196	865	560	1600
	200	46	1,5	81228	375	1460	530	1500
150	190	31	1	81130	204	930	530	1500
	215	50	1,5	81230	455	1800	500	1400
160	200	31	1	81132	212	980	500	1400
	225	51	1,5	81232	465	1900	500	1400
170	215	34	1,1	81134	265	1220	500	1400
	240	55	1,5	81234	520	2080	480	1300
180	225	34	1,1	81136	275	1290	480	1300
	250	56	1,5	81236	520	2160	450	1200

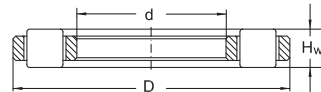
Cylindrical Roller Thrust Bearings



WS 8...



GS 8...

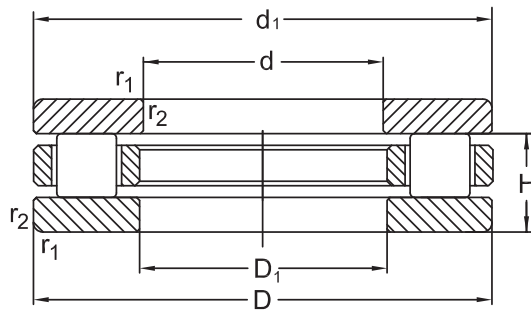


K 8...

Abutment and fillet
dimensions see on
page 554

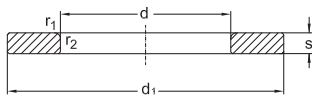
Dimensions				Designation of Bearing Components			Mass
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							[kg]
85	110	87	5,75	K81117	WS81117	GS81117	0,48
	125	88	9,5	K81217	WS81217	GS81217	1,36
90	120	92	6,5	K81118	WS81118	GS81118	0,72
	135	93	10,5	K81218	WS81218	GS81218	1,85
100	135	102	7	K81120	WS81120	GS81120	1,07
	150	103	11,5	K81220	WS81220	GS81220	2,45
110	145	112	7	K81122	WS81122	GS81122	1,12
	160	113	11,5	K81222	WS81222	GS81222	2,70
120	155	122	7	K81124	WS81124	GS81124	1,25
	170	123	12	K81224	WS81224	GS81224	2,98
130	170	132	9	K81126	WS81126	GS81126	1,72
	187	133	13	K81226	WS81226	GS81226	4,37
140	178	142	9,5	K81128	WS81128	GS81128	2,02
	197	143	13,5	K81228	WS81228	GS81228	4,76
150	188	152	9,5	K81130	WS81130	GS81130	2,15
	212	153	14,5	K81230	WS81230	GS81230	6,04
160	198	162	9,5	K81132	WS81132	GS81132	2,28
	222	163	15	K81232	WS81232	GS81232	6,52
170	213	172	10	K81134	WS81134	GS81134	3,01
	237	173	16,5	K81234	WS81234	GS81234	8,12
180	222	183	10	K81136	WS81136	GS81136	3,07
	247	183	17	K81236	WS81236	GS81236	8,69

Cylindrical Roller Thrust Bearings

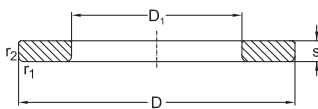


Dimension				Designation	Basical radial load		Speed limit	
d	D	H	r ₁ , r ₂ min.		dyn. C _a	stat. C _{0a}	grease	oil
mm					kN		min ⁻¹	min ⁻¹
190	240	37	1,1	81138	315	1500	450	1200
	270	62	2	81238	655	2650	430	1100
200	250	37	1,1	81140	325	1600	450	1200
	280	62	2	81240	695	2900	430	1100
220	270	37	1,1	81144	355	1830	430	1100
	300	63	2	81244	735	3200	400	1000
240	300	45	1,5	81148	465	2360	380	950
	340	78	2,1	81248	980	4250	360	900
260	320	45	1,5	81152	500	2650	360	900
	360	79	2,1	81252	1040	4650	340	850
280	350	53	1,5	81156	670	3450	340	850
	380	80	2,1	81256	1060	4900	320	800
300	380	62	2	81160	800	4000	300	750
	420	95	3	81260	1400	6200	280	700
360	440	65	2	81172	900	4900	240	630
	500	110	4	81272	1960	9150	220	600
380	460	65	2	81176	880	4900	240	630
	520	112	4	81276	2000	9500	200	560

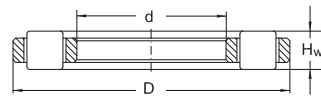
Cylindrical Roller Thrust Bearings



WS 8...



GS 8...



K 8...

Abutment and fillet
dimensions see on
page 554

Dimensions				Designation of Bearing Components			Mass
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							[kg]
190	237	193	11	K81138	WS81138	GS81138	3,99
	267	194	18	K81238	WS81238	GS81238	11,70
200	247	203	11	K81140	WS81140	GS81140	4,17
	277	204	18	K81240	WS81240	GS81240	12,2
220	267	223	11	K81144	WS81144	GS81144	4,65
	297	224	18,5	K81244	WS81244	GS81244	13,4
240	297	243	13,5	K81148	WS81148	GS81148	7,43
	335	244	23	K81248	WS81248	GS81248	23,10
260	317	263	13,5	K81152	WS81152	GS81152	7,99
	355	264	23,5	K81252	WS81252	GS81252	25,1
280	347	283	15,5	K81156	WS81156	GS81156	12
	375	284	24	K81256	WS81256	GS81256	27,1
300	376	304	18,5	K81160	WS81160	GS81160	17,2
	415	304	28,5	K81260	WS81260	GS81260	42,50
360	436	364	20	K81172	WS81172	GS81172	21,4
	495	365	32,5	K81272	WS81272	GS81272	68,7
380	456	384	20	K81176	WS81176	GS81176	22,4
	515	385	33,5	K81276	WS81276	GS81276	73,3

Cylindrical roller thrust bearings, single direction Non-standardized

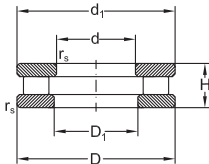


Fig. 1

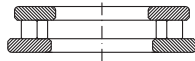


Fig. 2

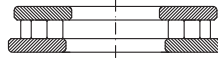


Fig. 3

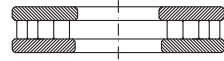


Fig. 4

Dimensions						Fig.	Basic load		Speed limit		Designation Bearing	Mass
d	D	H	rs min.	d ₁	D ₁		dyn C _a	stat. C _{0a}	grease	oil		
mm						-	kN		min ⁻¹	min ⁻¹		kg
25	49	15	0,6	49	25,2	1	37,1	92,7	3400	4800	85205 M	0,131
	52	18	0,5	52	25,2	1	36,8	92,4	3000	4300	85105 M	0,181
34.925	79	15,875	1,5	78	37	2	80	316	2200	3200	892007 M	0,43
40	91,035	15,5	0,3	87	45	3	92	378	2400	3400	85108 M	0,500
	105	16	0,5	105	48	10	141	591	2800	4000	86208 M	0,859
46	112,035	19	0,3	105	53	3	139	591	2000	2800	85109 M	1,04
50	105	20	0,5	105,5	54,5	9	172	776	2300	3300	85110 TN	0,655
	105	16	0,5	105,5	52	8	172	776	2800	4000	85210 TN	0,633
62	138,04	22	0,6	134	70	3	215	950	1700	2400	85112 M	1,87
70	95	6	0,3	-	72	1	46,2	234	3400	4800	85114 M	0,154
76,2	228,6	35	1	227	77,7	1	436	1996	1000	1500	85115 M	7,64
85	110	6	0,3	-	87	7	50	274	3000	4300	85117 M	0,18
96,15¹⁾	181,6 ¹⁾	17,2	0,3	175,05	96,15	4	286	1774	1700	2400	85119 M	2,39
100	210	67	3	208,5	103	2	669	2711	750	1100	85320 M	12,7
160	345	120	4	314	160,3	2	1836	7603	450	630	85132 M	66,8
200	280	62	2	277	204	1	735	3146	700	1000	81240 M	66,8
210	420	120	4	420	212	2	2380	11616	400	560	85142 M	95,6
	460	120	4	460	212	3	2500	12144	380	530	85242 M	117
240	540	125 ²⁾	5	540	242	4	5308	34918	360	500	85148 M	248
270	520	125	5	520	274	3	8239	16840	360	500	85154 M	148
272	480	132	5	480	274	3	2681	13010	360	500	85254 M	122
280	520	145	6	520	284	3	3296	16005	340	480	85156 M	160
340	620	170	6	620	344	3	4258	20698	280	400	85168 M	265

1) Cage diameters: d_c=82; D_c=181,6

2) Available with compensator ring, h=55

Cylindrical roller thrust bearings, single direction Non-standardized

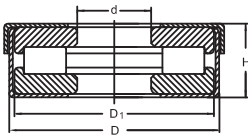


fig. 5

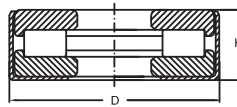


fig. 6



fig. 7

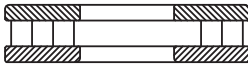


Fig. 8



fig. 9



fig. 10

Dimensions								Basic axial load		Speed limit		Designation	Mass
d	D	H	r _s min.	r ₁₅ min.	d ₁	D ₁	Fig.	dyn C _a	stat. C _{0a}	grease	oil	Bearing	
mm							-	kN		min ⁻¹	min ⁻¹		kg
22,45	48,02	15,9	0,3				6	38,5	87,1	2500	3200	851Z04	0,222
25,8	50,5	15,9	0,3				6	41	97	2400	3400	861Z05	0,139
32	61	17				55	5	27,3	72,6	2600	3800	851Z06	0,20
	61	17				55	5	27,3	72,6	2600	3800	851Z06 TN	0,20
39	73	20,5				69,5	6	67,7	190	2200	3200	851Z08	0,38
44	110	20		0,5	105	50	10	141	591	2300	3300	86108 M	1,147
50,952	74,74	15,875	0,6				6	52,2	155	2400	3600	851Z10	0,217
70	95	6	0,3		95	72	7	46	234	4900	7000	890614 M	0,154
85	110	6	0,3		110	87	7	50	273	4900	7000	890717 M	0,180

Cylindrical roller thrust bearings, double direction Non-standardized

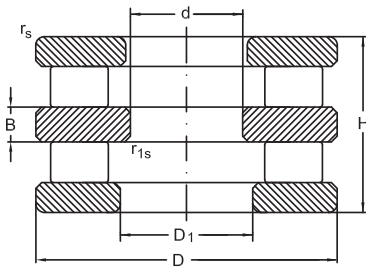


fig. 1

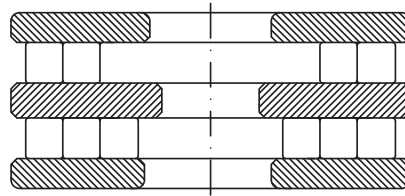


fig. 2

Dimensions							Fig.	Basic axial load		Speed limit		Designation Bearing	Mass
d	D	H	B	r_s min.	r_{1s} min.	D_1		dyn C_a	stat. C_{0a}	grease	oil		
mm							-	kN		min ⁻¹	min ⁻¹		kg
35	71,85	33	8	1	1	62	1	44	118	2800	4000	86107	0,535
85	230	100	29	1,5	1,5	113	2	626	3086	700	1000	86117 M	21,82
140	200	72	19	1	1	154	1	253	1061	900	1300	86228 M	6,87
141	200	68	24	1	1	162,4	-	192	878	900	1300	86128 M	6,392
150	215	78	20	0,6	0,6	166	-	287	1217	900	1300	86130 M	8,82
210	400	262,7	95	3	3	242	-	2390	7770	430	630	86142 M	157

Cylindrical roller and cage thrust assemblies

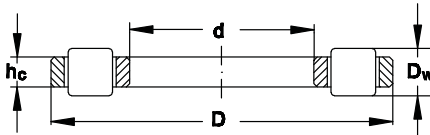


fig. 3

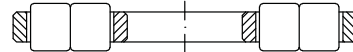


fig. 4

Dimensions				Fig.	Basic load dyn C_a	axial stat. C_{0a}	Speed limit		Designation Bearing	Mass
d	D	D_w	h_c				grease	oil		
mm				-	kN		min ⁻¹	min ⁻¹		kg
30,04	60	5,5	3,75	4	51,3	176	4000	5600	K89306 M	0,066
35,05	68	6	4,2	4	59	214	3100	4400	K89307 M	0,096
40,05	81	7	5	4	88,6	333	3000	4300	K85108 TN	0,084
60,06	85	7,5	5,2	3	71,7	257	2800	4000	K81112 M	0,129
65,06	90	7,5	5,2	3	72,8	268	2600	3800	K81113 M	0,134
70,05	100	11	7,5	3	127	432	2200	3000	K81214 M	0,319
75	169	19	15,5	4	480	1806	1300	1800	K891215 M	2,35
75,06	100	7,5	5,75	3	68,7	268	2000	2800	K81115 M	0,146
85	179	19	15,5	4	501	1956	1200	1700	K891117 M	2,54
90,06	120	9	6,5	3	106	416	1500	2200	K81115 M	0,209

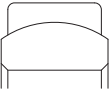
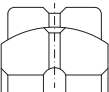
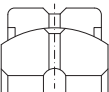


Spherical plain bearings

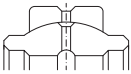
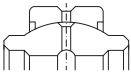
Rod ends

Spherical plain bearings and rod ends URB 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

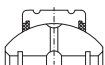
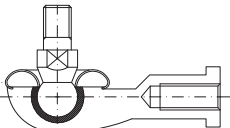
it is requested a precision use, or hard loads, or maintenance free. The tolerances of manufacture and assembly respect the rules of standard ISO (and DIN for some series used for hydraulics) and they are interchangeable with products of the most important manufactures.

Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Spherical plain radial bearings with fitting crack GE...E GEG...E	page 583 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 phosphorlylate-treated
 Spherical plain radial bearings with fitting crack GE...ES GEG...ES	page 583 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 phosphorlylate-treated
 Spherical plain radial bearings with two seals and fitting crack GE...ES 2RS GEG...ES 2RS	page 585 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 phosphorlylate-treated

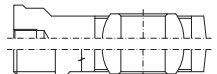
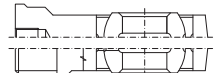
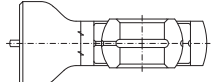
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Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Spherical plain radial bearings with wide inner ring and fitting crack. GEEW...ES	page 587 GEG...ES	GE...LO	-	12-100	Outer ring with single split in axial direction. 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 phosphorlylate-treated.
 Spherical plain radial bearings with two seals and wide inner ring and fitting crack GEEW...ES 2RS GEEM...ES 2RS	page 587 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 phosphorlylate-treated.
 Maintenance-free spherical plain radial bearings GE...E GE...ET 2RS GEG...C GEG...ET 2RS	page 589 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.
 Angular contact spherical plain bearings GAC...S	page 592 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 phosphorlylate-treated.
 Spherical plain thrust bearings GX...S	page 593 GX...F	GE...AW	-	10-120	Separable shaft and housing washers. Lubrication grooves and holes in the housing washer. Both shaft and housing washer are properly phosphorlylate-treated.

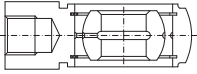
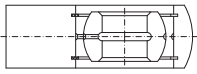
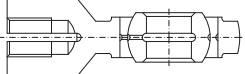
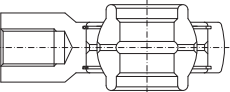
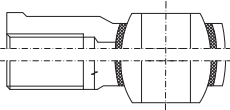
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Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Spherical plain radial bearings with fitting crack. Dimensions in inches. GEZ...ES GEZ...ES 2RS	page 594 GEZ...ES GEZ...ES 2RS	GE...ZO GE...ZO 2RS	SBB... SBB...2RS	12,7-152,4 12,7-152,4	As type GE...ES, but dimensions in inches.
 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 phosphorlylate-treated
 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 outer and inner rings.
 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.
 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.

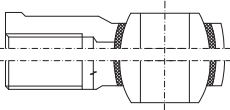
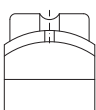
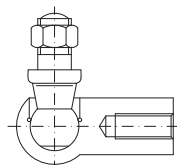
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Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Straight ball joint rod ends with a dust cover. SQZ...C RS	-	-	-	5-22	Ball joint housing is an axial shank with dust cover with female thread. Stretching rod with right or left hand thread. To line SF1 material on the surface of spherical plain.
 Combination rod ends SI...E SA...E	pages 604, 608 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.
 Combination rod ends SI...ES SA...ES SI...ES 2RS SA...ES 2RS	pages 604, 608 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.
 Combination rod ends SI...C SA...C SI...C 2RS SA...C 2RS	pages 604, 608 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.
 Ball joint ends for hydraulics with grease nipple, welding steel body TAC	page 610	GK...DO	-	10-18	Round ball joint ends to weld on the bottom of cylinder. Standard dimensions DIN 648. Sliding contact surface: steel/steel

(Continued)

Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Screwed ball joint ends for hydraulics also with screw clamping device and grease nipple TAPR...N	page 611 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
 Ball joint ends for hydraulics with grease nipple, welding steel body TPN	page 613 SCF...ES	GF...DO	-	2020	Ball joint ends in strong execution to weld advisable with alternate loads. Sliding contact surface: steel/steel
 Screw on ball joint ends for hydraulics with screw clamping device and grease nipple TAPR...DO	page 614 SIJ...ES	GIHO-K...DO	-	12-100	Ball joint ends with internal thread and clamping device through two screws on two sides Standard DIN 24555. Sliding contact surface: steel/steel
 Screw on ball joint ends for hydraulics with screw clamping device and grease nipple TAPR...CE	page 615 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
 Rod ends POS... PHS...	pages 616, 617 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.

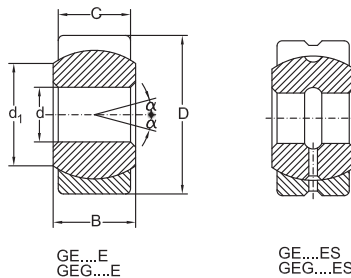
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Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Maintenance-free rod POS...EC PHS...EC	page 617 SAKB...F SIKB...F	GAKFR...PW GIKFR...PW	POS...EC PHS...EC	5-30 5-30	Bearings with a stretching rod with right or left-hand, male or female thread. To line SF1 material on the surface of spherical plain. Spherical surface of ball with chromium plating.
 Spherical plain radial bearings SSR	page 618 -	-	- -	5-30	Outer ring with single split in axial direction. Lubrication grooves and holes in the outer rings. Sliding contact surfaces: bronze/steel.
 Ball joints rod ends DIN 71802	page 619 -	-	- - -	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

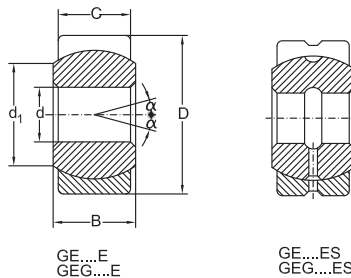


Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α^*	-	kg
mm					kN	kN		-	kg
4	12	5	3	6	2	10	16	GE4 E	0,0033
5	14	6	4	7	3,4	17	13	GE5 S	0,0038
6	14	6	4	8	3,4	17	13	GE6 S	0,0042
8	16	8	5	10	5,5	27	15	GE8 S	0,0075
10	19	9	6	13	8,1	40	12	GE10 E	0,011
12	22	10	7	15	10	54	10	GE12 E	0,015
15	26	12	9	18	17	85	8	GE15 E	0,027
	26	12	9	18	17	85	8	GE15 ES-2RS	0,027
17	30	14	10	20	21	106	10	GE17 ES	0,041
	30	14	10	20	21	106	10	GE17 ES-RS	0,041
20	35	16	12	24	30	146	9	GE20 ES	0,066
	35	16	12	24	30	146	9	GE20 ES-2RS	0,066
25	42	20	16	29	48	240	7	GE25 ES	0,119
	42	20	16	29	48	240	7	GE25 ES-2RS	0,119
30	47	22	18	34	62	310	6	GE30 ES	0,153
	47	22	18	34	62	310	6	GE30 ES-2RS	0,153
35	55	25	20	39	80	400	6	GE35 ES	0,233
	55	25	20	39	80	400	6	GE35 ES-2RS	0,233
40	62	28	22	45	100	500	7	GE40 ES	0,306
	62	28	22	45	100	500	7	GE40 ES-2RS	0,306
45	68	32	25	50	127	640	7	GE45 ES	0,427
	68	32	25	50	127	640	7	GE45 ES-2RS	0,427
50	75	35	28	55	156	780	6	GE50 ES	0,546
	75	35	28	55	156	780	6	GE50 ES-2RS	0,546
60	90	44	36	66	245	1220	6	GE60 ES	1,045
	90	44	36	66	245	1220	6	GE60 ES-2RS	1,045
70	105	49	40	77	315	1560	6	GE70 ES	1,55
	105	49	40	77	315	1560	6	GE70 ES-2RS	1,55
80	120	55	45	88	400	2000	6	GE80 ES	2,31
80	120	55	45	88	400	2000	6	GE80 ES-2RS	2,31
90	130	60	50	98	490	2450	5	GE90 ES	2,75

Spherical plain radial bearings with fitting crack

Two seals and fitting crack, fitting groove

ISO 6124-1979, ISO 6125-1979



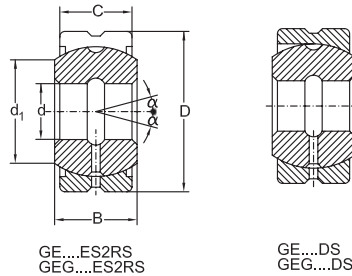
Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α*		
mm					kN	kN		-	kg
90	130	60	50	98	490	2450	5	GE90 ES-2RS	2,75
100	150	70	55	109	610	3050	7	GE100 ES	4,45
	150	70	55	109	610	3050	7	GE100 ES-2RS	4,45
110	160	70	55	120	655	3250	6	GE110 ES	4,82
	160	70	55	120	655	3250	6	GE110 ES-2RS	4,82
120	180	85	70	130	950	4750	6	GE120 ES	8,05
	180	85	70	130	950	4750	6	GE120 ES-2RS	8,05
140	210	90	70	150	1080	5400	7	GE140 ES	11,02
	210	90	70	150	1080	5400	7	GE140 ES-2RS	11,02
160	230	105	80	170	1370	6800	8	GE160 ES	14,01
	230	105	80	170	1370	6800	8	GE160 ES-2RS	14,01
180	260	105	80	192	1530	7650	6	GE180 ES	18,65
	260	105	80	192	1530	7650	6	GE180 ES-2RS	18,65
	260	105	80	192	1530	7650	6	GE180 DS	18,65
200	290	130	100	212	2120	10600	7	GE200 ES	28,03
	290	130	100	212	2120	10600	7	GE200 ES-2RS	28,03
	290	130	100	212	2120	10600	7	GE200 DS	28,03
220	320	135	100	238	2320	11600	8	GE220 ES	35,91
	320	135	100	238	2320	11600	8	GE220 ES-2RS	35,91
	320	135	100	238	2320	11600	8	GE220 DS	35,91
240	340	140	100	265	2550	12700	8	GE240 ES	39,91
	340	140	100	265	2550	12700	8	GE240 ES-2RS	39,91
	340	140	100	265	2550	12700	8	GE240 DS	39,91
260	370	150	110	285	3050	15300	7	GE260 ES	51,84
	370	150	110	285	3050	15300	7	GE260 ES-2RS	51,84
	370	150	110	285	3050	15300	7	GE260 DS	51,84
280	400	155	120	310	3550	18000	6	GE280 ES	65,36
	400	155	120	310	3550	18000	6	GE280 ES-2RS	65,36
	400	155	120	310	3550	18000	6	GE280 DS	65,36
300	430	165	120	330	3800	19000	7	GE300 ES	78,07
	430	165	120	330	3800	19000	7	GE300 ES-2RS	78,07
	430	165	120	330	3800	19000	7	GE300 DS	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

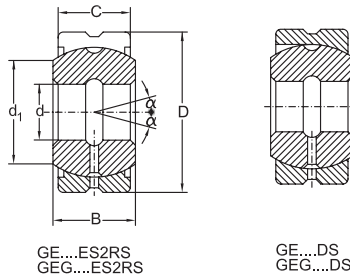


Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α*		
mm					kN	kN		-	kg
4	14	7	4	7	3,4	17	20	GEG4 E	0,0045
5	16	9	5	8	5,5	27	21	GEG5 S	0,0066
6	16	9	5	9	5,5	27	21	GEG6 S	0,0081
8	19	11	6	11	8,1	40	21	GEG8 E	0,014
10	22	12	7	13	10	54	18	GEG10 E	0,021
12	26	15	9	16	17	85	18	GEG12 E	0,033
15	30	16	10	19	21	106	16	GEG15 E	0,049
	30	16	10	19	21	106	16	GEG15 ES-2RS	0,049
17	35	20	12	21	30	146	19	GEG17 ES	0,083
	35	20	12	21	30	146	19	GEG17 ES-2RS	0,083
20	42	25	16	24	48	240	17	GEG20 ES	0,153
	42	25	16	24	48	240	17	GEG20 ES-2RS	0,153
25	47	28	18	29	62	310	17	GEG25 ES	0,203
	47	28	18	29	62	310	17	GEG25 ES-2RS	0,203
30	55	32	20	34	80	400	17	GEG30 ES	0,304
	55	32	20	34	80	400	17	GEG30 ES-2RS	0,304
35	62	35	22	39	100	500	16	GEG35 ES	0,408
	62	35	22	39	100	500	16	GEG35 ES-2RS	0,408
40	68	40	25	44	127	640	17	GEG40 ES	0,542
	68	40	25	44	127	640	17	GEG40 ES-2RS	0,542
45	75	43	28	50	156	780	15	GEG45 ES	0,713
	75	43	28	50	156	780	15	GEG45 ES-2RS	0,713
50	90	56	36	57	245	1220	17	GEG50 ES	1,44
50	90	56	36	57	245	1220	17	GEG50 ES-2RS	1,44
60	105	63	40	67	315	1560	17	GEG60 ES	1,60
	105	63	40	67	315	1560	17	GEG60 ES-2RS	1,60
70	120	70	45	77	400	2000	16	GEG70 ES	3,01
	120	70	45	77	400	2000	16	GEG70 ES-2RS	3,01
80	130	75	50	87	490	2450	14	GEG80 ES	3,64
	130	75	50	87	490	2450	14	GEG80 ES-2RS	3,64

Spherical plain radial bearings with fitting crack

Two seals and fitting crack, fitting groove

ISO 6124-1979, ISO 6125-1979



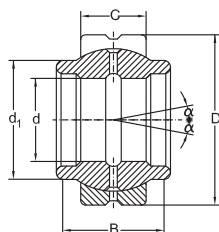
Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α*		
mm					kN	kN		-	kg
90	150	85	55	98	610	3050	15	GEG90 ES	5,22
	150	85	55	98	610	3050	15	GEG90 ES-2RS	5,22
100	160	85	55	110	655	3250	14	GEG100 ES	6,05
	160	85	55	110	655	3250	14	GEG100 ES-2RS	6,05
110	180	100	70	122	950	4750	12	GEG110 ES	9,68
	180	100	70	122	950	4750	12	GEG110 ES-2RS	9,68
120	210	115	70	132	1080	5400	16	GEG120 ES	14,72
	210	115	70	132	1080	5400	16	GEG120 ES-2RS	14,72
140	230	130	80	151	1370	6800	16	GEG140 ES	19,01
	230	130	80	151	1370	6800	16	GEG140 ES-2RS	19,01
160	260	135	80	176	1530	7650	16	GEG160 ES	20,02
	260	135	80	176	1530	7650	16	GEG160 ES-2RS	20,02
	260	135	80	176	1530	7650	16	GEG160 DS	20,02
180	290	155	100	196	2120	10600	14	GEG180 ES	32,21
	290	155	100	196	2120	10600	14	GEG180 ES-2RS	32,21
	290	155	100	196	2120	10600	14	GEG180 DS	32,21
200	320	165	100	220	2320	11600	15	GEG200 ES	45,28
	320	165	100	220	2320	11600	15	GEG200 ES-2RS	45,28
	320	165	100	220	2320	11600	15	GEG200 DS	45,28
220	340	175	100	243	2550	12700	16	GEG220 ES	51,12
	340	175	100	243	2550	12700	16	GEG220 ES-2RS	51,12
	340	175	100	243	2550	12700	16	GEG220 DS	51,12
240	370	190	110	263	3050	15300	15	GEG240 ES	65,12
	370	190	110	263	3050	15300	15	GEG240 ES-2RS	65,12
	370	190	110	263	3050	15300	15	GEG240 DS	65,12
260	400	205	120	285	3550	18000	15	GEG260 ES	82,44
	400	205	120	285	3550	18000	15	GEG260 ES-2RS	82,44
	400	205	120	285	3550	18000	15	GEG260 DS	82,44
280	430	210	120	310	3800	19000	15	GEG280 ES	97,21
	430	210	120	310	3800	19000	15	GEG280 ES-2RS	97,21
	430	210	120	310	3800	19000	15	GEG280 DS	97,21

*The sizes are not binding.

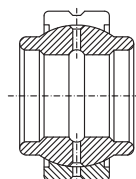
Spherical plain radial bearings with wide inner ring and fitting crack

Two seals and wide inner ring and fitting crack

ISO 61204/2-1982



GEEW....ES



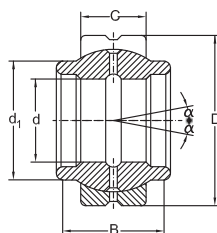
GEEW....ES2RS
GEEM....ES2RS

Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α^*		
mm					kN	kN		-	kg
12	22	12	7	15,5	10	54	4	GEEW12 ES	0,022
	22	12	7	15,5	10	54	4	GEEW12 ES-2RS*	0,022
15	26	15	9	18,5	17	85	5	GEEW15 ES	0,031
	26	15	9	18,5	17	85	5	GEEW15 ES-2RS	0,031
16	28	16	9	20	17	85	4	GEEW16 ES	0,035
	28	16	9	20	17	85	4	GEEW16 ES-2RS	0,035
17	30	17	10	21	21	106	7	GEEW17 ES	0,044
	30	17	10	21	21	106	7	GEEW17 ES-2RS	0,044
20	35	20	12	25	30	146	4	GEEW20 ES	0,071
	35	20	12	25	30	146	4	GEEW20 ES-2RS	0,071
25	42	25	16	30,5	48	240	4	GEEW25 ES	0,131
	42	25	16	30,5	48	240	4	GEEW25 ES-2RS	0,131
30	47	30	18	34	62	310	4	GEEW30 ES	0,168
	47	30	18	34	62	310	4	GEEW30 ES-2RS	0,168
32	52	32	18	37	62	310	4	GEEW32 ES	0,182
	52	32	18	37	62	310	4	GEEW32 ES-2RS	0,182
35	55	35	20	40	80	400	4	GEEW35 ES	0,253
	55	35	20	40	80	400	4	GEEW35 ES-2RS	0,253
40	62	40	22	46	100	500	4	GEEW40 ES	0,338
	62	40	22	46	100	500	4	GEEW40 ES-2RS	0,338
45	68	45	25	52	127	640	4	GEEW45 ES	0,481
	68	45	25	52	127	640	4	GEEW45 ES-2RS	0,481
50	75	50	28	57	156	780	4	GEEW50 ES	0,558
	75	50	28	57	156	780	4	GEEW50 ES-2RS	0,558
60	90	60	36	68	245	1220	3	GEEW60 ES	1,15
	90	60	36	68	245	1220	3	GEEW60 ES-2RS	1,15
63	95	63	36	71,5	245	1220	4	GEEW63 ES	1,23
	95	63	36	71,5	245	1220	4	GEEW63 ES-2RS	1,23
70	105	70	40	78	315	1560	4	GEEW70 ES	1,71
	105	70	40	78	315	1560	4	GEEW70 ES-2RS	1,71

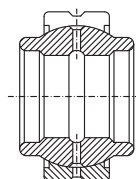
Spherical plain radial bearings with wide inner ring and fitting crack

Two seals and wide inner ring and fitting crack

ISO 61204/2-1982



GEEW....ES



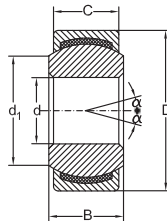
GEEW...ES2RS
GEEM...ES2RS

Dimensions					Load ratings			Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α^*		
mm					kN	kN		-	kg
80	120	80	45	91	400	2000	4	GEEW80 ES	2,39
	120	80	45	91	400	2000	4	GEEW80 ES-2RS	2,39
100	150	100	55	113	610	3050	4	GEEW100 ES	4,80
	150	100	55	113	610	3050	4	GEEW100 ES-2RS	4,80
125	180	125	70	138	950	4750	4	GEEW125 ES	8,50
	180	125	70	138	950	4750	4	GEEW125 ES-2RS	8,50
20	35	24	12	24	30	146	6	GEEM20 ES-2RS	0,073
25	42	29	16	29	48	240	4	GEEM25 ES-2RS	0,13
30	47	30	18	34	62	310	4	GEEM30 ES-2RS	0,17
35	55	35	20	40	80	400	4	GEEM35 ES-2RS	0,25
40	62	38	22	45	100	500	4	GEEM40 ES-2RS	0,35
45	68	40	25	52	127	640	4	GEEM45 ES-2RS	0,49
50	75	43	28	57	156	780	4	GEEM50 ES-2RS	0,60
60	90	54	36	68	245	1220	3	GEEM60 ES-2RS	1,15
70	105	65	40	78	315	1560	4	GEEM70 ES-2RS	1,65
80	120	74	45	90	400	2000	4	GEEM80 ES-2RS	2,50

*The sizes are not binding.

Maintenance free spherical plain radial bearings

GB304.7-81, GB304.9-81 (ISO6124-1979, ISO6125-1979)

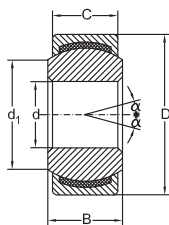


GE...C
GE...ET2RS

Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α*		
mm					kN	kN		-	kg
4	12	5	3	6	2,1	5,4	16	GE4 C	0,0033
5	14	6	4	7	3,6	9,1	13	GE5 C	0,0038
6	14	6	4	8	3,6	9,1	13	GE6 C	0,0042
8	16	8	5	10	5,8	14	15	GE8 C	0,0075
10	19	9	6	13	8,6	21	12	GE10 C	0,011
12	22	10	7	15	11	28	10	GE12 C	0,015
15	26	12	9	18	18	45	8	GE15 C	0,027
17	30	14	10	20	22	56	10	GE17 C	0,041
20	35	16	12	24	31	78	9	GE20 C	0,066
	35	16	12	24	31	78	9	GE20 ET-2RS	0,066
25	42	20	16	29	51	127	7	GE25 C	0,119
	42	20	16	29	51	127	7	GE25 ET-2RS	0,119
30	47	22	18	34	65	166	6	GE30 C	0,163
	47	22	18	34	65	166	6	GE30 ET-2RS	0,163
35	55	25	20	-	110	220	6	GE35 ET-2RS	0,25
40	62	28	22	-	140	280	6	GE40 ET-2RS	0,30
45	68	32	25	-	180	350	6	GE45 ET-2RS	0,35
50	75	35	28	-	220	430	6	GE50 ET-2RS	0,50
60	90	44	36	-	340	690	6	GE60 ET-2RS	1,00
70	105	49	40	-	430	870	6	GE70 ET-2RS	1,40
80	120	55	45	-	560	1140	6	GE80 ET-2RS	2,00
90	130	60	50	-	690	1350	6	GE90 ET-2RS	2,50

Maintenance free spherical plain radial bearings

GB304.7-81, GB304.9-81 (ISO6124-1979, ISO6125-1979)

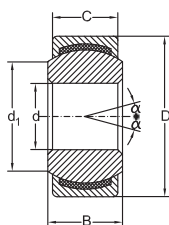


GE...C
GE...ET2RS

Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α*		
mm					kN	kN		-	kg
100	150	70	55	-	850	1700	6	GE100 ET-2RS	4,00
110	160	70	55	-	900	1850	6	GE110 ET-2RS	4,50
120	180	85	70	-	1300	2700	6	GE120 ET-2RS	7,20
140	210	90	70	-	1500	3000	6	GE140 ET-2RS	10,00

Maintenance free spherical plain radial bearings

ISO 6124-1979, ISO 6125-1979



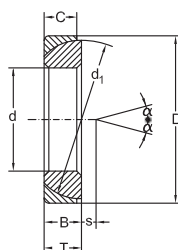
GE....C
GE....ET2RS

Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α*		
mm					kN	kN		-	kg
4	14	7	4	7	3,6	9,1	20	GEG4 C	0,0045
5	16	9	5	8	5,8	14	21	GEG5 C	0,0066
6	16	9	5	9	5,8	14	21	GEG6 C	0,0081
8	19	11	6	11	8,8	21	21	GEG8 C	0,014
10	22	12	7	13	11	28	18	GEG10 C	0,021
12	26	15	9	16	18	45	18	GEG12 C	0,033
15	30	16	10	19	22	56	16	GEG15 C	0,049
17	35	20	12	21	31	78	19	GEG17 C	0,083
20	42	25	16	24	51	127	17	GEG20 C	0,153
25	47	28	18	29	65	166	17	GEG25 C	0,203
30	55	32	20	34	83	212	17	GEG30 C	0,304
	55	32	20	-	110	220	17	GEG30 ET-2RS	0,30
35	62	35	22	-	140	270	17	GEG35 ET-2RS	0,35
40	68	40	25	-	180	350	15	GEG40 ET-2RS	0,50
45	75	43	28	-	220	430	15	GEG45 ET-2RS	0,60
50	90	56	36	-	340	680	15	GEG50 ET-2RS	1,40
60	105	63	40	-	430	850	15	GEG60 ET-2RS	2,00
70	120	70	45	-	550	1100	16	GEG70 ET-2RS	2,80
80	130	75	50	-	680	1350	14	GEG80 ET-2RS	3,40
90	150	85	55	-	850	1700	15	GEG90 ET-2RS	5,00
100	160	85	55	-	900	1800	14	GEG100 ET-2RS	5,50
110	180	100	70	-	1300	2700	12	GEG110 ET-2RS	9,00
120	210	115	70	-	1500	3000	15	GEG120 ET-2RS	14,50
140	230	130	80	-	1900	3500	15	GEG140 ET-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



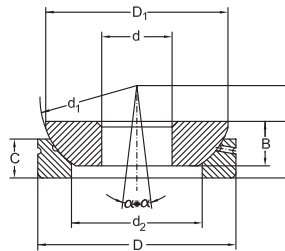
GAC....S

Dimensions							Load ratings			Designation	Mass
d	D	B	C	T	d ₁	S	dyn.	stat.	α*		
mm							kN	kN		-	kg
25	47	15	14	15	42	0,6	47,5	236	3,5	GAC25 S	0,148
30	55	17	15	17	49,5	1,3	63	315	3	GAC30 S	0,208
35	62	18	16	18	55,5	2,1	76,5	390	3	GAC35 S	0,268
40	68	19	17	19	62	2,8	90	450	3	GAC40 S	0,327
45	75	20	18	20	68,5	3,5	106	530	3	GAC45 S	0,416
50	80	20	19	20	74	4,3	118	585	3	GAC50 S	0,455
60	95	23	21	23	88,5	5,7	160	800	3	GAC60 S	0,714
70	110	25	23	25	102	7,2	208	1040	2,5	GAC70 S	1,04
80	125	29	25,5	29	115	8,6	250	1250	2,5	GAC80 S	1,54
90	140	32	28	32	128,5	10,1	320	1600	2,5	GAC90 S	2,09
100	150	32	31	32	141	11,6	345	1760	2	GAC100 S	2,34
110	170	38	34	38	155	13	475	2360	2	GAC110 S	3,68
120	180	38	37	38	168	14,5	510	2550	2	GAC120 S	3,97

*The sizes are not binding.

On request: sliding contact surface steel / PTFE, example GX...C.

Spherical plain thrust bearing



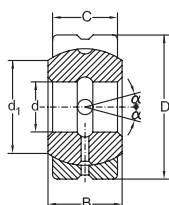
GX....S

Dimensions										Load ratings			Designation	Mass
d	D	H	B	C	d ₁	d ₂	D ₁	S		dyn.	stat.	α*		
mm										kN	kN		-	kg
10	30	9,5	7,5	7	32	15,5	27,5	7	24	120	9		GX10 S	0,036
12	35	13	9,5	9,3	38	18	32	8	32,5	163	8		GX12 S	0,072
15	42	15	11	10,8	46	22,5	39	10	52	260	8		GX15 S	0,108
17	47	16	11,8	11,2	52	27	43,5	11	58,5	300	10		GX17 S	0,137
20	55	20	14,5	13,8	60	31	50	12,5	75	375	9		GX20 S	0,246
25	62	22,5	16,5	16,7	68	34,5	58,5	14	129	640	7		GX25 S	0,415
30	75	26	19	19	82	42	70	17,5	170	850	7		GX30 S	0,614
35	90	28	22	20,7	98	50,5	84	22	260	1290	8		GX35 S	0,973
40	105	32	27	21,5	114	59	97	24,5	375	1860	9		GX40 S	1,59
45	120	36,5	31	25,5	128	67	110	27,5	490	2450	9		GX45 S	2,24
50	130	42,5	33	30,5	139	70	120	30	655	3250	7		GX50 S	3,14
60	150	45	37	34	160	84	140	35	735	3650	8		GX60 S	4,63
70	160	50	42	36,5	176	94,5	153	35	800	4050	8		GX70 S	5,37
80	180	50	43,5	38	197	107,5	172	42,5	1040	5200	8		GX80 S	6,91
100	210	59	51	46	222	127	198	45	1200	6000	8		GX100 S	10,98
120	230	64	53,5	50	250	145	220	52,5	1250	6200	6		GX120 S	13,97

*The sizes are not binding.

On request: sliding contact surface steel / PTFE, example GX...C.

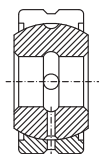
Spherical plain radial bearings dimension in inches with fitting crack Two seals and fitting crack



GE,Z,...ES

Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α*		
mm					kN	kN		-	kg
12,7	22,225	11,1	9,525	14,1	13,7	41,5	6	GEZ12 ES	0,022
15,875	26,988	13,894	11,913	18,3	22,0	65,5	6	GEZ15 ES	0,036
19,05	31,75	16,662	14,275	21,8	31,5	95,0	6	GEZ19 ES	0,053
22,225	36,513	19,431	16,662	25,4	4,25	127	6	GEZ22 ES	0,085
25,4	41,275	22,225	19,05	27,6	56,0	166	6	GEZ25 ES	0,121
	41,275	22,225	19,05	27,6	56,0	166	6	GEZ25 ES-2RS	0,121
31,75	50,8	27,762	23,8	36,0	86,5	260	6	GEZ31 ES	0,232
	50,8	27,762	23,8	36,0	86,5	260	6	GEZ31 ES-2RS	0,232
34,925	55,563	30,15	26,187	38,6	102	310	6	GEZ34 ES	0,351
	55,563	30,15	26,187	38,6	102	310	6	GEZ34 ES-2RS	0,351
38,1	61,913	33,325	28,575	41,2	125	375	6	GEZ38 ES	0,422
	61,913	33,325	28,575	41,2	125	375	6	GEZ38 ES-2RS	0,422
44,5	71,438	38,887	33,325	50,7	170	510	6	GEZ44 ES	0,641
	71,438	38,887	33,325	50,7	170	510	6	GEZ44 ES-2RS	0,641
50,8	80,963	44,45	38,1	57,9	224	670	6	GEZ50 ES	0,932
	80,963	44,45	38,1	57,9	224	670	6	GEZ50 ES-2RS	0,932
57,15	90,488	50,013	42,85	64,9	280	850	6	GEZ57 ES	1,33
	90,488	50,013	42,85	64,9	280	850	6	GEZ57 ES-2RS	1,33
63,5	100,013	55,55	47,625	73,3	355	1060	6	GEZ63 ES	1,85
	100,013	55,55	47,625	73,3	355	1060	6	GEZ63 ES-2RS	1,85
69,85	111,125	61,112	52,375	79,1	415	1250	6	GEZ69 ES	2,42
	111,125	61,112	52,375	79,1	415	1250	6	GEZ69 ES-2RS	2,42
76,2	120,65	66,675	57,15	86,8	500	1500	6	GEZ76 ES	3,10
	120,65	66,675	57,15	86,8	500	1500	6	GEZ76 ES-2RS	3,10
82,55	130,175	72,238	61,9	94,5	585	1760	6	GEZ82 ES	3,82
	130,175	72,238	61,9	94,5	585	1760	6	GEZ82 ES-2RS	3,82
88,9	139,7	77,775	66,675	101,6	680	2040	6	GEZ88 ES	4,79
	139,7	77,775	66,675	101,6	680	2040	6	GEZ88 ES-2RS	4,79

Spherical plain radial bearings dimension in inches with fitting crack Two seals and fitting crack

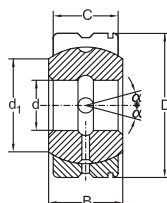


GEZ.....ES2RS

Dimensions					Load ratings			Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α^*		
mm					kN	kN		-	kg
95,25	149,225	83,337	71,425	108,7	780	2360	6	GEZ95 ES	5,78
	149,225	83,337	71,425	108,7	780	2360	6	GEZ95 ES-2RS	5,78
101,6	158,75	88,9	76,2	115,8	900	2650	6	GEZ101 ES	6,99
	158,75	88,9	76,2	115,8	900	2650	6	GEZ101 ES-2RS	6,99
107,95	168,275	94,463	80,95	122,8	1000	3000	6	GEZ107 ES	8,41
	168,275	94,463	80,95	122,8	1000	3000	6	GEZ107 ES-2RS	8,41
114,3	177,8	100,013	85,725	130,6	1120	3400	6	GEZ114 ES	9,79
	177,8	100,013	85,725	130,6	1120	3400	6	GEZ114 ES-2RS	9,79
120,65	187,325	105,562	90,475	137,6	1250	3750	6	GEZ120 ES	11,5
	187,325	105,562	90,475	137,6	1250	3750	6	GEZ120 ES-2RS	11,5
127	196	111,125	95,25	145,3	1400	4150	6	GEZ127 ES	13,5
	196	111,125	95,25	145,3	1400	4150	6	GEZ127 ES-2RS	13,5
152,4	222,25	120,65	104,775	168,2	1730	5200	5	GEZ152 ES	17,5
	222,25	120,65	104,775	168,2	1730	5200	5	GEZ152 ES-2RS	17,5

*The sizes are not binding.

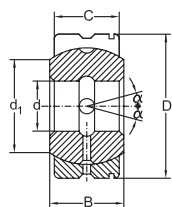
Spherical plain radial bearings with two piece outer ring



GE...XSK

Dimensions				Load ratings				Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.	α*		
mm					kN	kN		-	kg
12	22	11	9	14	12,9	39,2	7	GE12 XS-K	0,019
15	26	13	11	17,5	19,5	57,8	6	GE15 XS-K	0,028
20	32	16	14	23	31,3	94,8	4	GE20 XS-K	0,053
22	37	19	16	25,5	40,3	122	6	GE22 XS-K	0,085
25	42	21	18	29	51,1	155	5	GE25 XS-K	0,116
30	50	27	23	36	81,2	248	6	GE30 XS-K	0,225
35	55	30	26	40	103	314	5	GE35 XS-K	0,302
40	62	33	28	44	122	370	6	GE40 XS-K	0,375
45	72	36	31	50,5	152	461	5	GE45 XS-K	0,598
50	80	42	36	58,5	225	622	5	GE50 XS-K	0,869
55	90	47	40	64,5	253	768	6	GE55 XS-K	1,26
60	100	53	45	72,5	321	980	6	GE60 XS-K	1,72
65	105	55	47	76	350	1060	5	GE65 XS-K	2,05
70	110	58	50	81,5	396	1220	5	GE70 S-K	2,23
75	120	64	55	89,5	478	1450	5	GE75 XS-K	3,01
80	130	70	60	97,5	571	1730	5	GE80 XS-K	3,98
85	135	74	63	100,5	624	1890	6	GE85 XS-K	4,31
90	140	76	65	105,5	670	2030	5	GE90 XS-K	4,72
95	150	82	70	113,5	776	2350	5	GE95 XS-K	6,05
100	160	88	75	121,5	891	2700	5	GE100 XS-K	7,43

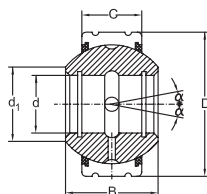
Spherical plain radial bearings with two piece outer ring



GE...XSK

Dimensions				Load ratings			α*	Designation	Mass
d	D	B	C	d ₁ min	dyn.	stat.			
mm					kN	kN		-	kg
110	170	93	80	130	1010	3070	5	GE110 XS-K	8,54
115	180	98	85	132,5	1110	3370	5	GE115 XS-K	10,3
120	190	105	90	140	1250	3780	6	GE120 XS-K	12,4
130	200	110	95	148,5	1390	4220	5	GE130 XS-K	13,8
150	220	120	105	166	1710	5170	5	GE150 XS-K	17,1

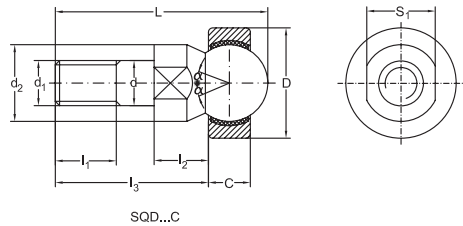
Spherical plain radial bearings with two seals and two piece outer ring



GEK...XS2ES

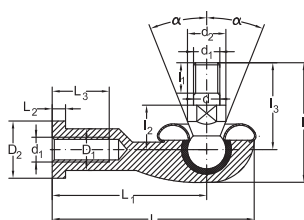
Dimensions				Load ratings			α^*	Designation	Mass
d	D	B	C	d_1 min	dyn.	stat.			
mm					kN	kN		-	kg
25	68	40	28	30	117	590	19	GEK25 XS-2RS	0,516
30	70	47	32	37,3	163	813	19	GEK30 XS-2RS	0,785
35	80	54	38	44,5	226	1130	17	GEK35 XS-2RS	1,23
40	90	64	44	48	298	1490	19	GEK40 XS-2RS	1,83
45	100	72	52	54	398	1990	17	GEK45 XS-2RS	2,56
50	110	80	58	60	493	2450	17	GEK50 XS-2RS	3,43
55	125	90	64	63,2	598	2990	19	GEK55 XS-2RS	5,02
60	135	98	72	69,3	732	3660	17	GEK60 XS-2RS	6,43

Ball joint ends with one shank



Dimensions										Load ratings			Designation	Mass
d	d ₁	d ₂ min	L _{max}	I ₁ min	I ₂	I ₃ max	S ₁	C	D	dyn.	stat.	α*		
mm										kN	kN		-	kg
5	M5	9	27,5	8	8	19	7	6	16	2,4	6,2	25	SQD5 C	0,014
6	M6	10	33,5	11	8,8	23,8	8	6,75	18	3,2	8,1	25	SQD6 C	0,021
8	M8	12	41	12	11,6	28,6	10	9	22	5,5	14	25	SQD8 C	0,042
10	M10x1,25	14	49	15	14,2	34,2	11	10,5	26	7,8	20	25	SQD10 C	0,067
12	M12x1,25	19	55,1	17	15,1	38,1	16	12	30	10	27	25	SQD12 C	0,108
14	M14x1,25	19	70,7	22	16,8	51,3	16	13,5	34	13	35	20	SQD14 C	0,167
16	M16x1,25	22	76,3	23	18	54,5	18	15	38	17	45	20	SQD16 C	0,238

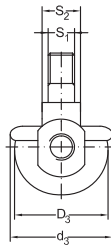
Winding shape ball joint rod ends



SQ...C RS

Dimensions										
d	d ₁	d ₂ min	d ₃ max	l max	l ₁ min	l ₂	l ₃ max	S ₁	L max	L 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	M14X1,25	19	38	73,5	22	21,5	56	16	75	57
	M14X1,25	19	38	73,5	22	21,5	56	16	75	57
16	M16X1,25	22	44	79,5	23	23,5	60	18	84	64
	M16X1,25	22	44	79,5	23	23,5	60	18	84	64
18	M18X1,25	25	45	90	25	26,5	68	21	93	71
	M18X1,25	25	45	90	25	26,5	68	21	93	71
20	M20X1,25	29	50	90	25	27	68	24	99	77
	M20X1,25	29	50	90	25	27	68	24	99	77
22	M22X1,25	29	52	95	26	28	70	24	109	84
	M22X1,25	29	52	95	26	28	70	24	109	84

Winding shape ball joint rod ends



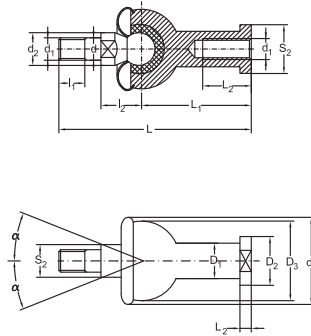
l ₂ max	l ₃ min	D ₁ max	D ₂ max	D ₃ max	S ₂	Load ratings			Designation	Mass
						dyn.	stat.	α*		
						kN	kN		-	kg
4	14	9	12	18	10	2,7	9,2	25	SQ5 C	0,025
4	14	9	12	18	10	2,7	9,2	25	SQ5 C-RS	0,025
5	14	10	13	20	10	3,6	12	25	SQ6 C	0,039
5	14	10	13	20	10	3,6	12	25	SQ6 C-RS	0,039
5	17	12,5	16	25	13	5,7	19	25	SQ8 C	0,068
5	17	12,5	16	25	13	5,7	19	25	SQ8 C-RS	0,068
6,5	21	15	19	29	16	8,2	27	25	SQ10 C	0,112
6,5	21	15	19	29	16	8,2	27	25	SQ10 C-RS	0,112
6,5	25	17,5	22	31	18	11	37	25	SQ12 C	0,164
6,5	25	17,5	22	31	18	11	37	25	SQ12 C-RS	0,164
8	26	20	25	35	21	14	48	25	SQ14 C	0,254
8	26	20	25	35	21	14	48	25	SQ14 C-RS	0,254
8	32	22	27	39	24	16	53	20	SQ16 C	0,336
8	32	22	27	39	24	16	53	20	SQ16 C-RS	0,336
10	34	25	31	44	27	18	61	20	SQ18 C	0,464
10	34	25	31	44	27	18	61	20	SQ18 C-RS	0,464
10	35	27,5	34	44	30	18	612	20	SQ20 C	0,538
10	35	27,5	34	44	30	18	612	20	SQ20 C-RS	0,538
12	41	30	37	50	30	22	75	16	SQ22 C	0,713
12	41	30	37	50	30	22	75	16	SQ22 C-RS	0,713

*The sizes are not binding.

Available with thread M1,5 (SQ10 and SQ12) and M2 (SQ14 and SQ16)

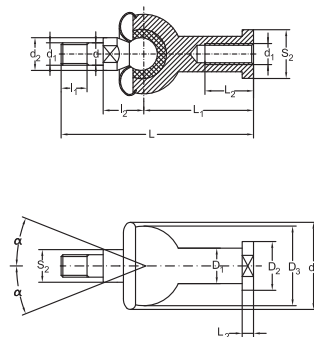
C - to line SF1 material on the surface of spherical plain. The shank of ball joint housing may be left - hand thread, for left - hand thread, suffix "L" is added to bearings number and thread sign, e. g. SQL6C, M6L - 6H.

Straightball joint rod ends



SOZ...C RS

Dimensions										
d	d ₁	d ₂ min	d ₃ max	l ₁ min	l ₂	S ₁	L max	L ₁	L ₂ max	L ₃ 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	M14X1,25	19	38	22	23,5	16	104,5	45	8	25
	M14X1,25	19	38	22	23,5	16	104,5	45	8	25
16	M16X1,25	22	44	23	25,5	18	112	50	8	27
	M16X1,25	22	44	23	25,5	18	112	50	8	27
18	M18X1,25	25	45	25	31	21	130,5	58	10	32
	M18X1,25	25	45	25	31	21	130,5	58	10	32
20	M20X1,25	29	50	25	31	24	133	63	10	38
	M20X1,25	29	50	25	31	24	133	63	10	38
22	M22X1,25	29	52	26	33	24	145	70	12	43
	M22X1,25	29	52	26	33	24	145	70	12	43



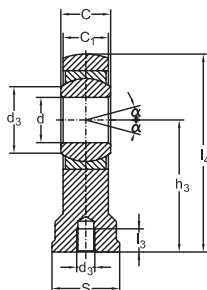
SQZ...C-RS

D ₁ max	D ₂ max	D ₃ max	S ₂	Load ratings		α*	Designation	Mass
				dyn.	stat.			
				kN	kN		-	kg
9	12	17	10	1,7	5,7	15	SQZ5 C	0,025
9	12	17	10	1,7	5,7	15	SQZ5 C-RS	0,025
10	13	20	10	2,2	7,5	15	SQZ6 C	0,040
10	13	20	10	2,2	7,5	15	SQZ6 C-RS	0,040
12,5	16	24	13	3,3	11	15	SQZ8 C	0,075
12,5	16	24	13	3,3	11	15	SQZ8 C-RS	0,075
15	19	28	16	4,8	16	15	SQZ10 C	0,121
15	19	28	16	4,8	16	15	SQZ10 C-RS	0,121
17,5	22	32	18	6,6	22	15	SQZ12 C	0,187
17,5	22	32	18	6,6	22	15	SQZ12 C-RS	0,187
20	25	36	21	8,7	29	11	SQZ14 C	0,277
20	25	36	21	8,7	29	11	SQZ14 C-RS	0,277
22	27	40	24	10	33	11	SQZ16 C	0,361
22	27	40	24	10	33	11	SQZ16 C-RS	0,361
25	31	45	27	11	37	11	SQZ18 C	0,539
25	31	45	27	11	37	11	SQZ18 C-RS	0,539
27,5	34	45	30	11	37	7,5	SQZ20 C	0,575
27,5	34	45	30	11	37	7,5	SQZ20 C-RS	0,575
30	37	50	30	14	46	7,5	SQZ22 C	0,757
30	37	50	30	14	46	7,5	SQZ22 C-RS	0,757

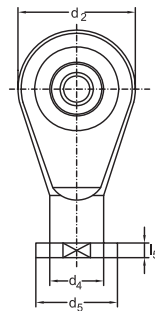
*The sizes are not binding.

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, e. g. SQL6C, M6L - 6H.

Combination (series e) rod ends (ISO 6126 - 1982)

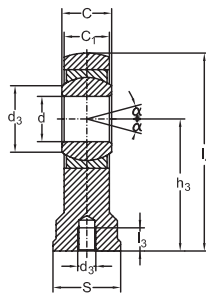


Dimensions										
d	B	C ₁ max	d ₁ min	d ₂ max	d ₃	h ₁	l ₃ min	l ₄ max	l ₅ max	d ₄ max
mm										
5	6	4,5	7	21	M5	30	11	42	5	10
	6	4,5	8	21	M6	30	11	42	5	11
8	8	6,5	10	24	M8	36	15	49	5	13
	8	6,5	10	24	M8	36	15	49	5	13
10	9	7,5	13	29	M10	43	15	58	6,5	16
	9	7,5	13	29	M10	43	15	58	6,5	16
12	10	8,5	15	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

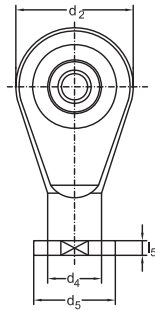


d ₅ max	S	Load ratings			Designation	Mass
		dyn.	stat.	α *		
mm		kN	kN	-	-	kg
13	10	3,4	8,1	13	SI5 E	0,016
13	11	3,4	8,1	13	SI6 E	0,017
13	11	3,4	8,1	13	SI6 C**	0,017
16	13	5,5	12,9	15	SI8 E	0,035
16	13	5,5	12,9	15	SI8 C**	0,035
19	16	8,1	17,6	12	SI10 E	0,061
19	16	8,1	17,6	12	SI610 C**	0,061
22	18	10,8	24,5	10	SI12 E	0,096
22	18	10,8	24,5	10	SI12 C**	0,096
26	21	17	36	8	SI15 ES	0,162
26	21	17	36	8	SI15 ES-2RS	0,162
26	21	17	36	8	SI15 C**	0,162
29	24	21	45	10	SI17 ES	0,233
29	24	21	45	10	SI17 ES-2RS	0,233
29	24	21	45	10	SI17 C**	0,233
34	30	30	60	9	SI20 ES	0,324
34	30	30	60	9	SI20 ES-2RS	0,324
34	30	30	60	9	SI20 C**	0,324
42	36	48	83	7	SI25 ES	0,625
42	36	48	83	7	SI25 ES-2RS	0,625
42	36	48	83	7	SI25 C**	0,625
50	46	62	110	6	SI30 ES	0,976
50	46	62	110	6	SI30 ES-2RS	0,976
50	46	62	110	6	SI30 C**	0,976

Combination (series e) rod ends (ISO 6126 - 1982)



Dimensions										
d	B	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
mm										
35	25	22	39	82	M36x2	125	60	167	15	48
	25	22	39	82	M36x2	125	60	167	15	48
	25	22	39	82	M36x2	125	60	167	15	48
40	28	24	45	92	M39x2	142	65	190	18	52
	28	24	45	92	M39x2	142	65	190	18	52
	28	24	45	92	M39x2	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
	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



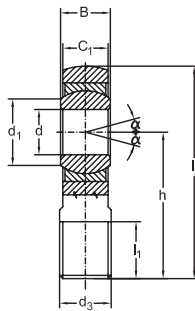
d ₅ max mm	S	Load ratings		α *	Designation	Mass kg
		dyn. kN	stat. kN			
58	55	80	146	6	SI35 ES	1,52
58	55	80	146	6	SI35 ES-2RS	1,52
58	55	80	146	6	SI35 C**	1,52
65	60	100	180	7	SI40 ES	2,06
65	60	100	180	7	SI40 ES-2RS	2,06
65	60	100	180	7	SI40 C**	2,06
70	65	127	240	7	SI45 ES	2,72
70	65	127	240	7	SI45 ES-2RS	2,72
70	65	127	240	7	SI45 C-2RS**	2,72
75	70	156	290	6	SI50 ES	3,57
75	70	156	290	6	SI50 ES-2RS	3,57
75	70	156	290	6	SI50 ES-2RS**	3,57
88	80	245	450	6	SI60 ES	5,63
88	80	245	450	6	SI60 ES-2RS	5,63
88	80	245	450	6	SI60 ES-2RS**	5,63
98	85	315	610	6	SI70 ES	8,33
98	85	315	610	6	SI70 ES-2RS	8,33
98	85	315	610	6	SI70 ES-2RS**	8,33
110	95	400	750	6	SI80 ES	13,04
110	95	400	750	6	SI80 ES-2RS	13,04
110	95	400	750	6	SI80 ES-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.

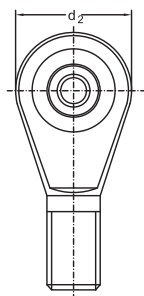
**Sliding contact surface: steel/PTFE.

Combination (series e) rod ends (ISO 6126 - 1982)



SA...E/ES
SA...ES2RS

Dimensions								Load ratings				Designation	Mass
d	B	C ₁ max	d ₁ min	d ₂ max	d ₃	h	l ₁ min	l ₂ max	dyn.	stat.	α*		
mm								kN		kN			
5	6	4,5	7	21	M5	36	16	48	3,4	8,1	1	SA5 E	0,011
6	6	4,5	8	21	M6	36	16	48	3,4	8,1	13	SA6 E	0,013
	6	4,5	8	21	M6	42	21	48	3,4	8,1	13	SA6 C**	0,013
8	8	6,5	10	24	M8	42	21	55	5,5	12,9	15	SA8 E	0,026
	8	6,5	10	24	M8	42	21	55	5,5	12,9	15	SA8 C**	0,026
10	9	7,5	13	29	M10	48	26	63	8,1	17,8	12	SA10 E	0,044
	9	7,5	13	29	M10	48	26	63	8,1	17,8	12	SA10 C**	0,044
12	10	8,5	15	34	M12	54	28	71	10,8	24,5	10	SA12 E	0,066
	10	8,5	15	34	M12	54	28	71	10,8	24,5	10	SA12 C**	0,066
15	12	105	18	40	M14	63	34	83	17	36	8	SA15 ES	0,121
	12	105	18	40	M14	63	34	83	17	36	8	SA15 ES-2RS	0,121
	12	105	18	40	M14	63	34	83	17	36	8	SA15 C**	0,121
17	14	115	20	46	M16	69	36	92	21	45	10	SA17 ES	0,172
	14	115	20	46	M16	69	36	92	21	45	10	SA17 ES-2RS	0,172
	14	115	20	46	M16	69	36	92	21	45	10	SA17 C**	0,172
20	16	135	24	53	M20x1,5	78	43	105	30	60	9	SA20 ES	0,283
	16	135	24	53	M20x1,5	78	43	105	30	60	9	SA20 ES-2RS	0,283
	16	135	24	53	M20x1,5	78	43	105	30	60	9	SA20 C**	0,283
25	20	18	29	64	M24x2	94	53	126	48	83	7	SA25 ES	0,504
	20	18	29	64	M24x2	94	53	126	48	83	7	SA25 ES-2RS	0,504
	20	18	29	64	M24x2	94	53	126	48	83	7	SA25 C**	0,504
30	22	20	34	73	M30x2	110	65	147	62	110	6	SA30 ES	0,835
	22	20	34	73	M30x2	110	65	147	62	110	6	SA30 ES-2RS	0,835
	22	20	34	73	M30x2	110	65	147	62	110	6	SA30 C**	0,835



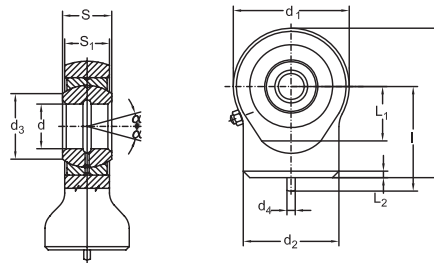
Dimensions								Load ratings				Designation	Mass
d	B	C ₁ max	d ₁ min	d ₂ max	d ₃	h	l ₁ min	l ₂ max	dyn.	stat.	α*		
mm								kN		kN			
35	25	22	39	82	M36x2	140	82	182	80	148	6	SA35 ES	1,41
	25	22	39	82	M36x3	140	82	182	80	148	6	SA35 ES-2RS	1,41
	25	22	39	82	M36x3	140	82	182	80	146	6	SA35 C-2RS**	1,41
40	28	24	45	92	M39x3	150	86	198	100	180	7	SA40 ES	1,86
	28	24	45	92	M39x3	150	86	198	100	180	7	SA40 ES-2RS	1,86
	28	24	45	92	M39x3	150	86	198	100	180	7	SA40 2RSC**	1,86
45	32	28	50	102	M42x3	163	92	217	127	240	7	SA45 ES	2,57
	32	28	50	102	M42x3	163	92	217	127	240	7	SA45 ES-2RS	2,57
45	32	28	50	102	M42x3	163	92	217	127	240	7	SA45 C-2RS**	2,57
50	35	31	55	112	M45x3	185	104	246	156	290	6	SA50 ES	3,58
	35	31	55	112	M45x3	185	104	246	156	290	6	SA50 ES-2RS	3,58
	35	31	55	112	M45x3	185	104	246	156	290	6	SA50 C-2RS**	3,58
60	44	39	66	135	M52x3	210	115	282	245	450	6	SA60 ES	5,73
	44	39	66	135	M52x3	210	115	282	245	450	6	SA60 ES-2RS	5,73
	44	39	66	135	M52x3	210	115	282	245	450	6	SA60 C-2RS**	5,73
70	49	43	77	160	M56x4	235	125	318	315	610	6	SA70 ES	7,94
	49	43	77	160	M56x4	235	125	318	315	610	6	SA70 ES-2RS	7,94
	49	43	77	160	M56x4	235	125	318	315	610	6	SA70 C-2RS**	7,94
80	55	48	88	180	M64x4	270	140	365	400	750	6	SA80 ES	12,06
	55	48	88	180	M64x4	270	140	365	400	750	6	SA80 ES-2RS	12,06
	55	48	88	180	M64x4	270	140	365	400	750	6	SA80 C-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

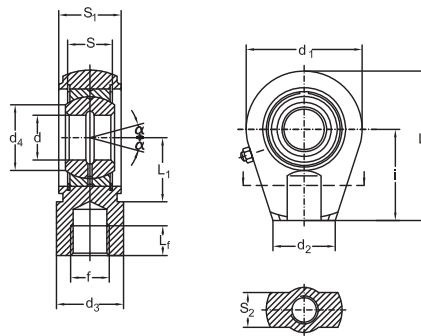


TAC...

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

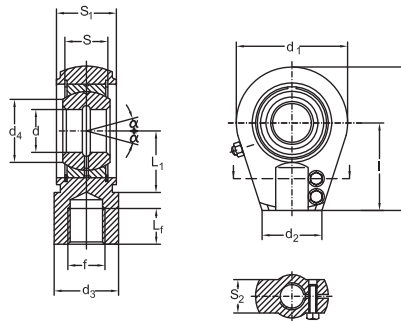


TAPR...N

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

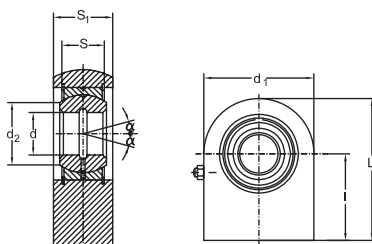


TAPR...U

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 595U
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

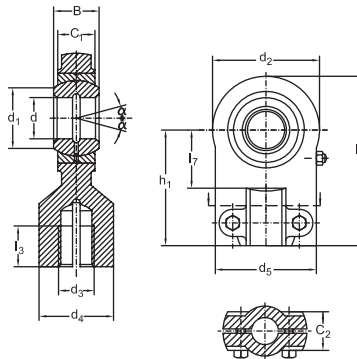


TPN...

Dimensions							Designation
d	S	d ₁	i	d ₂	S ₁	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



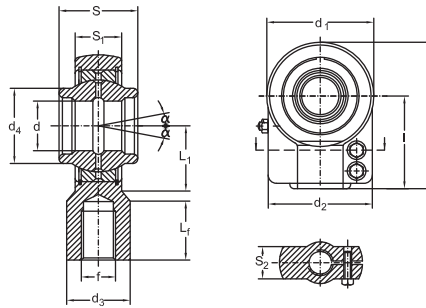
TAPR...DO

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	TAPR 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	TAPR 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

Contact surface: steel / steel
The sizes are not binding.

Rod ends for hydraulic components

DIN 24338



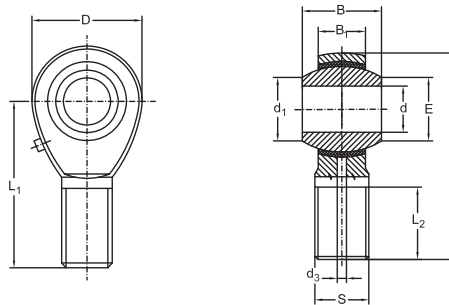
TAPR...CE

Dimensions													Designation
d	S	d ₁	l	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

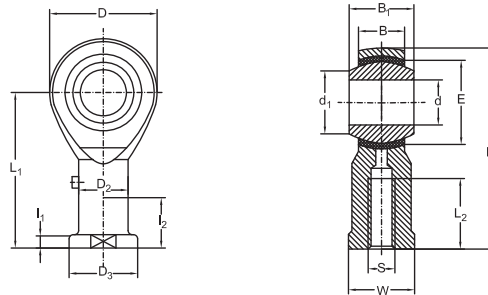
Dimensions									Load ratings		Designation	Mass
d	d ₁	B ₁	E	B	D	S	L ₁	L ₂	dyn.	stat.		
mm									kN	kN	-	kg
5	7,7	8	11,11	7	16	M5x0,8	33	20	3,2	7	POS5*	0,014
	7,7	8	11,11	7,5	18	M5	33	20	3,2	7	POS5 EC**	0,014
6	9	9	12,70	7	18	M6x1	36	22	3,5	8	POS6*	0,019
	8,9	9	12,70	7,5	20	M6	36	22	3,5	8	POS6 EC**	0,019
8	10,4	12	15,88	9	22	M8x1,25	42	25	5,8	13	POS8*	0,036
	10,3	12	15,88	9,5	24	M8	42	25	5,8	13	POS8 EC**	0,036
10	12,9	14	19,05	11	26	M10x1,5	48	29	8,6	18	POS10*	0,060
	12,9	14	19,05	11,5	30	M10	48	29	8,6	18	POS10 EC**	0,070
12	15,4	16	22,23	12	30	M12x1,75	54	33	11,5	24	POS12*	0,089
	15,4	16	22,23	12,5	34	M12	54	33	11,5	24	POS12 EC*	0,110
14	16,9	19	25,40	14	34	M14x2	60	36	17,5	36	POS14*	0,129
	16,8	19	25,40	14,5	38	M14	60	36	17,5	36	POS14 EC**	0,130
16	19,4	21	28,58	15	38	M16x2	66	40	20	40	POS16*	0,181
	19,3	21	28,58	15,5	42	M16	66	40	20	40	POS16 EC**	0,220
17	20,6	22	30,16	16	40	M16x1,5	69	42	22	45	POS17*	0,206
18	21,9	23	31,75	17	42	M18x1,5	72	44	27	50	POS18*	0,250
	21,8	23	31,75	17,5	46	M18x1,5	72	44	27	50	POS18 EC**	0,290
20	24,4	25	34,93	18	46	M20x1,5	78	47	31	60	POS20*	0,333
	24,3	25	34,93	18,5	50	M20x1,5	78	47	31	60	POS20 EC**	0,360
22	25,9	28	38,10	20	50	M22x1,5	84	51	43	72	POS22*	0,430
	25,8	28	38,1	21	56	M22x1,5	84	51	43	72	POS22 EC**	0,490
25	29,5	31	42,86	22	56	M24x2	94	57	50	85	POS25*	0,575
	29,5	31	42,86	23	60	M24x2	94	57	50	85	POS25 EC**	0,65
28	32,3	35	47,59	25	66	M27x2	103	62	60	90	POS28*	0,800
	32,2	35	47,59	26	66	M27x2	103	62	60	90	POS28 EC**	0,870
30	34,9	37	50,80	26	67	M30x2	110	66	66	110	POS30*	0,996
	34,8	37	50,80	27	70	M30x2	110	66	66	110	POS30 EC**	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

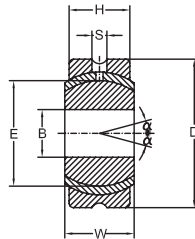
ISO 6126 - 1982



PHS
PHS...EC

Dimensions													Load ratings		Designation	Mass
d	d ₁	B ₁	E	B	D	S	L ₁	L ₂	D ₂	D ₃	L ₁	W	dyn.	stat.		
mm													kN	kN	-	kg
5	7,7	8	11,11	7	16	M5x0,8	27	8	9	12	4	9	3,2	7	PHS5	0,018
	7,7	8	11,11	7,5	18	M5	27	8	9	12	4	10	3,2	7	PHS5 EC	0,018
6	9,0	9	12,71	7	18	M6x1	30	9	10	13	5	11	3,5	8	PHS6	0,026
	8,9	9	12,71	7,5	20	M6	30	9	10	13	5	10	3,5	8	PHS6 EC	0,026
8	10,4	12	15,88	9	22	M8x1,25	36	12	12,5	16	5	14	5,8	13	PHS8	0,045
	10,3	12	15,88	9,5	24	M8	36	12	12,5	16	5	13	5,8	13	PHS8 EC	0,045
10	12,9	14	19,05	11	26	M10x1,5	43	15	15	19	6,5	17	8,6	18	PHS10	0,076
	12,9	14	19,05	11	26	M10x1,25	43	15	15	19	6,5	17	8,6	18	PHS10,1	0,076
	12,9	14	19,05	11,5	30	M10	43	15	15	19	6,5	16	8,6	18	PHS10 EC	0,088
	12,9	14	19,05	11,5	30	M10x1,25	43	15	15	19	6,5	16	8,6	18	PHS10,1 EC	0,088
12	15,4	16	22,23	12	30	M12x1,75	50	18	17,5	22	6,5	19	11,5	24	PHS12	0,114
	15,4	16	22,23	12	30	M12x1,25	50	18	17,5	22	6,5	19	11,5	24	PHS12,1	0,114
	15,4	16	22,23	12,5	34	M12	50	18	17,5	22	6,5	18	11,5	24	PHS12 EC	0,120
	15,4	16	22,23	12,5	34	M12x1,25	50	18	17,5	22	6,5	18	11,5	24	PHS12,1 EC	0,120
14	16,9	19	25,40	14	34	M14x2	57	21	20	25	8	22	17,5	36	PHS14	0,158
	16,8	19	25,40	14,5	38	M14	57	21	20	25	8	21	17,5	36	PHS14 EC	0,140
16	19,4	21	28,58	15	38	M16x2	64	24	22	27	8	22	20	40	PHS16	0,200
	19,4	21	28,58	15	38	M16x1,5	64	24	22	27	8	22	20	40	PHS16,1	0,200
	19,3	21	28,58	15,5	42	M16	64	24	22	27	8	24	20	40	PHS16 EC	0,240
	19,3	21	28,58	15,5	42	M16x1,5	64	24	22	27	8	24	20	40	PHS16,1 EC	0,240
17	20,6	22	30,16	16	40	M16x1,5	67	25	24	31	10	27	22	45	PHS17	0,259
18	21,9	23	31,75	17	42	M18x1,5	71	27	25	31	10	27	27	50	PHS18	0,288
	21,8	23	31,75	17,5	46	M18	71	27	25	31	10	27	27	50	PHS18 EC	0,320
20	24,4	25	34,93	18	46	M20x1,5	77	30	27,5	37	10	30	31	60	PHS20	0,372
	24,3	25	34,93	18,5	50	M20	77	30	27,5	37	10	30	31	60	PHS20 EC	0,430
22	25,9	28	38,10	20	50	M22x1,5	84	33	30	37	12	32	43	72	PHS22	0,475
	25,8	28	38,10	21	56	M22	84	33	30	37	12	34	43	72	PHS22 EC	0,610
	29,6	31	42,86	22	56	M24x2	94	36	33,5	42	12	36	50	85	PHS25	0,673
25	29,5	31	42,86	23	60	M24	94	36	33,5	42	12	36	50	85	PHS25 EC	0,810
28	32,3	35	47,59	25	66	M27x2	103	41	37	46	14	41	60	90	PHS28	0,950
	32,2	35	47,59	26	66	M27	103	41	37	46	14	41	60	90	PHS28 EC	1,120
30	34,9	37	50,80	26	67	M30x2	110	45	40	50	15	41	66	110	PHS30	1,050
	34,8	37	50,80	27	70	M30	110	45	40	50	15	46	66	110	PHS30 EC	1,350

Spherical plain bearings



SSR

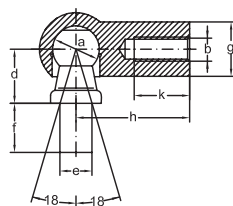
Dimensions									Max static load ratings		Designation	Mass
B	W	H	O	D	R	S	E	α	dyn.	stat.		
mm									kN	kN	-	kg
5	8	7	7,71	16	0,5	1,5	11,11	24	9,30	2,30	SSR5	0,010
6	9	7	8,96	18	0,5	1,5	12,7	28	10,70	2,70	SSR6	0,012
8	12	9	10,4	22	0,5	1,5	15,88	25	17,20	4,30	SSR8	0,024
10	14	11	12,92	26	0,5	1,5	19,05	23	25,10	6,30	SSR10	0,040
12	16	12	15,43	30	1	2	22,23	24	32,00	8,00	SSR12	0,058
14	19	14	16,86	34	1	2	25,4	23	42,70	10,70	SSR14	0,086
15	20	14	18,2	36	1	2	26,99	24	45,30	11,30	SSR15	0,098
16	21	15	19,39	38	1	2	28,58	24	51,40	12,90	SSR16	0,116
17	22	16	20,63	40	1	2,5	30,16	23	57,90	14,50	SSR17	0,135
18	23	17	21,89	42	1,5	2,5	31,75	23	64,80	162,0	SSR18	0,157
20	25	18	24,38	46	1,5	2,5	34,93	24	75,40	18,90	SSR20	0,200
22	28	20	25,84	50	1,5	2,5	38,1	23	91,40	22,90	SSR22	0,262
25	31	22	29,6	56	1,5	3	42,86	23	113,20	28,30	SSR25	0,362
28	35	25	32,29	62	1,5	3	47,83	22	142,90	35,70	SSR28	0,500
30	37	26	34,81	67	2	3	50,8	23	158,50	39,60	SSR30	0,608

Materials: - housing - steel
 - insert - bronze
 - ball - chrome steel

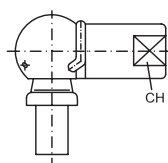
The sizes are not binding.

Ball joint rod end with spring clamping

DIN 71802



B



BS

Dimensions									Mass
a	b	d	e	f	g	h	k	CH*	B and BS
H9/h8			h11						
mm								-	kg
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

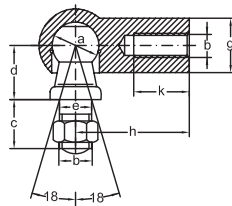
Surface: zinc - plating FeZN7 Uni 4721 - or coarse oiled surface by request.

*Clamping plains.

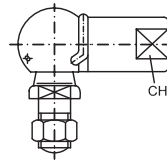
C45 special.

The sizes are not binding.

Ball joint rod end with spring clamping and safety ring DIN 71802



A



AS

Dimensions											Mass
a	b	c	d	e	g	h	L ₁	L ₂	k	CH*	A and AS
H9/h8				h11							
mm										-	g
8	M5	10	9	5	8	22	25,2	28,5	10,2	7	15,2
10	M6	12	11	6	10	25	30,2	32,5	11,5	8	25,2
13	M8	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.

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE





Linear ball bearings bushing

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 (C_0).

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	
Table 1	
Condition of use	Low limit of f_s
When the shaft has less deflection and shock	1 to 2
When elastic deformation should be considered with respect to pinch load	2 to 4
When the equipment is subject to vibration and impacts	3 to 5

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 cause flaking on the rolling bodies and planes because of material fatigue. The travelling distance of linear system until the first 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 below 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:

$$L = c \frac{f_H^3 \cdot f_T \cdot c}{f_W \cdot P} n \cdot 50,$$

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:

$$L_h = \frac{L \cdot 10^3}{2 l_s \cdot n_1 \cdot 60},$$

where:

- L_h - rating life in hours, hr,
- l_s - stroke length, m
- L - rating life, km,
- n_1 - no of trokes 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 608

shaft lowers to decresure the permissible load compared to that of the linear system used at room temperature rise shortens the rating life.

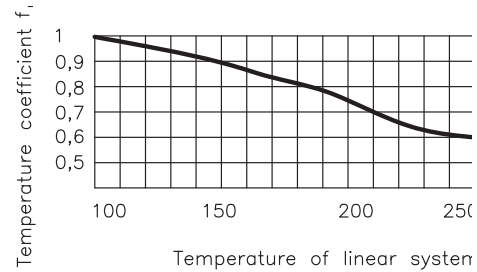


Fig. 2

Contact coefficient

Generally two or more linear bushing are used on one shaft. Thus, the load on each linear system differs depending on each precessing accuracy. Because the linear bushing are not loaded equally, the number of linear bushing per shaft changes the permissible load of system.

Contact coefficient	
	Table 2
Number of linear system 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 oprating conditions into account.

Load coefficient		Table 3
Operating Conditions	f_w	
Operation at low speed (15 m/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 URB 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 URB linear system depends on the model, load weight, speed, and lubricant. The sealing resistance depends on lip interference and lubricant, regardless of the load weight. 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	Ambient Working Temperature	
Linear Bushing	LM LME LMB	0,002 to 0,003	

Ambient working temperature

The ambient working temperature range for each URB linear system depends on the model. Consult URB on use outside the recommended temperature range.

Temperature conversion equation:

$$C = \frac{5}{9} (F - 32)$$

$$F = 32 + \frac{9}{5} C$$

Ambient working temperature			Table 4
Linear System Type	Models	Ambient Working Temperature	
Linear Bushing	LM LME LMB	-20 to 80°C	

Lubrication and dust prevention

Using URB linear systems without lubrication increases the abrasion of the rolling elements, shortening the life span. The URB linear systems, therefore require appropriate lubrication. For lubrication URB recommends turbine oil conforming to ISO Standards G32 to G68 or lithium base soap grease no. 2. Some URB 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 URB 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 inlaid inside the outer cylinder by end rings.

Those parts are assembled to optimize their required functions.

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 URB linear bushing is reduced from a solid steel outer cylinder and incorporates an industrial strenght resin retainer.

Ease of assembly

The standard type of URB 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

URB 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

URB offers a full line of linear bushing: The standard, integral single - retainer closed type, the clearance adjustable type and the open type. 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.

610

Seal:

No entry	- no seal,
U	- seal on one side,
UU	- seals on both sides.

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:

$$L = c \frac{f_H \# f_T \# \frac{C}{P} \# \frac{C}{P} m^3}{f_W \# P} 50, \quad (1)$$

where:

L	- rated life, km,
C	- basic dynamic load rating, N
P	- working load, N,
f_W	- load coefficient,
f_H	- hardness factor (see page 624),
f_T	- temperature coefficient (see page 624),
f_C	- contact coefficient (see page 624).

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:

$$L_h = c \frac{L \# 10^3}{2 \# l_s \# n_1 \# 60} m \quad (2)$$

where:

L_h	- lifespan, hr,
l_s	- stroke length, m,
L	- rated life, km,
n_1	- number of strokes per minute, cpm.

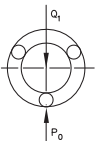
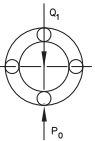
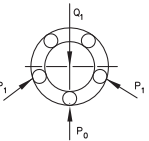
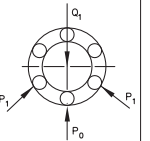
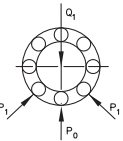
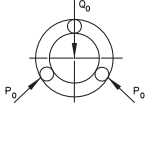
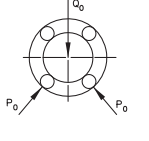
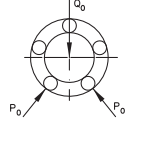
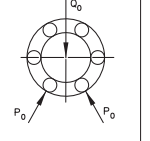
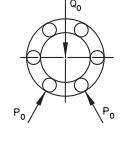
Relation between ball circuits and load rating

The URB linear bushing includes ball circuits that are spaced equally and circumferentially. The load rating varies according to the loaded position on the circumference.

URB

The value in the dimension table indicates the load rating when the load is placed on top of one ball circuit. If the URB 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:

Table 6					
Row position load ratio	Number of rows				
	3	4	5	6	8
Row position load ratio	 $Q_1 = P_0$	 $Q_1 = P_0$	 $Q_1 = 1,106P_0$	 $Q_1 = 1,1354P_0$	 $Q_1 = 1,841P_0$
Row position	 $Q_0 = P_0$	 $Q_0 = 1,414P_0$	 $Q_0 = 1,618P_0$	 $Q_0 = 1,732P_0$	 $Q_0 = 2,052P_0$
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 URB linear bushing used in the following conditions:

Linear bushing	LM20
Stroke lenght	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:

$$L = c \frac{f_H}{f_W} \frac{f_P}{P} \frac{C}{P} \frac{3}{m} 50 = \frac{882^3}{490^3} \frac{3}{m} 50 = 292 \text{ km,}$$

where:

$$F_H = f_T = f_C = f_W = 1.0$$

From equation (2), the lifespan is obtained as follows:

$$L_h = c \frac{L}{2} \frac{10^3}{e_s n} \frac{m}{60} = c \frac{292}{2} \frac{10^3}{0,05 \cdot 50} \frac{m}{60} \approx 973 \text{ hr}$$

Selecting the linear bushing type satisfying the following conditions:

Number of linear bushing used	4
Stroke lenght	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:

$$C = \sqrt[3]{\frac{L}{50}} \frac{f_W}{f_H + f_T + C} n P = 1492 \text{ N}$$

Assume the following with a pair of shafts each with two linear bushing:

$$f_C = 0,81, f_W = f_T = f_H = 1$$

As a result, LM30 is selected from the dimension table as the URB linear bushing type satisfying the value of C.

Clearance and fit

When a standard-type URB 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		Housing	
Model	Normal fit High class	Transitional	Loose fit	Tight fit
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 URB linear bushing high precision of the shaft and housing is required.

Shaft

The rolling balls in the URB 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.

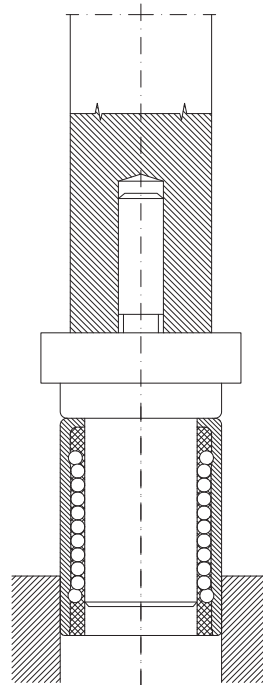
- Zero clearance or negative clearance increases the frictional resistance slightly. If the negative clearance is too tight, the deformation of the outside cylinder will become larger, to shorten the bush life.

Housing

There is a wide range of housing differing in design, machining and mounting. For the fitness and shapes of housing see in table 8 and the following section on mounting.

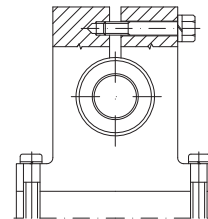
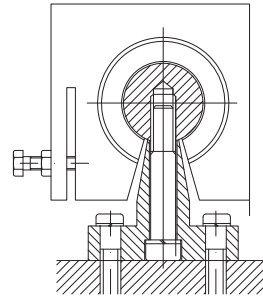
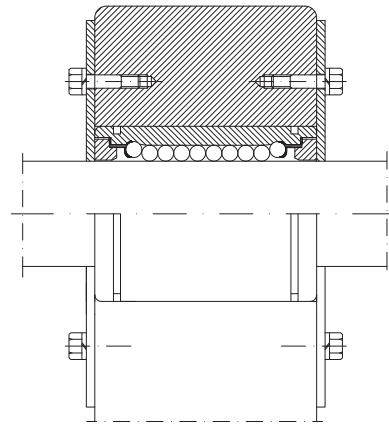
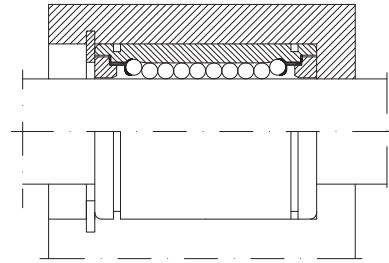
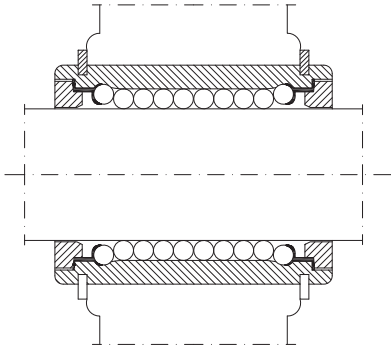
Mounting

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.



Examples 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.



URB ball bushing interchangeability list

Ball bushing compact type

URB	NTN	STAR	INA	SKF	FAG
KH...	KH...	0658 - 0... -00	KH...	LBBR...	LNA...
				LBBS...	LFA
KH... PP	KH...LL	0658 - 2... -40	KN...PP	LBBR...2LS	LNA...2RS
				LBBS...2LS	LFA...2RS

Ball bushing resin retainer

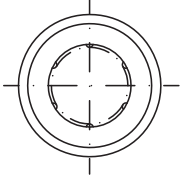
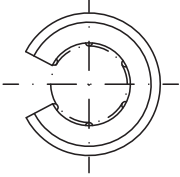
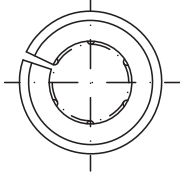
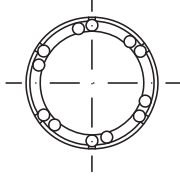
URB	NB	INA	SKF	THK	IKO	THOMSON	EASE
LME	KB...G	KB	LBAR/LBCR	LME...	LBE...	MA M...	SDE
LME...UU	KB...GUU	KB...PP	LBAR/LBCR...2LS	LME...UU	LBE...UU	MA M...WW	SDE...UU
LME...AJ	KB...GAJ	KBS...	LBAS...	LME...AJ	LBE...AJ	MA M...ADJ	SDE...AJ
LME...UUAJ	KB...GUUAJ	KBS...PP	LBAS...2LS	LME...UUAJ	LBE...UUAJ	MA 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.

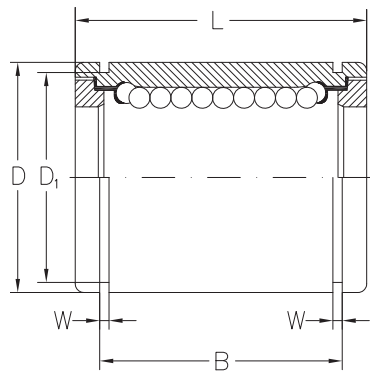
URB	NB	THK	EASE	URB	NB	THK	EASE
LM	SM...G	LM...	SDM	LMB	SW...G	LMB...	SDB
LM...UU	SM...GUU	LM...UU	SDM...UU	LMB...UU	SW...GUU	LMB...UU	SDB...UU
LM...AJ	SM...GAJ	LM...AJ	SDM...AJ	LMB...AJ	SW...GAJ	LMB...AJ	SDB...AJ
LM...UUAJ	SM...GUUAJ	LM...UUAJ	SDM...UUAJ	LMB...UUAJ	SW...GUUAJ	LMB...UUAJ	SDB...UUAJ
LM...OP	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.

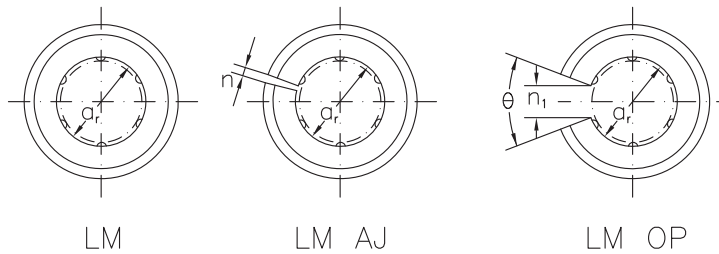
The above types are inch dimension series generally used in US.

Standard type	 page 633 page 634 page 636	
Open type	 page 633 page 634 page 636	One ball circuit (50° - 80°) is removed to allow an opening slot to fit over rail supports.
Adjustable type	 page 633 page 634 page 636	This type has a slot in the outside cylinder. This design allows for clearance adjustment.
Drawn cup type	 page 638	This type linear ball bushing 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.						Nominal shaft diameter
Standard type	Seal type	Ball circuit	Mass	Adjustable type	Open type	Tolerance
-	-		gr	-	-	mm
LM5	LM5 UU	4	4	-	-	$5 \begin{smallmatrix} 0 \\ -0,008 \end{smallmatrix}$
LM6	LM6 UU	4	8	LM6 AJ	-	$6 \begin{smallmatrix} 0 \\ -0,009 \end{smallmatrix}$
LM8 S	LM8 SUU	4	11	LM8 SAJ	-	8
LM8	LM8 UU	4	16	LM8 AJ	-	8
LM10	LM10 UU	4	30	LM10 AJ	-	10
LM12	LM12 UU	4	31,5	LM12 AJ	LM12 OP	12
LM13	LM13 UU	4	43	LM13 AJ	LM13 OP	13
LM16	LM16 UU	4	69	LM16 AJ	LM16 OP	16
LM20	LM20 UU	5	87	LM20 AJ	LM20 OP	$20 \begin{smallmatrix} 0 \\ -0,010 \end{smallmatrix}$
LM25	LM25 UU	6	220	LM25 AJ	LM25 OP	25
LM30	LM30 UU	6	250	LM30 AJ	LM30 OP	30
LM35	LM35 UU	6	390	LM35 AJ	LM35 OP	$35 \begin{smallmatrix} 0 \\ -0,012 \end{smallmatrix}$
LM40	LM40 UU	6	585	LM40 AJ	LM40 OP	40
LM50	LM50 UU	6	1580	LM50 AJ	LM50 OP	50
LM60	LM60 UU	6	2000	LM60 AJ	LM60 OP	$60 \begin{smallmatrix} 0 \\ -0,015 \end{smallmatrix}$



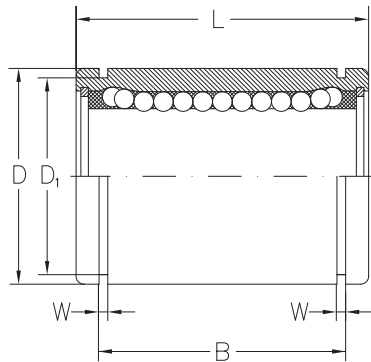
Major dimensions and tolerance

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		kN		
10 ⁰ _{-0,009}	15 ⁰ _{-0,012}	10,2 ⁰ _{-0,2}	1,1	9,6	-	-	-	8	-3	0,17	0,21	LM5
12 ⁰ _{-0,011}	19 ⁰ _{-0,02}	13,5 ⁰ _{-0,2}	1,1	11,5	1	-	-	12	-5	0,21	0,27	LM6
15 ⁰ _{-0,011}	17 ⁰ _{-0,02}	11,5 ⁰ _{-0,2}	1,1	14,3	1	-	-	12	-5	0,18	0,23	LM8S
15 ⁰ _{-0,011}	24 ⁰ _{-0,02}	17,5 ⁰ _{-0,2}	1,1	14,3	1	-	-	12	-5	0,27	0,41	LM8
19 ⁰ _{-0,013}	29 ⁰ _{-0,02}	22 ⁰ _{-0,2}	1,3	18	1	-	-	12	-5	0,38	0,56	LM10
21 ⁰ _{-0,013}	30 ⁰ _{-0,02}	23 ⁰ _{-0,2}	1,3	20	1,5	8	80°	12	-5	0,42	0,61	LM12
23 ⁰ _{-0,013}	32 ⁰ _{-0,02}	23 ⁰ _{-0,2}	1,3	22	1,5	9	80°	12	-7	0,52	0,79	LM13
28 ⁰ _{-0,013}	37 ⁰ _{-0,02}	26,5 ⁰ _{-0,2}	1,6	27	1,5	11	80°	12	-7	0,79	1,2	LM16
32 ⁰ _{-0,016}	42 ⁰ _{-0,02}	30,5 ⁰ _{-0,2}	1,6	30,5	1,5	11	60°	15	-9	0,88	1,4	LM20
40 ⁰ _{-0,016}	59 ⁰ _{-0,03}	41 ⁰ _{-0,3}	1,85	38	2	12	50°	15	-9	1	1,6	LM25
45 ⁰ _{-0,016}	64 ⁰ _{-0,03}	44,5 ⁰ _{-0,3}	1,85	43	2,5	15	50°	15	-9	1,6	2,8	LM30
52 ⁰ _{-0,019}	70 ⁰ _{-0,03}	49,5 ⁰ _{-0,3}	2,1	49	2,5	17	50°	20	-13	1,7	3,2	LM35
60 ⁰ _{-0,019}	80 ⁰ _{-0,03}	60,5 ⁰ _{-0,3}	2,1	57	3	20	50°	20	-13	2,2	4,1	LM40
70 ⁰ _{-0,022}	100 ⁰ _{-0,03}	74 ⁰ _{-0,3}	2,6	76,5	3	25	50°	20	-13	3,9	8,1	LM50
80 ⁰ _{-0,022}	110 ⁰ _{-0,03}	85 ⁰ _{-0,3}	3,15	86,5	3	30	50°	25	-16	4,8	10,2	LM60

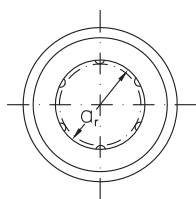
LM < Built-in synthetics resin retainers >

This type is a metric dimension series widely used in Japan and other countries.

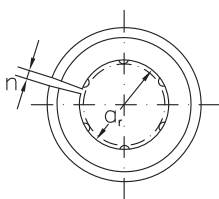
Linear ball bushing



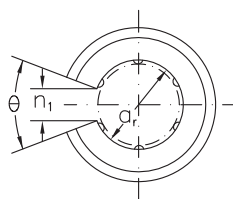
Nominal part no.						Nominal shaft diameter
Standard type	Seal type	Ball circuit	Mass	Adjustable type	Open type	Tolerance
-	-		gr	-	-	mm
LME5	LME5 UU	3	11	LME5 AJ	-	5 $\begin{smallmatrix} +0,008 \\ 0 \end{smallmatrix}$
LME8	LME8 UU	4	20	LME8 AJ	-	8
LME12	LME12 UU	4	41	LME12 AJ	LME12 OP	12
LME16	LME16 UU	4	57	LME16 AJ	LME16 OP	16 $\begin{smallmatrix} +0,009 \\ -0,001 \end{smallmatrix}$
LME20	LME20 UU	5	91	LME20 AJ	LME20 OP	20
LME25	LME25 UU	6	215	LME25 AJ	LME25 OP	25 $\begin{smallmatrix} +0,011 \\ -0,001 \end{smallmatrix}$
LME30	LME30 UU	6	325	LME30 AJ	LME30 OP	30
LME40	LME40 UU	6	705	LME40 AJ	LME40 OP	40 $\begin{smallmatrix} +0,013 \\ -0,002 \end{smallmatrix}$
LME50	LME50 UU	6	1130	LME50 AJ	LME50 OP	50
LME60	LME60 UU	6	2220	LME60 AJ	LME60 OP	60



LME



LME AJ



LME OP

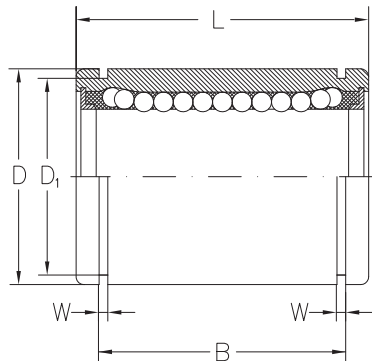
Major dimensions and tolerance

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 _{-0,008}	22 ⁰ _{-0,02}	14,5 ⁰ _{-0,2}	1,1	11,5	1	-	-	12	-5	21	27		LME5	
16 ⁰ _{-0,008}	25 ⁰ _{-0,02}	16,5 ⁰ _{-0,2}	1,1	15,2	1	-	-	12	-5	21	41		LME8	
22 ⁰ _{-0,009}	32 ⁰ _{-0,02}	22,9 ⁰ _{-0,2}	1,3	21	1,5	7,5	78°	12	-7	52	79		LME12	
26 ⁰ _{-0,009}	36 ⁰ _{-0,02}	24,9 ⁰ _{-0,2}	1,3	24,9	1,5	10	78°	12	-7	59	91		LME16	
32 ⁰ _{-0,011}	45 ⁰ _{-0,02}	31,5 ⁰ _{-0,2}	1,6	30,3	2	10	60°	15	-9	88	140		LME20	
40 ⁰ _{-0,011}	58 ⁰ _{-0,03}	44,1 ⁰ _{-0,3}	1,85	37,5	2	12,5	60°	15	-9	100	160		LME25	
47 ⁰ _{-0,011}	68 ⁰ _{-0,03}	52,1 ⁰ _{-0,3}	1,85	44,5	2	12,5	50°	15	-9	160	280		LME30	
62 ⁰ _{-0,013}	80 ⁰ _{-0,03}	60,6 ⁰ _{-0,3}	2,15	59	3	16,8	50°	17	-13	220	410		LME40	
75 ⁰ _{-0,013}	100 ⁰ _{-0,03}	77,6 ⁰ _{-0,3}	2,65	72	3	21	50°	17	-13	390	810		LME50	
90 ⁰ _{-0,015}	125 ⁰ _{-0,04}	101,7 ⁰ _{-0,4}	3,15	86,5	3	27,2	54°	20	-13	480	1020		LME60	

LM < Built-in synthetics resin retainers >

This type is a metric dimension series generally used in Europe.

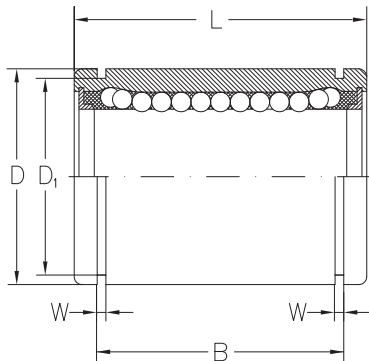
Linear ball bushing



Nominal diameter	Nominal part no.						Nominal shaft diameter	Major dimensions and tolerance	
	Standard type	Seal type	Ball circuit	Mass	Adjustable type	Open type		Tolerance	D _{Tolerance}
inch/mm	-	-		kg	-	-	inch/mm		
1/4 6,350	LMB4	LMB4 UU	4	0,008	LMB4 AJ	-	0,250 6,350	0 -0,0040	0,5000 12,700 0 -0,011
3/8 9,525	LMB6	LMB6 UU	4	0,014	LMB6 AJ	-	0,3750 9,525		0,6250 15,875 0 -0,00050
1/2 12,700	LMB8	LMB8 UU	4	0,037	LMB8 AJ	LMB8 OP	0,5000 12,700	0 -0,0090	0,8750 22,225 0 -0,013
5/8 15,875	LMB10	LMB10 UU	4	0,076	LMB10 AJ	LMB10 OP	0,625 15,875		1,1250 28,575 0 -0,00065
3/4 19,050	LMB12	LMB12 UU	5	0,095	LMB12 AJ	LMB12 OP	0,7500 19,050	0 -0,0040	1,2500 31,750 0 -0,00075
1 25,400	LMB16	LMB16 UU	6	0,200	LMB16 AJ	LMB16 OP	1,0000 25,400		1,5625 39,688 0 -0,00075
1-1/4 31,750	LMB20	LMB20 UU	6	0,440	LMB20 AJ	LMB20 OP	1,2500 31,750	0 -0,0050	2,0000 50,800 0 -0,019
1-1/2 38,000	LMB24	LMB24 UU	6	0,670	LMB24 AJ	LMB24 OP	1,5000 38,100		2,3750 60,325 0 -0,022
2 50,800	LMB32	LMB32 UU	6	0,114	LMB32 AJ	LMB32 OP	2,0000 50,800	0 -0,0010	3,0000 76,200 0 -0,00090

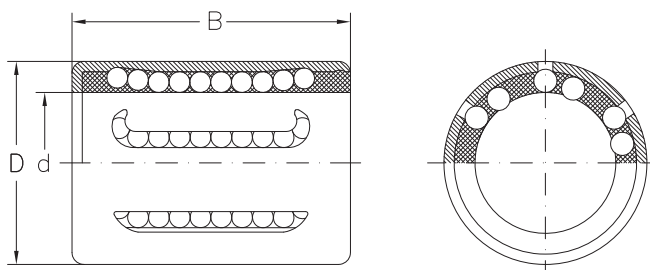
LM < Built-in synthetics resin retainers >

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	D1	h	h1		max	max	C	C ₀	
inch/mm													
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	LMB4
	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	
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	LMB8
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	LMB10
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	LMB12
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	LMB16
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	LMB20
3,000 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	LMB24
4,000 101,600		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	LMB32
	0 -0,022												

Standard linear ball bushing Steel drawn cup/cage plastic



Dimensions			Load capacity		Designation	Mass
d	D	B	dyn.	stat.	bearing	
mm						g
6	12	22	400	239	KH0622	7
8	15	24	435	280	KH0824	12
10	17	26	500	370	KH1026	14,5
12	19	28	620	510	KH1228	18,5
14	21	28	620	520	KH1428	20,5
16	24	30	800	620	KH1630	27,5
20	28	30	950	790	KH2030	32,5
25	35	40	1990	1670	KH2540	66
30	40	50	2800	2700	KH3050	95
40	52	60	4400	4450	KH4060	182
50	62	70	5500	6300	KH5070	252

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE



URB



Pillow blocks

Feature

The spherical outside surface ball bearings of URB 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 housing. The type of bearing units are defined according to the different mounting methods of the bearings to shafts: the set-screws type, the adapter type, the eccentric locking collar type.

The URB housing are mainly casting housing. There are pressed steel plate housing 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 bearing 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 relubricate 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.

Lubrication

The Spherical Outside Surface Ball Bearings of URB 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 surface ball bearings during manufacturing.

Static safety factors		
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	within 500
	above 75 µm	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 should not be lower than -30°C.

The permissible speed of rotation is connected with the fit between shaft and bearing. It is reconnected 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.

Tolerance for bearing units

Tolerances on inner rings of bearing with cylindrical bore Unit: 0.001 mm									Table 2
Nominal bore diameter		Cylindrical bore						Radial run-out	
d over	incl.	bore diameter dm deviations		d deviations		width Bi deviations		max.	
		high	low	high	low	high	low		
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	

Table 2

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					
Nominal bore diameter		Δd		$\Delta d1 - \Delta d$	
d over	incl.	deviations 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

Table 3

Note: The deviation from nominal taper are defined by the limits of $(\Delta d1 - \Delta d)$, where $\Delta d1$ is actual deviations of $d1$ from nominal diameter at the largest end of bore and Δd is actual deviation of d from bearing bore nominal diameter.

$d1$ is obtained by the following formula:

$d1 = d + 0.083333 B$, where B is width of the bearing inner ring.

The nominal taper angle = $2^\circ 23'9.4''$.

Please refer to the figures 1.

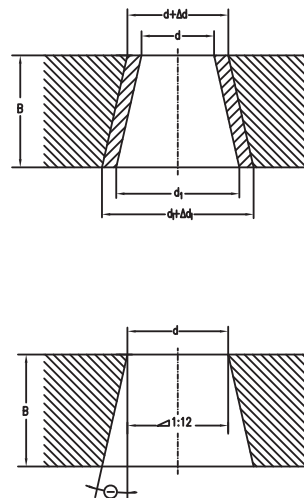


Fig. 1

Tolerances on outer ring Unit: 0.001 mm				
Nominal bore diameter		D_m		Radial run-out
D over	incl.	deviations 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

Table 4

Note: D_m is defined as the arithmetical means of the largest and the smallest diameter obtained by two-point measurement.

The low deviation of outside diameter D_m 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		
Nominal bore diameter		n
d over	incl.	deviations
mm		
40	50	± 200
50	80	± 250
80	120	± 300
120	160	± 350

Table 5

Please refer to the figures 2.

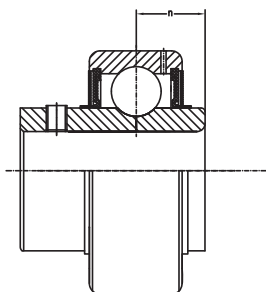


Fig. 2

Chamfer dimensions		
Nominal dimensions		
r	max.	r min.
mm		
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

Table 6

Please refer to the figures 3.

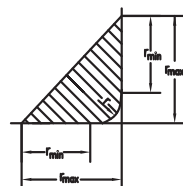


Fig. 3

Center height tolerances for pillow block type housing

Please refer to below figures 4 and table 7

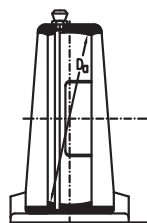


Fig. 4

Tolerances for flanged type housing (F, FS, FL, FT, FA, FB, FC)

Please refer below figures 5a, 5b and table 8a, 8b.

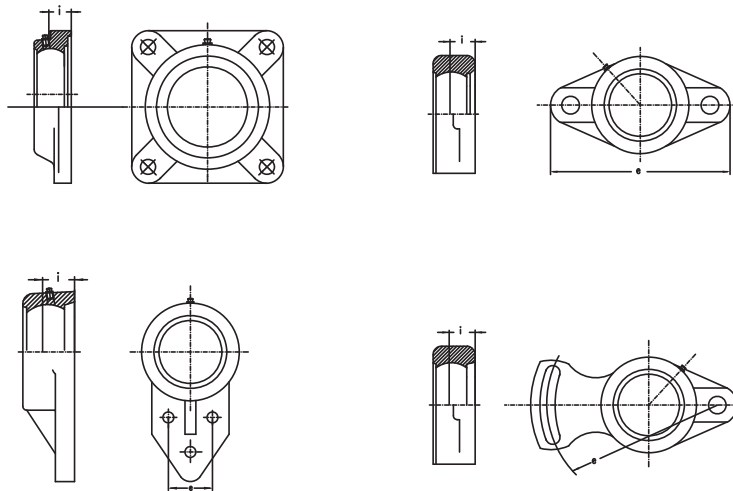


Fig. 5a

Tolerances for flanged type housings (F, FS, FL, FT, FA, FB) Center height tolerances for pillow block type housings Unit: 0.001 mm

Table 7

Housing number						h deviations
mm						
			AK204			
P203			AK205	PA203		
P204			AK206	PA204	PH204	
P205		P305	AK207	PA205	PH205	
P206	PX05	P306	AK208	PA206	PH206	±150
P207	PX06	P307	AK209	PA207	PH207	
P208	PX07	P308	AK210	PA208	PH208	
P209	PX08	P309	AK211	PA209	PH209	
P210	PX09	P310	AK212	PA210	PH210	
P211	PX10	P311	AK213	PA211	PH211	
P212	PX11	P312	AK214	PA212	PH212	
P213	PX12	P313	AK215	PA213	PH213	
P214	PX13	P314			PH214	
P215	PX14	P315			PH215	±200
P216	PX15	P316			PH216	
P217	PX16					
P218						

Unit: 0.001 mm								Table 8a	
Housing number								e	i
mm								deviations	deviations
F204		FL204		FT204	FS204	FA204	FB204		
F205	F305	FL205	FL305	FT205	FS205	FA205	FB205		
F206	F306	FL206	FL306	FT206	FS206	FA206	FB206		
F207	F307	FL207	FL307	FT207	FS207	FA207	FB207	±700	±500
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		
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			±1000	±800
F216		FL216							
F217		FL217							
F218		FL218							

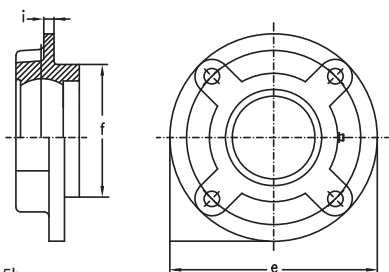


Fig. 5b

Tolerance for take-up type housing (T,ST)

Please refer to below figure 6 and table 9a, 9b.

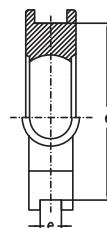


Fig. 6

Tolerance for flanged type housing (FC)					Table 8b	
Unit: 0.001 mm						
Housing number	f	e	i	Radial run-out of machined pilot max		
	deviations	deviations	deviations			
	high	low				
mm						
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				

Tolerances for take-up type housing (T)				Table 9a	
Unit: 0,001 mm					
Housing number	k deviations high low	e deviations	Parallelism of guide max		
mm					
T204	+200	0	500		
T210	0	- 500			
T211	+300	0	600		
T217	0	- 800			

Tolerances for take-up type housing (ST)
Unit: 0.001 mm

Table 9b

Housing number	k deviations		e deviations	Parallelism of guide max
	high	low		
mm				
ST204	+500		± 250	500
ST210	-250			
ST211	+1000		± 250	600
ST215	- 250			

Note:

$D_{am} = (D_{a \max} + D_{a \min}) / 2$

$D_{a \max}$ - maximum measured value of D_a

$D_{a \min}$ - minimum measured value of D_a

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.

Tolerances on spherical inside diameter
Unit: 0.001 mm

Table 10

Nominal spherical		Symbol H7		Symbol J7					
inside diameter									
D_a		D_{am}		D_a		D_{am}		D_a	
over	incl.	high	low	high	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

Machining tolerances

Table 11

Nominal dimension		Dimensional tolerance
over	incl.	
mm		
4	16	± 0,2
16	63	± 0,3
63	250	± 0,5

Casting tolerances on thickness

Table 13

Nominal dimension		Dimensional
over	incl.	tolerance
mm		
up	5	± 1
5	10	± 1,5
10	20	± 2
20	30	± 3
30	50	± 3,5

Casting tolerances on lenght

Table 12

Nominal dimension		Dimensional
over	incl.	tolerance
mm		
up	100	± 1,5
100	200	± 2,0
200	400	± 3,0
400	800	± 4,0

One side machining tolerances

Table 14

Nominal dimension		Dimensional
over	incl.	tolerance
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 lenght and thickness may be added with deviations on draft taper.

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: 0,001 mm							
Table 15							
Nominal bore diameter		Clearance symbol					
d		C2		normal		c3	
over	incl.	min.	max.	min.	max.	min.	max.
mm							
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: 0,001 mm							
Table 16							
Nominal bore diameter		Clearance symbol					
d		C2		normal		c3	
over	incl.	min.	max.	min.	max.	min.	max.
mm							
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 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:

$$L_{10h} = \frac{10^6}{60n} \cdot \left(\frac{C}{P} \right)^3 \text{ or } L_{10h} = \frac{10^6}{60n} L_{10} = \frac{16666}{n} \cdot \left(\frac{C}{P} \right)^3,$$

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.

$$f_n = \left(\frac{331/3}{n} \right)^3, f_h = \left(\frac{L_{10h}}{500} \right)^3$$

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 according to 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:

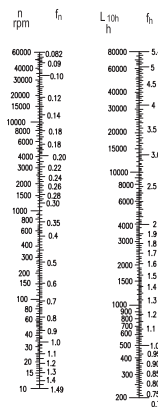
$$P_m = \sqrt[3]{\frac{1}{N} \sum_{i=1}^N P_i^3}$$

where:

P_m - mean equivalent dynamic bearing load, N

P - equivalent dynamic bearing load, N

N - total revolution numbers with one load changing cycle, r



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:

$$P = XF_r + YF_a$$

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 $F_r = 3000$ N, 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 689).

From the required basic rating life (anticipated service life), it can be found that:

$f_h = 3,42$ (figure 7 shows about 3,4, refer to page 689).

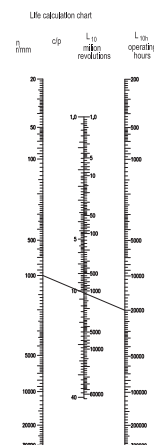
Under only radial load, i.e.

$$P = F_r = 3000 \text{ N}$$

Therefore,

$$C = \frac{\#h}{\#n} P = \frac{3,42}{0,322} = 31,863 \text{ N}$$

A simplified way to calculate the bearing life can be applied by using figure 8.



Radial and thrust factors X and Y for spherical outside surface ball bearings

Table 17

Clearance for normal						Clearance for C3					
$\frac{F_a}{C_a}$	$\frac{F_a}{F_r} \# e$		$\frac{F_a}{F_r} 2 e$		e	$\frac{F_a}{F_r} \# e$		$\frac{F_a}{F_r} 2 e$		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 know, $P = F_r = 3000$ N, thus the required basic dynamic load rating is:

$$C = 3000 \times 10,6 = 31,800, \text{ N}$$

In this way, we can select the spherical outside surface ball bearings inside this catalogue (refer to pages 148-160).

Adjusted rating life equation

The basic rating life L10 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. reliability).

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:	$a_3 = 1$
- properly mounted	
- sufficiently lubricated	
- without outside matters intrusion	
When under operating temperature, the spherical outside surface 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 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		Deviation of tolerances in shaft							
over	incl.	For lower speed		For medium speed		For rather high speed		For high speed	
		h9		h8		h7		J6	
mm		max.	min.	max.	min.	max.	min.	max.	min.
10	18	0	-43	0	-27	0	-18	+8	-3
18	30	0	-52	0	-33	0	-21	+9	-4
30	50	0	-62	0	-39	0	-25	+11	-5
50	80	0	-74	0	-46	0	-30	+12	-7
80	120	0	-87	0	-54	0	-35	+13	-9
120	180	0	-100	0	-63	0	-40	+14	-11

Table 21

Shaft tolerances for interference fit for bearing with cylindrical bore									
Shaft diameter		Deviation of tolerances in shaft							
over	incl.	Higher speed		Rather heavy load		Highest load		Heavy load	
		m6		m7		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

Table 22

Shaft tolerances for bearing with tapered bore					
Shaft diameter		Deviation of tolerances For shot shaft		Deviation of tolerances For shot shaft	
over	incl.	h9		h10	
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

Table 23

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.

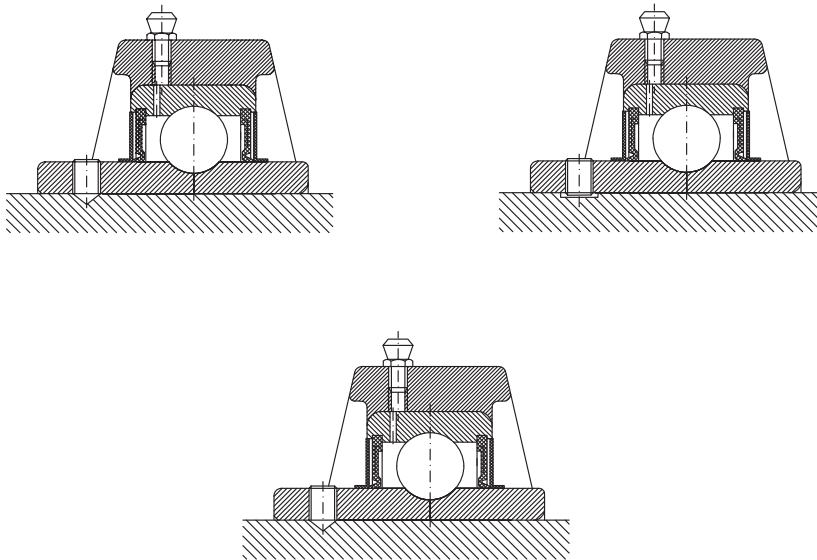


Fig. 9

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 heavily.

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.

Bearing units with set-screws

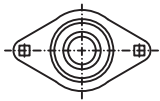
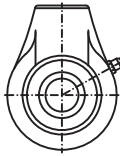
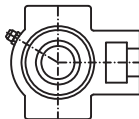
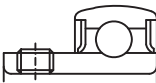
There are two set-screws located at two places on one side of the wide inner ring 120 apart with which the bearing units can be mounted to the shaft. When mounting the bearing to the shaft, the torque shown in the following table 23 is recommended to tighten the set screws to shaft.

The material for cast iron housing

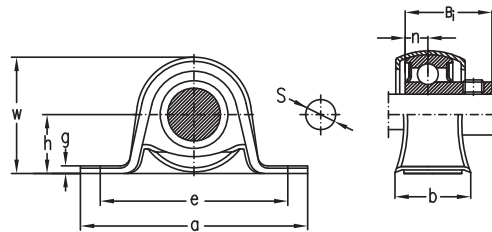
The material of cast iron housing under ISO/DIS GG20, the mechanical properties please refer to table 24.

Proper tightening torque of set-screws				
Set-screws type	Bearing type	Tightening torque	Table 23	
			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, UEL 201 - UEL 205 UC X05, UC 305 - UC 306	3,5 - 4	30 - 35,4
M 8x1	5/16-24 UNF	SB 208, UC 207 - UC 209 SA 207 - SA 210, UEL 206 - UEL 210 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			
Number	Major wall thickness of casting piece	Strain stress	Hardness m6
	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 701	
Flanged units type	page 717	
Two bolts flanged units type	page 728	
Flanged cartridge units type	page 743	
Hanger units type	page 750	
Cylindrical cartridge units type	page 752	
Take up units type	page 755	
Insert bearings	page 762	

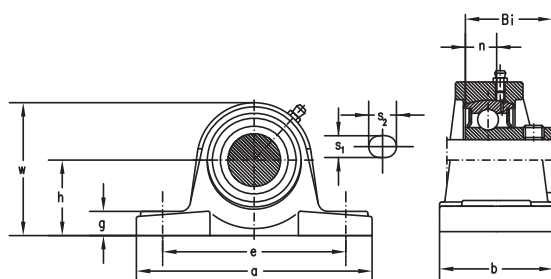
Standard duty pillow blocks pressed steel housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	s	g	w	Bi	n						
mm												-			Kg
12	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP201	SB201	PP203		0,17
15	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP202	SB202	PP203		0,16
17	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP203	SB203	PP203		0,15
20	25,4	98	76	32	9,5	3,2	50,5	25	7	M8	SBPP204	SB204	PP204		0,22
25	28,6	108	86	32	11,5	4	56,6	27	7,5	M10	SBPP205	SB205	PP205		0,31
30	33,3	117	95	38	11,5	4	66,3	29	8	M10	SBPP206	SB206	PP206		0,45
35	39,7	129	106	42	11,5	4,6	78	32	8,5	M10	SBPP207	SB207	PP207		0,61

Note: Inch sizes available on request.

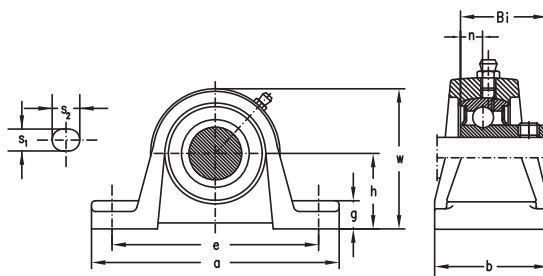
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions				s_1	s_2	g	w	B_i	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b											
mm												-			Kg
20	31,8	128	98	38	11	14	14	63	25	7	M10	SBAK204	SB204	AK204	0,70
25	33,3	140	105	40	11	14	15	66,5	27	7,5	M10	SBAK205	SB205	AK205	0,81
30	39,7	160	121	44	14	19	17	79	29	8	M12	SBAK206	SB206	AK206	1,18
35	46	167	127	48	14	19	18	91	32	8,5	M12	SBAK207	SB207	AK207	1,61
40	49,2	181	140	52	14	19	19	98	34	9,5	M12	SBAK208	SB208	AK208	1,99

Note: Inch sizes available on request.

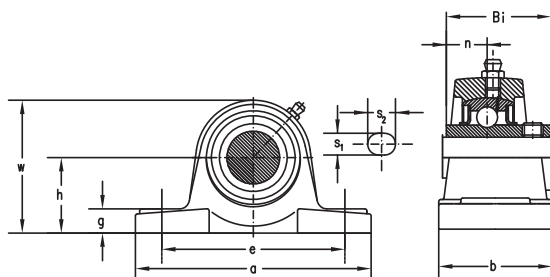
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
20	33,3	127	96	35	13	16	14	65	25	7,0	M10	SBP204	SB204	P204	0,62
25	36,5	140	105	36	13	19	15	71	27	7,5	M10	SBP205	SB205	P205	0,73
30	42,9	160	121	42	14	19	16	84	29	8	M12	SBP206	SB206	P206	1,16
35	47,6	167	127	45	15	19	17	94	32	8,5	M12	SBP207	SB207	P207	1,46
40	49,2	180	137	49	15	21	18	100	34	9,5	M12	SBP208	SB208	P208	1,74

Note: Inch sizes available on request.

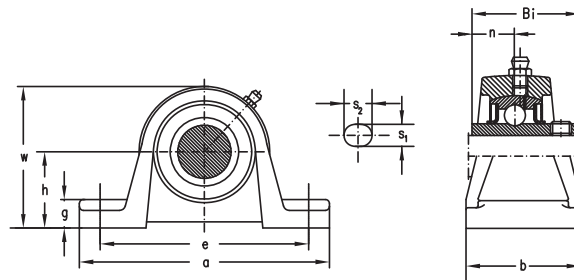
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions				s_1	s_2	g	w	B_i	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b											
mm												-			Kg
20	31,8	128	98	38	11	14	14	63	31	12,7	M10	UCAK204	UC204	AK204	0,74
25	33,3	140	105	40	11	14	15	66,5	34	14,3	M10	UCAK205	UC205	AK205	0,85
30	39,7	160	121	44	14	19	17	79	38,1	15,9	M12	UCAK206	UC206	AK206	1,24
35	46,0	167	127	48	14	19	18	91	42,9	17,5	M12	UCAK207	UC207	AK207	1,70
40	49,2	181	140	52	14	19	19	98	49,2	19	M12	UCAK208	UC208	AK208	2,13
45	52,4	189	146	54	14	19	20	105	49,2	19	M12	UCAK209	UC209	AK209	2,39
50	55,6	203	159	57	17,5	21	21	111,5	51,6	19	M16	UCAK210	UC210	AK210	2,83
55	61,9	232	181	60	18	24	23	123	55,6	22,2	M16	UCAK211	UC211	AK211	3,85
60	68,3	241	191	64	18	24	25	136	65,1	25,4	M16	UCAK212	UC212	AK212	4,92
65	74,6	262	203	70	21	28	27	147,5	65,1	25,4	M20	UCAK213	UC213	AK213	6,13
70	77,8	266	210	74	21	28	28	153,5	74,6	30,2	M20	UCAK214	UC214	AK214	6,90
75	82,6	304	241	78	22	32	30	162	77,8	33,3	M20	UCAK215	UC215	AK215	8,56

Note: Inch sizes available on request.

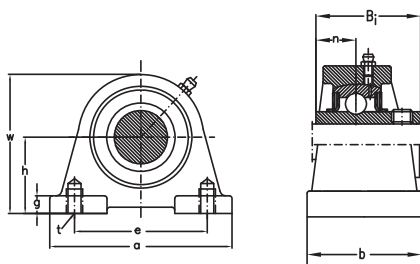
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing		Housing number	Mass
	h	a	e	b	s ₁	s ₂	g	w	Bi	n			number	number	number	
mm												-				Kg
12	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP201	UC201	P203		0,68
15	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP202	UC202	P203		0,67
17	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP203	UC203	P203		0,66
20	33,3	127	96	35	13	16	14	65,0	31	12,7	M10	UCP204	UC204	P204		0,66
25	36,5	140	105	36	13	19	15	71,0	34	14,3	M10	UCP205	UC205	P205		0,77
30	42,9	160	121	42	14	19	16	84,0	38,1	15,9	M12	UCP206	UC206	P206		1,22
35	47,6	167	127	45	15	19	17	94,0	42,9	17,5	M12	UCP207	UC207	P207		1,55
40	49,2	180	137	49	15	21	18	100,0	49,2	19	M12	UCP208	UC208	P208		1,88
45	54	189	146	50	15	21	20	107,5	49,2	19	M12	UCP209	UC209	P209		2,19
50	57,2	204	159	56	19	22	21	114,0	51,6	19	M16	UCP210	UC210	P210		2,73
55	63,5	217	172	58	19	22	22	126	55,6	22,2	M16	UCP211	UC211	P211		3,38
60	69,9	238	186	64	19	25	24	139	65,1	25,4	M16	UCP212	UC212	P212		4,75
65	76,2	262	203	70	23	29	26	149	65,1	25,4	M20	UCP213	UC213	P213		5,81
70	79,4	266	210	72	23	29	27	155	74,6	30,2	M20	UCP214	UC214	P214		6,50
75	82,6	274	217	74	25	29	28	161,6	77,8	33,3	M20	UCP215	UC215	P215		7,11
80	88,9	292	232	78	25	30	30	174	82,6	33,3	M20	UCP216	UC216	P216		8,69
85	95,2	310	247	83	25	30	32	186	85,7	34,1	M20	UCP217	UC217	P217		10,63
90	101,6	326	262	88	27	30	33	198	96	39,7	M22	UCP218	UC218	P218		12,95

Note: Inch sizes available on request.

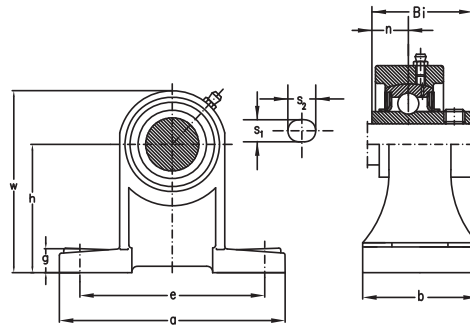
Standard duty pillow blocks cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	g	w	f	t	Bi	n					
mm												-			Kg
12	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA201	UC201	PA204	0,57
15	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA202	UC202	PA204	0,56
17	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA203	UC203	PA204	0,55
20	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA204	UC204	PA204	0,53
25	36,5	84	56	38	12	72	15	M10	34	14,3	M10	UCPA205	UC205	PA205	0,71
30	42,9	94	66	48	13	84	18	M14	38,1	15,9	M14	UCPA206	UC206	PA206	1,07
35	47,6	110	80	48	13	95	20	M14	42,9	17,5	M14	UCPA207	UC207	PA207	1,49
40	49,2	116	84	54	13	100	20	M14	49,2	19	M14	UCPA208	UC208	PA208	1,75
45	54,2	120	90	60	13	108	25	M14	49,2	19	M14	UCPA209	UC209	PA209	2,17
50	57,2	130	94	60	14	116	25	M16	51,6	19	M16	UCPA210	UC210	PA210	2,53
55	63,5	140	104	66	14	125	25	M16	55,6	22,2	M16	UCPA211	UC211	PA211	3,17
60	69,9	150	114	68	15	138	25	M16	65,1	25,4	M16	UCPA212	UC212	PA212	4,17
65	76,2	160	124	70	15	150	25	M16	65,1	25,4	M16	UCPA213	UC213	PA213	4,96

Note: Inch sizes available on request.

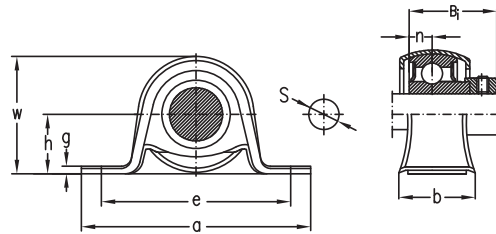
Standard duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
12	70	127	95	40	12	16	13	101	30	12,7	M10	UCPH201	UC201	PH204	0,81
15	70	127	95	40	12	16	13	101	30	12,7	M10	UCPH202	UC202	PH204	0,80
17	70	127	95	40	12	16	13	101	31	12,7	M10	UCPH203	UC203	PH204	0,79
20	70	127	95	40	12	16	13	101	31	12,7	M10	UCPH204	UC204	PH204	0,77
25	80	140	105	50	13	19	16	114	34	14,3	M10	UCPH205	UC205	PH205	1,01
30	90	165	121	50	17	21	18	130	38,1	15,9	M14	UCPH206	UC206	PH206	1,56
35	95	167	127	60	17	21	19	140	42,9	17,5	M14	UCPH207	UC207	PH207	1,88
40	100	184	137	66	17	21	20	150	49,2	19,0	M14	UCPH208	UC208	PH208	2,44
45	105	190	146	70	17	21	20	158	49,2	19,0	M14	UCPH209	UC209	PH209	2,72
50	110	204	159	70	19	22	22	165	51,6	19,0	M16	UCPH210	UC210	PH210	3,08
55	120	217	171	75	19	22	23	181	55,6	22,2	M16	UCPH211	UC211	PH211	4,05
60	130	236	186	80	19	22	24	197	65,1	25,4	M16	UCPH212	UC212	PH212	4,78
65	140	258	203	85	23	28	26	213	65,1	25,4	M20	UCPH213	UC213	PH213	5,93
70	150	266	210	90	23	28	27	227	74,6	30,2	M20	UCPH214	UC214	PH214	6,99
75	160	274	217	95	23	28	28	240	77,8	33,3	M20	UCPH215	UC215	PH215	7,84
80	170	290	232	100	24	28	30	256	82,6	33,3	M20	UCPH216	UC216	PH216	9,13

Note: Inch sizes available on request.

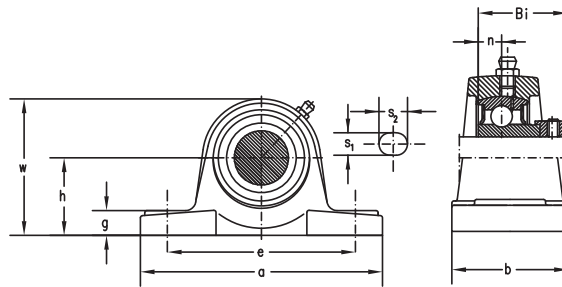
Standard duty pillow blocks pressed steel housing eccentric locking collar type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Mass	
	h	a	e	b	s	g	w	Bi	n						
mm											-				Kg
12	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP201	SA201	PP203	0,21	
15	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP202	SA202	PP203	0,20	
17	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP203	SA203	PP203	0,19	
20	25,4	98	76	32	9,5	3,2	50,5	29,7	7	M8	SAPP204	SA204	PP204	0,27	
25	28,6	108	86	32	11,5	4	56,6	30,5	7,5	M10	SAPP205	SA205	PP205	0,34	
30	33,3	117	95	38	11,5	4	66,3	33,9	8	M10	SAPP206	SA206	PP206	0,52	
35	39,7	129	106	42	11,5	4,6	78	37,5	8,5	M10	SAPP207	SA207	PP207	0,73	

Note: Inch sizes available on request.

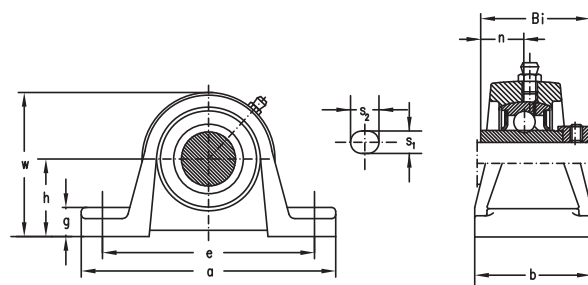
Standard duty pillow blocks pressed steel housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
20	31,8	128	98	38	11	14	14	63,0	29,5	7,0	M10	SAAK204	SA204	AK204	0,75
25	33,3	140	105	40	11	14	15	66,5	30,5	7,5	M10	SAAK205	SA205	AK205	0,84
30	39,7	160	121	44	14	19	17	79	33,9	8	M12	SAAK206	SA206	AK206	1,25
35	46	167	127	48	14	19	18	91	37,5	8,5	M12	SAAK207	SA207	AK207	1,73
40	49,2	181	140	52	14	19	19	98	40,5	9,5	M12	SAAK208	SA208	AK208	2,14
45	52,4	189	146	54	14	19	20	105	42,2	10	M12	SAAK209	SA209	AK209	2,40
50	55,6	203	159	57	17,5	21	21	111,5	43,7	10,5	M16	SAAK210	SA210	AK210	2,83
55	61,9	232	181	60	18	24	23	123	48,4	11,5	M16	SAAK211	SA211	AK211	3,60

Note: Inch sizes available on request.

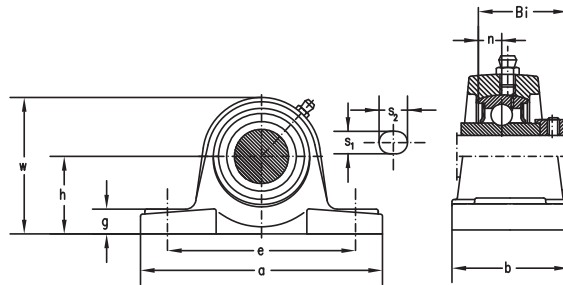
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing		Housing number	Mass
	h	a	e	b	s ₁	s ₂	g	w	Bi	n			number	number		
mm												-				Kg
20	33,3	127	96	35	13	16	14	65	29,5	7	M10	SAP204	SA204	P204		0,67
25	36,5	140	105	36	13	19	15	71	30,5	7,5	M10	SAP205	SA205	P205		0,76
30	42,9	160	121	42	14	19	16	84	33,9	8	M12	SAP206	SA206	P206		1,23
35	47,6	167	127	45	15	19	17	94	37,5	8,5	M12	SAP207	SA207	P207		1,58
40	49,2	180	137	49	15	21	18	100	40,5	9,5	M12	SAP208	SA208	P208		1,89
45	54	189	146	50	15	21	20	107,5	42,2	10	M12	SAP209	SA209	P209		2,20
50	57,2	204	159	56	19	22	21	114	43,7	10,5	M16	SAP210	SA210	P210		2,73
55	63,5	217	172	58	19	22	22	126	48,4	11,5	M16	SAP211	SA211	P211		3,13

Note: Inch sizes available on request.

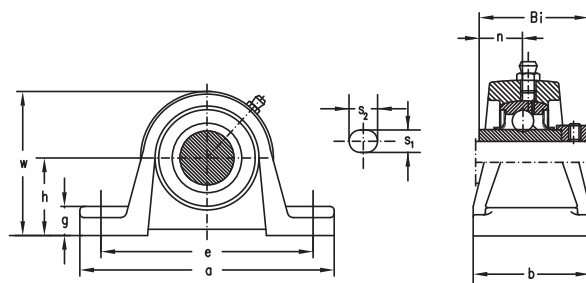
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
20	31,8	128	98	38	11	14	14	63,0	43,5	17	M10	UELAK204	UEL204	AK204	0,79
25	33,3	140	105	40	11	14	15	66,5	44,3	17,4	M10	UELAK205	UEL205	AK205	0,89
30	39,7	160	121	44	14	19	17	79,0	48,3	18,2	M12	UELAK206	UEL206	AK206	1,33
35	46,0	167	127	48	14	19	18	91,0	51,1	18,8	M12	UELAK207	UEL207	AK207	1,83
40	49,2	181	140	52	14	19	19	98,0	56,3	21,4	M12	UELAK208	UEL208	AK208	2,27
45	52,4	189	146	54	14	19	20	105,0	56,3	21,4	M12	UELAK209	UEL209	AK209	2,56
50	55,6	203	159	57	17,5	21	21	111,5	62,7	24,6	M16	UELAK210	UEL210	AK210	3,04
55	61,9	232	181	60	18	24	23	123	71,3	27,7	M16	UELAK211	UEL211	AK211	4,12
60	68,3	241	191	64	18	24	25	136	77,7	30,9	M16	UELAK212	UEL212	AK212	5,26
65	74,6	262	203	70	21	28	27	147,5	85,7	34,1	M20	UELAK213	UEL213	AK213	6,68
70	77,8	266	210	74	21	28	28	153,5	85,7	34,1	M20	UELAK214	UEL214	AK214	7,42
75	82,6	304	241	78	21	32	30	162	92,1	37,3	M20	UELAK215	UEL215	AK215	9,19

Note: Inch sizes available on request.

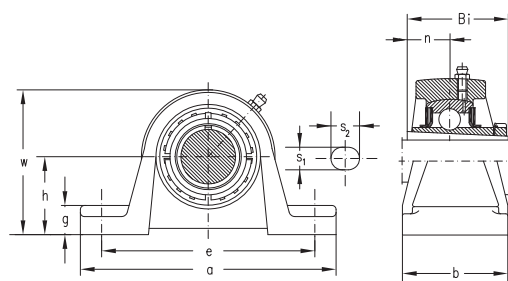
Standard duty pillow blocks cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
12	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL201	UEL201	P203	0,74
15	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL202	UEL202	P203	0,72
17	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL203	UEL203	P203	0,71
20	33,3	127	96	35	13	16	14	65,0	43,5	17,0	M10	UEL204	UEL204	P204	0,71
25	36,5	140	105	36	13	19	15	71,0	44,3	17,4	M10	UEL205	UEL205	P205	0,81
30	42,9	160	121	42	14	19	16	84,0	48,3	18,2	M12	UEL206	UEL206	P206	1,31
35	47,6	167	127	45	15	19	17	94,0	51,1	18,8	M12	UEL207	UEL207	P207	1,68
40	49,2	180	137	49	15	21	18	100,0	56,3	21,4	M12	UEL208	UEL208	P208	2,02
45	54	189	146	50	15	21	20	107,5	56,3	21,4	M12	UEL209	UEL209	P209	2,36
50	57,2	204	159	56	19	22	21	114,0	62,7	24,6	M16	UEL210	UEL210	P210	2,94
55	63,5	217	172	58	19	22	22	126	71,3	27,7	M16	UEL211	UEL211	P211	3,59
60	69,9	238	186	64	19	25	24	139	77,7	30,9	M16	UEL212	UEL212	P212	4,95
65	76,2	262	203	70	23	25	26	149	85,7	34,1	M20	UEL213	UEL213	P213	6,35
70	79,4	266	210	72	23	29	27	155	85,7	34,1	M20	UEL214	UEL214	P214	6,95
75	82,6	274	217	74	25	29	28	161,6	92,1	37,3	M20	UEL215	UEL215	P215	7,70

Note: Inch sizes available on request.

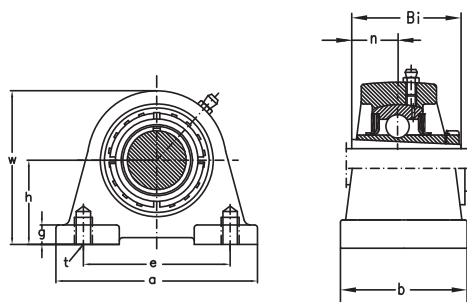
Standard duty pillow blocks cast housing adapter type



Shaft dia.	Nominal dimensions				s_1	s_2	g	w	B_i	Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b										
mm											-			Kg
20	36,5	140	105	36	13	19	15	71	35	M10	UKP205	UK205	P205	0,71
25	42,9	160	121	42	14	19	16	84	38	M12	UKP206	UK206	P206	1,15
30	47,6	167	127	45	15	19	17	94	43	M12	UKP207	UK207	P207	1,45
35	49,2	180	137	49	15	21	18	100	46	M12	UKP208	UK208	P208	1,72
40	54	189	146	50	15	21	20	107,5	50	M12	UKP209	UK209	P209	2,04
45	57,2	204	159	56	19	22	21	114	55	M16	UKP210	UK210	P210	2,52
50	63,5	217	172	58	19	22	22	126	59	M16	UKP211	UK211	P211	3,03
55	69,9	238	186	64	19	25	24	139	62	M16	UKP212	UK212	P212	4,25
60	76,2	262	203	70	23	29	26	149	65	M20	UKP213	UK213	P213	5,31

Note: Inch sizes available on request.

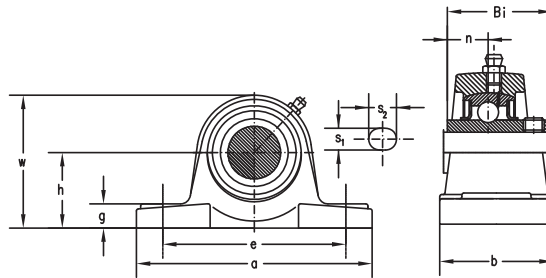
Standard duty pillow blocks cast housing adapter type



Shaft dia.	Nominal dimensions				g	w	f	t	Bi	Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b										
mm											-			Kg
20	36,5	84	56	38	12	72	15	M10	35	M10	UKPA205	UK205	PA205	0,65
25	42,9	94	66	48	13	84	18	M14	38	M14	UKPA206	UK206	PA206	1,00
30	47,6	110	80	48	13	95	20	M14	43	M14	UKPA207	UK207	PA207	1,39
35	49,2	116	84	54	13	100	20	M14	46	M14	UKPA208	UK208	PA208	1,59
40	54,2	120	90	60	13	108	25	M14	50	M14	UKPA209	UK209	PA209	2,02
45	57,2	130	94	60	14	116	25	M16	55	M16	UKPA210	UK210	PA210	2,32
50	63,5	140	104	66	14	125	25	M16	59	M16	UKPA211	UK211	PA211	2,82
55	69,9	150	114	68	15	138	25	M16	62	M16	UKPA212	UK212	PA212	3,67
60	76,2	160	124	70	15	150	25	M16	65	M16	UKPA213	UK213	PA213	4,46

Note: Inch sizes available on request.

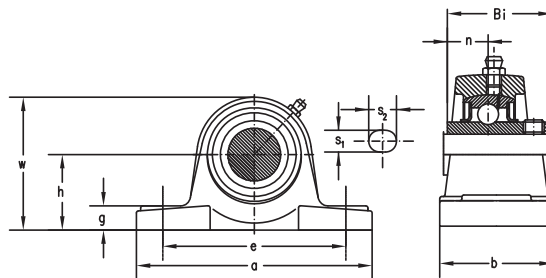
Medium duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	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	UCPX05	UCX05	PX05	1,48
30	47,6	175	127	54	17	20	20	93	42,9	17,5	M14	UCPX06	UCX06	PX06	1,85
35	54	203	144	57	17	20	21	105	49,2	19	M14	UCPX07	UCX07	PX07	2,49
40	58,7	222	156	65	20	23	23	112	49,2	19	M16	UCPX08	UCX08	PX08	3,13
45	58,7	222	156	67	20	23	25	116	51,6	19	M16	UCPX09	UCX09	PX09	3,35
50	63,5	240	171	71	20	23	25	126	55,6	22,2	M16	UCPX10	UCX10	PX10	4,17
55	69,8	260	184	79	25	28	29	137	65,1	25,4	M20	UCPX11	UCX11	PX11	5,65
60	76,2	280	203	81	25	28	31	149	65,1	25,4	M20	UCPX12	UCX12	PX12	6,80
65	76,2	286	203	83	25	28	33	152	74,6	30,2	M20	UCPX13	UCX13	PX13	7,42
70	88,9	320	229	85	27	30	34	170	77,8	33,3	M22	UCPX14	UCX14	PX14	9,59
75	88,9	330	229	92	27	30	35	175	82,6	33,3	M22	UCPX15	UCX15	PX15	10,91
80	101,6	378	283	99	27	30	37	194	85,7	34,1	M22	UCPX16	UCX16	PX16	15,09

Note: Inch sizes available on request.

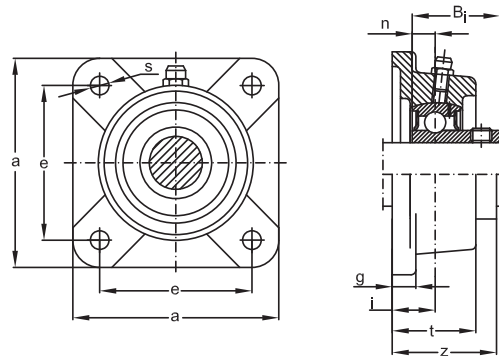
Heavy duty pillow blocks cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	s ₁	s ₂	g	w	Bi	n					
mm											-				Kg
25	45	173	132	45	17	20	15	85	38	15	M14	UCP305	UC305	P305	1,27
30	50	180	140	50	17	20	15	95	43	17	M14	UCP306	UC306	P306	1,86
35	56	210	160	56	17	25	19	106	48	19	M14	UCP307	UC307	P307	2,66
40	60	218	170	62	18	25	19	116	52	19	M14	UCP308	UC308	P308	3,37
45	67	244	190	66	20	26	23	129	57	22	M16	UCP309	UC309	P309	4,26
50	75	271	212	74	20	30	26	143	61	22	M16	UCP310	UC310	P310	6,17
55	80	300	236	80	20	32	29	154	66	25	M16	UCP311	UC311	P311	7,12
60	85	325	250	85	23	35	31	164	71	26	M20	UCP312	UC312	P312	9,10
65	90	335	260	90	25	38	33	176	75	30	M20	UCP313	UC313	P313	11,04
70	95	360	280	93	27	40	34	187	78	33	M22	UCP314	UC314	P314	12,82
75	100	380	290	100	27	40	35	198	82	32	M22	UCP315	UC315	P315	15,40
80	106	400	300	105	27	40	37	210	86	34	M22	UCP316	UC316	P316	18,00

Note: Inch sizes available on request.

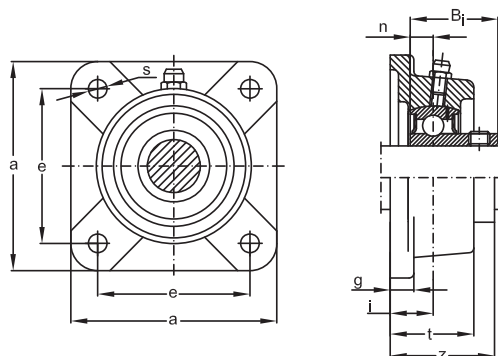
Standard duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e												
mm											-			Kg
20	86	63,5	19	15	29,5	11,5	37,0	25	7,0	M10	SBFS204	SB204	FS204	0,59
25	93	70,0	19	15	30,0	11,5	38,5	27	7,5	M10	SBFS205	SB205	FS205	0,72
30	106	82,5	20	16	32,5	13,0	41,0	29	8,0	M12	SBFS206	SB206	FS206	0,95
35	116	92,0	21	17	35,0	13,0	44,5	32	8,5	M12	SBFS207	SB207	FS207	1,25
40	129	101,5	24	17	39,0	14,0	48,5	34	9,5	M12	SBFS208	SB208	FS208	1,60

Note: Inch sizes available on request.

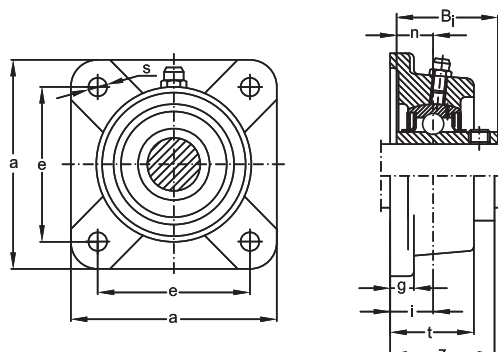
Standard duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e												
mm											-			Kg
20	86	64	15	12	25,5	12	33,0	25	7,0	M10	SBF204	SB204	F204	0,49
25	95	70	16	13	27,0	12	35,5	27	7,5	M10	SBF205	SB205	F205	0,70
30	108	83	18	13	31,0	12	39,0	29	8,0	M10	SBF206	SB206	F206	0,99
35	117	92	19	15	34,0	14	42,5	32	8,5	M12	SBF207	SB207	F207	1,25
40	130	102	21	15	36,0	16	45,5	34,0	9,5	M14	SBF208	SB208	F208	1,63

Note: Inch sizes available on request.

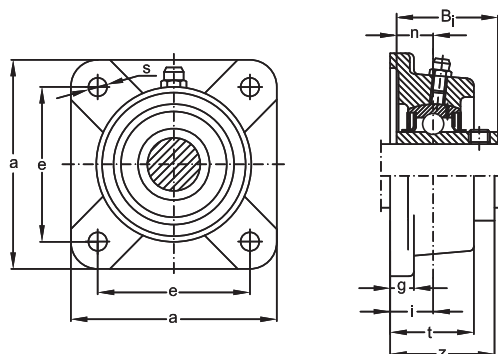
Standard duty flanged units cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	z	Bi	n						
mm											-				Kg
20	86	63,5	19	15	29,5	11,5	37,3	31,0	12,7	M10	UCFS204	UC204	FS204		0,63
25	93	70,0	19	15	30,0	11,5	38,7	34,0	14,3	M10	UCFS205	UC205	FS205		0,76
30	106	82,5	20	16	32,5	13,0	42,2	38,1	15,9	M12	UCFS206	UC206	FS206		1,01
35	116	92,0	21	17	35,0	13,0	46,4	42,9	17,5	M12	UCFS207	UC207	FS207		1,34
40	129	101,5	24	17	39,0	14,0	54,2	49,2	19,0	M12	UCFS208	UC208	FS208		1,74
45	135	105,0	24	18	40,0	16,0	54,2	49,2	19,0	M14	UCFS209	UC209	FS209		1,98
50	143	111,0	28	20	45,0	16,0	60,6	51,6	19,0	M14	UCFS210	UC210	FS210		2,43
55	162	130,0	31	21	49,0	17,0	64,4	55,6	22,2	M14	UCFS211	UC211	FS211		3,43
60	175	143,0	34	22	53,5	17,0	73,7	65,1	25,4	M14	UCFS212	UC212	FS212		4,24
65	184	149,0	38	22	58,0	18,0	77,7	65,1	25,4	M16	UCFS213	UC213	FS213		5,11
70	188	152,0	38	23	60,0	18,0	82,4	74,6	30,2	M16	UCFS214	UC214	FS214		5,30
75	200	152,4	41	24	62,0	20,0	85,5	77,8	33,3	M16	UCFS215	UC215	FS215		6,38

Note: Inch sizes available on request.

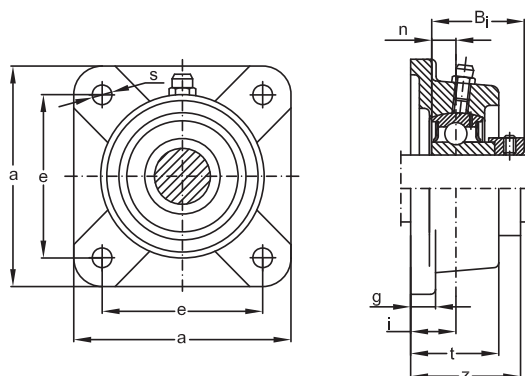
Standard duty flanged units cast housing set screws type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	z	Bi	n					
mm											-			Kg
12	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF201	UC201	F204	0,57
15	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF202	UC202	F204	0,56
17	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF203	UC203	F204	0,55
20	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF204	UC204	F204	0,53
25	95	70	16	13	27	12	35,7	34,0	14,3	M10	UCF205	UC205	F205	0,74
30	108	83	18	13	31	12	40,2	38,1	15,9	M10	UCF206	UC206	F206	1,05
35	117	92	19	15	34	14	44,4	42,9	17,5	M12	UCF207	UC207	F207	1,34
40	130	102	21	15	36	16	51,2	49,2	19	M14	UCF208	UC208	F208	1,77
45	137	105	22	16	38	16	52,2	49,2	19	M14	UCF209	UC209	F209	2,05
50	143	111	22	16	40	16	54,6	51,6	19	M14	UCF210	UC210	F210	2,35
55	162	130	25	18	43	19	58,4	55,6	22,2	M16	UCF211	UC211	F211	3,00
60	175	143	29	18	48	19	68,7	65,1	25,4	M16	UCF212	UC212	F212	3,57
65	187	149	30	22	50	19	69,7	65,1	25,4	M16	UCF213	UC213	F213	4,92
70	193	152	31	22	54	19	75,4	74,6	30,2	M16	UCF214	UC214	F214	5,62
75	200	159	34	22	56	19	78,5	77,8	33,3	M16	UCF215	UC215	F215	5,55
80	208	165	34	24	58	23	83,3	82,6	33,3	M20	UCF216	UC216	F216	6,99
85	220	175	36	26	63	23	87,6	85,7	34,1	M20	UCF217	UC217	F217	8,58
90	235	187	40	26	68	23	96,3	96,0	39,7	M20	UCF218	UC218	F218	11,20

Note: Inch sizes available on request.

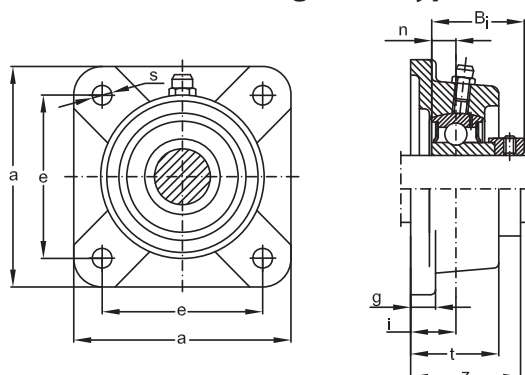
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	z	Bi	n						
mm											-				Kg
20	86	63,5	19	15	29,5	11,5	41,5	29,5	7,0	M10	SAFS204	SA204	FS204		0,64
25	93	70,0	19	15	30,0	11,5	42,0	30,5	7,5	M10	SAFS205	SA205	FS205		0,75
30	106	82,5	20	16	32,5	13,0	45,9	33,9	8,0	M12	SAFS206	SA206	FS206		1,02
35	116	92,0	21	17	35,0	13,0	50,0	37,5	8,5	M12	SAFS207	SA207	FS207		1,37
40	129	101,5	24	17	39,0	14,0	55,0	40,5	9,5	M12	SAFS208	SA208	FS208		1,75
45	135	105,0	24	18	40,0	16,0	56,2	42,2	10,0	M14	SAFS209	SA209	FS209		1,99
50	143	111,0	28	20	45,0	16,0	61,2	43,7	10,5	M14	SAFS210	SA210	FS210		2,43
55	162	130,0	31	21	49,0	17,0	67,9	48,4	11,5	M14	SAFS211	SA211	FS211		3,18

Note: Inch sizes available on request.

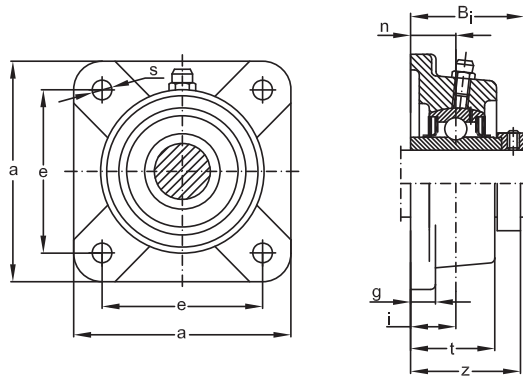
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e												
mm											-			Kg
20	86	64	15	12	25,5	12	37,5	29,5	7,0	M10	SAF204	SA204	F204	0,54
25	95	70	16	13	27,0	12	39,0	30,5	7,5	M10	SAF205	SA205	F205	0,73
30	108	83	18	13	31,0	12	43,9	33,9	8,0	M10	SAF206	SA206	F206	1,06
35	117	92	19	15	34,0	14	48,0	37,5	8,5	M12	SAF207	SA207	F207	1,37
40	130	102	21	15	36,0	16	52,0	40,5	9,5	M14	SAF208	SA208	F208	1,78
45	137	105	22	16	38,0	16	54,2	42,2	10,0	M14	SAF209	SA209	F209	2,06
50	143	111	22	16	40,0	16	55,2	43,7	10,5	M14	SAF210	SA210	F210	2,35
55	162	130	25	18	43,0	19	61,9	48,4	11,5	M16	SAF211	SA211	F211	2,75

Note: Inch sizes available on request.

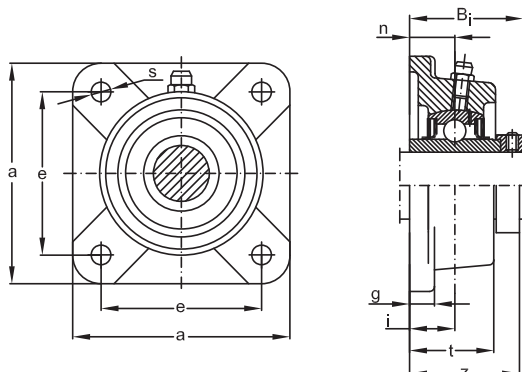
Standard duty flanged units cast housing eccentric locking collar type



Shaft Nominal dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	z	Bi	n						
mm											-				Kg
20	86	63,5	19	15	29,5	11,5	45,5	43,5	17	M10	UELFS204	UEL204	FS204		0,68
25	93	70	19	15	30	11,5	45,9	44,3	17,4	M10	UELFS205	UEL205	FS205		0,80
30	106	82,5	20	16	32,5	13,0	50,1	48,3	18,2	M12	UELFS206	UEL206	FS206		1,10
35	116	92	21	17	35	13	53,3	51,1	18,8	M12	UELFS207	UEL207	FS207		1,47
40	129	101,5	24	17	39	14	58,9	56,3	21,4	M12	UELFS208	UEL208	FS208		1,88
45	135	105	24	18	40	16	58,9	56,3	21,4	M14	UELFS209	UEL209	FS209		2,15
50	143	111	28	20	45	16	66,1	62,7	24,6	M14	UELFS210	UEL210	FS210		2,64
55	162	130	31	21	49	17	74,6	71,3	27,7	M14	UELFS211	UEL211	FS211		3,70
60	175	143	34	22	53,5	17	80,8	77,7	30,9	M14	UELFS212	UEL212	FS212		4,58
65	184	149	38	22	58	18	89,6	85,7	34,1	M16	UELFS213	UEL213	FS213		5,66
70	188	152	38	23	60	18	89,6	85,7	34,1	M16	UELFS214	UEL214	FS214		5,82
75	200	152,4	41	24	62	20	95,8	92,1	37,3	M16	UELFS215	UEL215	FS215		7,01

Note: Inch sizes available on request.

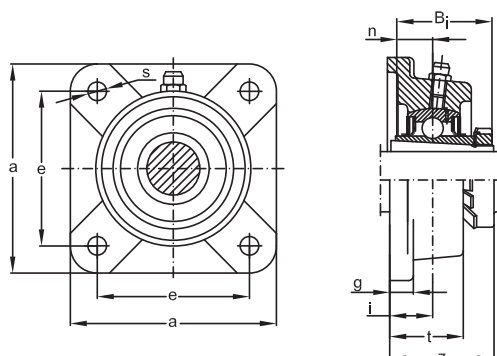
Standard duty flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e												
mm											-			Kg
12	86	64	15	12	25,5	12	41,5	43,5	17	M10	U ELF201	UEL201	F204	0,63
15	86	64	15	12	25,5	12	41,5	43,5	17	M10	U ELF202	UEL202	F204	0,61
17	86	64	15	12	25,5	12	41,5	43,5	17	M10	U ELF203	UEL203	F204	0,60
20	86	64	15	12	25,5	12	41,5	43,5	17	M10	U ELF204	UEL204	F204	0,58
25	95	70	16	13	27	12	42,9	44,3	17,4	M10	U ELF205	UEL205	F205	0,78
30	108	83	18	13	31	12	48,1	48,3	18,2	M10	U ELF206	UEL206	F206	1,14
35	117	92	19	15	34	14	51,3	51,1	18,8	M12	U ELF207	UEL207	F207	1,47
40	130	102	21	15	36	16	55,9	56,3	21,4	M14	U ELF208	UEL208	F208	1,91
45	137	105	22	16	38	16	56,9	56,3	21,4	M14	U ELF209	UEL209	F209	2,22
50	143	111	22	16	40	16	60,1	62,7	24,6	M14	U ELF210	UEL210	F210	2,56
55	162	130	25	18	43	19	68,6	71,3	27,7	M16	U ELF211	UEL211	F211	3,27
60	175	143	29	18	48	19	75,8	77,7	30,9	M16	U ELF212	UEL212	F212	3,91
65	187	149	30	22	50	19	81,6	85,7	34,1	M16	U ELF213	UEL213	F213	5,47
70	193	152	31	22	54	19	82,6	85,7	34,1	M16	U ELF214	UEL214	F214	6,14
75	200	159	34	22	56	19	88,8	92,1	37,3	M16	U ELF215	UEL215	F215	6,18

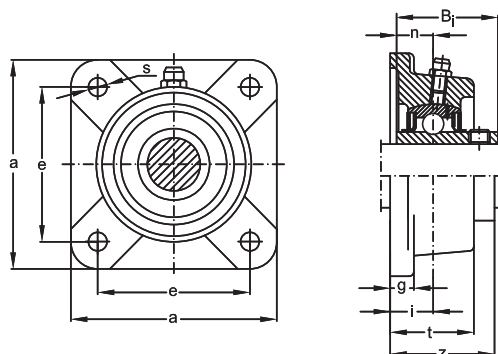
Note: Inch sizes available on request.

Standard duty flanged units cast housing adapter type



Shaft dia.	Nominal dimensions									Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	z	Bi	n					
mm										-				Kg
20	95	70	16	13	27	12	35,5	35		M10	UKF205	UK205	F205	0.68
25	108	83	18	13	31	12	39,0	38		M10	UKF206	UK206	F206	0.98
30	117	92	19	15	34	14	42,5	43		M12	UKF207	UK207	F207	1.24
35	130	102	21	15	36	16	46,5	46		M14	UKF208	UK208	F208	1.61
40	137	105	22	16	38	16	48,5	50		M14	UKF209	UK209	F209	1.90
45	143	111	22	16	40	16	50,0	55		M14	UKF210	UK210	F210	2.14
50	162	130	25	18	43	19	54,5	59		M16	UKF211	UK211	F211	2.65
55	175	143	29	18	48	19	61,0	62		M16	UKF212	UK212	F212	3.07
60	187	149	30	22	50	19	64,0	65		M16	UKF213	UK213	F213	4.42

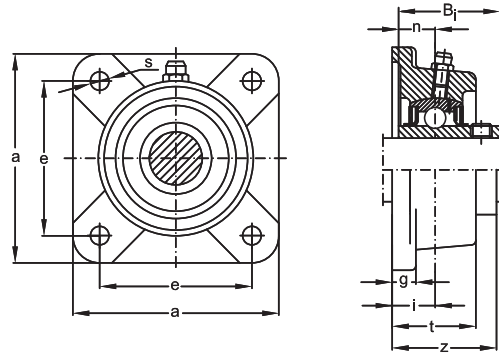
Medium duty flanged units cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	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	UCFX05	UCX05	FX05		1,15
30	117	92,0	19	14	34	16	44,4	42,9	17,5	M14	UCFX06	UCX06	FX06		1,50
35	130	101,5	21	14	38	16	51,2	49,2	19,0	M14	UCFX07	UCX07	FX07		1,97
40	137	105,0	22	14	40	19	52,2	49,2	19,0	M16	UCFX08	UCX08	FX08		2,18
45	143	111,0	23	14	40	19	55,6	51,6	19,0	M16	UCFX09	UCX09	FX09		2,37
50	162	130,0	26	20	44	19	59,4	55,6	22,2	M16	UCFX10	UCX10	FX10		3,47
55	175	143,0	29	20	49	19	68,7	65,1	25,4	M16	UCFX11	UCX11	FX11		4,13
60	187	149	34	21	59	19	73,7	65,1	25,4	M16	UCFX12	UCX12	FX12		5,70
65	187	149	34	21	59	19	78,4	74,6	30,2	M18	UCFX13	UCX13	FX13		5,77
70	197	152	37	24	60	23	81,5	77,8	33,3	M20	UCFX14	UCX14	FX14		6,79
75	197	152	40	24	68	23	89,3	82,6	33,3	M20	UCFX15	UCX15	FX15		7,66
80	214	171	40	24	70	23	91,6	85,7	34,1	M20	UCFX16	UCX16	FX16		9,99

Note: Inch sizes available on request.

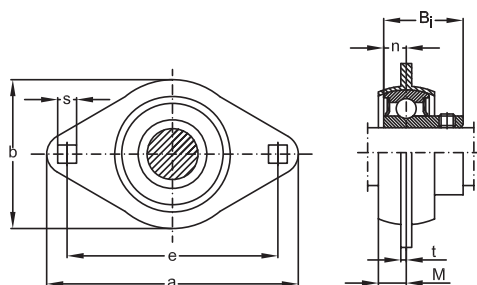
Heavy duty flanged units cast housing set screws type



Shaft Nominal dia.	Nominal dimensions		i	g	t	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e												
mm											-			Kg
25	108	80	16	13	29	16	39	38	15	M14	UCF305	UC305	F305	1,01
30	125	95	18	15	32	16	44	43	17	M14	UCF306	UC306	F306	1,53
35	135	100	20	16	36	19	49	48	19	M16	UCF307	UC307	F307	1,86
40	150	112	23	17	40	19	56	52	19	M16	UCF308	UC308	F308	2,65
45	160	125	25	18	44	19	60	57	22	M16	UCF309	UC309	F309	3,21
50	175	132	28	20	48	23	67	61	22	M20	UCF310	UC310	F310	4,32
55	185	140	30	20	52	23	71	66	25	M20	UCF311	UC311	F311	5,24
60	193	150	33	22	56	23	78	71	26	M20	UCF312	UC312	F312	6,40
65	208	166	33	22	58	23	78	75	30	M20	UCF313	UC313	F313	7,54
70	226	178	36	25	61	25	81	78	33	M22	UCF314	UC314	F314	9,02
75	236	184	39	25	66	25	89	82	32	M22	UCF315	UC315	F315	10,45
80	250	196	38	27	68	31	90	86	34	M27	UCF316	UC316	F316	14,00

Note: Inch sizes available on request.

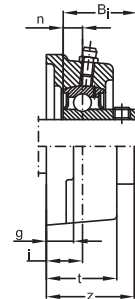
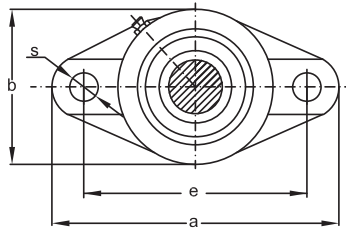
Standard duty two bolts flanged units pressed steel housing set screws type



Shaft dia.	Nominal dimensions			t	s	b	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	M										
mm										-			Kg
12	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL201	SB201	PFL203	0,18
15	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL202	SB202	PFL203	0,17
17	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL203	SB203	PFL203	0,16
20	90	71,5	8,0	2,0	9	67	25	7	M8	SBPFL204	SB204	PFL204	0,22
25	95	76,0	9,0	2,0	9	71	27	7,5	M8	SBPFL205	SB205	PFL205	0,27
30	113	90,5	9,5	2,6	11	84	29	8	M10	SBPFL206	SB206	PFL206	0,44
35	122	100	11	2,6	11	94	32	8,5	M10	SBPFL207	SB207	PFL207	0,58

Note: Inch sizes available on request.

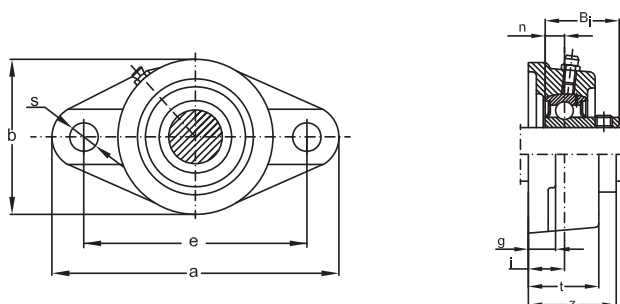
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions		i	g	t	s	b	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e													
mm												-			Kg
20	112,5	90	19	15	29,5	10	61	37	25	7	M8	SBFT204	SB204	FT204	0,40
25	123	99	19	15	30	11,5	70	38,5	27	7,5	M10	SBFT205	SB205	FT205	0,56
30	142	116,5	20	16	32,5	11,5	82	41	29	8	M10	SBFT206	SB206	FT206	0,79
35	158	130	21	17	36	13	94	44,5	32	8,5	M10	SBFT207	SB207	FT207	1,18
40	172	143,5	24	17	39	13	103	48,5	34	9,5	M10	SBFT208	SB208	FT208	1,35

Note: Inch sizes available on request.

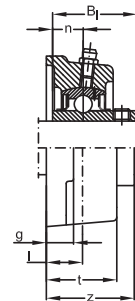
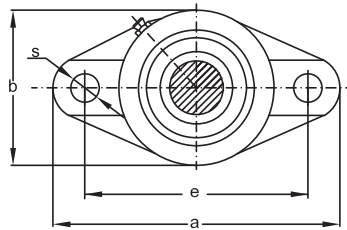
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	b	z	Bi	n					
mm											-				Kg
20	113	90	15	11	25,5	12	60	33	25	7	M10	SBFL204	SB204	FL204	0,39
25	130	99	16	13	27	16	68	35,5	27	7,5	M14	SBFL205	SB205	FL205	0,56
30	148	117	18	13	31	16	80	39	29	8	M14	SBFL206	SB206	FL206	0,85
35	161	130	19	14	34	16	90	42,5	32	8,5	M14	SBFL207	SB207	FL207	1,05
40	175	144	21	14	36	16	100	45,5	34	9,5	M14	SBFL208	SB208	FL208	1,29

Note: Inch sizes available on request.

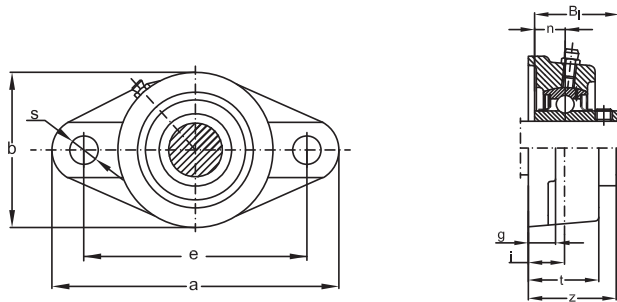
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	b	z	Bi	n						
mm												-				Kg
20	112,5	90	19	15	29,5	10	61	37,3	31	12,7	M8	UCFT204	UC204	FT204		0,51
25	123	99	19	15	30	11,5	70	38,7	34	14,3	M10	UCFT205	UC205	FT205		0,60
30	142	116,5	20	16	32,5	11,5	82	42,2	38,1	15,9	M10	UCFT206	UC206	FT206		0,85
35	158	130	21	17	36	13	94	46,4	42,9	17,5	M10	UCFT207	UC207	FT207		1,27
40	172	143,5	24	17	39	13	103	54,2	49,2	19	M10	UCFT208	UC208	FT208		1,49
45	180	148,5	24	18	40	15	108	54,2	49,2	19	M12	UCFT209	UC209	FT209		1,71
50	190	157	28	20	45	15	114	60,6	51,6	19	M12	UCFT210	UC210	FT210		1,97
55	217	184	31	21	48	16,5	128	64,4	55,6	22,2	M14	UCFT211	UC211	FT211		2,79
60	237	202	34	21	53	16,5	138	73,7	65,1	25,4	M14	UCFT212	UC212	FT212		3,62
65	256	210	38	22	56	21	152	77,7	65,1	25,4	M20	UCFT213	UC213	FT213		4,51
70	264	216	38	23	58	21	157	82,4	74,6	30,2	M20	UCFT214	UC214	FT214		4,81

Note: Inch sizes available on request.

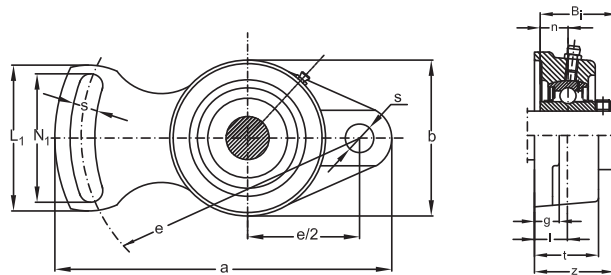
Standard duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	b	z	Bi	n					
mm											-				Kg
12	113	90	15	11	25,5	12	60	33,3	31	12,7	M10	UCFL201	UC201	FL201	0,47
15	113	90	15	11	25,5	12	60	33,3	31	12,7	M10	UCFL202	UC202	FL202	0,46
17	113	90	15	11	25,5	12	60	33,3	31	12,7	M10	UCFL203	UC203	FL203	0,45
20	113	90	15	11	25,5	12	60	33,3	31	12,7	M10	UCFL204	UC204	FL204	0,43
25	130	99	16	13	27	16	68	35,7	34	14,3	M14	UCFL205	UC205	FL205	0,60
30	148	117	18	13	31	16	80	40,2	38,1	15,9	M14	UCFL206	UC206	FL206	0,91
35	161	130	19	14	34	16	90	44,4	42,9	17,5	M14	UCFL207	UC207	FL207	1,14
40	175	144	21	14	36	16	100	51,2	49,2	19	M14	UCFL208	UC208	FL208	1,43
45	188	148	22	16	38	19	108	52,2	49,2	19	M16	UCFL209	UC209	FL209	1,80
50	197	157	22	16	40	19	115	54,6	51,6	19	M16	UCFL210	UC210	FL210	2,13
55	224	184	25	18	43	19	130	58,4	55,6	22,2	M16	UCFL211	UC211	FL211	2,86
60	250	202	29	18	48	23	140	68,7	65,1	25,4	M20	UCFL212	UC212	FL212	3,76
65	258	210	30	20	50	23	155	69,7	65,1	25,4	M20	UCFL213	UC213	FL213	4,63
70	265	216	31	20	54	23	160	75,4	74,6	30,2	M20	UCFL214	UC214	FL214	5,22
75	275	225	34	20	56	23	165	78,5	77,8	33,3	M20	UCFL215	UC215	FL215	5,36
80	290	233	34	22	58	25	180	83,3	82,6	33,3	M22	UCFL216	UC216	FL216	6,99
85	305	248	36	22	63	25	190	87,6	85,7	34,1	M22	UCFL217	UC217	FL217	8,28
90	320	265	40	23	68	25	205	96,3	96	39,7	M22	UCFL218	UC218	FL218	10,7

Note: Inch sizes available on request.

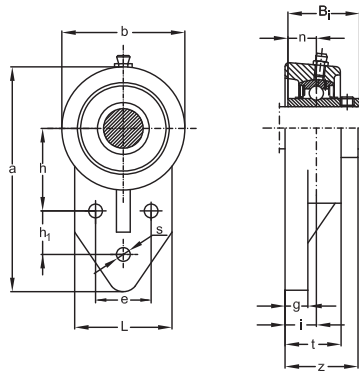
Standard duty flanged units cast housing special type set screws type



Shaft dia.	Nominal dimensions													Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	N ₁	b	L ₁	z	Bi	n						
mm															-			Kg
12	102	78	15	12	25,5	10	40	60	54	33,3	31	12,7	M8	UCFA201	UC201	FA201		0,49
15	102	78	15	12	25,5	10	40	60	54	33,3	31	12,7	M8	UCFA202	UC202	FA202		0,48
17	102	78	15	12	25,5	10	40	60	54	33,3	31	12,7	M8	UCFA203	UC203	FA203		0,47
20	102	78	15	12	25,5	10	40	60	54	33,3	31	12,7	M8	UCFA204	UC204	FA204		0,45
25	125	98	16	14	27	12	51	68	65	34,7	34	14,3	M10	UCFA205	UC205	FA205		0,64
30	144	117	18	14	31	12	58	80	72	40,2	38,1	15,9	M10	UCFA206	UC206	FA206		0,92
35	161	130	19	16	34	14	66	90	82	45,4	42,9	17,5	M12	UCFA207	UC207	FA207		1,27
40	175	144	21	16	36	14	71	100	87	52,2	49,2	19	M12	UCFA208	UC208	FA208		1,62
45	178	146	22	16	38	16	72	108	88	52,2	49,2	19	M14	UCFA209	UC209	FA209		1,84
50	188	155	22	16	39	16	75	114	92	54,6	51,6	19	M14	UCFA210	UC210	FA210		2,10
55	216	182	25	18	42,5	16	84	128	102	58,4	55,6	22,2	M14	UCFA211	UC211	FA211		2,16
60	238	202	29	19	47,5	18	104	140	122	68,7	65,1	25,4	M16	UCFA212	UC212	FA212		2,92
65	248	210	30	20	49	18	106	152	126	69,7	65,1	25,4	M16	UCFA213	UC213	FA213		3,61

Note: Inch sizes available on request.

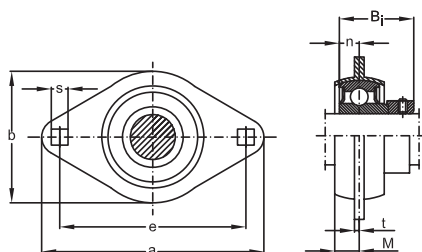
Standard duty flanged units cast housing special type set screws type



Shaft dia.	Nominal dimensions													Bolt size	Unit number	Bearing Housing number number			Mass
	a	e	i	g	t	s	h	h ₁	L	b	z	Bi	n						
mm														-					Kg
12	109	32	15	11	25,5	10	42	27	52	60	33,3	31	12,7	M8	UCFB201	UC201	FB201		0,53
15	109	32	15	11	25,5	10	42	27	52	60	33,3	31	12,7	M8	UCFB202	UC202	FB202		0,52
17	109	32	15	11	25,5	10	42	27	52	60	33,3	31	12,7	M8	UCFB203	UC203	FB203		0,51
20	109	32	15	11	25,5	10	42	27	52	60	33,3	31	12,7	M8	UCFB204	UC204	FB204		0,49
25	116	34	16	13	27	10	45	27	56	68	35,7	34	14,3	M8	UCFB205	UC205	FB205		0,66
30	132	40	18	13	31	10	50	29	65	80	40,2	38,1	15,9	M8	UCFB206	UC206	FB206		0,99
35	144	46	19	14	33	10	55	32	70	90	44,4	42,9	17,5	M8	UCFB207	UC207	FB207		1,21
40	164	50	21	16	35	12	60	41	78	100	51,2	49,2	19	M10	UCFB208	UC208	FB208		1,72
45	175	54	22	16	38	12	65	43	80	108	52,2	49,2	19	M10	UCFB209	UC209	FB209		1,86
50	184	58	22	16	39	12	68	46	86	114	54,6	51,6	19	M10	UCFB210	UC210	FB210		2,36
55	207	62	25	18	42,5	14	78	50	90	128	58,4	55,6	22,2	M12	UCFB211	UC211	FB211		3,11
60	224	66	29	19	47,5	14	84	55	94	140	68,7	65,1	25,4	M12	UCFB212	UC212	FB212		4,07
65	244	70	30	20	49	14	92	60	102	152	69,7	65,1	25,4	M12	UCFB213	UC213	FB213		4,86

Note: Inch sizes available on request.

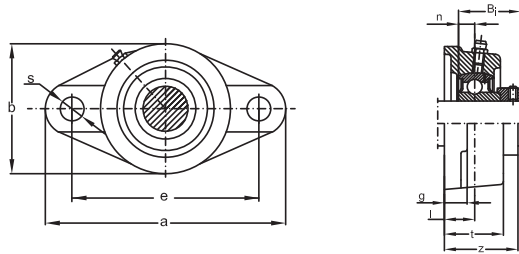
Standard duty two bolts flanged units pressed steel housing eccentric locking collar type



Shaft dia.	Nominal dimensions			t	s	b	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	M										
mm										-			Kg
12	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL201	SA201	PFL201	0,22
15	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL202	SA202	PFL202	0,21
17	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL203	SA203	PFL203	0,20
20	90	71,5	8	2	9	67	29,5	7	M8	SAPFL204	SA204	PFL204	0,27
25	95	76	9	2	9	71	30,5	7,5	M8	SAPFL205	SA205	PFL205	0,30
30	113	90,5	9,5	2,6	11	84	33,9	8	M10	SAPFL206	SA206	PFL206	0,51
35	122	100	11	2,6	11	94	37,5	8,5	M10	SAPFL207	SA207	PFL207	0,70

Note: Inch sizes available on request.

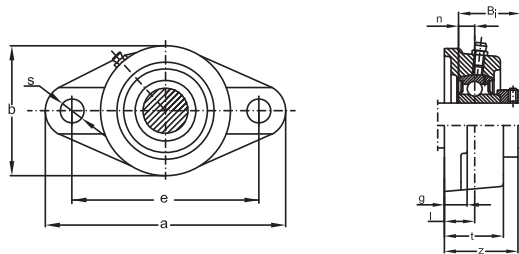
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	b	z	Bi	n					
mm															Kg
20	112,5	90	19	15	29,5	10	61	41,5	29,5	7	M8	SAFT204	SA204	FT204	0,52
25	123	99	19	15	30	11,5	70	42	30,5	7,5	M10	SAFT205	SA205	FT205	0,59
30	142	116,5	20	16	32,5	11,5	82	45,9	33,0	8	M10	SAFT206	SA206	FT206	0,86
35	158	130	21	17	36	13	94	50	37,5	8,5	M10	SAFT207	SA207	FT207	1,30
40	172	143,5	24	17	39	13	103	55	40,5	9,5	M10	SAFT208	SA208	FT208	1,50
45	180	148,5	24	18	40	15	108	56,2	42,2	10	M12	SAFT209	SA209	FT209	1,72
50	190	157	28	20	45	15	114	61,2	43,7	10,5	M12	SAFT210	SA210	FT210	1,97
55	217	184	31	21	48	16,5	128	67,9	48,4	11,5	M14	SAFT211	SA211	FT211	2,54

Note: Inch sizes available on request.

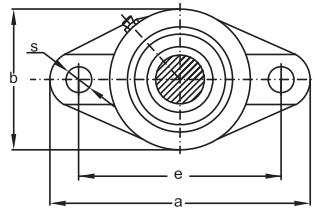
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	b	z	Bi	n					
mm											-				Kg
20	113	90	15	11	25,5	12	60	37,5	29,5	7	M10	SAFL204	SA204	FL204	0,44
25	130	99	16	13	27	16	68	39	30,5	7,5	M14	SAFL205	SA205	FL205	0,59
30	148	117	18	13	31	16	80	43,9	33,9	8	M14	SAFL206	SA206	FL206	0,92
35	161	130	19	14	34	16	90	48	37,5	8,5	M14	SAFL207	SA207	FL207	1,17
40	175	144	21	14	36	16	100	52	40,5	9,5	M14	SAFL208	SA208	FL208	1,44
45	188	148	22	16	38	19	108	54,2	42,2	10	M16	SAFL209	SA209	FL209	1,81
50	197	157	22	16	40	19	115	55,2	43,7	10,5	M16	SAFL210	SA210	FL210	2,13
55	224	184	25	18	43	19	130	61,9	48,4	11,5	M16	SAFL211	SA211	FL211	2,61

Note: Inch sizes available on request.

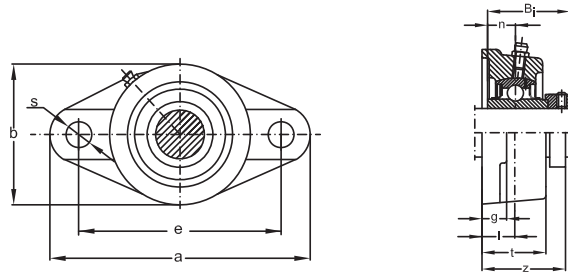
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	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	UELFT204	UEL204	FT204	0,56
25	123	99	19	15	30	11,5	70	45,9	44,3	17,4	M10	UELFT205	UEL205	FT205	0,64
30	142	116,5	20	16	32,5	11,5	82	50,1	48,3	18,2	M10	UELFT206	UEL206	FT206	0,94
35	158	130	21	17	36	13	94	53,3	51,1	18,8	M10	UELFT207	UEL207	FT207	1,40
40	172	143,5	24	17	39	13	103	58,9	56,3	21,4	M10	UELFT208	UEL208	FT208	1,63
45	180	148,5	24	18	40	15	108	58,9	56,3	21,4	M12	UELFT209	UEL209	FT209	1,88
50	190	157	28	20	45	15	114	66,1	62,7	24,6	M12	UELFT210	UEL210	FT210	2,18
55	217	184	31	21	48	16,5	128	74,6	71,3	27,7	M14	UELFT211	UEL211	FT211	3,06
60	237	202	34	21	53	16,5	138	80,8	77,7	30,9	M14	UELFT212	UEL212	FT212	3,96
65	256	210	38	22	56	21	152	89,6	85,7	34,1	M20	UELFT213	UEL213	FT213	5,06
70	264	216	38	23	58	21	157	89,6	85,7	34,1	M20	UELFT214	UEL214	FT214	5,33

Note: Inch sizes available on request.

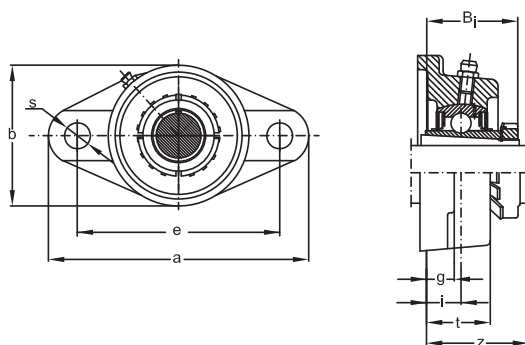
Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	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	M10	UELFL201	UEL201	FL201	0,53
15	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL202	UEL202	FL202	0,51
17	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL203	UEL203	FL203	0,50
20	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL204	UEL204	FL204	0,48
25	130	99	16	13	27	68	16	42,9	44,3	17,4	M14	UELFL205	UEL205	FL205	0,64
30	148	117	18	13	31	80	16	48,1	48,3	18,2	M14	UELFL206	UEL206	FL206	1,00
35	161	130	19	14	34	90	16	51,3	51,1	18,8	M14	UELFL207	UEL207	FL207	1,27
40	175	144	21	14	36	100	16	55,9	56,3	21,4	M14	UELFL208	UEL208	FL208	1,57
45	188	148	22	16	38	108	19	56,9	56,3	21,4	M16	UELFL209	UEL209	FL209	1,97
50	197	157	22	16	40	115	19	60,1	62,7	24,6	M16	UELFL210	UEL210	FL210	2,34
55	224	184	25	18	43	130	19	68,6	71,3	27,7	M16	UELFL211	UEL211	FL211	3,13
60	250	202	29	18	48	140	23	75,8	77,3	30,9	M20	UELFL212	UEL212	FL212	4,10
65	258	210	30	20	50	155	23	81,6	85,7	34,1	M20	UELFL213	UEL213	FL213	5,18
70	265	216	31	20	54	160	23	82,6	85,7	34,1	M20	UELFL214	UEL214	FL214	5,74
75	275	255	34	20	56	165	23	88,8	92,1	37,3	M20	UELFL215	UEL215	FL215	5,99

Note: Inch sizes available on request.

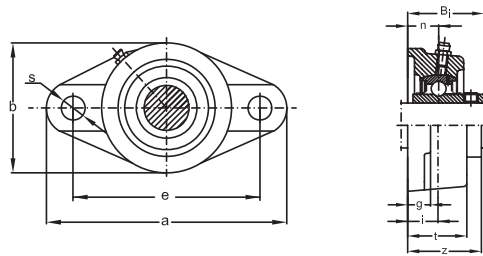
Standard duty two bolts flanged units cast housing adapter type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	b	s	z	Bi						
mm															
20	130	99	16	13	27	68	16	35,5	35	M14	UKFL205	UK205	FL205		0,54
25	148	117	18	13	31	80	16	39	38	M14	UKFL206	UK206	FL206		0,84
30	161	130	19	14	34	90	16	42,5	43	M14	UKFL207	UK207	FL207		1,04
35	175	144	21	14	36	100	16	46,5	46	M14	UKFL208	UK208	FL208		1,27
40	188	148	22	16	38	108	19	48,5	50	M16	UKFL209	UK209	FL209		1,65
45	197	157	22	16	40	115	19	50	55	M16	UKFL210	UK210	FL210		1,92
50	224	184	25	18	43	130	19	54,5	59	M16	UKFL211	UK211	FL211		2,51
55	250	202	29	18	48	140	23	61	62	M20	UKFL212	UK212	FL212		3,26
60	258	210	30	20	50	155	23	64	65	M20	UKFL213	UK213	FL213		4,13

Note: Inch sizes available on request.

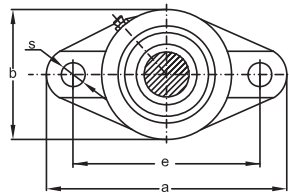
Medium duty two bolts flanged units cast housing set screws type



Shaft dia.	Nominal dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	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	M10	UCFLX05	UCX05	FLX05	0,95
30	156	130	19	15	34	95	16	44,4	42,9	17,5	M14	UCFLX06	UCX06	FLX06	1,34
35	171	144	22	16	38	105	16	51,2	49,2	19	M14	UCFLX07	UCX07	FLX07	1,74
40	179	148	22	16	40	111	16	52,2	49,2	19	M14	UCFLX08	UCX08	FLX08	1,97
45	189	157	23	16	40	116	16	55,6	51,6	19	M14	UCFLX09	UCX09	FLX09	2,18
50	216	184	26	18	44	133	19	59,4	55,6	22,2	M16	UCFLX10	UCX10	FLX10	3,19

Note: Inch sizes available on request.

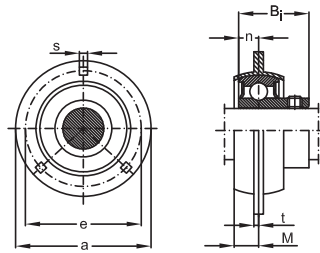
Heavy duty two bolts flanged units cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	b	s	z	Bi	n					
mm															
25	150	113	16	13	29	80	19	39	38	15	M16	UCFL305	UC305	FL305	0,88
30	180	134	18	15	32	90	23	44	43	17	M20	UCFL306	UC306	FL306	1,34
35	185	141	20	16	36	100	23	49	48	19	M20	UCFL307	UC307	FL307	1,59
40	200	158	23	17	40	112	23	56	52	19	M20	UCFL308	UC308	FL308	2,11
45	230	177	25	18	44	125	25	60	57	22	M22	UCFL309	UC309	FL309	3,07
50	240	187	28	19	48	140	25	67	61	22	M22	UCFL310	UC310	FL310	3,83
55	250	198	30	20	52	150	25	71	66	25	M22	UCFL311	UC311	FL311	4,66
60	270	212	33	22	56	160	31	78	71	26	M27	UCFL312	UC312	FL312	5,59
65	295	240	33	25	58	175	31	78	75	30	M27	UCFL313	UC313	FL313	6,99
70	315	250	36	28	61	185	35	81	78	33	M30	UCFL314	UC314	FL314	8,42
75	320	260	39	30	66	195	35	89	82	32	M30	UCFL315	UC315	FL315	9,80
80	355	285	38	32	68	210	38	90	86	34	M33	UCFL316	UC316	FL316	13,00

Note: Inch sizes available on request.

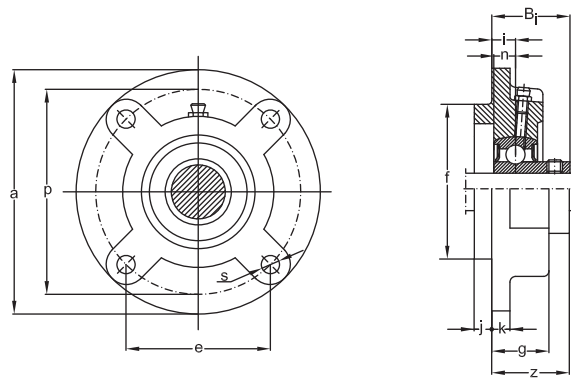
Standard duty flanged cartridge units pressed steel housing set screws type



Shaft dia.	Nominal dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	t	s	M	Bi	n					
mm												
12	81	63,5	2	7,1	7	22	6	M6	SBPF203	SB201	PF201	0,23
15	81	63,5	2	7,1	7	22	6	M6	SBPF203	SB202	PF202	0,22
17	81	63,5	2	7,1	7	22	6	M6	SBPF203	SB203	PF203	0,21
20	90	71,5	2	9	8	25	7	M8	SBPF204	SB204	PF204	0,29
25	95	76	2	9	9	27	7,5	M8	SBPF205	SB205	PF205	0,37
30	113	90,5	2,6	11	9,5	29	8	M10	SBPF206	SB206	PF206	0,58
35	122	100	2,6	11	11	32	8,5	M10	SBPF207	SB207	PF207	0,74

Note: Inch sizes available on request.

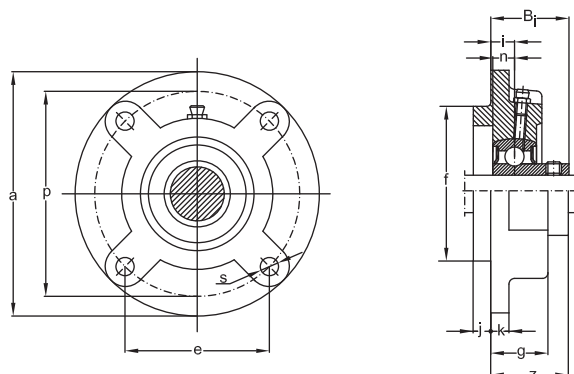
Standard duty flanged cartridge units cast housing set screws type



Shaft dia.	Nominal dimensions													Bolt size	Unit number	Bearing number	Housing number	Mass
	a	p	e	i	s	j	k	g	f	z	Bi	n						
mm															-			
20	100	78	55,1	10	12	5	6	20,5	62	28	25	7	M10	SB204	SBFC204	FC204		0,65
25	115	90	63,6	10	12	6	7	21	70	29,5	27	7,5	M10	SB205	SBFC205	FC205		0,95
30	125	100	70,7	10	12	8	8	23	80	31	29	8	M10	SB206	SBFC206	FC206		1,19
35	135	110	77,8	11	14	9	9	26	90	34,5	32	8,5	M12	SB207	SBFC207	FC 207		1,55
40	145	120	84,8	11	14	9	9	26	100	35,5	34	9,5	M12	SB208	SBFC208	FC208		1,87

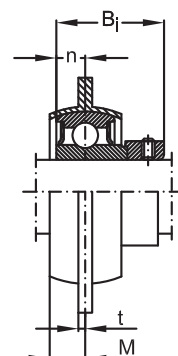
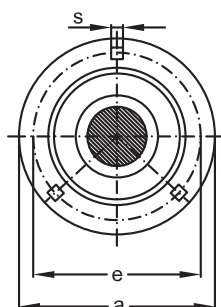
Note: Inch sizes available on request.

Standard duty flanged cartridge units cast housing set screws type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Mass
	a	p	e	i	s	j	k	g	f	z	Bi	n					
mm													-				
12	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC201	UC201	FC201	0,73
15	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC202	UC202	FC202	0,72
17	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC203	UC203	FC203	0,71
20	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC204	UC204	FC204	0,69
25	115	90	63,6	10	12	6	7	21	70	29,7	34	14,3	M10	UCFC205	UC205	FC205	0,99
30	125	100	70,7	10	12	8	8	23	80	32,2	38,1	15,9	M10	UCFC206	UC206	FC206	1,25
35	135	110	77,8	11	14	8	9	26	90	36,4	42,9	17,5	M12	UCFC207	UC207	FC207	1,64
40	145	120	84,8	11	14	10	9	26	100	41,2	49,2	19	M12	UCFC208	UC208	FC208	2,01
45	160	132	93,3	10	16	12	10	26	105	40,2	49,2	19	M14	UCFC209	UC209	FC209	2,57
50	165	138	97,6	10	16	12	14	28	110	42,6	51,6	19	M14	UCFC210	UC210	FC210	2,85
55	185	150	106,1	13	19	12	13	30	125	46,4	55,6	22,2	M16	UCFC211	UC211	FC211	3,92
60	195	160	113,1	17	19	12	15	36	135	56,7	65,1	25,4	M16	UCFC212	UC212	FC212	5,03
65	205	170	120,2	16	19	14	15	35	145	55,7	65,1	25,4	M16	UCFC213	UC213	FC213	5,52
70	215	177	125,1	17	19	14	16	38	150	61,4	74,6	30,2	M16	UCFC214	UC214	FC214	6,55
75	220	184	130,1	18	19	16	17	39	160	62,5	77,8	33,3	M16	UCFC215	UC215	FC215	7,01
80	240	200	141,4	18	23	16	18	42	170	67,3	82,6	33,3	M20	UCFC216	UC216	FC216	8,94
85	250	208	147,1	18	23	18	20	45	180	69,6	85,7	34,1	M20	UCFC217	UC217	FC217	10,68
90	265	220	155,5	22	23	20	18	50	190	78,3	96	39,7	M20	UCFC218	UC218	FC218	12,95

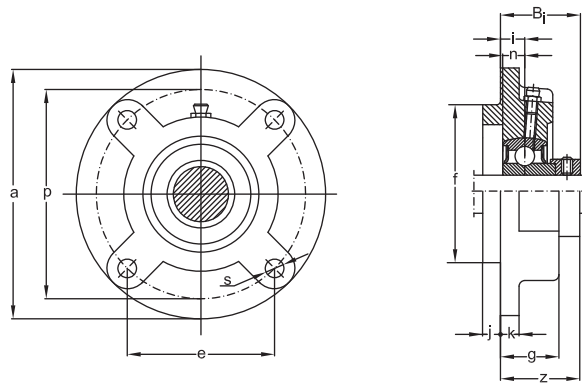
Standard duty flanged cartridge units pressed steel housing set screws type



Shaft dia.	Nominal dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	t	s	M	Bi	n					
mm									-			
12	81	63,5	2	7,1	7	28,5	6	M6	SAPF201	SA201	PF201	0,27
15	81	63,5	2	7,1	7	28,5	6	M6	SAPF202	SA202	PF202	0,26
17	81	63,5	2	7,1	7	28,5	6	M6	SAPF203	SA203	PF203	0,25
20	90	71,5	2	9	8	29,5	7	M8	SAPF204	SA204	PF204	0,34
25	95	76	2	9	9	30,5	7,5	M8	SAPF205	SA205	PF205	0,40
30	113	90,5	2,6	11	9,5	33,9	8	M10	SAPF206	SA206	PF206	0,65
35	122	100	2,6	11	11	37,5	8,5	M10	SAPF207	SA207	PF207	0,86

Note: Inch sizes available on request.

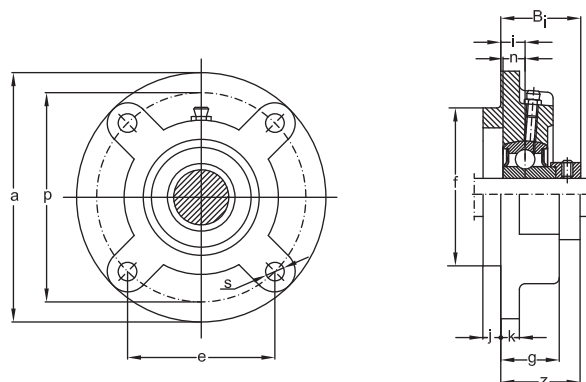
Standard duty flanged cartridge units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Mass
	a	p	e	i	s	j	k	g	f	z	Bi	n					
mm													-				
20	100	78	55,1	10	12	5	6	20,5	62	32,5	29,5	7	M10	SAFC204	SA204	FC204	0,70
25	115	90	63,6	10	12	6	7	21	70	33	30,5	7,5	M10	SAFC205	SA205	FC205	0,98
30	125	100	70,7	10	12	8	8	23	80	35,9	33,9	8	M10	SAFC206	SA206	FC206	1,26
35	135	110	77,8	11	14	8	9	26	90	40	37,5	8,5	M12	SAFC207	SA207	FC207	1,67
40	145	120	84,8	11	14	10	9	26	100	42	40,5	9,5	M12	SAFC208	SA208	FC208	2,02
45	160	132	93,3	10	16	12	10	26	105	42,2	42,2	10	M14	SAFC209	SA209	FC209	2,58
50	165	138	97,6	10	16	12	14	28	110	43,2	43,7	10,5	M14	SAFC210	SA210	FC210	2,85
55	185	150	106,1	13	19	12	13	30	125	49,9	48,4	11,5	M16	SAFC211	SA211	FC211	3,67

Note: Inch sizes available on request.

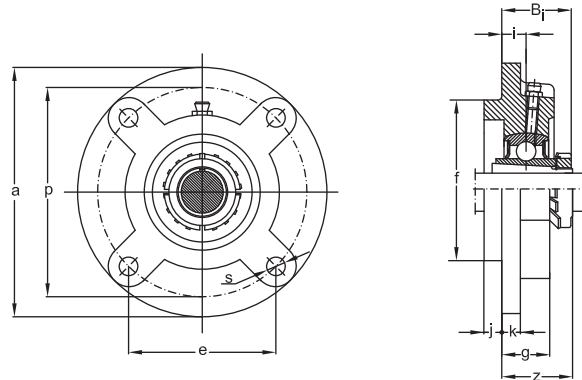
Standard duty flanged cartridge units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions												Bolt size	Unit number	Bearing number	Housing number	Mass
	a	p	e	i	s	j	k	g	f	z	Bi	n					
mm																	
12	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	UELFC201	UEL201	FC201	0,79
15	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	UELFC202	UEL202	FC202	0,77
17	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	UELFC203	UEL203	FC203	0,76
20	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	UELFC204	UEL204	FC204	0,74
25	115	90	63,6	10	12	6	7	21	70	36,9	44,3	17,4	M10	UELFC205	UEL205	FC205	1,03
30	125	100	70,7	10	12	8	8	23	80	40,1	48,3	18,2	M10	UELFC206	UEL206	FC206	1,34
35	135	110	77,8	11	14	8	9	26	90	43,3	51,1	18,8	M12	UELFC207	UEL207	FC207	1,77
40	145	120	84,8	11	14	10	9	26	100	45,9	56,3	21,4	M12	UELFC208	UEL208	FC208	2,15
45	160	132	93,3	10	16	12	10	26	105	44,9	56,3	21,4	M14	UELFC209	UEL209	FC209	2,74
50	165	138	97,6	10	16	12	14	28	110	48,1	62,7	24,6	M14	UELFC210	UEL210	FC210	3,06
55	185	150	106,1	13	19	12	13	30	125	56,6	71,3	27,7	M16	UELFC211	UEL211	FC211	4,19
60	195	160	113,1	17	19	12	15	36	135	63,8	77,7	30,9	M16	UELFC212	UEL212	FC212	5,37
65	205	170	120,2	16	19	14	15	35	145	67,6	85,7	34,1	M16	UELFC213	UEL213	FC213	6,07
70	215	177	125,1	17	19	14	16	38	150	68,6	85,7	34,1	M16	UELFC214	UEL214	FC214	7,07
75	220	184	130,1	18	19	16	17	39	160	72,8	92,1	37,3	M16	UELFC215	UEL215	FC215	7,64

Note: Inch sizes available on request.

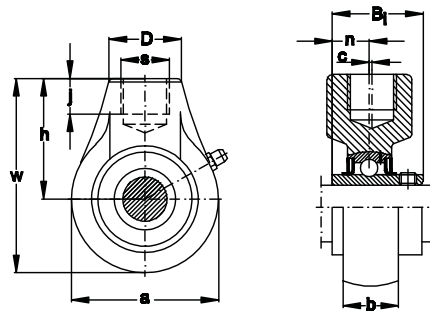
Standard duty flanged cartridge units cast housing adapter type



Shaft dia.	Nominal dimensions											Bolt size	Unit number	Bearing number	Housing number	Mass
	a	p	e	i	s	j	k	g	f	z	Bi					
mm																
20	115	90	63,6	10	12	6	7	21	70	29,5	35	M10	UKFC205	UK205	FC205	0,93
25	125	100	70,7	10	12	8	8	23	80	31	38	M10	UKFC206	UK206	FC206	1,18
30	135	110	77,8	11	14	8	9	26	90	34,5	43	M12	UKFC207	UK207	FC207	1,54
35	145	120	84,8	11	14	10	9	26	100	36,5	46	M12	UKFC208	UK208	FC208	1,85
40	160	132	93,3	10	16	12	10	26	105	36,5	50	M14	UKFC209	UK209	FC209	2,42
45	165	138	97,6	10	16	12	14	28	110	38	55	M14	UKFC210	UK210	FC210	2,64
50	185	150	106,1	13	19	12	13	30	125	42,5	59	M16	UKFC211	UK211	FC211	3,57
55	195	160	113,1	17	19	12	15	36	135	49	62	M16	UKFC212	UK212	FC212	4,53
60	205	170	120,2	16	19	14	15	35	145	50	65	M16	UKFC213	UK213	FC213	5,02

Note: Inch sizes available on request.

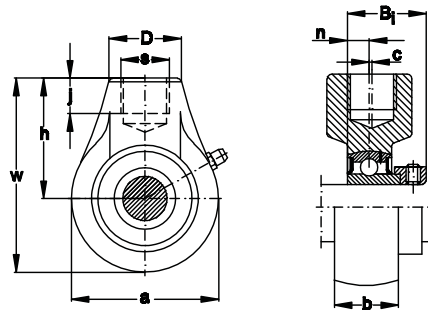
Standard duty hanger units set screws type



Shaft dia.	Nominal dimensions										Unit number	Bearing number	Housing number	Mass
	a	w	c	b	h	s		D	j	Bi				
mm														
12	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA201	UC201	HA201	0,66
15	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA202	UC202	HA202	0,65
17	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA203	UC203	HA203	0,64
20	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA204	UC204	HA204	0,62
25	78	103	0	23	64	RP 3/4	40	19	34	14,3	UCHA205	UC205	HA205	0,83
30	78	103	0	25	64	RP 3/4	40	19	38,1	15,9	UCHA206	UC206	HA206	0,78
35	92	116	0	26	70	RP 3/4	40	19	42,9	17,5	UCHA207	UC207	HA207	1,11
40	96	121	2	30	73	RP 3/4	40	19	49,2	19	UCHA208	UC208	HA208	1,25
45	108	136	5	30	82	RP 1	48	21	49,2	19	UCHA209	UC209	HA209	1,65
50	115	140,5	5	32	83	RP 1	48	21	51,6	19	UCHA210	UC210	HA210	1,95
55	126	150	7	33	87	RP 1-1/4	60	24	55,6	22,2	UCHA211	UC211	HA211	2,48
60	142	173	9	36	102	RP 1-1/4	60	28	65,1	25,4	UCHA212	UC212	HA212	3,59
65	166	200	9,5	38	117	RP 1-1/2	70	32	65,1	25,4	UCHA213	UC213	HA213	5,37
70	166	200	9,5	40	117	RP 1-1/2	70	32	74,6	30,2	UCHA214	UC214	HA214	5,47
75	166	200	9,5	40	117	RP 1-1/2	70	32	77,8	33,3	UCHA215	UC215	HA215	5,11

Note: Inch sizes available on request.

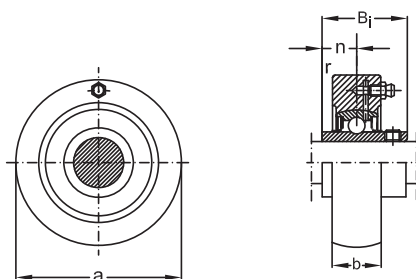
Standard duty hanger units set screws type



Shaft dia.	Nominal dimensions									Unit number	Bearing number	Housing number	Mass
	a	w	c	b	h	s	D	j	Bi				
mm													
20	64	96	0	22	64	RP 3/4	40	19	29,5 7	SAHA204	SA204	HA204	0,63
25	78	103	0	23	64	RP 3/4	40	19	30,5 7,5	SAHA205	SA205	HA205	0,82
30	78	103	0	25	64	RP 3/4	40	19	33,9 8	SAHA206	SA206	HA206	0,79
35	92	116	0	26	70	RP 3/4	40	19	37,5 8,5	SAHA207	SA207	HA207	1,14
40	96	121	2	30	73	RP 3/4	40	19	40,5 9,5	SAHA208	SA208	HA208	1,26
45	108	136	5	30	82	RP 1	48	21	42,2 10	SAHA209	SA209	HA209	1,66
50	115	140,5	5	32	83	RP 1	48	21	43,7 10,5	SAHA210	SA210	HA210	1,95
55	126	150	7	33	87	RP 1-1/4	60	24	48,4 11,5	SAHA211	SA211	HA211	2,23

Note: Inch sizes available on request.

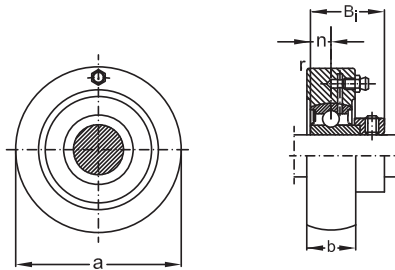
Standard duty cylindrical cartridge units set screws type



Shaft dia.	Nominal dimensions					Unit number	Bearing number	Housing number	Mass
	a	b	r	Bi	n				
mm						-			Kg
12	72	20	2	31	12,7	UCC201	UC201	C204	0,53
15	72	20	2	31	12,7	UCC202	UC202	C204	0,52
17	72	20	2	31	12,7	UCC203	UC203	C204	0,51
20	72	20	2	31	12,7	UCC204	UC204	C204	0,49
25	80	22	2	34	14,3	UCC205	UC205	C205	0,65
30	85	27	2	38,1	15,9	UCC206	UC206	C206	0,81
35	90	28	2	42,9	17,5	UCC207	UC207	C207	0,90
40	100	30	2,5	49,2	19	UCC208	UC208	C208	1,19
45	110	31	2,5	49,2	19	UCC209	UC209	C209	1,49
50	120	33	2,5	51,6	19	UCC210	UC210	C210	1,92
55	125	35	2,5	55,6	22,2	UCC211	UC211	C211	2,21
60	130	38	2,5	65,1	25,4	UCC212	UC212	C212	2,48
65	140	40	3	65,1	25,4	UCC213	UC213	C213	2,97

Note: Inch sizes available on request.

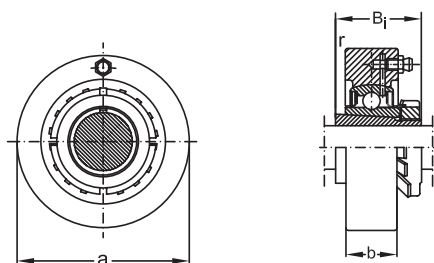
Standard duty cylindrical cartridge units eccentric locking collar type



Shaft dia.	Nominal dimensions					Unit number	Bearing number	Housing number	Mass
	a	b	r	Bi	n				
mm						-			Kg
20	72	20	2	7	29,5	SAC204	SA204	C204	0,50
25	80	22	2	7,5	30,5	SAC205	SA205	C205	0,64
30	85	27	2	8	33,9	SAC206	SA206	C206	0,82
35	90	28	2	8,5	37,5	SAC207	SA207	C207	0,93
40	100	30	2,5	9,5	40,5	SAC208	SA208	C208	1,20
45	110	31	2,5	10	42,2	SAC209	SA209	C209	1,50
50	120	33	2,5	10,5	43,7	SAC210	SA210	C210	1,92
55	125	35	2,5	11,5	48,4	SAC211	SA211	C211	1,96

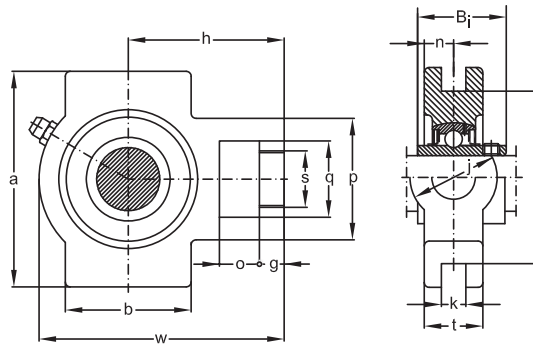
Note: Inch sizes available on request.

Standard duty cylindrical cartridge units adapter type



Shaft dia.	Nominal dimensions				Unit number	Bearing number	Housing number	Mass
	a	b	r	Bi				
mm					-			Kg
20	80	22	2	35	UKC205	UK205	C205	0,59
25	85	27	2	38	UKC206	UK206	C206	0,74
30	90	28	2	43	UKC207	UK207	C207	0,80
35	100	30	2,5	46	UKC208	UK208	C208	1,03
40	110	31	2,5	50	UKC209	UK209	C209	1,34
45	120	33	2,5	55	UKC210	UK210	C210	1,71
50	125	35	2,5	59	UKC211	UK211	C211	1,86
55	130	38	2,5	62	UKC212	UK212	C212	1,98
60	140	40	3	65	UKC213	UK213	C213	2,47

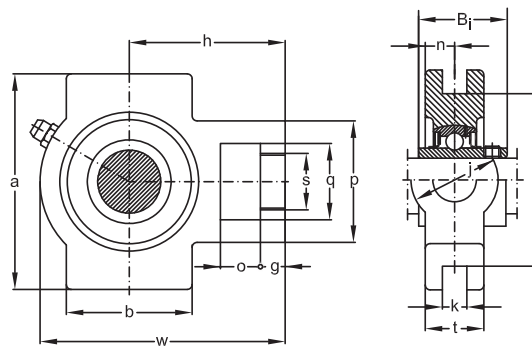
Standard duty take-up units cast housing set screws type



Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Mass
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n				Kg
mm																-			
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	31	12,7	UCST204	UC204	ST204	0,73
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	34	14,3	UCST205	UC205	ST205	0,83
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	38,1	15,9	UCST206	UC206	ST206	1,26
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	42,9	17,5	UCST207	UC207	ST207	1,58
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	49,2	19	UCST208	UC208	ST208	2,30
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	49,2	19	UCST209	UC209	ST209	2,27
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	51,6	19	UCST210	UC210	ST210	2,49
55	25	19	102	64	35	95	27	130	146	171	64	38	106	55,6	22,2	UCST211	UC211	ST211	3,77
60	32	19	102	64	35	102	27	130	146	194	64	42	119	65,1	25,4	UCST212	UC212	ST212	4,77
65	32	21	111	70	41	121	27	151	167	224	70	44	137	65,1	25,4	UCST213	UC213	ST213	6,65
70	32	21	111	70	41	121	27	151	167	224	70	46	137	74,6	30,2	UCST214	UC214	ST214	6,74
75	32	21	111	70	41	121	27	151	167	232	70	48	140	77,8	33,3	UCST215	UC215	ST215	7,10

Note: Inch sizes available on request.

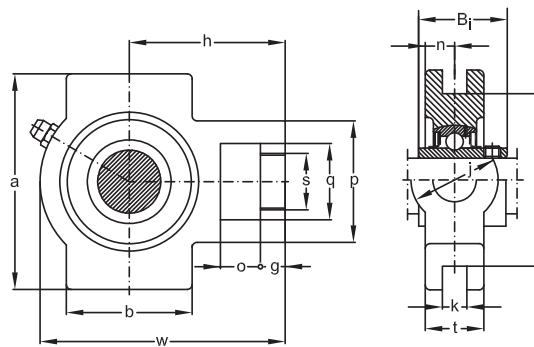
Standard duty take-up units cast housing set screws type



Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Mass
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n				Kg
mm																-			
12	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT201	UC201	T204	0,70
15	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT202	UC202	T204	0,76
17	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT203	UC203	T204	0,75
20	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT204	UC204	T204	0,73
25	16	10	51	32	19	51	12	76	89	97	32	24	62	34	14,3	UCT205	UC205	T205	0,83
30	16	10	56	37	22	57	12	89	102	113	37	28	70	38,1	15,9	UCT206	UC206	T206	1,26
35	16	13	64	37	22	64	12	89	102	129	37	30	78	42,9	17,5	UCT207	UC207	T207	1,58
40	19	16	83	49	29	83	16	102	114	144	49	33	88	49,2	19	UCT208	UC208	T208	2,31
45	19	16	83	49	29	83	16	102	117	144	49	35	87	49,2	19	UCT209	UC209	T209	2,28
50	19	16	83	49	29	86	16	102	117	149	49	37	90	51,6	19	UCT210	UC210	T210	2,50
55	25	19	102	64	35	95	22	130	146	171	64	38	106	55,6	22,2	UCT211	UC211	T211	3,79
60	32	19	102	64	35	102	22	130	146	194	64	42	119	65,1	25,4	UCT212	UC212	T212	4,79
65	32	21	111	70	41	121	26	151	167	224	70	44	137	65,1	25,4	UCT213	UC213	T213	6,66
70	32	21	111	70	41	121	26	151	167	224	70	46	137	74,6	30,2	UCT214	UC214	T214	6,75
75	32	21	111	70	41	121	26	151	167	232	70	48	140	77,8	33,3	UCT215	UC215	T215	7,11
80	32	21	111	70	41	121	26	165	184	235	70	51	140	82,6	33,3	UCT216	UC216	T216	8,19
85	38	29	124	73	48	157	30	173	198	260	73	54	162	85,7	34,1	UCT217	UC217	T217	10,58

Note: Inch sizes available on request.

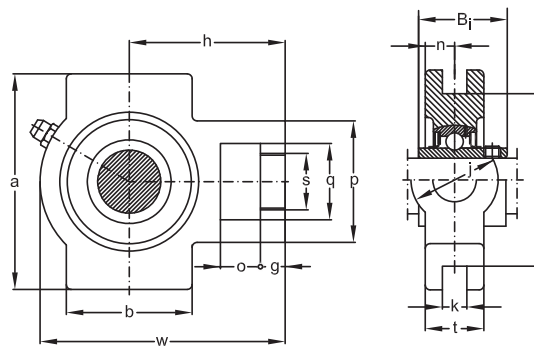
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Mass
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n				Kg
mm																-			
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	29,5	7	SAST204	SA204	ST204	0,74
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	30,5	7,5	SAST205	SA205	ST205	0,82
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	33,9	8	SAST206	SA206	ST206	1,27
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	37,5	8,5	SAST207	SA207	ST207	1,61
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	40,5	9,5	SAST208	SA208	ST208	2,31
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	42,2	10	SAST209	SA209	ST209	2,28
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	43,7	10,5	SAST210	SA210	ST210	2,49
55	25	19	102	64	35	95	27	130	146	171	64	38	106	48,4	11,5	SAST211	SA211	ST211	3,52

Note: Inch sizes available on request.

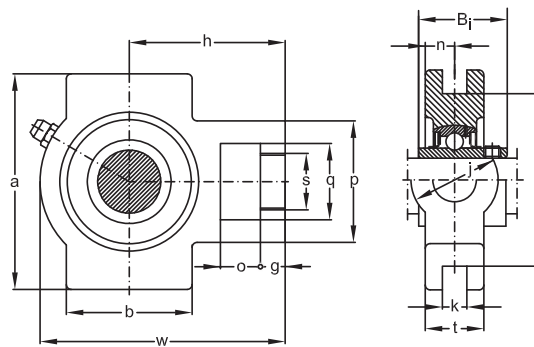
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions															Unit number	Bearing number	Housing number	Mass
	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	SAT204	SA204	T204	0,74
25	16	10	51	32	19	51	12	76	89	97	32	24	62	30,5	7,5	SAT205	SA205	T205	0,82
30	16	10	56	37	22	57	12	89	102	113	37	28	70	33,9	8	SAT206	SA206	T206	1,27
35	16	13	64	37	22	64	12	89	102	129	37	30	78	37,5	8,5	SAT207	SA207	T207	1,61
40	19	16	83	49	29	83	16	102	114	144	49	33	88	40,5	9,5	SAT208	SA208	T208	2,32
45	19	16	83	49	29	83	16	102	117	144	49	35	87	42,2	10	SAT209	SA209	T209	2,29
50	19	16	83	49	29	86	16	102	117	149	49	37	90	43,7	10,5	SAT210	SA210	T210	2,50
55	25	19	102	64	35	95	22	130	146	171	64	38	106	48,4	11,5	SAT211	SA211	T211	3,54

Note: Inch sizes available on request.

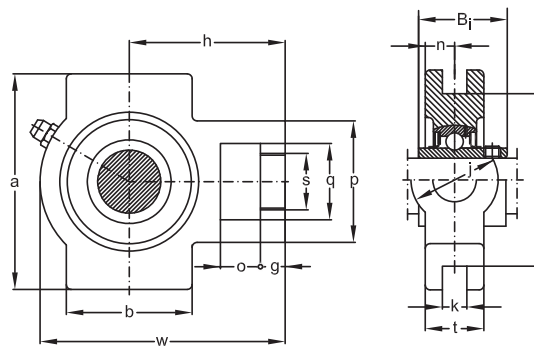
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Mass	
	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	43,5	17	UELST204	UEL204	ST204	0,78
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	44,3	17,4	UELST205	UEL205	ST205	0,87
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	48,3	18,2	UELST206	UEL206	ST206	1,35
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	51,1	18,8	UELST207	UEL207	ST207	1,71
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	56,3	21,4	UELST208	UEL208	ST208	2,44
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	56,3	21,4	UELST209	UEL209	ST209	2,44
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	62,7	24,6	UELST210	UEL210	ST210	2,70
55	25	19	102	64	35	95	27	130	146	171	64	38	106	71,3	27,7	UELST211	UEL211	ST211	4,04
60	32	19	102	64	35	102	27	130	146	194	64	42	119	77,7	30,9	UELST212	UEL212	ST212	5,11
65	32	21	111	70	41	121	27	151	167	224	70	44	137	85,7	34,1	UELST213	UEL213	ST213	7,20
70	32	21	111	70	41	121	27	151	167	224	70	46	137	85,7	34,1	UELST214	UEL214	ST214	7,26
75	32	21	111	70	41	121	27	151	167	232	70	48	140	92,1	37,3	UELST215	UEL215	ST215	7,73

Note: Inch sizes available on request.

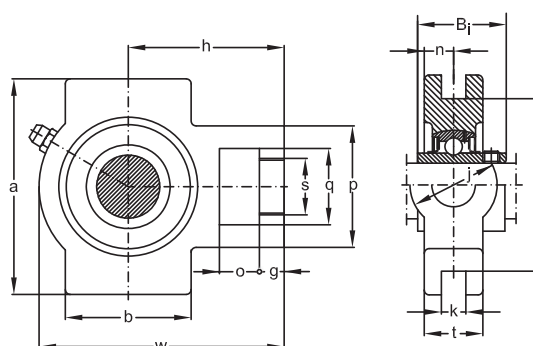
Standard duty take-up units cast housing eccentric locking collar type



Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Mass
	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	UEL201 T204	0,83
15	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL202	UEL202 T204	0,81
17	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL203	UEL203 T204	0,80
20	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL204	UEL204 T204	0,78
25	16	12	51	32	19	51	12	76	89	97	32	24	62	44,3	17,4	UEL205	UEL205 T205	0,87
30	16	12	56	37	22	57	12	89	102	113	37	28	70	48,3	18,2	UEL206	UEL206 T206	1,35
35	16	15	64	37	22	64	12	89	102	129	37	30	78	51,1	18,8	UEL207	UEL207 T207	1,71
40	19	18	83	49	29	83	16	102	114	144	49	33	88	56,3	21,4	UEL208	UEL208 T208	2,45
45	19	18	83	49	29	83	16	102	117	144	49	35	87	56,3	21,4	UEL209	UEL209 T209	2,45
50	19	18	83	49	29	86	16	102	117	149	49	37	90	62,7	24,6	UEL210	UEL210 T210	2,71
55	25	21	102	64	35	95	22	130	146	171	64	38	106	71,3	27,7	UEL211	UEL211 T211	4,06
60	32	21	102	64	35	102	22	130	146	194	64	42	119	77,7	30,9	UEL212	UEL212 T212	5,13
65	32	23	111	70	41	121	26	151	167	224	70	44	137	85,7	34,1	UEL213	UEL213 T213	7,21
70	32	23	111	70	41	121	26	151	167	224	70	46	137	85,7	34,1	UEL214	UEL214 T214	7,27
75	32	23	111	70	41	121	26	151	167	232	70	48	140	92,1	37,3	UEL215	UEL215 T215	7,74

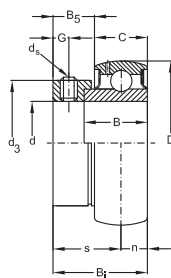
Note: Inch sizes available on request.

Standard duty take-up units cast housing adapter type



Shaft dia.	Nominal dimensions														Unit number	Bearing number	Housing number	Mass
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi				Kg
mm														-				
20	16	12	51	32	19	51	12	76	89	97	32	24	62	35	UKT205	UK205	T205	0,77
25	16	12	56	37	22	57	12	89	102	113	37	28	70	38	UKT206	UK206	T206	1,19
30	16	15	64	37	22	64	12	89	102	129	37	30	78	43	UKT207	UK207	T207	1,48
35	19	18	83	49	29	83	16	102	114	144	49	33	88	46	UKT208	UK208	T208	2,15
40	19	18	83	49	29	83	16	102	117	144	49	35	87	50	UKT209	UK209	T209	2,13
45	19	18	83	49	29	86	16	102	117	149	49	37	90	55	UKT210	UK210	T210	2,29
50	25	21	102	64	35	95	22	130	146	171	64	38	106	59	UKT211	UK211	T211	3,44
55	32	21	102	64	35	102	22	130	146	194	64	42	119	62	UKT212	UK212	T212	4,29
60	32	23	111	70	41	121	26	151	167	224	70	44	137	65	UKT213	UK213	T213	6,16

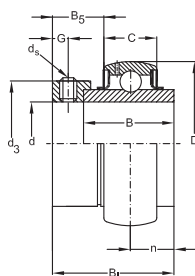
Standard duty spherical outside surface ball bearings set screws type



Shaft dia. d	Nominal dimensions			n	s	G	d _s	Bearing number	Basic load ratings		Mass
									dyn. C _r	stat. C _{or}	
mm	D	Bi	C					-	N		Kg
12	40	22	12	6	16	4	M5X0,8	SB201	9,6	4,6	0,10
15	40	22	12	6	16	4	M5X0,8	SB202	9,6	4,6	0,09
17	40	22	12	6	16	4	M5X0,8	SB203	9,6	4,6	0,08
20	47	25	14	7	18	5	M6X1	SB204	12,8	6,65	0,13
25	52	27	15	7,5	19,5	5,5	M6X1	SB205	14	7,85	0,17
30	62	29	16	8	21	6	M6X1	SB206	19,5	11,3	0,26
35	72	32	17	8,5	23,5	6,5	M6X1	SB207	25,7	15,3	0,38
40	80	34	19	9,5	24,5	7	M8X1	SB208	29,1	17,8	0,50

Note: Inch sizes available on request.

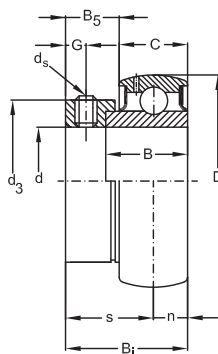
Standard duty spherical outside surface ball bearings set screws type



Shaft dia. d	Nominal dimensions					G	F	d _s	Bearing number	Basic load ratings		Mass
	D	Bi	C	n	s					dyn. C _r	stat. C _{or}	
mm									-	N		Kg
12	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC201	12,8	6,65	0,21
15	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC202	12,8	6,65	0,20
17	47	31	16	12,7	18,3	5	3,5	M5X0,8	UC203	12,8	6,65	0,19
20	47	31	16	12,7	18,3	5	3,5	M6X1	UC204	12,8	6,65	0,17
25	52	34	17	14,3	19,7	5,5	4	M6X1	UC205	14	7,85	0,21
30	62	38,1	19	15,9	22,2	6	4,2	M6X1	UC206	19,5	11,3	0,32
35	72	42,9	20	17,5	25,4	6,5	4,3	M8X1	UC207	25,7	15,3	0,47
40	80	49,2	21	19	30,2	8	4,2	M8X1	UC208	29,1	17,8	0,64
45	85	49,2	22	19	30,2	8	4,2	M8X1	UC209	32,5	20,4	0,68
50	90	51,6	23	19	32,6	9	4,8	M10X1,25	UC210	35	23,2	0,80
55	100	55,6	25	22,2	33,4	9	5,3	M10X1,25	UC211	43,5	29,2	1,12
60	110	65,1	27	25,4	39,7	10,5	5,3	M10X1,25	UC212	52,5	36	1,53
65	120	65,1	28	25,4	39,7	12	6	M12X1,25	UC213	57,5	40	1,86
70	125	74,6	30	30,2	44,4	12	6	M12X1,25	UC214	62	44	2,05
75	130	77,8	30	33,3	44,5	12	6	M12X1,25	UC215	66	49,5	2,21
80	140	82,6	33	33,3	49,3	14	6,3	M12X1,25	UC216	72,5	53	2,79
85	150	85,7	35	34,1	51,6	14	6,5	M12X1,25	UC217	83,5	64	3,38
90	160	96	37	39,7	56,3	14	6,5	M12X1,25	UC218	96	71,5	4,45

Note: Inch sizes available on request.

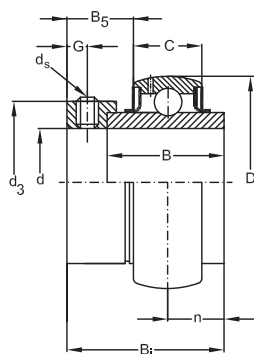
Standard duty spherical outside surface ball bearings eccentric locking collar type



Shaft dia.	Nominal dimensions										Bearing number	Basic load ratings		Mass
	d	D	B _i	B	C	n	s	G	d _s	d ₃	B ₅	dyn C _r	stat. C _{0r}	
mm												N		kg
12	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA201	9,6	4,6	0,14
15	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA202	9,6	4,6	0,13
17	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA203	9,6	4,6	0,12
20	47	29,5	20	14	7	22,5	4,8	M6X1	33,3	13,5	SA204	12,8	6,65	0,18
25	52	30,5	21	15	7,5	23	4,8	M6X1	38,1	13,5	SA205	14	7,85	0,20
30	62	33,9	22	16	8	25,9	6	M6X1	44,5	15,9	SA206	19,5	11,3	0,33
35	72	37,5	24	17	8,5	29	6,8	M8X1	55,6	17,5	SA207	25,7	15,3	0,50
40	80	40,5	27	19	9,5	31	6,8	M8X1	60,3	18,3	SA208	29,1	17,8	0,65
45	85	42,2	28,7	20	10	32,2	6,8	M8X1	63,5	18,3	SA209	32,5	20,4	0,69
50	90	43,7	30,2	21	10,5	33,2	6,8	M8X1	69,9	18,3	SA210	35	23,2	0,80
55	100	48,8	32,4	23	11,5	36,9	8	M10X1,25	76,2	18,3	SA211	43,5	29,2	0,87

Note: Inch sizes available on request.

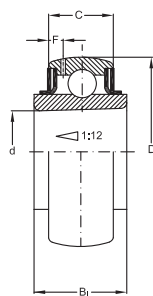
Standard duty spherical outside surface ball bearings eccentric locking collar type



Shaft		Nominal									Bearing number	Basic load ratings		Mass
dia.	dimensions											dyn	stat.	
d	D	B ₁	C	n	B	G	d ₃	B ₅	F	d _s		C _r	C _{0r}	kg
mm											-	N		
12	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL201	12,8	6,65	0,27
15	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL202	12,8	6,65	0,25
17	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL203	12,8	6,65	0,24
20	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	UEL204	12,8	6,65	0,22
25	52	44,3	17	17,4	34,8	4,8	38,1	13,5	4	M6X1	UEL205	14	7,85	0,25
30	62	48,3	19	18,2	36,4	6	44,5	15,9	4,2	M8X1	UEL206	19,5	11,3	0,41
35	72	51,1	20	18,8	37,6	6,8	55,6	17,5	4,3	M8X1	UEL207	25,7	15,3	0,60
40	80	56,3	21	21,4	42,8	6,8	60,3	18,3	4,2	M8X1	UEL208	29,1	17,8	0,78
45	85	56,3	22	21,4	42,8	6,8	63,5	18,3	4,2	M8X1	UEL209	32,5	20,4	0,85
50	90	62,7	23	24,6	49,2	6,8	69,9	18,3	4,8	M8X1	UEL210	35	23,2	1,01
55	100	71,3	25	27,7	55,4	8	76,2	20,7	5,3	M10X1,25	UEL211	43,5	29,2	1,39
60	110	77,7	27	30,9	61,8	8	84	22,3	5,3	M10X1,25	UEL212	52,5	36	1,87
65	120	85,7	28	34,1	68,2	8,7	86	23,5	6	M10X1,25	UEL213	57,5	40	2,41
70	125	85,7	30	34,1	68,2	8,7	96	23,9	6	M10X1,25	UEL214	62	44	2,57
75	130	92,1	30	37,3	74,6	8,7	102	23,9	6	M10X1,25	UEL215	66	49,5	2,84

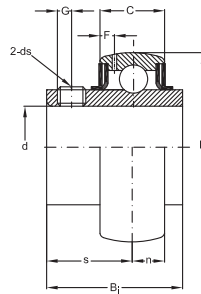
Note: Inch sizes available on request.

Standard duty spherical outside surface ball bearings adapter type



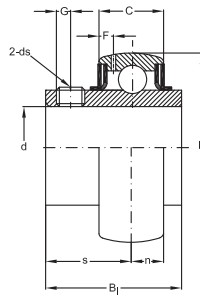
Shaft dia. d	Nominal dimensions				Bearing number	Basic load ratings		Mass
	D	B ₁	C	F		dyn C _r	stat. C _{0r}	
mm					-	N		kg
20	52	21	17	4,2	UK205	14	7,85	0,15
25	62	25	19	4,5	UK206	19,5	11,3	0,25
30	72	27	20	4,2	UK207	25,7	15,3	0,37
35	80	29	21	4,2	UK208	29,1	17,8	0,48
40	85	30	22	4,2	UK209	32,5	20,4	0,53
45	90	31	23	5	UK210	35	23,2	0,59
50	100	33	27	6,3	UK211	43,5	29,2	0,77
55	110	36	27	5,3	UK212	52,5	36	1,03
60	120	36	28	6	UK213	57,5	40	1,36

Medium duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions								Bearing number	Basic load ratings		Mass
d	D	B _i	C	n	s	G	F	d _s		dyn C _r	stat. C _{0r}	
mm									-	N		kg
25	62	38,1	19	15,9	22,2	6	5	M6X1	UCX05	19,5	11,3	0,39
30	72	42,9	22	17,5	25,4	6,5	5,8	M8X1	UCX06	25,7	15,3	0,58
35	80	49,2	21	19	30,2	8	6,3	M8X1	UCX07	29,1	17,8	0,74
40	85	49,2	22	19	30,2	8	6,8	M8X1	UCX08	32,5	20,4	0,83
45	90	51,6	23	19	32,6	9	6,5	M10X1,25	UCX09	35	23,2	0,95
50	100	55,6	25	22,2	33,4	9	7,2	M10X1,25	UCX10	43,5	29,2	1,29
55	110	65,1	27	25,4	39,7	10,5	8,2	M10X1,25	UCX11	52,5	36	1,80
60	120	65,1	28	25,4	39,7	12	8	M12X1,25	UCX12	57,5	40	2,05
65	125	74,6	30	30,2	44,4	12	9	M12X1,25	UCX13	62	44	2,52
70	130	77,8	30	33,3	44,5	12	9	M12X1,25	UCX14	66	49,5	2,74
75	140	82,6	33	33,3	49,3	14	10,3	M12X1,25	UCX15	72,5	53	3,41
80	150	85,7	35	34,1	51,6	14	11	M12X1,25	UCX16	83,2	63,8	3,87

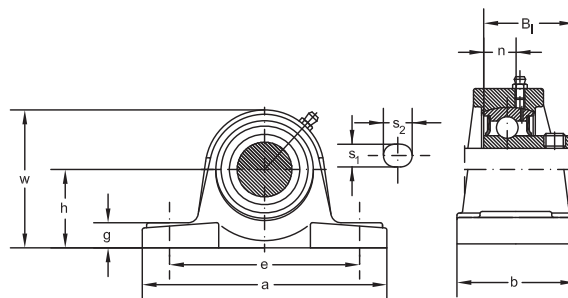
Heavy duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions								Bearing number	Basic load ratings		Mass
d	D	B _i	C	n	s	G	F	d _s		dyn C _r	stat. C _{0r}	
mm									-	N		kg
25	62	38	21	15	23	6	4,3	M6X1	UC305	21,2	10,9	0,35
30	72	43	24	17	26	6	5,5	M6X1	UC306	26,7	15	0,56
35	80	48	25	19	29	8	5,3	M8X1	UC307	33,5	19,1	0,71
40	90	52	28	19	33	10	5,5	M10X1,25	UC308	40,5	24	0,96
45	100	57	30	22	35	10	6	M10X1,25	UC309	53	32	1,28
50	110	61	32	22	39	12	6,1	M12X1,25	UC310	62	38,5	1,65
55	120	66	34	25	41	12	6,4	M12X1,25	UC311	71,5	45	1,90
60	130	71	36	26	45	12	6,7	M12X1,25	UC312	82	52	2,60
65	140	75	38	30	45	12	6,9	M12X1,25	UC313	92,5	60	3,25
70	150	78	40	33	47	12	7,2	M12X1,25	UC314	104	68	3,95
75	160	82	42	32	50	14	7,5	M14X1,5	UC315	113	77	4,33
80	170	86	44	34	52	14	7,5	M14X1,5	UC316	122	86	5,57

SSUCP series pillow blocks

Normal duty with set screw lock and grease fitting

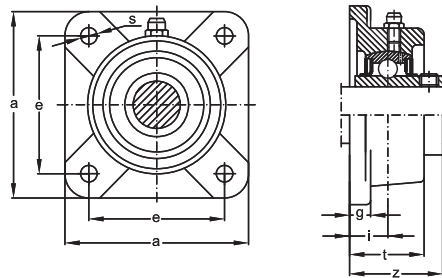


Dimensions											Unit no.	Bolt size	Bearing no.	Housing no.
d	B	n	b	h	g	w	a	e	s_1	s_2				
mm											-	mm		
12	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP201	M10	SSUC201	SSP203
15	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP202	M10	SSUC202	SSP203
17	27,4	11,5	38	30,2	14	62	127	95	12	19	SSUCP203	M10	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	15	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	23	SSUCP210	M16	SSUC210	SSP210

Note: Grease fitting 1/4 - 28 UNF

SSUCF series four bolt flanges

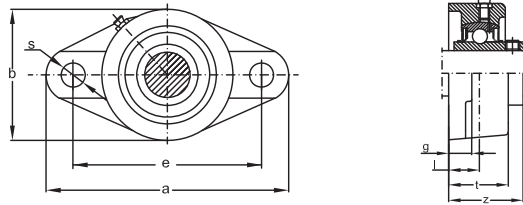
Normal duty with set screw lock and grease fitting



Dimensions								Unit no.	Bolt size	Bearing no.	Housing no.
d	z	t	g	i	s	a	e				
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

SSUCFL series two bolt flanges

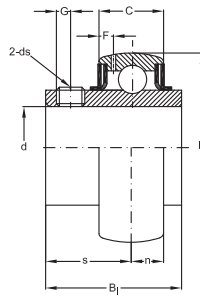
Normal duty with set screw lock and grease fitting



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								Basic load ratings		Designation
d	D	B	S	r _{min}	C	d _s	G	C _r *	C _{0r}	
H7	H5									
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 "Cr" by 1,3 if the tolerance of mounted shaft is "h6" or higher.

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE



URB



Cam Rollers

Standards, Boundary dimensions

Standard plans

DIN 616

General

Cam Rollers are non - separable radial bearings. They are special variants of either radial **deep groove bearings** or **double row angular contact ball bearings**.

Cam roller run either directly on a guide track or against a surface that has been machined for a guidance.

To achieve this cam rollers feature an extra thick - walled outer ring this enables cam roller to accept high radial forces, including shock loads.

As cam rollers often run misaligned they are generally used with crowned outer ring surfaces.

Cam rollers normally run outside the machine compartment, under extreme operating conditions, in the presence of heavy contaminations (i.e. dust and dirt, etc).

For this reason, cam rollers are produced and fitted with contacting seals.

Some types of the Double Row cam rollers are also available with shields.

Design variants

(see also drawings on following pages)

Cam rollers are readily available in several design variants. For the most common designs see drawings on page 810.

Single Row Cam Rollers

Cam rollers of the narrow series (series **3612..** and **3612.. R**, are based on the proven sealed single row deep groove ball bearings, (suffix **.2RS**) for their internal design.

The **URB cam rollers**, series **3612..** and **3612..R**, respectively, are produced with **.2RS** - type contacting seals as standard. These seals provide a very effective and efficient sealing of the bearing compartment against penetration by foreign particles even under unfavourable operating conditions.

The narrow **URB cam rollers**, series **3612** are available with either cylindrical (without extra suffix) or crowned outer ring diameter (suffix **R**) as standard.

The radius of crowning on single row cam rollers for the series **3612.. R**, is standardised at **R = 400 mm, irrespective of their outer diameter**.

Double Row Cam Rollers

The internal design of **URB double row cam rollers** (series **305** and **306**) are based on the double row angular contact ball bearings of the series **32..** (for series **305**) or **33..** (for series **306** cam rollers), respectively.

URB double row cam rollers have contact angles of 25° they also feature polyamide cages as standard.

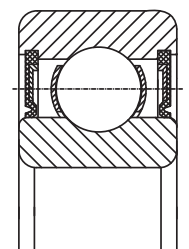
Double row cam rollers are widely used with pressed steel shields, (suffix **.2Z**), they are also available with **rubbing seals** (suffix **.2RS**) as standard.

As for single row rollers, **URB double row cam rollers** are produced with either a, cylindrical or sphered outer ring diameters.

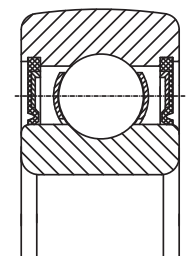
The radius of crowning of double row cam roller outer diameter is also **standardised at R = 400 mm**.

Material of seals

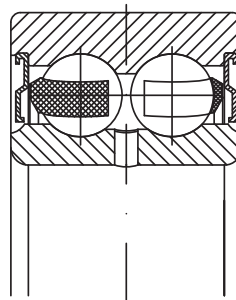
For the contacting seal of sealed **URB - cam**



3612...

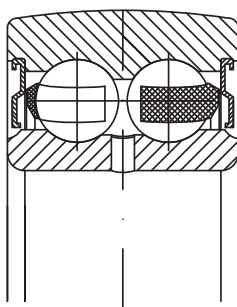


3612...R



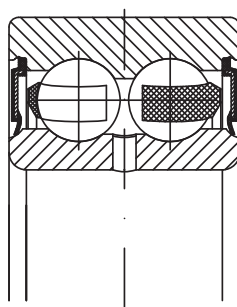
3057...2Z

3067...2Z



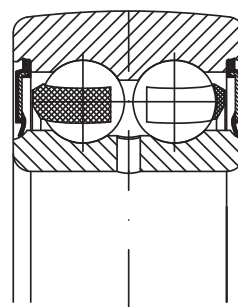
3058...2Z

3068...2Z



3057...2RS

3067...2RS



3058...2RS

3068...2RS

rollers (suffix **.2RS**) a wear - resistant **synthetic rubber (NBR)** is used as standard material.

This seal material is suitable for operating temperatures of **-30°C** up to **+120°C**.

On request, the **URB** - cam rollers are supplied with alternative seal materials, such as high - temperature **FPM** - contacting seals.

Grease filling

URB cam rollers incorporating either seals or shields (suffixes) are supplied grease filled from the factory with a proven high quality, lithium soap based rolling bearing grease suitable for operating temperatures of **-30°C** up to **+110°C**.

Although cam rollers, operating under normal

conditions, run generally maintenance free.

Some application require additional lubrication where high speeds, heavy dust, permanent operating temperatures over 70°C exist.

Double Row cam rollers only feature a lubrication hole in the inner rings to provide a simple and effective relubricating method.

Where relubrication is necessary, it is emphasised that, undue pressure by the regreasing method may cause unnecessary damage to either the seals or shields.

URB cam rollers are be supplied with special grease fills according to customer specification or with variable grease fill volumes than the standard.

Cages

Single Row Cam Rollers are standard fitted with pressed steel cages as standard. **Double Row Cam Rollers** feature solid polyamide cages as standard.

Tolerances

URB cam rollers, with cylindrical outer ring diameter, are produced to normal class tolerances (PN) as standard.

For cam rollers with sphered outer ring diameters the outer ring diameter tolerance is double the standard value.

For detailed tolerance values see in the chapter "**Bearing tolerances**" page 27.

Internal clearance

URB cam rollers are produced with **normal internal clearance** group (CN) as standard according to DIN 620.

URB cam rollers are also produced to other internal clearances.

Load carrying capability

Unlike the "normal" rolling element bearings, the outer ring of cam rollers contact their adjacent mating surface on a very small contacting area, this causes deformations of the outer ring.

These deformations are considered by the recommended maximum values for the permissible dynamic and static radial loads as shown in by the product tables.

Equivalent dynamic load

Cam rollers must be calculated as rolling element bearings:

$$P = F_r$$

But, **P** must be $\leq F_r$ zul
(for F_r zul see product tables)

Equivalent static bearing load

For Cam rollers:

$$P_0 = F_r$$

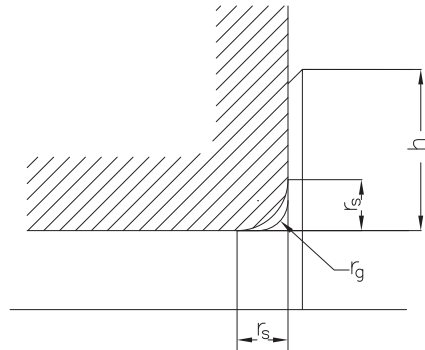
But, **P₀** must be $\leq F_{0r}$ zul
(for F_{0r} zul see product tables)

Abutment and Fillet dimensions for cam rollers

The bearing inner ring must contact adjacent surfaces with their side faces only. The radius of inner ring corners must not touch the fillet radius of the shaft shoulder.

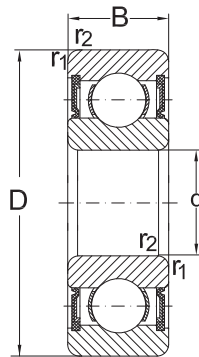
Therefore, the largest fillet radius (r_g) must be smaller than the minimum fillet dimension of the cam roller inner rings (r_s) as listed in the product tables.

Since cam rollers normally have point loaded inner rings, their shaft fits may be rather loose, (i.e. according to ISO - tolerance fields g6, h6 or j6).

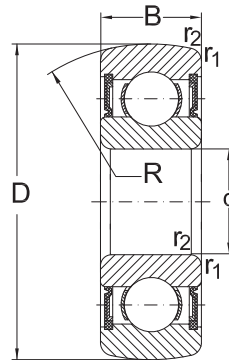


r_{smin}	r_{gmax}	h_{min}
0.6	0.6	2.1
1	1	2.8
1.1	1	3.5
1.5	1.5	4.5
2	2	5.5

Cam Rollers, Single Row



3612...



3612...R

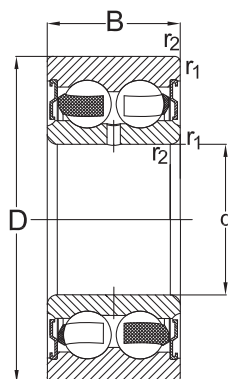
Dimensions					Designation	
D	d	B	R	r_1, r_2 min.	With cylindrical outer ring	With sphered outer ring
mm						
32	10	9	400	0,6	361200	361200 R
35	12	10	400	0,6	361201	361201 R
40	15	11	400	0,6	361202	361202 R
47	17	12	400	0,6	361203	361203 R
52	20	14	400	1	361204	361204 R
62	25	15	400	1	361205	361205 R
72	30	16	400	1	361206	361206 R
80	35	17	400	1,1	361207	361207 R
85	40	18	400	1,1	361208	361208 R
90	45	19	400	1,1	361209	361209 R

Cam Rollers, Single Row

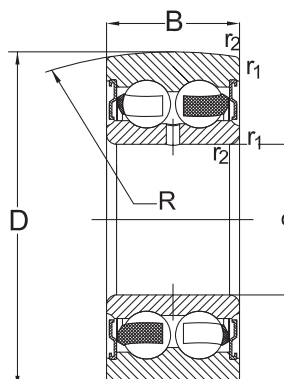
*Abutment and
fillet dimensions
see on page 811*

Speed rating	Load ratings				Max. permissible radial load		Mass
	as bearing		as cam roller				
	dyn. C_r	stat. C_{Or}	dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{Or \max}$	
min^{-1}	kN				kN		kg
17000	5,1	2,4	4,6	2	3,4	4,9	0,041
15000	6,8	3,1	6,2	2,6	3,3	4,7	0,052
13000	7,8	3,8	7,1	3,2	5	7,2	0,074
12000	9,6	4,8	8,8	4,2	8,2	11,6	0,11
10000	12,7	6,6	11,4	5,4	7,4	10,6	0,16
8500	14	7,8	12,7	6,8	12,9	18	0,24
7500	19,5	11,2	17,4	9,3	14,3	20,4	0,34
6300	25,5	15,3	22,1	11,8	12,7	18	0,43
5000	32,5	19,8	22,8	13,6	13,4	23,1	0,45
4500	32,5	20,4	22,5	13,7	13,3	22,8	0,50

Cam Rollers, Double Row



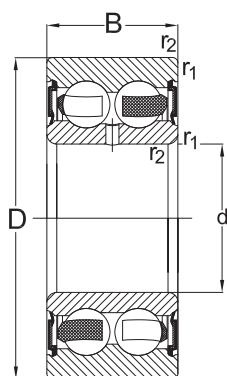
3057...2Z
3067...2Z



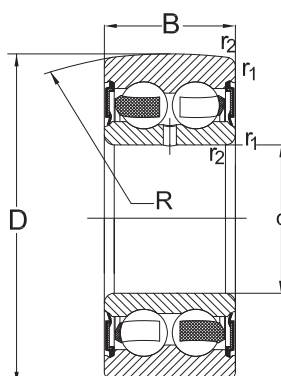
3058...2Z
3068...2Z

Dimensions					Designation	
D	d	B	R	r_1, r_2 min.	With cylindrical outer ring	With sphered outer ring
mm						
32	10	14	400	0,6	305700 2Z	305800 2Z
	10	14	400	0,6	305700 2RS	305800 2RS
35	12	15,9	400	0,6	305701 2Z	305801 2Z
	12	15,9	400	0,6	305701 2RS	305801 2RS
40	15	15,9	400	0,6	305702 2Z	305802 2Z
	15	15,9	400	0,6	305702 2RS	305802 2RS
47	17	17,5	400	0,6	305703 2Z	305803 2Z
	17	17,5	400	0,6	305703 2RS	305803 2RS
	15	19	400	1,0	306702 2Z	306802 2Z
	15	19	400	1,0	306702 2RS	306802 2RS
52	20	20,6	400	1	305704 2Z	305804 2Z
	20	20,6	400	1	305704 2RS	305804 2RS
	17	22,2	400	1,0	306703 2Z	306803 2Z
	17	22,2	400	1,0	306703 2RS	306803 2RS
62	25	20,6	400	1	305705 2Z	305805 2Z
	25	20,6	400	1	305705 2RS	305805 2RS

Cam Rollers, Double Row



3057...2RS
3067...2RS

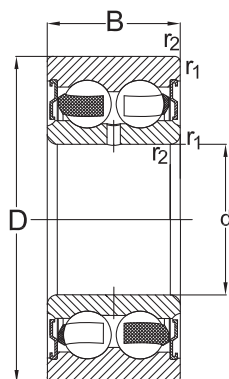


3058...2RS
3068...2RS

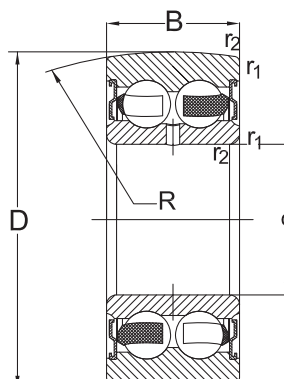
Abutment and
fillet dimensions
see on page 811

Speed rating	Load ratings				Max. permissible radial load		Mass
	as bearing	as bearing	as cam roller	as cam roller	dyn.	stat.	
	dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{0LR}	$F_{r \max}$	$F_{0r \max}$	
min^{-1}	kN				kN		kg
13000	7,8	4,5	7,4	4,1	9	12,9	0,062
8500	7,8	4,5	7,4	4,1	9	12,9	0,062
11000	10,6	5,9	10	5,2	8,3	12	0,078
7300	10,6	5,9	10	5,2	8,3	12	0,078
10000	11,9	7,1	11,1	6,4	12,2	17,6	0,10
6500	11,9	7,1	11,1	6,4	12,2	17,6	0,10
9000	14,6	9	13,8	8,3	19,3	27,5	0,16
6000	14,6	9	13,8	8,3	19,3	27,5	0,16
10000	17,7	10,3	14,6	9,2	12,5	18,4	0,15
6500	17,7	10,3	14,6	9,2	12,5	18,4	0,15
8000	19,5	12,5	18,2	11	17	24,5	0,22
5300	19,5	12,5	18,2	11	17	24,5	0,22
9500	21,1	12,5	17,2	11	15,5	22,2	0,20
6300	21,1	12,5	17,2	11	15,5	22,2	0,20
7000	21,2	14,6	19,9	13,4	30,5	44	0,32
4500	21,2	14,6	19,9	13,4	30,5	44	0,32

Cam Rollers, Double Row



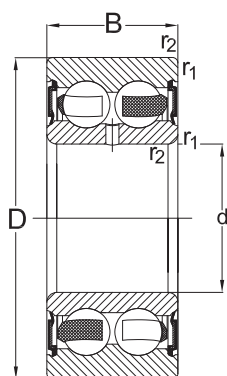
3057...2Z
3067...2Z



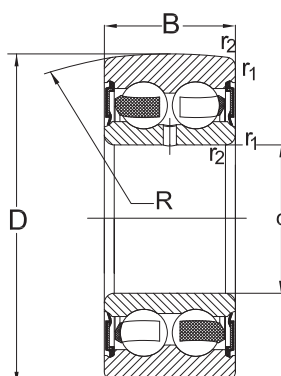
3058...2Z
3068...2Z

Dimensions					Designation	
D	d	B	R	r_1, r_2 min.	With cylindrical outer ring	With sphered outer ring
mm						
62	20	22,2	400	1,1	306704 2Z	306804 2Z
	20	22,2	400	1,1	306704 2RS	306804 2RS
72	30	23,8	400	1	305706 2Z	305806 2Z
	30	23,8	400	1	305706 2RS	305806 2RS
	25	25,4	400	1,1	306705 2Z	306805 2Z
	25	25,4	400	1,1	306705 2RS	306805 2RS
80	35	27	400	1,1	305707 2Z	305807 2Z
	35	27	400	1,1	305707 2RS	305807 2RS
	30	30,2	400	1,1	306706 2Z	306806 2Z
	30	30,2	400	1,1	306706 2RS	306806 2RS
90	35	34,9	400	1,5	306707 2Z	306807 2Z
	35	34,9	400	1,5	306707 2RS	306807 2RS
100	40	36,5	400	1,5	306708 2Z	306808 2Z
	40	36,5	400	1,5	306708 2RS	306808 2RS

Cam Rollers, Double Row



3057...2RS
3067...2RS



3058...2RS
3068...2RS

Abutment and
fillet dimensions
see on page 811

Speed rating	Load ratings				Max. permissible radial load		Mass
	as bearing		as cam roller		dyn.	stat.	
	dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{0LR}	$F_{r \max}$	$F_{0r \max}$	
min^{-1}	kN				kN		kg
9000	24,5	15,8	21,1	14,5	27	29	0,34
6000	24,5	15,8	21,1	14,5	27	29	0,34
6000	29,6	21,2	27,6	18,6	34	49	0,49
4000	29,6	21,2	27,6	18,6	34	49	0,49
7900	32,5	21,6	27,5	19,5	34,5	39	0,5
5200	32,5	21,6	27,5	19,5	34,5	39	0,5
5300	39	28,5	35,1	24	31	44	0,65
3500	39	28,5	35,1	24	31	44	0,65
6200	45,5	31,5	36,5	26,5	43,5	53	0,67
4100	45,5	31,5	36,5	26,5	43,5	53	0,67
5100	56	39,5	44,5	33	39,5	66	0,95
3400	56	39,5	44,5	33	39,5	66	0,95
4700	69	49,5	56	42	70	84	1,2
4700	69	49,5	56	42	70	84	1,2

URB



Support rollers

Standards, Boundary dimensions

Standard plans

DIN 616

General

Support Rollers are either needle roller or cylindrical roller bearings with an extra radially thick outer ring. Depending on their series, support rollers may be both separable and non-separable radial bearings.

Support Rollers usually run with their outer ring either directly on a guide track or against a machine surface that is for guidance. Due to their extra - thick outer rings, Support rollers are able to accept high radial forces as well as shock loads.

Their ability to accommodate axial forces, however, depends on the particular design of the support roller.

Support roller are usually exposed to minor misalignments during operation. To minimize the negative effects of such misalignments, (e.g. high edge stresses), support rollers are more frequently used with sphered outer rings.

URB - support rollers with parallel (cylindrical) outer diameters are indicated by the suffix "X".

Design variants

In order to cover as many applications as possible, **URB Support rollers** are available in several different design variants as standard.

To provide simple re-lubrication, all support roller have lubrication holes in their inner rings.

For the most common design are shown in the figures on the pages 820 and 822.

Support Rollers without axial guidance

The most simple design of support rollers is provided by the **STO** - type rollers.

For these rollers the outer ring, inner ring and the needle roller and cage assembly may be fitted separately. Since **STO** - type support rollers do not provide any axial guidance to their needle roller and cage assembly they adequately accept radial loads only.

The axial guidance of outer ring and needle roller and cage assembly must be provided by a suitable design of adjacent machine parts.

STO - Type support rollers are frequently used without their inner rings, namely **RSTO** - rollers. The needle roller and cage assembly of **RSTO** - type support rollers run directly onto the shaft surface, which must be designed in an adequate manner, (e.g. hardened and ground).

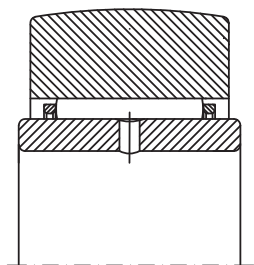
For detailed guide lines on the design of bearing raceways on shafts see chapter "**Bearing application**" on page 45.

STO and **RSTO** - type support rollers are the only support rollers that are satisfactory for operating with oil lubrication.

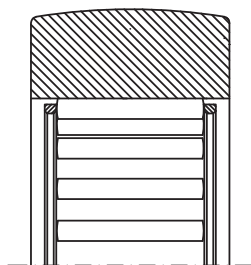
Unlike the **STO** - type support rollers, the outer ring, and the needle rollers and cage assembly of series **NA 22 ..2RS** build a unit, whilst the inner ring may be dealt with individually.

NA 22 ..2RS - type support rollers also accommodate radial loads only. They also require adequate axial guidance of their outer rings by adjacent parts.

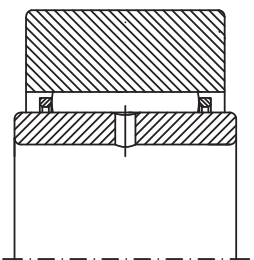
Due to the contact seals, which are integrated in their outer rings, **NA 22 ..2RS** - type support rollers provide the possibility for maintenance - free bearing arrangements.



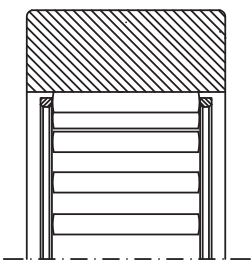
STO



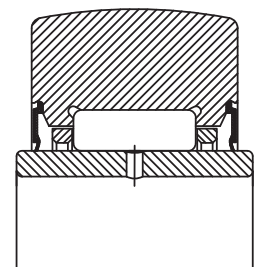
RSTO



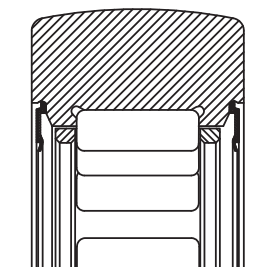
STO...X



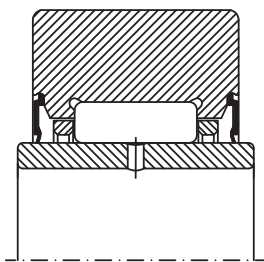
RSTO...X



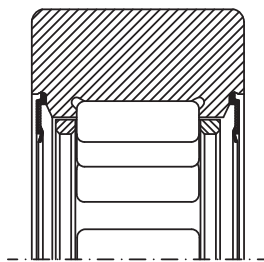
NA22...2RS



RNA22...2RS



NA22...2RS.X



RNA22...2RS.X

Sealed support rollers, without inner rings, are also produced, namely **RNA 22...2RS**.

For these types both the needle rollers and the rubbing seals run on the contacting shaft surface.

Support Rollers with axial guidance

These types of supporting rollers are also to accommodate additional thrust loads as they occur, due to aligning errors or if rollers run out of line.

That is why no extra external guiding surfaces are required.

Where high axial loads are anticipated effective axial support of side washers must be achieved by the adjacent machine components.

Support rollers, type **STO..2Z**

STO...2Z - type support rollers are designed similar to the **STO** - type but have two loose side plates to accept axial forces.

These types of support rollers are separable, this enables simple mounting of the rollers due to the separable parts.

Particular attention must be paid to the adequate axial camming of loose side washers during mounting.

The side plates of **STO...2Z** - type support rollers must not have any axial play when they are mounted.

Support rollers, type **NATR**

The side washers of **NATR** - type needle roller support rollers are pressed into the inner ring to ensure guidance of the outer ring and the needle roller and cage assembly.

Therefore, these roller types are non - separable. **NATR** - type needle roller support roller are optimum for applications where the rollers are exposed to high radial loads at high speeds.

The sealed support rollers, namely, **NATR..PP**, which feature integrated rubbing seals on each side of the outer ring are very suitable for operating in harsh conditions (e.g. heavy dust, dirt and other contaminants).

Support rollers, type **NATV**

NATV-type rollers are identical to the **NATR**-type except they have no fitted cage (i.e. full complement type).

This enables an increased numbers of needle roller to be fitted in the available space (i.e. full circumferentially and radially). Therefore, significantly higher "basic" load ratings are achieved.

NATV type full complement rollers are unsuitable for high speed applications due to the differing kinematic operating condition. Also they must be re-lubricated more frequently.

For applications of harsh operating conditions the sealed support roller, namely, **NATV...PP** is also available.

NUTR - type support rollers

The base internal design of **NUTR** - type support rollers is similar to that of double row cylindrical roller bearings.

Since the outer ring has tow shoulders these support rollers are able to accommodate greater thrust loads.

NUTR - type support rollers are non separable.

The separate loose ribs of these type are retained using either cupped washers pressfitted into the outer ring or with lamellar rings which sit in the formed circumferential grooves machined in the loose rib outer diameter.

Both methods also act as a gap seal.

Due to do their full complement design, **NUTR** - type support roller feature a maximum load rating but they must be more frequently re-lubrication.

For extra heavy duty applications, particularly where heavy shock loads occur **NUTR** - type support rollers are available with an extra - radially thick walled outer ring (see sketch).

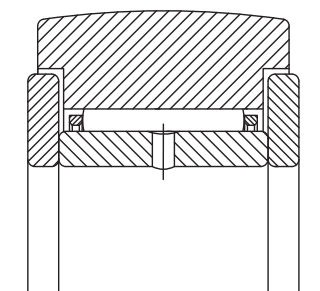
URB's extra heavy duty **NUTR** -type support rollers with increased outer ring wall thickness are identified by the fact that their nominal diameters are included in their designation.

Examples:

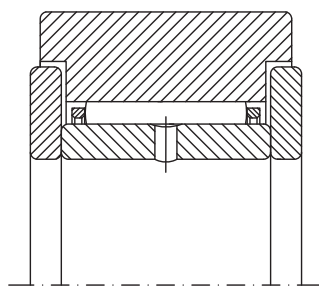
NUTR 1747

or

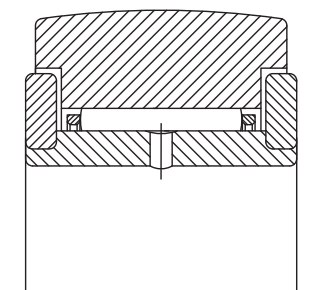
NUTR 50110.



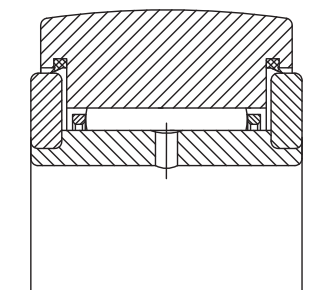
STO...2Z



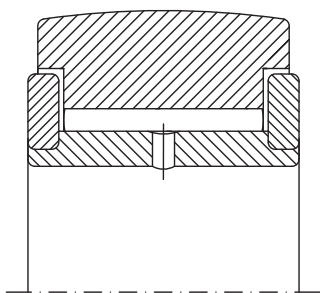
STO...2ZX



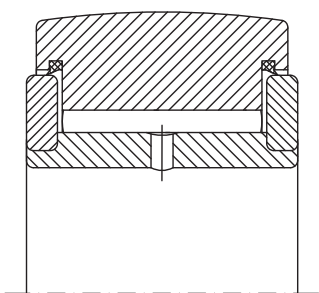
NATR



NATR...PP



NATV



NATV...PP

Tolerance values of ISO - tolerance fields F6 and h12 [μm]

Nominal dimension	[mm]	> ≤	3	6	10	18	30	50
			6	10	18	30	50	80
ISO - Tolerance field	F6	min	+10	+13	+16	+20	+25	+30
		max	+18	+22	+27	+33	+41	+49
ISO - Tolerance field	h12	min	-120	-150	-180	-210	-250	-300
		max	0	0	0	0	0	0

All **URB support rollers** are produced with **crowned outer ring diameter as standard** they are also available with parallel (cylindrical) outer diameters indicated by the suffix "**X**", see the relevant designs.

Material of seals

Several types of URB support rollers, such as series **NA22...2RS**, **NATR .. PP** und **NATV...PP** are also available in sealed versions.

These support rollers feature contacting seals made from wear - resistant synthetic rubber compound (**NBR**) that provides an efficient and effective seal against the penetration of impurities or the escape of grease.

The synthetic rubber used for these contacting seals is satisfactory for operation temperatures of **-30°C up to +120°C**.

Grease filling

All **URB Support rollers** are already supplied filled with a high quality, lithium - soaped bearing grease as standard.

This lubricant is adequate for operating temperatures of **-30°C** up to ca. **+110°C**. Although support rollers under normal operating conditions usually run maintenance - free, they may require more frequent re - lubrication under certain unfavourable operating conditions such as heavy dust, high speeds, permanent operating temperatures of more than 70°C, and the presence of increased humidity etc.

Therefore a **URB support rollers** feature a lubrication hole in the inner ring to provide the possibility of re-lubricating the rollers, when necessary.

It must be considered where relubrication is necessary, with a satisfactory grease, the force of pressure to re-grease must be of a level not to cause permanent damage to either the seals or shields.

URB also produce roller with alternative grease fill according to customer's specification upon order request.

Cages

URB support rollers, with cages fitted, have normally pressed steel cages as standard. Only small support rollers without axial guidance, series **STO** and **RSTO**, respectively, are fitted with solid polyamide cages (suffix **TN**), as standard.

Tolerances

URB support rollers are produced to normal tolerance class (**PN**) as standard, according to DIN - standard DIN 620.

The exceptions being the outer ring outer diameter tolerance of crowned outer rings and the width tolerance of supporting roller of series **STO ...ZZ**, **NATR**, **NATV** and **NUTR**.

The tolerance for the outer ring diameter of support rollers with sphered outer ring is uniform at:

0 / -0,05 mm

The width tolerance of support rollers of series **STO ...ZZ**, **NATR**, **NATV** and **NUTR** is lateral and lies in the ISO - tolerance field **h12**.

The tolerance for the **inside diameter of the needle roller complement**, (**F**), of **RSTO** and **RNA 22...2RS** - type support rollers that are used without inner rings, is lateral in the ISO - tolerance field **F6**.

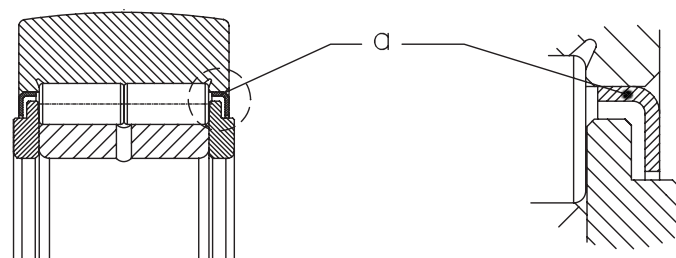
Values of ISO - tolerance field **F6** and **h12** are listed in the table below. For detailed values of tolerances to DIN 620 see chapter "**Bearing tolerances**" page 27.

Internal Clearance

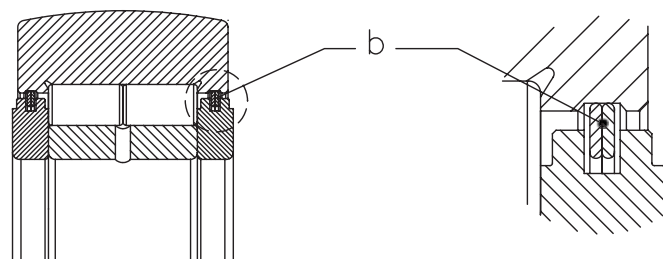
URB Support rollers are produced to normal internal clearance group (**CN**) as standard according to DIN 620.

Load carrying capability

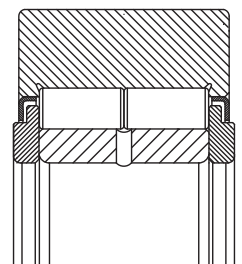
Unlike "normal" rolling element bearings, the outer ring of support rollers contact the adjacent parts with a very small contacting surface only.



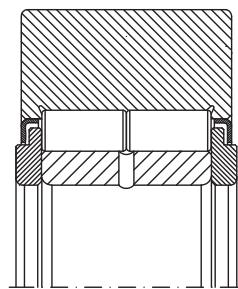
NUTR (a)



NUTR (b)



NUTR...X



NUTR...XXXX

This causes deformations of the outer ring. These are considered by the recommended maximum values for the permissible dynamic and static radial loads as given by the product tables.

Equivalent dynamic load

Where Support rollers must be calculated as rolling element bearings:

$$P = F_r$$

But, P must be $\leq F_r$ zul
(for F_r zul see product tables)

Equivalent static bearing load

For Support rollers:

$$P_0 = F_r$$

But, P_0 must be $\leq F_{0r}$ zul
(for F_{0r} zul see product tables)

Design of adjacent machine components

For support rollers of the series **STO**, **RSTO**, **NA22..2RS** and **RNA22..2RS**, an effective axial guidance of the outer rings must be provided by satisfactory designed surrounding parts.

These guiding surfaces must have a clean and plain machined surface, minimum fine turned, without any burrs.

These guide surfaces which are machined should reach **50%**, or greater, of the outer ring radial wall section or the equivalent diameter.

Hardened guide surfaces, however, feature a higher wear - resistance and may therefore be smaller in diameter.

RSTO and **RNA22..2RS** - type support rollers that run directly on a shaft require an **axial play** of 0,2 mm minimum between the lateral guiding surfaces in mounted condition.

The diameter of the supposed shaft raceway should have a diameter tolerance according to **k5**.

The shaft or pin have to fulfil certain requirements in terms of hardness, dimensional and geometric accuracy.

For detailed information on the design requirements see the chapter "**Bearing application**" on page 45.

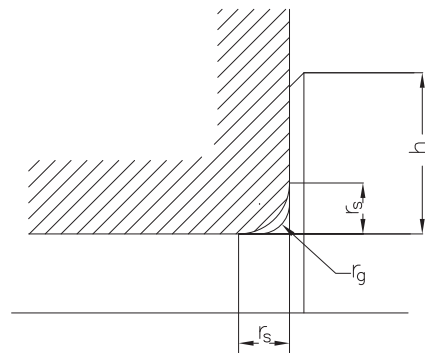
For support roller which are exposed to high axial loads, effective lateral support of their side washers is necessary.

Since Support rollers usually have point loaded inner rings, their shaft may be rather loose (i.e. according to ISO - tolerance fields **g6**, **h6** or **j6**).

Abutment and Fillet dimensions for Support rollers

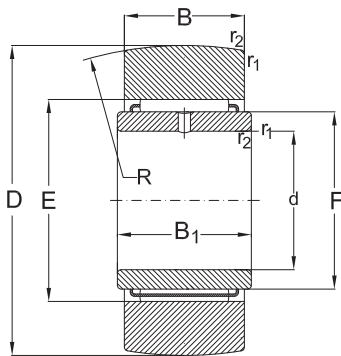
The bearing inner ring must contact adjacent surfaces with their side faces only. The fillet radius of inner ring corners must not touch the fillet radius of shaft shoulder.

Therefore, the largest fillet radius (r_g) must be smaller than the minimum fillet dimension of the Support roller inner rings (r_s) as listed in the product tables.

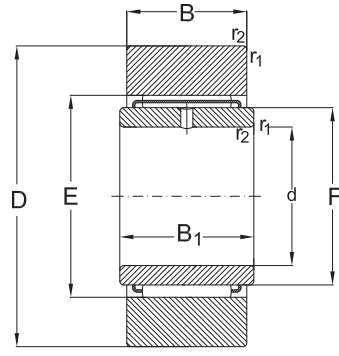


r_{smin}	r_{gmax}	h_{min}
0.6	0.6	2.1
1	1	2.8
1.1	1	3.5
1.5	1.5	4.5
2	2	5.5

Support Rollers without axial guidance



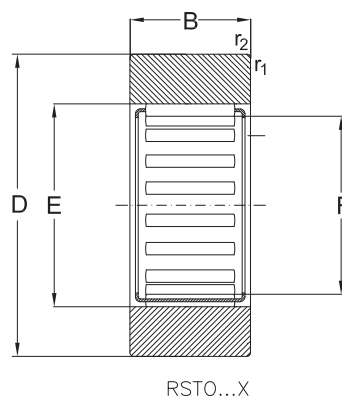
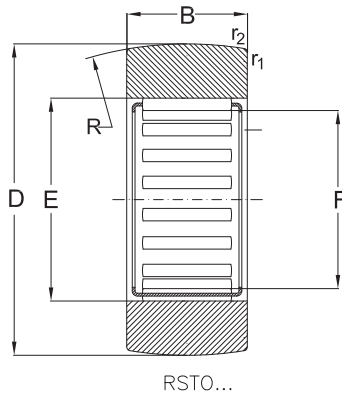
STO...



STO...X

Dimensions						Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	R	with sphered outer ring	with cylindrical outer ring
mm							
16	-	7,8	-	0,3	500	RSTO5 TN	RSTO5 XTN
19	-	9,8	-	0,3	500	RSTO6	RSTO6 X
	6	9,8	10	0,3	500	STO6	STO6 X
24	-	9,8	-	0,3	500	RSTO8	RSTO8 X
	8	9,8	10	0,3	500	STO8	STO8 X
30	-	11,8	-	0,3	500	RSTO10	RSTO10 X
	10	11,8	12	0,3	500	STO10	STO10 X
32	-	11,8	-	0,3	500	RSTO12	RSTO12 X
	12	11,8	12	0,3	500	STO12	STO12 X
35	-	11,8	-	0,3	500	RSTO15	RSTO15 X
	15	11,8	12	0,3	500	STO15	STO15 X
40	-	15,8	-	0,3	500	RSTO17	RSTO17 X
	17	15,8	16	0,3	500	STO17	STO17
47	-	15,8	-	0,3	500	RSTO20	RSTO20 X
	20	15,8	16	0,3	500	STO20	STO20 X

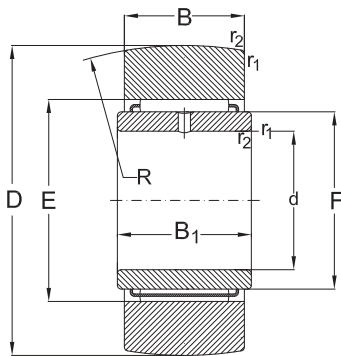
Support Rollers without axial guidance



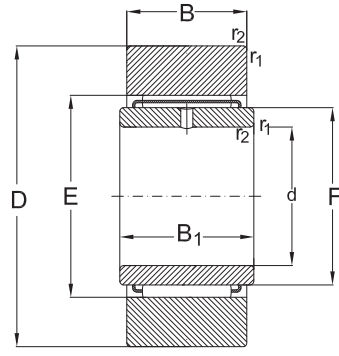
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible		Mass
			as bearing		as support roller		radial load		
F	E	B	dyn. C _r	stat. C _{0r}	dyn. C _{LR}	stat. C _{OLR}	dyn. F _{r max}	stat. F _{0r max}	
mm		min ⁻¹	kN				kN		kg
7	10	24000	2,65	2,5	2,36	2,5	2,9	3	0,01
10	13	18000	5,2	6,55	4	4,5	3,9	5,6	0,01
10	13	18000	5,2	6,55	4	4,5	3,9	5,6	0,02
12	15	16000	5,6	7,65	4,5	5,4	6,4	7,5	0,02
12	15	16000	5,6	7,65	4,5	5,4	6,4	7,5	0,03
14	20	12000	10	10,8	8,15	8,8	7,35	10,6	0,04
14	20	12000	10	10,8	8,15	8,8	7,35	10,6	0,05
16	22	10000	10,6	12	8,3	9,8	7,35	10,8	0,05
16	22	10000	10,6	12	8,3	9,8	7,35	10,8	0,06
20	26	7000	12,5	15,6	8,65	10,6	6,55	11	0,05
20	26	7000	12,5	15,6	8,65	10,6	6,55	11	0,06
22	29	6300	18,3	23,6	13,2	17,6	10,8	18	0,09
22	29	6300	18,3	23,6	13,2	17,6	10,8	18	0,11
25	32	5300	19	26	14,3	15,6	15,6	22,4	0,13
25	32	5300	19	26	14,3	15,6	15,6	22,4	0,15

Support Rollers without axial guidance



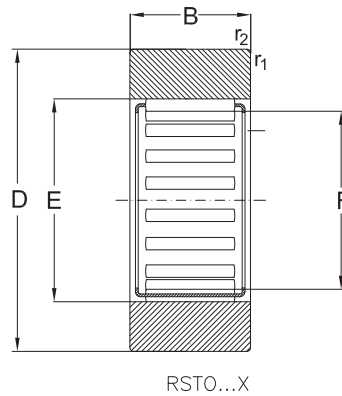
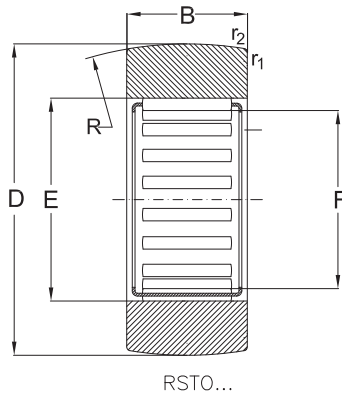
STO...



STO...X

Dimensions						Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	R	with sphered outer ring	with cylindrical outer ring
mm							
52	-	15,8	-	0,3	500	RSTO25	RSTO25 X
	25	15,8	16	0,3	500	STO25	STO25 X
62	-	19,8	-	0,6	500	RSTO30	RSTO30 X
	30	19,8	20	0,6	500	STO30	STO30 X
72	-	19,8	-	0,6	500	RSTO35	RSTO35 X
	35	19,8	20	0,6	500	STO35	STO35 X
80	-	19,8	-	1	500	RSTO40	RSTO40 X
	40	19,8	20	1	500	STO40	STO40 X
85	-	19,8	-	1	500	RSTO45	RSTO45 X
	45	19,8	20	1	500	STO45	STO45 X
90	-	19,8	-	1	500	RSTO50	RSTO50 X
	50	19,8	20	1	500	STO50	STO50 X

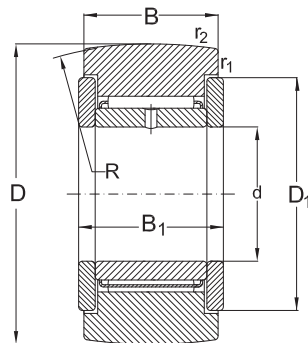
Support Rollers without axial guidance



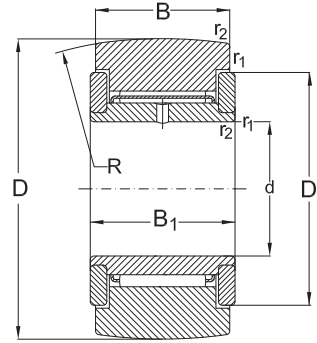
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Mass
F	E		dyn. C_r	stat. C_{Or}	dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{Or \max}$	
mm		min^{-1}					kN		kg
30	37	4300	21,2	31,5	15	22,8	16	23,6	0,15
30	37	4300	21,2	31,5	15	22,8	16	23,6	0,18
38	46	3000	31,5	52	21,2	34,5	22	33,5	0,26
38	46	3000	31,5	52	21,2	34,5	22	33,5	0,31
42	50	2400	33,5	57	24	40,5	31,5	43	0,38
42	50	2400	33,5	57	24	40,5	31,5	43	0,44
50	58	1800	36,5	68	23,8	39,0	32,5	45	0,42
50	58	1800	36,5	68	23,8	39,0	32,5	45	0,53
55	63	1600	38	75	24,5	43,0	33,5	45,5	0,45
55	63	1600	38	75	24,5	43,0	33,5	45,5	0,58
60	68	1500	40	80	25	45,5	34,5	45,5	0,48
60	68	1500	40	80	25	45,5	34,5	45,5	0,62

Support Rollers with axial guidance



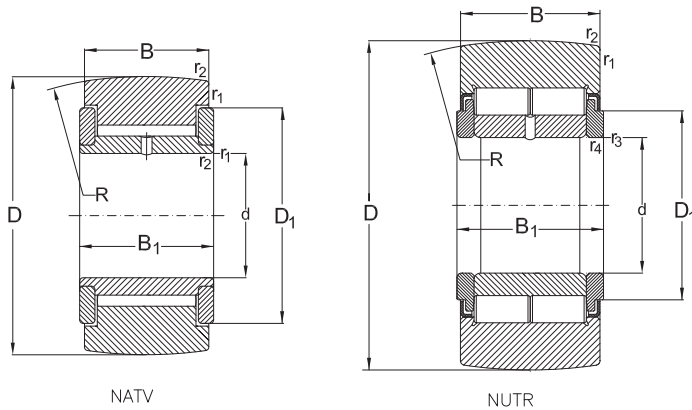
STO...2Z



NATR

Dimensions						Designation		
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
16	5	11	12	0,1	-	500	NATR5	NATR5 X
	5	11	12	0,1	-	500	NATV5	NATV5 X
19	6	11	12	0,1	-	500	NATR6	NATR6 X
	6	11	12	0,1	-	500	NATV6	NATV6 X
	6	13,8	14	0,3	-	500	STO6 2Z	STO6 2ZX
24	8	14	15	0,3	-	500	NATR8	NATR8 X
	8	14	15	0,3	-	500	NATV8	NATV8 X
	8	13,8	14	0,3	-	500	STO8 2Z	STO8 2ZX
30	10	14	15	0,6	-	500	NATR10	NATR10 X
	10	14	15	0,6	-	500	NATV10	NATV10 X
	10	15,8	16	0,3	-	500	STO10 2Z	STO10 2ZX
32	12	14	15	0,6	-	500	NATR12	NATR12 X
	12	14	15	0,6	-	500	NATV12	NATV12 X
	12	15,8	16	0,3	-	500	STO12 2Z	STO12 2ZX
35	15	18	19	0,6	-	500	NATR15	NATR15 X
	15	18	19	0,6	-	500	NATV15	NATV15 X

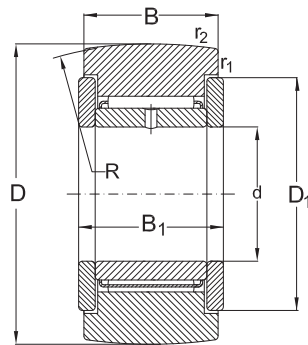
Support Rollers with axial guidance



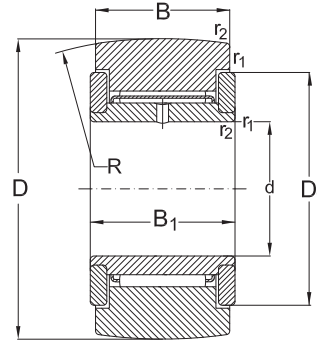
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible		Mass
D	D ₁		as bearing		as support roller		radial load		
			dyn. C _r	stat. C _{0r}	dyn. C _{LR}	stat. C _{OLR}	dyn. F _{r max}	stat. F _{0r max}	
mm		min ⁻¹			kN		kN		kg
16	12	22000	3,7	3,9	3,1	3,2	2,9	4,1	0,02
	12	11000	6	8,8	4,7	6,5	4	5,7	0,02
19	14	20000	4,15	4,75	3,25	3,8	3,45	5,5	0,02
	14	10000	6,9	11	5,3	8	5,1	7,4	0,02
	15	18000	5,1	6,55	4	5,1	4,2	5,85	0,03
24	19	17000	6,6	7,8	5,3	6,1	4,8	7,35	0,04
	19	8500	9,7	16	7,4	11,4	7,4	10,4	0,04
	18	16000	5,6	7,65	4,65	6,4	7,1	7,5	0,04
30	23	15000	7,8	9,65	6,4	8	7,1	11,2	0,06
	23	7500	11,4	19,3	8,9	14,6	11	15,6	0,07
	23	12000	10	10,8	8,3	8,8	8,15	11	0,07
32	25	14000	8,4	10,8	6,6	8,5	7,1	10	0,07
	25	7000	12,3	22	9,3	15,3	10,6	15	0,07
	25	10000	10,6	12	8,3	9,3	8	11,2	0,08
35	27	13000	12,3	19,3	9,5	13,7	11,4	16,3	0,10
	27	6700	17,2	35,5	12,3	23,2	14,6	20,8	0,11

Support Rollers with axial guidance



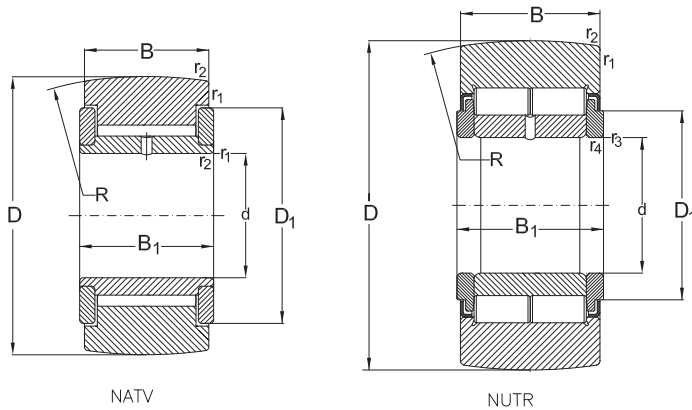
STO...2Z



NATR

Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
35	15	18	19	0,6	0,3	500	NUTR15	NUTR15 X
	15	15,8	16	0,3	-	500	STO15 2Z	STO15 2ZX
40	17	20	21	1	-	500	NATR17	NATR17 X
	17	20	21	1	-	500	NATV17	NATV17 X
	17	20	21	1	0,3	500	NUTR17	NUTR17 X
	17	19,8	20	0,3	-	500	STO17 2Z	STO17 2ZX
42	15	18	19	0,6	0,3	500	NUTR1542	NUTR1542 X
47	20	24	25	1	-	500	NATR20	NATR20 X
	20	24	25	1	-	500	NATV20	NATV20 X
	17	20	21	1	0,3	500	NUTR1747	NUTR1747 X
	20	24	25	1	0,3	500	NUTR20	NUTR20 X
	20	19,8	20	0,3	-	500	STO20 2Z	STO20 2ZX
52	25	24	25	1	-	500	NATR25	NATR25 X
	25	24	25	1	-	500	NATV25	NATV25 X
	20	24	25	1	0,3	500	NUTR2052	NUTR2052 X
	25	24	25	1	0,3	500	NUTR25	NUTR25 X

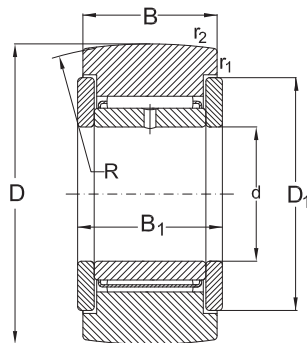
Support Rollers with axial guidance



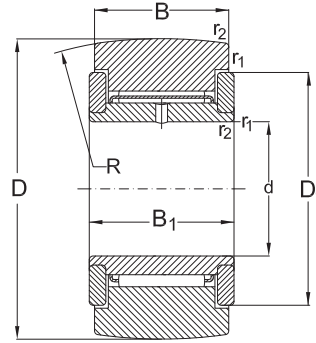
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible radial load		Mass
D	D ₁		as bearing dyn. C _r	stat. C _{0r}	as support roller dyn. C _{LR}	stat. C _{OLR}	dyn. F _{r max}	stat. F _{0r max}	
mm		min ⁻¹	kN				kN		kg
35	20	5600	24,2	28,5	16,8	17,6	8,7	12,2	0,10
	30	7000	12,3	15,6	8,8	10,6	7,8	6,95	0,09
40	32	10000	13,4	20,4	10,5	14,6	12,5	18	0,14
	32	5600	19,4	40	14,2	26,5	17	24,5	0,15
	22	5300	26	32	19	20	14	22,2	0,15
	33	6300	18,3	23,6	13,2	16,6	11,4	18,6	0,15
42	20	5600	24,2	28,5	20,1	17,6	21,6	31	0,16
47	37	9500	18,7	32,5	14,7	24,5	23,6	33,5	0,25
	37	5300	26	60	19,4	41,5	30,5	43	0,26
	22	5300	26	32	22	27	30	43	0,22
	27	4500	39	49	28,6	33,5	17	25	0,25
	37	5300	19	26	14,6	19,6	16,6	22,8	0,2
52	42	8000	20,5	38	14,7	25,5	21,6	31	0,28
	42	4300	28,6	72	19,8	44	28,5	40,5	0,29
	27	4500	39	49	30	39	30	42,5	0,32
	31	3800	44,6	61	29,7	36	18	25,5	0,28

Support Rollers with axial guidance



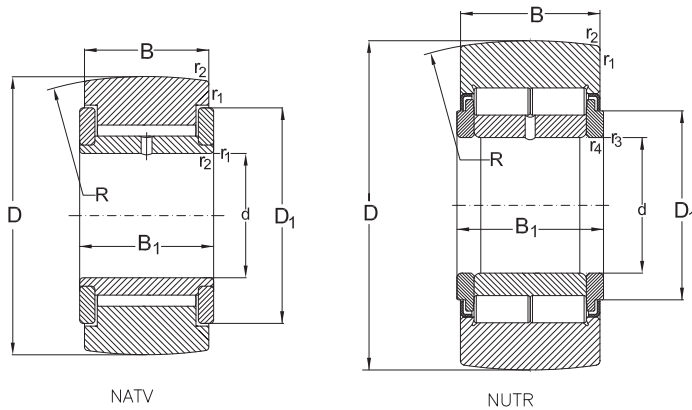
STO...2Z



NATR

Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
52	25	19,8	20	0,3	-	500	STO25 2Z	STO25 2ZX
62	30	28	29	1	-	500	NATR30	NATR30 X
	30	28	29	1	-	500	NATV30	NATV30 X
	25	24	25	1	0,3	500	NUTR 2562	NUTR2562 X
	30	28	29	1	0,3	500	NUTR 30	NUTR30 X
	30	24,8	25	0,6	-	500	STO30 2Z	STO30 2ZX
72	35	28	29	1,1	-	500	NATR35	NATR35 X
	35	28	29	1,1	-	500	NATV35	NATV35 X
	30	28	29	1	0,3	500	NUTR3072	NUTR3072 X
	35	28	29	1,1	0,3	500	NUTR35	NUTR35 X
	35	24,8	25	0,6	-	500	STO35 2Z	STO35 2ZX
80	40	30	32	1,1	-	500	NATR40	NATR40 X
	40	30	32	1,1	-	500	NATV40	NATV40 X
	35	28	29	1,1	0,6	500	NUTR3580	NUTR3580 X
	40	30	32	1,1	0,6	500	NUTR40	NUTR40 X
	40	25,8	26	0,6	-	500	STO40 2Z	STO40 2ZX

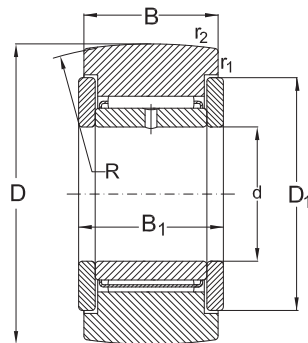
Support Rollers with axial guidance



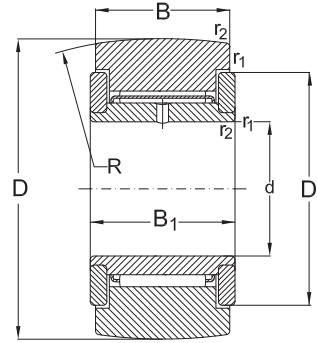
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible radial load		Mass
D	D ₁		as bearing		as support roller		dyn.	stat.	
			dyn. C _r	stat. C _{0r}	dyn. C _{LR}	stat. C _{OLR}	F _{r max}	F _{0r max}	
mm		min ⁻¹			kN		kN		kg
52	42	4300	21,2	31,5	15,3	21,6	17	24	0,2
62	51	7000	33	60	22,9	37,5	26,5	38	0,47
	51	3600	44,6	108	29,2	62	34,5	49	0,48
	31	3800	44,6	61	35,8	48	44	63	0,45
	38	3200	60	78	41,3	47,5	24	34,5	0,47
	52	3000	31,4	52	21,2	32	22,8	35,5	0,42
72	58	6000	35,8	69,5	24,6	43	33,5	48	0,64
	58	3000	49,5	129	31,9	72	43	62	0,65
	38	3200	60	78	46,5	61	52	76,5	0,71
	40	2800	65,5	91,5	44	57	33,5	47,5	0,63
	56	2400	31,9	54	22,8	36,5	34	41,5	0,56
80	66	5300	46,8	95	31,9	57	41,5	58,5	0,80
	66	2600	60,5	160	39,1	88	51	73,5	0,89
	44	2800	65,5	91,5	49	68	57	81,5	0,86
	51	2400	91,3	134	57,2	72	32	45,5	0,82
	64	1800	36,5	68	24,5	42,5	35,5	45,5	0,70

Support Rollers with axial guidance



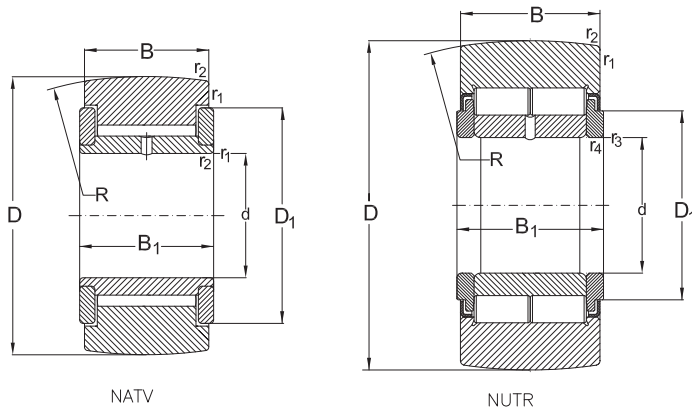
STO...2Z



NATR

Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindrical outer ring
mm								
85	45	30	32	1,1	-	500	NATR45	NATR45 X
	45	30	32	1,1	0,6	500	NUTR45	NUTR45 X
	45	25.8	26	0,6	-	500	STO45 2Z	STO45 2ZX
90	50	30	32	1,1	-	500	NATR50	NATR50 X
	50	30	32	1,1	-	500	NATV50	NATV50 X
	40	30	32	1,1	0,6	500	NUTR4090	NUTR4090 X
	50	30	32	1,1	0,6	500	NUTR50	NUTR50 X
100	45	30	32	1,1	0,6	500	NUTR45100	NUTR45100 X
110	50	30	32	1,1	0,6	500	NUTR50110	NUTR50110 X

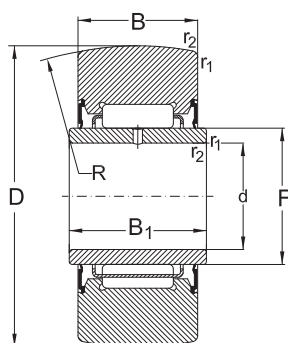
Support Rollers with axial guidance



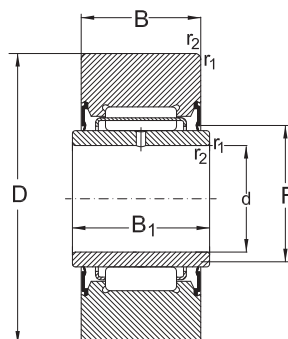
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible radial load		Mass
D	D ₁		as bearing dyn. C _r	stat. C _{0r}	as support roller dyn. C _{LR}	stat. C _{OLR}	dyn. F _{r max}	stat. F _{0r max}	
mm		min ⁻¹	kN				kN		kg
85	72	5000	48,4	102	31,4	57	40	57	0,91
	55	2000	98,8	146	58,3	75	32,5	46,5	0,88
	69	1600	38	75	24,5	43	36,5	47,5	0,77
90	76	4500	50,1	108	30,8	58,5	40	57	0,96
	76	2000	67,1	193	39,1	93	50	72	1,00
	51	2400	91,3	134	68,2	91,5	63	90	1,16
	60	1900	101	160	58,3	78	32,5	47,5	0,95
100	55	2000	96,8	146	73,6	104	80	114	1,43
110	60	1900	101	160	78,1	116	98	140	1,73

Sealed Support Rollers without axial guidance



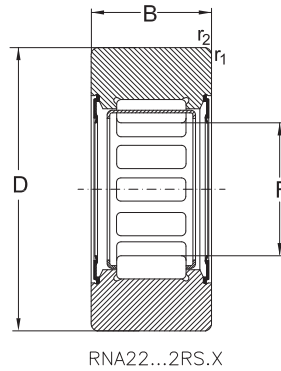
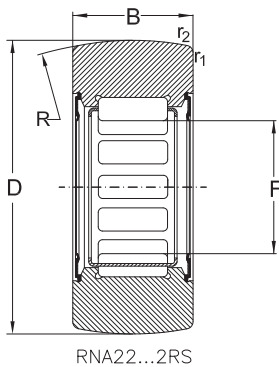
NA22...2RS



NA22...2RS.X

Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindricl outer ring
mm								
19	-	-	11,8	0,3	-	500	RNA22/6 2RS	RNA22/6 2RSX
	6	12	11,8	0,3	0,3	500	NA22/6 2RS	NA22/6 2RSX
24	-	-	11,8	0,3	-	500	RNA22/8 2RS	RNA22/8 2RSX
	8	12	11,8	0,3	0,3	500	NA22/8 2RS	NA22/8 2RSX
30	-	-	13,8	0,6	-	500	RNA2200 2RS	RNA2200 2RSX
	10	14	13,8	0,6	0,3	500	NA2200 2RS	NA2200 2RSX
32	-	-	13,8	0,6	-	500	RNA2201 2RS	RNA2201 2RSX
	12	14	13,8	0,6	0,3	500	NA2201 2RS	NA2201 2RSX
35	-	-	13,8	0,6	-	500	RNA2202 2RS	RNA2202 2RSX
	15	14	13,8	0,6	0,3	500	NA2202 2RS	NA2202 2RSX
40	-	-	15,8	1	-	500	RNA2203 2RS	RNA2203 2RSX
	17	16	15,8	1	0,3	500	NA2203 2RS	NA2203 2RSX
47	-	-	17,8	1	-	500	RNA2204 2RS	RNA2204 2RSX
	20	18	17,8	1	0,3	500	NA2204 2RS	NA2204 2RSX

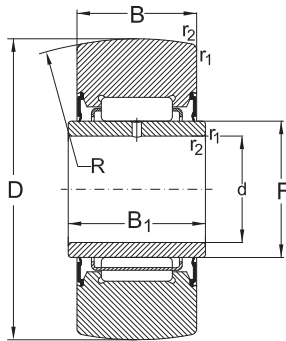
Sealed Support Rollers without axial guidance



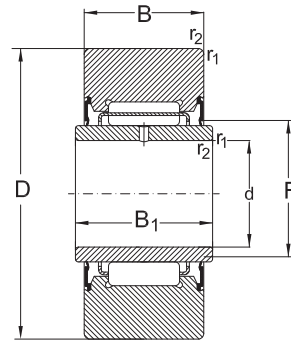
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible radial load		Mass
D	F		as bearing dyn. C_r	stat. C_{0r}	as support roller dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
mm		min ⁻¹	kN				kN		kg
19	10	16000	4,5	4,1	3,5	3	1,9	2,8	0,01
	10	16000	4,5	4,1	3,5	3	1,9	2,8	0,02
24	12	14000	5,4	5,2	4,5	4,4	5	7,1	0,03
	12	14000	5,4	5,2	4,5	4,4	5	7,1	0,03
30	14	13000	7,4	8,2	6,4	7,2	12	17	0,05
	14	13000	7,4	8,2	6,4	7,2	12	17	0,06
32	16	12000	8,1	9,1	6,9	8,2	11,6	16,6	0,06
	16	12000	8,1	9,1	6,9	8,2	11,6	16,6	0,07
35	20	9500	9,1	12	7,2	9	9,6	13,7	0,06
	20	9500	9,1	12	7,2	9	9,6	13,7	0,07
40	22	9000	11,3	16,3	9,4	12,9	16	22,8	0,09
	22	9000	11,3	16,3	9,4	12,9	16	22,8	0,11
47	25	7500	19,4	22,4	15,4	17,3	17,6	25,5	0,15
	25	7500	19,4	22,4	15,4	17,3	17,6	25,5	0,18

Sealed Support Rollers without axial guidance



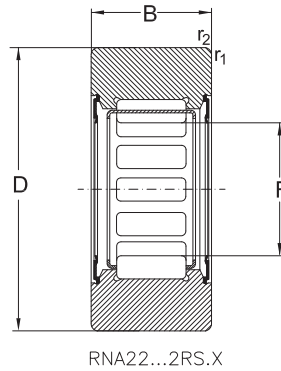
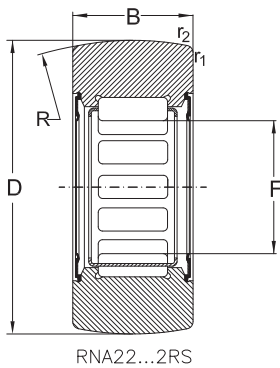
NA22...2RS



NA22...2RS.X

Dimensions							Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	r ₃ , r ₄ min.	R	with sphered outer ring	with cylindricl outer ring
mm								
52	-	-	17,8	1	-	500	RNA2205 2RS	RNA2205 2RSX
	25	18	17,8	1	0,3	500	NA2205 2RS	NA2205 2RSX
62	-	-	19,8	1	-	500	RNA2206 2RS	RNA2206 2RSX
	30	20	19,8	1	0,3	500	NA2206 2RS	NA2206 2RSX
72	-	-	22,7	1,1	-	500	RNA2207 2RS	RNA2207 2RSX
	35	23	22,7	1,1	0,6	500	NA2207 2RS	NA2207 2RSX
80	-	-	22,7	1,1	-	500	RNA2208 2RS	RNA2208 2RSX
	40	23	22,7	1,1	0,6	500	NA2208 2RS	NA2208 2RSX
85	-	-	22,7	1,1	-	500	RNA2209 2RS	RNA2209 2RSX
	45	23	22,7	1,1	0,6	500	NA2209 2RS	NA2209 2RSX
90	-	-	22,7	1,1	-	500	RNA2210 2RS	RNA2210 2RSX
	50	23	22,7	1,1	0,6	500	NA2210 2RS	NA2210 2RSX

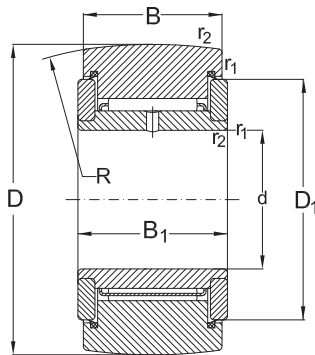
Sealed Support Rollers without axial guidance



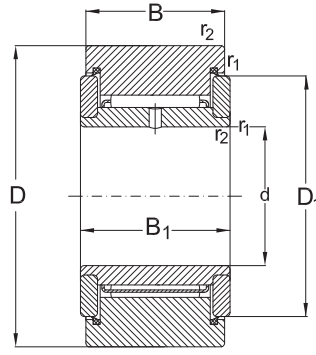
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible radial load		Mass
D	F		as bearing dyn. C_r	stat. C_{0r}	as support roller dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
mm		min ⁻¹	kN				kN		kg
52	30	6300	21,6	27,5	16,1	19	17,4	24,6	0,17
	30	6300	21,6	27,5	16,1	19	17,4	24,6	0,20
62	35	5600	22,4	32	17,6	24,5	28,5	40,5	0,29
	35	5600	22,4	32	17,6	24,5	28,5	40,5	0,32
72	42	4800	28,5	46,5	22	34	39	56	0,42
	42	4800	28,5	46,5	22	34	39	56	0,49
80	48	4000	36,9	58,5	27	39	37,5	53	0,515
	48	4000	36,9	58,5	27	39	37,5	53	0,615
85	52	3800	39	63	27,5	41,5	39	56	0,565
	52	3800	39	63	27,5	41,5	39	56	0,661
90	58	3400	40	71	27	41,5	36,5	52	0,59
	58	3400	40	71	27	41,5	36,5	52	0,712

Sealed Support Rollers with axial guidance



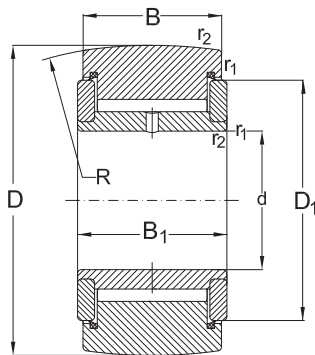
NATR...PP



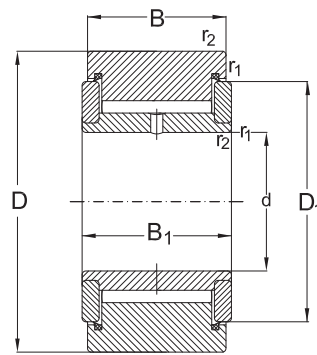
NATR...PPX

Dimensions						Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	R	with sphered outer ring	with cylindrical outer ring
mm							
16	5	11	12	0,1	500	NATR5 PP	NATR5 PPX
	5	11	12	0,1	500	NATV5 PP	NATV5 PPX
19	6	11	12	0,1	500	NATR6 PP	NATR6 PPX
	6	11	12	0,1	500	NATV6 PP	NATV6 PPX
24	8	14	15	0,3	500	NATR8 PP	NATR8 PPX
	8	14	15	0,3	500	NATV8 PP	NATV8 PPX
30	10	14	15	0,6	500	NATR10 PP	NATR10 PPX
	10	14	15	0,6	500	NATV10 PP	NATV10 PPX
32	12	14	15	0,6	500	NATR12 PP	NATR12 PPX
	12	14	15	0,6	500	NATV12 PP	NATV12 PPX
35	15	18	19	0,6	500	NATR15 PP	NATR15 PPX
	15	18	19	0,6	500	NATV15 PP	NATV15 PPX
40	17	20	21	1	500	NATR17 PP	NATR17 PPX
	17	20	21	1	500	NATV17 PP	NATV17 PPX
47	20	24	25	1	500	NATR20 PP	NATR20 PPX
	20	24	25	1	500	NATV20 PP	NATV20 PPX

Sealed Support Rollers with axial guidance



NATV...PP

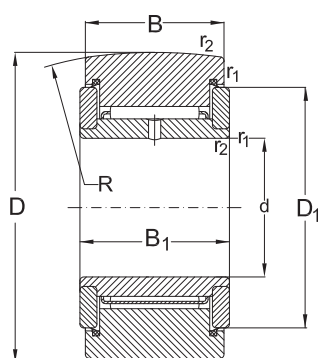


NATV...PPX

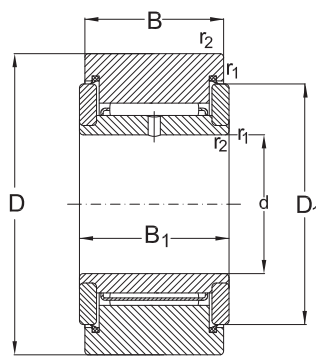
*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible		Mass
D	F		as bearing		as support roller		radial load		
			dyn. C_r	stat. C_{0r}	dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
mm		min^{-1}	kN				kN		kg
16	12	20000	3,7	3,9	3,1	3,2	2,9	4,2	0,01
	12	11000	6	8,8	4,7	6,5	4	5,7	0,02
19	14	17000	4,15	4,8	3,25	3,8	3,45	5,5	0,02
	14	10000	6,9	11	5,3	8	5,1	7,3	0,02
24	19	15000	6,6	7,8	5,3	6,1	5,2	7,65	0,04
	19	8500	9,6	16	7,4	11,4	7,3	10,4	0,04
30	23	13000	7,8	9,65	6,4	8	7,1	11,2	0,07
	23	7500	11,4	19,3	8,9	14,6	11	15,6	0,07
32	25	11000	8,4	10,8	6,6	8,5	7,1	10	0,07
	25	7000	12,3	22	9,3	15,3	10,6	15	0,07
35	27	10000	12,3	19,3	9,5	13,7	11,4	16,3	0,10
	27	6700	17,2	35,5	12,3	23,2	14,6	20,8	0,11
40	32	9000	13,4	20,4	10,5	14,6	12,5	18	0,14
	32	5600	19,4	40	14,2	26,5	17	24,5	0,15
47	37	8000	18,7	32,5	14,7	24,5	23,6	33,5	0,25
	37	5300	26	60	19,4	41,5	30,5	43	0,26

Sealed Support Rollers with axial guidance



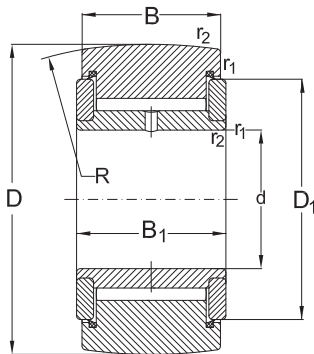
NATR...PP



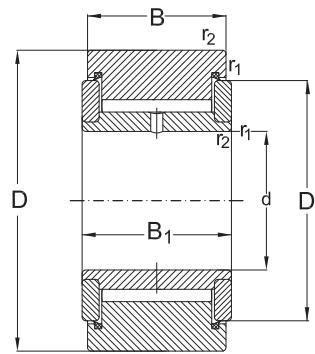
NATR...PPX

Dimensions						Designation	
D	d	B	B ₁	r ₁ , r ₂ min.	R	with sphered outer ring	with cylindricl outer ring
mm							
52	25	24	25	1	500	NATR25 PP	NATR25 PPX
	25	24	25	1	500	NATV25 PP	NATV25 PPX
62	30	28	29	1	500	NATR30 PP	NATR 30 PPX
	30	28	29	1	500	NATV30 PP	NATV30 PPX
72	35	28	29	1,1	500	NATR35 PP	NATR35 PPX
	35	28	29	1,1	500	NATV35 PP	NATV35 PPX
80	40	30	32	1,1	500	NATR40 PP	NATR40 PPX
	40	30	32	1,1	500	NATV40 PP	NATV40 PPX
85	45	30	32	1,1	500	NATR45 PP	NATR45 PPX
90	50	30	32	1,1	500	NATR50 PP	NATR50 PPX
	50	30	32	1,1	500	NATV50 PP	NATV50 PPX

Sealed Support Rollers with axial guidance



NATV...PP



NATV...PPX

*Recommended
Abutment and
fillet dimensions
see on page 825*

Dimensions		Speed rating	Load ratings				max. permissible radial load		Mass
D	F		as bearing dyn. C_r	stat. C_{0r}	as support roller dyn. C_{LR}	stat. C_{OLR}	dyn. $F_{r \max}$	stat. $F_{0r \max}$	
mm		min^{-1}	kN				kN		kg
52	42	6700	20,5	38	14,7	25,5	21,6	31	0,28
	42	4300	28,6	72	19,8	44	28,5	40,5	0,29
62	51	5300	33	60	22,9	37,5	26,5	38	0,47
	51	3600	44,6	108	29,2	62	34,5	49	0,48
72	58	4500	38,5	69,5	24,6	43	33,5	48	0,64
	58	3000	49,5	129	31,9	72	43	62	0,65
80	66	4000	46,8	95	31,9	57	41,5	58,5	0,80
	66	2600	60,5	160	39,1	88	51	73,5	0,89
85	72	3600	48,4	102	31,4	57	40	57	0,91
90	76	3400	50,1	108	30,8	58,5	40	57	0,96
	76	2000	67,1	193	39,1	93	50	72	1,00



Rolling Elements

General

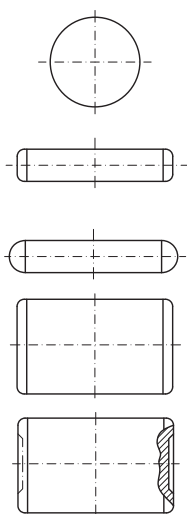
Rolling Elements are simple geometric bodies that are produced to very high precision standard by the rolling bearing industry.

Rolling elements are made from hardened bearing steel. They have fine ground or even superfinished surfaces as standard.

Rolling elements such as Balls, Cylindrical Rollers and Needle Rollers are used in a wide variety of Rolling Bearings for a whole spectrum of applications and industries.

Additional to the use in rolling bearings, individual rolling elements are frequently used separately or loose for other requirements or applications, such as Valve Balls, Gauge Rollers, Cycles wheels etc.

The more popular sizes are normally available and supplied loose from stock.



Balls

Standard, Boundary dimensions

Balls of through - hardening

rolling bearing steel DIN 5401 / Part 1
ISO 3290

Hardness

Balls made from through - hardened rolling bearing steel according to DIN 17 230 generally, have the following hardness values and ranges as stated in the table below.

Ball diameter DW [mm]		Hardness [HRC]	
>	≤	>	≤
-	12,7	62	67
12,7	50,8	60	66
50,8	70	59	65
70	120	57	63
120	-	55	61

Ball grades, Tolerances

URB balls from rolling bearing steel are supplied according to the following tolerances.

The balls are clasified and graded according to their diameters, each grade is sorted into individual ball gauges, each gauge is separately packaged.

Each package is clearly identified with ball diameter, grade and gauge. Where there are no specific grade and gauge requirements readily available standard ball diameters will be despatched.

Symbols

D_w	nominal ball diameter
D_{ws}	Single diameter of a ball. Distance between two parallel planes that contact the surface of the ball.
D_{wm}	Mean ball diameter. Arithmetical mean of largest and smallest (measured) single ball diameter.
Lot	A defined quantity of balls that have been manufactured under uniform conditions and have therefore similar characteristics.
D_{wml}	Mean ball diameter of a ball lot Arithmetical mean of largest and smallest mean ball diameter (D_{wm}) within a lot.
V_{Dws}	Variation of ball diameter. Difference between largest and smallest measured single diameter of one ball, (D_{ws})
V_{DWL}	Variation of ball diameters within a lot. Difference between largest and smallest mean ball diameter, (D_{wm}) within a lot.
tDW	Deviation from spherical form as defined by DIN ISO 1011.
Gauge	The amount by which the lot mean diameter, (D_{wml}), differs from the nominal ball diameter, (D_w). This amount being one of a defined series. Each ball gauge is a whole multiple of ball gauge interval (I).
I	Ball gauge interval; Amount in which the permissible deviation of ball diameter is divided.
R_a	Surface finish roughness, according to DIN 4768
Grade	Defined combination of quality features such as dimensional and geometrical accuracy, surface roughness, shape and gauge intervals of a specific ball.

**Tolerance Values for hardened balls from rolling bearing steel
according to ISO 3290**

Ball Grade	Tolerances						Gauge interval I	Gauge mean values (deviation range)		
	ΦD_w		V_{Dws} max	t_{Dw} max	R_a max	V_{DwL} max				
	>	≤								
	mm		μm				μm			
G3	-	12,7	0,08	0,08	0,012	0,13	0,5	-5 ... -0,5	0	+0,5 ... +5
G5	-	12,7	0,13	0,13	0,020	0,25	1	-5 ... -1	0	+1 ... +5
G10	-	25,4	0,25	0,25	0,025	0,5	1	-9 ... -1	0	+1 ... +9
G16	-	25,4	0,4	0,4	0,032	0,8	2	-10 ... -2	0	+2 ... +10
G20	-	25,4	0,5	0,5	0,040	1	2	-10 ... -2	0	+2 ... +10
G28	25,4	50,8	0,7	0,7	0,050	1,4	2	-12 ... -2	0	+2 ... +12
G40	-	101,6	1	1	0,080	2	4	-16 ... -4	0	+4 ... +16
G100	101,6	152,4	2,5	2,5	0,125	5	5	-20 ... -5	0	+5 ... +20
	152,4	175	2,5	2,5	0,125	5	10	-40 ... -10	0	+10 ... +40
G200	175	250	5	5	0,200	10	15	-60 ... -15	0	+15 ... +60
G500	-	25,4	13	13	0,200	-	50	-50	0	+50
	25,4	50,8	19	19	0,200	-	75	-75	0	+75
	50,8	76,2	25	25	0,200	-	100	-100	0	+100
	76,2	101,6	32	32	0,200	-	125	-125	0	+125
	101,6	127	38	38	0,200	-	150	-150	0	+150
	127	152,4	44	44	0,400	-	175	-175	0	+175
G600	all		-	-	-	-	400	-	0	-
G700	all		-	-	-	-	2000	-	0	-

Designation

Balls are classified according to their diameters, each grade and gauge is separately packed and despatched.

URB balls made from chromium rolling bearing steel are designated following the system as shown below:

RB 12,7 G10 P4

where:

- RB** Symbols for balls made from chromium rolling bearing steel
- 12,7** Nominal ball diameter D_w [mm]
- G10** Grade **G10**
- P4** Gauge **P4**
(the mean deviation of this specific lot equals $+4 \mu\text{m}$)

To avoid possible misinterpretations by poor visible printings etc. the **mean deviation** is stated according to the following system:

- P** **Plus**
e.g. **P4** = mean deviation + $4 \mu\text{m}$
- N** 0
- M** **Minus**
e.g. **M3** = mean deviation - $3 \mu\text{m}$

Therefore, the mean diameter deviation of a ball from a specific lot is

$$12,704 \text{ mm} \pm 0,5 \mu\text{m}$$

For a ball with the designation **RB 5,556 G3 M2**, the mean diameter deviation would be:

$$5,554 \pm 0,25 \mu\text{m}$$

Balls from other materials

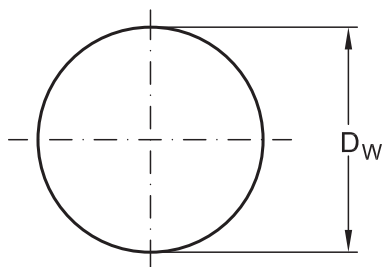
Additional to the balls produced from chromium bearing steel, **URB** also produce balls suitable for different purposes from alternative materials.

Examples are balls of:

- mild steel, unhardened
- stainless steel
- bronze
- brass, etc.

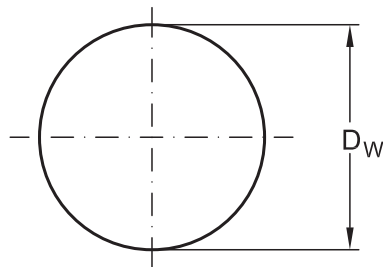
URB will provide detailed information on request.

Steel Balls



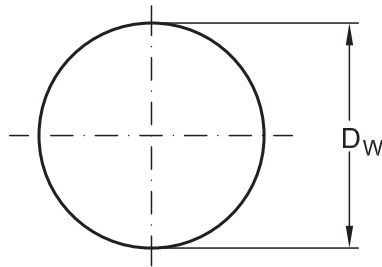
Ball diameter, D_w		Designation	Mass per 100 balls
mm	inch		kg
0,4	-	RB 0,4	0,0001
0,5	-	RB 0,5	0,0001
1	-	RB 1	0,0004
1,5	-	RB 1,5	0,0014
1,588	1/16	RB 1,588	0,0016
2	-	RB 2	0,0033
2,381	3/32	RB 2,381	0,0055
2,5	-	RB 2,5	0,0064
3	-	RB 3	0,0111
3,175	1/8	RB 3,175	0,0132
3,5	-	RB 3,5	0,0177
3,969	5/32	RB 3,969	0,0257
4	-	RB 4	0,0263
4,5	-	RB 4,5	0,0374
4,762	3/16	RB 4,762	0,0446
5	-	RB 5	0,0514
5,5	-	RB 5,5	0,0679
5,556	7/32	RB 5,556	0,702
6	-	RB 6	0,0882
6,350	1/4	RB 6,350	0,103
6,5	-	RB 6,5	0,113
7	-	RB 7	0,141
7,144	9/32	RB 7,144	0,150
7,5	-	RB 7,5	0,174
7,938	5/16	RB 7,938	0,106

Steel Balls



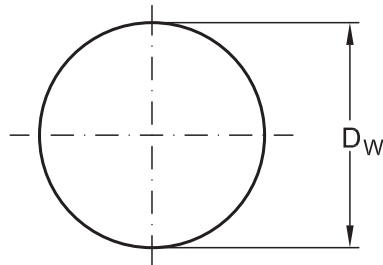
Ball diameter, D_w		Designation	Mass per 100 balls
mm	inch		kg
8	-	RB 8	0,210
8,5	-	RB 8,5	0,220
8,731	11/32	RB 8,731	0,266
9	-	RB 9	0,330
9,525	3/8	RB 9,525	0,355
10	-	RB 10	0,411
10,319	13/32	RB 10,319	0,443
10,5	-	RB 10,5	0,476
11	-	RB 11	0,547
11,112	7/16	RB 11,112	0,564
11,5	-	RB 11,5	0,625
11,906	15/32	RB 11,906	0,693
12	-	RB 12	0,710
12,5	-	RB 12,5	0,803
12,700	1/2	RB 12,700	0,842
13	-	RB 13	0,903
13,494	17/32	RB 13,494	1,01
14	-	RB 14	1,13
14,288	9/16	RB 14,288	1,20
15	-	RB 15	1,39
15,081	19/32	RB 15,081	1,41
15,875	5/8	RB 15,875	1,65
16	-	RB 16	1,68
16,5	-	RB 16,5	1,85
16,669	21/32	RB 16,669	1,91

Steel Balls



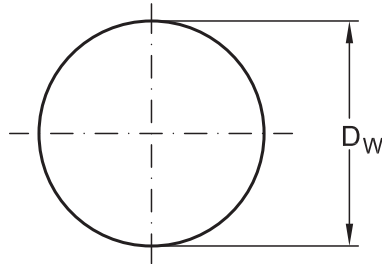
Ball diameter, D_w		Designation	Mass per 100 balls
mm	inch		kg
17	-	RB 17	2,02
17,462	11/16	RB 17,462	2,19
18	-	RB 18	2,40
18,256	23/32	RB 18,256	2,50
19	-	RB 19	2,82
19,050	3/4	RB 19,050	2,84
19,844	25/32	RB 19,844	3,24
20	-	RB 20	3,29
20,5	-	RB 20,5	3,54
20,638	13/16	RB 20,638	3,62
21	-	RB 21	3,81
22	-	RB 22	4,38
22,225	7/8	RB 22,225	4,52
22,5	-	RB 22,5	4,68
23	-	RB 23	5,00
23,812	15/16	RB 23,812	5,55
24	-	RB 24	5,68
25	-	RB 25	6,42
25,400	1	RB 25,400	6,74
26	-	RB 26	7,23
26,988	1 1/16	RB 26,988	8,08
28	-	RB 28	9,02
28,575	1 1/8	RB 28,575	9,55
30	-	RB 30	11,1
30,162	1 3/16	RB 30,162	11,3

Steel Balls



Ball diameter, D_w		Designation	Mass per 100 balls
mm	inch		kg
31,750	1 1/4	RB 31,750	13,2
32	-	RB 32	13,5
33	-	RB 33	14,8
33,338	1 5/16	RB 33,338	15,2
34	-	RB 34	16,2
34,925	1 3/8	RB 34,925	17,5
35	-	RB 35	17,7
36	-	RB 36	19,2
36,512	1 7/16	RB 36,512	20,0
38	-	RB 38	22,5
38,100	1 1/2	RB 38,100	22,7
39,688	1 9/16	RB 39,688	25,7
40	-	RB 40	26,3
41,275	1 5/8	RB 41,275	29,0
42,862	1 11/16	RB 42,862	32,4
44,450	1 3/4	RB 44,450	36,1
45	-	RB 45	37,4
46,038	1 13/16	RB 46,038	40,3
47,625	1 7/8	RB 47,625	44,6
49,212	1 15/16	RB 49,212	49,0
50	-	RB 50	51,4
50,800	2	RB 50,800	53,9
53,975	2 1/8	RB 53,975	64,6
55	-	RB 55	67,9
57,15	2 1/4	RB 57,15	76,7

Steel Balls



Ball diameter, D_w		Designation	Mass per 100 balls
mm	inch		
60	-	RB 60	88,2
60,325	2 3/8	RB 60,325	90,2
63,500	2 1/2	RB 63,500	103
65	-	RB 65	113
66,675	2 5/8	RB 66,675	122
69,850	2 3/4	RB 69,850	140
70	-	RB 70	141
73,025	2 7/8	RB 73,025	160
75	-	RB 75	174
76,200	3	RB 76,200	182
80	-	RB 80	210
82,550	3 1/4	RB 82,550	231
85	-	RB 85	252
88,900	3 1/2	RB 88,900	289
90	-	RB 90	300
95	-	RB 95	352
95,250	3 3/4	RB 95,250	355
100	-	RB 100	411
110	-	RB 110	547
120	-	RB 120	710
127	5	RB 127	842
150	-	RB 150	1390
200	-	RB 200	3290
250	-	RB 250	6420

Cylindrical Rollers

Standards, Boundary dimensions

Cylindrical rollers of Through-hardening
Rolling bearings steel DIN 5402/part 1

Hardness

URB cylindrical rollers made from through - hardened rolling bearing steel according to DIN 17 230 have a surface hardness of **58** up to **65 HRC**.

Design features

URB cylindrical rollers are produced using the latest technology, with the modified surface profile (i.e. semi-crowned) as standard (see sketch below).

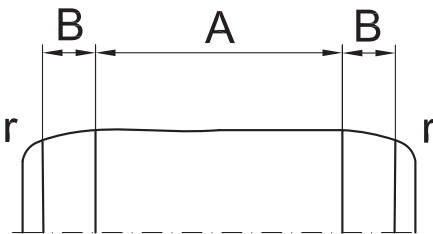
This modified profile features a cylindrical centre diameter (**A**) that blends into a slightly curved area (**B**) which blends into the roller radii (**r**) and end face.

This feature reduces considerably the negative effect of edge loading and, therefore, additional stresses.

For manufacturing reasons, small cylindrical rollers may have shallow dimples in their end faces.

Such dimples have a depth of approximately 0,5 mm, the diameter is approximately half the nominal roller diameter (**D_w**).

In cases where such dimpled cylindrical rollers are unsuitable for application reasons, it must be clearly stated on the order.

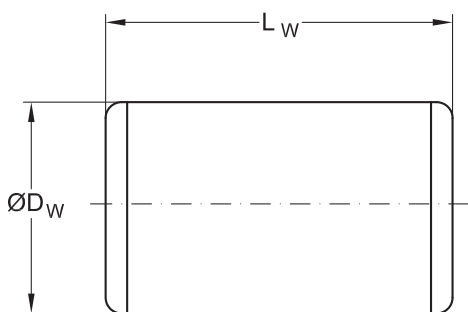


Tolerances for URB Cylindrical Rollers

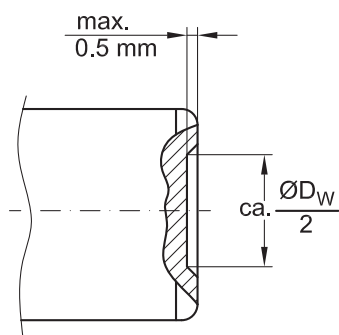
Values of dimensional and geometrical accuracy of **URB** cylindrical rollers

Roller diameter Nominal ΦD_w > ≤		Tolerances min. max.		Gauge interval I	Gauge mean values (deviation range)			Roundness tolerance to DIN ISO 1101
mm		µm			µm	µm		
-	26	-17	+11	2	-8 ... -1	0	+1 ... +6	1
26	40	-19,5	+10,5	3	-9 ... -1,5	0	+1,5 ... +6	1,2

Roller lenght Nominal L _w > ≤		Tolerances		Gauge interval I	Gauge mean values (deviation range)	Tolerance of end face runout to DIN ISO 1101
		min.	max.			
mm		µm		µm	µm	µm
-	48	-20	+10	6	-18 / -12 / -6 / 0 / +6	6
48	-	-45	+15	10	-30 / -20 / -10 / 0 / +10	10



a



b

Grades, Tolerances

URB cylindrical rollers are classified and grades according to their nominal diameters and lengths. Each grade is sorted into gauge ranges, each gauge is separately package.

Each package is clearly identified with the mean gauge interval of both, cylindrical roller diameter and roller length.

Where there are no specific Grade or gauge requirements specified the standard available cylindrical roller stock size will be despatched.

Designation

Cylindrical Rollers are classified according to their nominal diameters and lengths, each individual grade and gauge is separately packed and despatched.

URB Cylindrical Rollers made from chromium rolling bearing steel are designated following the system as shown below:

RC 6,5X9 P2/M6

where:

- RC** Symbol for cylindrical rollers from chromium rolling bearing steel
- 6,5** Nominal roller diameter, D_w [mm]
- 9** Nominal roller length, L_w [mm]
- P2** Diameter gauge **P2**
(the mean deviation of roller diameter of this specific lot equals + 2 μm)
- M6** Length gauge **M6**
(the mean deviation of roller length of

this specific lot is - 6 μm)

To avoid possible misinterpretations by poor visible printings etc., the **mean deviation** is stated according to the following system:

- P** **Plus**
e.g. **P2** = mean deviation + 2 μm
- N** **0**
- M** **Minus**
e.g. **M6** = mean deviation - 6 μm

Therefore, the **mean diameter deviation** of a cylindrical roller from this specific lot is

6,502 mm $\pm$ 1 μm .

The **mean roller length deviation** of a cylindrical roller from a specific lot is

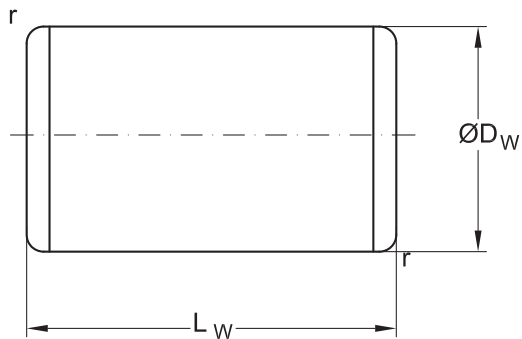
8,994 mm $\pm$ 3 μm .

Cylindrical Rollers to other Tolerances

URB also produces cylindrical rollers with reduced tolerances to customer order requirements.

URB will provide detailed information on request.

Cylindrical Rollers

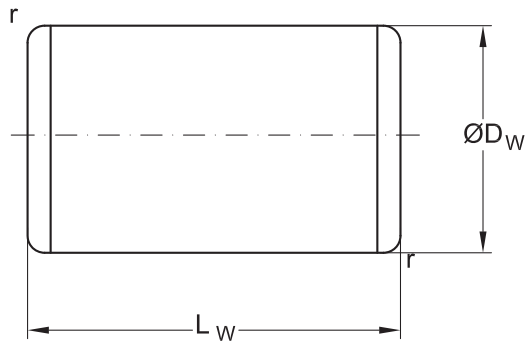


Dimensions				Designation	Mass per 100 rollers
D_W	L_W	r_{min}	r_{max}		
mm					kg
3	5	0,2	0,4	RC 3 X 5	0,027
3,5	5	0,2	0,4	RC 3,5 X 5	0,037
	8	0,2	0,4	RC 3,5 X 8	0,060
4	4	0,2	0,4	RC 4 X 4	0,038
	6	0,2	0,4	RC 4 X 6	0,058
	8	0,2	0,4	RC 4 X 8	0,078
4,5	6	0,2	0,6	RC 4,5 X 6	0,073
5	5	0,2	0,6	RC 5 X 5	0,075
	6	0,2	0,6	RC 5 X 6	0,091
	7	0,2	0,6	RC 5 X 7	0,106
	8	0,2	0,6	RC 5 X 8	0,121
	10	0,2	0,6	RC 5 X 10	0,152
5,5	5,5	0,2	0,6	RC 5,5 X 5,5	0,100
	8	0,2	0,6	RC 5,5 X 8	0,146
6	6	0,2	0,6	RC 6 X 6	0,130
	8	0,2	0,6	RC 6 X 8	0,178
	12	0,2	0,6	RC 6 X 12	0,261
6,5	6,5	0,2	0,6	RC 6,5 X 6,5	0,166
	9	0,2	0,6	RC 6,5 X 9	0,230

Cylindrical Rollers

Dimensions				Designation	Mass per 100 rollers
D _w	L _w	r _{min}	r _{max}		
mm					kg
7	7	0,2	0,6	RC 7 X 7	0,206
	10	0,2	0,6	RC 7 X 10	0,30
	14	0,2	0,6	RC 7 X 14	0,42
7,5	7,5	0,2	0,6	RC 7,5 X 7,5	0,25
	11	0,2	0,6	RC 7,5 X 11	0,37
8	8	0,2	0,6	RC 8 X 8	0,31
	12	0,2	0,6	RC 8 X 12	0,47
9	9	0,3	0,7	RC 9 X 9	0,44
	14	0,3	0,7	RC 9 X 14	0,68
10	10	0,3	0,7	RC 10 X 10	0,60
	14	0,3	0,7	RC 10 X 14	0,85
11	11	0,3	0,7	RC 11 X 11	0,81
	15	0,3	0,7	RC 11 X 15	1,10
12	12	0,3	0,7	RC 12 X 12	1,04
	18	0,3	0,7	RC 12 X 18	1,57
13	13	0,4	0,8	RC 13 X 13	1,33
	20	0,4	0,8	RC 13 X 20	2,04
14	14	0,4	0,8	RC 14 X 14	1,66
	20	0,4	0,8	RC 14 X 20	2,38

Cylindrical Rollers



Dimensions				Designation	Mass per 100 rollers
D_W	L_W	r_{min}	r_{max}		
mm					kg
15	15	0,4	0,8	RC 15 X 15	2,04
	22	0,4	0,8	RC 15 X 22	3,00
16	16	0,4	0,8	RC 16 X 16	2,48
	24	0,4	0,8	RC 16 X 24	3,73
17	17	0,4	1	RC 17 X 17	2,97
	24	0,4	1	RC 17 X 24	4,20
18	18	0,4	1	RC 18 X 18	3,57
	26	0,4	1	RC 18 X 26	5,10
19	19	0,4	1	RC 19 X 19	4,16
	28	0,4	1	RC 19 X 28	6,10
20	20	0,4	1	RC 20 X 20	4,85
	30	0,4	1	RC 20 X 30	7,30
21	21	0,5	1,1	RC 21 X 21	5,60
	30	0,5	1,1	RC 21 X 30	8,0
22	22	0,5	1,1	RC 22 X 22	6,4
	34	0,5	1,1	RC 22 X 34	10,0
23	23	0,5	1,1	RC 23 X 23	7,4
	34	0,5	1,1	RC 23 X 34	11,2
24	24	0,5	1,1	RC 24 X 24	8,4

Cylindrical Rollers

Dimensions				Designation	Mass per 100 rollers
D _w	L _w	r _{min}	r _{max}		kg
mm					
24	36	0,5	1,1	RC 24 X 36	12,6
25	25	0,5	1,1	RC 25 X 25	9,5
	36	0,5	1,1	RC 25 X 36	13,7
26	26	0,5	1,1	RC 26 X 26	10,7
	40	0,5	1,1	RC 26 X 40	16,4
28	28	0,6	1,4	RC 28 X 28	13,3
	44	0,6	1,4	RC 28 X 44	21,0
30	30	0,6	1,4	RC 30 X 30	16,3
	48	0,6	1,4	RC 30 X 48	26,2
32	32	0,6	1,4	RC 32 X 32	19,9
	52	0,6	1,4	RC 32 X 52	32,4
34	34	0,6	1,4	RC 34 X 34	23,9
	55	0,6	1,4	RC 34 X 55	38,7
36	36	0,7	1,7	RC 36 X 36	28,3
	58	0,7	1,7	RC 36 X 58	45,7
38	38	0,7	1,7	RC 38 X 38	33,3
	62	0,7	1,7	RC 38 X 62	55,0
40	40	0,7	1,7	RC 40 X 40	38,9
	65	0,7	1,7	RC 40 X 65	63,0

Needle Rollers

Standards, Bondary dimensions

Needle rollers of through-hardened rolling bearing steel
DIN 5402 / part 3

Hardness

URB - needle rollers made from through - hardened rolling bearing steel according to DIN 17 230 generally, have a hardness value range of **58 to 65 HRC**.

Design features

URB Needler Rollers are produced using the latest technology.

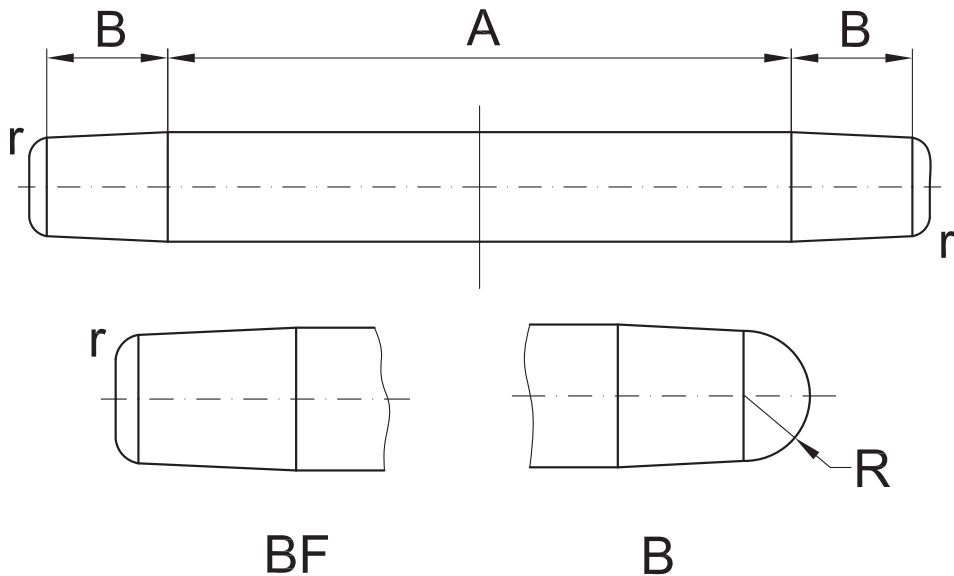
One detail of outstanding importance to needle rollers is the modified profile that is established as a standard for all **URB needle rollers**, see sletch below.

The modified profile features a cylindrical section in the centre (**A**) that blends into a slightly curved area (**B**) which blends into the roller radii (**r**) and end face.

This feature reduces considerably the potentially negative effect of edge loading and, therefore, additional stresses.

Needle rollers are available in two different designs as standard (see sketch below).

Needle rollers of type "**B**" have spherical end faces, whilst needle rollers of the "**BF**" - design are produced with flat ends.



Grades, tolerances

URB Needle rollers are classified and graded according to their diameters into tharee **Grades (G2, G3 and G5)**.

Furthermore, the needle diameters of every grade are subdivided in **gauges**.

The tolerance ranges of each gauge are different depending on the grade.

Each package is clearly identified with the nominal needle roller diameter, grade, individual gauge range and length.

Each gauge is packed and despatched separately.

Where there is no specific grade and/or gauge requirements G2-Needle rollers from available stock sizes will be despatched.

The **lenght tolerances** of needle rollers correspond uniformly to ISO tolerance field **h13**.

Values of dimensional and geometrical accuracy of URB Needle Rollers

Grade	Tolerances		Gauge internal I	Gauges (limit values)	Roundness tolerance
	min.	max.			
mm	μm		μm	μm	μm
G2	-10	0	2	0 / -2, -1 / -3, -2 / -4, -3 / -5, -4 / -6 -5 / -7, -6 / -8, -7 / -9, -8 / -10	1
G3	-10	0	3	0 / -3, -1,5 / -4,5, -3 / -6, -4,5 / -7,5, -6 / -9, -7 / -10	1,2
G5	-10	0	5	0 / -5, -3 / -8, -5 / -10	2,5

The length tolerance of needle rollers correspond uniformly to ISO tolerance field h13.

Designation

The URB designation system for needle rollers made from chromium rolling bearing steel follows the system as shown below:

RN 2X13,8 BF M2/M4 G2

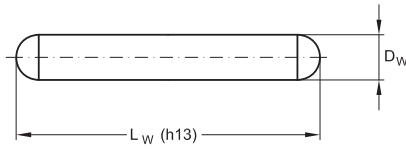
where:

- RN** Symbols for needle rollers from chromium rolling bearing steel
- 2** Nominal diameter of needle roller
 D_w [mm]
- 13,8** Nominal length of needle roller,
 L_w [mm]
- BF** Needle rollers with flat ends
- M2/M4** Diameter gauge **M2/M4**
(the physical roller diameter size of this specific lot lies between 1,998 to 1,996 mm)
- G2** Grade of needle rollers

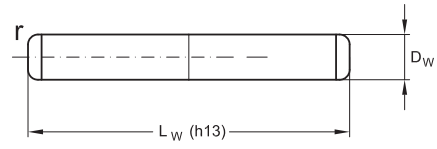
To avoid possible misinterpretation by poor visible printings, etc., the **diameter** gauges are stated according the following system:

- N** **0**
- M** **Minus**
e.g. **M2/M4** = -2 / -4 μm

Needle Rollers



B



BF

Dimensions				Designation		Mass per 100 needles
D_W	L_W	r_{min}	r_{max}	"Sphered end" type	"Flat end" type	
mm						kg
1,5	5,8	0,1	0,4	RN 1,5 X 5,8 B	RN 1,5 X 5,8 BF	0,008
	7,8	0,1	0,4	RN 1,5 X 7,8 B	RN 1,5 X 7,8 BF	0,011
	9,8	0,1	0,4	RN 1,5 X 9,8 B	RN 1,5 X 9,8 BF	0,013
	11,8	0,1	0,4	RN 1,5 X 11,8 B	RN 1,5 X 11,8 BF	0,016
	13,8	0,1	0,4	RN 1,5 X 13,8 B	RN 1,5 X 13,8 BF	0,020
2	7,8	0,1	0,4	RN 2 X 7,8 B	RN 2 X 7,8 BF	0,02
	9,8	0,1	0,4	RN 2 X 9,8 B	RN 2 X 9,8 BF	0,02
	11,8	0,1	0,4	RN 2 X 11,8 B	RN 2 X 11,8 BF	0,03
	13,8	0,1	0,4	RN 2 X 13,8 B	RN 2 X 13,8 BF	0,03
	15,8	0,1	0,4	RN 2 X 15,8 B	RN 2 X 15,8 BF	0,04
	17,8	0,1	0,4	RN 2 X 17,8 B	RN 2 X 17,8 BF	0,04
	19,8	0,1	0,4	RN 2 X 19,8 B	RN 2 X 19,8 BF	0,05
	21,8	0,1	0,4	RN 2 X 21,8 B	RN 2 X 21,8 BF	0,05
2,5	7,8	0,1	0,4	RN 2,5 X 7,8 B	RN 2,5 X 7,8 BF	0,03
	9,8	0,1	0,4	RN 2,5 X 9,8 B	RN 2,5 X 9,8 BF	0,04
	11,8	0,1	0,4	RN 2,5 X 11,8 B	RN 2,5 X 11,8 BF	0,05
	13,8	0,1	0,4	RN 2,5 X 13,8 B	RN 2,5 X 13,8 BF	0,05

Needle Rollers

Dimensions				Designation		Mass per 100 needles
D _w	L _w	r _{min}	r _{max}	"Sphered end" type	"Flat end" type	
mm						kg
2,5	15,8	0,1	0,4	RN 2,5 X 15,8 B	RN 2,5 X 15,8 BF	0,06
	17,8	0,1	0,4	RN 2,5 X 17,8 B	RN 2,5 X 17,8 BF	0,07
	19,8	0,1	0,4	RN 2,5 X 19,8 B	RN 2,5 X 19,8 BF	0,08
	21,8	0,1	0,4	RN 2,5 X 21,8 B	RN 2,5 X 21,8 BF	0,08
	23,8	0,1	0,4	RN 2,5 X 23,8 B	RN 2,5 X 23,8 BF	0,09
3	9,8	0,1	0,4	RN 3 X 9,8 B	RN 3 X 9,8 BF	0,05
	11,8	0,1	0,4	RN 3 X 11,8 B	RN 3 X 11,8 BF	0,07
	13,8	0,1	0,4	RN 3 X 13,8 B	RN 3 X 13,8 BF	0,08
	15,8	0,1	0,4	RN 3 X 15,8 B	RN 3 X 15,8 BF	0,09
	17,8	0,1	0,4	RN 3 X 17,8 B	RN 3 X 17,8 BF	0,10
	19,8	0,1	0,4	RN 3 X 19,8 B	RN 3 X 19,8 BF	0,11
	23,8	0,1	0,4	RN 3 X 23,8 B	RN 3 X 23,8 BF	0,13
	27,8	0,1	0,6	RN 3 X 27,8 B	RN 3 X 27,8 BF	0,15
3,5	29,8	0,1	0,6	RN 3,5 X 29,8 B	RN 3,5 X 29,8 BF	0,23
	34,8	0,1	0,6	RN 3,5 X 34,8 B	RN 3,5 X 34,8 BF	0,27
4	39,8	0,1	0,6	RN 4 X 39,8 B	RN 4 X 39,8 BF	0,40
5	49,8	0,1	0,6	RN 5 X 49,8 B	RN 5 X 49,8 BF	0,75



Adapter and Withdrawal Sleeves

General

Adapter and Withdrawal Sleeves are devices using to mount and secure rolling element bearings with tapered bores onto cylindrical shaft seats.

This enables the mounting or dismounting of rolling element bearings in a simple and effective way to for a variety of applications.

Since, adapter and withdrawal sleeves are able to adapt to shaft diameter variations within certain limits, larger than normal **shaft diameter tolerances** are accomodated.

The **geometrical accuracy**, however, must be more closely defined, as the forms errors of the shaft affect the running accuracy of the total bearing arrangement in a direct way.

Furthermore, using adapter or withdrawal sleeves allows bearing seats with lower surface qualities, (e.g. turned surfaces) to be acceptable. For applications where no accurate shaft guidance of bearings is required, bright drawn round bar stock may also be used.

Generally the following tolerances may be used for guidance:

Expected running accuracy	Diameter tolerance	Form accuracy
Normal	h7, h8, h9	$\frac{IT5}{2}$
Low	h10, h11	$\frac{IT7}{2}$

Adapter sleeves

Standards, boundary, dimensions

Adapter Sleeves

DIN 5415

General

Adapter sleeves (see sketch below) are slotted steel sleeves that have a tapered outer diameter, taper 1:12 on one side and a thread on the opposite side.

Small adapter sleeves may have phosphated surfaces, normally they are only oil preserved.

URB adapter sleeves are supplied complete with lock nut and locking washer as standard.

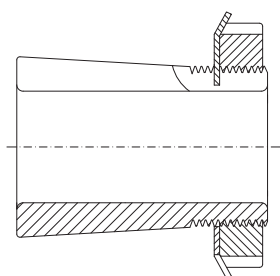
Beside the standard design (see figure **a**), there are also larger adapter sleeves available with oil bores and oil distribution ducs, (prefix **OH**) as required for applying the oil injection method as shown in figure **b**.

On smooth straight shafts, (e.g. on a drawn round stock), adapter sleeves allow a simple positioning of bearings in any position, (see figure **c**).

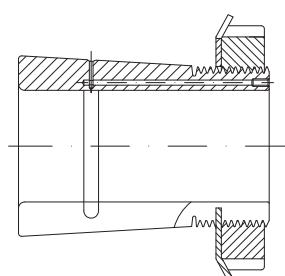
In applications where bearings with adapter sleeves are mounted on straight shafts without axial support, (see figure **c**), their ability to accept axial forces is limited by the friction between the adapter sleeve and the shaft.

in the case of higher axial forces, the bearing needs to be secured additionally by **supporting rings** (see figure **d**).

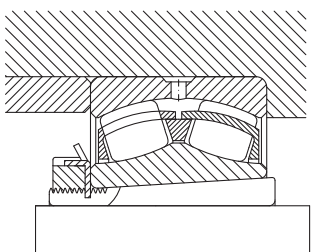
When designing such supporting rings, however, the abutment dimensions recommended by the product tables must be considered.



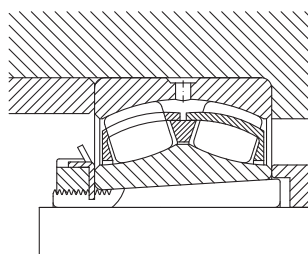
a



b



c



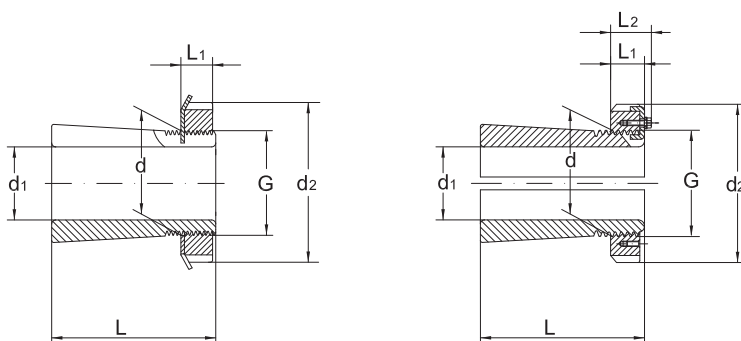
d

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE

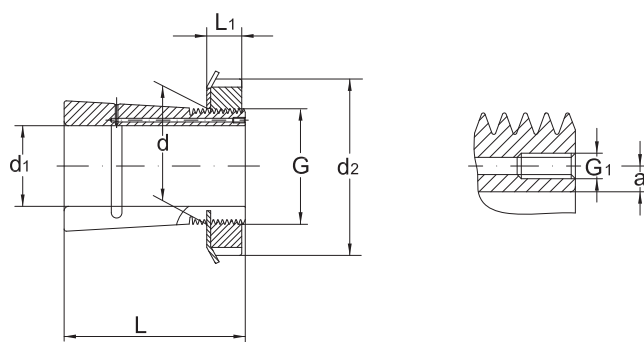


Adapter Sleeves



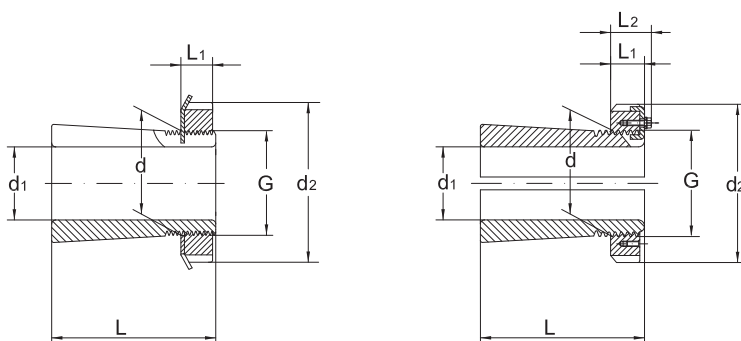
Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
17	20	32	24	H204	0,04
		32	28	H304	0,04
		32	31	H2304	0,05
20	25	38	26	H205	0,06
		38	29	H305	0,07
		38	35	H2305	0,09
25	30	45	27	H206	0,09
		45	31	H306	0,10
		45	38	H2306	0,11
30	35	52	29	H207	0,12
		52	35	H307	0,14
		52	43	H2307	0,15
35	40	58	31	H208	0,16
		58	36	H308	0,18
		58	46	H2308	0,22
40	45	65	33	H209	0,21
		65	39	H309	0,23
		65	50	H2309	0,27
45	50	70	35	H210	0,24
		70	42	H310	0,27
		70	55	H2310	0,34
50	55	75	37	H211	0,28
		75	45	H311	0,32
		75	59	H2311	0,39

Adapter Sleeves



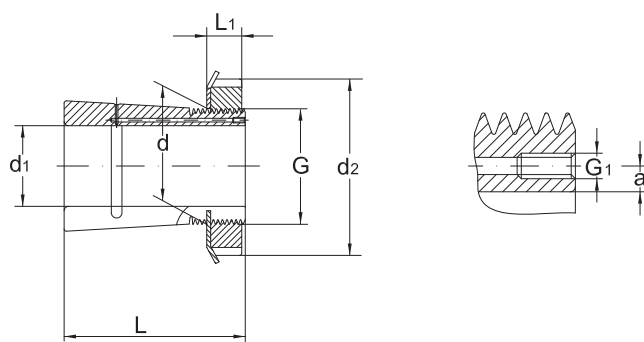
Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
17	M 20 X 1	7	-	-	-	MK4	MB4
	M 20 X 1	7	-	-	-	MK4	MB4
	M 20 X 1	7	-	-	-	MK4	MB4
20	M 25 X 1,5	8	-	-	-	MK5	MB5
	M 25 X 1,5	8	-	-	-	MK5	MB5
	M 25 X 1,5	8	-	-	-	MK5	MB5
25	M 30 X 1,5	8	-	-	-	MK6	MB6
	M 30 X 1,5	8	-	-	-	MK6	MB6
	M 30 X 1,5	8	-	-	-	MK6	MB6
30	M 35 X 1,5	9	-	-	-	MK7	MB7
	M 35 X 1,5	9	-	-	-	MK7	MB7
	M 35 X 1,5	9	-	-	-	MK7	MB7
35	M 40 X 1,5	10	-	-	-	MK8	MB8
	M 40 X 1,5	10	-	-	-	MK8	MB8
	M 40 X 1,5	10	-	-	-	MK8	MB8
40	M 45 X 1,5	11	-	-	-	MK9	MB9
	M 45 X 1,5	11	-	-	-	MK9	MB9
	M 45 X 1,5	11	-	-	-	MK9	MB9
45	M 50 X 1,5	12	-	-	-	MK10	MB10
	M 50 X 1,5	12	-	-	-	MK10	MB10
	M 50 X 1,5	12	-	-	-	MK10	MB10
50	M 55 X 2	12,5	-	-	-	MK11	MB11
	M 55 X 2	12,5	-	-	-	MK11	MB11
	M 55 X 2	12,5	-	-	-	MK11	MB11

Adapter Sleeves



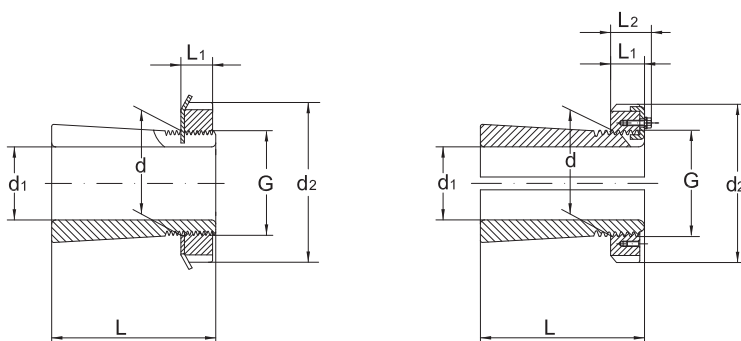
Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
55	60	80	38	H212	0,31
		80	47	H312	0,35
		80	62	H2312	0,45
60	65	85	40	H213	0,36
		85	50	H313	0,42
		85	65	H2313	0,52
		92	52	H314	0,68
		92	68	H2314	0,88
65	75	98	43	H215	0,66
		98	55	H315	0,78
		98	73	H2315	1,1
70	80	105	46	H216	0,81
		105	59	H316	0,95
		105	78	H2316	1,2
75	85	110	50	H217	0,94
		110	63	H317	1,1
		110	82	H2317	1,35
80	90	120	52	H218	1,1
		120	65	H318	1,3
		120	86	H2318	1,6
85	95	125	55	H219	1,25
		125	68	H319	1,4
		125	90	H2319	1,8
90	100	130	58	H220	1,4

Adapter Sleeves



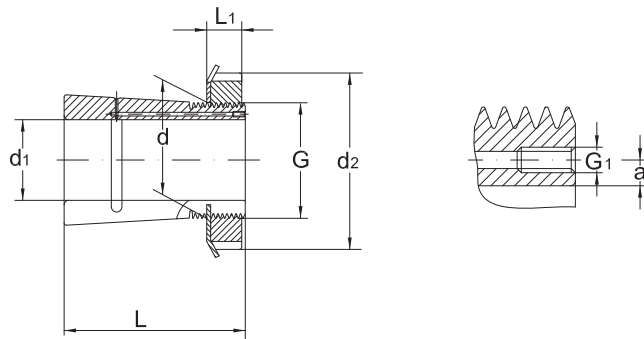
Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
55	M 60 X 2	13	-	-	-	KM12	MB 12
	M 60 X 2	13	-	-	-	KM12	MB12
	M 60 X 2	13	-	-	-	KM12	MB12
60	M 65 X 2	14	-	-	-	KM13	MB13
	M 65 X 2	14	-	-	-	KM13	MB13
	M 65 X 2	14	-	-	-	KM13	MB13
	M 70 X 2	14	-	-	-	KM14	MB14
	M 70 X 2	14	-	-	-	KM14	MB14
65	M 75 X 2	15	-	-	-	KM15	MB15
	M 75 X 2	15	-	-	-	KM15	MB15
	M 75 X 2	15	-	-	-	KM15	MB15
70	M 80 X 2	17	-	-	-	KM16	MB16
	M 80 X 2	17	-	-	-	KM16	MB16
	M 80 X 2	17	-	-	-	KM16	MB16
75	M 85 X 2	18	-	-	-	KM17	MB17
	M 85 X 2	18	-	-	-	KM17	MB17
	M 85 X 2	18	-	-	-	KM17	MB17
80	M 90 X 2	18	-	-	-	KM18	MB18
	M 90 X 2	18	-	-	-	KM18	MB18
	M 90 X 2	18	-	-	-	KM18	MB18
85	M 95 X 2	19	-	-	-	KM19	MB19
	M 95 X 2	19	-	-	-	KM19	MB19
	M 95 X 2	19	-	-	-	KM19	MB19
90	M 100 X 2	20	-	-	-	KM20	MB20

Adapter Sleeves



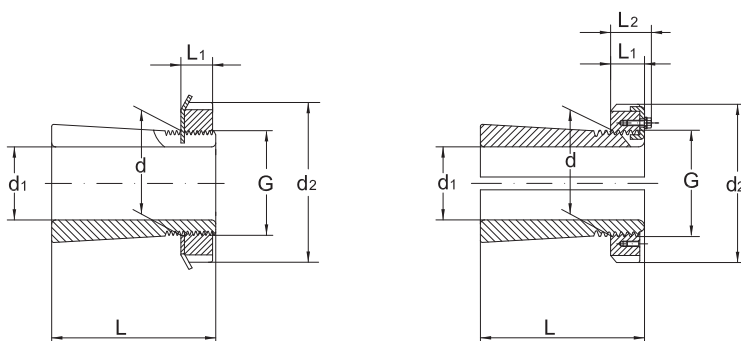
Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
90	100	130	71	H320	1,6
		130	97	H2320	2
	105	130	76	H3120	1,8
95		140	60	H221	1,6
		140	74	H321	1,85
100	110	145	63	H222	1,8
		145	77	H322	2,05
		145	105	H2322	2,75
		145	81	H3122	2,1
110	120	155	112	H2324	3
		145	72	H3024	1,8
		155	88	H3124	2,5
115	130	165	121	H2326	4,45
		155	80	H3026	2,8
		165	92	H3126	3,45
125	140	180	131	H2328	5,4
		165	82	H3028	3,05
		180	97	H3128	4,1
135	150	195	139	H2330	6,4
		180	87	H3030	3,75
		195	111	H3130	5,25
140	160	210	147	H2332	8,8
		210	147	OH2332 H	8,8
		190	93	H3032	5,1

Adapter Sleeves



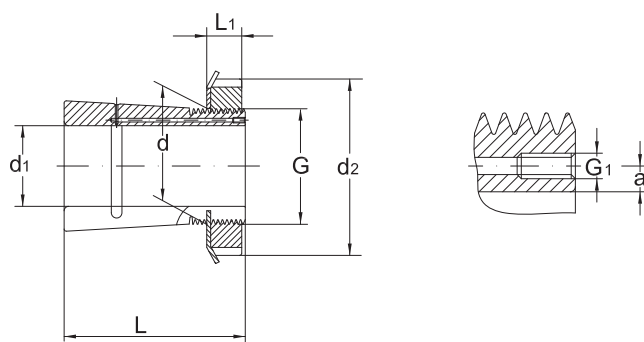
Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
90	M 100 X 2	20	-	-	-	KM20	MB20
	M 100 X 2	20	-	-	-	KM20	MB20
	M 100 X 2	20	-	-	-	KM20	MB20
95	M 105 X 2	20	-	-	-	KM21	MB21
	M 105 X 2	20	-	-	-	KM21	MB21
100	M 110 X 2	21	-	-	-	KM22	MB22
	M 110 X 2	21	-	-	-	KM22	MB22
	M 110 X 2	21	-	-	-	KM22	MB22
	M 110 X 2	31	-	-	-	KM22	MB22
110	M 120 X 2	22	-	-	-	KM24	MB24
	M 120 X 2	22	-	-	-	KML24	MBL24
	M 120 X 2	22	-	-	-	KM24	MB24
115	M 130 X 2	23	-	-	-	KM26	MB26
	M 130 X 2	23	-	-	-	KML26	MBL26
	M 130 X 2	23	-	-	-	KM26	MB26
125	M 140 X 2	24	-	-	-	KM28	MB28
	M 140 X 2	24	-	-	-	KML28	MBL28
	M 140 X 2	24	-	-	-	KM28	MB28
135	M 150 X 2	26	-	-	-	KM30	MB30
	M 150 X 2	26	-	-	-	KML30	MBL30
	M 150 X 2	26	-	-	-	KM30	MB30
140	M 160 X 3	28	-	-	-	KM32	MB32
	M 160 X 3	28	-	M 6	4,2	KM32	MB32
	M 160 X 3	27,5	-	-	-	KML32	MBL32

Adapter Sleeves



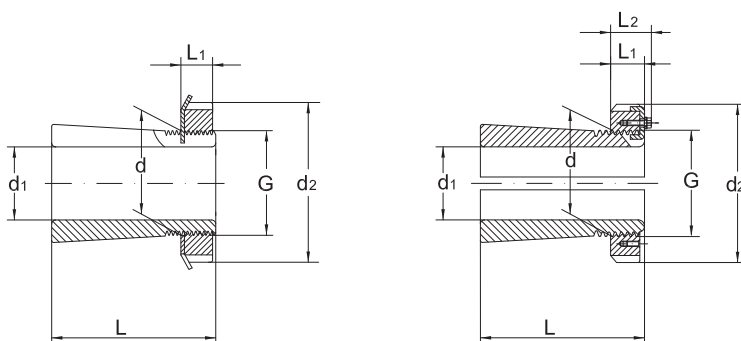
Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
140	160	190	93	OH3032 H	5,1
		210	119	H3132	7,25
		210	119	OH3132 H	7,25
150	170	220	154	H2334	9,9
		220	154	OH2334 H	9,9
		200	101	H3034	5,8
		200	101	OH3034 H	5,8
		220	101	H3134	8,1
		220	122	OH3134 H	8,1
160	180	230	161	H2336	11
		230	161	OH2336 H	11
		210	109	H3036	6,7
		210	109	OH3036 H	6,7
		230	131	H3136	9,15
		230	131	OH3136 H	9,15
170	190	240	169	H2338	12
		240	169	OH2338 H	12
		220	112	H3038	7,25
		220	112	OH3038 H	7,25
		240	141	H3138	10,5
		240	141	OH3138 H	10,5
180	200	250	176	H2340	13,5
		250	176	OH2340 H	13,5
		240	120	H3040	8,9

Adapter Sleeves



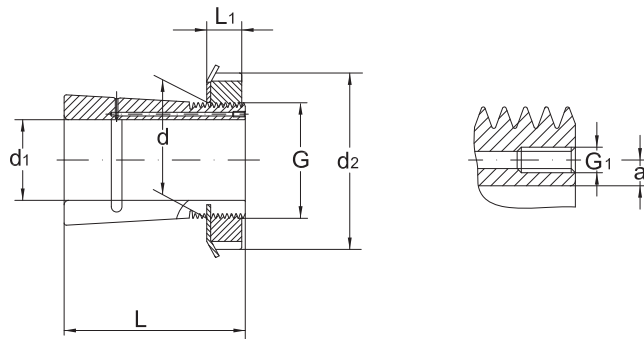
Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
140	M 160 X 3	27,5	-	M 6	4,2	KML32	MBL32
	M 160 X 3	28	-	-	-	KM32	MB32
	M 160 X 3	28	-	M 6	4,2	KM32	MB32
150	M 170 X 3	29	-	-	-	KM34	MB34
	M 170 X 3	29	-	M 6	4,2	KM34	MB34
	M 170 X 3	28,5	-	-	-	KML34	MBL34
	M 170 X 3	28,5	-	M 6	4,2	KML34	MBL34
	M 170 X 3	29	-	-	-	KM34	MB34
	M 170 X 3	29	-	M 6	4,2	KM34	MB34
160	M 180 X 3	30	-	-	-	KM36	MB36
	M 180 X 3	30	-	M 6	4,2	KM36	MB36
	M 180 X 3	29,5	-	-	-	KML36	MBL36
	M 180 X 3	29,5	-	M 6	4,2	KML36	MBL36
	M 180 X 3	30	-	-	-	KM36	MB36
	M 180 X 3	30	-	M 6	4,2	KM36	MB36
170	M 190 X 3	31	-	-	-	KM38	MB38
	M 190 X 3	31	-	M 6	4,2	KM38	MB38
	M 190 X 3	30,5	-	-	-	KML38	MBL38
	M 190 X 3	30,5	-	M 6	4,2	KML38	MBL38
	M 190 X 3	31	-	-	-	KM38	MB38
	M 190 X 3	31	-	M 6	4,2	KM38	MB38
180	M 200 X 3	32	-	-	-	KM40	MB40
	M 200 X 3	32	-	M 6	4,2	KM40	MB40
	M 200 X 3	31,5	-	-	-	KML40	MBL40

Adapter Sleeves



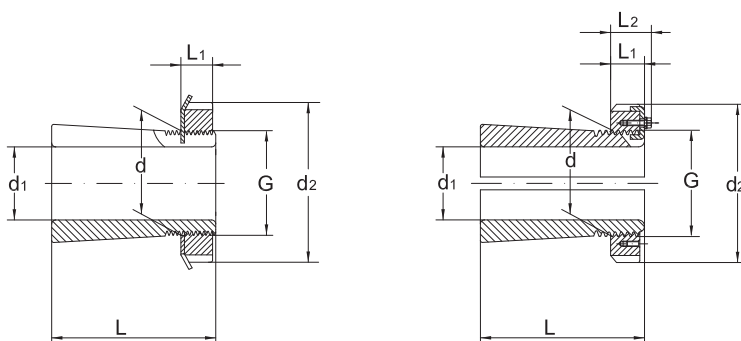
Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
180	200	240	120	OH3040 H	8,9
		250	150	H3140	12
		250	150	OH3140 H	12
200	220	280	186	H2344	17
		280	186	OH2344 H	17
		260	126	H3044	9,9
		260	126	OH3044 H	9,9
		280	161	H3144	15
		280	161	OH3144 H	15
220	240	300	199	H2348	19
		300	199	OH2348 H	19
		290	133	H3048	12
		290	133	OH3048 H	12
		300	172	H3148	16
		300	172	OH3148 H	16
240	260	330	211	H2352	23
		330	211	OH2352 H	23
		310	145	H3052	13,5
		310	145	OH3052 H	13,5
		330	190	H3152	21
		330	190	OH3152 H	21
260	280	350	224	H2356	27
		350	224	OH2356 H	27
		330	152	H3056	16
		330	152	OH3056 H	16

Adapter Sleeves



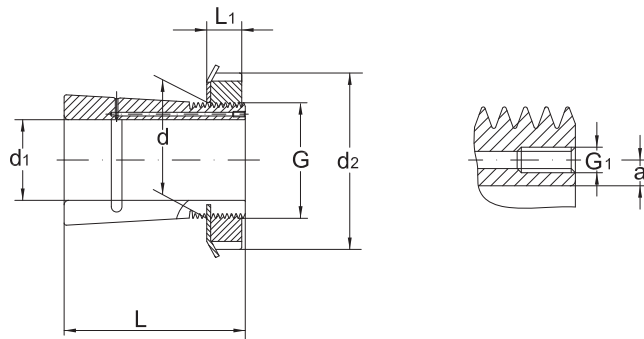
Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
180	M 200 X 3	31,5	-	M6	4,2	KML40	MBL40
	M 200 X 3	32	-	-	-	KM40	MB40
	M 200 X 3	32	-	M6	4,2	KM40	MB40
200	Tr 220 X 4	35	-	-	-	HM44 T	MB44
	Tr 220 X 4	35	-	M6	4,2	HM44 T	MB44
	Tr 220 X 4	30	41	-	-	HM3044	MS3044
	Tr 220 X 4	30	41	M6	4,2	HM3044	MS3044
	Tr 220 X 4	35	-	-	-	HM44 T	MB44
	Tr 220 X 4	35	-	M6	4,2	HM44 T	MB44
220	Tr 240 X 4	37	-	-	-	HM48 T	MB48
	Tr 240 X 4	37	-	M6	4,2	HM48 T	MB48
	Tr 240 X 4	34	46	-	-	HM3048	MS3052-48
	Tr 240 X 4	34	46	M6	4,2	HM3048	MS3052-48
	Tr 240 X 4	37	-	-	-	HM48 T	MB48
	Tr 240 X 4	37	-	M6	4,2	HM48 T	MB48
240	Tr 260 X 4	39	-	-	-	HM52 T	MB52
	Tr 260 X 4	39	-	M6	4,2	HM52 T	MB52
	Tr 260 X 4	34	46	-	-	HM3052	MS3052-48
	Tr 260 X 4	34	46	M6	4,2	HM3052	MS3052-48
	Tr 260 X 4	39	-	-	-	HM52 T	MB52
	Tr 280 X 4	39	-	M6	4,2	HM52 T	MB52
260	Tr 280 X 4	41	-	-	-	HM56 T	MB56
	Tr 280 X 4	41	-	M6	4,2	HM56 T	MB56
	Tr 280 X 4	38	50	-	-	HM3056	MS3056
	Tr 280 X 4	38	50	M6	4,2	HM3056	MS3056

Adapter Sleeves



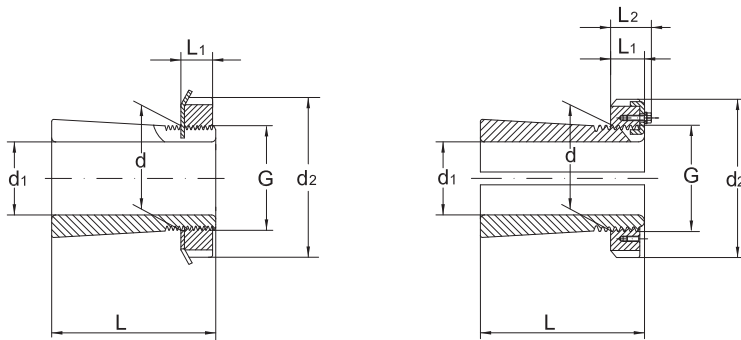
Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
260	280	350	195	H3156	23
		350	195	OH3156 H	23
280	300	360	168	H3060	20,5
		360	168	OH3060 H	20,5
		380	208	H3160	29
		380	208	OH3160 H	29
		380	240	H3260	32
		380	240	OH3260 H	32
300	320	380	171	H3064	22
		380	171	OH3064 H	22
		400	226	H3164	32
		400	226	OH3164 H	32
		400	258	H3264	35
		400	258	OH3264 H	35
320	340	400	187	H3068	27
		400	187	OH3068 H	27
		440	254	H3168	50
		440	254	OH3168 H	50
		440	288	H3268	51,5
		440	288	OH3268	51,5
340	360	420	188	H3072	29
		420	188	OH3072 H	29
		460	259	H3172	56
		460	259	OH3172 H	56

Adapter Sleeves



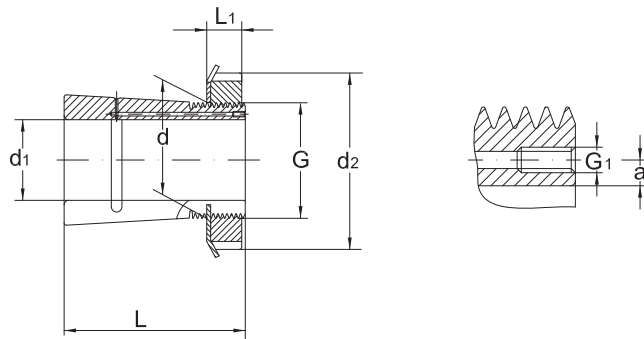
Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
260	Tr 280 X 4	41	-	-	-	HM56 T	MB56
	Tr 280 X 4	41	-	M6	4,2	HM56 T	MB56
280	Tr 300 X 4	42	54	-	-	HM3060	MS3060
	Tr 300 X 4	42	54	M6	4,2	HM3060	MS3060
	Tr 300 X 4	40	53	-	-	HM3160	MS3160
	Tr 300 X 4	40	53	M6	4,2	HM3460	MS3460
	Tr 300 X 4	40	53	-	-	HM3160	MS3160
	Tr 300 X 4	40	53	M6	4,2	HM3160	MS3160
300	Tr 320 X 5	42	55	-	-	HM3064	MS3068-64
	Tr 320 X 5	42	55	M6	4	HM3064	MS3068-64
	Tr 320 X 5	42	56	-	-	HM3164	MS3164
	Tr 320 X 5	42	56	M6	4	HM3164	MS3164
	Tr 320 X 5	42	56	-	-	HM3164	MS3164
	Tr 320 X 5	42	56	M6	4	HM3164	MS3164
320	Tr 340 X 5	45	58	-	-	HM3068	MS3068-64
	Tr 340 X 5	45	58	M6	4	HM3068	MS3068-64
	Tr 340 X 5	55	72	-	-	HM3168	MS3172-68
	Tr 340 X 5	55	72	M6	4	HM3168	MS3172-68
	Tr 340 X 5	55	72	-	-	HM3168	MS3172-68
	Tr 340 X 5	55	72	M6	4	HM3168	MS3172-68
340	Tr 360 X 5	45	58	-	-	HM3072	MS3072
	Tr 360 X 5	45	58	M6	4	HM3072	MS3072
	Tr 360 X 5	58	75	-	-	HM3172	MS3172-68
	Tr 360 X 5	58	75	M6	4	HM3172	MS3172-68

Adapter Sleeves



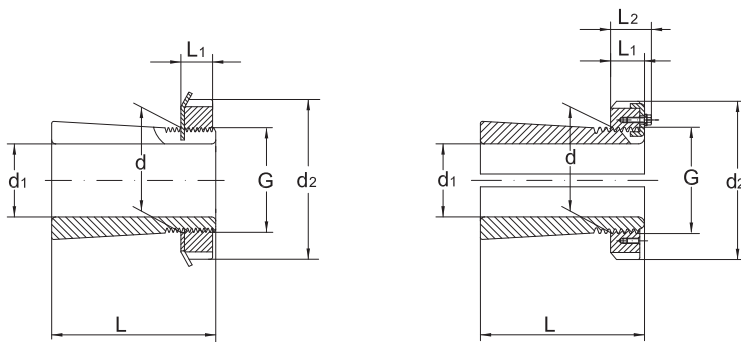
Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
340	360	460	299	H3272	60,5
		460	299	OH3272 H	60,5
360	380	450	193	H3076	35,5
		450	193	OH3076 H	35,5
		490	264	H3176	61,5
		490	264	OH3176 H	61,5
		490	310	H3276	69,5
		490	310	OH3276 H	69,5
380	400	470	210	H3080	40
		470	210	OH3080 H	40
		520	272	H3180	73
		520	272	OH3180 H	73
400	420	490	212	H3084	47
		490	212	OH3084 H	47
		540	304	H3184	80
		540	304	OH3184 H	80
410	440	520	228	H3088	65
		520	228	OH3088 H	65
		560	307	H3188	95
		560	307	OH3188 H	95
430	460	540	234	H3092	71
		540	234	OH3092 H	71

Adapter Sleeves



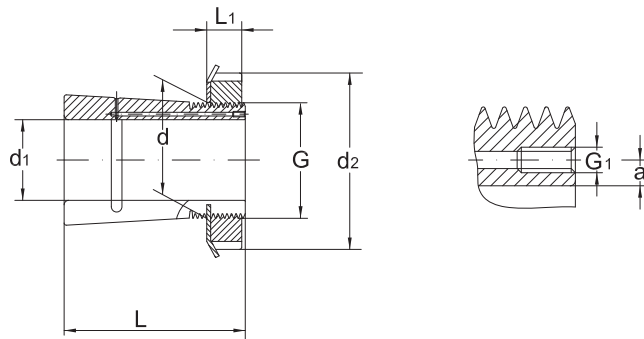
Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
340	Tr 360 X 5	58	75	-	-	HM3172	MS3172-68
	Tr 360 X 5	58	75	-	10	HM3172	MS3172-68
360	Tr 380 X 5	48	62	-		HM3076	MS3080-76
	Tr 380 X 5	48	62	M6	4	HM3076	MS3080-76
	Tr 380 X 5	60	77	-	-	HM3176	MS3176
	Tr 380 X 5	60	77	M6	4	HM3176	MS3176
	Tr 380 X 5	60	77	-	-	HM3176	MS3176
	Tr 380 X 5	60	77	-	10,5	HM3176	MS3176
380	Tr 400 X 5	52	66	-	-	HM3080	MS3080-76
	Tr 400 X 5	52	66	M6	4	HM3080	MS3080-76
	Tr 400 X 5	62	82	-	-	HM3180	MS3184-80
	Tr 400 X 5	62	82	M6	4	HM3180	MS3184-80
400	Tr 420 X 5	52	66	-	-	HM3084	MS3084
	Tr 420 X 5	52	66	M6	4	HM3084	MS3084
	Tr 420 X 5	70	90	-	-	HM3184	MS3184-80
	Tr 420 X 5	70	90	M6	4	HM3184	MS3184-80
410	Tr 440 X 5	60	77	-	-	HM3088	MS3092-88
	Tr 440 X 5	60	77	M8	6,5	HM3088	MS3092-88
	Tr 440 X 5	70	90	-	-	HM3188	MS3192-88
	Tr 440 X 5	70	90	M8	6,5	HM3188	MS3192-88
430	Tr 460 X 5	60	77	-	-	HM3092	MS3092-88
	Tr 460 X 5	60	77	M8	6,5	HM3092	MS3092-88

Adapter Sleeves



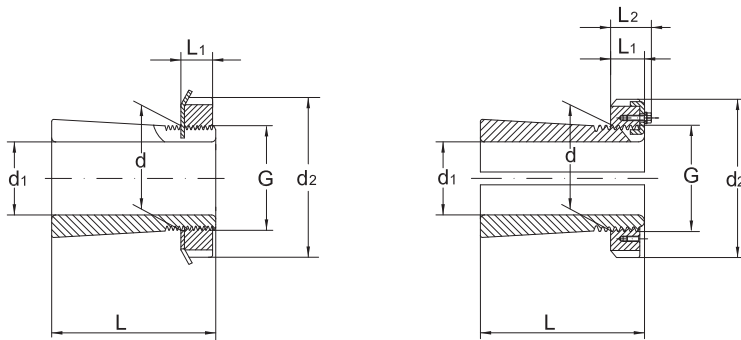
Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
430	460	580	326	H3192	119
		580	326	OH3192 H	119
450	480	560	237	H3096	75
		560	237	OH3096 H	75
		620	335	H3196	135
		620	335	OH3196 H	135
470	500	580	247	H30/500	82
		580	247	OH30/500 H	82
		630	356	H31/500	145
		630	356	OH31/500 H	145
500	530	630	265	H30/530	105
		630	265	OH30/530 H	105
530	560	650	282	H30/560	112
		650	282	OH30/560 H	112
560	600	700	289	H30/600	147
		700	289	OH30/600 H	147
600	630	730	301	H30/630	138
		730	301	OH30/630 H	138
630	670	780	324	H30/670	190
		780	324	OH30/670 H	190
670	710	830	342	H30/710	228
		830	342	OH30/710 H	228

Adapter Sleeves



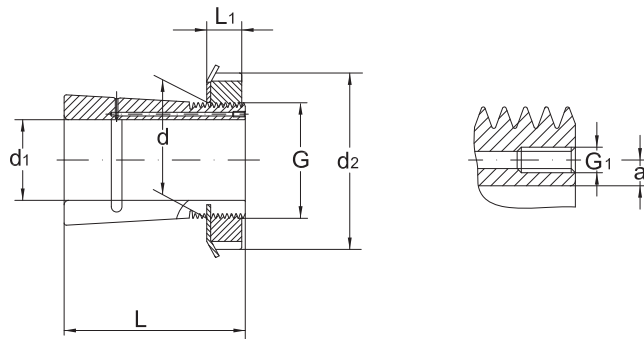
Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
430	Tr 460 X 5	75	95	-	-	HM3192	MS3192-88
	Tr 460 X 5	75	95	M8	6,5	HM3192	MS3192-88
450	Tr 480 X 5	60	77	-	-	HM3096	MS30/500-96
	Tr 480 X 5	60	77	M8	6,5	HM3096	MS30/500-96
	Tr 480 X 5	75	95	-	-	HM3196	MS3196
	Tr 480 X 5	75	95	M8	6,5	HM3196	MS3196
470	Tr 500 X 5	68	85	-	-	HM30/500	MS30/500-96
	Tr 500 X 5	68	85	M8	6,5	HM30/500	MS30/500-96
	Tr 500 X 5	80	100	-	-	HM31/500	MS31/500
	Tr 500 X 5	80	100	M8	6,5	HM31/500	MS31/500
500	Tr 530 X 6	68	90	-	-	HM30/530	MS30/600-530
	Tr 530 X 6	68	90	M8	6	HM30/530	MS30/600-530
530	Tr 560 X 6	75	97	-	-	HM30/560	MS30/560
	Tr 560 X 6	75	97	M8	6	HM30/560	MS30/560
560	Tr 600 X 6	75	97	-	-	HM30/600	MS30/600-530
	Tr 600 X 6	75	97	-	8	HM30/600	MS30/600-530
600	Tr 630 X 6	75	97	-	-	HM30/630	MS30/630
	Tr 630 X 6	75	97	M8	6	HM30/630	MS30/630
630	Tr 670 X 6	80	102	-	-	HM30/670	MS30/670
	Tr 670 X 6	80	102	-	8	HM30/670	MS30/670
670	Tr 710 X 7	90	112	-	-	HM30/710	MS30/710
	Tr 710 X 7	90	112	-	8	HM30/710	MS30/710

Adapter Sleeves



Shaft Φ	Dimension			Designation adapter sleeve, complete	Mass
d_1	d	d_2	L		
mm	mm				kg
710	750	870	356	H30/750	246
		870	356	OH30/750 H	246
750	800	920	366	H30/800	302
		920	366	OH30/800 H	302
800	850	980	380	H30/850	341
		980	380	OH30/850 H	341

Adapter Sleeves



Shaft Φ	Thread	Dimensions				Lock nut	Locking Device
d_1	G	L_1	L_2	G_1	a		
mm							
710	Tr 750 X 7	90	112	-	-	HM30/750	MS30/800-750
	Tr 750 X 7	90	112	-	8	HM30/750	MS30/800-750
750	Tr 840 X 7	90	112	-	-	HM30/800	MS30/800-750
	Tr 800 X 7	90	112	-	10	HM30/800	MS30/800-750
800	Tr 850 X 7	90	115	-	-	HM30/850	MS30/900-850
	Tr 850 X 7	90	115	-	10	HM30/850	MS30/900-850



Withdrawal Sleeves

Standards, Boundary dimensions

Withdrawal Sleeves

DIN 5416

General

Withdrawal sleeves (see sketch below) are slotted steel sleeves that have a tapered outer diameter on one side and a thread on the large diameter on the opposite side.

Standard withdrawal sleeves have tapered outers, taper **1:12** except for withdrawal sleeves of series **AH 240** and **AH 241** having tapers **1:30**.

URB Withdrawal Sleeves are supplied without lock nut as standard.

URB Withdrawal Sleeves are produced in two different designs as standard.

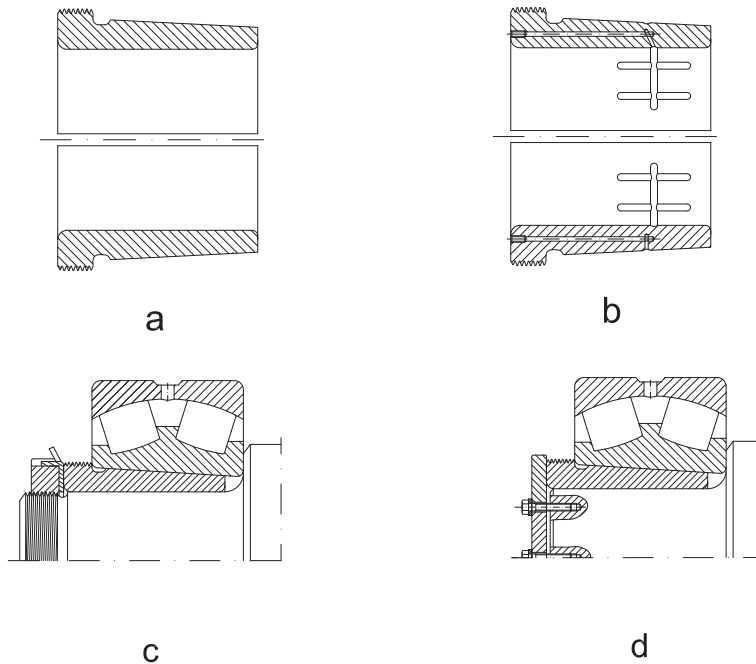
Beside the standard design (see figure **a**), larger withdrawal sleeves from bore diameter 200 mm onwards are also available with oil bores and oil distribution ducts as required for applying the oil injection method as shown in figure **b**.

URB withdrawal sleeves that are foreseen with facilities for an application of the oil injection method are designated "**AOH...**"

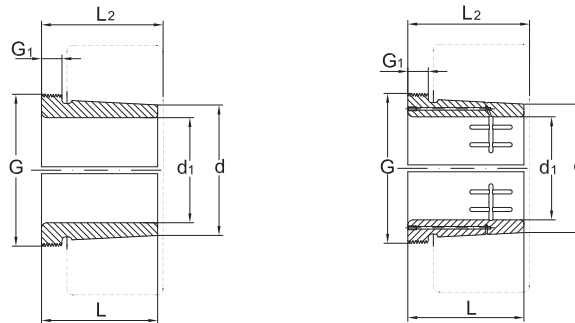
When withdrawal sleeves are used, the bearing inner ring must be supported by an effective surface contact, such as a shaft shoulder, (see figure **a**).

Where larger radii bearing journals and shaft shoulders are necessary for strenght reasons, (e.g. where such radii become larger than the bearing fillet, suitable distance rings must be applied.

In each case the withdrawal sleeves must be secured against axial displacement loosening by means of lock nuts (see fig. **c**) or end plates (see fig. **d**).

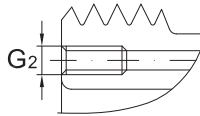


Withdrawal Sleeves



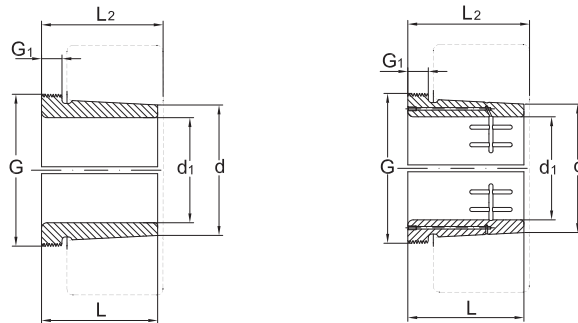
Shaft Φ		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d_1	d	G	G_1	G_2	L	L_1			
mm		mm					kg		
35	40	M 45 X 1,5	6	-	29	32	AH308	0,09	KM 9
		M 45 X 1,5	7	-	40	43	AH2308	0,13	KM 9
40	45	M 50 X 1,5	6	-	31	34	AH309	0,12	KM 10
		M 50 X 1,5	7	-	44	47	AH2309	0,16	KM 10
45	50	M 55 X 2	7	-	35	38	AHX310	0,13	KM 11
		M 55 X 2	9	-	50	53	AHX2310	0,19	KM 11
50	55	M 60 X 2	7	-	37	40	AHX311	0,16	KM 12
		M 60 X 2	10	-	54	57	AHX2311	0,26	KM 12
55	60	M 65 X 2	8	-	40	43	AHX312	0,19	KM 13
		M 65 X 2	11	-	58	61	AHX2312	0,30	KM 13
60	65	M 70 X 2	8	-	42	45	AH313 G	0,22	KM 14
		M 75 X 2	12	-	61	64	AH2313	0,39	KM 15
65	70	M 75 X 2	8	-	43	47	AH314 G	0,24	KM 15
		M 80 X 2	12	-	64	68	AHX2314	0,45	KM 16
70	75	M 80 X 2	8	-	45	49	AH315 G	0,29	KM 16
	75	M 85 X 2	12	-	68	72	AHX2315	0,53	KM 17
75	80	M 90 X 2	8	-	48	52	AH316	0,37	KM 18
		M 90 X 2	12	-	71	75	AHX2316	0,57	KM 18
80	85	M 95 X 2	9	-	52	56	AHX317	0,43	KM 19

Withdrawal Sleeves



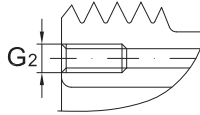
Shaft Φ		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d ₁	d	G	G ₁	G ₂	L	L ₁			
mm		mm					kg		
80	85	M 95 X 2	13	-	74	78	AHX2317	0,65	KM 19
85	90	M 100 X 2	9	-	53	57	AHX318	0,46	KM 20
		M 100 X 2	10	-	63	67	AHX3218	0,57	KM 20
		M 100 X 2	14	-	79	83	AHX2318	0,76	KM 20
90	95	M 105 X 2	10	-	57	61	AHX319	0,54	KM 21
		M 105 X 2	16	-	57	61	AHX2319	0,90	KM 21
95	100	M 110 X 2	10	-	59	63	AHX320	0,58	KM 22
		M 110 X 2	11	-	64	68	AHX3120	0,66	KM 22
		M 110 X 2	11	-	73	77	AHX3220	0,76	KM 22
		M 110 X 2	16	-	90	94	AHX2320	1,00	KM 22
105	110	M 120 X 2	11	-	68	72	AHX3122	0,76	KM 24
		M 125 X 2	11	-	82	86	AHX3222	1,05	KM 25
		M 125 X 2	16	-	98	102	AHX2322	1,35	KM 25
		M 115 X 2	13	-	82	91	AH24122	0,71	KM 23
115	120	M 130 X 2	13	-	60	64	AHX3024	0,73	KM 26
		M 130 X 2	12	-	75	79	AHX3124	0,94	KM 26
		M 135 X 2	13	-	90	94	AHX3224	1,30	KM 27
		M 135 X 2	17	-	105	109	AHX2324	1,65	KM 27
115	120	M 125 X 2	13	-	73	82	AH24024	0,70	KM 25

Withdrawal Sleeves



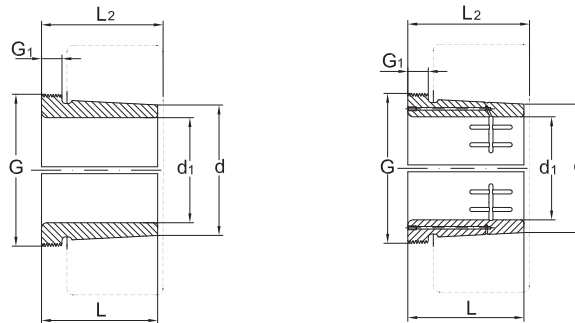
Shaft Φ		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d_1	d	G	G_1	G_2	L	L_1			
mm	mm	mm	mm	mm	mm	mm		kg	
115	120	M 130 X 2	13	-	93	102	AH24124	1,00	KM 26
125	130	M 140 X 2	14	-	67	71	AHX3026	0,91	KM 28
		M 140 X 2	12	-	78	82	AHX3126	1,10	KM 28
		M 145 X 2	15	-	98	102	AHX3226	1,55	KM 29
		M 145 X 2	19	-	115	119	AHX2326	2,00	KM 29
		M 135 X 2	14	-	83	93	AH24026	0,88	KM 27
		M 140 X 2	14	-	94	104	AH24126	1,15	KM 28
135	140	M 150 X 2	14	-	68	73	AHX3028	1,00	KM 30
		M 150 X 2	14	-	83	88	AHX3128	1,30	KM 30
		M 155 X 3	15	-	104	109	AHX3228	1,85	KM 31
		M 155 X 3	20	-	125	130	AHX2328	2,35	KM 31
		M 145 X 2	14	-	83	93	AH24028	0,95	KM 29
		M 150 X 2	14	-	99	109	AH24128	1,30	KM 30
145	150	M 160 X 3	15	-	72	77	AHX3030	1,15	KM 32
		M 165 X 3	15	-	96	101	AHX3130	1,80	KM 33
		M 165 X 3	17	-	114	119	AHX3230	2,20	KM 33
		M 165 X 3	24	-	135	140	AHX2330	2,80	KM 33
		M 155 X 3	15	-	90	101	AH24030	1,05	KM 31
		M 160 X 3	15	-	115	126	AH24130	1,55	KM 32
150	160	M 170 X 3	16	-	77	82	AH3032	2,05	KM 34

Withdrawal Sleeves



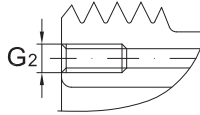
Shaft Φ		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d_1	d	G	G_1	G_2	L	L_1			
mm	mm	mm	mm	mm	mm	mm		kg	
150	160	M 180 X 3	16	-	103	108	AH3132	3,20	KM 36
		M 180 X 3	20	-	124	130	AH3232	4,00	KM 36
		M 180 X 3	24	-	140	146	AH2332	4,65	KM 36
		M 170 X 3	15	-	95	106	AH24032	2,30	KM 34
		M 170 X 3	15	-	124	135	AH24132	3,05	KM 34
160	170	M 180 X 3	17	-	85	90	AH3034	2,40	KM 36
		M 190 X 3	16	-	104	109	AH3134	3,45	KM 38
		M 190 X 3	24	-	134	140	AH3234	4,80	KM 38
		M 190 X 3	24	-	146	152	AH2334	5,25	KM 38
		M 180 X 3	16	-	106	117	AH24034	2,70	KM 36
		M 180 X 3	16	-	125	136	AH24134	3,25	KM 36
170	180	M 190 X 3	17	-	92	98	AH3036	2,80	KM 38
		M 200 X 3	17	-	105	110	AH2236	3,75	KM 40
		M 200 X 3	19	-	116	122	AH3136	4,25	KM 40
		M 200 X 3	24	-	140	146	AH3236	5,25	KM 40
		M 200 X 3	26	-	154	160	AH2336	6,05	KM 40
		M 190 X 3	16	-	116	127	AH24036	3,20	KM 38
		M 190 X 3	16	-	134	145	AH24136	3,75	KM 38
180	190	Tr 205 X 4	18	-	96	102	AH3238	3,40	HML 41 T
		Tr 210 X 4	18	-	112	117	AH2238	4,25	HM 42 T
		Tr 210 X 4	20	-	125	131	AH3138	4,90	HM 42 T

Withdrawal Sleeves



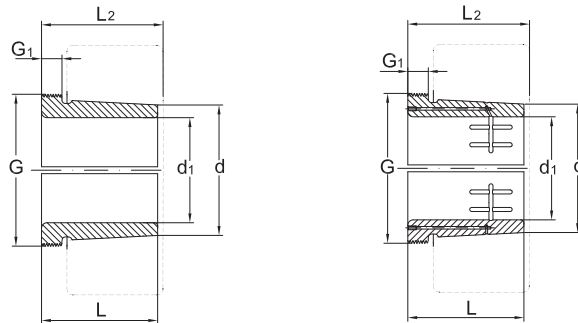
Shaft Φ		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d ₁	d	G	G ₁	G ₂	L	L ₁			
mm		mm						kg	
180	190	Tr 210 X 4	25	-	145	152	AH3238	5,90	HM 42 T
		Tr 210 X 4	26	-	160	167	AH2338	6,70	HM 42 T
		M 200 X 3	18	-	118	131	AH24038	3,55	KM 40
		M 200 X 3	18	-	146	159	AH24138	4,45	KM 40
190	200	Tr 215 X 4	19	-	102	108	AH3040	3,85	HML 43 T
		Tr 220 X 4	19	-	118	123	AH2240	4,70	HM 44 T
		Tr 220 X 4	21	-	134	140	AH3140	5,65	HM 44 T
		Tr 220 X 4	25	-	153	160	AH3240	6,60	HM 44 T
		Tr 220 X 4	30	-	170	177	AH2340	7,60	HM 44 T
		Tr 210 X 4	18	-	127	140	AH24040	4,00	HM 42 T
		Tr 210 X 4	18	-	158	171	AH24140	5,05	HM 42 T
200	220	Tr 235 X 4	20	G 1/8	111	117	AH3044	7,40	HML 47 T
		Tr 240 X 4	23	G 1/4	145	115	AH3144	9,30	HM 48 T
		Tr 240 X 4	30	G 1/4	181	189	AH2344	13,5	HM 48 T
		Tr 230 X 4	20	G 1/8	138	152	AH24044	8,20	HM 46 T
		Tr 230 X 4	20	G 1/8	170	184	AH24144	10,0	HM 46 T
220	240	Tr 260 X 4	21	G 1/4	116	123	AH3048	7,95	HM 3052
		Tr 260 X 4	25	G 1/4	154	161	AH3148	12,0	HM 52 T
		Tr 260 X 4	30	G 1/4	189	197	AH2348	14,0	HM 52 T
		Tr 250 X 4	20	G 1/8	138	153	AOH24048	8,05	HM 50 T

Withdrawal Sleeves



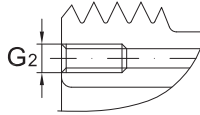
Shaft Φ		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d ₁	d	G	G ₁	G ₂	L	L ₁			
mm		mm					kg		
220	240	Tr 260 X 4	20	G 1/4	180	195	AOH24148	11,5	HM 52 T
240	260	Tr 280 X 4	23	G 1/4	128	135	AOH3052	9,60	HM 3056
		Tr 290 X 4	23	G 1/4	155	161	AOH2252	12,5	HM 58 T
		Tr 290 X 4	26	G 1/4	172	179	AOH3152	16,0	HM 58 T
		Tr 290 X 4	30	G 1/4	205	213	AOH2352	17,5	HM 58 T
		Tr 270 X 4	22	G 1/8	162	178	AOH24052	10,5	HM 54 T
		Tr 280 X 4	22	G 1/4	202	218	AOH24152	14,0	HM 56 T
260	280	Tr 300 X 4	24	G 1/4	131	139	AOH3056	11,0	HM 3060
		Tr 310 X 5	28	G 1/4	175	183	AOH3156	15,5	HM 62 T
		Tr 310 X 5	30	G 1/4	212	220	AOH2356	19,5	HM 62 T
		Tr 290 X 4	22	G 1/8	162	179	AOH24056	11,5	HM 58 T
		Tr 300 X 4	22	G 1/4	202	219	AOH24156	15,0	HM 3160
280	300	Tr 320 X 5	26	G 1/4	145	153	AOH3060	13,0	HM 3064
		Tr 330 X 5	30	G 1/4	192	200	AOH3160	19,0	HM 66 T
		Tr 330 X 5	34	G 1/4	228	236	AOH3260	23,5	HM 66 T
		Tr 310 X 5	24	G 1/8	184	202	AOH24060	14,0	HM 62 T
		Tr 320 X 5	24	G 1/4	224	242	AOH24160	18,5	HM 3164
300	320	Tr 345 X 5	27	G 1/4	149	157	AOH3064	14,5	HM 69 T
		Tr 350 X 5	31	G 1/4	209	217	AOH3164	22,5	HM 70 T
		Tr 350 X 5	36	G 1/4	246	254	AOH3264	27,5	HM 70 T
		Tr 330 X 5	24	G 1/8	184	202	AOH24064	15,0	HM 66 T

Withdrawal Sleeves



Shaft Φ		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d ₁	d	G	G ₁	G ₂	L	L ₁			
mm		mm						kg	
300	320	Tr 340 X 5	24	G 1/4	242	260	AOH24164	20,5	HM 3168
320	340	Tr 365 X 5	28	G 1/4	162	171	AOH3068	17,5	HML 73 T
		Tr 370 X 5	33	G 1/4	225	234	AOH3168	26,5	HM 74 T
		Tr 370 X 5	38	G 1/4	264	273	AOH3268	32,0	HM 74 T
		Tr 360 X 5	26	G 1/4	206	225	AOH24068	18,0	HM 3072
		Tr 360 X 5	26	G 1/4	269	288	AOH24168	25,5	HM 3172
340	360	Tr 385 X 5	30	G 1/4	167	176	AOH3072	19,0	HML 77 T
		Tr 400 X 5	35	G 1/4	229	238	AOH3172	30,0	HM 3180
		Tr 400 X 5	40	G 1/4	274	283	AOH3272	33,0	HM 3180
		Tr 380 X 5	26	G 1/4	206	226	AOH24072	20,0	HM 3076
		Tr 380 X 5	26	G 1/4	269	289	AOH24172	26,0	HM 3176
360	380	Tr 410 X 5	31	G 1/4	170	180	AOH3076	23,5	HML 82 T
		Tr 420 X 5	36	G 1/4	232	242	AOH3176	38,0	HM 3184
		Tr 420 X 5	42	G 1/4	284	294	AOH3276	45,5	HM 3184
		Tr 400 X 5	28	G 1/4	208	228	AOH24076	23,5	HM 3080
		Tr 400 X 5	28	G 1/4	271	291	AOH24176	31,0	HM 3180
380	400	Tr 430 X 5	33	G 1/4	183	193	AOH3080	27,0	HML 86 T
		Tr 440 X 5	38	G 1/4	240	250	AOH3180	39,5	HM 3188
		Tr 440 X 5	44	G 1/4	302	312	AOH3280	51,5	HM 3188

Withdrawal Sleeves



Shaft Φ		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d_1	d	G	G_1	G_2	L	L_1			
mm	mm	mm	mm	mm	mm	mm		kg	
380	400	Tr 420 X 5	28	G 1/4	228	248	AOH24080	27,0	HM 3084
		Tr 420 X 5	28	G 1/4	278	298	AOH24180	35,0	HM 3184
400	420	Tr 450 X 5	34	G 1/4	186	196	AOH3084	29,0	HML 90 T
		Tr 460 X 5	40	G 1/4	266	276	AOH3184	46,0	HM 3192
		Tr 440 X 5	30	G 1/4	230	252	AOH24084	29,0	HM 3088
		Tr 440 X 5	30	G 1/4	310	332	AOH24184	39,0	HM 3188
420	440	Tr 460 X 5	30	G 1/4	242	264	AOH24088	32,0	HML 92 T
		Tr 460 X 5	30	G 1/4	310	332	AOH24188	45,5	HM 3192
440	460	Tr 480 X 5	32	G 1/4	332	355	AOH24192	50,0	HM 3196
460	480	Tr 500 X 5	32	G 1/4	340	363	AOH24196	51,5	HM 31/500
480	500	Tr 530 X 6	35	G 1/4	360	383	AOH241/500	57,0	HM 31/530
500	530	Tr 550 X 6	35	G 1/4	370	394	AOH241/530	86,0	HM 110 T
530	560	Tr 580 X 6	38	G 1/4	393	417	AOH241/560	97,0	HM 116 T
560	600	Tr 630 X 6	38	G 1/4	413	439	AOH241/600	120	HM 126 T
600	630	Tr 650 X 6	40	G 1/4	440	466	AOH241/630	130	HM 130 T

URB GROUP

URB-ROMANIA ART-TURKEY MGM-HUNGARY URB-EUROPE

